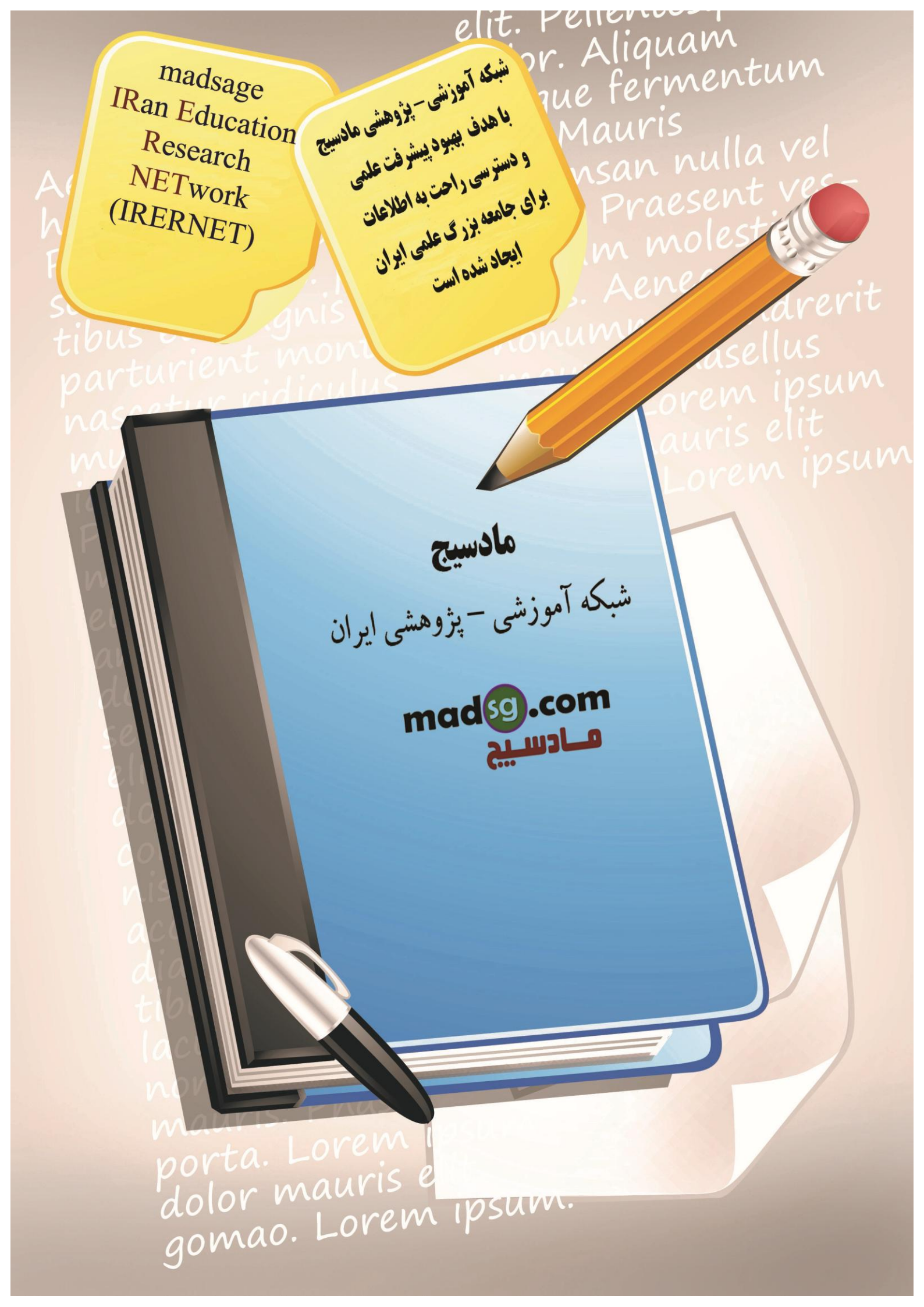
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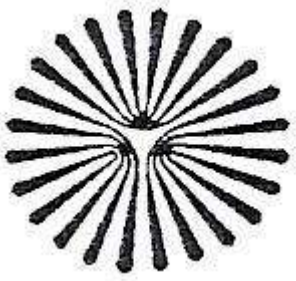

English for Information Technology

Dr. Ahmad Faraahi

2008

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UNIT 1

Information Technology Security Standards

Introduction

To implement the Information Technology (IT) Security Policy, to protect IT resources, and to enable security audits of those resources, it is required that agencies adhere to common IT security standards. Common standards will help ensure that all agencies have an effective and secure environment for IT processing.

The protection of computer systems and related data in the State of Washington requires an approach that results in implementation of a balanced, cost-effective application of security disciplines and techniques required by these standards.

Security standards define the processes, procedures, and practices necessary for implementing an agency-specific IT security program. These standards apply to all IT activities, whether they are operated by or for an agency. They include specific steps that shall be taken to ensure that a secure IT environment is maintained and all agency systems provide for privacy and security of confidential information.

At the core of these standards is the concept of a shared, trusted environment for interaction between agencies as well as agency to customer transactions. This shared, trusted environment is defined as the Washington State Digital Government Framework. This framework includes the State Government Network (SGN).

These standards are based on a set of key principles intended to protect this trusted environment, which include:

Sound risk assessment that results in an adequate level of security.

Security levels that are commensurate with the shared risk to the state enterprise.

Implementation of security with a customer-centric focus.

Security programs that support industry standards where applicable.

Focus on a least-privilege approach to access control.

Agencies that operate some or all of their information systems outside of this environment shall still adhere to the security principles contained in these standards by creating equivalent environments.

This document contains the following IT security standards:

I. Standards for Agency IT Security Program Development and Maintenance
II. Standards for Security Program Components
III. Standards for Digital Government (Internet) Applications

Interim Addendum

The requirements contained in the Information Technology Security Standards Interim Addendum, located at the end of this document, also apply to all IT activities. The addendum contains interim standards adopted in conjunction with the revision of Policy No. 400-P1 Securing Information Technology Assets effective January 10, 2008. These items, which had previously been included in the policy revision dated April 2002, will be reviewed in full and incorporated as appropriate into the body of these standards during the next revision.

Statutory Authority

The provisions of RCW 43.105.041 detail the powers and duties of the Information Services Board (ISB), including the authority to develop statewide or interagency information services and technical policies, standards, and procedures.

Scope

These standards apply to all executive and judicial branch agencies and educational institutions, as provided by law, that operate, manage, or use IT services or equipment to support critical state business functions.

Exemptions

These standards apply to Institutions of Higher Education, except, pursuant to RCW 43.105.200, when they develop security standards in lieu of the standards below that are: a) appropriate to their respective environments, and b) consistent with the intent of the ISB. Such higher education security standards shall address:

Appropriate levels of security and integrity for data exchange and business transactions;

Effective authentication processes, security architecture(s), and trust fabric(s); and

Compliance, testing, and audit provisions.

Standards

Standards for Agency IT Security Program Development and Maintenance

These standards provide instructions to facilitate the development and maintenance of an agency IT security program needed to protect the integrity, availability, and confidentiality of agency data and safeguard agency IT resources.

Agency IT Security Program Framework

The purpose and focus of developing an IT security program is to mitigate the risks associated with operating in a shared, enterprise environment. This shall be accomplished by defining the level of protection that will be accorded agency

information assets based on the results of a risk analysis process. In addressing their IT security programs, agencies shall document the processes that the organization has developed and adopted to protect its data and IT assets.

The amount of detail included in an agency program should be commensurate with the size, complexity, and potential business exposure based on the agency's *Business Impact and Vulnerability, Threat and Risk Analysis* (Section I.B). Most importantly, it shall recognize the importance of an enterprise approach to IT security.

Agencies shall document the general security approach of the agency, at a minimum addressing how the agency has complied with the following:

Agency IT Security Policies and Procedures.
All agency IT security policies and procedures shall be documented, communicated, and updated on a regular basis. They shall be specific enough to reduce ambiguity but flexible enough to address all agency environments.
Agency Authorization and Authentication Strategy.
Agencies shall have a strategic approach to authentication and authorization that is consistent with the concept of shared risk, specifically when operating on the SGN.
Agency Incident Response.
Agencies shall have a basic incident response plan as part of their security program. The incident response plan shall include an exercise approach to ensure the effectiveness of the plan.

An agency’s security program shall address all applicable standards outlined in this document. If it is determined by a thorough risk assessment that a component of this standard does not apply to an agency’s environment, the security program shall clearly document the reasons these elements are not applicable.

An Agency IT security program shall contain enough information to:

Enable agency management to assure the agency's ability to protect the integrity, availability, and confidentiality of agency information.
Protect its IT assets from unauthorized use or modification and from accidental or intentional damage or destruction.
Ensure the protection of the SGN.

When an agency contracts for IT resources or services with an entity not subject to the ISB Standards, the contracting agency shall ensure the entity's security practices are in compliance with these standards.

Organizations in compliance with the ISB Standards are considered trusted. Contracts between trusted organizations do not need to document compliance with the contracting agency's standards. If the contracting agency determines the need for higher security assertions, then a service level agreement or similar contract shall be established detailing the security requirements.

Agencies shall assign responsibility for IT security to an individual or group with the appropriate training and background to administer those functions. Agencies shall ensure that the individual or group has proper authority to install, monitor, and enforce security standards and procedures.

Agencies shall have a plan to maintain their IT security program that addresses the following:

The IT security program shall be reviewed, evaluated, and updated annually or whenever significant changes occur to an agency’s IT environment.

Documentation of the following maintenance components:

Procedures used for making changes to security processes, procedures, and practices.
Procedures for distributing initial and updated IT security policies, standards, and guidelines.

Agency management has the following responsibilities regarding the IT Security Program in accordance with the ISB Information Technology Security Policy:

Pursuant to RCW 43.105.017(3), agency heads are responsible for the oversight of their respective agency's IT security and shall confirm in writing that the agency is in compliance with these standards. The annual security verification letter shall be included in the agency IT portfolio and submitted to the ISB. The verification indicates review and acceptance of agency security processes, procedures, and practices as well as updates to them since the last approval. The head of each agency shall provide annual certification to the ISB by August 31 of each year that an IT Security Program has been developed and implemented.

Agencies shall have an audit performed once every three years for compliance with IT Security Policy and Standards. This audit shall be performed by parties independent of the agency's IT organization. Each agency will be required to maintain documentation showing the results of its audit and plans for correcting material deficiencies that the audit identifies.
All IT security program documentation shall be written in a clear, compelling, non-technical manner.

Some IT security program documentation may contain sensitive information about the agency's business, communications, and computing operations or employees. Such information is to be shared only with personnel who have a need to know. Security program documentation, as prescribed in RCW 42.17.310(1)(ww) and (ddd), should be clearly labeled as "Computer Security Information".

Business Impact and Vulnerability, Threat and Risk Analysis

A risk analysis is a systematic examination of assets, threats, and vulnerabilities that provides the foundation for the development of an appropriate IT Security Program. Adequate risk analysis is the key to determining the level of protection required for all computing assets such as networks, applications, systems, facilities and other enterprise assets. A risk analysis will:

Identify dependence on existing IT assets.

Identify vulnerabilities of existing IT assets.

Assess the probabilities of threats occurring to existing IT assets.

Determine the impact of losses if they do occur.

Identify the value of safeguards or countermeasures designed to reduce the threats and vulnerabilities to an acceptable level.

The goal of the risk analysis process is to determine an acceptable level of risk that considers agency security, the security of shared resources (especially related to operation on the SGN), agency business strategy and the overall cost of countermeasures. Conducting an adequate risk analysis will aid agency efforts to better apply available resources to their security program.

Agencies shall conduct a risk analysis when introducing significant new systems or when major changes are made to an agency's existing computing environment. To conduct a risk analysis, agencies shall complete the following steps:

Information Asset Review

An information asset review shall be performed to identify, at a minimum, those information assets that are critical to ongoing operations or which contain confidential or critical data. The criteria for this inventory assessment shall be documented.

Business Impact Analysis

A business impact analysis shall be performed for all information assets identified in the Information Asset Review. The purpose of the business impact analysis is to document the potential impact of loss of the assets. Consideration shall be given to operational, financial, and legal impacts.

Vulnerability Analysis

A vulnerability analysis is used to identify vulnerabilities associated with information assets. The vulnerability analysis shall identify specific vulnerabilities related to information assets identified in the information asset review, as well as where those vulnerabilities exist.

Threat Analysis

A threat analysis shall be conducted to identify threats that could result in the intentional or accidental destruction, modification or release of data, computer, or telecommunication resources.

Risk Analysis

A risk analysis is a collective review of the vulnerabilities and threats to all identified assets to determine the likelihood and impact. This analysis forms the foundation for security program planning.

While no specific format is required for the risk analysis, instructions and suggested formats, as well as links to risk analysis resources, can be found in the Information Technology Security Guidelines. Organizations may also consider leveraging disaster recovery reviews, specifically relating to critical assets and business impact, when completing IT security risk assessments.

i. Standards for Agency IT Security Program Components

Agency security programs shall document policies and procedures for the functional areas outlined below.

Personnel Security Standards

Agencies shall develop, document, and implement policies and procedures for the selection, orientation, and supervision of employees and contractors who have access to agency IT resources. The objective is to ensure that a high level of integrity and satisfactory staff conduct is achieved and maintained, and to promote an awareness of security matters. The following are to be included:

Reference checks and background investigations where appropriate.

Security awareness training, at hire and annually.

IT Security support staff technical training.

Sanctions for security violations.

Processes for employees or contractors when separating from service.

Appropriate language in all vendor contracts regarding security requirements.

Physical Security Standards

Agencies are responsible for assuring that adequate physical security protections are implemented to maintain the availability, confidentiality and integrity of the agency's computer systems. Investments in physical security shall be commensurate with the risks, threats, and vulnerabilities unique to each individual site and location.

Agencies shall develop, document, and implement policies and procedures for the following:

Location and layout of the facility.

Physical security attributes for computer or telecommunications rooms (if applicable).

Facility access control.

Physical data storage and telecommunications controls.

Off-site media storage.

Physical security controls for mobile/remote computing.

Laptops and Personal Digital Assistants (PDAs).

Portable data storage devices (e.g., tape drives, zip drives, removable hard drives, USB data storage devices).

Data Security Standards

The purpose of the data security component of the IT security program is to reduce the risk associated with the unauthorized access, disclosure, or destruction of agency-controlled data. Content shall include data classification standards and rules for the access, storage, and dissemination of data.

Agencies shall develop, document, and implement policies and procedures for:

Classification of data based on the agency's risk analysis. At a minimum classify data as sensitive/confidential versus public information.

Application development processes:

i. Ensure version control and currency.

Ensure system security requirements assessment and testing during the development life cycle.

When sharing data with an external entity (whether data sharing is covered as part of a larger contract, a service level agreement (SLA), or as a dedicated data sharing agreement), the following shall be addressed:

The data that is to be shared.

The classification of the data (reference ISB IT Security Guidelines).

How the data will be accessed or shared.

Who will have access to the data.

How the data will be protected.

What will be done with the data when it is no longer needed for the contract.

Data and program back up.

Agencies shall address data archival and rotational requirements for backup media based on the results of their risk analysis. This shall include media used in the backup of host and workstation data.

Agencies shall establish procedures for periodic tests to restore agency data from backup media.

Agencies shall establish methods to secure their backup media.

Secure management of information and data encryption standards.

An agency's risk assessment shall identify which data is confidential and when that data needs to be encrypted (secured).

If encryption is required, the agency security program shall include methodology to ensure the elements in the following areas related to secure file transfer, secure e-mail, and secure data storage are met.

i. Secure File Transfer

Secure exchange of information from one application or user to another requires that:
All manipulations of data during the exchange are secure.
If intercepted during transmission, data cannot be understood.
The intended recipient is the only one who can understand the transmitted information.
Confirmation is received that the intended recipient received the data.
Confidential information subject to exposure shall be encrypted.
It is assumed that the exchange of information occurs only between secure endpoints.

Secure E-mail

Secure delivery of a message from a sender to a receiver requires that:
E-mail, and any attachments, containing confidential information shall be encrypted from the sending device to the receiving device.
Chain-of-custody shall be preserved from sending device to receiving device.
Ability to un-encrypt sender's message through authorized process; sending organization must be able to un-encrypt and retrieve originating version of sent message.
All manipulations of data during the transfer from sending device to receiving device are secure.
If intercepted between sending device and receiving device, data cannot be understood.
Only the selected receiver can view the data in its original, unencrypted state.
If technically feasible, confirmation shall be issued to indicate that the intended receiver received the data.
The sending organization shall determine what information requires the need for secure e-mail and ensure that the encrypted e-mail message is retrievable within a pre-defined archival period.

Secure Data Storage

Secure data storage is defined as the protection of data content and changes in data state from its original storage on electronic media by using encryption processes. Secure data storage requires that:

An organization has the ability to un-encrypt stored data through an authorized process.
An organization has the ability to un-encrypt stored data through a pre-defined recovery period identified by the organization.
An organization protects the encryption and decryption method (key and algorithm).
If the data is accessed by unauthorized entity, it cannot be understood.
An organization has the ability to detect alteration of intended content.

Web Server Data Security

If a Web server is used for access to confidential or sensitive data, agencies shall ensure that the appropriate security and server and database configuration is put in place and documented to maintain the confidentiality and integrity of the data.

Network Security Standards

Agencies shall develop, document, and implement policies and procedures to ensure secure operation of their applications, secure network sessions within the Washington State Digital Government Framework, and appropriate layered protection to address shared risk. These policies and procedures shall include:

Infrastructure management processes.

Change management processes.

Appropriate network breach detection and incident response processes that leverage statewide incident response capabilities such as the Washington computer Incident Response Center (WACIRC) and the Department of Information Services Computer Security Incident Response Team (DIS CSIRT).

Agencies shall develop document, and implement policies and procedures to effectively secure wireless devices that extend their Local Area Networks (LANs). Agencies shall:

Develop, document, and implement wireless access security practices within the agency.

Firewall all wireless access point connections from the agency network and the SGN. Equivalent solutions shall be approved by the agency's Washington State Department of Information Services (DIS) Senior Technology Management Consultant and documented in the agency security program.

Use industry standard authentication and encryption methods.

Perform a self-audit on a regular basis to locate any unauthorized wireless devices.

Agencies shall develop, document, and implement policies and procedures for Patch Management.

All computers systems shall have all critical updates and security updates applied in a timely manner.

Agencies shall develop, document, and implement policies and procedures that require any remotely attached device, either employee owned, or agency owned, to have current patches. Agencies may choose to disable or block access for any device that is not in compliance with this requirement.

Agencies shall develop, document, and implement policies and procedures that require devices attached to agency networks (either on agency local area networks, or wireless networks) to have current patches.

Agencies shall develop, document, and implement policies and procedures for Anti-Virus Protection.

Agencies shall develop, document, and implement policies and procedures that address virus prevention, detection and removal processes, including signature currency. Agencies shall ensure that all file transfers, e-mail of all types, and web browser based traffic are examined for known viruses. File transfer, e-mail or web browser-based traffic that cannot be examined for viruses should be disallowed.

Agencies shall develop, document, and implement virus incident response procedures that are integrated with the WACIRC incident reporting processes.

Agencies with devices connected to the SGN shall ensure:

The devices are not connected to external networks either directly or through an extranet/VPN connection. External networks are defined as any networks not part of the SGN and not protected by the DIS-managed security layer, OR;

The devices are connected to external networks only through a DIS-managed or approved security layer. The DIS-managed security layer is defined as firewalls, proxy servers and security gateways, OR;

The agency network is only connected to the SGN through a DIS managed or approved security layer.

Agencies shall develop, document, and implement policies and procedures for Web Browser and E-mail Client security.

All software used to access or transmit through the Internet shall be approved by an authorized agency authority and shall incorporate all provided security patches that are appropriate to the environment in which it is operating in accordance with the patch management standards.

Agencies shall ensure that all files received from the Internet are checked for viruses in accordance with the virus prevention standards.

Agencies shall develop, document, and implement clear acceptable use policies for the use of web browsers and e-mail.

Agencies shall develop, document, and implement policies and procedures for Web server security.

Information placed on a Web site is subject to the same privacy restrictions as non-electronic information. Accordingly, before information is placed on the Internet, it shall be reviewed and approved for release in the same manner as other official memos, reports, or other official non-electronic information. Agencies shall conform to the ISB Public Records Privacy Protection Policy that implements Executive Order 00-03, Public Records Privacy Protections, for its Web site information.

Web server software shall not be downloaded, installed, or run without prior approval by an agency-authorized system administrator.

Remote control of Web servers (i.e. administrator operations, including supervisor-level logon) shall be done from the console or via properly secured sessions. The authentication processes and mechanisms used shall be commensurate with the level of risk associated with the nature of the remote environment (i.e. within the SGN or externally over the Internet).

Patches for Web server software and underlying operating system software shall be installed in accordance with the patch management standards found in section II. D. 3 of this document.

Access Security Standards

General Access Security

Agencies shall develop, document, and implement policies and procedures that address access security controls for mainframe, client/server, wireless LANs, and stand-alone workstation-based systems that are consistent with the agency's classification of the data processed.

Hardened passwords shall be used and enforced whenever technically and operationally feasible. For those systems for which it would be technically infeasible or which would require modification to meet this requirement as defined below, agencies shall document what other measures are to be taken to secure user access.

Agencies shall develop, document, and implement policies and procedures that address appropriate user training on the use, construction of, and maintenance of hardened passwords.

Hardened Passwords shall meet the following criteria:

i. Passwords shall be a minimum of eight characters long and contain at least one special character and two of the following three character classes: upper case letters, lower case letters, and numerals.

Shall not contain the user's name or any part of their full name.
Passwords shall be changed a minimum of every 120 days.
After a maximum of five incorrect login attempts, accounts will be locked for a specified period of time, or until administrator reset.
Password administration rules shall be systematically enforced. Any exception shall be documented in the agency's security program.

Remote Access

Agencies shall develop, document, and implement policies and procedures for remote access that mitigate the threat or risk posed by all users or devices authorized to connect remotely to or through the SGN. Mitigation must not be susceptible to end user modification. Technologies include, but are not limited to, dial-up, wireless, and Virtual Private Networks (VPN).

Agencies shall control the use of dial-up lines.

i. Dial-in ports may be used only if there is no other way to satisfy a business need.

If dial-in is used, all security features (dial back, etc.) appropriate to the operating environment shall be used.

Agencies shall maintain and review a log of remote connections.

Agencies shall monitor remote access by vendors.

Agencies that use VPN services shall develop, document, and implement policies and procedures and that, at a minimum, address the following:

i. VPN solutions shall use industry standard protocols.

An agency that operates a VPN solution through a firewall configuration other than the SGN perimeter gateways (e.g. routers, VPN, etc.) or DIS-managed security gateways (e.g. Secure Access Washington, Transact Washington, etc.), shall use an equivalent solution and shall include documentation of the configuration in the agency IT security program.

An agency that operates a VPN solution that involves token-based technology such as smart cards shall use the mechanisms supported by the Washington State Digital Government Framework or an equivalent solution approved by the agency's DIS Senior Technology Management Consultant. Equivalent solutions shall be documented in the agency security program.

Internet Access

The use of the Internet as an access alternative to applications and data imposes new risks regarding the verification of an end user's identity. The standards set forth in this section respond to the issues that shall be addressed by agencies concerned with authentication and access of Internet-based systems.

Internet-based applications shall involve the use of authentication processes and mechanisms that provide a level of identity confidence (level of confidence) that is commensurate with the risk associated with unintended access and/or disclosure of data. “Level of Confidence" can be determined by assessing the processes, controls, mechanisms and technologies used in the authentication process to provide the following:

Identification and Authentication: To initially establish and confirm the identity of an individual or entity and ensure that an authentication mechanism (e.g. digital certificate, password, etc.) used to authenticate an individual or entity has been securely issued.

Authentication Integrity: To ensure that the authentication mechanism used to authenticate an individual or entity is responsibly managed and properly protected to prevent unintended use or compromise.

Authentication Validation: To confirm and validate the identity of an individual or entity upon presentment of the authentication mechanism to an Internet-based system.

Application Security: To ensure that an Internet-based application is properly insulated from direct access from the Internet, and that only individuals or entities whose identities have been positively validated are eligible to access the application.

ii. Standards for Digital Government (Internet) Application Submittal

General Requirements

This section describes the IT security related content that shall be included in the submittals for Internet-based application design packets. The agency's DIS Senior Technology Management Consultant will use available internal and external resources to review design features relating to Internet security. The Consultant will provide developers pro-active access to the security infrastructure and provide development teams (particularly those agencies with no Internet-based application security personnel) with suggestions or advice on how to best utilize the security infrastructure and existing capabilities of the Washington State Digital Government Framework.

Internet-based applications that are designed to provide anonymous access to public information (no specific application level security requirements) are not subject to this submittal requirement.

If a new application or data source is to be integrated into a previously submitted and approved environment, no subsequent submittal is required.

Internet Application Design Packet Submittal Contents

The agency's security program shall address how the agency will ensure all new Internet-based applications will be reviewed with the agency's DIS Senior Technology Management Consultant.

The security program shall address how submitted information will include, at a minimum, the following IT security related information:

Application description.

Provide a general description of the purpose of the application and the nature of the information involved.

Application services.

Describe the nature of the services to be provided to the user of the application (static data, interactive queries, data entry, electronic payments).

Authentication requirements (high, medium, low level of confidence).

Describe the level of confidence required for user authentication and provide a summary of the analysis completed to determine this level.

Certificate Authority integration (if required).

If the proposed authentication mechanism involves the use of digital certificates, describe any known application integration issues.

Application access control mechanisms.

i. If the project involves providing access to an existing application, describe the nature of the application's access control mechanisms (user ID, password, etc.).

If it is the intent of the agency to re-authenticate a user at the application level after the users have been authenticated by a centralized mechanism and processes (such as SGN perimeter gateways (e.g. routers, VPN, etc.) or DIS-managed security gateways (e.g. Secure Access Washington, Transact Washington, etc.), describe the justification for not accepting the initial authentication.

Encryption requirements.

Describe any specific encryption requirements for data transmission and/or storage.

Proposed development tools.

If known, describe the proposed development tools to be used in the creation or modification of the application for use via the Internet.

Proposed Web server platform.

If known, provide information regarding the hardware, operating system, and services provided by the Web server platform.

Maintenance

Technological advances and changes in the business requirements of agencies will necessitate periodic revisions to policies, standards, and guidelines. The Department of Information Services is responsible for routine maintenance of these to keep them current. Major policy changes will require the approval of the ISB.

Appendix: Cross-reference of IT Security Policy and Standards

Table 1 provides a cross-reference of the IT Security Policy to the relevant sections in the IT Security Standards.

Table 1

Policy	Relevant Standard Section
1. Each agency must operate in a manner consistent with the maintenance of a shared, trusted environment.	Standards for IT Security Program Development and Maintenance (Section I) Network Security Standards (Section II, D.)
2. Each agency must establish its networks and secure applications within the Washington State Digital Government Framework. This requires that all parties interact with agencies through a common security architecture and authentication process.	Network Security Standards (Section II, D) Access Security Standards (Section II, E.)
3. Each agency that operates its applications and networks within the Washington State Digital Government Framework must subscribe to the principles of shared security	Standards for IT Security Program Development and Maintenance (Section I) Network Security Standards (Section II, D) Access Security Standards (Section II, E.)
4. Each agency must address the effect of using the Internet to conduct transactions for state business with other public entities, citizens, and businesses	Network Security Standards (Section II, D) Access Security Standards (Section II, E.)
5. Each agency must ensure staff is appropriately trained in IT security procedures	Personnel Security Standards (Section II, A.)
6. Each agency must review its IT security processes, procedures, and practices at least annually and make appropriate updates after any significant change to its business, computing, or telecommunications environment	Standards for IT Security Program Development and Maintenance (Section I)
7. Each agency must conduct an IT Security Policy and Standards Compliance Audit once every three years. It must be performed by parties independent of the agency's IT organization	Standards for IT Security Program Development and Maintenance (Section I)
8. Pursuant to RCW 43.105.017(3), agency heads will confirm in writing that the agency is in compliance with this policy	Standards for IT Security Program Development and Maintenance (Section I)
9. The State Auditor may audit agency IT security processes, procedures, and practices	Standards for IT Security Program Development and Maintenance (Section I)

Information Technology Security Standards Interim Addendum

Adopted by the Information Services Board (ISB) on January 10, 2008
Policy No: 401-S3
Effective Date: January 10, 2008

This addendum contains interim standards adopted in conjunction with the revision of Policy No. 400-P1 Securing Information Technology Assets effective January 10, 2008. These items, which had previously been included in the policy revision dated April 2002, will be reviewed in full and incorporated as appropriate into the body of the standards during the next revision.

Additional Interim Standards

1. Previous location in policy: Purpose

The purpose of the Information Technology (IT) Security Policy is to create an environment within State of Washington agencies that maintains system security, data integrity and privacy by preventing unauthorized access to data and by preventing misuse of, damage to, or loss of data. The state's transition from multiple proprietary network connections over dedicated leased networks to the Internet for conducting vital public business has highlighted the following security concerns:

- Information Integrity - Unauthorized deletion, modification or disclosure of information;
- Misuse - The use of information assets for other than authorized purposes by either internal or external users;
- Information Browsing - Unauthorized viewing of sensitive information by intruders or legitimate users;
- Penetration - Attacks by unauthorized persons or systems that may result in denial of service or significant increases in incident handling costs;
- Computer Viruses – Attacks using viral code that reproduces itself by modifying other programs, spreading across multiple programs, data files or devices on a system or through multiple systems in a network, that may result in the destruction of data or the erosion of system performance;
- Fraud - Attempts to masquerade as a legitimate user to steal services or information, or to initiate transactions that result in financial loss or embarrassment to the organization; and
- Component Failure - Failure due to design flaws or hardware/software faults can lead to denial of service or security compromises through the malfunction of a system component.

Because information technology security planning is primarily a risk management issue, the policy, these standards and the associated guidelines focus on the creation of a shared and trusted environment, with particular attention to:

- Common approaches to end-user authentication;
- Consistent and adequate network, server, and data management;
- Appropriate uses of secure network connections; and
- Closing unauthorized pathways into the network and into the data pursuant to RCW 43.105.017(2).

Such an environment is made possible through an enterprise approach to security in state government that:

- Promotes an enterprise view among separate agencies;
- Requires adherence to a common security architecture and its related procedures;
- Recognizes an interdependent relationship among agencies, such that strengthening security for one strengthens all and, conversely, weakening one weakens all; and
- Assumes mutual distrust until proven friendly, including relationships within government, with trading partners, and with anonymous users.

In response to these threats and to assist state agencies in mitigating associated risks, the Information Services Board (ISB) requires that agencies take steps necessary to initiate an enterprise-wide approach to:

- Ensure secure interactions between and among governmental agencies take place within a shared and trusted environment;
- Ensure secure interactions between and among business partners, external parties and state agencies utilize a common authentication process, security architecture, and point of entry;
- Prevent misuse of, damage to, or loss of IT hardware and software facilities;
- Ensure employee accountability for protection of IT assets; and
- Prevent unauthorized use or reproduction of copyrighted material by public entities.

Accordingly, the ISB directs state agencies to:

- Operate in a manner consistent with the Information Technology (IT) Security Policy of the State of Washington;
- Develop, implement, maintain, and test security processes, procedures, and practices to protect and safeguard voice, video, and computer data computing and telecommunications facilities—including telephones, hardware, software, and personnel—against security breaches;
- Train staff to follow security procedures and standards;
- Apply appropriate security measures when developing transactional Internet-based applications, including but not limited to electronic commerce (e-commerce); and
- Ensure and oversee compliance with the policy and standards.

2. Previous location in policy: Statement 1.

Agencies may establish certain autonomous applications, including those hosted by an Applications Service Provider or other third party, outside of the shared,

trusted environment, PROVIDED the establishment and operation of such applications does not jeopardize the enterprise security environment, specifically:

- The security protocols (including means of authentication and authorization) relied upon by others; and,
- The integrity, reliability, and predictability of the state backbone network.

3. Previous location in policy: Statement 3.

Furthermore, each agency that operates its applications and networks within the Washington State Digital Government framework must subscribe to the following principles of shared security:

- Agencies shall follow security standards established for selecting appropriate assurance levels for specific application or data access and implement the protections and controls specified by the appropriate assurance levels;
- Agencies shall recognize and support the state's standard means of authenticating external parties needing access to sensitive information and applications;
- Agencies shall follow security standards established for securing servers and data associated with the secure application; and
- Agencies shall follow security standards established for creating secure sessions for application access.

4. Previous location in policy: Statement 4.

Each agency must address the effect of using the Internet to conduct transactions for state business with other public entities, citizens, and businesses. Plans for Internet-based transactional applications, including but not limited to e-commerce, must be prepared and incorporated into the agency's portfolio and submitted for security validation.

5. Previous location in policy: Statement 5.

Agencies are encouraged to participate in appropriate security alert response organizations at the state and regional levels.

- All Internet applications should be included and managed within the agency portfolio. As required by the IT Security Standards, a detailed security design packet for transactional, non-anonymous applications (including but not limited to those using a security mechanism for access control) is submitted for review by DIS but the security related information need not be included in the portfolio.

Examples of security mechanism for access control include, but are not limited to, Public Key Infrastructure, User ID and passwords, or biometrics.

6. Previous location in policy: Statement 6.

Examples of changes that require review and appropriate updates to the agency security program include modifications to physical facility, computer hardware or software, telecommunications hardware or software, telecommunications

networks, application systems, organization, or budget. Practices will include appropriate mechanisms for receiving, documenting, and responding to security issues identified by third parties.

7. Previous location in policy: Statement 7

Each agency must maintain documentation showing the results of its review or audit and the plan for correcting material deficiencies revealed by the review or audit.

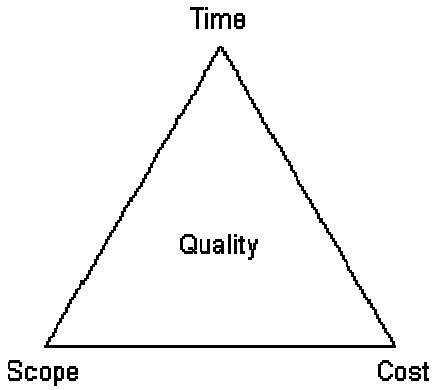
UNIT 2

An Introduction to Project Management

Project management in the modern sense began in the early 1960s, although it has its roots much further back in the latter years of the 19th century. The need for project management was driven by businesses that realized the benefits of organizing work around projects and the critical need to communicate and co-ordinate work across departments and professions. One of the first major uses of project management as we know it today was to manage the United States space programmed. The government, military and corporate world have now adopted this practice. Here is the main definition of what project management is:

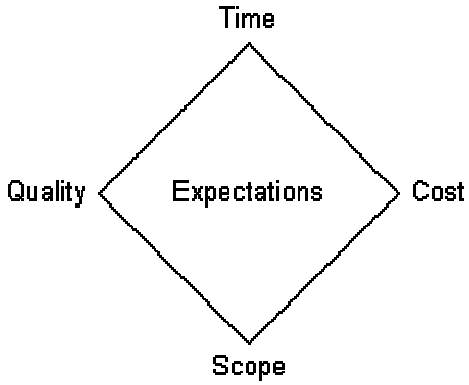
1. Project management is no small task.
2. Project management has a definite beginning and end. It is not a continuous process.
3. Project management uses various tools to measure accomplishments and track project tasks. These include Work Breakdown Structures, Gantt charts and PERT charts.
4. Projects frequently need resources on an ad-hoc basis as opposed to organizations that have only dedicated full-time positions.
5. Project management reduces risk and increases the chance of success.

Project management is often summarized in a triangle. The three most important factors are time, cost and scope, commonly called the triple constraint. These form the vertices with quality as a central theme.



1. Projects must be delivered on time.
2. Projects must be within cost.
3. Projects must be within scope.
4. Projects must meet customer quality requirements.

More recently, this has given way to a project management diamond, with time, cost, scope and quality the four vertices and customer expectations as a central theme. No two customers' expectations are the same so you must ask what their expectations are.



A project goes through six phases during its life:

1. Project Definition: Defining the goals, objectives and critical success factors for the project.
2. Project Initiation: Everything that is needed to set-up the project before work can start.
3. Project Planning: Detailed plans of how the work will be carried out including time, cost and resource estimates.
4. Project Execution: Doing the work to deliver the product, service or desired outcome.
5. Project Control: Ensuring that a project stays on track and taking corrective action to ensure it does.
6. Project Closure: Formal acceptance of the deliverables and disbanding of all the elements that were required to run the project.

The role of the project manager is one of great responsibility. It is the project manager's job to direct, supervise and control the project from beginning to end. Project managers should not carryout project work, managing the project is enough. Here are some of the activities that must be undertaken:

1. The project manager must define the project, reduce it to a set of manageable tasks, obtain appropriate resources and build a team to perform the work.
2. The project manager must set the final goal for the project and motivate his/her team to complete the project on time.
3. The project manager must inform all stakeholders of progress on a regular basis.
4. The project manager must assess and monitor risks to the project and mitigate them.
5. No project ever goes exactly as planned, so project managers must learn to adapt to and manage change.

A project manager must have a range of skills including:

- Leadership
- People management (customers, suppliers, functional managers and project team)
- Effective Communication (verbal and written)
- Influencing
- Negotiation

- Conflict Management
- Planning
- Contract management
- Estimating
- Problem solving
- Creative thinking
- Time Management

"Project managers bear ultimate responsibility for making things happen. Traditionally, they have carried out this role as mere implementers. To do their jobs they needed to have basic administrative and technical competencies. Today they play a far broader role. In addition to the traditional skills, they need to have business skills, customer relations skills, and political skills. Psychologically, they must be results-oriented self-starters with a high tolerance for ambiguity, because little is clear-cut in today's tumultuous business environment. Shortcomings in any of these areas can lead to project failure." - J. Davidson Frame

Many things can go wrong in project management. These things are often called barriers. Here are some possible barriers:

1. Poor communication
2. Disagreement
3. Misunderstandings
4. Bad weather
5. Union strikes
6. Personality conflicts
7. Poor management
8. Poorly defined goals and objectives

A good project management discipline will not eliminate all risks, issues and surprises, but will provide standard processes and procedures to deal with them and help prevent the following:

1. Projects finishing late, exceeding budget or not meeting customer expectations.
2. Inconsistency between the processes and procedures used by projects managers, leading to some being favored more than others.
3. Successful projects, despite a lack of planning, achieved through high stress levels, goodwill and significant amounts of overtime.
4. Project management seen as not adding value and as a waste of time and money.
5. Unforeseen internal and/or external events impacting the project.

Project management is about creating an environment and conditions in which a defined goal or objective can be achieved in a controlled manner by a team of people.

Structure 1

A. Contextual reference

Transitional markers are words used to link ideas together so that the text is smoother to read. When pronouns such as it, they, them, I, he, she, which, who, whose, that, such, one and demonstrative adjectives such as this, that, these and those, are used as transitional markers. They refer to a word, or words, mentioned earlier in the sentence or paragraph. Their function is to take your thoughts back to something that has already been mentioned. Thus they serve as synonyms or substitutes. Other words

which are often used to refer backwards are the former, the latter, the first, second, etc. and the last.

Sample paragraph

A ***computer(1)*** like any other machine, is used because, ***it(1)*** does certain jobs better and more efficiently than humans. ***It(1)*** can receive more ***information(2)*** and process ***it(2)*** faster than any human. The speed at which a computer works can replace weeks or even months of pencil-and-paper work. Therefore, ***computers(3)*** are used when the time saved offsets ***their(3)*** cost which is one of the many reasons ***they(3)*** are used so much in business, industry and research.

Exercise 1

Using the sample paragraph as a model, draw a rectangle around the word/ words and a circle around the word/words that the circled words refer to. Then join the ○ and the □ with arrows:

Computers are electronic machine that process information. They are capable of communicating with the user, of doing different kinds of arithmetic operations and of making three kinds of decisions. However, they are incapable of thinking. They accept data and instructions as input and after processing it, they output the results.

B. Making Comparisons

1. Formation

There are several ways of showing that similarities or differences exist between or amongst things. The regular comparative and superlative of descriptive words, whether these are adjectives or adverbs is formed as follows:

1. By adding the ending **-er** and **-est** to words of one syllable examples:

	ABSOLUTE	COMPARATIVE	SUPERLATIVE
Adjectives	new	newer	newest
	old	older	oldest
	big	bigger	biggest
Adverbs	soon	sooner	soonest
	late	later	latest

2. By placing the words more and most in front of words with three or more syllables:

	ABSOLUTE	COMPARATIVE	SUPERLATIVE
Adjectives	interesting	more interesting	most interesting
	convenient	more convenient	most convenient
	beautiful	more beautiful	most beautiful
Adverbs	easily	more easily	most easily
	carefully	more carefully	most carefully

3. Words with two syllables may be like 1 or 2 above in that they will add the ending **-er** and **-est** if they end in **-y** or **-ly**, **-ow**, **-le** and **-er**. Most of the remaining words take **more** and **most** in front of them:

	ABSOLUTE	COMPARATIVE	SUPERLATIVE
-y	happy funny	happier funnier	happiest funniest
-ly	early friendly	earlier friendlier	earliest friendliest
-ow	shallow narrow	shallower narrower	shallowest narrowest
-le	able gentle	abler gentler	ablest gentlest
-er	clever	cleverer	cleverest

N. B. Two-syllable adverbs ending in -ly take more or most example

quickly	more quickly	most quickly
slowly	more slowly	most slowly
badly	more badly	most badly

	ABSOLUTE	COMPARATIVE	SUPERLATIVE
Remaining descriptive two-syllable words	careful careless boring awful complex	more careful more careless more boring more awful more complex	most careful most careless most boring most awful most complex

4. Some common two-syllable adjectives can have either type of formation:

ABSOLUTE	COMPARATIVE	SUPERLATIVE
common	commoner more common	commonest most common
handsome	handsomer more handsome	handsomest most handsome
polite	politer more polite	politest most polite
quiet	quieter more quiet	quietest most quiet

5. There are a small number of adjectives and adverbs that form The comparative and superlative using a different stem. These irregular comparisons are as follows:

	ABSOLUTE	COMPARATIVE	SUPERLATIVE

Adjectives	bad	worse	worst
	far	further/farther	furthest/farthest
	good	better	best
	many	more	most
Adverbs	badly	worse	worst
	far	further/farther	furthest/farthest
	little	less	least
	much	more	most
	well	better	best

2. Use in sentences

There are many reasons for using comparisons in discourse, they may be used to show: a. *equivalence*; b. *non-equivalence*; c. *one item compared with others*; and d. *parallel increase*.

Equivalence

The following words or constructions are used to show equivalence (i.e. the same).

as ... as	*are similar*	*each*
as many ... as	*equal to*	*either*
as much ... as	*is like*	*all*
the same ... as	*similar/ly*	*both*
similar to	*equal/ly*	*alike*
the same	*compare to/with*	

Examples

1. Third-generation computers can do a thousand times **as many** calculations **as** first-generation computers.
2. Microcomputers are **as** efficient **as** minicomputers.
3. The term processor is **the same as** central processing unit.
4. The digital computer **is like** a huge cash register.
5. An analog computer and a car speedometer **are similar** in that they continuously work out calculations.
6. A microcomputer can sometimes cost **as much as** a minicomputer.
7. **Both** minicomputers and microcomputers can have a memory of 32K bytes.
8. A digital computer can be **compared to** a large cash register.
9. **All** computers have the same basic characteristics.
10. The time it takes a computer to solve a problem can **equal** months of work for man.

Non-equivalence

The following words and/or constructions are used to show non-equivalence (i.e. not the same).

not as ... as	*greater than*	*unequal (ly)*
word + er than	*not as many ... as*	*unlike*
more ... than	*neither ... nor ... as*	*not the same as*
fewer ... than	*not as much ... as*	*not all*
less ... than	*not equal to*	

Examples

1. Learning a computer language is **not as** difficult **as** it seems.
2. A mainframe is **bigger** and **mor**e expensive **than** a microcomputer.
3. For **less than** $10,000, you could have a very good microcomputer.
4. Ten years ago, there were **fewer** computers in use **than** today.
5. **Neither** minicomputers **nor** microcomputers could be as complex as large mainframes.
6. **Unlike** minicomputers, microcomputers are not very flexible.
7. An analog computer is **not the same as** a digital computer.
8. **Not all** businesses have computerized their accounting departments.

The superlative

The following words and/or constructions are used to show one item compared with others (i.e. the superlative).

the word + est …
the most …
the least …

Examples

1. Computer technology is **the fastest** growing technology in the world today.
2. Digital computer programming is **the** one **most commonly** used in data processing for business.
3. BASIC is probably **the least difficult** computer language to learn.

Parallel increase

The following words and/or constructions are used to show parallel increase (i.e. two comparatives).

the (word + er) the … the more ...

the (word + er) the … the less …

Examples

1. **The bigger** the computer, **the more complex** the operations it can do.
2. **The smaller** the problem, **the less challenging** it is to the computer programmer.

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

arbitrary adj. an action or decision made with little thought,
n. arbitrariness order or reason
syn. haphazard

Her choice of clothing seemed arbitrary.

The teacher arbitrarily decided to give the class a test.

astounding adj. very surprising
v. astound syn. astonishing

The scientists made an astounding discovery.

The fans were astounded by their team's success.

astute adj. very intelligent, smart, clever
n. astuteness syn. perceptive

He was an astute worker, finishing in half the time it took the others to finish.

They astutely have determined that there could be no chance to finish on time.

petition v. to make a request
n. petition syn. appeal

Canada petitioned the United Nations to consider its case.

The student's petition was denied.

relinquish v. to give up control
n. relinquishment syn. abdicate

The troubled executive relinquished his control of the company.

The relinquishment of his claim to the building will allow the building to be sold.

resilient adj. strong enough to recover from difficulty or disease
n. resilience syn. tenacious

She has a resilient personality and will soon feel better.

The doctor was surprised by his patient's resilience.

tempt v. to make it attractive to do something wrong

adj. tempting syn. entice

n. temptation

The idea of getting rich quickly tempted him to invest his life savings.

Desserts are more tempting when one is on a diet.

baffle v. to confuse to a point at which no progress can be

adj. baffling made

n. bafflement syn. puzzle

The causes of many harmful diseases have baffled doctors for centuries.

That was a baffling question.

3270 terminal – also called a "dumb" terminal. A 3270 terminal consists of a monitor and a keyboard, is attached to a mainframe, and must be connected to a system network architecture

(SNA) in order to function.

32-bit operating system – an operating system that can process 32 bits at one time

3GL (third-generation language) – programming languages such as BASIC, COBOL, FORTRAN, and C, which are one notch above Assembly languages

4GL (fourth-generation language) – programming languages such as Natural, Progress, PowerScript, and Passport, which are easier to use than 3GLs and use English-like commands

access control list – a table that tells a computer operating system what access rights each user has to a particular system object, such as a file directory or individual file. Each object has a security attribute that identifies its access control list. The list has an entry for each system user with access privileges. The most common privileges include the ability to read file (or all the files in a directory), to write to the file or files, and to execute the file (if it is an executable file, or program).

access privileges – what you need to log on to most computer networks. Having access privileges means you have an account and a password that let you use a network.

broker – application communication middleware that simplifies communications external to an application by providing common application program interfaces that can be used by any application to access shared services. The shared services can be deployed on multiple platforms and be written in different programming languages.

browser – (1) A software application that allows a user to view files available either locally or across the Internet. Two popular browsers are Netscape Navigator and Microsoft Internet Explorer. (2) Software that accesses and displays documents located on the Internet or an intranet

BTS (Business Technology Services) – the section within the Office of Information Technology Services that oversees, for its clients, software applications development, Web development, marketing services, and technical services convenience contracts

bus topology – a network LAN infrastructure in which all devices are connected in a line to a single cable. A bus network has two distinct ends: all devices on a bus network have equal access to it and can see all of the messages on the network.

business event – an occurrence that triggers a business rule. One example would be a motorist driving erratically triggers the business rule for "Traffic Stop."

relational database – (1) A database in which the data are organized and accessed according to relations (2) A collection of data that is organized into related tables. Relationships are established between and among data in the tables. Data can be queried and retrieved from a relational database through the use of SQL (Structured Query Language).

replication service – a service that propagates data and transactions that occur in a central source database to each participating remote database. Replication uses a database that has been identified as a central source and reproduces the data to distributed target databases.

repository – contains metadata, or information about data or components (e.g., federated data definitions, data aliases, where OLTP and OLAP data can be found, information about reusable and shareable components, etc.). The repository serves as a primary data warehouse administration tool and helps promote data and component reusability, reliability, and sharing across the enterprise. In information technology, a repository is a central place in which an aggregation of data is kept and maintained in an organized way, usually in computer storage.

Depending on how the term is used, a repository may be directly accessible to users or may be a place from which specific databases, files, or documents are obtained for further relocation or distribution in a network. A repository may be just the aggregation of data itself into some accessible place of storage or it may also imply some ability to selectively extract data. Related terms are data warehouse and data mining.

reusable component – an executable service that incorporates the logic for a single business rule or function. A component can be reused and shared between application systems.

reuse administration – a service that provides technical support for the inventory and the catalog of federated data, ensuring that the contents are sound, the systems run smoothly, necessary maintenance is performed when needed, and desirable enhancements are planned and implemented

W3C (The World Wide Web Consortium) – The W3C is an industry consortium that seeks to promote standards for the evolution of the Web and interoperability between WWW products by producing specifications and reference software. Although W3C is funded by industrial members, it is vendor-neutral and its products are freely available to all. The Consortium is international; jointly hosted by the MIT Laboratory for Computer Science in the United States and in Europe by INRIA, who provide both local support and performing core development. The W3C was initially established in collaboration with CERN, where the Web originated, and with support from DARPA and the European Commission.

WAN (wide area network) – a network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network and that may use or provide public communication facilities. A WAN typically consists of multiple LANs that are linked together.

WAP (Wireless Application Protocol) – The WAP is a specification for a set of communication protocols to standardize the way that wireless devices, such as cellular telephones and radio transceivers, can be used for Internet access, including e-mail, the World Wide Web,

newsgroups, and Internet Relay Chat (IRC).
While Internet access has been possible in the past, different manufacturers have used Different technologies. In the future, devices and service systems that use WAP will be able to interoperate. The WAP layers are Wireless Application Environment (WAE), Wireless Session
Layer (WSL), Wireless Transport Layer Security (WTLS), and Wireless Transport Layer (WTP).

WBEM (Web-based Enterprise Management) – an initiative focused on developing a set of enterprise systems management standards based on Internet technology. The Web-based approach enables enterprises to manage any component of their infrastructure in a distributed computing environment, as well as value-added applications built by any third party from a central location via Internet communications and web browsers.
Web accessibility – the ability of users to access information from a Web site, regardless of any limitation they may have. W3C has issued guidelines for designing Web-accessible Web sites.

UNIT 3

Project Management

With the excitement and sense of urgency and momentum of a new project, the natural tendency is to dive right in. Your enthusiasm and imagination will be essential to meeting project objectives, but they are not enough alone. Successful projects require effective management.

In the application process for OLT funding, you have already done much of the groundwork for sound project management and your hard work will pay dividends now. With a relatively small amount of additional planning before you begin your pilot project, you can help ensure a successful outcome.

The purpose of this learning module is to introduce you to the rudiments of project management. The module is divided into subsections which introduce some basic

terminology of project management, describe the characteristics of successful projects and provide practical advice on creating a simple yet useable project management plan for your community learning pilot project. We hope you will find it useful.

What is a Project?

According to the Project Management Institute (PMI), a project is any work that happens only once, has a clear beginning and end, and is intended to create a unique product or knowledge. It may involve only one person, or thousands. It may last several days, or many years. It may be undertaken by a single organization, or by an alliance of several stakeholders. A project may be as simple as organizing a one-day event or as complex as constructing a dam on a river.

What is Project Management?

Project management is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations of a project. The project manager, sometimes referred to as the project co-ordinator or leader, manages the details of the project on a day-to-day basis. This is an ongoing challenge that requires an understanding of the broader contextual environment of the project and the ability to balance conflicting demands between:

- Available resources and expectations;
- Differing stakeholder priorities;
- Identified needs and project scope;
- Quality and quantity.

Fortunately, a wide variety of project management tools and techniques have been developed for this purpose. The following pages outline a few techniques that - together with your creativity and hard work - will provide the foundation for a successful learning initiative.

Characteristics of Successful Projects

In the funding application process, you clearly defined the objectives of your project, sought partnerships with organizations with similar objectives and developed a detailed action plan for your project. In doing so, you laid the foundations for success. Consider the following traits that characterizes successful projects:

1. **Clear objectives** - The most successful projects have clearly defined objectives from the outset.
2. **A good project plan** - A carefully thought-out plan serves two purposes. First, it allows everyone involved to understand and perform their part in the project. It shows who is responsible for what and estimates how much money, people, equipment and time will be required to complete the project. Second, it serves as a monitoring tool, allowing you to take early action if things go wrong.
3. **Communication, communication, communication** - Your project is a collaborative effort between all of the individuals and organizations involved. You all need to work together to maintain effective and continual communication between the parties.

4. **A controlled scope** - Numerous issues will come up throughout your project, and not all of them will contribute to your overall objectives. It is important to stay focused on your priorities, with little wasted time or attention.
5. **Stakeholder support** - Projects typically involve several stakeholders, who invest time and resources in the project. It is important to maintain stakeholder support throughout the project, so the project team can meet its objectives.

How many of these characteristics does your project have? How can you improve it?

The tools and techniques provided throughout this module are all designed to help you meet these five characteristics.

Planning Your Project

Every project has a life cycle, composed of the phases it goes through from beginning to completion. The broad phases of an Office of Learning Technologies funded project are:

1. Formulating the concept, goals and objectives of a project that uses technology to enhance learning and skills development;
2. Applying for OLT funding;
3. Conducting the initial phase (developing partnerships, conducting a needs assessment, community learning asset mapping);
4. Conducting the pilot project;
5. Writing a final report and disseminating your results to others.

The techniques in this module will help you with the fourth phase, conducting your community learning pilot project. In formulating your project and applying for funding, you have already done substantial project planning: identifying partners and project team members, assigning responsibility for tasks, developing an action plan, budgeting resources and preparing a marketing strategy and evaluation plan. These elements form the basis of a project plan.

A project plan sets the ground rules and states them in a clear fashion. This is especially important since OLT projects typically include multiple partners and stakeholders with differing interests and perspectives.

oblems experienced on projects could have been avoided or lessened by ; a detailed project plan at the outset.

Why Plan?

First, it is vital that everyone understands and agrees to the "ground rules" that will govern the project from here on in. You need to ensure that the objectives are clearly stated so that there is no disagreement later on.

Second, the project plan helps you to control and measure your progress. Now that your team members and financing are finalized, you should revisit your action plan and add the specific details that will allow you to manage successfully.

Third, the project plan will help you deal with any changes that may occur (and they inevitably do occur!). For example, what if a stakeholder wants to add a new objective

to the project? A clear project plan will help you deal with this situation in keeping with the overall project objectives.

Finally, the project plan will help to cement stakeholder support over the coming months and years of the project. This is important because you will need the support of people from different organizations, and you will not have direct authority over them.

Allow sufficient time to get agreement on the plan - especially given different stakeholders. Remember that others have timetables that may not correspond to yours. Don't underestimate the amount of time this will take.

What is in a Project Plan?

No two projects are the same; hence no two project plans are the same. To provide the maximum benefits, your project plan should be relevant, understandable and complete, and reflect the size and complexity of your unique project.

Your project plan should include the following elements:

1. A project charter
2. A calendar of activities
3. A time schedule
4. A responsibility matrix
5. A project plan budget
6. Major milestones with target dates
7. A risk management strategy

The project manager, sponsor, every partner, and all key project staff should have a copy of the project plan. It is a valuable tool that can help to avoid confusion about the project's scope and misunderstandings about responsibilities, timeframes or resource management.

The amount of detail in your project plan will depend on your needs. It may be quite brief or very detailed. It is up to you to develop an appropriate project plan based on the nature of your project.

ii. 1 - The Project Charter

The Project Charter is a document that demonstrates management support for the project, authorizes the project manager to lead the project and allocate resources as required. It is very easy to create a project charter. It simply states the name and purpose of the project, the project manager's name and a statement of support by management. It is signed by senior management of the responsible organization and the partner organizations.

The project charter should be distributed widely - to anyone with an interest in the project. This will help build momentum, reinforce the project manager's authority, and possibly draw other interested and valuable team members into the project.

The charter can be e-mailed to broaden its distribution easily and quickly.

iii. 2 - The Calendar of Activities

A Calendar of Activities is one of the most important tools in a project manager's toolkit. By dividing a project into the individual tasks required to complete it, the Calendar of Activities:

- Provides a detailed view of the project's scope;
- Allows you to monitor what has been completed and what remains to be done;
- Allows you to track labour, time and costs for each task;
- Allows you assign responsibility for specific tasks to team members;
- Allows team members to understand how they fit into the "big picture".

Designing a Calendar of Activities requires some effort, and you may think that your project is too small to warrant the effort. However, with the action plan you developed when applying for funding, you already have the information you need to get started.

Creating a Calendar of Activities

The action plan you developed when applying for OLT funding breaks down your project into its component activities. For the initial phase, you described them on a month-by-month basis, for the pilot phase on a quarterly basis. The activities in your action plan may be considered summary tasks. Some of these tasks are small enough to manage as is, but others will need to be broken down further into their logical parts.

These smaller units of work, tasks, will be assigned to individuals and should be specific enough to track and manage performance, but not so small that you spend too much time chasing details. As a guideline, it doesn't make sense to define tasks that take less than half a day to perform over the lifecycle of the project.

The following example illustrates the work breakdown structure of the summary task "Conduct learner evaluation of skills development content":

Conduct learner evaluation of skills development content

- Create interview guide (1/2 day)
- Interview learners (2 ½ days)
- Collate responses (1/2 day)
- Write report (1 day)
- Discuss report at weekly meeting (1/2 day)
- Revise learning material content (4 days)
- Approve evaluation (1/2 day)

The bulleted items are the units of work that will be assigned to one or more individuals. Each task should begin with a verb that specifies the work to be done. Be sure to estimate the time required for each task, since tasks left open-ended are an invitation to procrastination.

The last task within each category should always be to approve the work of that phase, a good management practice. When all the work units are done, you will mark the Calendar of Activities to show the summary task as being complete. In the meantime, you will know exactly what steps remain to be done. Organize your Calendar of Activities on a quarterly basis. This will help you to prepare the quarterly progress reports you will be submitting to OLT.

When you've finished your Calendar of Activities, look at it objectively. Does it capture everything you need to do? Is it logical and easy to read? If not, rework it so that it becomes a meaningful tool. Getting the Calendar of Activities designed properly will save you hours of effort later on.

iv. 3 - The Time Schedule

In your action plan you laid out the activities of your project in their logical sequence. You have now expanded on the action plan to create a Calendar of Activities with a detailed work breakdown structure. Having identified the tasks to be completed and determined the sequence for doing them, you are ready to prepare the Time Schedule.

The Time Schedule identifies logical relationships between project activities, ensures personnel is available for tasks when needed and helps you to manage time effectively and complete your project when planned.

When setting the Time Schedule, review all the tasks and the sequence for doing them. Some tasks are “dependent” on others and can only be started when others are finished. Other tasks can be done concurrently, if you have sufficient human resources. External factors may also influence your Schedule. You may already have a list of eager learners and the learning materials ready for your project’s launch date, but repairs at the local community centre mean that the classroom facilities are unavailable until next month.

Project management software permits you to use Gantt charts for schedules. Gantt charts are popular because they graphically display the relationships between tasks. If you do not have project management software, spreadsheet software can also be used for schedules, as in this example showing one summary task:

Time Schedule					
Task	**Hours per week**				
	Week 1	Week 2	Week 3	Week 4	Total
Conduct learner evaluation of skills development content					
Create interview guide	4	-	-	-	4
Interview learners	-	16	4	-	20

Collate responses	-	-	4	-	4
Write report	-	-	8	-	8
Discuss report at weekly meeting	-	-	4	-	4
Revise learning material content	-	-	8	24	32
Approve evaluation	-	-	-	4	4
Subtotal	**4**	**16**	**28**	**28**	**76**

Managing the Time Schedule

Despite your best efforts at scheduling, there is often a rush to meet project deadlines. There seem to be three major reasons for this:

- No project manager is assigned. Most project resources are focused on completing the project deliverables, with little attention paid to actually managing the project.
- A perception that project management is "administration" or overhead. In fact, as we try to emphasize throughout this toolkit, project management is an essential foundation for ensuring quality and timeliness.
- Lack of awareness of project management techniques.

The following hints may help to keep your project on schedule:

- When creating the Time Schedule, involve key personnel who are familiar with individual tasks, can estimate the time they will require and know the problems you may face.
- Discuss the responsibilities and priorities that partners have within their own organizations that may impact the time they can devote to your project.
- Allot time in the schedule for project management activities - 10% of total project time is a general rule of thumb.
- Hold regular project status meetings with the entire team to discourage procrastination and identify difficulties early.

The duration of a task depends on the number of people you assign to it and their productivity. For simple, labour-intensive tasks, you can shorten the duration by recruiting additional resources (perhaps from a local community group). For more complex tasks, such as advanced research, adding more resources may not help because only highly skilled people can be productive on these tasks. Adding more resources may simply increase your cost, with no improvement in quality or time requirement.

As the project progresses, there may be tasks that were not foreseeable in the original plan, or you may wish to undertake additional tasks to enhance the overall project outcome. If so, you will need to consider the impact on both the Time Schedule and resources. If your organization and your partners decide that changes to the Schedule are warranted and feasible, the project manager should get a written agreement for the revised plan from all the key stakeholders in the project.

v. 4 - The Responsibility Matrix

Your project will be a collaborative effort by a number of individuals and organizations working together toward a common goal. Managing a diverse team, often spread over several locations, can present some special challenges.

A Responsibility Matrix is a valuable project management tool to help you meet these challenges. A Responsibility Matrix ensures that someone accepts responsibility for each major project activity and that nothing falls through the cracks. It need not be complex and is easily created by using your project Schedule.

To create a Responsibility Matrix, refer to your Time Schedule. The left hand column enumerates all the required tasks for your project. Across the top of the chart, list all the team members (e.g. project manager, evaluation consultant, office administrator, technical support etc.) for your project. Enter a code in each cell that represents that team member's involvement in the task in that row. For example:

Responsibility Matrix					
Task	**Project Team Members**				
	Project manager	Evaluator	Teacher	Instructional designer	Technical support
Conduct learner evaluation of skills development content					
Create interview guide	S	A	I	-	-
Interview learners	-	A	-	-	-
Collate responses	-	A	-	-	-
Write report	S	A	-	-	-
Discuss report at weekly meeting	P	P	P	P	P
Revise learning material content	S	I	P	A	I
Approve evaluation	S	-	-	-	-

vi. 5 - The Project Plan Budget

As part of the application process, you prepared a budget for your project that meets OLT guidelines. This "best estimate" of costs will be an important tool for managing resources while delivering a quality result.

It is important to have the most detailed and accurate estimates possible for major project costs (usually wages, materials and supplies and overhead) at the start of the project. With this information, the actual process of producing the Project Plan Budget is simple. Simply add up the labor and equipment costs of each task in the Time Schedule you produced. These costs should fit within the financial budget approved by OLT.

Keep the Project Plan Budget as simple as possible while maintaining accuracy. If you have experience in project accounting, enter the costs estimates from the budget for each of the tasks in your Schedule. This way, as actual expenses come in they will automatically be posted to the project, making the Financial Detail sheets and Cashflow Forecast forms required in your quarterly reports to OLT easier to fill out.

If you are not familiar with project costing, you can use spreadsheet software to monitor your budget. List all the Time Schedule tasks at the left of the spreadsheet, the resources to be used, cost estimates from your budget, actual costs and the difference, if any, in columns to the right:

Project Budget				
Task	**Resources to be Used**	**Budgeted Costs**	**Actual Costs**	**Budget - Actual Costs**
Conduct learner evaluation of skills development content				
Create interview guide	Wages of project manager, teacher; Evaluator's fees.	$600		
Interview learners	Wages of teacher; rental of meeting room; laptop computer.	$375		
Collate responses	Evaluator's fees.	$200		
Write report	Evaluator's fees.	$400		

Discuss report at weekly meeting	Wages of project manager, teacher, technical support; Evaluator's, instructional designer's fees.	$800
Revise learning material content	Wages of teacher, technical support; Evaluator's, instructional designer's fees; 10 CD-ROMs.	$1200
Approve evaluation	Wages of project manager	$200
Subtotal for learner evaluation of skills development content		**$3775**

vii. 6 - Major Milestones and Target Dates

Milestones are significant events in a project, usually the completion of a major deliverable. You defined project milestones and set target dates in your project action plan as part of the application for funding process. List these milestones and target dates in the Project Plan to ensure that everybody involved in the project is aware of them. While all those involved doubtless recognize that meeting them is important to achieving the objectives of your project, there are also additional, less obvious, benefits. Meeting milestones on schedule prevents wasting resources, maintains the momentum of the project and builds credibility among potential future partners.

Managing a project requires a constant balancing of resources and priorities. These constraints, coupled with unexpected effects of circumstances outside your control can make it difficult to meet milestones and target dates, but the Calendar of Activities, Time Schedule and Responsibility Matrix are powerful tools to ensure you do.

The following are a few hints to help with the process:

• Ensure the partners and key personnel have signed off on the project plan, explicitly committing themselves to milestones and target dates.

• Review the Time Schedule and Responsibility Matrix at weekly or bi-weekly project team meetings to address problems before they result in major slippage.

• Make sure each individual has the recognized authority and access to resources needed to complete tasks they are accountable for in the Responsibility Matrix.

• Allow sufficient time for training for all team members to perform effectively.

• Meet with team members individually to discuss the expected outcomes of the project and the tasks they are assigned, as well as to point out any difficulties they may face and answer any questions they may have.

• Recognise your project team's success when they meet milestones and target dates.

viii.7 - What is Risk?

Risk is inherent in all projects. In project management terms, "risk" refers to an uncertain event or condition that has a cause and, that if it occurs, has a positive or negative effect on a project's objectives, and a consequence on project cost, schedule or quality. For example: the cause of a risk may be requiring a classroom with networked computers for the learners in your skills development project. The risk event is that Internet connection is delayed and the classroom is not available for the anticipated start date. This affects your objective, offering computer literacy training to underemployed adults, with the consequence that you must rent another facility or delay project activities.

Naturally, you would prefer to maximize the probability and consequences of positive events and minimize the probability and consequences of events adverse to your project objectives. A risk response plan can help you. It identifies the risks that might affect your project, determines their effect on the project and includes agreed-upon responses for each risk.

The Risk Management Strategy

Identifying Risks

The first step in creating a risk response plan is to identify risks which might affect your project. The project manager, key staff and project partners should "brainstorm" referring to the project charter, calendar of activities schedule and budget to identify potential risks. Those involved in the project can often identify risks on the basis of experience. Published information resources are also available that identify risks for many application areas.

Common sources of risk in community learning initiatives include:

• Technical risks – such as unproven technology

• Project management risks – such as a poor allocation of time or resources

• Organizational risks – such as resource conflicts with other activities

• External risks – such as changing priorities in partner organizations

Developing Risk Response Strategies

You cannot prepare for or mitigate all possible risks, but risks with high probability and high impact are likely to merit immediate action. The effectiveness of your planning determines whether risk increases or decreases for your project's objectives. Several risk response strategies are available:

• Avoidance – changing the project plan to eliminate the risk or protect the objectives from its impact. An example of avoidance is using a familiar technology instead of an innovative one.

• Transference – shifting the management and consequence of the risk to a third party. Risk transfer almost always involves payment of a premium to the party taking on the risk. An example of transference is using a fixed-price contract for a consultant's services.

• Mitigation – reducing the probability and/or consequences of an adverse risk event to an acceptable threshold. Taking early action is more effective than trying to repair the consequences after it has occurred. An example of mitigation is seeking additional project partners to increase the financial resources of the project.

• Acceptance – deciding not to change the project plan to deal with a risk. Passive acceptance requires no action. Active acceptance may include developing contingency plans for action should the risk occur. An example of active acceptance is creating a list of eligible instructors that can be called upon if last minute replacements are needed for your project.

Since not all risks will be evident at the outset of the project, periodic risk reviews should be scheduled at project team meetings. Risks that do occur should be documented, along with their responses. Your lessons learned may be useful to others or on future projects.

Project Manager's Role

The Role of Project Managers

From a textbook perspective, the role of a project manager is quite easy to describe. A project manager is one, who looks into the application of knowledge, skills, tools, and techniques to describe, organize, oversee and control the various project processes. Having said that, the roles and responsibilities of a project manager differ from company to company. It is important to understand what role a particular project manager will play in a certain company or organization.

Role of the Project Manager

A project manager is the person who has the overall responsibility for the successful planning and execution of a project. He/she must possess a combination of skills including an ability to ask penetrating questions, detect unstated assumptions and resolve interpersonal conflicts as well as more systematic management skills.

Leadership for Programmers and Project Managers

Effective management is not just about being able to apply budgetary constraints or running projects to time. In fact, 70% of businesses fail to achieve their desired goals

and the causes for failure are usually lack of strong leadership, lack of team skills, and lack of stakeholder engagement. These more subtle skills can have a huge effect on successful outcomes.

The Hardest Word in the Project Management Vocabulary

For project managers "no" is often the toughest word in the English language to deploy. We often prefer the classic PM strategy of "Yes, but..." as the softer, kinder, gentler alternative. "No" sounds harsh. Uncooperative. It sounds reticent and recalcitrant. It sounds negative. And yet, for many of us, the time has come as professionals to set "yes, but..." aside and venture into the world of "no."

Successful Projects Are Led Not Managed

More and more in today's environment Project Managers are being judged on how well they operate within, and adhere, to standard practices and disciplines. This is all very well, but let us stand back and think for a moment. If I were to challenge any one of you to think of someone you respect, who consistently delivers projects on time, who always gets called on when things get tough. I am sure that you could name that person without knowing how well they work within the practices and disciplines of your company.

The Top Five Project Management Traits to Master "the How"

In project management, we tend to focus on the method. And there is no shortage of methods (Six Sigma, Scrum, Waterfall). The method is the what of project management and is often at the core of an effectively run project. But the method can only take your project so far.

If The Lord of the Rings Was a Project

Let's assume for a moment that the great quest in The Lord of the Rings was a project. Now that's not as odd as it might sound. Just think of the criteria. They had a clear goal and purpose. They had a team of people with defined (if unspoken) roles. All of the team needed to work together to achieve the goal. There was a definite time constraint in terms of when the goal needed to be achieved.

The Next Generation Project Manager

Are you tired being an average project manager, working on average projects, being passed over for promotion, and getting an average performance review? You need to understand something right now. There are new challenges and expectations today that require every project manager to evolve to the next level. If you do not take action now, you will be left behind.

How to Become a Project Manager

If you are new to project management don't be bamboozled by all the jargon. Managing a project is just another branch of business management. There are well understood methodologies, tools, guidelines, and procedures to help you on your way to developing the important life-skill of project management. This article sets out the key skills needed to become a competent project manager.

Top Seven Questions for Starting Projects More Effectively

We are all project managers. Some of us manage projects like vacations or reunions, while others run implementations of new software systems, consolidation divisions of

companies, launch new products, or build buildings. While the scale changes for different kinds of projects, and complexity changes as more people are affected and involved; at the core there are questions you can answer to help get any project off to a better start.

Must Project Managers Be Technically Savvy?

Must project managers be technically savvy? This topic always seems to cause quite a stir. While some believe that all you need to manage a project is a PMP certification, others are convinced that you can't successfully manage a software development project unless you truly understand the intricacies of the product.

Good Project Managers are Hard to Find!

This week, I have had a number of clients ask me if I have project managers available to manage urgent projects. Companies want to expand and move forward but the lack of project managers (PM's) is holding them back.

Five Ways to Turn Small Projects into Professional Success

Yes, there have always been projects. But never before has it been so important for every person to be able to lead, manage or participate in projects of all sizes. Here are five things you can do today to excel with small team or personal projects.

Legitimising the Project Manager Role

This article is dedicated to a better understanding of what a project manager is and what a project manager does. Just as important, we will also be talking about what a project manager isn't.

Project Managers, Trackers and Hybrids

Scott Berkun has some very interesting insights about the distinction between project managers, in the traditional sense and definition of the term, and project trackers, who may have the title of project manager, but essentially only gather actuals and create reports for sponsors and management without actually leading project teams during execution. Scott also provides a handy set of questions that can help one determine exactly what role a project manager is playing on projects.

The Difference Between Really Effective Project Managers and Those Who Muddle Through

Project management is what project managers do, not what project management software or a methodology does. No software exists that will deliver a project on time and on budget all by itself. No matter how "good" the software or methodology, it is only as good as the people using it.

How To Get Your Project Approved

What do you do when you have a great idea? You know how to save your company a ton of money or you've thought of a way to really improve a product. The problem is that you know that you have a great idea, but no-one else does. And you can't convert this idea into reality by yourself. You need resources. You need money. You feel that you need permission. What do you do?

Establishing Your Project Management Authority

It's been a tough climb to your project management position. How do you establish your authority and inspire respect? What must be done to influence project results and growth and make your stay long and productive?

7 Habits of Brilliant Project Managers

Project management is a tough role. You often find yourself being pulled between keeping users, subordinates, team members and senior people happy. Given these demands, what do the best project managers do that makes them stand out from the crowd?

Five Goals of Every Project

Project goals keep the focus on what is most important. However, on some teams these primary goals are lost in their meeting's activities. Make sure each meeting is structured so as to move the project forward. Even if the progress is only inches rather than by huge leaps, the team must be pushing the project forward as quickly, safely, and reasonably as possible.

Project Leader or Project Manager, Which One Are You?

With the increased attention given to "leadership" in today's business community, one could argue for the simple substitution of the expression project management with project leadership. Rightly so, since in some literature, the role of leader or manager is used interchangeably. Yukl (2006) uses the terms leader, manager and boss interchangeably to indicate people who are in positions in which they are expected to perform the role of leadership. Leadership in this context is used loosely to cover management as well. In order to answer this question adequately, we look at some definitions of leadership and management.

6 Key Tips For Running Effective Project Meetings

As a manager or leader, chances are that you will be given responsibility for a project at some time in your career. It could be a new computer system implementation, building a new facility, introducing a new piece of equipment or a new product or service. How can you excel in this area?

Ten New Rules for Project Managers

These ten ideas will help improve your projects. Are these ten rules the top ten? You decide. But don't take too long. Share these rules with your team. Your team members are sure to help you carry them out.

Project Management Confidence

If you have been doing project management for a while, your confidence has probably gotten an occasional shaking. And the resulting lack of confidence hurts you, but it also hurts your team members who need you to be confident and not self-conscious. You're their leader after all, and they want you to have a strong plan, vision, self-esteem and the confidence to lead.

Project Management Excellence

Project management excellence goes beyond producing project charters, detailed schedules and colourful status reports. Today's project managers must acquire the skills necessary to combat a myriad of modern challenges. Factors such as downsizing, merger mania, restricted finances, an accelerated business pace, a

multidisciplinary world, rising competition and seemingly ceaseless change, acting singly and in concert, demand much more.

Eight Easy Steps to Managing Your Website Development

Managing your website development need not cause you sleepless nights providing you learn the secrets of successful project management. Perform the best practices in project management and give your project the best chance of success.

Be a Smart Project Manager

The key to being a smart project manager is to remember how you are going to manage your project, to know what to do if it does not work, and to win and keep the support of all of the project stakeholders.

Manage Your Project On Time Every Time

An introduction to some of the most important best practices which will enable you to plan and manage your projects on time and within budget.

Managing Small Projects

Project management best practices can easily be applied on small projects to enable you to plan and manage your project successfully. This article looks at how to apply these practices without creating too much paperwork or overhead.

Project Management Success with the Top 7 Best Practices

Whether planning your wedding, developing a new website or building your dream house by the sea you need to employ project management techniques to help you succeed. This article summarises 7 key project management best practices to help you achieve project success.

Intelligent Disobedience: The Difference Between Good and Great Project Managers

Intelligent disobedience requires taking risks, creativity, flexibility and perseverance. Following this approach can have significant benefits in project management terms and can make the difference between good and great project managers.

Top 10 Qualities of a Project Manager

What qualities are most important for a project leader to be effective? Over the past few years, the people at ESI International, world leaders in Project Management Training, have looked in to what makes an effective project leader. With the unique opportunity to ask some of the most talented project leaders in the world on their Project Leadership courses ESI have managed to collect a running tally on their responses.

Better Behavior For More Effective IT Development Projects

How well equipped do you feel to carryout an IT development project. Do you always get the best from your team, engage your stakeholders and retain their interest to arrive at a successful conclusion? This article looks at some of the behaviors managers need to exhibit to run successful IT development projects.

Using Feedback as a Tool

As a project manager it is important to be able to give and receive feedback effectively. Feedback is best given on a one to one basis soon after the event that triggers its need. Here are some tips that can help.

Tips and Reminders for Project Managers

Here are some essential tips and reminders we have compiled for those new to project management or in case you need to refresh your memory.

Structure ۱

Word formation - *Suffixes*

When you are reading, you will come across unfamiliar words. It is often possible to guess the meanings of these words if you understand the way words in English are generally formed.

AFFIXES

PREFIXES + (STEM) + SUFFIXES

An English word can be divided into three parts: a prefix, a stem and a suffix. **Pre-** means 'before'; a **pre**fix, therefore, is what comes before the stem. Consider as an example, the prefix **de-** (meaning 'reduce' or 'reverse') in a word like **de**magnetize (meaning 'to deprive of magnetism'). A suffix is what is attached to the end of the stem. Consider as an example the suffix **-er** (meaning 'someone who') in programm**er** ('the person who programs'). Both prefixes and suffixes are referred to as affixes.

Prefixes usually change the meaning of the word; for example, un-changes a word to the negative. **Un**magnetizable means 'not capable of being magnetized'. Suffixes, on the other hand, change the word from one part of speech to another. For example, **-ly** added to the adjective quick gives the adverb quick**ly**. Let us now consider some suffixes and their usual meanings.

SUFFIXES

NOUNS	VERBS	ADJECTIVES	ADVERBS
-ance	-ize	-able	-ly
-ence	-ate	-ible	
-or	-ify	-less	
-er	-en	-ic	
-ist	-ify	-ical	
-ness		-ish	
		-ive	

Exercise 1

Study the following tables and try to find additional examples. Use your dictionary if necessary.

Noun-forming suffixes		
SUFFIX	**MEANING**	**EXAMPLES**
-ance	state	performance
-ence	quality of	independence
-er, -or	a person who, a thing which	programmer, operator, compiler, accumulator
-ation, -tion	the act of	execution
-ist, -yst	a person who	analyst, typist
-ness	condition of	cleanliness
-ion	action/state	conversion
-ing	activity	multiplexing
-ment	state, action	measurement
-ity	state, quality	electricity
-ian	pertaining to	electrician
-ism	condition/state	magnetism
-dom	domain/condition	freedom
-ship	condition/state	relationship, partnership, friendship
-ary		binary

Verb-forming suffixes		
SUFFIX	**MEANING**	**EXAMPLES**
-ize	to make	computerize
-ate		automate, activate, calculate
-ify		simplify
-en		harden, widen, lengthen

Adverb-forming suffix		
SUFFIX	**MEANING**	**EXAMPLES**
-ly	in the manner of	electronically, logically, comparably, helpfully

Adjective-forming suffixes

SUFFIX	MEANING	EXAMPLES
-al, -ar,	have the quality	computational, logical, circular
-ic, -ical		magnetic, automatic, electrical,
-able, -ible	capable of being	comparable, divisible
-ous, -ious	like, full of	dangerous, religious
-ful	characterized by	helpful
-less	without	careless
-ish	like	yellowish
-ed	having	computed, punched
-ive	quality of	interactive
-ing	to make or do	programming, coding, processing, multiplexing

Exercise 2

Read the following sentences and underline all the suffixes. Then try to find out what parts of speech the words are.

1. The systems analyst provides the programmer with the details of the data processing problems.
2. CRT terminals are very useful interactive devices for use in offices because of their speed and quietness.
3. The new microcomputer we purchased does not have a Fortran compiler. It is programmable Basic only.
4. A computer is a machine with an intricate network of electronic circuits that operate switches or tiny metal cores.
5. In very large and modern installations, the computer operator sits in front of a screen that shows an up-to-date summary of the computer jobs as they are being processed.
6. The introduction of terminals and screens has partly replaced the use of punched cards.
7. Binary arithmetic is based on two digits: 0 and 1.
8. Multiplexing is when many electrical signals are combined and carried on only one optical link.
9. Computers are machines designed to process electronically specially prepared pieces of information.
10. The computed results were printed in tables.

Exercise 3

Word forms: First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. operation, operate, operator, operational, operationally, operating a. A computer can perform mathematical ……. very quickly.

b. One of the first persons to note that the computer is malfunctioning is the computer ……..
c. The job of a computer operator is to …….. the various machines in a computer installation.
d. The new machines in the computer installation are not yet ……. .

2. acceptance, accept, accepted, acceptable, acceptably
   a. A computer is a device which …….. processes and gives out information.
   b. The students are still waiting for their …….. into the computer Science program.
   c. It is ……. to work without a template if the flowcharts are not kept on file.
3. solution, solve, solvable, solver
   a. It may take a lot of time to find a …….. to a complex problem in programming.
   b. A computer can …….. a problem faster than any human being.
   c. A computer has often been referred to as a problem …… .
4. remark, remarkable remarkably, remarked
   a. Today's computers are ……. faster than their predecessors.
   b. Systems analysts will often make ……. about existing programs so as to help make the operations more efficient.
   c. There have been …….. developments in the field of computer science in the last decade.

5. **communication, communicate, communicable, communicative, communicably** a. A computer must be able to …… with the user. b. Fiber optics is a new development in the field of ……. .
   c. Some people working in computer installations aren't very …… because they are shy.

6. calculation, calculate, calculating, calculated, calculator, calculable. calculus
   a. A computer can do many kinds of …… quickly and accurately
   b. ……. is a branch of mathematics for making…… without the use of a ……machine.
   c. A computer can ……..…. numbers much faster than a manual ……...
   d. Some problems aren't …….. without logarithm tables.

7. mechanic, mechanism, mechanize, mechanical, mechanically, mechanistic, mechanics, mechanization, mechanized
   a. Today's computers are less …… than they used to be.
   b. The ……devices in a computer system operate more slowly than the electromagnetic devices.
   c. The …… of the brain is very complicated hut unlike a computer it isn't.

8. necessity, necessitate, necessary, necessarily, necessities, need, needed
   a. Because it is expensive to set up a computer department it is …… to budget well for the basic ……. of the installations.
   b. A good programmer isn't ……. going to be a good systems analyst.

c. Students' lack of understanding of the basic concepts in computer science may …… the instructor to restructure the course.

9. dependence, depend on, dependable, dependably, dependent, dependency, depending
   a. The length of time a programmer takes to make a program will vary ……..…… on the complexity of the problem and his ability and experience.
   b. One can always ……..……. a computer to obtain accurate answers because it's probably the most …..…… machine in the world today.

10. technology, technological, technologically, technologist
   a. Computer …… is a fast growing discipline.
   b. The …… improvements of computers are reducing man's workload.

11. imagination, imagine, imaginable, imaginative, imaginary
   a. A computer is limited in its ability by the ……... of man.
   b. Some people are good at inventing ……… stories.
   c. It is practically impossible to ……... the speed at which a computer calculates numbers.

12. addition, add, added, additional, additionally, additive
   a. Many terminals can be ……..…….. to a basic system if the need arises.
   b. ……..……. and subtraction are two basic mathematical operations.
   c. When buying a system there is often no ..... charge for the programs.

13. complication, complicate, complicated, complicating, complicatedly
   a. There can be many ……..... involved in setting up a computer in an old building.
   b. It is sometimes a very ……..... process getting into a computer installation for security reasons.
   c. It is sometimes very ……..... to explain computer concepts.

14. difference, differ, different, differently, differential, differentiate
   a. There isn't a very big ..... in flowcharting for a program to be written in Cobol or Fortran.
   b. There are many ……computer manufacturers today and a buyer must be able to …….…….. between the advantages and disadvantages of each.
   c. The opinions of programmers as to the best way of solving a problem often ……..... greatly.

15. reliably, rely on, reliable, reliability
   a. Computers are……..….. machines.
   b. If you don't know the meaning of a computer term, you cannot always ……..an all-purpose dictionary for the answer.
   c. Computers can do mathematical operations quickly and …….

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

appealing adj. attractive or interesting, able to move feelings
v. appeal syn. alluring
n. appeal
Working abroad is appealing to many people.
Through his speeches, the candidate appealed to the voters.

celebrated adj. acclaimed, well-known and popular
syn. renowned

The celebrated pianist will give a concert this weekend.
San Francisco is celebrated for its multicultural makeup.

contemporary adj. modern, up-to-date; also a person living at the
n. contemporary same time as another person
syn. current

Contemporary architecture makes very good use of space.
Cervantes was a contemporary of Shakespeare.

frail adj. weak in health or in body
n. frailty syn. fragile
The frail wings of the newborn bird could not lift it off the ground.
One of the frailties of human beings is laziness.

alter v. to change or make different
n. alteration syn. modify
adj. alterable
adj. altered
adv. Alterably

Will the storm alter its course and miss the coast?

Gloria hasn't made any alterations to her plans.

anticipate	v. to think about or prepare for something ahead of time
adj. anticipatory	
adj. anticipated	syn. predict
n. anticipation	

No one can anticipate the results of the games.

They planned their vacation with anticipation.

conform	v. to follow established rules or patterns of behavior
n. conformity	syn. adapt
n. conformist	

You must conform to the rules or leave the club.

She has always been a conformist.

vital	adj. of great importance; full of life
n. vitality	syn. indispensable

Money is vital to the success of the program.

His intense vitality was easily observable.

access protocol – transfers e-mail from the message transfer agent (MTA) to the mail user

agent (MUA)

ACD (automatic call distribution) – the routing of an incoming call to the next available operator

ad hoc queries – a method used by end users and applications to access a database in an

interactive mode. Ad hoc queries usually require the end user to have knowledge of Structured Query Language (SQL).

adaptive system – a computer application system that can easily be modified to support unforeseen changes in the business process that the application supports.

ADSL (Asymmetrical Data Subscriber Line) – ADSL is a technology for transmitting digital information at high bandwidths on existing phone lines to homes and businesses. Unlike regular dialup phone service, ADSL provides a continuously available ("always on") connection. ADSL is asymmetric in that it uses most of the channel to transmit downstream to the user and only a small part to receive information from the user. ADSL simultaneously accommodates analog (voice) information on the same line. ADSL is generally offered at downstream data rates from 512 Kbps to about 6 Mbps. A form of ADSL, known as Universal ADSL or G.Lite, has been initially approved as a standard by the ITU.

agents – intelligent programs, essentially macros, that facilitate movement across applications to execute user-defined tasks.

AMS (Applications Management Services) – a branch within ITS' Business Technology Services. Formerly known as ADS, this branch develops and maintains software applications for state agencies.

carrier services – the various networking technologies offered by telephone companies as a service for wired and wireless communication.
CD-ROM (compact disk-read-only memory) – high-capacity, read-only memory in the form of an optically read compact disk.

cell relay – network technology based on the use of small, fixed-size packets, or cells. Cell relay is the basis for many high-speed network protocols.

centralized computing – a range of computing services offered from the same geographic location.
Centrex (central office exchange service) – a service from local telephone companies in the United States in which up-to-date phone facilities at the phone company's central (local) office are offered to business users so that they don't need to purchase their own facilities. The Centrex service effectively partitions part of its own centralized capabilities among its business customers.

The customer is spared the expense of having to keep up with fast-moving technology changes (for example, having to continually update their private branch exchange infrastructure) and the phone company has a new set of services to sell.

CGI (common gateway interface) – an application that enables an HTML document to call an executable program, pass information to it, and display the output in a dynamically created document. CGI scripts are used to count Web site hits, handle database queries, etc.

change management – process of planning, controlling, and managing enterprise system changes
DTD (Document Type Definition) – SGML file containing document format definitions; needed to decipher format commands

e-auction – an online service where surplus inventory is sold

EAI (enterprise application integration) – EAI is a business computing term for plans, methods, and tools aimed at modernizing, consolidating, and coordinating the computer applications in an enterprise. Typically, an enterprise has existing legacy applications and databases and wants to

continue to use them while adding or migrating to a new set of applications. These applications can help the enterprise exploit the Internet, e-commerce, extranets, and other new technologies.

EAI may involve developing a new total view of an enterprise's business and its applications, seeing how existing applications fit into the new view, and then devising ways to efficiently reuse what already exists while adding new applications and data. EAI encompasses methodologies such as object-oriented programming; distributed, cross-platform program communication using message brokers with CORBA and COM+; and the modification of enterprise resource planning (ERP) to fit new objectives, enterprise-wide content, and data distribution using common databases and data standards implemented with the Extensible Markup Language (XML), middleware, message queuing, and other approaches.

e-business (electronic business) – the conducting of business on the Internet, not only buying and selling, but also servicing customers and collaborating with business partners.

EBT (electronic benefits transfer) – a method of providing government benefits, such as cash assistance or food stamps, electronically instead of by paper. Beneficiaries are issued a card that can be used at certain automated teller machines (ATMs) to receive cash and point-of-sales (POS) terminals to purchase goods. EBT substantially cuts down on fraud and abuse in government benefit programs and provides safety and convenience to recipients who use the cards.

messaging – the process where a message is the delivery vehicle for service requests and replies

metadata – information about data, including the format of the data element, which application system owns it, where it is located, how it should be used. Metadata is the global information about what data exists across the enterprise and the standards that apply to that data.

microcash – small denomination digital tokens

micromerchants – those who offer their wares on the Internet in exchange for e-cash or digital cash

middleware – (1) Software and application program interfaces that serve as intermediaries among application programs and services, for example, gateway software between LAN-based database servers and mainframe databases (2) A layer of software that enables application, component, and data access communication. Middleware insulates programmers from the complexities of the communication architecture, such as network protocols.

midrange machine – a large computer (smaller than a mainframe) that supports hundreds of simultaneous users.

Telnet – the network terminal protocol allowing a user to log in on any other computer on a TCP/IP network

terabyte – a measure of computer storage capacity that is 2 to the 40^{th} power or, in decimal, approximately a thousand billion bytes (that is, a thousand gigabytes)

terminal – (1) A point in a system or communication network at which data can either enter or leave (2) A device, usually equipped with a keyboard and display device, capable of sending and receiving information. **Note:** The terms terminal and workstation are often used interchangeably.
However, a terminal may not have a human operator, whereas a workstation is at least a terminal (often a PC) where a human operator performs an application.

thin client – a two-tier client/server model for application design in which most of the computer code is executed on a server and the client process is limited to the software that provides the user presentation only. It provides simplified system management because there is little or no business application code distributed across multiple workstations.

third-party – an adjective describing an item or service that is available from an outside vendor

third party – a noun describing a person, group, or business outside of your organizational structure

thread – internal system structure that describes an application's connection existence and specifies its accessibility to resources and services. Operating systems, relational databases, and transaction monitors all employ the concept of threads.
three-tier – a client/server application in which the code that implements the business rules is monolithic but is separate and distinct from the code that implements the user interface and the code that implements data access

tier – an executable software component comprising one partition of an application. A tier typically performs a complete business function. **Note:** The number of tiers in an application does not necessarily refer to the number of platforms on which an application is deployed.

TIFF (Tagged Image File Format) – a file format for storing images on a computer

token ring – A local area network (LAN) in which all computers are connected in a ring or star topology and a bit- or token-passing scheme is used to prevent the collision of data between two computers that want to send messages at the same time. The token ring protocol is the second most widely used protocol on local area networks after Ethernet. The IBM Token Ring protocol led to a standard version, specified as IEEE 802.5. Both protocols are used and are very similar.

The IEEE 802.5 token ring technology provides for data transfer rates of either 4 or 16 megabits per second.

top-level domain – the portion of a Uniform Resource Locator (URL) or Internet address that identifies the general type of Internet domain, such as "com" for "commercial," "edu" for "educational," "gov" for "government", and so forth.

TP (transaction processing) monitor – application communication middleware that manages distributed transactions

tps (transactions per second) – metric used in evaluating OLTP system performance, typically measured under conditions of a specified response time

UNIT 4

The Evolution of Project Management

The importance of Project Management is an important topic because all organizations, be they small or large, at one time or other, are involved in implementing new undertakings. These undertakings may be diverse, such as, the development of a new product or service; the establishment of a new production line in a manufacturing enterprise; a public relations promotion campaign; or a major building programmed. Whilst the 1980's were about quality and the 1990's were all about globalization, the 2000's are about velocity. That is, to keep ahead of their competitors, organizations are continually faced with the development of complex products, services and processes with very short time-to-market windows combined with the need for cross-functional expertise. In this scenario, project management becomes a very important and powerful tool in the hands of organizations that understand its use and have the competencies to apply it.

The development of project management capabilities in organizations, simultaneously with the application of information management systems, allow enterprise teams to work in partnership in defining plans and managing take-to-market projects by synchronizing team-oriented tasks, schedules, and resource allocations. This allows cross-functional teams to create and share project information. However, this is not sufficient, information management systems have the potential to allow project management practices to take place in a real-time environment. As a consequence of this potential project management proficiency, locally, nationally or globally dispersed users are able to concurrently view and interact with the same updated project information immediately, including project schedules, threaded discussions, and other relevant documentation. In this scenario the term dispersed user takes on a wider meaning. It not only includes the cross-functional management teams but also experts drawn from the organization's supply chain, and business partners.

On a macro level organizations are motivated to implement project management techniques to ensure that their undertakings (small or major) are delivered on time, within the cost budget and to the stipulated quality. On a micro level, project management combined with an appropriate information management system has the objectives of: (a) reducing project overhead costs; (b) customizing the project workplace to fit the operational style of the project teams and respective team members; (c) proactively informing the executive management strata of the strategic projects on a real-time basis; (d) ensuring that project team members share accurate, meaningful and timely project documents; and (e) ensuring that critical task deadlines

are met. Whilst the motivation and objectives to apply project management in organizations is commendable, they do not assure project success.

However, before discussing the meaning and achievement of project success it is appropriate at this stage to provide a brief history of project management.

Brief History of Project Management

Project management has been practiced for thousands of years dating back to the Egyptian epoch, but it was in the mid-1950's that organizations commenced applying formal project management tools and techniques to complex projects. Modern project management methods had their origins in two parallel but different problems of planning and control in projects in the United States. The first case involved the U.S Navy, which at that time was concerned with the control of contracts for its Polaris Missile project. These contracts consisted of research, development work and manufacturing of parts that were unique and had never been previously undertaken.

This particular project was characterised by high uncertainty, since neither cost nor time could be accurately estimated. Hence, completion times were based on probabilities. Time estimates were based on optimistic, pessimistic and most likely. These three time scenarios were mathematically assessed to determine the probable completion date. This procedure was called program evaluation review technique (PERT). Initially, the PERT technique did not take into consideration cost. However, the cost feature was later included using the same estimating approach as with time. Due to the three estimation scenarios, PERT was found (and still is) to be best suited for projects with a high degree of uncertainty reflecting their level of uniqueness. The second case, involved the private sector, namely, E.I du Pont de Nemours Company, which had undertaken to construct major chemical plants in U.S. Unlike the Navy Polaris project, these construction undertakings required accurate time and cost estimates. The methodology developed by this company was originally referred to as project planning and scheduling (PPS). PPS required realistic estimates of cost and time, and is thus a more definitive approach than PERT. The PPS technique was later developed into the critical path method (CPM) that became very popular with the construction industry.

During the 1960s and 1970s, both PERT and CPM increased their popularity within the private and public sectors. Defense Departments of various countries, NASA, and large engineering and construction companies world wide applied project management principles and tools to manage large budget, schedule-driven projects. The popularity in the use of these project management tools during this period coincided with the development of computers and the associated packages that specialised in project management. However, initially these computer packages were very costly and were executed only on mainframe or mini computers. The use of project management techniques in the 1980s was facilitated with the advent of the personal computer and associated low cost project management software. Hence, during this period, the manufacturing and software development sectors commenced to adopt and implement sophisticated project management practices as well. By the 1990s, project management theories, tools and techniques were widely received by different industries and organizations.

Four periods in the development of modern project management.

[1] Prior to 1958: Craft system to human relations. During this time, the evolution of technology, such as, automobiles and telecommunications shortened the project

schedule. For instance, automobiles allowed effective resource allocation and mobility, whilst the telecommunication system increased the speed of communication. Furthermore, the job specification which later became the basis of developing the Work Breakdown Structure (WBS) was widely used and Henry Gantt invented the Gantt chart. Examples of projects undertaken during this period as supported by documented evidence include: (a) Building the Pacific Railroad in 1850's; (b) Construction of the Hoover Dam in 1931-1936, that employed approximately 5,200 workers and is still one of the highest gravity dams in the U.S. generating about four billion kilowatt hours a year; and (c) The Manhattan Project in 1942-1945 that was the pioneer research and development project for producing the atomic bomb, involving 125,000 workers and costing nearly $2 billion.

[2] 1958-1979: Application of Management Science. Significant technology advancement took place between 1958 and 1979, such as, the first automatic plain-paper copier by Xerox in 1959. Between 1956 and 1958 several core project management tools including CPM and PERT were introduced. However, this period was characterized by the rapid development of computer technology. The progression from the mainframe to the mini-computer in the 1970's made computers affordable to medium size companies. In 1975, Bill Gates and Paul Allen founded Microsoft. Furthermore, the evolution of computer technology facilitated the emergence of several project management software companies, including, Artemis (1977), Oracle (1977), and Scitor Corporation (1979). In the 1970's other project management tools such as Material Requirements Planning (MRP) were also introduced.

Examples of projects undertaken during this period and which influenced the development of modem project management as we know it today include: (a) Polaris missile project initiated in 1956 that had the objective of delivering nuclear missiles carried by submarines, known as Fleet Ballistic Missile for the U.S Navy. The project successfully launched its first Polaris missile in 1961; (b) Apollo project initiated in 1960 with the objective of sending man to the moon; and (c) E.I du Pont de Nemours chemical plant project commencing in 1958, that had the objective of building major chemical production plants across the U.S.

[3] 1980-1994: Production Centre Human Resources. The 1980s and 1990's are characterized by the revolutionary development in the information management sector with the introduction of the personal computer (PC) and associated computer communications networking facilities. This development resulted in having low cost multitasking PCs that had high efficiency in managing and controlling complex project schedules. During this period low cost project management software for PCs became widely available that made project management techniques more easily accessible.

Examples of major projects undertaken during this period that illustrate the application of high technology, and project management tools and practices include: (a) England France Channel project, 1989 to 1991. This project was an international project that involved two governments, several financial institutions, engineering construction companies, and other various organizations from the two countries. The language, use of standard metrics, and other communication differences needed to be closely coordinated; (b) Space Shuttle Challenger project, 1983 to 1986. The disaster of the Challenger space shuttle focused attention on risk management, group dynamics, and quality management; and (c) xv Calgary Winter Olympic of 1988, which successfully applied project management practices to event management.

[4] 1995-Present: Creating a New Environment. This period is dominated by the developments related to the Internet that changed dramatically business practices in the mid 1990's. The Internet has provided fast, interactive, and customized new medium that allows people to browse, purchase, and track products and services online instantly. This has resulted in making firms more productive, more efficient, and more client oriented. Furthermore, many of today's project management software have an Internet connectivity feature. This allows automatic uploading of data so that anyone around the globe with a standard browser can: (a) input the most recent status of their assigned tasks; (b) find out how the overall project is doing; (c) be informed of any delays or advances in the schedule; and (d) stay "in the loop" for their project role, while working independently at a remote site.

An example of a major project undertaken during this period is the Year 2000 (Y2K) project. The Y2K Project, known as the millennium bug referred to the problem that computers may not function correctly on January lst, 2000 at 12 AM. This was a global phenomenon and was highly problematic because resolving the problem at one's organization did not guarantee immunity, since a breakdown in the organization's supply chain could affect the organization's operating capability. Many organizations set up a project office to control and comply with their stakeholders regarding the Y2K issue. Furthermore, use of the Internet was common practice that led to the establishment of the virtual project office. The goal of this virtual project office was: (a) to deliver uninterrupted turn-of-the-century; (b) monitor Y2K project efforts; (c) provide coordination; (d) develop a risk management plan; and (e) communicate Y2K compliance efforts with various stakeholders. Thus, the virtual project office was a focal point for all the project works, and it increased the awareness and importance of risk management practices to numerous organizations.

Why Project Management?

There is no doubt that organizations today face more aggressive competition than in the past and the business environment they operate in is a highly turbulent one. This scenario has increased the need for organizational accountability for the private and public sectors, leading to a greater focus and demand for operational effectiveness and efficiency.

Effectiveness and efficiency may be facilitated through the introduction of best practices that are able to optimize the management of organizational resources. It has been shown that operations and projects are dissimilar with each requiring different management techniques. Hence, in a project environment, project management can: (a) support the achievement of project and organizational goals; and (b) provide a greater assurance to stakeholders that resources are being managed effectively.

Research by Roberts and Fur longer in a study of information systems projects show that using a reasonably detailed project management methodology, as compared to a loose methodology, improves productivity by 20 to 30 percent. Furthermore, the use of a formalized project management structure to projects can facilitate: (a) the clarification of project scope; (b) agreement of objectives and goals; (c) identifying resources needed; (d) ensuring accountability for results and performance; (e) and encouraging the project team to focus on the final benefits to be achieved. Moreover, the research indicates that 85-90% of projects fail to deliver on time, on budget and to the quality of performance expected. The major causes identified for this situation include:

1. Lack of a valid business case justifying the project;
2. Objectives not properly defined and agreed;
3. Lack of communication and stakeholder management;
4. Outcomes and/or benefits not properly defined in measurable terms;
5. Lack of quality control;
6. Poor estimation of duration and cost;
7. Inadequate definition and acceptance of roles (governance);
8. Insufficient planning and coordination of resources.

It should be emphasized that the causes for the failure to deliver on time, on budget and to the quality of performance expected could be addressed by the application of project management practices. Furthermore, the failure to deliver on time, on budget and to the quality of performance expected does not necessarily mean that the project was itself a failure. At this stage what is being discussed is the effectiveness and efficiency of project execution and not whether a project is a success or failure.

Conclusion

Project management should be viewed as a tool that helps organizations to execute designated projects effectively and efficiently. The use of this tool does not automatically guarantee project success. (project success will be discussed in a subsequent issue). However, in preparation for the next issue, I would like you to think about the distinction between project success and project management success. This distinction will provide further insight to the questions: Why are some projects perceived as failures when they have met all the traditional standards of success, namely, completed on time, completed within budget, and meeting all the technical specifications? Why are some projects perceived to be successful when they have failed to meet two important criteria that are traditionally associated with success, namely, not completed on time and not completed within budget?

Exercises

Word forms

First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. integration integrate, integrated, integrating
   a. Some computer manufacturers have …… both input and output devices into one terminal.
   b. The success of any computer system depends on the……..…all its parts to form a useful whole
   c. …… input and output devices into one peripheral has reduced the area needed for a computer installation.

2. coordination, coordinate, coordinated, coordinating, coordinator
   a. The control unit of a processor ……..… the flow of information between the arithmetic unit and the memory.
   b. ……..…... the many activities in a computer department is the job of the department head.
   c. The …….. of a language institute has assistants to help him and may have access to a computer to help him with the …… of the many programs, timetables, space and student results.

3. diagram, diagrammatic, diagrammatically, diagrammed
   a. Very often manufacturers provide ……..……representations of the internal workings of a computer.
   b. A …….. is a drawing that shows how something is arranged rather than what it actually looks like.
   c. A few ideas have been ……. for you in this book.

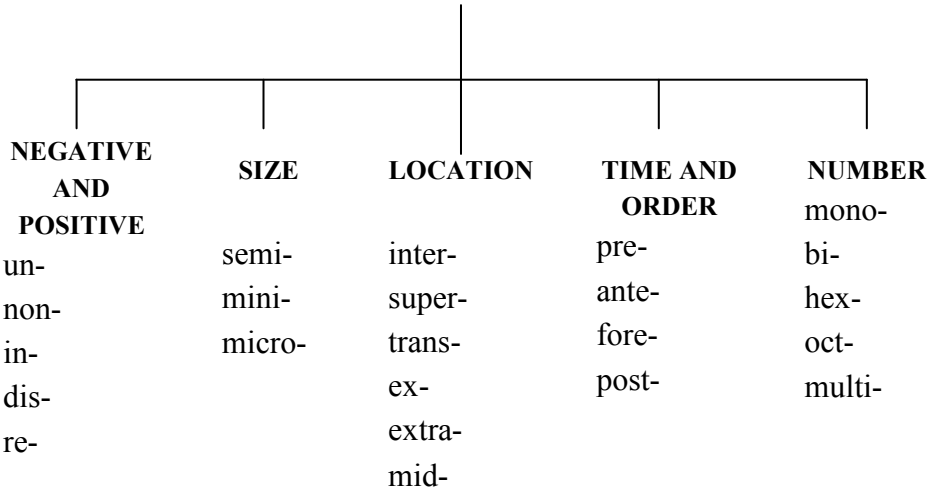
4. interchange, interchangeable, interchangeably interchanged.
   a. The words 'arithmetic-logic' and 'arithmetic-logical' can be used ……..
   b. There is often an . …….. of ideas among computer scientists.
   c. There is a big difference between an input and an output. These can not be……
5. division, divide, divisible
   a. It is often difficult for computer science students to ……..……their time up proportionally between studying and programming.
   b. Are all numbers …….……by three?
   c. There is always a …….. of labor within a computer company.

Structure1

Word formation - *Prefixes*

We have already seen how suffixes change the part of speech of a word. Let us now consider some prefixes, their usual meanings and how the change the meanings of English words.

PREFIXES



Exercise 1

Study these tables and try to find additional examples. Use your dictionary if necessary.

Negative and positive prefixes			
	PREFIX	**MEANING**	**EXAMPLES**

Negative	**un-, in-,**	not,	unmagnetized, unpunched,
	im-, il-,	not good enough	incomplete, impossible,
	ir-	not connected with	illegal, irregular, irrelevant
	non-	bad, wrong	non-programmable, non-impact
	mis-	opposite feeling, opposite action	mispronounce, mislead, mislay, misunderstand,
	dis-	against	disagree, disconnect
	anti-		antisocial
	de-	reduce, reverse	demagnetize, decode
	under-	too little	underestimate
Positive	**re-**	do again	reorganize
	over-	too much	overheat

Prefixes of size		
PREFIX	**MEANING**	**EXAMPLES**
semi-	half, partly	semiconductor
equi-	equal	equidistant
maxi-	big	maxicomputer
micro-	small	microcomputer
mini-	little	minicomputer
macro-	large	macroeconomics
mega-	large	megabyte

Prefixes of location		
PREFIX	**MEANING**	**EXAMPLES**
ante-, pre-	before	antecedent, prefix
prime-	first	primary, primitive
post-	after	postdated
retro-	backward	retroactive

Prefixes of time and order		
PREFIX	**MEANING**	**EXAMPLES**

semi-	half	semicircle
mono-	one	monochromatic
bi-	two	binary
tri-	three	triangle
quad-	four	quadruple
penta-	five	pentagon
hex-	six	hexadecimal
ceptefli-	seven	September
oct-	eight	octal
dec-	ten	decimal
multi-	many	multiprogramming, multiplexer

Other prefixes		
PREFIX	**MEANING**	**EXAMPLES**
pro-	for	program
auto-	self	automatic
co-	together	coordinate
neo-	new	neoclassical
pan-	all	Pan-American

Exercises 2

Fill in the blanks with the correct prefix from the following list. Use the glossary at the end of the book to help you.

multi-	*deci-*	*sub-*	*inter-*
semi-	*mono-*	*mega-*	*auto*
mini-	*de-*	*inter-*	*prim-*

1. ……byte means one million bytes.
2. …..……plexing is when many electrical signals are combined and carried on only one optical link.
3. Blocks are separated from each other by marks called …….block gaps.
4. The number system we use in everyday life is the ……mal system which has a base of 10.
5. CRT terminals are very useful ……...active devices for use in airline reservations.
6. Some screens are ……chromatic whereas others produce multicolor pictorial graphics.
7. The complete description of the logical structure of data is called the schema and the description of the parts, the ..…… schema.
8. The main storage locations of a computer are called its ……ary storage.

9. The small ferrite rings called cores have two states: they can be either magnetized or ……magnetized.
10. The introduction of chips or …….conductor memories made it possible to reduce the size of the computer.

Exercises 3

For each prefixes in structure 3 find out at least 4 words with it in the dictionary.

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

acclaim n. enthusiastic approval, applause
adj. acclaimed syn. praise
n. acclamation
Issac Stern has won acclaim abroad.
Acclaimed authors often win Pulitzer Prizes.

adverse adj. displeasing, objectionable, or bad
n. adversary syn. unfavorable
n. adversity
Adverse weather conditions made it difficult to play the game.
His indecision adversely affected his job performance.

autonomous adj. by itself, with no association
n. autonomy syn. independent
Mexico became an autonomous state in 1817.
Although working closely with the government, all businesses function autonomously.'

disruptive adj. causing confusion and interruption
v. disrupt syn. disturbing
n. disruption
Frequent questions during lectures can be disruptive.
The storm caused a disruption in bus service.

haphazardly adv. having no order or pattern, by chance
adj. haphazard syn. arbitrarily, carelessly
n. haphazardness
It was obvious that the house was built haphazardly.
Susan completed the assignment in a haphazard way.

advent n. the coming or arrival of something
syn. appearance
With the advent of computers, many tasks have been made easier.
The newspapers announced the advent of the concert season.

agile adj. able to move in a quick and easy way
n. agility syn. nimble
n. agileness
Deer are very agile animals.
She moved agilely across the stage.

albeit conj. in spite of the facts, regardless of the fact
syn. although
His trip was successful, albeit tiring.
Albeit difficult at times, speaking another language is rewarding.

ANCHOR-NET – a North Carolina Information Highway On-Ramp Network application. (1) The use to which an information processing system is put, for example, a payroll application, an accounting application, a network application. (2) A collection of software components used to perform specific types of user-oriented work on a computer. (3) Computer software that performs a business function (i.e., Microsoft Word is an application).

anonymous FTP (File Transfer Protocol) – a way to transfer files between computers on the Internet without needing a password. Universities, government agencies, and companies around the world have made files available to the public. To transfer files using anonymous FTP, you sign in on the other computer as "guest" or "anonymous" instead of using your real name. If someone tells you to use anonymous FTP and gives you the server name, just remember to use the word "anonymous" for your user ID. Usually, you can enter anything as a password.

ANSI (**American National Standards Institute**) – a voluntary non-profit organization that is the primary organization for fostering the development of technology standards in the United States.

ANSI works with industry groups and is the U.S. member of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Long-established computer standards from ANSI include the American Standard Code for Information Interchange (ASCII) and the Small Computer System Interface (SCSI).

anti-virus software – a class of program that searches your hard drive and floppy disks for any known or potential viruses. The market for this kind of program has expanded because of Internet growth and the increasing use of the Internet by businesses concerned about protecting their computer assets.

client/server – (1) In TCP/IP, the model of interaction in distributed data processing in which a program at one site sends a request to a program at another site and awaits a response. The requesting program is called a client and the answering program is called a server. (2) A computing model where functionality is divided between software clients and software servers. Clients depend on the services provided by servers, such as another application, component, or database, to complete the intended function.

client/server network – the most efficient way to connect 10 or more computers in a network to share information. Two popular client/server systems are Novell's NetWare and Microsoft's Windows NT. The server is the central computer that stores everyone's files. A client is any computer that can access the information stored on the server.

cluster systems – groups of interconnected, homogeneous processor computers and input/output systems acting as a single system. Cluster systems can be used to provide fault tolerant operation. Other machines in the cluster continue processing if a single processor fails.

CMIP (Common Management Information Protocol) – a network management protocol that was designed to improve on SNMP's weaknesses. It utilizes the Open Systems Interconnection (OSI) protocol, which is more complete than the TCP/IP protocol used by SNMP. The use of the CMIP protocol can increase network resource requirements; for this reason, it has not been widely accepted or implemented.

CMM (Capability Maturity Model) – created by the Software Engineering Institute (SEI) to assist organizations in maturing their people, process, and technology assets to improve long-term business performance

Ethernet – a local-area network (LAN) protocol that uses a bus topology and is one of the most widely implemented LAN standards to exchange information between computers on a network. Ethernet allows individuals to share files as well as peripherals such as a printer.

exabyte – a large unit of computer data storage, two to the sixtieth power bytes. The prefix *exa* means one billion billion, or one quintillion, which is a decimal term. Two to the sixtieth power is actually 1,152,921,504,606,846,976 bytes in decimal, or somewhat over a quintillion (or ten to the eighteenth power) bytes. It is common to say that an exabyte (EB) is approximately one quintillion bytes. In decimal terms, an exabyte is a billion gigabytes.

executable program – software that is compiled and ready to execute on a computer platform

extensible – the ability to easily integrate new technology and functionality

extranet – a private network that uses the Internet protocols and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses. An extranet can be viewed as part of a company's intranet that is extended to users outside the company. It has also been described as a "state of mind" in which the Internet is perceived as a way to do business with other companies as well as to sell products to customers.

The same benefits that HTML, HTTP, SMTP, and other Internet technologies have brought to the Internet and to corporate intranets now seem designed to accelerate

business between businesses. An extranet requires security and privacy. These require firewall server management, the issuance and use of digital certificates or similar means of user authentication, encryption of messages, and the use of virtual private networks (VPNs) that tunnel through the public network.

MUA (mail user agent) – the portion of the e-mail system that directly interacts with the end user; it may exist on one machine or may be divided across multiple machines. Although the MUA configuration may change, each individual MUA consists of an e-mail front end, an e-mail server, and the sub-components of each.

multi-dimensional database – a database that stores data that is closely related, viewed, and analyzed from multiple perspectives (i.e., dimensions)

multi-homed – a computer host that has multiple IP addresses to connected networks. A multihomed host is physically connected to multiple data links that can be on the same or different networks.

multimedia – the combined use of several media, including audio and video

multi-platform computing – computing accomplished through the use of multiple hardware and software types or operating system types

multiplexor – (1) A device that takes several input signals and combines them into a single output signal in such a manner that each of the input signals can be recovered (2) A device capable of interleaving the events of two or more activities or capable of distributing the events of an interleaved sequence to the respective activities

multi-tasking – the capability to process multiple tasks concurrently

multi-threaded – a computer hardware technology that allows a computer to process multiple simultaneous requests

multi-tier – Parts of a program can be distributed among several tiers, each located in a different computer in a network. Such a program is said to be tiered or multitiered. The 3-tier application model is probably the most common way of organizing a program in a network.

NCGOV.COM Initiative – Governor Hunt's e-government initiative, which includes PKI, credit card transactions, IT procurement, and IT enterprise management

WML (Wireless Markup Language) – WML, formerly called HDML (Handheld Devices Markup Language), is a language that allows the text portions of Web pages to be presented on cellular phones and personal digital assistants (PDAs) via wireless access. WML is part of the Wireless Application Protocol (WAP) that is being proposed by several vendors to standards bodies. The Wireless Application Protocol works on top of standard data link protocols, such as GSM, CDMA, and TDMA, and provides a complete set of network communication programs comparable to and supportive of the Internet set of protocols.

WML is an open language offered royalty-free. Specifications are available at Phone.com's Web site. According to Phone.com, any programmer with working knowledge of HTML, CGI scripts, and SQL queries should be able to write a presentation layer using WML. A filter program can be written or may be available from a vendor that will translate HTML pages into WML pages.

wrapper – In information technology, a wrapper is data that precedes or frames the main data or a program that sets up another program so that it can run successfully. On the Internet, http:// and "ftp://" are sometimes described as wrappers for the Internet addresses or URLs (Uniform Resource Locators) that follow. Bracketing symbols (such as < >) are sometimes referred to as wrappers.

In programming, a wrapper is a program or script that sets the stage and makes possible the running of another, more important program. In data transmission, a wrapper is the data that is put in front of or around a transmission that provides information about it and may also encapsulate it from view to anyone other than the intended recipient. A wrapper often consists of a header that precedes the encapsulated data and the trailer that follows it. In database technology, a wrapper can be used to determine who has access to look at or change the data that is wrapped.

WWW (World Wide Web) – the integrated worldwide network of computers based on the Hypertext Transfer Protocol (HTTP) and Transmission Control Protocol/Internet Protocol (TCP/IP), commonly used to bring information to computer users via a client browser program

WYSIWYG (what you see is what you get) – refers to a screen image that presents exactly that which will appear when the system is run or when the document or screen is printed.

X.25 – The CCITT protocol standard for connecting to packet-switched networks, typically used to connect wide area networks (WANs), packet switching breaks network data into smaller packets and sends the packets from point to point through interconnected switches. The X.25 protocol, adopted as a standard by the Consultative Committee for International Telegraph and Telephone (CCITT), is a commonly used network protocol. The X.25 protocol allows computers on different public networks (such as CompuServe, Tymnet, or a TCP/IP network) to communicate through an intermediary computer at the network layer level. X.25's protocols correspond closely to the data-link and physical-layer protocols defined in the Open Systems Interconnection (OSI) communication model.

X.400 – The ISO/CCITT mail transfer protocol standard. X.400 is the messaging (notably e-mail) standard specified by the ITU-TS (International Telecommunications Union – Telecommunication Standard Sector). It's an alternative to the more prevalent e-mail protocol, SMTP. X.400 is common in Europe and Canada. It's actually a set of standards, each in the 400-number range. Because X.400 stipulates a number of possible address characteristics that SMTP does not, an X.400 address can be long and cumbersome. On the other hand, X.400 adherents note that it is an official standard whereas SMTP is a "de facto" standard. Thus, products with X.400 implementations can be tested more rigorously than products with SMTP implementations can. X.400 offers more capabilities than SMTP does. However, many of these capabilities are seldom used.

UNIT 5

What is E-Learning?

About Online Learning

The information you'll here find will be helpful as you:

- research online learning
- decide upon a course of study
- choose a learning provider
- or are just curious about e-Learning!

What is e-Learning?

e-Learning is an umbrella term that describes learning done at a computer, usually connected to a network, giving us the opportunity to learn almost anytime, anywhere.

e-Learning is not unlike any other form of education - and it is widely accepted that e-Learning can be as rich and as valuable as the classroom experience or even more so. With its unique features e-Learning is an experience that leads to comprehension and mastery of new skills and knowledge, just like its traditional counterpart.

Instructional Design for e-Learning has been perfected and refined over many years using established teaching principles, with many benefits to students. As a result colleges, universities, businesses, and organizations worldwide now offer their students fully accredited online degree, vocational, and continuing education programs in abundance.

Some other terms frequently interchanged with e-Learning include:

- online learning
- online education
- distance education
- distance learning
- technology-based training
- web-based training
- computer-based training (generally thought of as learning from a CD-ROM)

Online Education Delivery Methods

Types of e-Learning

e-Learning is comes in many variations and often a combination of the following:

- Purely online - no face-to-face meetings
- Blended Learning - combination of online and face-to-face
- Synchronous
- Asynchronous
- Instructor-led group
- Self-study

- Self-study with subject matter expert
- Web-based
- Computer-based (CD-ROM)
- Video/audio tape

Delivery Methods

e-Learning is done over the WORLD WIDE WEB or by CD-ROM, and some variations (distance learning) incorporate traditional media. Here are common delivery methods used in e-Learning:

Print →
- e-text
- textbooks
- e-zines

Video →
- streaming video
- video tape
- satellite transmission
- cable

Audio →
- streaming audio
- audio tape

Review and Exams →
- electronic
- interactive
- paper

Communication → Asynchronous

- email
- listservs
- threaded discussion, web logs
- forums

Synchronous

- chat
- videoconferencing
- teleconferencing

How to Maximize Your Online Learning

Learning Styles

Knowing a little bit about learning styles can help you determine if online learning is for you. The interaction and delivery methods used in online classes are dramatically different from traditional classes, so understanding how you learn is a good part of the decision-making process. The knowledge can help you improve your study habits and be successful in any educational setting, regardless of what type of learner you are.

The three predominant learning styles are visual, auditory, and tactile/kinesthetic.

Broken down further, people learn by:

- Reading (visual)
- Listening (auditory)
- Seeing (visual)
- Speaking (auditory)
- Doing (Tactile/Kinesthetic)

The first three on the list are passive types of learning, while the last two are active types of learning. How much we tend to remember is a function of the type of learning we prefer and our level of involvement in the learning. People often learn through a combination of the ways described above. To a lesser degree, environment is a factor too.

The Active Learning Modes

Given a good learning environment (be it online or traditional), most people tend to remember best that which they do - practicing the real thing. Next, a combination of doing and speaking about what we learn produces a high retention rate, followed by speaking alone. These levels of involvement are all active learning modes.

The Passive Learning Modes

The passive learning modes - seeing and reading - fall just below the active learning modes on the retention ladder. After speaking, the combination of listening and seeing produces the next best retention results, then listening, then seeing, and then reading.

How it all relates to Online Learning

In an online class there is a lot of passive learning done through reading text, listening to audio clips, and seeing graphics, but the active "speaking" mode is done very much through writing, email, and chatting. Online learners are often self-directed and/or working in their chosen fields, so a lot of doing happens in the way of applying their newfound knowledge to the workplace, hobby, or home. For this reason many online learners say they learn more in online classes than traditional settings, and have better retention, too.

As you consider online learning, recognize that everyone learns differently and attempt to zero in on the particular style you use best. Maximize your online learning by choosing the courses suited to your learning styles - and be sure to talk about and apply what you learn.

The Illinois Online Network says one of the best things you can do as an online learning student is become a true advocate of its merits through discussion. If you ". . .truly believe in its potential to provide quality education which is equal to, if not better than the traditional face-to-face environment", you'll strengthen the habits you need to succeed.

New Dimensions in Education

Benefits of E-Learning

"Good teaching is good teaching, no matter how it's done."

The old adage still rings true, and e-Learning brings with it new dimensions in education. Some of the unique features of e-Learning are listed below.

Features of E-Learning

- Learning is self-paced and gives students a chance to speed up or slow down as necessary
- Learning is self-directed, allowing students to choose content and tools appropriate to their differing interests, needs, and skill levels
- Accommodates multiple learning styles using a variety of delivery methods geared to different learners; more effective for certain learners
- Designed around the learner
- Geographical barriers are eliminated, opening up broader education options
- 24/7 accessibility makes scheduling easy and allows a greater number of people to attend classes
- On-demand access means learning can happen precisely when needed
- Travel time and associated costs (parking, fuel, vehicle maintenance) are reduced or eliminated
- Overall student costs are frequently less (tuition, residence, food, child care)
- Potentially lower costs for companies needing training, and for the providers
- Fosters greater student interaction and collaboration
- Fosters greater student/instructor contact
- Enhances computer and Internet skills
- Draws upon hundreds of years of established pedagogical principles
- Has the attention of every major university in the world, most with their own online degrees, certificates, and individual courses

Benefits of e-Learning

There are many significant advantages for the student who learns online. Here are just a few to consider:

Convenience and Portability

- Courses are accessible on your schedule
- Online learning does not require physical attendance
- Learning is self-paced (not too slow, not too fast)
- You're unbound by time - courses are available 24/7
- You're unbound by place - study at home, work, or on the road
- Read materials online or download them for reading later

Cost and Selection

- Choose from a wide range of courses to meet your needs
- Degree, Vocational, and Certificate programs
- Continuing Education
- Individual courses

- Wide range of prices to fit your budget
- Go back to school to get a degree, learn a new skill, learn a new craft, or just have fun!
- From art to zoology you can do it all online in a price range to fit your budget.

Flexibility

- Online learning accommodates your preferences and needs - it's student-centered
- Choose instructor-led or self-study courses
- Skip over material you already know and focus on topics you'd like to learn
- Use the tools best suited to your learning styles

Higher Retention

- Online learning will draw you to topics you like and enjoy. Studies show that because of this and the variety of delivery methods used to reach different types of learners, retention is frequently better than in a traditional classroom.

Greater Collaboration

- Technology tools make collaboration among students much easier. Since many projects involve collaborative learning, the online environment is far easier (and often more comfortable) to work in since learners don't have to be face-to-face.

Global Opportunities

- The global learning community is at your fingertips with online learning. The technologies used give online instructional designers the ability to build in tools that take you to resources you may never see in a traditional classroom.

How to Choose an Online Course

E-Learning Evaluation

Online courses come in many flavors. Selecting the right online course for you - one that matches your education needs and your learning style - can be a daunting task, but here are a few simple questions to guide you. Use them to accelerate your search and make comparisons.

How does your learning style match up to the course delivery? Using the table below, you can get an idea of what types of course activities match your learning style. Remember that we generally learn in a variety of different ways and most courses combine delivery modalities to reach a large audience. Be sure to ask if you have a preference or need for a particular type of learning.

If you learn best by:	Look for a course with:
Reading	e-books, textbooks, and other required reading (written lessons are a primary method of delivering curriculum online)

Listening	audio lectures or sound bytes to explain concepts
Seeing how things are done	graphical demonstrations that illustrate new ideas
Doing	Assignments, quizzes, exams, or practical application examples
Speaking/Communicating	email, chat, or threaded discussion groups for sharing and feedback

Are you looking for short, personal enrichment classes or longer, more comprehensive courses for professional development or study toward a degree? You can narrow your options by deciding in advance how in-depth you want to go and how much time you want to spend. Courses associated with degrees are generally more complete in their treatment of a topic, although personal enrichment and professional development courses can be quite thorough too. Online education covers the spectrum from short tutorials to semester-length academic classes and the time you'll spend is directly proportionate to the type of course you select.

Do you want a self-directed or instructor-led course?
Some of us need structure and deadlines. Others prefer to study at our convenience. Self-directed courses generally allow more time for completion and the flexibility to jump around the curriculum at your own pace (although they may still have final deadlines). Instructor-led courses are more structured and deliver the material in a progressive or suggested sequence, guiding the learner to the finish. Also, self-directed courses normally don't have a human point of contact for help or feedback, but some may offer subject matter experts.

Open Enrollment vs. Traditional scheduling (following the timing of the school)
With open enrollment, you can learn on your time, starting whenever you want to. Other scheduling takes away that control, especially if it follows a quarter or semester schedule in conjunction with a traditional school.

Are credits or CEU's important to you?
Academic credit or CEU's (continuing education units) may be a requirement in your selection process. If so, read about the school or program's accreditation status and check with them regarding CEU's or credits for the particular course you're looking at. If credits or CEU's don't matter to you, your options are wide open.

What type of support is available?
Some online classes come with other student services like tutoring, reference links, library access, mentoring, writing/math labs, technical assistance, and other resources to help the learning process, while others are void of this.

How much do you want to spend?
The more in-depth the course, the more you can expect to pay. There are a wide range of choices to fit your budget. Personal/professional development courses cost $10-$300 or more, and comprehensive courses linked to degrees a few hundred to a thousand dollars or more. Short tutorials may be free or low cost. Cost is last on the list of questions for good reason: the other factors to consider in choosing an online course are equally, if not more important.

Once you've used these questions to narrow your field of choices, you'll find that many course providers offer a free demo that can help you decide and compare content and presentation.

Common Terms Used in Online Learning

E-Learning Glossary

A | B | C | D | E | F | G | H | I | K | L | M | N | O | P | R | S | T | U | V | W | Z

A

Accreditation
the recognition or certification of an institution that has been reviewed and meets specific measures of quality.

Analog
a fluctuating electronic signal used for storing and transferring data. The continuous nature of analog signals makes it relatively difficult to store, manipulate, and transfer data. Analog signals are transmitted slower than digital signals.

Applet
a small program or application that runs on a browser and enables additional features like animation.

Application
a software program that allows a user to perform specific tasks like word processing, email, accounting, database management.

Asynchronous Learning
learning where people are not online at the same time and interaction does not occur without a time delay, allowing people to participate on their schedules. Examples are email, discussion groups, and self-paced courses delivered via Internet or CD-ROM.

Audio Conferencing
voice-only connection between three or more locations.

B

Bandwidth
the capacity of a communication channel to carry information. The greater the bandwidth, the faster the data transfer. The amount of data sent or received over any given time is limited by bandwidth.

BBS (bulletin board system)
a system maintained by a host computer for posting information, carrying on discussions, uploading and downloading files, chatting, and other online services. BBSs are generally created for a specific group of users and are usually topic-specific.

Blended Learning
an increasing popular combination of online and in-person learning activities.

Blog (Weblog)
a public web site where users post informal journals of their thoughts, comments, and philosophies, updated frequently and normally reflecting the views of the blog's creator.

Broadband
a transmission channel able to simultaneously carry multiple signals.

Browser
software for interacting with , accessing, and viewing information on the Internet or created in HTML. Internet Explorer and Netscape Navigator are the two most widely used browsers.

Byte
one character that can be a letter, number, or symbol.

C

Cable Modem
a device that uses coaxial cables to transmit data faster than telephone line modems and roughly equivalent to modems using DSL telephone service.

CBT (Computer-Based Training)
training conducted using a computer, often used when referring to education or training presented while a computer is not connected to a network.

CD-ROM (compact disk read-only memory)
an electronic data storage medium that uses optical technology for storing and playing back audio, video, text, and other information in digital form.

Certification
a valued credential awarded in several fields that proves competency upon satisfactory demonstration of particular knowledge and skills.

Chat
An online, real-time interactive communication method using text to send and receive instant messages.

Cookie
a small text file placed on your hard by a web site to record information about you. When you return, your computer serves up the "cookie" to the web site and previously recorded information such as your name, site login/password, preferences, shopping cart info, and more are passed along. The web page is then customized based on that information.

Courseware
educational software that delivers course material and instruction via computer.

D

Delivery
the method of getting information to the user via Internet, CD-ROM, books, instructors, and other mediums.

Dial-up
an Internet connection achieved through telephone lines using a modem.

Digital
A discrete electronic signal used for storing and transferring data. The non-continuous nature of digital signals makes it relatively easy to store, manipulate, and transfer data. Digital signals are transmitted faster than analog signals.

Discussion Forums
a place where people can exchange messages of common interest.

Distance Education
education designed for delivery where students and instructors not in the same location.

Distance Learning
often used synonymously with Distance Education; distinct as an outcome of Distance Education.

Distributed Learning
often used synonymously with Distance Learning; distinct in that it is the outcome of education that combines a blend of online and traditional delivery methods.

Download
a file transfer from one computer to yours.

DSL (digital subscriber line)
an Internet access method for high-speed data transfer over telephone lines.

DVD (digital versatile disk)
an electronic data storage medium that uses optical technology for storing and playing back audio, video, text, and other information in digital form, but with far greater capacity than CDs.

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E

E-Learning
learning that is accomplished over the Internet, a computer network, via CD-ROM, interactive TV, or satellite broadcast.

Email
short for electronic mail; primarily text messages sent between two computers.

End User
the person or persons who will be using a particular technology and for whom it is designed.

F

Facilitator
an instructor who assists, directs, and stimulates the learning during an online course.

FAQ (frequently asked questions)
highly useful, a list of common questions about a particular topic, product, or service directed primarily at new users.

File Server
a computer that stores and manages files and software on a computer network, giving users the capability of sharing information and other resources.

Firewall
specialized hardware or software designed to secure a computer or network from unauthorized access.

FTP (file transfer protocol)
an Internet protocol for transferring files between two computers. Most browsers incorporate FTP software to download and upload files.

G

GB (gigabyte)
a gigabyte is 1000 megabytes, or 1,073,741,824 characters and is roughly equivalent to a thousand novels.

GUI (graphical user interface)
a computer interface that presents information in a user-friendly way using pictures and icons.

H

Home page
the opening page or main document that appears when you visit a web site, usually contains links to other web pages.

Host
a computer system on a network that distributes and receives information from other computers.

HTML (Hypertext Markup Language)
computer code used to structure text and images for viewing with a browser.

HTTP (Hypertext Transfer Protocol)
an Internet application protocol used for exchanging information over the world wide web.

Hypertext
highlighted text in a web page that links the user to additional related information.

I

ILT (Instructor-led Training)
delivery of a course in a traditional classroom setting wherein an instructor guides a group of learners.

Instructional Designer
the person who develops the methodology and delivery systems for presenting course content.

Interactive multimedia
allows two-way interaction with multimedia course material, another computer, or another user with direct response to the input, as opposed to one-way communication from TV, video, and other non-responsive media. Interactive attributes commonly include data or text entry, mouse input, touch screens, voice commands, video capture, and real-time interaction.

Internet
the global network of regional and local computer networks.

Intranet
an internal computer network owned by a company or organization and accessible only to designated staff.

ISDN (integrated service digital network)
a telecommunications line that is able to carry data, voice, and video simultaneously.

K

KB (kilobyte)
a kilobyte is 1042 characters (bytes), roughly equivalent to one page of double-spaced text.

Knowledge Management
the collection, organization, analysis, and sharing of information held by workers and groups within an organization.

L

LAN (local area network)
a group of networked computers in relative proximity to one another that allows users to communicate and share information and other devices such as file servers, printers, and modems.

Link
hypertext that is usually underlined to indicate a pointer to additional related information.

Listserv
an automatic email service that users subscribe to in order to receive future mailings. Users must be a member of the list to receive mail, and can choose to unsubscribe at any time.

Log in/on
the act of providing a user name and password to gain access to another computer, application, web site, or file.

Log off/out
the act of disconnecting from another computer, application, web site, or file.

M

MB (megabyte)
one megabyte is 1,048,576 bytes and is roughly equivalent to one novel. A floppy disk stores 1.44MB, CDs over 600MB, and DVDs are capable of holding up to 17GBs (or 17,000MBs) of information!

Metatag
an HTML code line that identifies the contents of the web page to search engine indexes.

Modem
MOdulator/DEModulator, a device that converts digital signals to analog for transmission, and analog signals back to digital upon reception.

Multicasting
an audio, video, email, or application broadcast over the web, from one computer to many.

Multimedia
the combination of text, graphics, audio, colors to create used to present information in an engaging and dynamic way.

N

Netiquette
etiquette on the Internet, best used when sending email, chatting, posting messages, and using limited resources.

Network
a group of computers and peripheral devices (like printers and modems) connected to allow users to communicate and share information and resources.

Newsgroup
an information exchange forum where notes about a particular topic are posted and shared.

O

Onground
a traditional classroom instructional setting.

Online
connected to the Internet or another computer.

Online learning
an umbrella term used to describe any education or training that occurs online.

P

Plug-in
software programs that enhance your browser and allow it to perform additional tasks such as playing audio, displaying video, and viewing documents as an integrated function of the browser.

Portal
web site that is a major starting point or gateway to additional information on the Internet, sometimes general (like Yahoo!) and sometimes specific (like World Wide Learn).

Post
used as a noun for messages "posted" to BBSs, newsgroups, blogs, etc.

R

Real-time communication
communication with little or no delay; synchronous interaction.

Rich content
high quality course or web page material, often presented using advanced or sophisticated design techniques employed to emphasize the message or learning.

S

Self-paced learning
learning that is done asynchronously, such as from CD-ROM or over the Internet without an instructor, where the user controls the flow of course material.

Server
a computer with large storage capacity that serves out files, applications, and other resources.

Simulations
interactive multimedia presentations designed to model real scenarios and which allow the user to participate and experience without risk.

SME (subject matter expert)
one who has demonstrated competency and mastery in a particular subject or topic.

Software
computer programming code that provides a computer with instructions to perform specific tasks; a program or application.

Spam
unsolicited email.

Streaming
a technique where media (audio, video, or both) are downloaded to the user's computer in a continuous stream and played upon arrival.

Synchronous learning
Learning where people are online at the same time and interaction occurs without a time delay (real-time) and which requires them to attend at specific times.

T

Teleconferencing
video or audio conferences conducted over telecommunications channels such as telephone lines, local area networks, and the Internet.

24/7
24 hours per day, seven days a week. Refers to availability of a service, product, person, or information.

U

Upload
a file transfer from your computer to another.

URL (uniform resource locator)
the address used to identify a page or file on the Internet.

User interface
the components of a computer system that the operator uses to interact with the computer - the screen display, keyboard, mouse, touch controls, etc.

V

Video Conferencing
live video and audio communication between three or more locations.

Virtual
not physical.

Virtual classroom
the area where students and instructors interact online.

Virtual community
a community on the Internet where people share common interests; an online community.

W

W3C
the World Wide Web consortium, whose mission it is to create standards and specifications for the World Wide Web.

WBT (web-based training)
education or training delivered over the Internet and accessible using a browser. May incorporate the use of an instructor or facilitator.

Web page
an HTML file or document; part of a web site.

Web site
a group of related web pages that includes a home page.

WWW (World Wide Web)
as defined by the World Wide Web consortium, "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge." Alternatively, the web is the collection of users and resources on the Internet that use HTTP (Hypertext Transfer Protocol).

WYSIWYG (what you see is what you get)
computer text and graphics that will print exactly as they appear on the screen.

Z

Zip file
a file that has been reduced in size to allow faster transferring between computers, or to save storage space. Originated with PKWARE, the technique is widely used and the term is used frequently to describe any compressed file. Some compressed files have the .EXE extension, indicating the file is self-extracting.

UNIT 6

E-Banking

This booklet, one of several comprising the FFIEC Information Technology Examination Handbook (IT Handbook), provides guidance to examiners and financial institutions on identifying and controlling the risks associated with electronic banking (e-banking) activities. The booklet primarily discusses e-banking risks from the perspective of the services or products provided to customers. This approach differs from other booklets that discuss risks from the perspective of the technology and systems that support automated information processing. To avoid duplication of material, this booklet refers the reader to other IT Handbook booklets for detailed explanations of technology-specific issues or controls.

Examiners may use the examination procedures and request letter items included in this booklet in appendix A to review risks in the electronic delivery of financial products and services. These procedures address services and products of varied complexity. Examiners should adjust the procedures, as appropriate, for the scope of the examination and the risk profile of the institution. The procedures may be used independently or in combination with procedures from other IT Handbook booklets or from agency handbooks covering non-IT areas.

DEFINITION OF E-BANKING

For this booklet, e-banking is defined as the automated delivery of new and traditional banking products and services directly to customers through electronic, interactive communication channels. E-banking includes the systems that enable financial institution customers, individuals or businesses, to access accounts, transact business, or obtain information on financial products and services through a public or private network, including the Internet. Customers access e-banking services using an intelligent electronic device, such as a personal computer (PC), personal digital assistant (PDA), automated teller machine (ATM), kiosk, or Touch Tone telephone. While the risks and controls are similar for the various e-banking access channels, this booklet focuses specifically on Internet-based services due to the Internet's widely accessible public network. Accordingly, this booklet begins with a discussion of the two primary types of Internet websites: informational and transactional.

INFORMATIONAL WEBSITES

Informational websites provide customers access to general information about the financial institution and its products or services. Risk issues examiners should consider when reviewing informational websites include:

- Potential liability and consumer violations for inaccurate or incomplete information about products, services, and pricing presented on the website;
- Potential access to confidential financial institution or customer information if the website is not properly isolated from the financial institution's internal network;
- Potential liability for spreading viruses and other malicious code to computers communicating with the institution's website; and
- Negative public perception if the institution's on-line services are disrupted or if its website is defaced or otherwise presents inappropriate or offensive material.

TRANSACTIONAL WEBSITES

Transactional websites provide customers with the ability to conduct transactions through the financial institution's website by initiating banking transactions or buying products and services. Banking transactions can range from something as basic as a retail account balance inquiry to a large business-to-business funds transfer. E-banking services, like those delivered through other delivery channels, are typically classified based on the type of customer they support. The following table lists some of the common retail and wholesale e-banking services offered by financial institutions.

Table 1: Common E-Banking Services

Retail Services	Wholesale Services
Account management	Account management
Bill payment and presentment	Cash management
New account opening	Small business loan applications, approvals, or advances
Consumer wire transfers	
Investment/Brokerage services	Commercial wire transfers
Loan application and approval	Business-to-business payments
Account aggregation	Employee benefits/pension administration

Since transactional websites typically enable the electronic exchange of confidential customer information and the transfer of funds, services provided through these websites expose a financial institution to higher risk than basic informational websites. Wholesale e-banking systems typically expose financial institutions to the highest risk per transaction, since commercial transactions usually involve larger dollar amounts. In addition to the risk issues associated with informational websites, examiners reviewing transactional e-banking services should consider the following issues:

- Security controls for safeguarding customer information;
- Authentication processes necessary to initially verify the identity of new customers and authenticate existing customers who access e-banking services;
- Liability for unauthorized transactions;
- Losses from fraud if the institution fails to verify the identity of individuals or businesses applying for new accounts or credit on-line;
- Possible violations of laws or regulations pertaining to consumer privacy, anti-money laundering, anti-terrorism, or the content, timing, or delivery of required consumer disclosures; and
- Negative public perception, customer dissatisfaction, and potential liability resulting from failure to process third-party payments as directed or within specified time frames, lack of availability of on-line services, or unauthorized access to confidential customer information during transmission or storage.

E-BANKING

COMPONENTS

E-banking systems can vary significantly in their configuration depending on a number of factors. Financial institutions should choose their e-banking system configuration, including outsourcing relationships, based on four factors:

- Strategic objectives for e-banking;
- Scope, scale, and complexity of equipment, systems, and activities;
- Technology expertise; and
- Security and internal control requirements.

Financial institutions may choose to support their e-banking services internally. Alternatively, financial institutions can outsource any aspect of their e-banking systems to third parties. The following entities could provide or host (i.e., allow applications to reside on their servers) e-banking-related services for financial institutions:

- Another financial institution,
- Internet service provider,
- Internet banking software vendor or processor,
- Core banking vendor or processor,
- Managed security service provider,
- Bill payment provider,
- Credit bureau, and
- Credit scoring company.

E-banking systems rely on a number of common components or processes. The following list includes many of the potential components and processes seen in a typical institution:

- Website design and hosting,
- Firewall configuration and management,
- Intrusion detection system or IDS (network and host-based),
- Network administration,
- Security management,
- Internet banking server,
- E-commerce applications (e.g., bill payment, lending, brokerage),
- Internal network servers,
- Core processing system,
- Programming support, and
- Automated decision support systems.

These components work together to deliver e-banking services. Each component represents a control point to consider.

Through a combination of internal and outsourced solutions, management has many alternatives when determining the overall system configuration for the various components of an e-banking system. However, for the sake of simplicity, this booklet presents only two basic variations. First, one or more technology service providers can host the e-banking application and numerous network components as illustrated in the following diagram. In this configuration, the institution's service provider hosts the institution's website, Internet banking server, firewall, and intrusion detection system. While the institution does not have to manage the daily administration of these component systems, its management and board remain responsible for the content, performance, and security of the e-banking system.

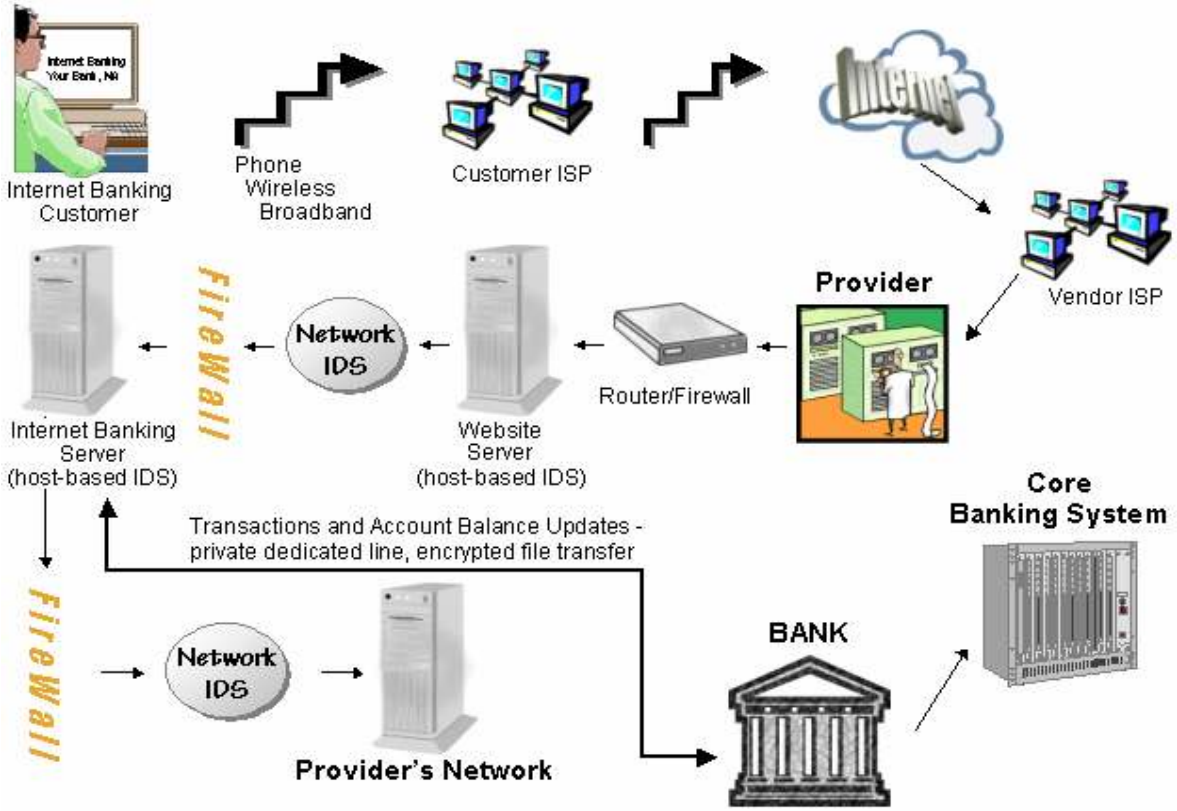


Figure 1: Third-Party Provider Hosted E-Banking Diagram

This diagram illustrates the transaction flow for one possible configuration where the bank relies on a technology service provider to host its Internet banking application.

Internet banking customer sends an e-banking transaction through their Internet Service Provider (ISP) via a phone, wireless, or broadband connection.

The customer's ISP routes the transaction through the Internet and sends it to the e-banking service provider's ISP, which routes it to the provider.

The transaction enters the provider's network through a router, which directs the e-banking transaction through a firewall to the application running on the Internet banking server.

The website server and Internet banking server may have host-based intrusion detection system (IDS) software monitoring the server and its files to provide alerts of potential unauthorized modifications.

Network IDS software may reside at different points within the network to analyze the message for potential attack characteristics that suggest an intrusion attempt.

The Internet banking application processes the transaction against account balance data through a real time connection to the core banking system or a database of account balance data, which is updated periodically from the core banking system.

The Internet banking server has a firewall filtering Internet traffic from its internal network.

Second, the institution can host all or a large portion of its e-banking systems internally. A typical configuration for in-house hosted, e-banking services is illustrated below. In this case, a provider is not between the Internet access and the financial institution's core processing system. Thus, the institution has day-to-day responsibility for system administration.

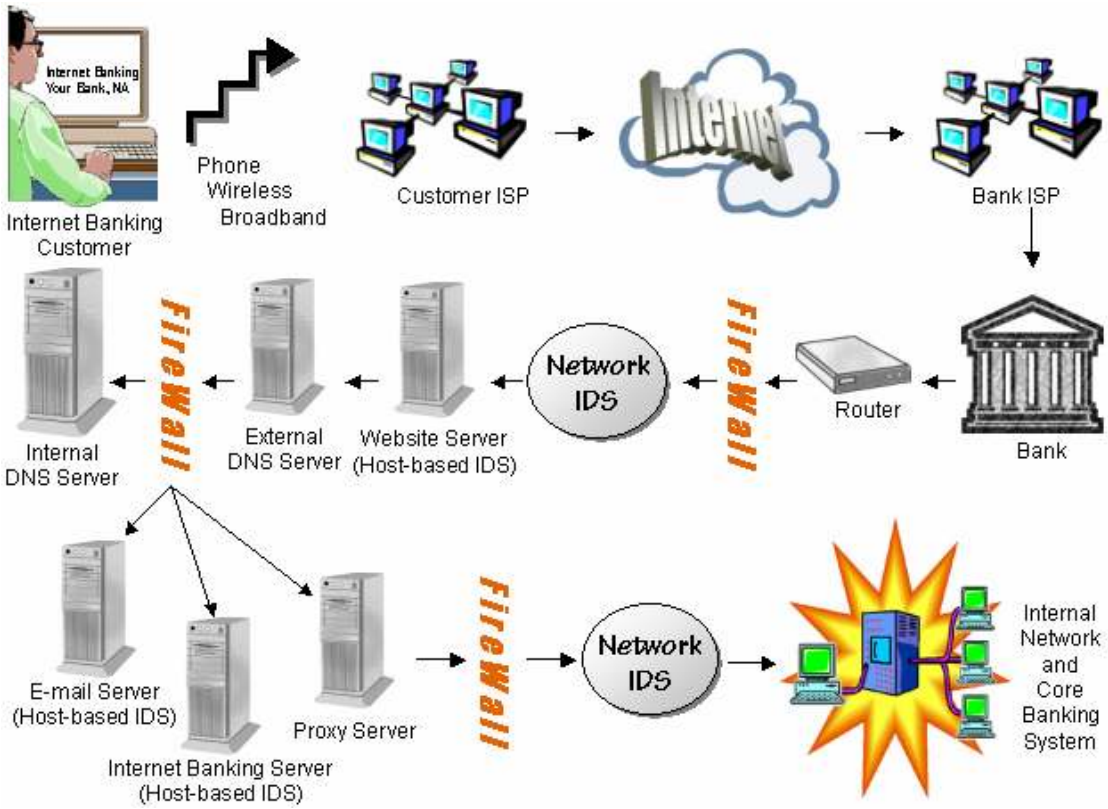


Figure 2: In-House E-Banking Diagram

This diagram illustrates the transaction flow for one possible configuration in which the bank hosts the Internet banking application.

Internet banking customer sends an e-banking transaction through their Internet Service Provider (ISP) via a phone, wireless, or broadband connection.

The customer's ISP routes the transaction through the Internet and sends it to the e-banking service bank's ISP, which routes it the provider.

The transaction enters the bank's network through a router, which directs the Internet-banking transaction through a firewall to the application running on the Internet banking server.

The bank typically has several Internet application servers that could include a website server, e-mail server, proxy server, and domain name server (DNS) in addition to the Internet banking application server.

The router will typically send the transaction around the other application servers directly to the Internet banking server unless it is a non-banking transaction.

The website server and Internet banking server may have host-based intrusion detection system (IDS) software monitoring the server and its files to provide alerts of potential unauthorized modifications.

Network IDS software may reside at different points within the network to analyze the message for potential attack characteristics that suggest an unauthorized intrusion attempt.

The Internet banking application processes the transaction against account balance data through a real time connection to the core banking system or a database of account balance data, which is updated periodically from the core banking system.

The Internet banking server has a firewall filtering Internet traffic from the bank's internal network

E-BANKING SUPPORT SERVICES

In addition to traditional banking products and services, financial institutions can provide a variety of services that have been designed or adapted to support e-commerce. Management should understand these services and the risks they pose to the institution. This section discusses some of the most common support services: weblinking, account aggregation, electronic authentication, website hosting, payments for e-commerce, and wireless banking activities.

WEBLINKING

A large number of financial institutions maintain sites on the World Wide Web. Some websites are strictly informational, while others also offer customers the ability to perform financial transactions, such as paying bills or transferring funds between accounts.

Virtually every website contains "weblinks." A weblink is a word, phrase, or image on a webpage that contains coding that will transport the viewer to a different part of the website or a completely different website by just clicking the mouse. While weblinks are a convenient and accepted tool in website design, their use can present certain risks. Generally, the primary risk posed by weblinking is that viewers can become confused about whose website they are viewing and who is responsible for the information, products, and services available through that website. There are a variety of risk management techniques institutions should consider using to mitigate these risks. These risk management techniques are for those institutions that develop and maintain their own websites, as well as institutions that use third-party service providers for this function. The agencies have issued guidance on weblinking that provides details on risks and risk management techniques financial institutions should consider.

ACCOUNT AGGREGATION

Account aggregation is a service that gathers information from many websites, presents that information to the customer in a consolidated format, and, in some cases, may allow the customer to initiate activity on the aggregated accounts. The information gathered or aggregated can range from publicly available information to personal account information (e.g., credit card, brokerage, and banking data). Aggregation services can improve customer convenience by avoiding multiple log-ins and providing access to tools that help customers analyze and manage their various account portfolios. Some aggregators use the customer-provided user IDs and passwords to sign in as the customer. Once the customer's account is accessed, the aggregator copies the personal account information from the website for representation on the aggregator's site (i.e., "screen scraping"). Other aggregators use direct data-feed arrangements with website operators or other firms to obtain the customer's information. Generally, direct data feeds are thought to provide greater legal protection to the aggregator than does screen scraping.

Financial institutions are involved in account aggregation both as aggregators and as aggregation targets. Risk management issues examiners should consider when reviewing aggregation services include:

- Protection of customer passwords and user IDs – both those used to access the institution's aggregation services and those the aggregator uses to retrieve customer information from aggregated third parties – to assure the confidentiality of customer information and to prevent unauthorized activity,
- Disclosure of potential customer liability if customers share their authentication information (i.e., IDs and passwords) with third parties, and
- Assurance of the accuracy and completeness of information retrieved from the aggregated parties' sites, including required disclosures

Additional information regarding management of risks in aggregation services can be found in appendix D.

ELECTRONIC AUTHENTICATION

Verifying the identities of customers and authorizing e-banking activities are integral parts of e-banking financial services. Since traditional paper-based and in-person identity authentication methods reduce the speed and efficiency of electronic

transactions, financial institutions have adopted alternative authentication methods, including:

- Passwords and personal identification numbers (PINs),
- Digital certificates using a public key infrastructure (PKI),
- Microchip-based devices such as smart cards or other types of tokens,
- Database comparisons (e.g., fraud-screening applications), and
- Biometric identifiers.

The authentication methods listed above vary in the level of security and reliability they provide and in the cost and complexity of their underlying infrastructures. As such, the choice of which technique(s) to use should be commensurate with the risks in the products and services for which they control access. Additional information on customer authentication techniques can be found in this booklet under the heading "Authenticating E-Banking Customers."

The Electronic Signatures in Global and National Commerce (E-Sign) Act establishes some uniform federal rules concerning the legal status of electronic signatures and records in commercial and consumer transactions so as to provide more legal certainty and promote the growth of electronic commerce. The development of secure digital signatures continues to evolve with some financial institutions either acting as the certification authority for digital signatures or providing repository services for digital certificates.

WEBSITE HOSTING

Some financial institutions host websites for both themselves as well as for other businesses. Financial institutions that host a business customer's website usually store, or arrange for the storage of, the electronic files that make up the website. These files are stored on one or more servers that may be located on the hosting financial institution's premises. Website hosting services require strong skills in networking, security, and programming. The technology and software change rapidly. Institutions developing websites should monitor the need to adopt new interoperability standards and protocols such as Extensible Mark-Up Language (XML) to facilitate data exchange among the diverse population of Internet users.

Risk issues examiners should consider when reviewing website hosting services include damage to reputation, loss of customers, or potential liability resulting from:

- Downtime (i.e., times when website is not available) or inability to meet service levels specified in the contract,
- Inaccurate website content (e.g., products, pricing) resulting from actions of the institution's staff or unauthorized changes by third parties (e.g., hackers),
- Unauthorized disclosure of confidential information stemming from security breaches, and
- Damage to computer systems of website visitors due to malicious code (e.g., virus, worm, active content) spread through institution-hosted sites.

PAYMENTS FOR E-COMMERCE

Many businesses accept various forms of electronic payments for their products and services. Financial institutions play an important role in electronic payment systems by creating and distributing a variety of electronic payment instruments, accepting a similar variety of instruments, processing those payments, and participating in clearing and settlement systems. However, increasingly, financial institutions are competing with third parties to provide support services for e-commerce payment systems. Among the electronic payments mechanisms that financial institutions provide for e-commerce are automated clearing house (ACH) debits and credits through the Internet, electronic bill payment and presentment, electronic checks, e-mail money, and electronic credit card payments. Additional information on payments systems can be found in other sections of the *IT Handbook*.

Most financial institutions permit intrabank transfers between a customer's accounts as part of their basic transactional e-banking services. However, third-party transfers – with their heightened risk for fraud – often require additional security safeguards in the form of additional authentication and payment confirmation.

Bill Payment and Presentment

Bill payment services permit customers to electronically instruct their financial institution to transfer funds to a business's account at some future specified date. Customers can make payments on a one-time or recurring basis, with fees typically assessed as a "per item" or monthly charge. In response to the customer's electronic payment instructions, the financial institution (or its bill payment provider) generates an electronic transaction – usually an automated clearinghouse (ACH) credit – or mails a paper check to the business on the customer's behalf. To allow for the possibility of a paper-based transfer, financial institutions typically advise customers to make payments effective 3–7 days before the bill's due date.

Internet-based cash management is the commercial version of retail bill payment. Business customers use the system to initiate third-party payments or to transfer money between company accounts. Cash management services also include minimum balance maintenance, recurring transfers between accounts and on-line account reconciliation. Businesses typically require stronger controls, including the ability to administer security and transaction controls among several users within the business.

This booklet discusses the front-end controls related to the initiation, storage, and transmission of bill payment transactions prior to their entry into the industry's retail payment systems (e.g., ACH, check processing, etc.). The IT Handbook's "Retail Payments Systems Booklet" provides additional information regarding the various electronic transactions that comprise the back end for bill payment processing. The extent of front-end operating controls directly under the financial institution's control varies with the system configuration. Some examples of typical configurations are listed below in order of increasing complexity, along with potential control considerations.

- Financial institutions that do not provide bill payment services, but may direct customers to select from several unaffiliated bill payment providers.

- Caution customers regarding security and privacy issues through the use of on-line disclosures or, more conservatively, e-banking agreements.

- Financial institutions that rely on a third-party bill payment provider including Internet banking providers that subcontract to third parties.
  - Set dollar and volume thresholds and review bill payment transactions for suspicious activity.
  - Gain independent audit assurance over the bill payment provider's processing controls.
  - Restrict employees' administrative access to ensure that the internal controls limiting their capabilities to originate, modify, or delete bill payment transactions are at least as strong as those applicable to the underlying retail payment system ultimately transmitting the transaction.
  - Restrict by vendor contract and identify the use of any subcontractors associated with the bill payment application to ensure adequate oversight of underlying bill payment system performance and availability.
  - Evaluate the adequacy of authentication methods given the higher risk associated with funds transfer capabilities rather than with basic account access.
  - Consider the additional guidance contained in the IT Handbook's "Information Security," "Retail Payment Systems," and "Outsourcing Technology Services" booklets.
- Financial institutions that use third-party software to host a bill payment application internally.
  - Determine the extent of any independent assessments or certification of the security of application source code.
  - Ensure software is adequately tested prior to installation on the live system.
  - Ensure vendor access for software maintenance is controlled and monitored.
- Financial institutions that develop, maintain, and host their own bill payment system.
  - Consider additional guidance in the IT Handbook's "Development and Acquisition Booklet."

Financial institutions can offer bill payment as a stand-alone service or in combination with bill presentment. Bill presentment arrangements permit a business to submit a customer's bill in electronic form to the customer's financial institution. Customers can view their bills by clicking on links on their account's e-banking screen or menu. After viewing a bill, the customer can initiate bill payment instructions or elect to pay the bill through a different payment channel.

In addition, some businesses have begun offering electronic bill presentment directly from their own websites rather than through links on the e-banking screens of a financial institution. Under such arrangements, customers can log on to the business's website to view their periodic bills. Then, if so desired, they can electronically authorize the business to "take" the payment from their account. The payment then occurs as an ACH debit originated by the business's financial institution as compared to the ACH credit originated by the customer's financial institution in the bill payment scenario described above. Institutions should ensure proper approval of businesses allowed to use ACH payment technology to initiate payments from customer accounts.

Cash management applications would include the same control considerations described above, but the institution should consider additional controls because of the higher risk associated with commercial transactions. The adequacy of authentication methods becomes a higher priority and requires greater assurance due to the larger average dollar size of transactions. Institutions should also establish additional controls to ensure binding agreements – consistent with any existing ACH or wire transfer agreements – exist with commercial customers. Additionally, cash management systems should provide adequate security administration capabilities to enable the business owners to restrict access rights and dollar limits associated with multiple-user access to their accounts.

ix. Person-to-Person Payments

Electronic person-to-person payments, also known as e-mail money, permit consumers to send "money" to any person or business with an e-mail address. Under this scenario, a consumer electronically instructs the person-to-person payment service to transfer funds to another individual. The payment service then sends an e-mail notifying the individual that the funds are available and informs him or her of the methods available to access the funds including requesting a check, transferring the funds to an account at an insured financial institution, or retransmitting the funds to someone else. Person-to-person payments are typically funded by credit card charges or by an ACH transfer from the consumer's account at a financial institution. Since neither the payee nor the payer in the transaction has to have an account with the payment service, such services may be offered by an insured financial institution, but are frequently offered by other businesses as well.

Some of the risk issues examiners should consider when reviewing bill payment, presentment, and e-mail money services include:

- Potential liability for late payments due to service disruptions,
- Liability for bill payment instructions originating from someone other than the deposit account holder,
- Losses from person-to-person payments funded by transfers from credit cards or deposit accounts over which the payee does not have signature authority,
- Losses from employee misappropriation of funds held pending access instructions from the payer, and
- Potential liability directing payment availability information to the wrong e-mail or for releasing funds in response to e-mail from someone other than the intended payee.

WIRELESS E-BANKING

Wireless banking is a delivery channel that can extend the reach and enhance the convenience of Internet banking products and services. Wireless banking occurs when customers access a financial institution's network(s) using cellular phones, pagers, and personal digital assistants (or similar devices) through telecommunication companies' wireless networks. Wireless banking services in the United States typically supplement a financial institution's e-banking products and services.

Wireless devices have limitations that increase the security risks of wireless-based transactions and that may adversely affect customer acceptance rates. Device limitations include reduced processing speeds, limited battery life, smaller screen sizes, different data entry formats, and limited capabilities to transfer stored records. These limitations combine to make the most recognized Internet language, Hypertext Markup Language (HTML), ineffective for delivering content to wireless devices. Wireless Markup Language (WML) has emerged as one of a few common language standards for developing wireless device content. Wireless Application Protocol (WAP) has emerged as a data transmission standard to deliver WML content.

Manufacturers of wireless devices are working to improve device usability and to take advantage of enhanced "third-generation" (3G) services. Device improvements are anticipated to include bigger screens, color displays, voice recognition applications, location identification technology (e.g., Federal Communications Commission (FCC) Enhanced 911), and increased battery capacity. These improvements are geared towards increasing customer acceptance and usage. Increased communication speeds and improvements in devices during the next few years should lead to continued increases in wireless subscriptions.

Structure

Phrasal verbs

A phrasal verb is a ***verb + preposition*** combination. For example, *look up, take down* and *turn over*. Phrasal verbs are common in *informal*, *spoken English*. Sometimes they have a more formal one word equivalent, for example, *work out = determine*.

Often phrasal verbs have two meanings.

One we can work out from the meaning of the two words separately:

She looked up at the roof.

A special meaning which does not easily relate to the separate meanings of the words:

She looked up a word in the dictionary.

Exercises

1. Study these phrasal verbs:

break into	*keep at*
get into	*throw away*
hack into	*shut down*
go about	*log on*
set about	*log out*
keep ahead	*find out*
grow up	*track down*
phone up	*hand over*
run up	

Now complete each blank with the appropriate phrasal verb in the correct form. In some cases, more than one answer is possible.

1. Hackers try to ……..…..... passwords so they can penetrate a system.
2. Don't …… your password to anyone who asks for it.
3. The police ……..…. Ralph ……..….by talking to his friends and acquaintances.
4. Some hackers…….…. systems to get commercially valuable information.
5. When you ……..…..…. to a network, you have to provide an ID.
6. How do you …….…….…. hacking into a system?
7. Hackers may ……..…..., pretending to be from your company and ask for your password.
8. Never ……..……. your credit card receipts where someone can find them.
9. Ralph was a hacker as a teenager but he's ……. now and become more responsible.
10. ……..…… a system is strictly illegal nowadays.
11. It's a constant race to …….…….. of the hackers.

2. Replace the verb in italics with a phrasal verb of similar meaning.

1. I don't *discard* your credit card receipts; they could help fraudsters.
2. Trying to *penetrate* computer systems is against the law.
3. The typical hacker is a young person who has not *matured* yet.
4. The best way to *begin* hacking into a system is to try to get hold of a password.
5. If someone *telephones* you and asks for your password, don't *provide* it.
6. Hackers *closed* Hotmail for five hours.
7. Hackers *accumulated* a telephone bill of $1m for Scotland Yard.
8. The difficult thing was to *determine* how the website would rook.
9. So you won't forget, *record* the ID number the support technician gives you.
10. *Examine* the manufacturers' websites before you phone for help.

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

sacrifice	n. the act of giving up something of value for the
adj. sacrificial	common good
v. sacrifice	syn. concession

He sacrificed his day off to help clean up the neighborhood.

She made sacrifices in order to be able to attend the university.

triumph n. a victory; a success
adj. triumphant syn. achievement
adj. triumphal
v. triumph

His career was characterized by one triumph after another.
He triumphed over all of his difficulties.

contaminated adj. to make something impure by adding something
v. contaminate dirty or poisonous
n. contamination syn. polluted

This contaminated water supply must be closed to the public.
Bacteria and insects are frequent agents of food contamination.

flourishing adj. active and growing; healthy
v. flourish syn. thriving

Small flourishing companies would be harmed by an increase in the minimum wage.
A young mind will flourish with the proper guidance.

negligible adj. hardly noticeable; scarcely detectable, to ignore;
adj. neglected to give little attention
adj. neglectful syn. insignificant
adj. negligent
n. neglect
n. negligence

The presence of the first person singular in the poem was almost negligible.
His negligence caused him to lose all of the work he had done on the computer.

application portfolio – the collection of integrated information systems (applications and components, purchased or custom-developed) required to satisfy business needs
APE (application package for the enterprise) – a group of applications designed to function across the enterprise
API (application program interface) – the specific method prescribed by a computer operating system or by another application program by which a programmer writing an application program can make requests of the operating system or another application. An API can be contrasted with a graphical user interface (GUI) or a command interface (both of which are direct user interfaces) as interfaces to an operating system or a program.

APM (advanced power management) – the ability of a portable computer to monitor and control its power consumption. APM puts your PC's screen or hard drive into "snooze" mode when you don't need them.

applet – generally, a small application written in Java
application architecture – a model that identifies criteria and techniques associated with the design of applications that can be easily modified to respond quickly to changing business needs
application communication middleware – middleware used to communicate between applications, software services, and software components

application development – the process of identifying the business need, designing an

application system, and developing it with a computer programming language

application integration – the process of bringing data or a function from one application program together with that of another application program. Object-oriented programming technology makes application integration easier to achieve.

With traditional procedural programming, "bridge" programs had to be written so that one program could work with data or the output from functions in another program. The introduction of program "objects" such as Windows Object Linking and Embedding (OLE) custom controls and ActiveX controls provides standard interfaces so that objects designed for use in one application can be reused in other applications.

application program – a component of computer software that automates a business function. A SETUP.EXE file is an application program.

application server – hardware and software platforms dedicated to a specific type of application processing, groupware systems, custom business applications, or mail services. An application server is a server program in a computer in a distributed network that provides the business logic for an application program.

The application server is frequently viewed as part of a three-tier application, consisting of a graphical user interface (GUI) server, an application (business logic) server, and a database and transaction server. More descriptively, it can be viewed as dividing an application into a first-tier, front-end, Web browser-based GUI, usually at a personal computer or workstation; a middle-tier business logic application or set of applications, possibly on a LAN or intranet server; and a third tier, back-end, database and transaction server, sometimes on a mainframe or large server. Older, legacy databases and transaction management applications are part of the back end or third tier. The application server is the middleman between browser-based front-ends and backend databases and legacy systems.

CTI (computer telephony integration) – using a computer connected to a telephone switch to issue call-routing commands; often used in call centers

CTO (Chief Technology Officer) – the executive who directs an organization in matters pertaining to technology
customer-oriented – an adjective describing software or services that are adapted to the customer. Typically, customer-oriented means "easy to use."
cyberspace – a word coined by science-fiction author William Gibson to mean the electronic space created when many computers are connected together. In the future, cyberspace could become a multi-dimensional experience, where you hear sound and speech and view and interact with 3-D objects.
cybertrust – belief that the information you provide online will remain confidential

daemon – an agent program, usually initiated at startup that operates in the background on a UNIX server, ready to perform an operation when required
DAP (Directory Access Protocol) – a set of X.500 protocols for accessing information directories and transferring the information— such as e-mail addresses— from the directory service to the mail user agent (MUA), message transfer agent (MTA), or another directory service
DASD (Direct Access Storage Device) – a device in which access time is effectively independent of the location of the data
data – factual information organized and used for transactions, analysis, and decision support
data access – the process of storing, searching, and retrieving data by computer applications and end users
data access middleware – communication middleware used for accessing a relational database in an n-tier application environment

data cleansing – used to clean up existing data stored in a database, including breaking data down into basic elements and transforming it based on standards
data communication – (1) Transfer of data among functional units by means of data transmission according to a protocol (2) The transmission, reception, and validation of data
data dictionary – defines the characteristics (i.e., formats and values) of each field in a database, enabling data to be used in a consistent manner. It is usually presented in a list format.
data hygiene – the process of cleansing data stored in a database. Data hygiene ensures that data meets the standards that have been set. Data hygiene is needed at multiple levels, including the data entry level and the data extraction and transformation level.

data integrity – accuracy, validity, and consistency of data, maintained according to a set of rules for modifying a database
data mart – a subset of a data warehouse. Where data warehouses are designed to support many requirements for multiple business needs, data marts are designed to support specific requirements for specific decision support applications (i.e., particular business needs). Data marts are typically considered a solution for distributed users who want exclusive control of the information required for their business need.
data mining – software that scans large amounts of data stored in data warehouses to reveal patterns or correlations. Demographic or behavioral information about people is often revealed through data mining. Data mining is the analysis of data for relationships that have not previously been discovered.

infranet – a term used to refer to the infrastructure of a network, especially the Internet. For the Internet, the infranet is that portion of the public telephone network on which data packets are exchanged using Internet protocols. It can also be said to include private network infrastructures that use the Internet set of protocols, TCP/IP, whether or not these interconnect with the public Internet.

The term was used to describe the major switching hardware and technologies, such as frame relay and ATM, in an April 1999 article, "The Next Net," in *Wired* magazine. John Chambers, head of Cisco Systems, is credited with coining the term.
Infranet® is also the trade mark ofPortal Software Inc., which uses the brand for

their Internet (IP and VoIP) customer management and billing software and other tools.

infrastructure – refers to the entire spectrum of information processing technologies and services. This includes data processing, telecommunications, office automation equipment and related goods and services, technical and user personnel, computer operating systems, and licensed programs. Information infrastructure includes, but is not limited to: computer hardware, firmware, and peripherals software management, support, and applications; telecommunications networks (wired and wireless) and their management systems; facilities (static, mobile, and portable) and supporting environmental utilities infrastructure (electricity, air conditioning, and more); personnel and user issues.

integration – the process of integrating new client/server, adaptive, and distributed systems with existing systems while still optimizing performance, minimizing maintenance and utilizing existing platforms

LEC (local exchange carrier) – a local telephone company, such as Southern Bell, GTE, and Carolina Sprint. There are a number of independent LECs. LEC companies are also sometimes referred to as "telcos." A "local exchange" is the local "central office" of an LEC. Lines from homes and businesses terminate at a local exchange. Local exchanges connect to other local exchanges within a local access and transport area (LATA) or to interexchange carriers (IXCs), such as long-distance carriers AT&T, MCI, and Sprint.

legacy application – In information technology, legacy applications and data are those that have been inherited from languages, platforms, and techniques earlier than current technology. Most enterprises that use computers have legacy applications and databases that serve critical business needs. Typically, the challenge is to keep the legacy application running while converting it to newer, more efficient code that makes use of new technology and programmer skills. In the past, much programming has been written for specific manufacturers' operating systems. Currently, many companies are migrating their legacy applications to new programming languages and operating systems that follow open or standard programming interfaces.

Theoretically, this will make it easier in the future to update applications without having to rewrite them entirely and will allow a company to use its applications on any manufacturer's operating system.

In addition to moving to new languages, enterprises are redistributing the locations of Application and data. In general, legacy applications have to continue to run on the platforms they were developed for. Typically, new development environments account for the need to continue to support legacy applications and data.

legacy system – in-place system that uses older, often outdated, technology

Level 1 Support – a help desk function tier. Level 1 client support should have end to-end

responsibility for each client request. The help desk analyst should be empowered to resolve as many requests as possible. Level 1 support provides the client contact point or call ownership, which is the single point of contact for the end user to request a service. Organizations should retain control of tier 1 help desk to ensure the quality of the customer relationship.

RMS (repository management system) – software that manages a repository and provides the tools to actively maintain metadata (i.e., changes to metadata occur in the repository before the changes occur in the data warehouse)

ROI (return on investment) – For a given use of money in an enterprise, the ROI is how much "return," usually profit or cost saving, results. An ROI calculation is sometimes used along with other approaches to develop a business case for a given proposal. The overall ROI for an enterprise is sometimes used as a way to grade how well a company is managed. If an enterprise has immediate objectives of getting market revenue share, building infrastructure, positioning itself for sale, or other objectives, a return on investment might be measured in terms of meeting one or more of these objectives rather than in immediate profit or cost saving.

rollout – a staged series of activities that often accumulate meaning as they occur. Computer product makers and marketers use the term to describe a series of related product announcements that are staged over time. Public relations campaigns use the term to describe the revelation of a major company theme, event, or other message over a period of time calculated to lead to ideal results. When a company installs new equipment, the installation staging is sometimes called a rollout.
router – (1) An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer (2) The combination of hardware and software that links LANs and WANs together

SAN (storage area network) – a networking architecture comprising separate storage networks to offload storage and backup/recovery traffic from general-purpose application networks, thereby increasing performance and manageability

SAP – SAP, started in 1972 by five former IBM employees in Mannheim, Germany, states that it is world's largest inter-enterprise software company and the world's fourth-largest independent software supplier, overall. The original SAP idea was to provide customers the ability to interact with a common corporate database for a comprehensive range of applications. Gradually, the applications have been assembled and today many corporations, including IBM and Microsoft, are using SAP products to run their own businesses.

SAP applications, built around their latest R/3 system, provide the capability to manage financial, asset, and cost accounting, production operations and materials, personnel, plants, and archived documents. The R/3 system runs on a number of platforms including Windows NT and uses the client/server model. The latest version of R/3 includes a comprehensive Internet-enabled package. SAP has recently recast its product offerings under a comprehensive Web interface, called mySAP.com, and added new e-business applications, including customer relationship management (CRM) and supply chain management.

UNIT 7

E-Government

Rapid and revolutionary changes in technology have created an increasingly information-centric
global economy, where knowledge has become a key factor in competitiveness. The challenge for
many governments today is to provide opportunities for citizens and businesses to actively
participate in the global knowledge-based economy. E-Government is believed to play a fundamental role towards this end.

Although the demand for e-government arose through the need to achieve greater operational

efficiency and respond better to citizen demands for improved public services, increasingly, e-Government has as much to do with economic reform as with administrative reform

1. What is e-Government ?

E-Government refers to the use of information and communications technologies (ICT) to improve the efficiency, effectiveness, transparency and accountability of government.

E-Government can be seen simply as moving citizen services online, but in its broadest sense it refers to the technology-enabled transformation of government - governments' best hope to reduce costs, whilst promoting economic development, increasing transparency in government, improving service delivery and public administration, and facilitating the advancement of an information society.

• **Reducing Costs:** Putting services on-line substantially decreases the processing costs of many activities compared with the manual way of handling operations. Efficiency is also attained by streamlining internal processes and by enabling faster and more informed decision making.

• **Promoting Economic development** - Technology enables governments to create positive business climates by simplifying relationships with businesses and reducing the administrative steps needed to comply with regulatory obligations. There is a direct impact on the economy, as in the case of e-procurement, which creates wider competition and more participants in the public sector marketplace.

• Enhancing Transparency and Accountability: E-Government helps to increase the

transparency of decision-making processes by making information accessible – publishing government debates and minutes, budgets and expenditure statements, outcomes and rationales for key decisions, and in some cases, allowing the on-line tracking of applications on the web by the public and press.

• **Improving Service Delivery**: government service delivery, in the traditional process, is time consuming, lacks transparency, and leads to citizen and business dissatisfaction. By putting government services online, e-government reduces bureaucracy and enhances the quality of services in terms of time, content and accessibility.

• **Improving Public Administration**- e-government administrative components, such as a computerized treasury, integrated financial management information systems, and human resource management systems, lead to greater efficiency in public administration. features include the integration of expenditure and receipt data, control of expenditure, human resources management, intelligent audit through data analysis and the publishing of financial data.

• **Facilitating an e-Society:** One of the main benefits of an e-government initiative consists of the promotion of ICT use in other sectors. The technological and management capacities required for e-government administration encourage, in turn, the development of new training courses and modules in schools and universities trying to supply the required skills and capabilities to the market E-Government usually describes relationships across 3 modalities:

1. *Government to Citizen:* deals with the relationship between government and citizens. G2C allows
   citizens to access government information and services instantly, conveniently, from everywhere, by

   use of multiple channels.

2. *Government to Business*: consists of e-interactions between government and the private sector. The opportunity to conduct online transactions with government reduces red tape and simplifies regulatory processes, therefore helping businesses to become more competitive.
3. *Government to Government:* Governments depend on other levels of government within the state to effectively deliver services and allocate responsibilities. In promoting citizen-centric service, a single access point to government is the ultimate goal, for which cooperation among different governmental departments and agencies is necessary. G2G facilitates the sharing of databases, resources and capabilities, enhancing the efficiency and effectiveness of processes.
   Many World Bank client countries are in the process of designing and implementing e government strategies, programs and projects, for which assistance in this area, both in terms of knowledge and financial support, is increasingly demanded. Many countries have already requested Bank support and several projects are under preparation or implementation.

2. Is e-Government appropriate for developing countries?

Although it is early to judge the macro impact of e-Government on overall development and

towards achievement of the Millennium Development Goals (MDGs) in developing countries, there are several examples of nation/state wide applications that have

delivered significant benefits, with moderate investments. Evaluations of some e-Government projects conducted by independent agencies indicate that costs of accessing services by citizens have been reduced, corruption has lessened and Government tax revenues have grown. Since the potential impact on reform goals that the World Bank pursues in many developing countries has been demonstrated, task managers and government clients should consider e- Government investments to create new opportunities for building institutional capacity and efficient, citizen-centric service delivery. Early experience shows that e-Government can be developed in stages, with projects suitable for different levels of technology preparedness in a country.

3. Is e-Government just about the Internet?

e-Government is, above all, a process of change in the way government shares information and delivers services to achieve greater transparency and convenience in transacting with citizens and businesses.

e-Government uses ICT to diversify delivery channels and make back-office work more efficient. The Internet is the most powerful and popular means of delivering e-Government. However, services may also be delivered through:

- Conventional telephone - call centers, automated voice responses, FAX on demand of forms and information;
- Personal Computers and the Internet - from simple display of information to highly sophisticated interactive services with credit card payment;
- In an assisted mode through integrated service delivery centers in convenient locations, rural Internet kiosks and cyber cafes.
- Mobile digital telephony and messaging technology
- By any combination of ICT and manual procedures, for example providing information on the web, ordering and paying by mobile telephone, and delivery at a community center. Diversifying delivery channels extends the services to as many citizens as possible and creates competition between channels, improving the quality of delivery. Access can also be expanded creatively; for example, where individual personal computer ownership is low, access to computers may be made available through a post office, or cyber cafes. Use of existing telephone and FAX technology can be combined with access to Internet through an intermediary for a small fee.

4. Are developing countries already developing e-Government capabilities?

Yes. Countries such as India, Sri Lanka, Brazil, Chile, Romania and South Korea are only a few best practice examples.

Two illustrative case studies follow:

Andhra Pradesh, India. It is the State Government policy to use information technologies to foster "**S**imple, **M**oral, **A**ccountable, **R**esponsive, and **T**ransparent Government".

The following state-wide applications deliver a host of on-line services to citizens, businesses and internal employees.

Computer Aided Registration of Deeds (CARD): A simplified and decentralized digital property registration system through 200 Sub-Registrars' offices across the state. The system simplifies and expedites the registration process, provides certificates for non encumbrance and assists in market valuation of properties. Nearly 5.7 million documents have been registered; 3.6 million encumbrance certificates have been issued in four years.

E-Seva: On-line processing of payments, issuance of licenses and certificates from different agencies
at central, state and municipal levels under one roof at conveniently located centers in more than 200 cities and towns. Three million transactions were processed per month in 2004.

FAST: Online renewal of driver's license and motor vehicle registration

SMARTGov: Work flow based paperless central secretariat.

Mexico. e-Government is firmly a part of Mexico's future:

The Mexican Government has registered over 500 government domain names.

These sites provide information on government services, with data and references

to other sources of information.
The Government provides information on competitive procurement opportunities of the 33 local
governments through its Compranet service and is additionally able to offer several on-line services for contractors and suppliers, enabling them to search for information on their contracts and payments.
Citizens can access public registry records; e.g. obtain copies of birth and property certificates and accept credit card payments
The sites also contain information that saves time and paperwork when dealing with government procedures

6. What are the benefits of e-Government?

Benefits include:

- Aligning ICT-investments with international technical and business standards
- Simplifying and integrating government services;
- Drastically reducing the time the citizens and businesses spend obtaining/submitting information from/to the government;
- Increasing government transparency and anti-corruption;
- Improving government finances through enhanced revenue collection and cost reduction
- Improving the business environment in the country for private sector development and to attract foreign direct investment.
- Upgrading of government staff skills
- Facilitating ICT awareness and skills-training within the larger populace.

.....and potential risks?
Just like any other ICT project in the private or public sector, e-Government projects also carry a risk of implementation failure. Overly ambitious project scale and scope,

lack of political will to transform Government functioning, and inadequate capacity to design and implement solutions, are some of the main reasons for failure. If processes are simply automated without appropriate reforms and safeguards, applications will fail to deliver the intended benefits, and can provide opportunities for electronic fraud. It is therefore important to assess the ICT infrastructure, human capacity, administrative maturity and motivation for reform in a country in order to define the scope of e- Government projects/programs.

7. What are the costs of e-Government and who pay ?

The costs of implementing e-Government can vary greatly with the scope of the project/program.

The cost components are: networking infrastructure; IT hardware and software; application design, development and implementation; training; and maintenance of equipment. E-Government necessitates the re-engineering of business processes in order to realize efficiency goals – the management of change is, therefore, an important element requiring effort and expenditure. While online service delivery can be more efficient and less costly than other channels , cost savings and service improvements are not automatic . Most e-Government activities will need to be made available offline as well as online. While there can be savings even in this mode (for instance in implementing a front-office/back-office approach, streamlining business processes within government, etc.) the necessity for parallel offline and online operations in the initial phase will mean some additional-costs.

Social costs must also be considered as e-Government may affect jobs, work relationships and the relationships the government has with its citizens. While taking advantage of technology, care must be taken not to deteriorate access for special groups.

8. What about security and privacy issues ?

e-Government must ensure that information systems are appropriately protected and individual rights are respected. Almost every successful e-government project is a case example in building trust, involving two issues of special concern to any online service:

- **Privacy**—Privacy is one of the most important issues facing the use of online services, and Governments must be responsible custodians of the enormous amounts of personal information they hold. Privacy must be addressed in the planning and design of e-government systems since it is much harder to interject privacy protections after a system is built.

- **Security**—protecting e-government sites from attack and misuse is costly, but must be addressed in the design phase, as security breaches can shatter public trust in e-government.

9. How do Governments make e-Government happen ?

In some countries e-Government applications have been built bottom up through the initiatives of political leadership or civil servants. Centrally coordinated programs are then set up to scale up such applications and work towards interoperability and integration of electronic service delivery.

Other countries have had a more planned and coordinated approach to the development of e- Government, starting with a vision, strategy and an implementation

plan. e-Government initiatives can be implemented at the federal/central or local government level. In

general, coordination will be required to help in the identification of crosscutting issues and the creation of appropriate strategies to address them. Such strategies should include details of departmental and sector programs to transform their businesses in accordance with an overall e-Government strategy, including:

- Examination of user needs and requirements
- Plans to converge with standards and frameworks;
- Plans to make services accessible for citizens and businesses;
- Plans to deliver internal processes electronically, e.g., via Internet for "joined up" services;
- Analysis of business requirements and benefits of applying ICT;
- Examination of existing information flows and transactions between departments, citizens,

businesses, and other public sector and community bodies.

- A system of incentives and policy frameworks to balance central direction with Departmental ownership
- Process reform to gain efficiency and establish transparency.
- Strategies to involve the private sector.

5. Can the World Bank help clientswith e-Government ?

The World Bank can help client countries initiate, design, and implement e-Government projects.

Its role can include:

- Financing e-Government projects and components;
- Supporting e-Government approaches through policy advice, strategy formulation, and operational support;
- Establishing a forum for knowledge sharing on e-Government including via

videoconferencing;

- Helping clients to create the necessary infrastructure for e-Government;
- Providing technical assistance;
- Promoting the use of information technology in public sector reforms.

e-Government planning can start at any level of development, but it is important to align ICT investments with e-Government best practices and standards, thereby avoiding future complications that may arise due to incompatible technologies.

Exercises

APPLICATION SERVICE PROVIDERS

If your hard disk is packed to bursting point, the IT department is far too busy to fix your email problems and your business can't afford to buy the tools that you'd like to develop the company website, then its time to think about using an application service provider (ASP). Rather than installing software on each machine or server within your

organization, you rent applications from the ASP, which provides remote access to the software and manages the hardware required to run the applications.

There are a lot of advantages to this approach. The havoc caused by viruses makes the idea of outsourcing your email and office suite services an attractive option. It also gives you more flexibility - you pay for applications as and when you need them, rather than investing in a lot of costly software which you're then tied to for years. Not having to worry about upgrading to the latest version of your office suite or about battling with the complexities of managing an email system, leaves businesses with mere time. Time to focus on what they do best.

However, there are some potential pitfalls. To use applications remotely requires a lot of bandwidth, which is only really available from a broadband connection or a leased line to the ASP itself. It is also important to ensure that the ASP will be able to provide a secure, reliable service which will be available whenever you need it.

Providing applications and storage space for vast numbers of users requires some powerful technology on the port of the ASP, This includes security controls and data storage as well as providing the physical links to customers. For the most part, ASPs don't own the data centers that store the information. Instead, they lease space from data storage specialists. In this way, they can be confident of meeting customers' increasing storage requirements by buying more space as it's needed.

There's a wide variety of applications available for use via ASPs. Office suite applications and email services are two of the most generic applications available through ASPs. Large, complex business applications such as enterprise resource planning tools like SAP are another popular candidate for delivery through an ASP. Other business services, such as payroll and accounting systems are also available. This is particularly beneficial to small businesses which are likely to grow quickly and don't want to deal with the problems caused by outgrowing their existing system and having to move to a high-end package. ASPs also offer a means of using specialist tools that would otherwise prove prohibitively expensive. Small businesses have the opportunity to use such tools for short periods of time as and when they need them, rather than having to buy the software as a permanent investment.

One of the major barriers for small businesses which want to make a start in e-commerce is ensuring that they have sufficient resources to cope with sudden large increases in customers. This means not only having adequate storage for all your customers' details, but ensuring that you have the technology in place to handle stock levels, efficient delivery and large volumes of traffic. It's very rare for an e-commerce business to handle all of these elements by itself, making this one of the best-established

areas of ASP use. Being able to respond rapidly to changes in the size of your customer base and the type of product that they want to order from your business, demands more flexibility than traditional software can provide.

1. Using information from the text, mark the following as True or False:

a. Software from an ASP must be installed locally on a user's computer.
b. You need a high bandwidth connection to use an ASP service.
c. ASPs usually use their own storage space for customers.
d. Using an ASP gives you more flexibility.
e. An e-commerce business usually provides all of the required technology itself.

2. Find the answers to these questions in the following text.

1. How do you pay for the applications provided by an ASP?
    a. no charge
    b. charged according to use
    c. single payment
2. What two main services does an ASP provide?
3. How does an ASP ensure that they have enough storage space for the changing needs of customers?
4. What types of applications are available from ASPs?
5. Why is it useful for a small business to be able to rent specialist tools from an ASP?
6. What is one of the best established areas of ASP use?

3. Match the items in Table A with the statements in Table B:

Table A

a. Website
b. ASP
c. Virus
d. Office suite
e. Bandwidth
f. Broadband
g. Data centre
h. SAP

Table B

i. Set of standard programs used in an office
ii. Facility for storing large amounts of information
iii. Capacity of a network connection
iv. High capacity Internet connection
v. Self-replicating program
vi. Common enterprise resource planning tool
vii. Application service provider

viii. Collection of related WebPages

4. Read the next page text (Understanding MP3) to find the answers to these questions.

1. What does MP3 stand for?
2. What is the difference between MP3 and WAV files?
3. What kind of sound does MP3 strip out?
4. What kind of information is included in the tag?

Understanding MP3

The name comes from MPEG (pronounced EM-peg), which stands for the Motion Picture Experts Group. MPEG develops standards for audio and video compression. MP3 is actually MPEG Audio Layer 3.

MP3 competes with another audio file format called WAV. The key difference is that MP3 files are much smaller than WAV files. An MP3 file can store a minute of sound per megabyte, while a WAV file needs 11 or 12 megabytes to hold the same amount. How does MP3 achieve this compression? CDs and audio files don't reproduce every sound of a performance. Instead, they sample the performance and store a discrete code for each sampled note. A CD or WAV file may sample a song 44,000 times a second, creating a huge mass of information.

By stripping out sounds most people can't hear, MP3 significantly reduces the information stored. For instance, most people can't hear notes above a frequency of 16kHz, so it eliminates them from the mix. Similarly, it eliminates quiet sounds masked by noise at the same frequency. The result is a file that sounds very similar to a CD, but which is much smaller. An MP3 file can contain spoken word performances, such as radio shows or audio books, as well as music. It can provide information about itself in a coded block called a tag. The tag may include the performer's name, a graphic such as an album cover, the song's lyrics, the musical genre and a URL for more details.

5. Read the rest of next page text (Play MP3 Files) to find the answers to these questions:

1. How do you play MP3 files?
2. What does the Windows Media Player file do with an MP3 file?
3. What is a standalone player?
4. What special features can players offer?
5. What information can you obtain by clicking on the track info button?
6. What does a skin enable you to do?
7. How do you play music from a CD-ROM on an MP3 player?
8. What hardware and software do you need to make your own audio CDs?

Play MP3 Files

Most machines today have enough processing power and memory to play MP3s immediately Simply download an MP3 file like any other and click on it in Windows Explorer. The Windows Media Player will decode the file and route the signals to your soundcard and then to your speakers.

Other MP3 features include:

1. Players.

Most standalone players have many features beyond Windows' default Media Player. To control what music you play, players let you group songs into play lists and randomize the selections. To control how the music sounds, they offer spectrum analyzers, graphic equalizers and frequency displays.

2. Track info.

A track info button gives you the information on the MP3 file's tag. Other buttons may take you to a music library where you can organize your MP3 files by performer or genre.

3. Skins or themes.

These programs are designed to change the appearance of the most popular players. They're akin to the wallpaper that alters the look of the Windows desktop. With a skin, a player can become a jukebox, a car dashboard, or a Star Trek tricorder. Think of them as easily interchangeable faceplates.

4. Rippers and encoders.

A ripper is a program that rips songs from a CD in your CD-ROM drive and turns them into WAV files. An encoder converts WAV files into MP3 files or vice versa. Many MP3 players incorporate rippers and encoders and can do both steps in one.

5. Recorders.

With a writeable CD-ROM drive, a recorder program lets you create your own audio CDs.

Structure

A. Study this sentence.

1. *Using MIDI, computers can communicate with synthesizers.*

It contains two clauses. An-ing clause:

using MIDI

and a main clause:

computers can communicate with synthesizers

We can use an -ing clause, as in example 1, to explain how something happens. The-ing clause explanation can be placed before or after the main clause as in example 2.

2. *DVD drives read DVD disks (by) using blue laser light*

We can also use -ing clauses to link a cause and effect.

3. *A WAV file may sample a song 44,000 times a second, [cause] creating a huge mass of information. [effect]*

Exercise

1. Match each cause and effect. Then link them with an -ing clause.

Cause

1. Computers with MIDI interface boards can be connected to MIDI instruments.
2. Each side of a DVD can have two layers.
3. MP3 removes sounds we can't hear.
4. You can download single tracks.
5. Each MP3 file has a tag.
6. MP3 players contain several devices.
7. You can download a skin program.
8. You can legally download some music.

Effect

a. This permits extra information to be stored on the performer and other track details.
b. You can create your own compilation.
c. This allows you to sample a new group before buying their CD.
d. This gives an enormous storage capacity.
e. This allows the music being played to be stored by the computer and displayed on the monitor.
f. This enables you to change the appearance of your player.
g. These allow you to control the way the music sounds.
h. This produces much smaller files.

B. Relative clauses with a participle

Relative clauses with a participle are often used in technical descriptions. They allow you to provide a lot of information about a noun using as few words as possible.

Study these examples from the Task 3 text.

1. *The technology needed to set up a home network*
2. *PCs equipped with Ethernet adapters*
3. *Network modem allowing clients to access the Internet simultaneously*
4. *Data line linking client to server*

We can use the passive participle as in examples 1 and 2.

1. The technology needed to set up a home network.

= technology which is needed

2. PCs equipped with Ethernet adapters

= PCs which are equipped

We can use an active participle as in examples 3 and 4.

3. Network modem allowing clients to access the Internet simultaneously

= *modem which allows clients to access the Internet simultaneously*

4. Data line linking client to server

= *data line which links client to server*

Exercises

1. Complete these definitions with the correct participle of the verb given in brackets.

1. A gateway is an interface ……(enable) dissimilar networks to communicate.
2. A bridge is a hardware and software combination…… (use) to connect the same type of networks.
3. A backbone is a network transmission path……. (handle) major data traffic.
4. A router is a special computer …….(direct) messages when several networks are linked.
5. A network is a number of computers and peripherals……. (link) together.
6. A LAN is a network…… (connect) computers over a small distance such as within a company.
7. A server is a powerful computer ……(store) many programs ……..(share) by all the clients in the network.
8. A client is a network computer …….....(use) for accessing a service on a server.
9. A thin client is a simple computer…… (comprise) a processor and memory, display, keyboard, mouse and hard drives only.
10. A hub is an electronic device …….(connect) all the data cabling in a network.

2. Link these statements using a relative clause with a participle.

1. a. The technology is here today.
   b. It is needed to set up a home network.
2. a. You only need one network printer.
   b. It is connected to the server.
3. a. Her house has a network.
   b. It allows basic file-sharing and multi-player gaming.
4. a. There is a line receiver in the living room.
   b . It delivers home entertainment audio to speakers.
5. a. Eve has designed a site.
   b. It is dedicated to dance.
6. a. She has built in links.
   b. They connect her site to other dance sites.
7. a. She created the site using a program called Netscape Composer.
   b. It is contained in Netscape Communicator.
8. a. At the centre of France Telecom's home of tomorrow is a network.

b. It is accessed through a Palm Pilot-style control pad.

9. a. The network can simulate the owner's presence.

b. This makes sure vital tasks are carried out in her absence.

10. a. The house has an electronic door-keeper.

b. It is programmed to recognize you.

c. This gives access to family only.

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

dramatic adj. something that captures the imagination; exciting
v. dramatize syn. emotional
n. drama

The dramatic finish to the game left us speechless.
The hurricane dramatically changed the coastline.

elaborate adj. something with a large number of parts; fill of details
v. elaborate syn. complex
n. elaboration

An elaborate headdress indicated rank within the Aztec community.
His elaboration of the issue was quite thorough.

hazardous adj. very risky, unsafe
n. hazard syn. dangerous

Handling flammable liquids is hazardous.
There are many hazards involved with starting a business.

minuscule adj. of little consequence; very small
adj. minute syn. tiny
n. minutia

The sale of the building had a minuscule effect on the profits of the corporation.
Some leaves are covered with minute hairs.

prime v. to make ready; first in importance, time, or quality
adj. primed syn. prepare
adj. prime
n. prime
The directors primed the actors before the performance.
Mozart passed away in the prime of his life.

rudimentary adj. simple; not complex
n. rudiments syn. basic
He has a rudimentary knowledge of computers.
The rudiments of grammar are taught in all English classes.

vigorous adj. powerful, full of action
n. vigor syn. strong
His vigorous defense of the issues impressed everyone.
He approached his work with vigor.

amenity n. something that makes life easier or more enjoyable
syn. convenience
She had all the amenities of life when she went camping.
One expects many amenities at a five-star hotel.

application services – a classification for the business rule components of a service-oriented

architecture

application software – a classification for software that performs a complete business function,

for example, a word processor or a payroll system

application system – a set of application programs that completes an entire business process,

for example, an accounts payable system

application-based – an adjective describing solutions that are addressed within an application

Archie – Archie is a program that allows you to search the files of all Internet FTP servers that

offer anonymous FTP access for a particular search string. Archie is actually an indexing spider

that visits each anonymous FTP site, reads the entire directory and file names, and then indexes

them in one large index. A user can then query Archie, which checks the query against its index.

architecture – In information technology, architecture is a term applied to the process and the outcome of planning and specifying the overall structure, logical components, and logical interrelationships of a computer, its operating system, a network, or other conception. An architecture can be a reference model, such as the Open Systems Interconnection (OSI) reference model, intended as a model for specific product architectures, or it can be a specific product architecture, such as that for an Intel Pentium microprocessor or for IBM's OS/390 operating system.

Computer architecture can be divided into five fundamental components: input/output, storage, communication, control, and processing. In practice, each of these components (also called subsystems) is sometimes said to have an architecture.

archive – to move seldom-used files from your hard drive to tape cartridges or floppy disks. Archiving old files frees up space on your hard drive. If you ever need a file you stored, you can retrieve it from the tape cartridge or floppy disk.

ARP (Address Resolution Protocol) – a protocol within TCP/IP that is used for routing data packets in a distributed network
BGP (Border Gateway Protocol) – used for exchanging routing information between gateway hosts (each with its own router) in a network of autonomous systems. It is often the protocol used between gateway hosts on the Internet.

BI (business intelligence) – a broad category of application programs and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions. BI applications include the activities of decision support, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining. Business Intelligence applications can be mission-critical and integral to an enterprise's operations or occasional to meet a special requirement; enterprise-wide or local to one division, department, or project; or centrally initiated or driven by user demand.

Binary Executable Format – a computer readable format of an executable program. An executable program is compiled into machine-readable code.

BISDN (Broadband Integrated Services Digital Network) – a network technology that

integrates interactive voice, data, and video by using cable TV's broadband channels and uses asynchronous transfer mode

booting – the process of loading a computer memory with instructions needed for the computer to operate. Remote booting refers to loading software over the network.

BPR (business process re-engineering) – an organizational process that helps to identify fundamental business objectives, formulate a detailed strategy to achieve those objectives, determine measures for success, redesign business processes, and implement new policies and procedures
bps (bits per second) In data communications, bps is a common measure of data speed for computer modems and transmission carriers. As the term implies, the speed in bps is equal to the number of bits transmitted or received each second.

bridge – a network device that connects two separate networks. When a bridge is implemented,

the interconnected networks resemble a single network.

cooperative processing – a distributed computing method that requires two or more distinct processes to complete a single business transaction. Typically, cooperative processing programs interact and execute concurrently on different processors.

CORBA (Common Object Request Broker Architecture) – an architecture and specification for creating, distributing, and managing distributed program objects in a network. It allows programs at different locations and developed by different vendors to communicate in a network through an "interface broker." CORBA was developed by a consortium of vendors through the Object Management Group (OMG), which currently includes over 500 member companies. Both ISO and X/Open have sanctioned CORBA as the standard architecture for distributed objects (which are also known as components).

core services – a classification for the basic application infrastructure components of a service– oriented architecture, such as security, naming, and directory services

COTS (commercial off-the-shelf) software – describes ready-made products that can easily be obtained. The term is sometimes used in military procurement specifications.

CPI (continuous process improvement) – a methodology that incorporates management of business practices, workflow, skills, project/time and resources, metrics, software configuration, and reporting

CRM (customer relationship management) – CRM is an information industry term for methodologies, software, and usually Internet capabilities that help an enterprise manage customer relationships in an organized way. For example, an enterprise might build a database pertaining to its customers that described relationships in sufficient detail so that management, salespeople, people providing services, and perhaps the customer could access information. This information could match customer needs with product plans and offerings, remind customers of service requirements, and know what other products a customer had purchased.

cross-platform – a program available for more than one type of computer. For example, Microsoft produces the Word program for the PC platform and for the Macintosh platform. Using a cross-platform program makes it easier to exchange a document from one platform (computer) to another.

CS (Computing Services) – a section within ITS that maintains state-of-the-art equipment and operates the Customer Support Center for ITS and provides mainframe computer services, remote LAN management (MAPS Servers), ITS LAN management, and LAN technology assessment

e-government (electronic government) – government services available online to citizens, employees, and businesses

elementizing – a data cleansing process that breaks a data record into elements (e.g., the address 123 Main Street may be broken down into Street Number: 123, Street Name: Main, Street Type: Street).

e-mail – electronic mail messages in the form of text, documents, images, and other electronic files

e-mail application programming interface – an interface that enables programs to access various components of the e-mail system

e-mail front end – the interface for composing and reading e-mail messages; it can appear in three different formats: e-mail viewer front-end, e-mail enabled front-end, and non-user interface
e-mail gateways – a software service that is responsible for transferring messages between incompatible e-mail systems
e-mail server – a server that provides a set of services to one or multiple clients in an e-mail environment. The services may include: distribute files, temporarily hold new messages, or store messages that have already been read. It may be located on the desktop PC or on a combination of servers accessed on a LAN.
e-mail system – software that manages the transmission of e-mail and manages mailboxes

encapsulation – a technology where data and logic are protected from uncontrolled external access. Data is considered encapsulated if it can only be accessed via the software programs that manage it.

encryption – the conversion of data into a form, called a *cipher*, that cannot be easily understood by unauthorized people

end user – the final link in the customer service request or computer program usage chain

enterprise – any agency, department, division, or service provider that is a part of the North Carolina state government system. In the computer industry, an enterprise is an organization that uses computers. A word was needed that would encompass corporations, small businesses, nonprofit institutions, government bodies, and possibly other kinds of organizations. The term enterprise seemed to do the job. In practice, the term is applied much more often to larger organizations than smaller ones.

enterprise application service provider – a third-party entity that manages and distributes high-end business applications to customers across a wide area network (WAN) from a central data center.

enterprise management – as defined in North Carolina SB 222, "IT enterprise management" refers to distributed IT assets. IT enterprise management is an approach that uses policies, procedures, and technical infrastructure to manage the state's tremendous investment in distributed IT assets, such as workstations, servers, routers, etc., to minimize total life-cycle costs while maximizing benefits for transacting the state's business and delivering services to its citizens.
enterprise portal – Portal is a new term, generally synonymous with gateway, for a World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site. Typical services offered by portal sites include a directory of Web sites, a facility to search for other sites, news, weather information, e-mail, stock quotes, phone and map information, and sometimes a community forum. The primary goal of an enterprise portal is to decrease the effort required to move pertinent, contextually relevant information to those that require it.

IDL (Interface Definition Language) – a method for component developers to describe a component's API enabling applications to pass parameters and receive results during component execution

IETF (Internet Engineering Task Force) – a large, open, international community of network designers, operators, vendors, and researchers concerned with the

evolution of the Internet architecture and the smooth operation of the Internet. IETF is generally recognized as the standards organization for the Internet.

IIOP (Internet Inter-ORB Protocol) – a protocol developed by the Object Management Group (OMG) implementing CORBA solutions over the World Wide Web. IIOP enables browsers and servers to exchange integers, arrays, and other complex objects.

imaging – the processes and technologies associated with incorporating photographic renderings into systems

IMAP (Internet Message Access Protocol) – a standard protocol for accessing e-mail from your local server. IMAP (the latest version is IMAP4) is a client/server protocol in which e-mail is received and held for you by your Internet server. You (or your e-mail client) can view just the heading and the sender of the letter and then decide whether to download the mail. You can also create and manipulate folders or mailboxes on the server, delete messages, or search for certain parts or an entire note. IMAP requires continual access to the server during the time that you are working with your mail.

index – a method used to catalog particular fields within a database to improve the performance of queries against the data. Database indexes are comparable to how a dictionary has tabs for the letters of the alphabet so that it is easier to look up a word, or a reference book has an index to quickly find information needed.

industry standard – a defined standard for a particular industry (i.e., a particular solution or product base)

information – a compilation of operational data from across the organization. Information is used for reporting and analysis to support the decision-making process.

information design – the detailed planning of specific information that is to be provided to a particular audience to meet specific objectives. The output of an information design is sometimes expressed in written instructions, plans, sketches, drawings, or formal specifications. However, on very small projects, information design is likely to be much less formal.

information model – used by application or data architects to build a data warehouse. Before a data warehouse can become a reality, a model must be built to assist in the design. The information model is stored in a repository.

MIPS (millions of instructions per second) – The number of MIPS is a general measure of computing performance and, by implication, the amount of work a larger computer can do. For large servers or mainframes, it is also a way to measure the cost of computing: the more MIPS delivered for the money, the better the value.

mirror site – a Web site or set of files on a computer server that has been copied to another computer server to reduce network traffic, ensure better availability of the Web site or files, or make the site or downloaded files arrive more quickly for users close to the mirror site. A mirror site is an exact replica of the original site and is usually updated frequently to ensure that it reflects the content of the original site. Mirror sites are used to make access faster when the original site may be geographically distant.

MOM (message oriented middleware) – application communication middleware that sends messages between software components. Some MOM permits time-independent communication between applications. Communication, in the form of

messages sent and received by applications, occurs between applications in an asynchronous mode. Applications using MOM can be deployed on multiple platforms using multiple programming languages.

monolithic application – an application in which the user interface, business rules, and data access code are combined into a single executable program and deployed on one platform. A monolithic application operates independently from other applications, performing every step of the process needed to complete the entire business function. It does not share any logic or data across system or organizational boundaries. Databases are designed for access by single application systems within a single agency, not for access by multiple application systems in multiple agencies simultaneously.

Moore's Law – The pace of microchip technology change is such that the amount of data storage that a microchip can hold doubles every year or at least every 18 months. In 1965 when preparing a talk, Gordon Moore noticed that up to that time microchip capacity seemed to double each year. The pace of change having slowed down a bit over the past few years, the definition has changed (with Gordon Moore's approval) to reflect that the doubling occurs only every 18 months. In September 1997, announcements by Intel of 2-bit flash memory and by IBM of chip circuitry of copper rather than aluminum suggested a return of the original version of Moore's Law.

mouseover – a technique using JavaScript that lets you change a Web page element (usually a graphic image) when the user rolls the mouse over something on the page (like a line of text or a graphic image)

MPEG (Moving Picture Experts Group) – a file format for multimedia files (audio and video) used on the World Wide Web

POP (point-of-presence) – the location of an access point to the Internet. A POP necessarily has a unique Internet (IP) address. Your independent service provider (ISP) or online service provider (OSP) has a point-of-presence on the Internet. POPs are sometimes used as one measure of the size and growth of an ISP or OSP. A POP may actually reside in rented space owned by a telecommunications carrier such as Sprint. A POP usually includes routers, digital/analog call aggregators, servers, and frequently frame relay or ATM switches.

POP3 (Post Office Protocol 3) – the most recent version of a standard protocol for receiving email. POP3 is a client/server protocol in which e-mail is received and held for you by your Internet server. Periodically, you (or your client e-mail receiver) check your mailbox on the server and download any mail.

portability – the capability to move software across different platforms
portal – a "doorway" to the Internet. Internet portals provide a window into the information of the Internet, while enterprise portals provide a similar window into the information, systems, and processes of an enterprise. Enterprise portals typically refer to services aimed at employee productivity. The Internet portal— part guide, part home base— is now seamlessly integrated into everyday Web use, making the "doorway" concept of a portal extinct. Portals no longer only direct Web traffic but now provide value-added services from content to communication to commerce as

a one-stop destination.

PostScript – Adobe's device-independent page description/printer language. It describes type, graphics, and halftones as well as their placement on the page.

POTS (plain old telephone service) – POTS is a term sometimes used in discussion of new telephone technologies in which the question of whether and how existing voice transmission for ordinary phone communication can be accommodated. For example, ADSL and ISDN provide some part of their channels for "plain old telephone service" while providing most of their bandwidth for digital data transmission.

print server – hardware and software that manages shared printers on a network
private key – In cryptography, a private or secret key is an encryption/decryption key known only to the party or parties that exchange secret messages. In traditional secret key cryptography, communicators share a key so that each could encrypt and decrypt messages. The risk in this system is that if either party loses the key or it is stolen, the system is broken. A more recent alternative is to use a combination of public and private keys. In this system, a public key is used together with a private key.

UNIT 8

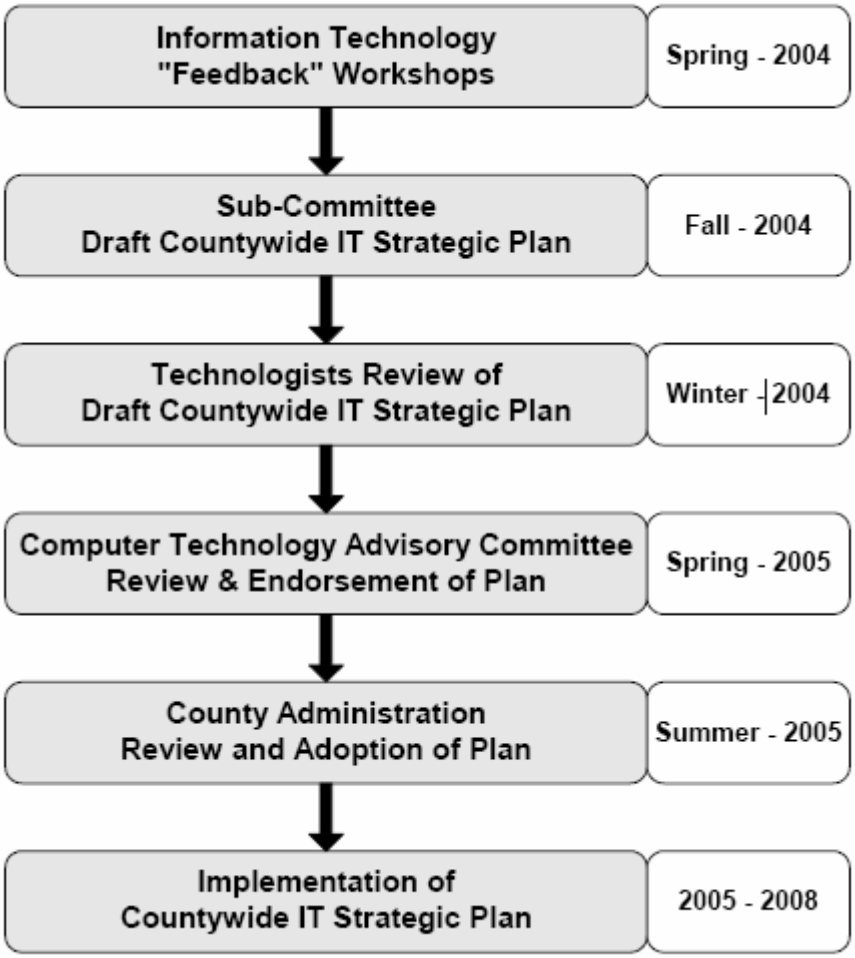
Countywide Information Technology Strategic Plan

PLANNING PROCESS

Whatcom County government increasingly relies on information technology to deliver service to citizens. In partnership with County departments, the Division of Information Technology (DoIT) is tasked with the overall management and advancement of this critical system. Faced with escalating demands on the current staff and infrastructure, and growing technology needs, the County Administration called for a new approach to strategic planning in the spring of 2004.

All County Department Heads, Elected Officials and key staff were invited to a series of workshops to provide their input about technology needs and directions. A summary of the feedback provided in these workshops can be found in Appendix A and was incorporated into this plan.

A sub-committee of technologists and organizational leaders was formed to craft a plan to address the technology needs of the organization. The plan was critically reviewed by technologists both within and outside of the Division of Information Technology. The revised plan was then endorsed by the County's Computer Technology Advisory Committee (CTAC) and adopted by the Administration in Executive Order 2005-03. Following adoption, specific work plans will be developed by technologists to implement the strategic plan.



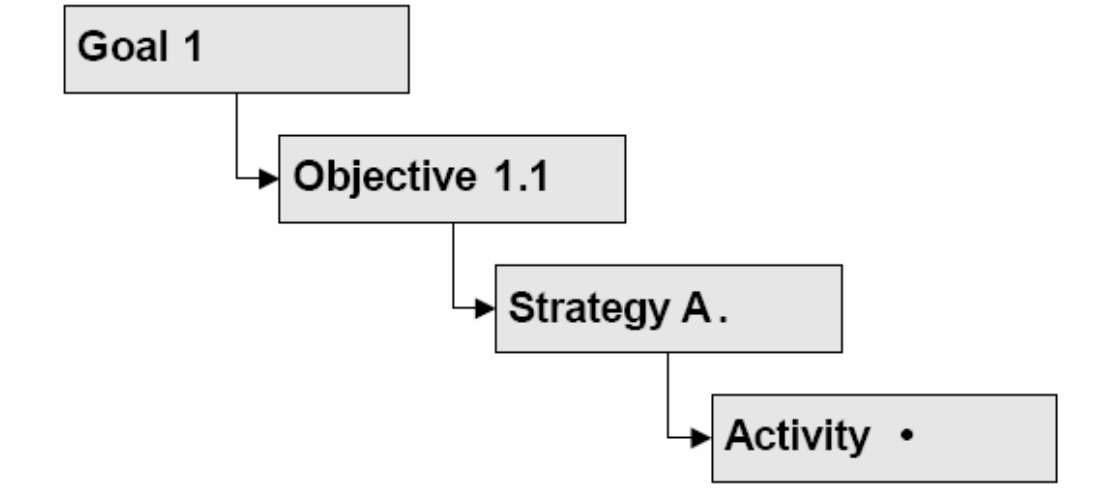
PURPOSE

Over the last thirty years, information technology use at Whatcom County has evolved from manual typewriters to fully automated mobile data collection devices. As we enter the 21st century, the pace of technology growth has become ever more rapid. It is important for the County to shift to a more proactive approach to its use of information technology. Whatcom County is committed to being a government leader in the positive use of information technology to deliver effective services to its staff, partners and citizens. Especially in these times of constrained resources, the most important thing we can do is to invest in the tools and processes of automation to support limited staff across the organization in serving our community.

The purpose of this Countywide Information Technology Strategic Plan is to provide

Guidance for ALL departments and decision makers in making significant improvements a reality over the next four years.

This Countywide Information Technology Strategic Plan is presented in outline form. The outline hierarchy is from goal to objective to strategy to activity as follows:



Goals are broad statements to guide information technology over the next four years.

Objectives are general statements of what Whatcom County hopes to achieve. Strategies are the approaches to be used to meet the objectives. Activities are suggested tasks with measurable actions to achieve desired outcomes.

The goals, objectives, strategies and activities of the plan were developed with the following beliefs:

- Technology planning and delivery is best when based on a comprehensive organization model;
- It is essential to have a strong partnership and positive communications between departments and the central Division of Information Technology;
- Migrating data and applications from desktop to enterprise (countywide) systems will be implemented with the aim of increasing ease of work without impeding local user flexibility;
- Clarity and visibility of technology responsibilities and processes is vital;
- Technology investment funding needs to be built into long-range capital planning; and
- Governance and security audit findings of 2003 will be addressed.

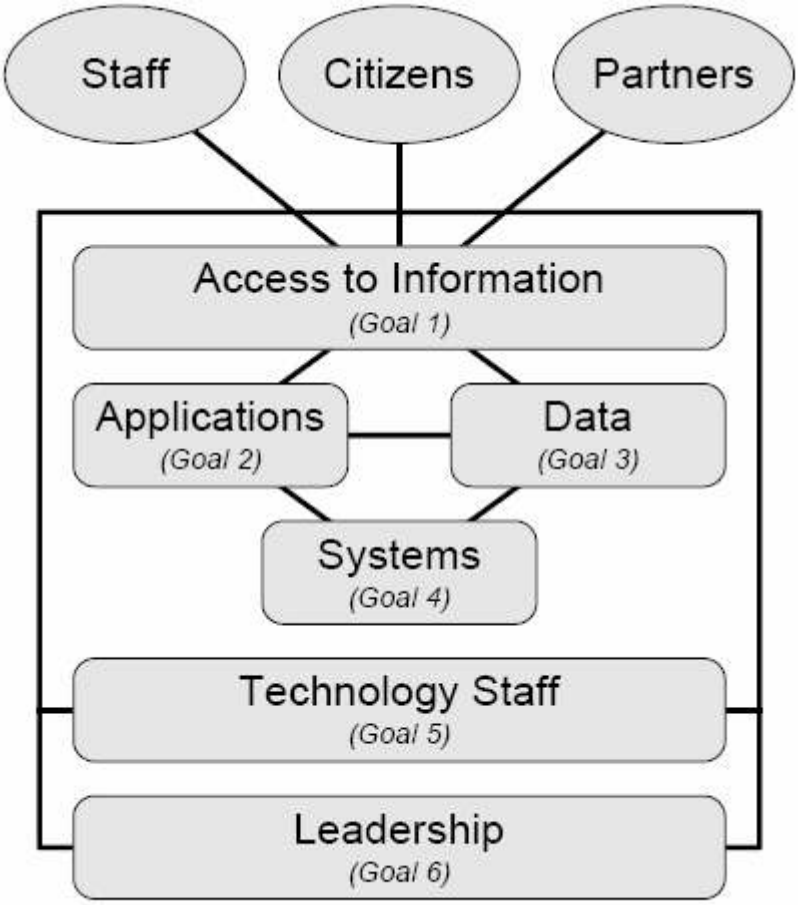
Plan Overview

This Countywide Technology Strategic Plan presents six general goals along with the objectives, strategies and activities to achieve each goal.

x. Technology Goals

#	Goal	Key Word
1	Provide Timely Access to Information	Access
2	Seek Opportunities to Improve Work Processes	Applications
3	Approach Technology Projects with an Emphasis on Data Integration	Data
4	Deploy Secure and Reliable Information Systems	Systems
5	Deliver Services in a Responsive and Cost Effective Fashion	Staff
6	Actively Lead Information Technology	Leadership

These goals are essential in providing technology services to staff, partners and citizens. The following diagram depicts how these goals collectively provide customers with access to electronic information.



Plan Accountability and Review

Accountability and review cycles will be critical to the success of the strategic plan. Goal 6 (Actively Lead Information Technology) emphasizes the importance of accountability and review. A few of these activities are listed below:

- Improve the communications of progress updates;

- Apply and refine the use of performance measures;
- Communicate the results of measured performance;
- Report progress to multiple audiences (Council, users, technologists);
- Monitor and report on the implementation of the strategic plan; and
- Review, refine and update the strategic plan at least annually.

GOAL 1:

PROVIDE TIMELY ACCESS TO INFORMATION

xi. Objective 1.1:
xii. Enhance “virtual” front counter on the Web

A. Use Web as primary vehicle for access to County documents

- Develop public records electronic access and management policies
- Establish cost-recovery policy for hardcopy distribution of documents

(e.g. Bound reports and compact discs)

- Integrate Web with document management system (Laserfiche) and other County business systems
- Deploy a Web-GIS portal for universal access to County information

(e.g. Zoom to parcel on map and retrieve property information)

- Establish the Web as a universal tool for distributing countywide information to employees
- Publish countywide services Frequently Asked Questions (FAQ)
- Implement robust County Web site search services
- Explore implementing a download site for community requests for public datasets
  (e.g. Web or FTP)
- Provide login access to appropriate Web services

B. Expand Web experience to include business processes

- Automate application process for County services

(e.g. Jobs, permits, reservations, and other applications)

- Implement e-commerce technologies to accept on-line payment
- Develop form routing capabilities to automate the approval process
- Provide citizens and partners with transparent access to transactions

(e.g. Permit or contract status)

- Explore electronic tools for facilitating community dialog

(e.g. Forum, listserv, wiki)

C. Promote updates to Web content

- Encourage departments to actively maintain Web site using content management software
- Provide countywide event management system
- Keep dynamic Web content current

xiii. Objective 1.2:
xiv. Increase the digital capture of information at its point of origin

A. Deploy mobile and front counter digital collection and access devices

- Equip field teams with mobile devices

(e.g. Personal Digital Assistants, Tablet PCs, etc.)

- Provide staff collecting location-based data with Global Positioning

System (GPS) enabled devices

- Deploy a common "Desktop Kiosk" for self-service access to and update of countywide information

B. Deploy electronic forms using Web, desktop and mobile technologies

- Perform a countywide inventory of paper forms
- Replace 50% of paper forms with electronic forms or other equivalents
- Provide ability to "save" forms to disk (PDF, etc.)

C. Establish digital submission policies

- Introduce County policies to require digital submissions when supported by a business case

(e.g. Subdivisions, job applications, etc.)

xv. Objective 1.3:

Develop processes to maintain the integrity of digital information

A. Validate information at point of origin

- Maximize the use of data entry fields with "pick lists" or "drop-down" choices
- Minimize the use of "free form" data entry fields
- Employ data entry error checking and correction techniques

B. Establish countywide standards for common data formats

- All departments use common format for site addresses
- All departments use common format for parcel number
- Identify other opportunities for data standardization

C. Develop master datasets for use across all departments

- Maintain and publish common datasets

(e.g. All valid site addresses in County)

- Assign data steward responsibility for common datasets and communicate countywide

xvi. Objective 1.4:
xvii. Expand "virtual" office to remote staff and partners

A. Provide remote access to County business systems

- Continue to support and enhance remote computing capabilities beyond current e-mail access

(e.g. Intranet access, file servers, etc.)

- Deploy secure access to authorized remote staff to County business

systems
(e.g. MyWhatcom)
- Increase electronic transactions with partners

(e.g. City of Bellingham access to County property information system)

GOAL 2:

SEEK OPPORTUNITIES TO IMPROVE WORK PROCESSES

xviii. Objective 2.1:
xix. Increase application development capacity

A. Increase enterprise application development capacity

- Provide training in enterprise application development

(e.g. Visual Basic, Java, RPG for "front-end" development)

- Increase use of business analyst consulting (internal and external)
- Augment central Division of Information Technology application development staff and separate from desktop support operations to focus efforts on programming
- Reduce reliance on legacy code and increase reliance on contemporary code
(e.g. Migrate from SYS36 to a modern computer language)
- Apply standard techniques for documenting programming and technical processes

B. Increase desktop application customization capacity

- Provide training in department desktop applications customization

(e.g. Customize MS Office applications)

xx. Objective 2.2:
xxi. Work with departments to identify key information workflows

A. Develop a standardized approach to documenting workflow

- Identify and adopt techniques for documenting workflows
- Promote countywide use of workflow documentation through education and training

B. Set up small process improvement workgroups for workflows

- Create small process improvement workgroups for key workflows
- Identify and document key information workflows
- Identify and address security and privacy issues
- Analyze information workflows for improvement and automation

xxii. Objective 2.3:
xxiii. Automate key workflows

A. Evaluate and prioritize automation

- Build "business cases" for the introduction of new information technologies to automate key information workflows
- Select priority workflows for automation

B. Implement selected desktop solutions

- Customize standard desktop business applications (MS Office) to improve staff and department information workflows

C. Implement selected enterprise solutions

- Develop enterprise applications to improve countywide information workflows

D. Educate users and monitor workflow solutions

- Train users on new work processes
- Periodic review and revision of workflows

GOAL 3:

APPROACH TECHNOLOGY PROJECTS

WITH AN EMPHASIS ON DATA INTEGRATION

xxiv. Objective 3.1:

Support and coordinate countywide data management activities

A. Establish an interdepartmental data management team

- Coordinate technical data management activities across departments
- Inventory key department and countywide datasets and ownership
- Apply countywide standards for data collection, quality, storage and retrieval
- Provide a forum or other mechanisms for peer support

B. Support geographic information systems (GIS)

- Support GIS Policy Committee, departmental and central GIS staff implement a countywide GIS
- Organize digitally submitted data for efficient search and retrieval by location
  (e.g. Geo-hazard studies, wetland reports)

C. Lead multi-jurisdictional data integration efforts for region

- Assume leadership role for multi-jurisdictional databases and applications
- Position the County to serve as the digital hub for priority regional data integration
- Lead development of a secure regional network for seamless data exchange and system integration with local government partners

xxv. Objective 3.2:

xxvi. Encourage desktop to enterprise database migration

A. Provide enterprise database infrastructure to consolidate databases

- Provide central database server capacity for tabular and GIS datasets
- Provide consolidation and reporting of countywide datasets using technologies
  (e.g. Data warehousing and Web services)

B. Partner with departments to populate centralized databases

- Work with department data administrators to inventory business critical desktop databases
- Upsize business critical desktop databases to central enterprise databases (e.g. MS Access to MS SQL Server)
- Provide department data custodians with administrative rights to their data on central database servers

xxvii. Objective 3.3:
xxviii. Create data integration opportunities

A. Design an integration-friendly architecture

- Build an enterprise system architecture to facilitate cross-department and external data integration
- Identify data standards for types and key fields
- Develop database key structures to enable cross departmental and database reporting
- Establish location (parcel, address, latitude/longitude) as a common database key to join information from disparate databases

B. Implement Web services

- Construct Web service interfaces for all business critical systems

(e.g. iSeries - Parcel Database Information System)

- Develop a common language that applications can use to communicate with Web service interfaces (e.g. Persistent Uniform Resource Locator)

C. Approach technology projects with an emphasis on data integration

- Encourage and support cross-department and external technology collaboration
- Require new technology solutions to have interfaces to existing and planned business systems (e.g. Maintenance management to/from financial system interface)

GOAL 4:

DEPLOY SECURE AND RELIABLE INFORMATION SYSTEMS

xxix. Objective 4.1:

Establish and monitor system availability and performance targets

A. Develop Service Level Agreements (SLA)

- Identify departments' critical business information systems
- Establish measurable performance standards (metrics)
- Enter into Service Level Agreements with responsible parties (partners and service providers)

B. Implement monitoring and reporting

- Monitor business critical information systems
- Provide monthly reporting of actual usage and performance

C. Maintain business continuity

- Develop disaster recovery procedures and safeguards
- Implement periodic testing of disaster recovery procedures and safeguards
- Provide semi-annual reporting of disaster recovery simulations

xxx. Objective 4.2:
xxxi. Maintain secure information systems

A. Implement access policies

- Develop countywide security levels for systems and data
- Seek appropriate counsel

(e.g. legal, audit, current policies)

- Publish data access policies
- Implement standardized security levels on business critical systems

B. Actively monitor and respond to security breaches

- Enhance intrusion detection
- Perform periodic security audits with published results and mitigation plans
- Develop, publish and follow security incident response procedures

C. Improve perimeter security

- Optimize the County's perimeter security architecture

(e.g. Connection to Internet and state agencies)

- Shorten evaluation and replacement cycles for security tools
- Perform periodic tests of perimeter security

D. Security education and compliance

- Promote security awareness across all staff
- Conduct regular security training for management and staff

xxxii. Objective 4.3:
xxxiii. Maintain reliable information systems

A. Adhere to "best practices"

- Apply industry-standard technology "best practices"

B. Isolate and protect production systems

- Adopt formal change management procedures

(e.g. maintenance windows, departmental notification, documentation

of technical changes)

- Maintain logs of changes on all critical business systems
- Perform development and staging activities on non-production systems

C. Implement fault tolerant systems

- Deploy redundant hardware solutions for critical business systems

(e.g. Redundant Array of Independent Drives)

D. Enhance storage, backup and restoration systems

- Identify countywide and department specific needs

(e.g. Data, schedule, technique, archive, retention, etc.)

- Develop and implement department and countywide backup procedures
- Conduct periodic restoration tests and document results
- Explore new data storage technologies

(e.g. Storage Area Networks and Network Attached Storage)

GOAL 5:

DELIVER SERVICES IN A RESPONSIVE AND

COST-EFFECTIVE FASHION

xxxiv. Objective 5.1:

xxxv. Implement Information Technology help desk ticket system

A. Select and deploy Help Desk ticket system

- Evaluate the new Computerized Maintenance Management System

(CMMS) along with specialized Help Desk ticket systems for use in the

Division of Information Technology

- Select and deploy Help Desk ticket system

B. Improve customer communication

- Provide customers with transparent access to all work tickets to provide self-service updates on work progress and priorities

C. Improve services and balance priorities

- Perform regular analysis of service request patterns to improve service delivery
- Publish detailed monthly reports on accomplishments and workload to help align resources with priorities

xxxvi. Objective 5.2:

xxxvii. Improve technology procurement and installation process

A. Analyze technology procurement process

- Create a procurement improvement task force
- Document the technology procurement and installation processes
- Explore opportunities for using enterprise systems such as document management (Laserfiche), e-mail/groupware (GroupWise) or a new help desk ticket system to automate procurement

B. Streamline technology procurement

- Prepare and implement an action plan to streamline technology procurement and installation
- Stage procurement evenly throughout the year
- Establish average time for technology procurement and installation

(e.g. Three weeks for personal computer)

- Publish current pre-approved lists of standard hardware, software and "fringe" technology
  (e.g. Facsimile machines and copiers)

C. Improve customer communication

- Publish procurement and installation process
- Provide customers with transparent access to the status of procurement orders

xxxviii. Objective 5.3:
xxxix. Foster technology proficiency in all staff

A. Support countywide technology staff

- Foster trust and cooperation among all countywide technology staff
- Clearly define department Information Technology Contact roles and responsibilities in the overall information systems support structure
- Increase department Information Technology Contacts' ability to handle first-level technology support

B. Work to improve countywide technology skills

- Survey departments to identify priority technology education needs
- Provide countywide training tailored to end users
- Deploy and actively maintain a Frequently Asked Questions (FAQ) technology support knowledge base on the Intranet which will become the user's first point of problem resolution

xl. Objective 5.4:
xli. Place a premium on customer satisfaction

A. Continue to achieve and improve customer satisfaction

- Develop strategies for maintaining customer satisfaction in a resourceconstrained environment
- Actively communicate project activities, successes and issues to customers and management
- Seek frank feedback from customers about services
- Manage customer expectations through improved communications using project management tools such as timelines and status reports

B. Clarify technology service roles and responsibilities

- Formalize service area roles and assign direct and backup responsibilities
- Publish general service area responsibilities to clarify customer support channels (e.g. Who do I call?)

C. Expand technology consulting services

- Identify unmet technology consulting needs

- Build internal and external technology consulting capacity to meet the growing department needs to improve business processes with technology (e.g. Technology project management, application development, etc.)
- Consider separating consulting from operations to promote both service areas as a priority

xlii. Objective 5.5:
xliii. Reduce desktop support costs

A. Improve the use of desktop standards to lower costs

- Establish a collaborative process involving countywide technologists to recommend standards
- Regularly review and advance standards
- Support standards through education

B. Explore managed personal computer concepts

- Develop department or role level standard computer images
- Experiment with thin client software and hardware technologies

C. Research alternative acquisition strategies

- Explore the leasing of desktops

GOAL 6:

ACTIVELY LEAD INFORMATION TECHNOLOGY

xliv. Objective 6.1:
xlv. Identify plan priorities and refocus staffing for implementation

A. Prioritize plan elements

- Engage stakeholders in prioritization process
- Seek peer review from external experts
- Publish and communicate plan priorities

B. Refocus staffing toward priority plan initiatives

- Revise Division of Information Technology work plans and staff assignments
- Revise departmental staff work plans and staff assignments
- Determine and address staffing gaps

(e.g. DoIT., departments, contractors)

- Consider methods to foster partnership between DoIT and departments
- Provide targeted technology training
- Establish and document technology training plans
- Fund required training

xlvi. Objective 6.2:
xlvii. Evolve infrastructure for plan implementation

A. Follow plan priorities and proactively invest in infrastructure

- Incorporate plan into budgeting process

(e.g. Inventory of Services, Additional Services Requests)

- Create a "large systems" selection process
- Develop a "business case" approach to evaluate costs and benefits of new technology projects and significant technology purchases
- Craft project submission and prioritization processes
- Establish standards for applications, personal computer hardware and peripherals

B. Develop a Technology Projects Plan (4-Year)

- Establish and document enterprise architectures
- Update and maintain services, hardware and application inventories
- Conduct annual review of accomplishments with departments and technology oversight bodies
- Identify large technology projects
- Project capital needs

(e.g. New phone system)

- Draft detailed Technology Projects Plan(s)

C. Create a mechanism to fund the Technology Projects Plan

- Include large technology projects in countywide capital planning
- Expand TR&R funding concept to include server-side and networking infrastructure
- Explore other funding mechanisms to keep our technology current

xlviii. Objective 6.3:

xlix. Apply "best practices" in managing technology projects

A. Identify project management "best practices"

- Create a team of organizational project management leaders
- Establish core project management expectations
- Develop practical set of project management techniques by project scale
- Obtain project management certification for at least one senior staff member (e.g. Project Management Institute)

B. Apply project management "best practices"

- Incorporate project management techniques into daily operations
- Deploy project management resources, aids, templates on the Intranet
- Use risk management techniques to plan for organizational concerns

(e.g. Security and legal)

- Plan for ongoing support and maintenance (services tail)
- Publish monthly project status reports on the Intranet
- Setup review cycles at the conclusion of large projects

I. Objective 6.4:
Ii. Govern for effective information technology

A. Clarify technology governance structure

- Review current leadership configuration
- Develop a comprehensive list of all technology committees and clarify their respective roles and responsibilities
- Clarify advisory from decision-making authority
- Review other organizations for insights where governance and technology excel
- Revise governance to support implementation of the strategic plan
- Conduct ongoing review of the effectiveness of the governance structure

B. Enhance methods for monitoring technology progress

- Improve the communications of progress updates
- Apply and refine the use of performance measures
- Communicate the results of measured performance
- Report progress to multiple audiences

(e.g. Council, users, technologists)

C. Increase effectiveness of policy, standards and guidelines

- Update policies to reflect strategic plan
- Develop and refine policies as identified

(e.g. Technology security)

- Communicate policies and provide ongoing training to users

D. Conduct periodic Information Technology Strategic Plan review

- Monitor and report on the implementation of the strategic plan
- Review, refine and update the strategic plan at least annually

TERMS

Best Practice: A superior method or innovative practice that contributes to the improved
performance of an organization, usually recognized as "best" by other peer organizations.
(Source: American Society for Quality Dictionary)
Business Case: A structured proposal for business improvement providing a decision package for organizational decision makers. A business case includes an analysis of business process performance and associated needs or problems, proposed alternative

solutions, assumptions, constraints, and risk-adjusted cost/benefit analysis. *(Source: U.S.*

General Accounting Office Business Process Reengineering Assessment Guide)
Client-side: Occurring on a local client computer in a client-server system. For example,
on the World Wide Web, some programming scripts are considered client-side because they
are executed by your local computer's Web browser. In contrast, other programming scripts

are considered server-side because they run on the Web server. *(Source: Modified Webopedia)*

Computer & Technology Advisory Committee (CTAC): A committee established by
Whatcom County Executive Order 97-07 "… to perform the duties of reviewing and developing necessary strategies regarding the County's needs for computer and technological systems, evaluating and planning for the technological needs of the County,
and recommending, when necessary, capital improvements to the technological system of
the County." (Source: Whatcom County Executive Order 97-07)
Disaster Recovery: Methods for ensuring an organization recovers from natural and human-caused disasters that affect its computer-based operations. *(Source: McGraw-Hill*
Online Learning Center)
E-Business (Electronic Business): Conducting business on-line via the Internet. It not only includes buying and selling but also serving customers and collaborating with partners.
(Source: Modified SearchCIO.com)

E-Commerce (Electronic Commerce): Buying and selling products and services online
via the Internet. (Source: Modified SearchCIO.com)

E-Government (Electronic Government): Delivering government service through
electronic means such as the Internet. The application of e-business technologies and
strategies to government organizations. (Source: Modified Unisys 2000 Annual Report
Glossary)

Enterprise Architecture: The overall configuration of technology (software, networks,
hardware, data) to most effectively support organization-wide needs.

Geospatial Data: Information to identify the geographic location and characteristics of natural or
constructed features and boundaries on the earth. This information may be derived from, among other
things, remote sensing, mapping, and surveying technologies. *(Source: United States Geological Survey*
Content Standards for Digital Geospatial Metadata Glossary)

Geographic Information System (GIS): An arrangement of computer hardware, software, and
geographic data people interact with to integrate, analyze, and visualize the data; identify relationships,

patterns, and trends; and find solutions to problems. The system is designed to capture, store, update,

manipulate, analyze, and display the geographic information. A GIS is typically used to represent maps

as data layers for study and analysis. (Source: Environmental Systems Research Institute GIS

Dictionary)

Global Positioning System (GPS): A constellation of 24 radio-emitting satellites deployed by the U.S. Department of Defense and used to determine location on the earth's surface. The orbiting satellites transmit signals that allow a GPS receiver anywhere on earth

to calculate its own location through triangulation. The system is used in navigation, mapping,

surveying, and other applications in which precise positioning is necessary. *(Source:*

Environmental Systems Research Institute GIS Dictionary)

Help Desk Ticket System: Software which assists in tracking and prioritizing computer support requests.

Infrastructure: The computer and communication hardware, software, databases, people, and policies supporting the organization's information management functions.

Information Technology (IT) Contact: A person designated by the Contact's department head to relay PC/Network problems to DoIT staff. This allows for a single point of contact to DoIT. *(Source: Whatcom Internal Resource Exchange WIRE)*

Listserv: An automatic mailing list server. When e-mail is addressed to a LISTSERV mailing list, it is automatically broadcast to everyone on the list. *(Source: Modified Webopedia)*

Large system: A critical business technology serving one or more departments. Whatcom County examples include e-mail (Novell GroupWise), document management (Laserfiche) and election system (EIMS).

Portal: A main "point of entry." In technology terms, a portal typically refers to a Web site serving as gateway to a large amount of information and services.

Remote computing: Using computer devices away from an organization's primary location(s).

Server-side: Occurring on a central computer server in a client-server system. For example, on the World Wide Web, some programming scripts are considered server-side because they run on the Web server. In contrast, other programming scripts are considered

client-side because they are executed by your local computer's Web browser. *(Source:*

Modified Webopedia)

Service Level Agreement: Abbreviated SLA, a contract between a service provider and the end user that stipulates and commits the provider to a required level of service. An SLA should contain a specified level of service, support options, enforcement or penalty provisions for services not provided, a guaranteed level of system performance as relates to downtime or uptime, a specified level of customer support and what software or hardware will be *provided. (Source: Modified Webopedia)*

Technology Replacement & Revolving (TR&R) Fund: The Whatcom County fund used to replace **existing** hardware, software, fax machines and computer peripherals. (Source: *Whatcom County Policy AD132101Z)*

Technologists: Whatcom County staff with technology responsibilities. This includes staff in the Information Services Division as well as staff in other departments with roles such as Information Services Contacts, GIS specialists, data administrators and Web contacts.

Thin Client: In client/server applications, a client designed to be especially small so that the bulk of the data processing occurs on the server. Although the term thin client usually refers to software, it is increasingly used for computers, such as network computers that are designed to serve as the clients for client/server architectures. A thin client is a network computer without a hard disk drive, whereas a fat client includes a disk drive. *(Source: Modified Webopedia)*

Virtual: Not real. The term *virtual* is popular among computer scientists and is used in a wide variety of situations. In general, it distinguishes something that is merely conceptual from something that has physical reality. A *virtual* front counter is a front counter that is simulated using computer technologies such as electronic documents and forms, on-line *payment, etc. (Source: Modified Webopedia)*

Virtual private network (VPN): A network technology allowing a public network such as the Internet to establish a secure connection between two remote locations. *(Source: Modified Webopedia)*

Web: A computer network with a collection of informational sites with text, graphics, sound and animation resources viewable by desktop “Web” browsers. The Web typically refers to

the World Wide Web on the Internet, but it may also refer to an internal intranet.

Wiki: A collaborative Web site comprised of the perpetual collective work of many authors.

(Source: Modified Webopedia)

APPENDIX A – SUMMARY OF WORKSHOPS

IS- Strategic Planning Meeting

May 11, 2004

"Weighted" Technology Goals

1. Convert Physical Records – Laserfice (20 green, 12 yellow)
   - Searchable
   - Less staff time
   - Frees up storage space
   - Reduces mold
   - Centralized
   - Easy access
2. Dynamic Web Development (18 green, 8 yellow)
   - Online forms (fill out and submit online)
   - Cut down on calls/visits
   - Provide instant information
   - Schedule facilities
   - Complaint/results tracking
   - Maps and projects list
   - Departmental editing of website and intranet content
   - May cut costs
   - Improves service
   - Electronic signature
3. Remote Access to Information that Creates a Virtual Office (14 green, 9 yellow)
   - Accessible anywhere 24/7
4. Electronic Filing and Service (12 green, 6 yellow)
5. Level of Support for Systems (11 green, 16 yellow)
   - Maintenance
   - Response to changing business needs
   - Define roles
6. Centralized GIS (9 green, 5 yellow)
   - Standards and protocols
   - Repository
   - Shared Data
   - Reduced duplication
   - Linking
7. Evaluate and Update/Create Departmental Software Needs (9 green, 3 yellow)
   - Victim Witness Notification
   - Jury Selection
   - Conflict Recognition
   - Assets Management

- Digital Holographic Exhibits
- Automate and Merge Data
- Brief Banks
- Stand Alone Capacity

8. Streamline Administrative Workflows (8 green, 16 yellow)
   - Cut down on multiple reviews/signoffs
   - Council actions (contracts, budget, resolutions)
   - Purchasing
   - Timesheets and payroll
   - PDA recorded project time
   - Scheduling common rooms
9. EOC/Command Post – Stand Alone Capacity (8 green, 3 yellow)
10. Real Time Data Collection and Use – Wireless Applications and Updating (8 green, 2 yellow)
    - From the field
    - For work planning/response
    - Permit planning
11. Make Maps Accurate (7 green, 5 yellow)
    - Legally
    - Geographically
    - For modeling purposes
    - Survey grade monumentation
    - Roads and sector corners
12. Security (7 green, 1 yellow)
    - Weapons screening
    - Jail/Juvenile Controls
    - GPS Monitoring
    - Surveillance/recording cameras
13. Coordinated Credit Card Usage (5 green, 9 yellow)
    - Countywide
    - Over the county
    - Online
14. Sharing Case Management System (5 green, 6 yellow)
    - Access internally
    - Manipulate
    - Secure external access
15. Take Data – Make Interactive Links (5 green, 4 yellow) (GIS, GPS)
    - Access by all departments
    - Minimize number of people to manage
    - Inventory and searchable
16. Multi-platform Report Writer (5 green, 4 yellow)
17. Biometric ID and Monitoring (4 green, 10 yellow)
18. Expand/Update System Capacities (4 green, 7 yellow)
    - HVAC System
    - Prox Lock System

- Training/Event Support
- Distribute Electronically to all employees
- More flexible/versatile HRMS
- Ability to send receive large documents

19. Track Manpower and Materials – Computerized Maintenance Management (4 green, 4 yellow)
(Production management extends life of assets.)
20. Life of Systems (4 green, 3 yellow)
- Vendors – evaluate relationships
- Aging equipment
- Adequate reserves
- Updates/replacements of major infrastructure

21. Process Speed of AS400 (4 green, 1 yellow)
(Capacity and availability) (DASD)
22. Voice Recognition Software – Voice to Text (3 green, 8 yellow)
- Reduce Carpal Tunnel Syndrome
- Save transcription time

23. Barcode Capabilities (3 green, 3 yellow)
24. Videoconferencing (2 green, 18 yellow)
- Saves travel costs
- Training
- Conferences
- Interviewing

25. IS Upgrades (2 green, 3 yellow)
- Reroute IGN traffic through firewall
- Improved incident tracking
- Intrusion detection
- Improve backup and restore
- Revamp IS department contact system

26. Telephone System (2 green, 3 yellow)
- Assess business needs
- Instant Voice Recognition (IVR)
- Call center management
- Explore Voice Over Internet Protocol (VOIP)

27. Fax from Desktop (2 green, 2 yellow)
- Saves phone lines
- Reduces long distance
- Distribution capability

28. Improved Communications (2 green, 1 yellow)
- Public access kiosks

29. Electronic Library (1 green, 8 yellow)
- Laws
- Reports
- Convert physical one to computer

30. Track Service Requests (1 green, 3 yellow)
31. Juvenile Remote Education Access (1 green, 2 yellow)
32. Special District Access (1 green, 1 yellow)

33. Prevent Unauthorized Access to County Records and Work Areas ((1 green, 1 yellow)
34. Track Workflow (1 green)
    - Details from each desk (internal, external)
35. Video Training (4 yellow)
    - Internet
    - In-house
    - On-demand
36. Business Continuity Planning (2 yellow)
    - Redundancy
    - Data protection
    - Disaster recovery
37. Back-up/Duplication (1 yellow)
    - Knowledge bases (cross-train, data bases)
    - Computer back-ups
38. Expand Emergency Communication for Public Safety/Health (1 yellow)
    - Power outage
    - Cell phones
    - Land lines
39. Customized Database
    - Storage
    - Retrieval
    - Email address collection
40. Individual Departmental Needs
41. Technologically Prepared and Cross-trained Staff
42. User Friendly Information for the Public
43. Single Location/Site for Public to Go (One Stop Web)
44. Use Technology to Schedule Across Departments
    - Vehicles
    - Laptops
    - Projectors
    - Space
    - Shared equipment
    - Regular maintenance
    - Replacement of parts
    - Allows accountability and audit trail
    - Less staff time
45. ID of Potential Users of Users
46. Single Point of Access (Appol, Internet, WIRE)
47. Groupwise Training
48. Work Management Tools
49. Capitalize on Tools departments Can Use Directly
50. System Integrity Centralized
51. Departments and Groups of Departments as Data Custodians

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

accurate adj. careful and exact
c. accuracy syn. precise
She was able to make accurate observations with the new telescope.
Experiments must be conducted with accuracy.

dim adj. not bright or clear
v. dim syn. faint
n. dimness
The light was too dim for studying.
The stars dimly lit the evening sky.

gigantic adj. very large
syn. enormous
Reaching the Moon was a gigantic step in space exploration for mankind.
New methods of farming offer gigantic advantages over the old methods.

lasting adj. forever, without end
v. last syn. enduring
Kennedy left a lasting impression on the people who heard his inaugural address.
The introduction of robots will have a lasting effect on industry.

vibrant adj. lively, powerful, full of action, bright
n. vibrance syn. brilliant
His vibrant personality made him well liked by everyone.
The vibrance of the city is attractive to many individuals.

dominant adj. primary or principal; having or exercising control
v. dominate over something
n. domination syn. major
The dominant life forms of the Paleozoic era lived in the water. The skyscraper dominated the skyline.

dormant adj. not growing or producing; asleep
n. dormitory syn. inactive
n. dormancy

The volcano had been dormant for hundreds of years before the eruption last month.
The seniors live in the new dormitory.

drab adj. lacking color; uninteresting, boring
n. drabness syn. colorless
Their clothing was quite drab.
The drabness of the desert made driving less interesting.

selective adj. carefully chosen
adj. select syn. discriminating
v. select
n. selection
n. selectivity
They were very selective when they chose the members of the academic team.
He selected Spanish as his language class.

ASC (Accredited Standards Committee) X12 – the ANSI Electronic Data Interchange (EDI) standard

ASC (Accredited Standards Committee) X9 – the ANSI Financial Services standard ASCII (American Standard Code for Information Interchange) – a standard code for representing English characters as numbers, with each letter assigned a number from 0 to 127.

For example, the ASCII code for uppercase M is 77. Most computers use ASCII codes to represent text, which makes it possible to transfer data from one computer to another.

ASP (Active Server Page) – an HTML page that includes one or more scripts (small embedded programs) that are processed on a Microsoft Web server before the page is sent to the user. An ASP is somewhat similar to a server-side include or a common gateway interface (CGI) application in that all involve programs that run on the server, usually tailoring a page for the user.

Typically, the script in the Web page at the server uses input received as the result of the user's request for the page to access data from a database and then builds or customizes the page on the fly before sending it to the requestor.

ASP (application service provider) – a third party that manages and distributes software-based services and solutions to customers across a wide area network (WAN) from a central data center. ASPs help companies outsource some or almost all aspects of their information technology needs.

Assembler – a low-level computer programming language similar to a computer's machine language and specific to each hardware platform. An Assembler program from one platform will not run on other platforms.

asynchronous processing – a method of communication that allows one program to send messages or data to another program without requiring an immediate response. Just as voice mail permits communication without requiring both parties to be available at the same time,

requests can be placed in a queue and the other application has the flexibility to process the requests when it is ready (e.g., once a day, once an hour, or as they occur).

ATM (asynchronous transfer mode) – (1) A switching architecture that uses cell relay technology to carry vast quantities of data at extremely high speeds (2) A switching communications method that provides high-bandwidth capacity
ATM provides a universal transport method for both LANs and WANs and has the potential to remove the distinctions between them. ATM accommodates high bandwidth applications such as those used in multimedia, image, and video conferencing.
atomic-level data – transaction-level data containing much more detail than summary data. Atomic-level data addresses the business need to recast history.

authentication – the process of determining whether someone or something is, in fact, who or what it is declared to be. In private and public computer networks (including the Internet), authentication is commonly done through the use of logon passwords. Knowledge of the password is assumed to guarantee that the user is authentic. Each user registers initially (or is registered by someone else) using an assigned or self-declared password. On each subsequent use, the user must know and use the previously declared password.

business recovery – reactions to a sudden, unplanned event that enable an organization to continue critical business functions until normal business operations resume, such as facilities and local work items

business rules – fundamental units of work required to complete a business process. An application program can automate business rules.

CA (certificate authority) – an application program technology in PKI-based security systems that issues and manages security credentials and public keys for message encryption and decryption. A CA typically creates both public and private keys, embeds them in certificates, and provides them for storage in a smart card or the user's local hard drive (private-key certificate) and in a directory (public-key certificate).

As part of a public key infrastructure, a CA checks with a registration authority (RA) to verify information provided by the requestor of a digital certificate. If the RA verifies the requestor's information, the CA can then issue a certificate. Depending on the public key infrastructure implementation, the certificate includes the owner's public key, the expiration date of the certificate, the owner's name, and other information about the public key owner.
cabling – the physical wire that connects a network
calendaring and scheduling – a technology that provides, by combining with an organization's overall groupware system(s), a methodology for coordination and communication of individual and group activities and plans

calendaring and scheduling front end – the application that runs on a user's desktop that allows the viewing and manipulation of calendaring and scheduling information
call center – a central place where customer and other telephone calls are handled by an organization, usually with some amount of computer automation. Typically, a call

center has the ability to handle a considerable volume of calls at the same time, to screen calls and forward them to someone qualified to handle them, and to log calls. Call centers are used by mail-order catalog organizations, telemarketing companies, computer product help desks, and any large organization that uses the telephone to sell or service products and services.
CIC (customer interaction center) – The call center is evolving into a "new age" contact center.

The CIC accommodates multiple channels for customer interaction and critical functions, including customer service/support, field service dispatch, quality management, intelligent routing, case-based reasoning, and knowledge repositories.

CICS (Customer Information and Control System) – (1) A general–purpose licensed program that controls online communication between terminal users and a database (2) A mainframe multi-user single address space subsystem from IBM that supports mainframe transaction processing programs

Over the past several decades CICS, together with the COBOL programming language, has formed the most common set of tools for building customer transaction applications in the world of large enterprise mainframe computing. A great number of the legacy applications still in use are COBOL/CICS applications. Using the programming interfaces provided by CICS, a programmer can write programs that communicate with online users and read from or write to customer and other records (orders, inventory figures, customer data, and so forth) in a database (usually referred to as "data sets") using CICS facilities rather than IBM's access methods directly. Like other transaction managers, CICS can ensure that transactions are completed and,
if not, undo partly completed transactions so that the integrity of data records is maintained.

fiber optic cable – a network cabling technology. Fiber optic cable uses light impulses instead of electrical impulses to transmit data from point A to point B. Due to the high cost and high capacity of fiber optic cabling, it is typically used as a backbone solution.

file server – (1) A high-capacity disk storage device or a computer that each computer on a network can use to access and retrieve files that can be shared among attached computers.

Note: Access to a file is usually controlled by the file server's software rather than by the operating system of the computer that accesses the file. (2) Hardware and software that manage files and shared disk space on a network

filter – a program or section of code that is designed to examine each input or output request for certain qualifying criteria and then process or forward it accordingly. This term was used in UNIX systems and is now used in other operating systems. A filter is "pass-through" code that takes input data, makes some specific decision about it and possible transformation of it, and passes it on to another program in a kind of pipeline. Usually, a filter does no input/output operation on its own. Filters are sometimes used to remove or insert headers or control characters in data.

firewall – (1) One or more computer systems placed between trusted and non-trusted networks to prevent unauthorized access to networks and systems (2) A combination of hardware and software that separates a LAN into two or more parts for security purposes.

A firewall is a set of related programs, located at a network gateway server that protects the resources of a private network from users from other networks. (The term also implies the security policy that is used with the programs.) An enterprise with an intranet that allows its workers access to the wider Internet installs a firewall to prevent outsiders from accessing its own private data resources and for controlling what outside resources its own users have access to.
Basically, a firewall, working closely with a router program, filters all network packets to determine whether to forward them toward their destination. A firewall also includes or works with a proxy server that makes network requests on behalf of workstation users. A firewall is often installed in a specially designated computer separate from the rest of the network so that no incoming request can get directly at private network resources.

firmware – an ordered set of instructions and data stored in a way that is functionally independent of main storage. **Note:** The term firmware describes microcode in ROM. At the time they are coded, micro-instructions are software. When they are put into ROM, they become part of the hardware (microcode) or a combination of hardware and software (micro-programs).

Usually, microcode is permanent and cannot be modified by the user, but there are exceptions.

frame relay – a data communications interface that provides high-speed transmission with minimum delay and efficient use of bandwidth. It does not have error detection or error control and it assumes that connections are reliable.
front end – the user interface portion of a client/server application
host – a platform on which software executes
HSM (hierarchical storage management) – policy-based management of file backup and archiving in a way that uses storage devices economically and without the user needing to be aware of when files are being retrieved from backup storage media. Although HSM can be implemented on a stand-alone system, it is more frequently used in the distributed network of an enterprise.
The hierarchy represents different types of storage media, such as RAID systems, optical storage, or tape, each type representing a different level of cost and speed of retrieval when access is needed. For example, as a file ages in an archive, it can be automatically moved to a slower but less expensive form of storage. Using an HSM product, an administrator can establish and state guidelines for how often different kinds of files are to be copied to a backup storage device. Once the guideline has been set up, the HSM software manages everything automatically.
HTML (Hypertext Markup Language) – a language used to create electronic documents for use on the internet or the intranet. An HTML document can be viewed by a Web browser.

HTTP (Hypertext Transfer Protocol) – the fundamental protocol used by the World Wide Web.

HTTP defines message formatting, message transmission, and what action Web servers and browsers should take in response to various commands.

hub – a network hardware component that connects cables from numerous network devices in a star topology. A hub can be described as intelligent when the hub monitors and reports upon network activity.

hypertext – the organization of information units into connected associations that a user can choose to make. An instance of such an association is called a link or hypertext link. Hypertext was the main concept that led to the invention of the World Wide Web, which is, after all, nothing more (or less) than an enormous amount of information content connected by an enormous number of hypertext links. Ted Nelson first used the tem to describe his Xanadu system.

IANA (Internet Assigned Numbers Authority) – an Internet central registry for the assigned values of the addresses (in the form of numbers) used in TCP/IP network protocol implementations. IANA is the organization under the Internet Architecture Board (IAB) of the Internet Society that, under a contract from the U.S. government, has overseen the allocation of IP addresses to Internet service providers (ISPs).

IANA also has had responsibility for the registry for any "unique parameters and protocol values" for Internet operation. These include port numbers, character sets, and MIME media access types. Partly because the Internet is now a global network, the U.S. government has withdrawn its oversight of the Internet, previously contracted out to IANA, and lent its support to a newly formed organization with global, non-government representation, the Internet Corporation for Assigned Names and Numbers (ICANN).

systems integration – the progressive assembling of system components into a whole system

system management – the process for managing and supporting the enterprise-wide technical architecture with primary emphasis on centrally managing distributed systems at geographically disbursed sites. Resources managed include the systems, databases, applications, networks, and Internet components necessary to conduct the automated business functions of the state.

tape storage – a magnetic storage in which data are stored by magnetic recording on the surface of a tape that moves longitudinally in use

TCO (total cost of ownership) – how much it actually costs to own a PC. The TCO includes the original cost of the computer and software, hardware and software upgrades, maintenance, technical support, and training. Most estimates place the TCO at about three to four times the actual purchase cost of the PC. The TCO has become a rallying cry for companies supporting network computers. They claim that not only are network computers less expensive to purchase, but the TCO is also much less because network computers can be centrally administered and upgraded.

TCP (Transmission Control Protocol) – a communication protocol responsible for verifying the correct delivery of data from platform to platform. TCP adds support to detect errors or lost data and to trigger re-transmission until the data is correctly and completely received.

TCP/IP (Transmission Control Protocol/Internet Protocol) – (1) A set of communication

protocols that support peer-to-peer connectivity functions for both local and wide area networks

(2) Low-level network transport protocols developed to allow cooperating computers to share resources across a network.

technical architecture – a framework for making decisions about information systems implementation and the supporting infrastructure. It is designed to establish

consistency, promote resource sharing, reduce duplication of effort, and improve the state's ability to benefit from the economies of scale.

technical architecture standards – the national, international, and industry standards that support the architecture, in addition to the standards necessary for current operations

telecommunications – (1) The transmission of control signals and information between two or more locations, such as by telegraph, radio, or television (2) The transmission of data between two computer systems over telecommunication lines and between a computer system and remote devices

traffic filtering – the ability to reduce the amount of data flowing across a network by identifying common data patterns and programmatically preventing data containing those patterns from traveling across the network

transaction – a process that performs a single automated function, for example, a renew vehicle registration transaction

transformation engine – software designed to prepare data from multiple operational databases for a data warehouse. A transformation engine provides an alternative to developing, maintaining, and running data extraction and transformation processing on production application systems. The data preparation occurs asynchronously.

TS (Telecommunications Services) – a section within ITS which provides and maintains all state telephone products and services and oversees the NC Integration Network (NCIIN). Specifically, TS provides computer network services (WAN, SNA), voice services (telephone, cellular, VRU), transport network services (digital backbone, long distance, credit cards, and video and advanced network services (two-way interactive, high speed data).

TSR (terminate and stay resident) – DOS program that is loaded into memory to extend the functionality to the operating system

UNIT 9

Analysing & Designing a System

- Fact-finding techniques
- System Flowcharts
- Data Flow Diagrams

Systems Investigation

The first stage in a Systems Life Cycle is the Problem Definition, followed by a Feasibility Study to

determine whether a proposed solution is feasible, or achievable, given the organisation's resources

and constraints.

Once the decision has been made to go ahead, a much more detailed investigation can take place.

One of the most difficult tasks of the analyst is to define the specific information requirements that

must be met by the new system. The aim is to gain a complete understanding of the existing system,

and how it will change in the future. It will cover:

⇒ The data ~ its origin, uses, volumes and characteristics;
⇒ The procedures ~ what is done, where, when and how, and how errors and exceptions are
handled;

⇒ The future ~ development plans and expected growth rates;
⇒ Management reports ~ requirements for new reports and their contents and frequency;
⇒ Problems with the existing system.

Methods of Fact-Finding

There are a number of ways of finding out about existing procedures and problems. These include:

⇒ Observation ~ spending some time in the department concerned, seeing at first hand the
procedures used, workloads and bottlenecks;
⇒ Reading the documents associated with the system;
⇒ Asking clerical staff to keep special counts during a trial period to establish where problems
might lie;
⇒ Questionnaires ~ these can be used when a lot of people will be affected by a new system;
⇒ Interviews ~ the most common and useful way of fact-finding. Interviews must be well planned

and consideration given to such factors as:

- whom to interview;
- When to interview;
- What to ask;
- Where to hold the interview;

Reporting Techniques

The analyst may use different diagrammatic ways of reporting on the findings of the analysis. Data

Flow Diagrams (DFDs) are a useful tool for showing:

⇒ Where the data originates;
⇒ What processing is performed on it and by whom;
⇒ Who uses the data;
⇒ What data is stored and where;
⇒ What output is received and who uses it.

References:

Heathcote, P. M. (2000) 'A' Level Computing, 4th Edition

Data Flow Diagrams

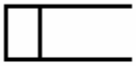
The symbols used in DFDs are shown below:

External entity ~ data source or data destination, for example, people who generate data

such as a customer order, or receive information such as an invoice.

Process ~ an operation performed on the data. The two lines are optional; the top

section of the box can be used to label the process, the middle to give a brief explanation, the bottom to say where the process takes place. Make the first word an active verb - **validate** data, **adjust** stock level.



Data store ~ such as a file held on disk or tape

Data flow ~ the arrow represents movement between entities, processes or data stores.

The arrow should be labelled to describe what data is involved.

Levelled DFDs

It is often impossible to represent a complete business system in a single diagram, so two or three

levels of data flow diagrams may be used. Each showing more detail.

Example 1

The payroll system in a certain company may be described as follows:

At the end of each week, time sheets are collected and sent to the computer centre. There, the pay

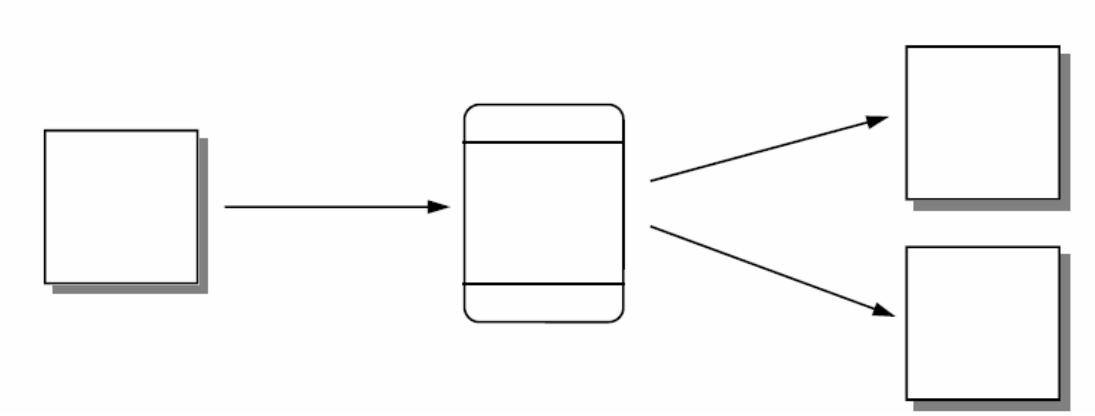
roll data is entered via a key-to-disk system, verified and validated, producing a new file of valid

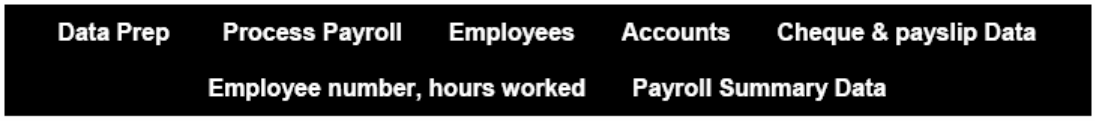
transactions on disk and an error report. The file is used to update the employee master file,

payslips are printed and funds are electronically transferred to employees' bank accounts.

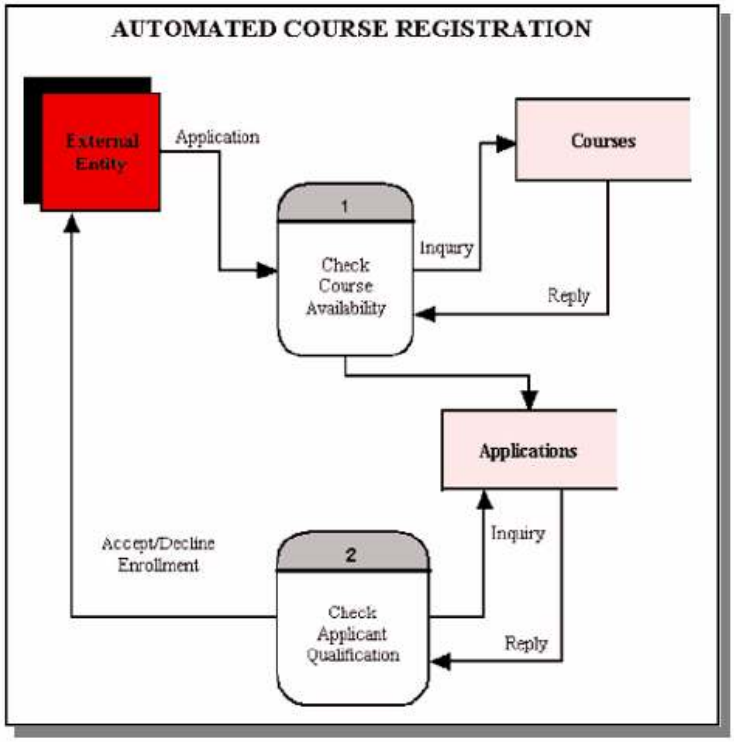
 Complete the *Top Level Diagram* using the terms found in the answer box:

lii. Data Prep Process Payroll Employees Accounts Cheque





Data Flow Diagram ~ Example



DATA FLOW DIAGRAMS

Data flow diagrams are a network representation of a system. They are the cornerstone for

structured systems analysis and design. The diagrams use four symbols to represent any system at

any level of detail. The four entities that must be represented are:

- data flows - movement of data in the system
- data stores - data repositories for data that is not moving
- processes - transforms of incoming data flow's to outgoing data flow's
- external entities - sources or destinations outside the specified system boundary

Data flow diagrams do not show decisions or timing of events. Their function is to illustrate data

sources, destinations, flows, stores, and transformations. The capabilities of data flow diagramming

align directly with general definitions of systems. Data flow diagrams are an implementation of a

method for representing systems concepts including boundaries, input/outputs, processes/subprocesses, etc.

The data flow diagram is analogous to a road map. It is a network model of all possibilities with different detail shown on different hierarchical levels. The process of representing different detail levels is called "levelling" or "partitioning" by some data flow diagram advocates.

Data Flow

Data Flow Diagrams

"When examining an existing information system or analysing the information that is going to be designed, it is important to recognise what the data is, where the data comes from, how it passes from one point to another within the information system and finally how it will be used by the intended audience or user."

Exercises

OBJECT-ORIENTED PROGRAMMING

One of the principal motivations for using OOP is to handle multimedia applications in which such diverse data types as sound and video can be packaged together into executable modules. Another is writing program code that's more intuitive and reusable; in other words, code that shortens program-development time.

Perhaps the key feature of OOP is encapsulation - bundling data and program instructions into modules called 'objects'. Here's an example of how objects work. Art icon on a display screen might be called 'Triangles'. When the user selects the Triangles icon - which is an object composed of the properties of triangles and other data and instructions - a menu might appear on the screen offering several choices. The choices may be (1) create a

new triangle and (2) fetch a triangle already in storage. The menu, too, is an object, as are the choices on it. Each time a user selects an object, instructions inside the object are executed with whatever properties or data the object holds, to get to the next step. Triangle, the application might execute a set of instructions that displays several types of triangles-right, equilateral, isosceles and so on.

Many industry observers feel that the encapsulation feature of OUP is the natural tool for complex applications in which speech and moving images are integrated with text and graphics. With moving images and voice built into the objects themselves, program developers avoid the sticky problem of deciding how each separate type of data is to be integrated and synchronized into a working whole.

A second key feature of OOP is inheritance. This allows OOP developers to define one class of objects, say 'Rectangles' and a specific instance of this class, say 'Squares' (a rectangle with equal sides). Thus, all properties of rectangles - 'Has 4 sides' and 'Contains 4 right angles' are the two shown here are automatically inherited by Squares. Inheritance is a useful property in rapidly processing business data. For instance, consider a business that has a class called 'Employees at the Dearborn Plant' and a specific instance of this class, 'Welders'. If employees at the Dearborn plant are eligible for a specific benefits package, welders automatically qualify for the package. If a welder named John Smith is later relocated from Dearborn to Birmingham. Alabama, where a different benefits package is available, revision is simple. An icon representing John Smith - such as John Smith's face - can be selected on the screen and dragged with a mouse to an icon representing the Birmingham plant. He then automatically 'inherits' the Birmingham benefit package.

A third principle behind OOP is polymorphism. This means that different objects can receive the same instructions but deal with them in different ways. For instance, consider again the triangles example. If the user right clicks the mouse on 'Right triangle', a voice clip might explain the properties of right triangles. However, if the mouse is right clicked on 'Equilateral triangle' the voice instead explains properties of equilateral triangles.

The combination of encapsulation, inheritance and polymorphism leads to code reusability. 'Reusable code' means that new programs can easily be copied and pasted together from old programs. All one has to do is access a library of objects and stitch them into a working whole. This eliminates the need to write code from scratch and then debug it. Code reusability makes both program development and program maintenance faster.

1. Find the answers to these questions in the following text.

1. What advantages of using object-oriented programming are mentioned in the text?
2. What are the three key features of OOP?
3. What multimedia data types are referred to in the text?
4. List the different types of triangle mentioned in the text.
5. What feature avoids the problem of deciding how each separate type of data is integrated and synchronized into a working whole?

6. What specific type of rectangle is named in the text?
7. What common properties of a rectangle are mentioned in the text?
8. What features are made quicker by code reusability?

2. Complete the following text using words from the reading text:

Encapsulation, ……. and polymorphism are key features of ……. programming.

Encapsulation allows data and program instructions to be bundled together in …… called objects. Inheritance means that specific of a class of objects …….. the properties of the class of objects. Polymorphism means that instructions are treated differently by different ……. . The combination of these …… features of OOP means that program code is reusable. This speeds up …….. and …….. of programs.

3. Match the terms in Table A with the statements in Table B.

Table A

a. OOP
b. Encapsulation
c. Object
d. Menu
e. Square
f. Polymorphism
g. Library

Table B

i. An OOP property that allows data and program instructions to be bundled into an object
ii. A list of choices
iii. An OOP property that enables different objects to deal with the same instruction in different ways
iv. A reusable collection of objects
v. A module containing data and program instructions
vi. Object-Oriented Programming
vii. A rectangle with equal sides

4. Read the next page texts: A, B and C then:

Complete this table. You may not find information for each section of your table.

	A	B	C
1. job title **2. nature of work** **3. formal qualifications** **4. personal qualities** **5. technical skills**			

6. how to get started **7. how to make progress**			

A. How to become a programming expert

The primary requirements for being a good programmer are nothing more than a good memory, an attention to detail, a logical mind and the ability to work through a problem in a methodical manner breaking tasks down into smaller, more manageable pieces.

However, it's not enough just to turn up for a job interview with a logical mind as your sole qualification. An employer will want to see some sort of formal qualification and a proven track record. But if you can show someone an impressive piece of software with your name on it, it will count for a lot more than a string of academic qualifications.

So what specific skills are employers looking for? The Windows market is booming and there's a demand for good C, C++, Delphi, Java, Visual Basic and .net developers. Avoid older languages such as FORTRAN and COBOL unless you want to work as a contract programmer.

For someone starting out, my best advice would be to subscribe to the programming magazines such as Microsoft Systems Journal. Get one or two of the low-cost 'student' editions of C++, Visual Basic and Delphi. Get a decent book on Windows programming. If you decide programming is really for you, spend more money on a training course.

B. How to become a computer consultant

The first key point to realize is that you can't know everything. However you mustn't become an expert in too narrow a field. The second key point is that you must be interested in your subject. The third key point is to differentiate between contract work and consultancy good contractors move from job to job every few months. A consultant is different. A consultant often works on very small timescales - a few days here, a week there, but often for a care collection of companies that keep coming back again and again.

There's a lot of work out there for people who know Visual Basic, C++ and so on. And there are lots of people who know it too, so you have to be better than them. Qualifications are important. Microsoft has a raft of exams you can take, as do Novell and Cisco and in my experience these are very useful pieces of paper. Exams like Microsoft Certified Systems Engineer (MCSE) are well worth doing. The same goes for NetWare Certification. However, this won't guarantee an understanding of the product, its positioning in the market, how it relates to other products and so on. That's where the all-important experience comes in.

Here's the road map. After leaving university you get a technical role in a company and spend your evenings and weekends learning the tools of your trade - and getting your current employer to pay for your exams. You don't stay in one company for more than two years. After a couple of hops like that, you may be in a good position to move into a junior consultancy position in one of the larger consultancy companies. By the age of 30, you've run

big projects, rolled out major solutions and are well known. Maybe then it's time to make the leap and run your own life.

C. How to become an IT manager

IT managers manage projects, technology and people. Any large organization will have at least one IT manager responsible for ensuring that everyone who actually needs a PC has one and that it works properly. This means taking responsibility for the maintenance of servers and the installation of new software and for staffing a help-desk and a support group.

Medium to large companies are also likely to have an IT systems manager. They are responsible for developing and implementing computer software that supports the operations of the business. They're responsible for multiple development projects and oversee the implementation and support of the systems. Companies will have two or three major systems that are probably bought off the shelf and then tailored by an in-house development team.

Apart from basic hardware and software expertise, an IT manager will typically have over five years' experience in the industry. Most are between 30 and 45. Since it managers have to take responsibility for budgets and for staff, employers look for both of these factors in any potential recruit.

Nearly all IT managers have at least a first degree if not a second one as well. Interestingly, many of them don't have degrees in computing science. In any case, the best qualification for becoming a manager is experience. If your personality is such that you're unlikely to be asked to take responsibility for a small team or a project, then you can forget being an IT manager. You need to be bright, communicative and be able to earn the trust of your teams. Most of this can't be taught, so if you don't have these skills then divert your career elsewhere.

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

plentiful	adj. more than sufficient
n. plenty	syn. abundant

Examples of Miro's art are plentiful.

A balanced diet normally provides plenty of the necessary vitamins.

sheltered adj. protected from harmful elements; isolated from reality
n. shelter
v. shelter
syn. protected

She has led a sheltered life since her parents have done everything for her.
Everyone looked for shelter from the blazing sun.

account n. a report of an event; money kept in a bank; a statement of something used or received, usually a financial report
adj. accountable
v. account
n. accounting
n. accountant
syn. story

His account of the incident varied from that of the other witnesses.
We need an accounting of all the money spent.

hue n. color
syn. color

The hue of the sunset was beautiful.
The hue of the room gave it a warm feeling.

intricate adj. having many parts; finely detailed
n. intricacy
syn. complex

The intricate design of the vase made it a valuable piece for her collection.
I cannot begin to understand all of the intricacies of modern automobile motors.

magnitude n. of great size or importance, to increase
adj. magnificent
v. magnify
n. magnification
syn. dimension

The magnitude of shock waves determines the damage that occurs during an earthquake.
The invention of the telephone was a magnificent achievement for mankind.

poll n. questionnaire; a vote of public opinion
n. polling
n. pollster
syn. survey

v. poll

The poll indicated that conservation of the environment was the number one

issue with college students.

The pollster asked the questions in a nonpartisan manner.

authorization – the process of giving someone permission to do or have something. In multi-user

computer systems, a system administrator defines for the system which users are allowed access

to the system and what privileges of use (such as access to which file directories, hours of

access, amount of allocated storage space, and so forth). Assuming that someone has logged on

to a computer operating system or application program, the system or application may want to

identify what resources the user can be given during this session.

Authorization is sometimes seen as both the preliminary setting up of permissions and the actual

checking of the permission values that have been set up when a user is getting access. Logically,

authorization is preceded by authentication.

AVI (Audio/Video Interleaved) – a popular file format that combines video and audio. To play

AVI files, you need Video for Windows. Windows' CD-ROMs contain AVI files that the computer

uses to display video images.

backbone – (1) A set of nodes and their interconnecting links providing the primary data path

across a network (2) In a LAN multiple-bridge ring configuration, a high-speed link to which the

rings are connected by means of bridges. A backbone may be configured as a bus or a ring. (3)

In a WAN, a high-speed link to which nodes or data switching exchanges (DSEs) are connected

(4) A high-speed computer network designed to interconnect lower-speed networks or clusters of

dispersed user devices

bandwidth – (1) The speed or capacity of a network connection. The more bandwidth a particular

medium has, the faster data can be transmitted. (2) The carrying capacity of a circuit, usually

measured in bits per second (bps) for digital circuits or hertz (Hz) for analog circuits. The greater

the bandwidth, the greater the information-carrying capacity. Bandwidth is comparable to the

number of cars per hour a highway can support: a four-lane interstate highway has a higher

bandwidth than a two-lane road.

best practices – methodologies that provide beneficial results. Some best practices are general

in nature and can be applied to almost every industry; other best practices are industry-specific.

broadband – (1) A frequency band broad enough to be divided into several narrower bands,

each of which can be used for different purposes or be made available to different users (2) A

high-speed, high-capacity transmission channel. Broadband channels are carried on coaxial or

fiber-optic cables that have a wider bandwidth than conventional telephone lines, giving them the

ability to carry video, voice, and data simultaneously. Cable modems and digital subscriber line

(DSL) technologies are examples of broadband connectivity.

broadcast – the capability to send a single message from one device and be received by all
other connected devices on a network

CIO (Chief Information Officer) – CIO is a job title commonly given to the person in an
enterprise responsible for the information technology and computer systems that support
enterprise goals. As information technology and systems have become more important, the CIO

has come to be viewed in many organizations as a key contributor in formulating strategic goals.

In many companies, the CIO reports directly to the Chief Executive Officer (CEO). In some

companies, the CIO sits on the executive board.

In a large enterprise the CIO normally will delegate technical decisions to employees more

familiar with details. The CIO proposes the information technology an enterprise will need to

achieve its goals, and then works within a budget to implement as much as possible of the plan.

Typically, a CIO is involved with analyzing and reworking existing business processes, with

identifying and developing the capability to use new tools, with reshaping the enterprise's physical

infrastructure and network access, and with identifying and exploiting the enterprise's knowledge

resources.

Many CIOs head the enterprise's efforts to integrate the Internet and the World Wide Web into its

long-term strategy and its immediate business plans. For ITS, the CIO is the head information

officer for the state of North Carolina.

Class A LAN Support – a local area network (LAN) support arrangement that provides agencies

with support on an ongoing subscription basis

class libraries – a collection of software object classes, or a set of pre-built and pre-tested

software components that can be used as building blocks to develop applications. Class libraries

are often provided by development tool vendors and may also be purchased from third-party

vendors.

client – (1) A computer program that relies on services provided from another software module to

complete its intended function. A client, as it relates to an n-tier client/server programming

environment, is not a computer or a human being. (2) A human user of a computer application (3) A workstation attached to a server on a network

database – (1) A collection of data with a given structure for accepting, storing, and providing, on

demand, data for multiple users (2) A collection of interrelated data organized according to a

database model to serve one or more applications (3) A collection of data fundamental to a

system (4) A collection of data fundamental to an enterprise (5) Collections of data arranged so it

is easily retrieved by users and applications

database server – hardware and software platforms dedicated to database access

DB – database

DBMS (database management system) – software and data storage facility that organizes and

manages data storage, structure, access, and security; can either be relational or non-relational

DCE (Distributed Computing Environment) – Open Software Foundation's standard, offering

distributed file, remote procedure call, security, naming, and X.500 directory services to

participating computers

DCS (Distributed Computing Services) – a business unit within ITS' Computing Services that

provides LAN Assistance, Internet and Web Development Services, Managed Platform Services

(MaPS), Statewide Computer and Network Security (SCANS), Novell Directory Services, and
Domain Name Services
decryption – the process of converting encrypted data back into its original form so it can be
understood
de facto standard – a standard that has emerged due to extensive use of a particular product or

solution

deployment – the implementation of a software program or component on a particular platform

desktop publishing – the process of composing copy, including graphics and images, on an

end-user workstation. Output can be sent directly to high-resolution reproduction equipment (e.g.,

phototypesetters, laser printers)

DHTML (Dynamic Hypertext Markup Language) – a collective term for a combination of new

HTML tags and options, style sheets, and programming that will let you create Web pages more

animated and more responsive to user interaction than previous versions of HTML. Much of

dynamic HTML is specified in HTML 4.0. Simple examples of dynamic HTML pages would

include (1) having the color of a text heading change when a user passes a mouse over it or (2)

allowing a user to "drag and drop" an image to another place on a Web page. Dynamic HTML

can allow Web documents to look and act like desktop applications or multimedia productions.

digital cash – Digital cash is a system of purchasing cash credits in relatively small amounts,

storing the credits in your computer, and then spending them when making electronic purchases

over the Internet. Theoretically, digital cash could be spent in very small increments, such as

tenths of a cent (U.S.) or less. Most merchants accepting digital cash so far, however, use it as

an alternative to other forms of payment for somewhat higher price purchases. There are several

commercial approaches to digital cash on the Web. Digital cash can also be stored on an
electronically sensitive card (smart card).
digital certificate – an electronic document issued by a certificate authority that is used to
establish a company's identity by verifying its public key
digital government – electronic government; government services available online to citizens,

employees, and businesses
digital innovation – the merger of business drivers and emerging technology in the digital
economy
digital network – a network or line in which the information is encoded as a series of ones and

zeros rather than as a continuously varying wave— as in traditional analog networks. Digital

networks have several major pluses over analog ones. First, they're "cleaner." They have far less

noise, static, etc. Second, they are easier to monitor because you can measure them more easily.

Third, you can typically pump more digital information down a communications line than you can

analog information.

digital signature – a digital signature (not to be confused with a digital certificate) is an electronic

rather than a written signature that can be used by someone to authenticate the identity of the

sender of a message or the signer of a document. It can also be used to ensure that the original

content of the message or document that has been conveyed is unchanged. Additional benefits to

the use of a digital signature are that it is easily transportable, cannot be easily repudiated,

cannot be imitated by someone else, and can be automatically time-stamped. A digital signature

can be used with any kind of message, whether it is encrypted or not, simply so that the receiver

can be sure of the sender's identity and that the message arrived intact. A digital certificate

contains the digital signature of the certificate-issuing authority so that anyone can verify that the

certificate is real.

intelligent workstation – a computer that can work independently or work as part of a network.

An intelligent workstation is more commonly referred to as a personal computer, or PC.

interactive – a process where a request is processed immediately and a response is received

interactive system – a computer application system that accepts input and immediately
processes the request
inter-application middleware – communication between the application system and external
services, such as common shared services and other application systems
interface – (1) Hardware, software, or both that link systems, programs, or devices (2) A manner

of presentation allowing applications to communicate with people and with other software

programs

Internet – sometimes called simply "the Net" or “the Web.” The Internet is a worldwide system of

computer networks, a network of networks in which users at any one computer can, if they have

permission, get information from any other computer (and sometimes talk directly to users at

other computers). It was conceived by the Advanced Research Projects Agency (ARPA) of the

U.S. Government in 1969 and was first known as the ARPANet. The original aim was to create a

network that would allow users of a research computer at one university to be able to "talk to"

research computers at other universities. A side benefit of ARPANet's design was that, because

messages could be routed or rerouted in more than one direction, the network could continue to

function even if parts of it were destroyed in the event of a military attack or other disaster.

InterNIC (Internet Network Information Center) – a cooperative activity between the U.S.

Government and Network Solutions, Inc. Until recently, InterNIC was the organization responsible

for registering and maintaining the com, net, and org top-level domain names on the World Wide

Web. The actual registration was performed by Network Solutions, Inc.
As a result of a new U. S. Government Statement of Policy (known as "the white paper") in
October, 1998, competition will be introduced in domain name registration for these top-level
domains and a new, non-profit global organization, the Internet Corporation of Assigned Names

and Numbers (ICANN), has been designated to conduct the registrar accreditation process.

ICANN has initially designated five new registrar companies— in addition to Network Solutions—

for a two-month test period. After that period, additional registrars are expected to be accredited.

interoperability – the capability for software services or components to easily exchange logic,

data, and information
inter-query parallelism – a parallel processing method where multiple queries from multiple
concurrent users can be processed at the same time
intra-application middleware – communication within the tiers of an application system
intranet – information made available to a limited set of users, usually within a corporation,
government entity, or educational institution that is often coded with HTML and viewed with a
browser
intra-query parallelism – a parallel processing method where a single query can be broken
down into multiple processes and all can be processed in parallel
IOTP (Internet Open Trading Protocol) a set of standards that makes all electronic purchase

transactions consistent for customers, merchants, and other involved parties, regardless of
payment system. IOTP accommodates a wide range of payment systems such as SET,
DigiCash, e-checks, and debit cards. Payment system data is encapsulated within IOTP
messages. IOTP is designed to handle a transaction that involves a number of different parties:

the customer, merchant, credit checker and certifier, bank, and delivery handler. IOTP uses the

Extensible Markup Language (XML) to define data that encompasses everything that may be

needed in a transaction.

IP (Internet Protocol) – a communication protocol that routes packets of data from one node on

the Internet to another. IP routes each packet based on a four-byte destination address (the IP

number, e.g., 123.456.789.1). Ranges of numbers are assigned to different organizations. The

organizations then assign groups of their numbers to sections or departments.

IP operates on gateway machines that move data from department to organization to region and

then around the world. Each computer (known as a host) on the Internet has at least one address

that uniquely identifies it from all other computers on the Internet. When you send or receive data

(for example, an e-mail note or a Web page), the message gets divided into little chunks called

packets. Each of these packets contains both the sender's Internet address and the receiver's
address. Any packet is sent first to a gateway computer that understands a small part of the
Internet. The gateway computer reads the destination address and forwards the packet to an
adjacent gateway that in turn reads the destination address and so forth across the Internet until

one gateway recognizes the packet as belonging to a computer within its immediate

neighborhood or domain. That gateway then forwards the packet directly to the computer whose

address is specified. Because a message is divided into a number of packets, each packet can

be sent by a different route across the Internet. Packets can arrive in a different order than the

order they were sent in. The Internet Protocol just delivers them. It's up to another protocol, the

Transmission Control Protocol (TCP) to put them back in the right order.

IP address – This definition is based on Internet Protocol Version 4. Note that the system of IP

address classes described here, while forming the basis for IP address assignment, is generally

bypassed today by use of Classless Inter-Domain Routing (CIDR) addressing.
In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-bit
number that identifies each sender or receiver of information that is sent in packets across the
Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP

includes your IP address in the message (actually, in each of the packets if more than one is

required) and sends it to the IP address that is obtained by looking up the domain name in the

URL you requested or in the e-mail address you're sending a note to.

At the other end, the recipient can see the IP address of the Web page requestor or the e-mail

sender and can respond by sending another message using the IP address it received. An IP

address has two parts: the identifier of a particular network on the Internet and an identifier of the

particular device (which can be a server or a workstation) within that network. On the Internet

itself, that is, between the routers that move packets from one point to another along the route,

only the network part of the address is looked at.

IRM (Information Resource Management) – a section within ITS that provides staff support to

the IRMC and its oversight of statewide information resource management serving private

citizens, corporate citizens, private business partners, public employees, county and municipal

governments, and federal agencies. It is responsible for the statewide technical architecture,

large project monitoring and quality assurance, the Application Portfolio Management System

(APMS), e-government, federated data, and the state’s adaptive infrastructure.

IRMC (Information Resource Management Commission) – a North Carolina governmental
organization that provides increased emphasis for strategic information technology planning and

policy development. The IRMC was created within the NC Department of Commerce with the

powers and duties assigned by N.C.G.S. 143B-472.41 ratified by the 1997 session of the General

Assembly.

ISDN (Integrated Services Digital Network) – a network technology implemented through a

digital telephone service providing high-speed integration of voice and data over special

telephone lines. ISDN uses asynchronous transfer mode (ATM).

ISO (International Organization for Standardization) – an international organization composed

of national standards bodies from over 75 countries. ISO has defined a number of important

computer standards, the most significant of which is perhaps the Open Systems Interconnection

(OSI), a standardized architecture for designing networks.

ISP (Internet service provider) – a company that provides individuals and other companies

access to the Internet and other related services, such as Web site building and hosting. An ISP

has the equipment and the telecommunication line access required to provide points-of-presence

on the Internet for the geographic area served. The larger ISPs have their own high-speed leased

lines so that they are less dependent on the telecommunication providers and can provide better

service to their customers.

IT (information technology) – the technology surrounding information systems. IT is a term that

encompasses all forms of technology used to create, store, exchange, and use information in its

various forms (business data, voice conversations, still images, motion pictures, multimedia

presentations, and other forms, including those not yet conceived). It's a convenient term for

including both telephony and computer technology in the same word. It is the technology that is

driving what has often been called "the information revolution."

IT enterprise management – As defined in North Carolina SB 222, “IT enterprise management”

refers to distributed IT assets. IT enterprise management is an approach that uses policies,

procedures, and technical infrastructure to manage the state's tremendous investment in

distributed IT assets— such as workstations, servers, routers, etc.— to minimize total life-cycle

costs while maximizing benefits for transacting the state's business and delivering services to its

citizens.

IT portfolio-based management – links IT investments with political priorities and program
strategies and provides tools to monitor and manage using portfolio management techniques

IT procurement – ensures that the state (NC) buys the best goods and services at the lowest
total life-cycle costs

ITS (Office of Information Technology Services) ITS provides shared information technology

services for state agencies and other governmental units in the areas of information processing,

telecommunications, systems development, and technology training.

IVR (interactive voice response) – a type of computer telephony interface enabling a caller to

interface with computer applications via a telephone. The IVR software application prompts users

for input, provides menus of options, and provides output from the application in humanunderstandable

speech. The user provides input to the IVR application using the telephone

keypad and, occasionally, speech.

X/Open – an organization that creates and promotes standards for vendor-neutral application

program interfaces. The standard is called common applications environment (CAE) and contains

specifications for GUIs, data access, and networks.

X/Open API – a standard application programming interface between distributed transaction
processing monitors and database management systems

X/Open TX – a standard defined by the X/Open Company Ltd. (now known as The Open Group).

X/Open TX standard defines transactions through a distributed transaction processing monitor.

X/Open XA – a standard defined by the X/Open Company Ltd. (now known as The Open Group).

X/Open XA specification defines specifications for two-phase commits that work with distributed

databases in a distributed transaction processing monitor environment.

X/Open XATMI – a standard defined by the X/Open Company Ltd. (now known as The Open

Group). X/Open X/ATMI provides a standard transaction management interface.

XML (Extensible Markup Language) – a flexible way to create common information formats and

share both the format and the data on the World Wide Web, intranets, and elsewhere. For
example, computer makers might agree on a standard or common way to describe the information about a computer product (processor speed, memory size, and so forth) and then
describe the product information format with XML. Such a standard way of describing data would

enable a user to send an intelligent agent (a program) to each computer maker's Web site, gather

data, and then make a valid comparison.
Any individual, group, or group of companies who want to share information in a consistent way
can use XML. It is "extensible" because, unlike HTML, the markup symbols are unlimited and
self-defining. XML is actually a simpler and easier-to-use subset of the Standard Generalized
Markup Language (SGML), the standard for how to create a document structure. It is expected

that HTML and XML will be used together in many Web applications.

UNIT 10

HOW TCP/IP LINKS DISSIMILAR MACHINES

At the heart of the Internet Protocol (IP) portion of TCP/IP is a concept called the Internet address. This 32-bit coding system assigns a number to every node on the network. There are various types of addresses designed for networks of different sizes, but you can write every address with a series of numbers that identify the major network and the sub-networks to which a node is attached. Besides identifying a node, the address provides a path that gateways can use to route information from one machine to another.

Although data-delivery systems like Ethernet or X.25 bring their packets to any machine electrically attached to the cable, the IP modules must know each other's Internet addresses if they are to communicate. A machine acting as a gateway connecting different TCP/IP networks will have a different Internet address on each network. Internal look-up tables and software based on another standard-called Resolution Protocol-are used to route the data through a gateway between networks.

Another piece of software works with the IP-layer programs to move information to the right application on the receiving system. This software follows a standard called the User Datagram Protocol (UDP).You can think of the UDP software as creating a data address in the TCP/IP message that states exactly what application the data block is supposed to contact at the address the IP software has described. The UDP software provides the final routing for the data within the receiving system.

The Transmission Control Protocol (TCP) part of TCP/IP comes into operation once the packet is delivered to the correct Internet address and application port. Software packages that follow the TCP standard run on each machine, establish a connection to each other and manage the communication exchanges. A data-delivery system like Ethernet doesn't promise to deliver a packet successfully. Neither IP nor UDP knows anything about recovering packets that aren't successfully delivered, but TCP structures and buffers the data flow, looks for responses and takes action to replace missing data blocks. This concept of data management is called reliable stream service.

After TCP brings the data packet into a computer, other high-level programs handle it. Some are enshrined in official US government standards, like the File Transfer Protocol (FTP) and the Simple Mail Transfer Protocol (SMTP). If you use these standard protocols on

different kinds of computers, you will at least have ways of easily transferring files and other kinds of data.

Conceptually, software that supports the TCP protocol stands alone. It can work with data received through a serial port, over a packet-switched network, or from a network system like Ethernet. TCP software doesn't need to use IP or UDP, it doesn't even have to know they exist. But in practice, TCP is an integral part of the TCP/IP picture and it is most frequently used with those two protocols.

Exercises

1. Mark the following statements as True or False:

a. Internet addresses are an integral part of the IP protocol.
b. Internet addresses can be written as a series of numbers.
c. UDP software provides the final routing for data within the receiving system.
d. UDP recovers packets that aren't successfully delivered.
e. TCP only works with packet switched networks.
f. TCP only works when it is combined with IP.

2. Find the answers to these questions in the following text.

1. What purpose does the Internet address have apart from identifying a node?
2. What data-delivery systems are mentioned in the text?
3. What do IP modules need to know about each other to communicate?
4. How many Internet addresses does a gateway have?
5. What does UDP software do?
6. When does the TCP part of TCP/IP come into operation?
7. What processes are performed by TCP software to provide reliable stream service?
8. What standard protocols are mentioned which are used to deal with the data after TCP brings it into the computer?

3. Match the terms in Table A with the statements in Table B.

Table A

a. Internet address
b. Resolution Protocol
c. Look-up table
d. Gateway
e. User Datagram Protocol
f. Transmission Control Protocol

Table B

i. Standard used for software that routes data through a gateway
ii. Standard used by software that moves information to the correct application on the receiving system of a network

iii. Standard used by software that manages communication exchanges between computers on the Internet
iv. A 32-bit number identifying a node on an IP network
v. Stored information used to route data through a gateway
vi. A device for connecting dissimilar networks

BECOMING CERTIFIED

Suppose you're a support engineer. You're stuck in a job you don't like and you want to make a change. One way of making that change is to improve your marketability to potential employers by upgrading your skill-set. If you're going to train yourself up however, whose training should you undertake? If you need certificates, whose certificates should they be? Even if you get those certificates, how certain can you be that your salary will rise as a result? One solution is the range of certifications on offer from Microsoft.

Microsoft offers a large array of certification programmers aimed at anyone from the user of a single program such as Microsoft Word, to someone who wants to become a certified support engineer. There are a myriad of certificates to study for too, If you're the proud holder of any of those qualifications, then you're entitled to call yourself a Microsoft Certified Professional (MCP).

Once you've decided which track you want to take, you should consider just how qualified you already are in terms of experience and knowledge. Will you need to go and take some courses with a training company, or are you the type who can make good use of self-study materials? How much time do you genuinely have to devote towards this? Will your employer pay for your course? Will it grant you leave to go and do the course - assuming you can find one - on either a full-time or part-time basis?

The key question here is experience. This will not only influence the amount of work you'll have to do to get up to speed for the exams, it could also mean the difference between passing or failing the exam.

While you're busy learning all you need to know for your certification, the practice exams are an absolute godsend. They show you the type of questions you'll encounter and they familiarize you with the structure of the exam. This is essential if you want to pass: the exams have time limits and you need to get used to answering the requisite number of questions within the allotted time. It's as simple as that.

If you decide a training course will help you out, don't let the title of a course alone convince you that it will be suitable or cost effective. Find out exactly what the course offers and whether there are prerequisites for attendants. You should also find out what the training company is prepared to do if attendants don't have the minimum knowledge necessary to be on the course.

As exams are replaced by 'updated' ones, you need to upgrade your certification to stay current.

Ultimately it's your responsibility to make sure you stay up to date. If you don't, you lose your certification until you take an update.

As a support engineer, you get the satisfaction of knowing that you passed a tough test and the happy knowledge that your network manager is sweating a bit over the fact that you could be head-hunted at any time.

Exercises

1. Mark the following statements as True or False:

a. Microsoft offers a large range of certification programmers to study.
b. You must get an advanced certificate before you can call yourself a Microsoft Certified Professional.
c. All Microsoft training courses involve a period of full-time study.
d. Practice exams allow you to become familiar with the structure of the exams.
e. You can decide on the suitability of a course by its title.
f. It is your responsibility to make sure that your certification is kept up to date.
g. Gaining a certificate is likely to make you more attractive to other employers.

2. Find the answers to these questions in the following text.

1. What advice is given for someone who is stuck in a computing support job?
2. What questions should you ask yourself if you are thinking of getting extra training?
3. What computer program is mentioned in the text?
4. Name two ways of studying that are mentioned in the text.
5. What two factors will be affected by your level of experience?
6. Why is it important to become used to answering exam questions?
7. What factors help you decide whether the course will be suitable or cost effective?
8. What happens if you don't upgrade your certification?

3. Which qualification would be most useful if you wanted to do each of the following:

a. be an operating system expert
b. troubleshoot systems
c. teach computing
d. design business solutions

4. How to read each of the following computer devices and what is each one used to:

1. Intel Pentium IV 1.7 GHz processor
2. Giga Main-board (Motherboard)

3. 512 MB RAM-bus RDRAM
4. 80 GB Hard Disk
5. Embedded Intel 3D Direct AGP video with 64MB SDRAM
6. 64-voice wave-table sound
7. NEC 3D multimedia speakers
8. 48X CD-ROM drive
9. TDK CD-Writer
10. JAZ drive
11. ZIP drive
12. 1.44 MB 3.5" Floppy drive
13. 17" color SVGA monitor
14. Microsoft Intelligent-mouse
15. 105-key keyboard
16. 56 Kb modem
17. Sony USB2 Web-cam
18. Sony Microphone
19. Mini-tower Chassis
20. Microsoft Windows XP
21. Microsoft Office XP & Applications

5. How to write a Resume or Curriculum Vitae (CV)?

Resumes and application forms are two ways to provide employers with written evidence of your qualifications and skills. Generally, the same information appears on both a resume and an application form. The way it is presented differs. Some employers prefer a resume and others require an application form. You want to apply for a job. Do you need a resume? That depends on the kind of job you're applying for.

Resume is required for all jobs; professional, technical, administrative and managerial jobs.

There are many ways of organizing a good resume. Depending on the job, you should choose the format that best highlights your skills, training, and experience.

When do you use a resume?

- To respond to a want ad.
- To give an employer more information about you than the job application gives.
- To send to a company you'd like to work for.
- To give to an interviewer so he or she will ask you about the positive things on your resume you want to talk about.
- To leave with an employer after an interview as a reminder of your skills and abilities.

Tips for good resume:

Self information. Completing a background and experience list will give you the self information required to prepare your resume.

If you've worked before, list your jobs. Next, write down the work duties for the jobs you've listed. Now, think about the skills or talents it took to do each work duty. Write them down.

List your hobbies, clubs you belong to, sports you've been involved in, school activities, and things that interest you. Look at the first item on your list.

Think about the skills or talents. Resume must be very easy to read so that an employer can see at a glance, who you are, where you can be reached, what kind of work you can do, and why you're qualified for that kind of work. A resume should be short, preferable one page typewritten. It must be error free. It includes honest, positive information that is related to your job goal.

A good resume will open the door for an interview. it takes to do that item. Write them all down. Look at the abilities (talents) identified on your background and experience list. You have talents that you use everyday.

Resumes are required for some jobs, and are sometimes required for other jobs. An employer may have you complete an application form instead of submitting a resume. On some occasions, an employer may ask you to complete an application in addition to your resume.

When you fill out an application form, make sure you fill it out completely and follow all instructions. Do not omit any requested information and make sure that the information you provide is correct.

A good resume is concise and is written in one page or more but at most, three pages is enough. In the following, you will see a sample resume in one page:

Curriculum Vitae (CV)

Name: Ahmad
Family: Ahmadi
Sex: Male
Nationality: IRAN
Birth date: 1974, 12 Apr
Marital Status: Married, 1 son
Tel: 0098-21-33332222
Fax: 0098-21-44442222
Address: No. 311, 3rd St., Valie-asr Sq., Tehran, IRAN
P.O.Box: 5436-876 Tehran-IRAN
e-mail: ahmad@gmail.com

Educational Background

- 1995-1999 B.Sc. in Computer Engineering in Michigan University, USA, GPA=16.5

  B.Sc. Project: Design and Implementation of MIS system for one hospital

- 1991-1995 High School in Mathematics, GPA=18.25

Career Background

- 2004-present Apple Company in Tehran, .net Programmer
- 2002-2004 SQL Server Trainer in X13 Company in Tehran and Training ICDL and Microsoft Office
- 2001 Network manager of IBM Branch in Tehran
- 2003 Translating a book about Computer Maintenance System

Skills

- Programming Languages: .net, VB, C# and, C++, Pascal
- Databases: Oracle, SQL Sever, Access
- Operating Systems: Windows 2000, XP
- System Analysis and Design: UML and RUP
- Good in English Reading and Writing

Interesting & Hobbies

- Programming in .net
- Network Programming
- Database Design & Programming
- Studying Computer Books
- Learning English
- Swimming

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

erratic adj. no regular pattern in thinking or movement; changeable without reason
Syn. inconsistent

The artist's paintings have an erratic quality, some being excellent and others mediocre.

The unstable chemical reacted erratically.

exaggerate v. to make something more than what it is
adj. exaggerated syn. embellish
n. exaggeration
The federal government exaggerated the success of its programs.
To say that his business is successful would be an exaggeration.

burgeon v. grow at a fast pace
adj. burgeoning syn. thrive
The burgeoning population of major cities is creating a demand for more services.
His talent as a pianist burgeoned at the age of 14.

conspicuously adv. attracting attention
adj. conspicuous syn. noticeably
His name was conspicuously absent from the list of winners.
The attorneys were conspicuous for their aggressive manner in the courtroom.

dignitary n. a very important or famous person, usually associated with a high position in government
syn. notable
Every dignitary in Washington was invited to the wedding.
All of the high-ranking dignitaries attended the economic summit.

elude v. to escape in a tricky way
adj. elusive syn. evade
n. elusiveness
The criminal has eluded the police for months.
Success has been elusive for the team.

exhaust v. to use completely; to expend all energy; very y thorough
adj. exhaustive syn. deplete
adj. exhausting
adj. exhausted
n. exhaustion
They exhausted their energy in 10 minutes.
The exhaustive report was acclaimed by everyone.

facet n. element or component
adj. faceted syn. aspect
The proposal had many beneficial facets.

It was a multifaceted problem that challenged the entire student body.

ample adj. more than enough
syn. sufficient

There is ample evidence that the young man was speeding when the accident occurred.
She was amply paid for the work she completed.

arid adj. having little rain or water
syn. dry

The area known as the Sahara Desert is one of the most arid places in the world.
The valley on the leeward side of the mountain was extremely arid.

defy v. to show little fear or regard for rules or established
adj. defiant norms; to challenge
adj. defying syn. resist
n. defiance

I defy you to find that book in the library's collection.
The circus performer demonstrated her death-defying routine.

enact v. to pass a law
adj. enacted syn. legislate
n. enactment

Congress enacted the legislation during its last session.
The enactment of the laws was in the hands of the Senate.

feign v. to pretend, make believe
adj. feigned syn. simulate

She feigned illness when it was time to visit the dentist.
Her unhappiness was feigned.

indiscriminate adj. not chosen carefully; unplanned
syn. arbitrary

The indiscriminate arrangement of the products made the store confusing.
The book's chapters seem to be organized indiscriminately.

client contact point – instance where a client makes contact with the help desk organization

when requesting support. This is usually a Level 1 area of a service desk organization.

coaxial cable – a network cabling technology. Coaxial cabling is generally used in small bus

topology networks because it requires less cabling. Due to its slow speed, coaxial cable cannot

support any of the high-speed network technologies.
COBOL (Common Business Oriented Language) – the second-oldest high-level computer
programming language; a procedural, structured programming language
COLD (computer output to laser disk) – archival storage of computer-generated data within an

optical storage system

common business service – a service that incorporates the logic for commonly used business

rules or functions. A service can be reused and shared between application systems.
component – an executable service that incorporates the logic for a single business rule or
function. A component can be reused and shared between application systems.
component testing suite – software that contains special programs needed for testing a
component. It provides services for calling a component, entering sample input, and capturing
sample output data in order to verify the results.
componentware – software designed to be a component in an N–tier application
conferencing and meeting – a technology that provides a means for geographically diverse
individuals and groups to participate, in real time, in conferences and meetings
configuration management – the process of maintaining workstation and server configurations

in a large enterprise
connectivity – the ability to send and receive information between locations, devices, and
business services
content providers – While content provisioning is also outside the core competencies of portal

product vendors, many enterprises want content relevant to their industry. Portal product vendors

have partnered with content providers for this service.

contention – two or more users or programs vying for the same computing resource at the same

time (e.g., memory, storage, bus)
cookie – a small file of information held on a client device, provided by an Internet host,
containing information on the client and enabling the host to identify the user directly on

subsequent visits

CSC (Customer Support Center) – The Customer Support Center Level 1 is designed to assist

clients with problems and/or questions related to the client's needs for all ITS services.

CSS (Cascading Style Sheets) – a Web page style sheet derived from multiple sources with a

defined order of precedence where the definitions of any style element conflict. The Cascading

Style Sheet, Level 1 (CSS1) recommendation from the World Wide Web Consortium (W3C),

which is implemented in the latest versions of the Netscape and Microsoft Web browsers,

specifies the possible style sheets or statements that may determine how a given element is

presented in a Web page. CSS gives more control over the appearance of a Web page to the

page creator than to the browser designer or the viewer.

CSS (Customer Support System) – an electronic incident and change management system

used to track and resolve customer calls, internal incidents, and software and hardware system

changes. The system uses the Vantive Help Desk software package. ITS shares this system with

other agencies that volunteer to participate and set up their own business definitions and rules.

data model – specifies the data formats and the relationships of fields and tables in an

application system. It drives basic database design.

data processing – the systematic performance of operations upon data, for example, arithmetic

or logic operations on data, merging or sorting of data, assembling or compiling of programs

data repository – a database that contains metadata, or information about data that is stored in

a database (e.g., federated data definitions, data aliases, where OLTP and OLAP data can be

found)

data review board – a committee consisting of key business users from across the enterprise.

The data review board provides and maintains federated data definitions and promotes the reuse

of data across the enterprise.

data visualization – the method of displaying data resulting from end user queries and data

mining from a data warehouse in a visual or pictorial manner (i.e., graphs, pie charts, bar and line

charts). Similar to data mining, data visualization can be helpful in realizing trends or patterns in

interrelated data.

DSE (data switching exchange) – the equipment installed at a single location to provide
switching functions, such as circuit switching, message switching, and packet switching

DSL (digital subscriber line) – a technology for bringing high-bandwidth information to homes

and small businesses over ordinary copper telephone lines. xDSL refers to different variations of

DSL, such as ADSL, HDSL, and RADSL. If your home or small business is close enough to a

telephone company central office that offers DSL service, you may be able to receive data at

rates up to 6.1 megabits per second, enabling continuous transmission of motion video, audio,

and even 3-D effects. More typically, individual connections will provide from 1.544 Mbps to 512

Kbps downstream and about 128 Kbps upstream. A DSL line can carry both data and voice

signals and the data part of the line is continuously connected.

e-cash (electronic, or digital, cash) – a system of purchasing cash credits in relatively small

amounts, storing the credits in your computer, and then spending them when making electronic

purchases over the Internet. Theoretically, e-cash could be spent in very small increments, such

as tenths of a cent (U.S.) or less. Most merchants accepting digital cash so far, however, use it as

an alternative to other forms of payment for somewhat higher price purchases. E-cash can also

be stored on an electronically sensitive card.

e-commerce (electronic commerce) – the process of conducting business (buying and selling

of goods and services) on the Internet, especially the World Wide Web. In practice, this term and

a new term, "e-business," are often used interchangeably. When talking about Internet-based

transactions for the state of North Carolina, e-government should be used instead of ecommerce.

EDI (electronic data interchange) – a data exchange technology that facilitates the rapid,

accurate exchange of standard commercial transactions by creating, transferring, and processing

transactions electronically. EDI is the transmission between two trading partners of the data

comprising common business transactions, in a mutually agreed-upon format.

e-form (electronic form) – a computer program version of a paper form. Aside from eliminating

the cost of printing, storing, and distributing pre-printed forms, and the wastage of obsolete forms,

e-forms can be filled out faster because the programming associated with them can automatically

format, calculate, look up, and validate information for the user. With digital signatures and

routing via e-mail, approval cycle times can be significantly reduced. With electronic submission

of completed forms, you can eliminate the cost of rekeying data and the associated errors.

EFT (electronic funds transfer) – a system of transferring money from one bank account

directly to another without any paper money changing hands. One of the most widely-used EFT

programs is Direct Deposit, in which payroll is deposited straight into an employee's bank

account, although EFT refers to any transfer of funds initiated through an electronic terminal,

including credit card, ATM, Fedwire and point-of-sale (POS) transactions. It is used for both credit

transfers, such as payroll payments, and for debit transfers, such as mortgage payments.

EPMO (Enterprise Program Management Office) – This entity supports decision making

regarding the prioritization and utilization of IT resources assigned to major projects as well as

their progress relative to project objectives and milestones. Typically, the EPMO reports to an IT

steering committee composed of management from all lines of business and the CIO.

e-procurement – the business-to-business purchase and sale of supplies and services over the

Internet. An important part of many business-to-business sites, e-procurement is also sometimes

referred to by other terms, such as supplier exchange. Typically, e-procurement Web sites allow

qualified and registered users to look for buyers or sellers of goods and services. Depending on

the approach, buyers or sellers may specify prices or invite bids. Transactions can be initiated

and completed. Ongoing purchases may qualify customers for volume discounts or special offers.

E-Rate – The Schools and Libraries Program, commonly called the "E-Rate," is administered by

the Schools and Libraries Division (SLD) of the Universal Services Administrative Company

(USAC). USAC oversees the administration of all universal service support, which includes the

High Cost Program, the Low-Income Program, the Rural Health Care Program, and the Schools

and Libraries Program. The Schools and Libraries Universal Service Program was established as

part of the Telecommunications Act of 1996 with the express purpose of providing affordable

access to telecommunications services for all eligible schools and libraries, particularly those in

rural and inner-city areas. Funded at up to $2.25 billion annually, the Program provides discounts

of 20% to 90% on telecommunications services, Internet access and internal connections.

Funding for the universal service discounts comes from the telecommunications industry, in an

Information Age update to the time-honored concept of universal service. The level of discounts

schools and libraries are eligible to receive depends on economic need and location, rural or

urban; once approved, they apply their discounts to telecommunications services, Internet access

and internal connections, then pay the difference out of their own budgets.

ERP (enterprise resource planning) – an industry term for the broad set of activities supported

by multi-module application software that help a manufacturer or other business manage the

important parts of its business, including product planning, parts purchasing, maintaining

inventories, interacting with suppliers, providing customer service, and tracking orders. ERP can

also include application modules for the finance and human resources aspects of a business.

Typically, an ERP system uses or is integrated with a relational database system. The

deployment of an ERP system can involve considerable business process analysis, employee

retraining, and new work procedures.

fat client – a two-tier client/server model for application design in which the business rules are

tightly integrated and deployed with the code that implements the graphical user interface. A fat

client is usually deployed on a workstation.

JAD (joint application development) – a methodology introduced by IBM to facilitate end-user

and developer participation in the application development process

Java – a high-level programming language from Sun Microsystems designed for use on the

World Wide Web

JPEG (Joint Photographic Experts Group) – a file format for color images and one of two

graphics file formats supported on the World Wide Web. (The other format is GIF.) JPEG files

usually end with a .jpg extension.

Kbps (kilobits per second) – a measure of bandwidth (the amount of data that can flow in a

given time) on a data transmission medium. Higher bandwidths are more conveniently expressed

in megabits per second (Mbps, or millions of bits per second) and in gigabits per second (Gbps,

or billions of bits per second).

Kerberos – a private key encryption-based authentication mechanism for network security,
developed by MIT's Project Athena

Kermit – a popular file transfer and management protocol and suite of communications software

programs with advantages over existing Internet protocols such as FTP and Telnet. It is freeware,

developed and maintained by members of the Kermit Project at Columbia University.

The Kermit protocol is described as "fast, robust, extensible, tunable, and medium-independent."

In addition to the protocol support, the Kermit suite includes terminal emulation, character-set

translation, and scripting. The suite can be installed on almost any operating system, including

Windows, UNIX, DOS, VMS, OS/2, and a number of mainframe operating systems. Most

versions support direct and dialed serial connections (with a modem) and network connections

(Telnet and often others such as Rlogin, LAT, or X.25).

key – a string of digits that produces cipher text when used with a cryptographic algorithm

kiosk – an extension of the automated teller machine concept, with a free-standing point of
access disseminating information and services to the public through the use of touch screens,
audio, video, and teleconferencing

knowledge management – the name of a relatively new concept in which an enterprise
consciously and comprehensively gathers, organizes, shares, and analyzes its knowledge to
further its aims. In early 1998, it was believed that few enterprises actually had a comprehensive

knowledge management practice (by any name) in operation. Instead, many companies are

focusing on existing processes and striving to bring them together.

Some aspects of knowledge management— such as data mining and pushing information to

users— are new; others, such as data entry and OCR, are very familiar. Some vendors are now

offering products that address the newer ideas. Since the process is complex, involving many

stages and addressing many different needs, no vendor provides a comprehensive suite of

products, according to industry experts. The consensus is that an enterprise's knowledge

management plan can only be implemented with a meld of different products.

LAN (local area network) – a computer network that links multiple workstations and other

devices in a limited area, typically with a local geographic area. Typically, this might be within the

area of a small office building. However, Fiber Distributed Data Interface (FDDI) extends a local

area network over a much wider area. Usually, the server has applications and data storage that

are shared in common by multiple workstation users. A local area network may serve as few as

four or five users or, in the case of FDDI, may serve several thousand. The main LAN technologies are Ethernet, token ring, ARCNET, and FDDI.

laser printer – a non-impact printer that creates, by means of a laser beam directed on a

photosensitive surface, a latent image which is then made visible by a toner and transferred and

fixed on paper

NC @ Your Service – the logo for North Carolina's e-government portal

NC @ Your Service Project Office – the project office that oversees North Carolina's egovernment

portal development

NCIH (North Carolina Information Highway) – The North Carolina Information Highway

provides state government entities with a broadband network for high-speed data, voice, and

video. It operates within the Department of Commerce and is managed by the Office of

Information Technology Services (ITS). The information highway supports the vision that all

people of North Carolina will have broadband access simultaneously and efficiently for

teleconferencing, high-speed data, distance learning, and multimedia applications. The NCIH

project gives the state of North Carolina the advantages of broadband technology and ways to

reorganize government operations to improve service, implement new services, and reduce

overall costs.

NCIIN (North Carolina Integrated Information Network) – North Carolina's state-of-the-art

telecommunications network. Electronic tools associated with Internet access, such as electronic

mail (e-mail) and the World Wide Web (WWW), help public agencies streamline information
access and conduct business. These tools are used with the NCIIN to facilitate inter-agency
communication and information processing. These same tools are used for communications
between public agencies and entities on the Internet, such as other government organizations,

educational institutions, private businesses, and citizens.

network – (1) A configuration of data processing devices and software connected for information

interchange (2) A group of nodes and the links interconnecting them (3) The physical hardware

and software connections between computers. A network allows information to be shared and

electronic communication to occur (4) A group of two or more computer systems linked together

network computing – computing performed on geographically dispersed platforms connected

via a network; also referred to as distributed computing

NIST (National Institute of Standards & Technology) – formerly the National Bureau of
Standards. NIST promotes and maintains measurement standards. It also has active programs

for encouraging and assisting industry and science to develop and use these standards.

non-relational database – a database that stores a collection of data in one table. Examples of

non-relational databases are VSAM databases and flat files.

non-user interface – an interface that provides services to an external application, as opposed

to a user interface
NOS (network operating system) – software that is used to link files, computers, and other
devices over a LAN or WAN
n-tier (some number of tiers) – a method of application development where application logic is

divided into layers and is distributed among three or more separate computers in a distributed

network. Business rules are implemented in distinct executable modules and are not tightly

coupled with other business rules, with the code that implements the user interface, or with the

code that provides data access.
N-tier programming enables ease of maintenance and flexibility in platform deployment. The most
common form of n-tier is the 3-tier application, in which user interface programming is in the
user's computer, business logic is in a more centralized computer, and required data is in a
computer that manages a database. N-tier application structure implies the client/server program

model. Where there are more than three distribution levels or tiers involved, the additional tiers in

the application are usually associated with the business logic tier.

Object Management Group – a non-profit organization that promotes the theory and practice of

object technology for the development of distributed computing systems

ODBC (Open Database Connectivity) driver – the middleware used to connect database

access tools to relational databases through the use of a generic application program interface

(API). The ODBC drivers enable access to data and provide insulation between a program and

the specific RDBMS language used by each database. Database access tools and programs do

not have to be customized for each database; an ODBC configuration file maintains the database

connections.

OEM (original equipment manufacturer) – an equipment maker that sells products to resellers

that may add value to the product, re-label it, or bundle it with their own products

office automation – the process of automating everyday business procedures

OLAP (online analytical processing) – an application system used for analysis, planning, and

management reporting through interactive access to a wide variety of information. An OLAP

system usually references summary data in order to process information and frequently answers

business needs for "what if" scenarios.

OLTP (online transactional processing) – an application system used for online, interactive

processing that performs business transactions. OLTP systems are typically used by many users

simultaneously to perform data acquisition, maintenance, or retrieval.
OMG (Object Management Group) – a non-profit organization that promotes the theory and
practice of object technology for the development of distributed computing systems
one-stop shop – the idea that you can accomplish all of your business needs at one place. This
is the idea behind an e-government portal: a citizen should be able to access the portal and
conduct all required transactions without having to visit each agency's Web site.
online transaction – an business process conducted over the Internet
protocol – (1) A set of semantic and syntactic rules that determine the behavior of functional
units in achieving communication (2) In System Network Architecture (SNA), the meanings of and
the sequencing rules for requests and responses used for managing the network, transferring
data, and synchronizing the states of network components (3) A set of special rules for
communication that enable independent technology components to communicate with one
another
In information technology, a protocol is the special set of rules for communicating that the end
points in a telecommunication connection use when they send signals back and forth. Protocols
exist at several levels in a telecommunication connection. There are hardware telephone
protocols. There are protocols between the end points in communicating programs within the
same computer or at different locations. Both end points must recognize and observe the
protocol.
Protocols are often described in an industry or international standard. On the Internet, there are
the TCP/IP protocols, consisting of: TCP (Transmission Control Protocol), IP (Internet Protocol),
HTTP, FTP, and other protocols, each with defined sets of rules to use with other Internet points
relative to a defined set of capabilities.

proxy server – In an enterprise that uses the Internet, a proxy server is a server that acts as an
intermediary between a workstation user and the Internet so that the enterprise can ensure
security, administrative control, and caching service. A proxy server is associated with or part of a

gateway server that separates the enterprise network from the outside network and a firewall

server that protects the enterprise network from outside intrusion.

public access – the method by which the public accesses data. Web-based application systems

are frequently used to provide information to the public. In this case, an Internet application with a

Web front end is developed and a search engine is used to query the data. Also, voice response

units (VRUs) are implemented to support public information provided through a phone interface

using a touch-tone phone.

Public Directory Service Protocol – a protocol that governs the setup and organization of directories

public key – a value provided by some designated authority as a key that, combined with a private key derived from the public key, can be used to effectively encrypt and decrypt messages

and digital signatures. The use of combined public and private keys is known as asymmetric cryptography. A system for using public keys is called a public key infrastructure (PKI).

publish and subscribe – a messaging technique where one application service publishes information. Another application that needs the information subscribes to the published information (i.e., a "push" model). Messages containing the new information are placed in a queue for each subscriber by the publishing application. When a subscriber is ready to receive

the new information, it checks for new messages in the message queue.

push technology – the practice or technology of having information brought to you by an intelligent agent

PVC (permanent virtual circuit) – a channel through an ATM network provisioned by a carrier

between two end points, used for dedicated long-term information transport between locations

QA (quality assurance) – procedures taken to ensure that a company delivers products that conform to standards

QOS (Quality of Service) – On the Internet and in other networks, Quality of Service (QoS) is

the idea that transmission rates, error rates, and other characteristics can be measured,

improved, and, to some extent, guaranteed in advance. QoS is of particular concern for the

continuous transmission of high-bandwidth video and multimedia information. Transmitting this

kind of content dependably is difficult in public networks using ordinary "best effort" protocols.

RAD (Rapid Application Development) – a concept that products can be developed faster and

of higher quality through: gathering requirements using workshops or focus groups; prototyping

and early, reiterative user testing of designs; the re-use of software components; a rigidly paced

schedule that defers design improvements to the next product version; and less formality in

reviews and other team communication.

Some companies offer products that provide some or all of the tools for RAD software

development. (The concept can be applied to hardware development as well.) These products

include requirements gathering tools, prototyping tools, CASE tools, language development

environments such as those for the Java platform, groupware for communication among

development members, and testing tools. RAD usually embraces object-oriented programming

methodology, which inherently fosters software re-use. The most popular object-oriented

programming languages, C++ and Java, are offered in visual programming packages often

described as providing rapid application development.

RDBMS (relational database management system) – a software system and data storage
facility that organizes and manages a relational database

reuse facilitation – a service that supports users and application developers in exploiting the
catalog and inventory, follows a methodology of reuse, and markets the reusability program
throughout the organization

signature file – a short text file you create for use as a standard appendage at the end of your email

notes or Usenet messages. For example, you might include your full name, occupation or

position, phone number, fax number, e-mail address, and the address of your Web site if you have one. Many people also include a favorite quote, company motto, or short personal statement.

Most e-mail and Usenet news facilities make it possible for you to either create the signature file as part of the application or to specify another file you've created with a word processor. Then, you tell the facility (usually in an "Options" menu) the name of your signature file and it automatically adds it to the note or message template it provides you.

SLA (service-level agreement) – (1) An agreement among two or more parties that establishes measurable levels of service and expectations for that service (2) An agreement between end users and the help desk defining the boundaries of acceptable service and details the associated fees for help desk services rendered. The SLA defines users' expectations and serves as a guidepost for establishing and measuring performance goals.

smart card – in computer security, a credit card-sized device containing an embedded microprocessor that stores information. The smart card can be loaded with data, used for telephone calling, electronic cash payments, and other applications, and then periodically "recharged" for additional use.

SMTP (Simple Mail Transfer Protocol) – the standard transport protocol for sending messages from one mail transfer agent (MTA) to another MTA over the Internet. Using MIME encoding, it enables the transfer of text, video, multimedia, images, and audio attachments through e-mail messages.

SNA (System Network Architecture) – The framework, designed by IBM, which defines the structuring of data-communications functions and protocols of the mainframe, including networking protocols, administration software, and hardware devices that provide physical

delivery of those protocols. It enables reliable transfer of data among end users and provides

protocols for controlling the resources of various network configurations. The SNA network

consists of network accessible units (NAUs), boundary function, gateway function, and

intermediate session routing function components; and the transport network.

SNADS (Systems Network Architecture Distribution Services) – the SNADS gateway is an email

gateway that moves and translates messages between an IBM SNADS environment and the

state's standard Simple Mail Transfer Protocol (SMTP) mail backbone

SNMP (Simple Network Management Protocol) – a set of network communication

specifications covering all the basics of network management. It is a simple and expandable

protocol designed to give the capability to remotely manage a computer network by polling,

setting terminal values, and monitoring network events.

sockets – a name given to the package of subroutines that provide access to TCP/IP on most

systems

software – all or part of the programs, procedures, rules, and associated documentation of a

data processing system. Software is an intellectual creation that is independent of the medium on

which it is recorded.

software distribution – the process of propagating software installation, upgrades, and

maintenance to each workstation that needs it

SONET (Synchronous Optical Network) – (1) A new and growing body of standards that define

all aspects of transporting and managing digital traffic over fiber-optic facilities in the public

network (2) A network communication technology offering fiber optic transmission system for

high-speed digital traffic

SPOC (single point of contact) – A methodology that allows an end user to make one attempt

at contacting an organization for service, then having the request channeled by some automated

means to the group that can best service the user’s need.

SQL (Structured Query Language) – a non-proprietary method for querying and retrieving data

from a relational database. The industry standard for SQL is ANSI Standard SQL. Vendors may

add extensions to the SQL language for their proprietary databases. A sample SQL statement is:

liii. SELECT CUSTOMER, ADDRESS, PHONE_NUMBER FROM CLIENT_DATAWHERE LAST_NAME="SMITH" ORDER BY FIRST_NAME.

SSL (Secure Sockets Layer) – a transport-level technology for authentication and data
encryption between a Web browser and a Web server

SSO (single sign-on) – single-password access to multiple systems

stand-alone – pertaining to operation that is independent of any other device, program, or
system

stand-alone workstation – a computer workstation where the computer is not connected to any

other computer on a network. It can neither send nor receive files or information electronically

from any other computer without the use of a diskette.

star topology – a network LAN infrastructure in which each node is connected to a central hub

sticky – the ability to keep a user at a particular Web site

UNIT 11
TEST

Passage 1:

Computer Graphics: Graphics technology has changed vastly in the nearly three decades since research-educators first started passing their knowledge on to students. Introductory computer graphics courses are changing their focus and learning environments. Improvements in hardware and software technology coupled with changes in preparation, interest and abilities of incoming students are driving the need

for curriculum change. Past courses focused on low and intermediate, level rendering principles, algorithms and software development tools. many of these algorithms have migrated into hardware. Though important knowledge for advanced graphics programmers, most graphics applications programmers have no need to study at this level, much as application programmers have no need to study hardware systems of assembly level programming. Courses need to focus on intermediate and 3D graphics Application Programmer Interface (API) into the instruction. This article presents experiences teaching this focus with both low and high level graphics programming API's. The experiences were gained in courses at an undergraduate university, university in multi-day industrial causes for experienced professional programmers.

1. Which one of the following reasons is not the driving force behind the necessity for the computer graphics curriculum's change?

1) changes in abilities of incoming students.
2) changes in preparation and interest of incoming student.
3) dramatic changes in the principles of the computer graphics.
4)improvement in computer graphics related hardware and software technologies.

2. What were the focuses of the past computer graphics courses?
1) integration of 3D graphics and API.
2) applications programmer interfaces.
3) high-level principles, algorithms and tools.
4) low and intermediate-level rendering principles, algorithms, methods and tools.

3. According to the author, which group of programmers needs to study low-level and software development tools?

1) introductory level programmers.
2) advanced graphics programmers.
3) undergraduate university students.
4) graphics application programmers.

4. How long ago researcher-educators started teaching computer graphics to students? about .....

1) two and a half decades ago.
2) thirty years ago.
3) twenty years ago.
4) three centuries ago.

5. According to this article, what is necessary in the modern graphics curriculum?
1) rendering principles.
2) application programmer interfaces.
3) integration of 3D graphics and API.
4) hardware systems and assembly level programming.

6. Where author of this article received his or her teaching experience?

1) teaching undergraduate university students.

2) professional programmers at an undergraduate university.

3) taking multi-day industrial courses as an experienced professional programmer.

4) teaching both undergraduate university students and industrial programmers.

Passage 2:

E-Banking and Internet: Westerners are increasingly skipping lines at teller windows to take care of their banking needs over the internet, according to figures released Wednesday, November 27, 2002. The nonprofit pew internet and American life project found online banking is rapidly catching on in the west, as an estimated thirty seven million Americans now pay bills and transfer funds on the web, more than twice the number that did so two years ago. on any given day, Internet user are nearly as likely to check their balance as use instant-messaging software, the survey found. Thirty-two percent of those surveyed said they did their banking online, compared with seventeen percent in 2000. while other activities like booking travel reservations and making purchases remained more popular, the Pew project found them growing at slower rate. Those surveyed were most likely to cite convenience and time saved as reasons they banked online.

7. What was the number of Americans who pay bills and transfer funds on the web two years before the composition of this article?

1) the estimated number could not be determined at all.
2) more than thirty seven millions.
3) less than half of thirty seven millions.
4) about twenty millions.

8. Who conducted the study that is reported in this article?
1) pew internet.
2) American life project.
3) American life project and pew internet.
4) Reuters news agency and pew internet.

9. Daily check of balance are done by:
1) instant-messaging software users.
2) online users and teller windows users alike.
3) online travelers who reserve their travel booking online.
4) online users as nearly as likely as they use instant-messaging software.

10. According to this article, which one of the following is not correct?
1) online banking grows fast on the west.
2) pew internet is a nonprofit organization.
3) 32% of those surveyed said they did their banking on the web.
4) more people are using teller windows to take care of their banking needs.

11. According to those who were surveyed, what are the most important reasons for doing online banking?

1) it is convenient and save their time.
2) internet is available at their workplace.
3) it is less expensive to do their banking on the web.

4) it is hard to find teller windows in their neighborhood.

Passage 3:

China's shift from technological nationalism to a more pragmatic strategy of developing national capabilities in conjunction with multinational corporations has transformed its economy. consistent with this transformation, China has revamped its industrial and technology policies, moving from an isolationist approach aimed at achieving technological independence to become a major producer of computer hardware and a major market for information technology products.

In 1990, China had only 500,000 PCs in a country of more than 1.2 billion people. By 2000, mainland Chinese purchased more than seven million PCs in a year. During the same time, China's production of computer hardware grew from less than US$ 1 billion to US$ 23 billion.

China's policies clearly drew on the developmental approach of other Asian Pacific economies such as Japan, Korea, Taiwan and Singapore. Each of these became Leaders in different segments of the global computer industry through the strong support of government industrial and technology policies.

11. In what way has China undergone a transformation of it's economy? It .....

1) has transformed it's corporations.
2) has transformed it's market by globalization.
3) has transformed it's purchase capabilities.
4) moved to more pragmatic strategy of developing it's national capabilities.

12. By reading the above passage, what could you say about china's technological development in the past decade'? It …….....

1) isn't dependent to change of its policies.
2) has had a rapid growth.
3) has a technological nationalism.
4) has had an isolationist approach.

13. If you were to choose a title for the above passage, which of the following would best fit with the context of the passage? China's .....

1) computer technology 2) transformation
3) corporations 4) development

Passage 4:

IBM is beginning a large scale autonomic-computing initiative designed to develop computer systems that run with little or no human involvement. IBM is already working on several autonomic computing projects, some involving artificial intelligence; adaptive algorithms; and self-healing technology, which lets systems keep running even if certain components fail.

Far too much, computer systems work has involved making things faster, larger, et cetera, without considering reliability, maintainability, availability etcetera. Autonomic computing would eventually reduce system support costs and would be most useful in remote areas where human oversight isn't practical, such as in space. In fact, autonomic systems are years away, although in the nearer term, autonomic functionality will appear in servers and software.

14. What is meant by autonomic-computing systems? Systems that .....
1) are revolutionary
2) have and oversight
3) run faster and on a larger scale.
4) have the capability to run with little or no human involvement

15. At present, what is the principal approach of computer technology in running the systems according to the above passage? to.....

1) make them self-healing
2) make them autonomous
3) make them faster and larger
4) use them in remote places

16. What is meant by the last sentence of the passage where it says 'In fact, autonomic systems are'.

1) for the future
2) nearer in functionality
3) in reach of servers and software
4) operating in the computer technology

Passage 5:

Although Linux has yet to achieve wide popularity in the computer game world, it is making rapid progress toward becoming the dominant operating system in the other major entertainment arena: motion pictures. The Linux operating system initially found a niche for use in computer generated image rendering for film. With the success of films such as Toy Story and Titanic, most major motion picture studios now employ CGI and strive to reduce the costs of using this expensive technology. Given the many systems that run it and the numerous applications that support it, filmmakers can now use Linux for an animated features entire production process, including modeling, animation and rendering. Thus, when we see the entire film industry adopting Linux to remain cost and performance competitive, how can we help but wonder what new realms Linux may conquer next?

17. According to the passage, which of the following statements can best describe the role of Linux in today's motion pictures industry? Linux .....in this arena.

1) must achieve cost and performance competitiveness
2) has become the dominant operating system
3) should strive to reduce the costs
4) has yet to achieve popularity

18. What is meant by CGI?
1) computer graphics industry
2) computer generated image
3) computer generated industry
4) computer graphics implementation

19. According to the following statements would best be the conclusion of this passage? Linux.....

1) has still new realms to conquer in the future.
2) has had great achievements in the motion pictures industry.
3) is used for an animated feature's entire production process.
4) is the only operating system used in the motion pictures industry.

Passage 6:

Go-To surveys the history of modern software, from the creation of the first successful high level language, FORTRAN and its compiler in the 1950s, through to the open source movement of today. The development of Unix and C, the rise of the graphical user interface and the creation of the spreadsheet are included among the events that shaped modern computing. Although some will argue with choices of topics covered for example, an entire chapter is devoted to Java, while no mention is made of the development of the internet protocol Go-To is full of fascinating details about an intangible creation that has had a very tangible impact on the modern world.

20. By reading the above passage, what do you think Go-To is ?

1) a book
2) a survey
3) a journal
4) an article

21. What topic is missing in Go-To?

1) Java
2) fascinating details
3) development of internet protocol
4) development of modern computing

Passage 7:

For intelligent systems research in e-business to have real impact, we need to cross the existing borders computer science and economic and management sciences. Truly interdisciplinary progress in science appears difficult to achieve because of the traditional decomposition into disciplines, which can turn different academic fields into almost separate cultures. Nevertheless, the contributors to this special issue on intelligent e-business hope to show how interdisciplinary thinking has helped to advance e-business. E-business implies that information technology must prove itself in an interactive and distributed context of economic value creation. Technology push and market pull both play their role in driving e-business forward.

22. The first paragraph can best summarized as:

1) despite the fact interdisciplinary progress in science seems difficult to achieve-business scholar try to prove it helpful in this respect.

2) the traditional decomposition of science into disciplines has brought about crucial difficulties for researchers developing e-business.

3) the impression of e-business on economic and management sciences has caused scholars to consider interdisciplinary concept helpful in the advance of e-business.

4) although intelligent systems research in e-business may seriously affect other field of science, some students hope to follow it up through interdisciplinary approach.

23. How does the second paragraph logically relate to the first? It

1) disagrees with the idea that sciences are to follow the traditional classification.

2) presents information technology as the fundamental element in e-business advancement.

3) supports the idea that there exists a close interrelation between the science of computer and economy.

4) suggests the ways to be studied by the students of computer in relation to economy, management and computer science.

Passage 8:

Traditional methods of teaching no longer suffice in this technological world. Currently there are more than 1,000,000 computers in schoolrooms in the United States. Students, mediocre and bright alike, from the first grade through high school, not only are not intimidated by computers, but have become avid participants in the computer epoch.

Kids operating computers implement their curriculum with great versatility. A music student can program musical notes so that the computer will play Beethoven or the Beatles. For a biology class, the computer can produce a picture of the intricate biology in a profound way. A nuclear reactor is no longer an enigma to students who can see its workings in minute detail on a computer. In Wisconsin, the Chippewa Indians are studying their ancient and almost forgotten language with the aid of a computer. More commonly, the computer is used for drilling math and language concepts so that youngsters may learn at their own speed without trying the patience of their human teachers. The simplest computers aid the handicapped, who learn more rapidly from the computer than from humans. Once irksome, remedial drills and exercises now on computer are conducive to learning because the machine responds to correct answers with praise and to incorrect answers with frowns and even an occasional tear.

Adolescents have become so exhilarated by computers that they have developed their own jargon, easily understood by their peers but leaving their disconcerted parents in the dark. They have shown so much fervor for computers that they have formed computer clubs, beguile their leisure hours in computer stores and even attend computer camps. A Boy Scout can get a computer merit badge. One ingenious young student devised a computer game for Atari that will earn him $100,000 in royalties.

This definitely the computer age. It is expected that in 2-3 years there will be between 3,000,000 and 6,500,000 computers in American schools. Manufactures of computers are presently getting tax write-offs for donating equipment to colleges and

universities and are pushing for legislation to obtain further deductions for contributions to elementary and high schools. Furthermore, the price of computers has steadily fallen to the point where a small computer for home or office is being sold for less than $100. At that price every class in the country will soon have computer kids.

24. The expression traditional methods of teaching in the first sentence refers to .....

1) technological methods of teaching
2) teachers, textbooks and class drills
3) teachers who punish students for not learning
4) teaching the students with the aid of computers

25. In order to operate a computer, a student does not have to be .....

1) musical
2) versatile
3) in grade school
4) especially bright

26. A computer is a robot teacher because it …….
1) is human
2) teaches machines
3) shows human emotions
4) enables students to learn through mechanical means

27. According to the passage, one exceedingly clever student has .....

1) overcome a handicap
2) invented a video game
3) learned an Indian language
4) played music on a computer

28. Computer manufactures donate equipment to schools .....
1) in 2000
2) to get tax deductions
3) to increase their sales
4) to teach students how to operate computers

29. The author of this article implies that .....
1) traditional methods of teaching are obsolete today.
2) computers are difficult to operate
3) students today have to be smarter than their parents
4) Computers make learning today easier than it was in the past

30. In next 2-3 years it is estimated that the number of computers in schools will .....

1) triple at least
2) continue as it is today
3) be at least twice that of today
4) be considerably lower than the number today

31. The price of a computer is now .....

1) rising
2) too high for most schools
3) affordable for most school
4) preventing schools from buying computers

Determine the meaning of the underlined word from the context of above passage (8) from 32 to 35.

32. He devised a computer game and sold it to Atari.

1) bought
2) played
3) invented
4) divided

33. Manufacturers are donating computers to schools.

1) going
2) deducting
3) giving
4) dedicating

34. I am not ingenious enough to invent a video game.

1) Studious
2) clever
3) glorious
4) indigenous

35. Even a mediocre student can learn to operate a computer.

1) average
2) brilliant
3) attentive
4) thoughtful

Passage 9:

Human memory formerly believed to be rather inefficient, is really more sophisticated than that of a computer. Researchers approaching the problem from a variety of points of view have all concluded that there is a great deal more stored in our minds than has been generally supposed. Dr. Wilder Penfield. A Canadian neurosurgeon, proved that by stimulating their brains electrically, he could elicit the events supposedly forgotten for many years suddenly emerged in detail.

The memory trace is the term for whatever is the internal representation of the specific information about the event stored in the memory. Assumed to have been made by structural changes in the brain, the memory trace is not subject to direct observation but is rather a theoretical construct that we use to speculate about how information presented at a particular time can cause performance at a later time. Most theories include the strength of the memory trace as a variable in the degree of learning, retention and retrieval possible for a memory. One theory is that the fantastic capacity for storage in the brain is the result of an almost unlimited combination of interconnections between brain cells, stimulated by patterns of activity. Repeated references to the same information supports recall. Or, to say that another way, improved performance is the result of strengthening the chemical bonds in the memory.

36. With what topic is the passage mainly concerned?

1) Neurosurgery
2) Human memory
3) Wilder Penfield
4) Chemical reactions

37. Compared with a computer, human memory is:

1) less durable
2) more limited
3) more complex
4) less dependable

38. According to the passage, researchers have concluded that .....
1) human memory is inefficient
2) different points of view are valuable
3) the physical basis for memory is clear
4) the mind has a much greater capacity for memory than was previously believed.

39. How did Penfield stimulate dreams and other minor events from the past?

1) By surgery
2) By repetition
3) By electric stimulation
4) By chemical stimulation

40. According to the passage, the capacity for storage in the brain .....
1) is not influenced by repetition
2) is stimulated by patterns of activity
3) has a limited combination of relationships
4) can be understood by examining the physiology

41. All of the following are true of a memory trace EXCEPT that .....
1) it is able to be observed
2) it is a theoretical construct
3) it is related to the degree of recall
4) it is probably made by structural changes in the brain

Passage 10:

Electronic technology has produced significant changes in the way that humans interact. Before telephones, computers and digital pagers, people communicated primarily by writing. We had to sit down, compose our thoughts and then spend some time writing them down on paper. There was also a delay between the expression of our ideas and their reception on the other end, but folks were patient enough to wait. With technology, however, communication happens in "real time". We don't take time before had to consider what we want to say and how to say it best. We express ourselves directly and bluntly. Now we are irritated when no one answers the phone, or get overly anxious if we don’t receive an immediate response to anew mail or page. We want all of our communication to happen instantaneously.

42. According to the passage, which of the following changes in human's interactions is <u>not</u> a product of electronic Technology?

1) People are more restless than before
2) Folks are more annoyed to wait
3) People communicate more promptly
4) People express things in sophisticated way

43. Which of the following words is the antonym for the expression "real time" in the above passage?

1) delay
2) actual time
3) instantaneous
4) virtual time

44. The author of this passage probably believes that the effects of technology on human communication are:

1) mostly negative
2) almost negligible
3) not very important
4) not well understood

Passage 11:

While film used in cinema contains pigments that create an infinitely large number of color variations, TV sets combine discrete amounts of red, green and blue light to create a much more limited color range. To produce more colors, TV sets would have

to combine purer, or more saturated, red, green and blue by using narrowband light filters that select colors more precisely but diminish brightness at the same time.

Genoa Color Technologies Ltd. has developed the software and hardware necessary to close this gap and make TV images more cinema-like without the unwanted dimming side effect. The trick is to extra primaries, the basic colors that, combined, form all others. By adding Yellow and Cyan (a light blue) to standard red, green and blue, a display that could normally generate about 16.7 million colors would now be able to show more than one trillion.

Genoa developed a color conversion algorithm that runs in a special microchip to be added to a television's imaging circuit. The algorithm gets a color value -from a DVD, for example, that the television would originally exhibit as a combination of three primaries -and finds how to best represent it as a combination of five primaries.

45. According to the passage, the Genoa Technologies Ltd. is a company .....
1) producing more colors for its TV sets.
2) manufacturing TV sets with better resolution.
3) that has developed a combination of five primaries.
4) that has tried to bring close the quality of a TV image to that of the cinema.

46. By adding the two extra colors, the ratio of the colors that can he generated to those of the old standard is .....

1) 10 to 1.
2) 40 to 1.
3) 60 to 1.
4) 90 to 1.

47. What is meat by the primaries as stated in the passage?
1) The basic colors.

2) Yellow and Cyan colors.
3) The trick to generate more colors.
4) The standard red, green and blue colors.

48. Genoa Color Technologies Ltd. has .....
1) created a special microchip.
2) developed the necessary software.
3) developed a color conversion algorithm.
4) developed a combination of fib's primaries.

49. According to the passage, Genoa Color Technologies Ltd. has managed to .....of the images.

1) close the gap between the TV image and the film image.
2) increase the gap between the TV image and the film image.
3) increase the brightness and the unwanted dimming side effect.
4) diminish the brightness and the unwanted dimming side effect.

Passage 12:

The MP3 audio-compression format is a technical standard-turned-fashion fold MP3: players have become ubiquitous on city streets in many parts of the world. It's probably no surprise that, as television followed radio, the next standard-turned-fad will likely be a video-compressible format: MPEG-4.

MPEG-4 became an internationally recognized standard in 2000. The visual equivalent to MP3, it was developed by the same organization, the Moving Picture Experts Group, an international working group operating under the auspices of the International. Organization for Standardization and the International Electrotecnical Commission. Like MP3, MPEG-4 offers very compact file compression at selectable data r:1tes. This allows losers to make 11 tradeoff between quality and required storage space. MPEG-4 can produce images superior to those produced \with MPEG-2 (the DVD recording format), with only one-third to three-eighths the data.

With the new availability of high-quality digital video in manageable file sizes, pocket widco players and camcorders \with no moving parts are starting to appear, as well as hard drive-based video jukeboxes holily dozens offuil-length movies. Soon, people will carry their movies, along with their music, in their shirt pockets.

Some of these new players and camcorders store wideo files in flash memory, such as the Secure Digital (SD) memory cards used in digital cameras and PDAs.

50. According to the above passage, what is/are the ever present technical standard(s) in a number of places in the world at present?

1) MP3
2) MPEG-2
3) MPEG-4
4) MPEG-4 and MP3

51. What organization developed the MPEG-4?
1) The International Working Group.
2) The Moving Picture Experts Group.
3) The International Electrorechnical Commission.
4) The International Organization Standardization.

52. If you were asked to identify the most conspicuous quality for MP3 and MPEG-4 standards, which of the following would you choose?

1) Secure Digital memory.
2) High quality digital video.
3) Compact file compression.
4) Video-compression format.

Passage 13:

XML, the extensible mark-up language, structure as well as good looks to a document. While HTML can format things like things like headlines and tables and is considered as the current language, XML can define things like dates. invoice numbers and prices and is assumed to able to replace the HTML in a few years.

This means you can build data, files, Web pages, or documents that can he probed with simple questions by relying on semantics and logic instead of key words that this in turn speeds up any search you need to make.

To make this kind of smart searching possible, one further concept comes into play: the resource description format (RDF), a way of specifying the relationship between entities. It defines how pieces of data are represented in a series of documents, acting like a dictionary of definitions. For example: is "spectrum" a scientific term defining a range of electromagnetic frequencies, a slice of opinions of viewpoints is sociology or politics, or a well-known magazine? The builder of the database gets to decide, or . adopt a definition suggested in some other already defined RDF. This allows you to define an ontology, or the relationships among RGF statements, linking various data elements in documents and allowing logical inferences to be made. An ontology is a "family tree" or a cluster of related concepts; for example, to medical database, all words ending in -oma are types of cancer.

53. According to the passage, what is the principal feature of the XML'?

1) Building data files.
2) Formatting the text.
3) Relying on semantics.
4) Having the ability to infer.

54. What does the passage reveal to the reader about the two languages?

1) XML is the customary language that has replaced the HTML.
2) HTML and XML are both used but each for different purposes.
3) XML is more popular than HTML as it is capable to serve more purposes.
4) That HTML is the customary language for the present that may be shortly replaced by XML.

55. What is meant by an RDF (the Resource Description Format) statement?

1) A dictionary.
2) A smart search.
3) A list of data represented in a series of documents.
4) A linking of different data elements in documents that allows logical inferences to be made

Passage 14:

It turns out that your kids are right once again. According to a recent report in Nature, playing video games of the kill-or-killed variety is good for their brain-power.

Not only that: if they are playing these games on the Sony Play station 2 toy got them last Christmas and get bored with Tony Hawk's ProSkater 4, your kid and his or her closest 99 buddies can bundle their PS2s together and do their quantum chromo dynamics homework.

This second bit of news-using Sony Play stations to build a specialized supercomputer was announced by researchers at the National Center for Supercomputing Applications and the computer science department at the University of Illinois in Urbana. These tinkerers paid about $50,000 and got computing power that would otherwise cost at least five times as much. They wanted to learn if the sophisticated graphics processor used in the Sony Play station to run slick games could also be used to solve big problems in particle physics.

While hardly a threat to supercomputing giants like IBN, the achievement illustrates the point that consumer electronics has now become a leading edge of the computer industry. Advances are no longer trickling down to these devices from grand government projects but surging up from this innovation hot spot. Although some manufacturers have gone to great lengths to prevent unusual uses of their consumer equipment, it is hoped that most would adopt Sony's tinkerer-friendly attitude, allowing this hot spot to percolate Upward as fast as possible.

56. According to the passage, what is the first bit of news about Sony play stations?

1) Kide like to play the kill-or-be-killed video games.
2) Kide get bored soon from games played on the Sony Play station.
3) Kide like to play kill-or-be-killed games on the Sony Play station 2.
4) Unlike the popular opinion, the kill-or-be-killed video games can be good for children's brain power.

57. What have the researchers at the National Center for Supercomputing Applications and the computer science department at the University of Illinois at Urbana accomplished with the help of Sony Play stations?

1) To become Sony's tinkerers hot spot.
2) To build a specialized supercomputer.
3) To become a leading edge of computer industry.
4) To pay one fifth of the actual cost for the computer science.

58. By reading the passage, which of the following can best reveal who a tinkerer may be ?

1) Children playing with Play stations.
2) Researchers working at scientific centers.
3) Manufacturers producing consumer electronics.
4) People who try to repair or improve something in a casual way

Passage 15:

Within the next several years, we'll be awash in powerful, cheap sensor radio-frequency ID (RFID) tags that track objects (and the people who to be wear riding, or

chatting into them); biometric sensors that will identify us by our unit irises, fingerprints, voices, walking patterns, or other physical quirks; Glo Positioning System receivers, embedded into all manner of things, able to track u: within a meter; and tiny, high-resolution digital still and video cameras, also built everything from cell phones to wallpaper.

The resulting torrent of data will cascade into government and corporate systems, the Internet. Facts and information that are largely incoherent overwhelming in volume and detail will accumulate in databases too scattered numerous-and valuable -to be shut off completely from the rest of cyberspace.

59. What is meant by cyberspace as given on the last line of the passage?

1) Databases. 2) The Internet.

3) The information world. 4) The cascading torrent of data.

60. If you were asked to choose the best title for the above passage which oj followings would it be?

1) The Cheap Sensors. 2) The Tracking Sensors.

3) The Ubiquitous Sensors. 4) The Omnipotent Sensors.

61. The principal feature of a biometric sensor is to identify .....

1) A human trait. 2) A physical quirk.

3) An individual's position. 4) All of the above.

Exercises

Read the next page texts: A, B and C then: complete table.

	A	B	C
1. Area of IT **2. Predictions** **3. Comments**			

Text A.

Telecoms applications will soon be bundled together in much the same way as office application suites are today. A major example is the electronic marketplace, which will bring customers and suppliers together in smart databases and virtual environments, with ID verification, encryption and translation. It will then implement the billing, taxation and electronic funds transfer, while automatically producing accounts and auditing. The whole suite of services will be based on voice processing, allowing a natural voice interface to talk to the computer, all the AI to carry out the request and voice synthesis and visualization technology to get the answer out.

Electronic money will be very secure but much more versatile than physical alternatives. E-cash can be completely global and could be used as a de facto standard. It does

not have to be linked to any national currency, so can be independent of local currency fluctuations. Its growing use on the Net will lead to its acceptance on the street and we may hold a large proportion of our total funds in this global electronic cash. People will increasingly buy direct from customized manufacturers. Shops will be places where people try on clothes, not buy them. Their exact measurements can be sent instantly to the manufacturer as soon as they have chosen an outfit. The shops may be paid by the manufacturer instead.

Text B.

Employment patterns will change, as many jobs are automated and new jobs come into existence to serve new technologies. Some organizations will follow the virtual company model, where a small core of key employees is supported by contractors on a project by project basis, bringing together the right people regardless of where they live. The desks they will use will have multiple flat screens, voice interfaces, computer programs with human-like faces and personalities, full-screen videoconferencing and 3D sound positioning. All this will be without any communication cables since the whole system uses high capacity infrared links. The many short-term contractors may not have enough space in their homes for an office and may go instead to a new breed of local telework centre.

Of course, workers can be fully mobile and we could see some people abandon offices completely, roaming the world and staying in touch via satellite systems. Even in trains and planes there may be infrared distribution to each seat to guarantee high bandwidth communication. One tool they may have in a few years is effectively a communicator badge. This will give them a voice link to computers across the network, perhaps on their office desk. Using this voice link, they can access their files and email and carry out most computer-based work. Their earphones will allow voice synthesizers to read out their mail and glasses with a projection system built into the arms and reflectors on the lenses will allow a head-up display of visual information. Perhaps by 2010, these glasses could be replaced by an active contact lens that writes pictures directly onto the retina using tiny lasers.

Text C.

Finally to the very long term, by around 2030, we may have the technology to directly link our brain to the ultra-smart computers that will be around then, giving us so much extra brainpower that we deserve a new name, Homo Cybernetics. In much the same time frame, geneticists may have created the first biologically optimized humans, Homo Optimus. It would make sense to combine this expertise with information technology wizardry to make something like the Borg, Homo Hybridus, with the body of an Olympic athlete and a brain literally the size of the planet, the whole global superhighway and every machine connected to it. Over time, this new form may converge with the machine world, as more and more of his thoughts occur in cyberspace. With a complete backup on the network, Homo Hybridus would be completely immortal. Ordinary biological humans would eventually accept the

transition and plain old Homo Sapiens could become voluntarily extinct, perhaps as early as 2200.

5. **Complete the gaps in this text on operating systems using these linking words and phrases:**

although	*in addition*
because	*such as*
but	*therefore*

The user is aware of the effects of different applications programs ……..…… operating systems are invisible to most users. They lie between applications programs, ……. word-processing and the hardware. The supervisor program is the most important. It remains in memory, …… it is referred to as resident. Others are called non-resident ……. they are loaded into memory only when needed. Operating systems manage the computer's resources, ……..…….. the central processing unit, …….. they establish a user interface and execute and provide services for applications software, ……..…….. input and output operations are invoked by applications programs, they are carried out by the operating system.

6. **Some verbs beginning or ending with *-en-* have a causative meaning. Replace the words in *italics* in these sentences with the appropriate form of *-en-* verb from this list.**

enable	*encrypt*	*ensure*	*encourage*
encode	*enhance*	*enlarge*	
heighten	*widen*	*brighten*	*fasten*

1. A MIDI message *makes* sound *into* code as 8-bit bytes of digital information.
2. The teacher is using a new program to *give* courage *to* children to write stories.
3. The new version of SimCity has been *made better* in many ways.
4. A gateway *makes* it possible *for* dissimilar networks to communicate.
5. You can *convert* data *to* secret code to make it secure.
6. *Make sure* the machine is disconnected before you remove the case.
7. Designers can offer good ideas for *making* your website *brighter*.
8. Electronic readers allow you to *make* the print size *larger*.
9. Programmers write software which makes the computer *able to* carry particular tasks.
10. You can *make* the picture on your monitor *wider*.

7. Read the following passage (A) and then explain how some drivers solve this problem for themselves.

Passage A:

In the last ten years, police have installed speed trap units on many busy roads. These contain a radar set, a microprocessor and a camera equipped with a flash. The radar sends out a beam of radio waves at a frequency of 24 gigahertz. This is equivalent to a wavelength of 1.25 cms. If a car is moving towards the radar, the reflected signal will bounce back with a slightly smaller wavelength. If away from the radar, the waves will reflect with a slightly longer wavelength. The microprocessor within the unit measures the difference in wavelength between outgoing and returning signals and calculates the speed of each vehicle. If it is above the speed pre-set by the police, the camera takes a picture of the vehicle. The information is stored on a smart card for transfer to the police computer. The owner of the vehicle can then be traced using the Driver and Vehicle Licensing Center database.

Now compare your answer with the following passage (B):

Passage B:

Some drivers have now got used to these traps. They slow down when they approach one to ensure that the camera is not triggered. They speed up again as soon as they have passed. This is known as ‘surfing’. One way of outwitting such motorists is a new computerized system. This consists of two units equipped with digital cameras positioned at a measured distance apart. The first unit records the time each vehicle passes it and identifies each vehicle by its number plates using Optical Character Recognition (OCR) software. This information is relayed to the second unit which repeats the exercise. The microprocessor within the second unit then calculates the time taken by each vehicle to travel between the units. The registration numbers of those vehicles exceeding the speed limit are relayed to police headquarters where a computer matches each vehicle with the DVLC database. Using mail-merge a standard letter is then printed off addressed to the vehicle owner.

Structure

A. -ing form as a noun; after prepositions

We can use the -ing form of the verb as a noun. It can be the subject, object, or complement of a sentence. For example:

1. *Managing the computer's resources is an important function of the operating system.*
2. *The operating system starts running the user interface as soon as the PC is switched on.*
3. *Another function of the operating system is executing and providing services for applications software.*

The -ing form is also used after prepositions. This includes to when it is a preposition and not part of the infinitive. For example:

4. *Without the user being aware of the details, the operating system manages the computer's resources.*
5. *We begin by focusing on the interaction between a user and a PC operating system.*
6. *We look forward to having cheaper and faster computers.*

Exercises

1. Rewrite each of these sentences like this:

An important function of the operating system is to manage the computer's resources.

Managing the computer's resources is an important function of the operating system.

1. One task of the supervisor program is to load into memory non resident programs as required.
2. The role of the operating system is to communicate directly with the hardware.
3. One of the key functions of the operating system is to establish a user interface.
4. An additional role is to provide services for applications software.
5. Part of the work of mainframe operating systems is to support multiple programs and users.
6. The task in most cases is to facilitate interaction between a single user and a PC.
7. One of the most important functions of a computer is to process large amounts of data quickly.
8. The main reason for installing more memory is to allow the computer to process data faster.

2. Complete these sentences with the correct form of the verb:

infinitive or -ing form.

1. Don't switch off without (close down) your PC.
2. I want to (upgrade) my computer.
3. He can't get used to (log on) with a password.
4. You can find information on the Internet by (use) a search engine.

5. He objected to (pay) expensive telephone calls for Internet access.
6. He tried to (hack into) the system without (know) the password.
7. You needn't learn how to (program) in HTML before (design) WebPages.
8. I look forward to (input) data by voice instead of (use) a keyboard.

B. verbs + object + infinitive

C. verbs + object + to-infinitive

New developments in computing are often designed to make something easier.

These verbs are often used to describe such developments:

allow, let, enable, permit, help

Study these examples:

1. *A GUI lets you point to icons and click a mouse button to execute a task.*
2. *A GUI allows you to use a computer without knowing any operating system commands.*
3. *The X-Window System enables Unix-based computers to have a graphical look and feel.*
4. *Voice recognition software helps disabled users (to) access computers.*

allow, ***enable*** and ***permit*** are used with this structure:

verb + object + to-infinitive

let is used with this structure:

verb + object + infinitive

help can be used with either structure.

3. Complete the gap in each sentence with the correct form of the verb in brackets.

1. The Help facility enables users…… (get) advice on most problems.
2. Adding more memory lets your computer …..... (work) faster.
3. Windows allows you ……. (display) two different folders at the same time.
4. The Shift key allows you …….. (type) in upper case.
5. The MouseKeys feature enables you ……. (use) the numeric keypad to move the mouse pointer.
6. ALT + TAB allows you …… (switch) between programs.
7. The Sticky Keys feature helps disabled people …… (operate) two keys simultaneously.
8. ALT + PRINT SCREEN lets you …….. (copy) an image of an active window to the Clipboard.

Vocabulary section

This part contains entries for some keywords like *flash-cards*. In order to study vocabulary efficiently, you must have a study plan and follow it carefully.

In these *flash-cards*, direct under the word, you will find other forms of the same word. These words have the same general meaning; they represent the different parts of speech of the word. For each of the forms, the part of speech is given. Also you can observe two examples of using the keywords and other parts.

The keyword is then, defined in clear, easy to understand English.

aggravating adj. making worse; annoying
n. aggravation syn. irritating
v. aggravate
The aggravating delay was caused by road repairs.
The shortage of work aggravated the crisis in the small town.

convert v. to change from one form or state to another
adj. convertible syn. alter
n. conversion
When boiled, liquids convert to gases.
The conversion from Fahrenheit to centigrade can be easily made.

curative adj. being able to restore to good condition
n. cure syn. healing
The curative properties of certain plants have been well documented.
There is no simple cure for the ills of society.

debilitating adj. weakening
v. debilitate syn. weakening
n. debility
The lack of investment savings has a debilitating effect on the economy.
The patient's debility restricted him to the room.

deplete v. to use up; to reduce greatly
adj. depleted syn. consume
n. depletion
She depleted all of her savings to buy the word processor.
The depletion of the Earth's oil reserves poses a threat to our current style of life.

toxic adj. harmful; capable of being fatal
n. toxicity syn. poisonous

Disposal of toxic wastes is an ongoing problem.
This product has the highest toxicity of any known to science.

acknowledge v. to know, remember and accept the existence of something
n. acknowledgment
adj. acknowledged
syn. concede

The foreman acknowledged the fact that there had been a mistake in the design of the house.
The promotion he received was an acknowledgment of his excellent work.

tranquility n. calm; quietness
adj. tranquil
v. tranquilize
syn. peacefulness

The tranquility of the lake at sunrise inspired a profound sense of well-being.
His tranquil manner of expressing made us all feel more secure.

data warehouse – a data warehouse is a collection of data designed to support decision making and analytical processing. Data warehouses contain a wide variety of data, usually from multiple data sources, presenting a comprehensive view of a particular business environment. Due to the nature of the data stored in a data warehouse, the size of the data warehouse is usually very large, so it requires special design and planning.

directory service – one or more databases that store and manage distribution lists containing information like user identifiers, e-mail addresses, and network component addresses. Directory services are used by many different applications.

disaster recovery – (1) Reactions to a sudden, unplanned event that enable an organization to continue critical business functions until normal business operations resume, such as data center and other critical applications (2) Recovery plans and technology that ensure the continued operation of critical business functions when productivity is threatened by unforeseen circumstances

disk array – two or more hard disks interconnected to increase security, performance, or reliability

distributed computing – computing performed on geographically dispersed platforms connected via a network; also referred to as network computing.

distributed device management – a management approach enabling heterogeneous devices

from different vendors to provide event, fault, and performance data using a common graphical

user interface (GUI), a common set of application program interfaces (APIs), common console

support, and reporting and data aggregation capabilities. Distributed device management
provides a single view of devices included in a heterogeneous distributed computing environment.

distributed infrastructure – a foundation consisting of multiple applications exchanging data
and information across a complex, heterogeneous environment

distributed systems management – the process of remote monitoring and management of
servers, networks, databases, and applications. This process includes performance management, scheduling, access control, help desk support, user account maintenance, and
change management.

distributed transaction – a computer transaction that requires the successful completion of
multiple events on multiple systems before it can be completed. For example, when transferring

money from a savings account to a checking account, the transaction involves both a debit and a

credit. It is imperative that both parts of the transfer occur: (1) the withdrawing of funds from the

savings account, and (2) the deposit into the checking account. All steps in the process must

succeed; otherwise, no steps are allowed to succeed. A distributed transaction processing

monitor ensures completeness of a complex distributed transaction.

DLL (Dynamic Link Library) – a library of shared executable functions that can be dynamically

linked into a Windows application during program execution. The application code contained in a

Dynamic Link Library is not coded and compiled into each application system that uses it.

DNS (domain name system) – the way that Internet domain names are located and translated

into IP (Internet Protocol) addresses. A domain name is a meaningful and easy-to-remember
"handle" for an Internet address. Maintaining a central list of domain name/IP address

correspondences would be impractical; therefore, the lists of domain names and IP addresses
are distributed throughout the Internet in a hierarchy of authority. There is probably a DNS server

within close geographic proximity to your access provider that maps the domain names in your

Internet requests or forwards them to other servers in the Internet.

document management – a technology that provides more control and better management of

computer-generated files. This technology adds enhanced file security, revision control, file

descriptions, extended file names, and user access privileges to the basic file directory

management features of the computer operating system.

domain name system server – software that provides the capability for a long or complicated

TCP/IP network location to be accessed by a generic, short alphabetic name. It is basically a

lookup service. It maps the generic alphabetic DNS name to its complicated TCP/IP location. (For

example, a client can access a database by using the generic name "Summary." The DNS server

accepts "Summary" and translates the address into "\\UX00001\SRV1\DBASE\DATAWAR.FIL".

The client then is able to access the database). If the database location changes, the DNS

configuration is changed, and no changes are needed to each client configuration.

dot-com – any Web site intended for business use and, in some usages, it's a term for any kind

of Web site. The term is based on the .com that forms the last part of the address for most

commercial Web sites. The term is popular in news stories about how the business world is

transforming itself to meet the opportunities and competitive challenges posed by the Internet and

the World Wide Web.
driver – (1) A program (and possibly data files) that contains information needed to run a
particular unit, such as a plotter, printer, port, or mouse (2) A system or device that enables a
functional unit to operate (3) A circuit that increases the signal current for sending data over long

cables or to many other circuits (4) A circuit that sends small electronic signals to a device (5)

Software that interacts with the operating system to control communications equipment and

facilitate the transfer of information to and from the network. Examples include software needed

to support printers, a pointer device, and other hardware.

fat server – a two-tier client/server model for application design in which the business rules are

tightly integrated and deployed with the code that performs data access. A fat server is usually

deployed on a server.

FDDI (Fiber Distributed Data Interface) – a WAN technology for wiring and access control.

FDDI offers operating speeds of 100 megabits per second (Mbps) and is a good choice for a

backbone network solution. FDDI is a standard for data transmission on fiber optic lines in a local

area network that can extend in range up to 200 km (124 miles). The FDDI protocol is based on

the token ring protocol.

In addition to being large geographically, an FDDI local area network can support thousands of

users. An FDDI network contains two token rings, one for possible backup in case the primary

ring fails. The primary ring offers up to 100 Mbps capacity. If the secondary ring is not needed for

backup, it can also carry data, extending capacity to 200 Mbps. The single ring can extend the

maximum distance; a dual ring can extend 100 km (62 miles).

federated data – common data elements that are defined consistently across the enterprise,

even if located in multiple places. It is stored and maintained once whenever possible, accessed

by each system that needs it, and collection, verification, storage, and maintenance are typically

all in one place.

FTP (File Transfer Protocol) – in TCP/IP, an application protocol used for transferring files to

and from host computers. FTP, a standard Internet protocol, is the simplest way to exchange files

between computers on the Internet. Like the Hypertext Transfer Protocol (HTTP), which transfers

displayable Web pages and related files, and the Simple Mail Transfer Protocol (SMTP), which

transfers e-mail, FTP is an application protocol that uses the Internet's TCP/IP protocols.

FTP is commonly used to transfer Web page files from their creator to the computer that acts as

their server for everyone on the Internet. It's also commonly used to download programs and

other files to your computer from other servers. As a user, you can use FTP with a simple

command line interface (for example, from the Windows MS-DOS Prompt window) or with a

commercial program that offers a graphical user interface (GUI). Your Web browser can also

make FTP requests to download programs you select from a Web page.

gateway – (1) A functional unit that interconnects two computer networks with different network

architectures. A bridge interconnects networks or systems with the same or similar architectures.

(2) In TCP/IP, a device used to connect two systems that use either the same or different

communications protocols (3) The combination of machines and programs that provide address

translation, name translation, and systems services control point rerouting between independent

SNA networks to allow those networks to communicate (4) Hardware or software that handles

communication between two dissimilar protocols. In the network for an enterprise, a computer

server acting as a gateway node is often also acting as a proxy server and a firewall server.

Gateways also involve the use of routers and switches.

Gbps – billions of bits per second; a measure of bandwidth on a digital data transmission medium

such as optical fiber. With slower media and protocols, bandwidth may be in the Mbps (millions of

bits or megabits per second) or the Kbps (thousands of bits or kilobits per second) range.

GIF (Graphics Interchange Format) – a file format for images. GIF is commonly used on the

World Wide Web.

gigabyte – a measure of computer data storage capacity and is "roughly" a billion bytes. A

gigabyte is two to the 30th power, or 1,073,741,824 in decimal notation.

glass house – an informal term used to describe mainframe data centers. The glass house term

evolved because of the windows surrounding a data center. People could see inside but needed

special authorization to enter.

gov – "gov" is one of the top-level domain names that can be used when choosing a domain

name. It generally describes the entity owning the domain name as a branch or an agency of the

U.S. Federal government. (Other U.S. government levels are encouraged to use the geographic

top-level domain name of "us.")

Along with the second-level domain name (for example: "whitehouse" in whitehouse.gov), the

top-level domain name is required in Web and e-mail addresses. The Internet Assigned Numbers

Authority (IANA) has overall responsibility for domain names (as well as for IP addresses and

many other Internet parameters). Day-to-day responsibility is delegated to the Internet Registry

(IR) and regional registries. In North America, the domain name registry is InterNIC. Specific

criteria are set forth for the use of the top-level domain name in RFC 1591 - Domain Name

System Structure and Delegation and in InterNIC's Registration Template.

granularity – the relative size, scale, level of detail, or depth of penetration that characterizes an

object or activity. It may help to think of it as: which type of "granule" are we looking at? This term

is used in astronomy, photography, physics, linguistics, and fairly often in information technology.

It can refer to the level of a hierarchy of objects or actions, to the fineness of detail in a

photograph, or to the amount of information that is supplied in describing a person's age.

groupware – software that provides the infrastructure for staff to work collaboratively and share

information electronically, regardless of where they are geographically located

GUI (graphical user interface) – an end-user interface to an application that makes use of

windows, icons, menus, pointers, and scroll bars. A GUI accepts input from a keyboard and a

pointing device, such as a mouse. It takes advantage of the graphical computer environments

and is typically easy to use and understand.

hand-held computer – a computer that can conveniently be stored in a pocket (of sufficient size)

and used while you're holding it. Today's hand-held computers, which are also called personal

digital assistants (PDAs), can be divided into those that accept handwriting as input and those

with small keyboards. Windows CE and EPOC are two of the most widely used operating

systems in hand-held computers.

hard-coded – an informal term that describes a programming technique where logic, data, and

procedures are specifically written into a software program

hardware – (1) All or part of the physical components of an information processing system, such

as computers or peripheral devices (2) Physical devices that are capable of performing automated computing functions

hard-wired – a direct physical connection between computing devices

harvesting – the examination of legacy applications to identify functions that can be isolated into

stand-alone program modules or components. These modules and components can be shared by

many applications.

help desk – an integrated support services structure forming the hub for effectively using and

deploying technology. It is the central collection point for client contact and control of the problem,

change, and service management process.

heterogeneous systems – information systems that contain components and software from
different manufacturers

HIPAA (Health Insurance Portability and Accountability Act) – legislation helping to set a

national standard for protecting the security and integrity of medical records when they are kept in

electronic form

home page – the set of files containing related information coded in Hypertext Markup Language

(HTML) and placed on a computer linked to the Internet and available to users on the Internet via

a Universal Resource Locator (URL) address.
(1) For a Web user, the home page is the first Web page that is displayed after starting a Web
browser like Netscape's Navigator or Microsoft's Internet Explorer. The browser is usually
preset so that the home page is the first page of the browser manufacturer. However, you
can set it to open to any Web site.
(2) For a Web site developer, a home page is the first page presented when a user selects a site
or presence on the World Wide Web. The usual address for a Web site is the home page

address, although you can enter the address (URL) of any page and have that page sent to

you.

ICANN (The Internet Corporation of Assigned Names and Numbers) – ICANN has been

designated to conduct the registrar accreditation process of domain name registration for toplevel

domains (gov, net, com, org). ICANN's responsibility ultimately is derived from the Internet

Assigned Numbers Authority (IANA), which inherited responsibility for Internet root naming and

address assignment from the originator of the Internet, DARPA.

intelligent agent – a program that gathers information or performs some other service without

your immediate presence and on some regular schedule. Typically, an agent program, using

parameters you have provided, searches all or some part of the Internet, gathers information

you're interested in, and presents it to you on a daily or other periodic basis.

An agent is sometimes called a bot (short for robot). Other agents have been developed that

personalize information on a Web site based on registration information and usage analysis.

Other types of agents include specific site watchers that tell you when the site has been updated

or look for other events and analyst agents that not only gather but also organize and interpret

information for you. The practice or technology of having information brought to you by an agent

is sometimes referred to as push technology.

last-mile technology – any telecommunications technology, such as wireless radio, that carries

signals from the broad telecommunication infrastructure along the relatively short distance

(hence, the "last mile") to and from the home or business. Or to put it another way: the

infrastructure at the neighborhood level. In many communities, last-mile technology represents a

major remaining challenge to high-bandwidth applications such as on-demand television, fast

Internet access, and Web pages full of multimedia effects. Today, in addition to "plain old

telephone (dial-up) service," last-mile technologies that deliver voice, data, and TV can include:

ISDN, DSL over existing telephone twisted-pair lines, cable and the cable modem for data (using

the same installed coaxial cable that already is used for television), and wireless, including

services such as DirecTV.

LATA (local access transport area) – a term in the U.S. for a geographic area covered by one

or more local telephone companies, which are legally referred to as local exchange carriers

(LECs). A connection between two local exchanges within the LATA is referred to as intraLATA.

A connection between a carrier in one LATA to a carrier in another LATA is referred to as

interLATA. InterLATA is long-distance service. The current rules for permitting a company to

provide intraLATA or interLATA service (or both) are based on the Telecommunications Act of

1996.

Level 2 Support – a help desk function tier. Level 2 client support provides advanced technical

expertise to the Level 1 client contact points. Their responsibility is to analyze the requests routed

to them and resolve the problems. Resources at this level can be composed of staff specialists

and/or third-party providers/vendors.

Level 3 Support – a help desk function tier. Level 3 client support is composed of highly

specialized technical experts. Calls that cannot be solved at Levels 1 and 2 are routed to this

level. Resources at this level can be composed of staff specialists and/or third-party providers/vendors.

leveraged management of IT – the practice of constructing and coordinating operational and

business functions across organizational and geographic boundaries to provide service and

support for the comprehensive IT environment

list server – a program that handles subscription requests for a mailing list and distributes new

messages, newsletters, or other postings from the list's members to the entire list of subscribers

as they occur or are scheduled. (A list server should not be confused with a mail server, which

handles incoming and outgoing e-mail for Internet users.) Two commonly used list servers are

listserv and Majordomo. Lyris is a list server that is free for users maintaining very small mailing

lists and scales up in price for those managing thousands of mailing list subscribers.

LOB (line of business) – an individual business unit within a larger organization

logical application boundary – a boundary that exists between related application systems

look and feel – the appearance and behavior of a graphical user interface (GUI) to the end user,

determined by the tools and style guide provided by the vendor

loosely coupled – the method of n-tier application development where services and components

are implemented as separate tiers. If a tier changes, it is easy to deploy the change since it does

not affect other tiers.

LPAR (logical partition) – (1) Physical partition that is divided into a greater number of partitions

using software. The number of logical partitions within a logical volume is variable. (2) In the IBM

mainframe operating environment, this is the concept where one physical computer system can

be divided up into multiple mainframe operating environments utilizing software partitioning. This

allows ITS to partition a single physical computer into several different "virtual" computers, which

can be started and stopped separately while sharing the same hardware resources.
machine language – the language that a computer uses to process commands. Machine
languages are built from numbers only and are specific to each computer platform.
mailbox – an electronic storage area that manages e-mail for a particular end user
mainframe – (1) A computer, usually in a computer center, with extensive capabilities and
resources to which other computers may be connected so that they can share facilities **Note:** the

term usually refers to the hardware only: main storage, execution circuitry, and peripheral units.

(2) A large and powerful computer that is capable of supporting thousands of simultaneous users

MAPI (Messaging Application Programming Interface) – a system built into Microsoft

Windows that enables e-mail-style messaging by a variety of Windows applications. It allows
different applications to distribute messages to each other.
marketspace – a new term for the market where electronic commerce is conducted. It encompasses the transition from physically defined markets to markets based on and controlled

by information.

Mbps (millions of bits per second) – a measure of bandwidth (the total information flow over a

given time) on a data transmission medium such as twisted-pair copper cable, coaxial cable, or

optical fiber. Depending on the medium and the transmission method, bandwidth may also be in

the Kbps (thousands of bits or kilobits per second) range or the Gbps (billions of bits or gigabits

per second) range.

megabyte – (1) As a measure of computer processor storage and real and virtual memory, a

megabyte (abbreviated MB) is 2 to the 20^{th} power bytes, or 1,048,576 bytes in decimal notation.

(2) According to the *IBM Dictionary of Computing*, when used to describe disk storage capacity

and transmission rates, a megabyte is 1,000,000 bytes in decimal notation. (3) According to the

Microsoft Press Computer Dictionary, a megabyte means either 1,000,000 bytes or 1,048,576

bytes. (4) According to Eric S. Raymond in *The New Hacker's Dictionary*, a megabyte is always

1,048,576 bytes on the argument that bytes should naturally be computed in powers of two.

message store – a database used to file and manipulate e-mail messages, allowing messages

to be opened, read, deleted, browsed, and searched

migration – the process of moving files from one storage medium to another. An administrator

can set high and low thresholds for hard disk capacity that hierarchical storage management

(HSM) software will use to decide when to migrate older or less-frequently used files to another

medium. Certain file types, such as executable files (programs), can be excluded from those to

be migrated.

MIME (Multipurpose Internet Mail Extensions) – an SMTP message structure that is the
standard specification for the attachment of audio, video, image, and application programs to
plain ASCII text messages

minicomputer – an intermediate-size computer that can perform the same kinds of applications

as a mainframe but has less storage capacity, processing power, and speed than a mainframe

MTA (message transfer agent) – an e-mail delivery program that accepts a message from either

a MUA or another MTA. The message is stored locally while the MTA determines the message's

destination and delivery method.

Open Group, The – an international consortium of computer and software manufacturers and

users dedicated to advancing multi-vendor technologies. The Open Group was formed from two

previously independent groups— the Open Software Foundation (OSF) and X/Open Company

Ltd. The Open Group maintains standards for the Distributed Computing Environment.

open system – a system whose characteristics comply with standards made available
throughout the industry and therefore can be connected to other systems complying with the
same standards

operations – coordination of system and network resources throughout an enterprise in order to

support business processes

operations management – the coordination of system and network resources throughout the enterprise. Its goal is to provide reliable availability for mission critical systems. It includes job scheduling to coordinate jobs and processes in the distributed environment, fault/event management, configuration management, backup and recovery and automated software distribution.

optical storage – system storage that uses a laser optic mechanism for reading and writing data

organizational boundary – the boundary between two agencies or other state and federal organizations

OS (operating system) – software that performs basic functions on a platform, such as accepting input from the keyboard, sending output to a screen, managing files and directories on disks, and controlling other devices such as printers

OSI (Open System Interconnection) – an ISO standard for worldwide communications defining a framework for implementing protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, proceeding to the bottom layer, over the channel to the next station and back up the hierarchy.

OTS (off-the-shelf) – ready-made products that can easily be obtained. The term is sometimes used in military procurement specifications.

outsourcing – an arrangement in which one company provides services for another company that could also be or usually have been provided in-house. Outsourcing is a trend that is becoming more common in information technology and other industries for services that have usually been regarded as intrinsic to managing a business. In some cases, the entire information management of a company is outsourced, including planning and business analysis as well as the installation, management, and servicing of the network and workstations.

PABX (private automatic branch exchange) – an automatic telephone switching system within a private enterprise. Originally, such systems, called private branch exchanges (PBXs), required the use of a live operator. Since almost all private branch exchanges today are automatic, the

abbreviation "PBX" usually implies a "PABX." Some manufacturers of PABX (PBX) systems
distinguish their products from others by creating new kinds of private branch exchanges.

PAC (privilege access certificate) – a mechanism by which an authenticated client establishes
a session with a server, subsystem, or application it wants to access and is permitted or denied
privileges to perform activities that it might attempt

packet – a collection of data that is transmitted as a bundle across a network connection

packet switching – the process of routing and transferring data by means of addressed packets
so that a channel is occupied only during transmission of a packet. On completion of the
transmission, the channel is made available for transfer of other packets.

parallel processing – (1) The concurrent or simultaneous execution of two or more processes in
a single unit (2) Capability to support the additional processing power needed for queries against
very large relational databases

partitioning – to electronically segment or separate the hard drive of a computer or a database
into different sections or components. Partitioning typically is done for performance reasons.

PDA (personal digital assistant) – any small mobile hand-held device that provides computing
and information storage and retrieval capabilities for personal or business use, often for keeping
schedule calendars and address book information handy. The term handheld computer is a
synonym.

PDF (Portable Document Format) – a file format, developed by Adobe Systems, that captures
formatting information from a variety of desktop applications, making it possible to electronically
send formatted documents and have them appear on the recipient's monitor or printer in the
original format.

petabyte – a measure of memory or storage capacity and is 2 to the 50^{th} power bytes or, in
decimal, approximately a thousand terabytes

physical partitioning – an application deployment method where software components of an
application are physically deployed on various platforms. Physical partitioning is independent of
the logical partitioning of an application.

pilot project – a project designed to test a preliminary version of an information processing

system under actual but limited operating conditions and which will then be used to test the
definitive version of the system

PIO (Public Information Officer) – The person in this position handles press releases as well as
any external communication that staff of the agency creates. The PIO is also responsible for
internal communications.

PIM (personal information manager) – software application akin to an appointment book that
enables the user to organize personal information

PKI (public key infrastructure) – enables users of a basically unsecure public network— such as
the Internet— to securely and privately exchange data and money through the use of a public and
a private cryptographic key pair that is obtained and shared through a trusted authority. The
public key infrastructure provides for digital certificates that can identify individuals or
organizations and directory services that can store and, when necessary, revoke them.

A public key infrastructure consists of: a certificate authority (CA) that issues and verifies digital
certificates; a registration authority (RA) that acts as the verifier for the certificate authority before
a digital certificate is issued to a requestor; one or more directories where the certificates (with
their public keys) are held (usually in an ITU X.500 standard directory); and a certificate
management system.

platform – a combination of computer hardware and operating system software

platform-independent languages – high-level computer programming languages that can
compile and execute programs that can be deployed on multiple platforms

PPTP (Point-to-Point Tunneling Protocol) – a protocol (set of communication rules) that allows
corporations to extend their own corporate network through private "tunnels" over the public
Internet. Effectively, a corporation uses a wide-area network (WAN) as a single large local area
network. A company no longer needs to lease its own lines for wide-area communication but can
securely use the public networks. This kind of interconnection is known as a virtual private
network (VPN).

point-to-point – pertaining to data transmission between two locations without the use of any
intermediate display station or computer

policy-based networking – the management of a network so that various kinds of traffic— data,
voice, and video— get the priority of availability and bandwidth needed to serve the network's
users effectively. Using policy statements, network administrators can specify which kinds of
service to give priority at what times of day on what parts of their Internet Protocol (IP)-based
network. This kind of management is often known as Quality of Service (QoS) and is controlled
using policy-based network software.
process – (1) A standardized method of performing work that is broken down into specific or
detailed tasks (2) An instance of a software program during execution
process-oriented – an adjective describing software or services that are adapted to the
processes needed to complete a business function
project management – the formalized process of managing a large project, typically
accomplished with the assistance of project management application software. IRM and the
Enterprise Project Management Office are examples of groups that practice project management.
proprietary – an adjective that applies to a design or technique owned by a company which has
not divulged specifications that would allow other companies to duplicate the product or to allow
other software programs to interface with it

reuse methodology – a consistent method for using componentware in a service-oriented

architecture. The reuse methodology includes establishing an inventory, catalog, design

standards, principles, quality assurance, and performance incentives.

RFI (request for information) – less formal version of RFP

RFP (request for proposal) – request to a vendor soliciting a proposal for services, hardware,

software, or systems integration

ring topology – a network LAN infrastructure in which all network-connected devices are

connected to one another in the shape of a closed loop. Each device is connected directly to two

other devices, one on each side.

scalability – (1) The capability for a software application to provide support to more users or a

higher volume of transactions or data than the application was originally deployed to support (2)

The ability to quickly meet demands for increased performance: processing power, network

connectivity, or data storage. In information technology, scalability seems to have two uses.

(A) It is the ability of a computer application or product (hardware or software) to continue to

function well as it (or its context) is changed in size or volume in order to meet a user need.
Typically, the rescaling is to a larger size or volume. The rescaling can be of the product itself
(for example, a line of computer systems of different sizes in terms of storage, RAM, and so
forth) or in the scalable object's movement to a new context (for example, a new operating
system).
(B) It is the ability not only to function well in the rescaled situation, but also to actually take full
advantage of it. For example, an application program would be scalable if it could be moved

from a smaller to a larger operating system and take full advantage of the larger operating

system in terms of performance (user response time and so forth) and the larger number of

users that could be handled. It is usually easier to have scalability upward rather than

downward since developers often must make full use of a system's resources (for example,

the amount of disk storage available) when an application is initially coded. Scaling a product

downward may mean having to achieve the same results in a more constrained environment.

scheduling and calendaring – a technology that provides, by combining with an organization's

overall groupware system(s), a methodology for coordination and communications of individual

and group activities and plans

security – protection of the physical, intellectual, and electronic assets of an enterprise, including

its security policies, network access controls, virus protection, network administration, and

workstation security

security services – risk assessment and protection of the physical, intellectual, and electronic

assets of an enterprise, including security policies, network access, virus protection, firewalls,

NOS administration and workstation security

SEI (Software Engineering Institute) – founded by the U.S. Department of Defense to advance

the practice of software engineering

server – (1) A functional unit that provides shared services to workstations over a network, for
example, a file server, a print server, a mail server (2) In TCP/IP, a system in a network that
handles the requests of a system at another site, called a client/server (3) Software that provides

functionality that can be requested by other software (4) A platform on which software executes.

Server hardware is often referred to by the type of software that executes on it, such as
"application server" or "database server," or by the operating system that it executes, such as
"HP server" or "Novell Server."

service – (1) Functionality that can be requested by a software component (2) A software
component that provides functionality that can be requested by other software

service broker – a generic middleware interface for application communication. Common
middleware services are combined together and a single API is provided to meet inter-application

communication needs.

service-oriented – an adjective describing software or services that are adapted to provide a
service

SGML (Standard Generalized Markup Language) – international standard way of identifying

the basic structural elements of a text document. SGML addresses only the structure of a

document, not its format or presentation.

storage management – a set of policies and operational procedures required to maintain disk,

tape, and optical storage media

store and forward – a messaging technique where messages are stored in a message queue

and forwarded to a software service as needed. Store and forward messaging is similar to doing

business through voice mail. The voice mailbox is the queue. Incoming calls are retrieved when it

is convenient, they are prioritized, and calls are returned at a convenient time.

stovepiped – generally refers to components that have poor integration capabilities

summary data – high-level data representing a summary of detailed data, such as totals, yearto-

date information, etc.

support services – a classification for the operating system components of a service-oriented

architecture, such as printing, faxing, and imaging

synchronous processing – a method of communication that requires an immediate response

before the requester can continue processing

tunneling – Relative to the Internet, tunneling is using the Internet as part of a private secure

network. The "tunnel" is the particular path that a given message or file might travel through the

Internet. A protocol or set of communication rules called Point-to-Point Tunneling Protocol (PPTP)

has been proposed that would make it possible to create a virtual private network (VPN) through

"tunnels" over the Internet. This would mean that companies would no longer need their own
leased lines for wide-area communication but could securely use the public networks.
two-tier – a client/server application in which the code that implements the business rules is
monolithic and is tightly coupled to either the code that implements the user interface or to the
code that implements data access
UI (user interface) – a manner of presentation allowing applications to communicate with people.

User interfaces include graphical user interfaces (GUIs), terminal or character-based interfaces,

VRUs, and credit card readers.

UPS (uninterruptible power supply) – a device that allows your computer to keep running for at

least a short time when the primary power source is lost. It also provides protection from power

surges. A UPS contains a battery that "kicks in" when the device senses a loss of power from the

primary source. If you are using the computer when the UPS notifies you of the power loss, you

have time to save any data you are working on and exit gracefully before the secondary power

source (the battery) runs out. When all power runs out, any data in your computer's random

access memory (RAM) is erased. When power surges occur, a UPS intercepts the surge so that

it doesn't damage your computer. Software is available that automatically backs up (saves) any

data that is being worked on when nthe UPS becomes activated.

URL (Uniform Resource Locator) – a URL is the address of a file (resource) accessible on the

Internet. The type of resource depends on the Internet application protocol. Using the World Wide

Web's protocol, the Hypertext Transfer Protocol (HTTP), the resource can be an HTML page, an

image file, a program such as a CGI application or Java applet, or any other file supported by

HTTP. The URL contains the name of the protocol required to access the resource, a domain

name that identifies a specific computer on the Internet, and a hierarchical description of a file

location on the computer. An example of an URL is: http://www.its.state.nc.us.

user – an active participant, person, or thing using a computer, computer program, or services of

an enterprise

user authentication – application security code that requires both a user name and password to

ensure that a user requesting access to a secured system or application is an authorized user

user authorization – a security feature that identifies specific end users, by user ID, as having

the authority to use or access an application or system

user interface – a manner of presentation allowing applications to communicate with people.

User interfaces include graphical user interfaces (GUIs), terminal or character-based interfaces,

voice recognition units (VRUs), and credit card readers

VAN (virtual area network) – a network on which users are enabled to share a more visual

sense of community through high bandwidth connections. As conceived by PennWell Media

Online, a virtual area network is something like a metropolitan area network (MAN) or extended

local area network (LAN) in which all users can meet over high-bandwidth connections, enabling

"face-to-face" online "coffeehouses," remote medical diagnosis and legal consultation, and online

corporate or extra-corporate workgroups, focus groups, and conferences.

A VAN requires multi-megabyte data flow and can be implemented through the use of ADSL but

more likely through the installation of cable modems. Since the high-bandwidth connections imply

a common infrastructure, the first VANs are likely to be local or regional. However, a VAN can

also be national or international in geographic scope, assuming all users share similar

capabilities.

Vantive – the customer support system software used by ITS

vCalendar – an industry standard format for exchanging scheduling and activity-recording

information electronically. If someone sends you their week's schedule in a vCalendar attachment

to an e-mail note, you can drag-and drop it (or otherwise move it) to a personal information

manager (PIM) type of application program and integrate with or relate it to your own schedule.

vCalendar was developed along with the vCard electronic business card specification.

vCard – an electronic business (or personal) card and also the name of an industry specification

for the kind of communication exchange that is done on business or personal cards. You may

have seen a vCard attached to an e-mail note someone has sent you. Because vCard is a

published industry specification, software application developers can create programs that

process vCards by letting you view them, or drag-and-drop them to an address book or some

other application. vCards can include images and sound as well as text.

VDC (virtual data center) – a concept encouraging the development of standard network
configurations that are deployed locally but managed centrally. A VDC allows central management of multiple instances of network configurations at remote sites and behaves as if

they were on the same data center floor.
version control – the process of controlling, maintaining, and documenting maintenance and
updates to computer software programs
vertical market – a particular industry or group of enterprises in which similar products or
services are developed and marketed using similar methods (and to whom goods and services

can be sold). Broad examples of vertical markets are insurance, real estate, banking, heavy

manufacturing, retail, transportation, hospitals, and government.

vertical market software – software aimed at a particular vertical market. It can be contrasted

with horizontal market software (such as word processors and spreadsheet programs) that can

be used in a cross-section of industries.

video conferencing – a meeting that has active participants who are at geographically dispersed

locations. Communication occurs through online audio and video technology.

VIM (vendor independent messaging) – an application program interface (API) developed by

Lotus Development Corporation that provides cross-platform support for e-mail applications
VLDB (very large database) – a database that contains 50 million rows or more. A VLDB
requires special handling in order to maintain an acceptable level of performance.
voice mail – the use of computers to alert recipients that recorded telephone messages are
waiting
VPN (virtual private network) – a private data network that makes use of the public
telecommunication infrastructure, maintaining privacy through the use of a tunneling protocol and

security procedures. A virtual private network can be contrasted with a system of owned or

leased lines that can only be used by one company. The idea of the VPN is to give the company

the same capabilities at much lower cost by using the shared public infrastructure rather than a

private one. Phone companies have provided secure shared resources for voice messages. A

virtual private network makes it possible to have the same secure sharing of public resources for

data. Companies today are looking at using a private virtual network for both extranets and widearea

intranets.

VRU (voice response units) – an interface that allows users to communicate with an application

via a telephone

Web browser – a software application used to locate and display Web pages from Web sites on

the Internet

Web hosting – also known as Web site hosting; the business of housing, serving, and maintaining files for one or more Web sites

Web page – an electronic document stored in HTML format that is accessible through a Web site

Web site – an electronic collection of Web pages accessible through an intranet in an

organization or through the Internet on the World Wide Web. The initial connection to a Web site

is through a home page. The Web site may contain links to other Web pages or sites.

white paper – an article that states an organization's position or philosophy about a social,

political, or other subject, or a not-too-detailed technical explanation of an architecture,

framework, or product technology. Typically, a white paper explains the results, conclusions, or

construction resulting from some organized committee or research collaboration or design and

development effort.

In information technology, a white paper is often a paper written by a lead product designer to

explain the philosophy and operation of a product in a marketplace or technology context. Many,

if not most, Web sites for software products include a white paper in addition to a frequently

asked questions (FAQ) page and more detailed product specifications.

In government, a white paper is often a policy or position paper. The U.S. Government's June

1998 policy statement on the Management of Internet Names and Addresses (known generally

as "The White Paper") is an example of great interest to many Internet users.

wireless – Wireless refers to a communications, monitoring, or control system in which

electromagnetic or acoustic waves carry a signal through atmospheric space rather than along a

wire. In most wireless systems, radio frequency (RF) or infrared (IR) waves are used. Some

monitoring devices, such as intrusion alarms, employ acoustic waves at frequencies above the

range of human hearing.

wireless LAN – New high-bandwidth allocation for wireless LANs will make possible a relatively

low-cost wiring of classrooms in the United States. A similar frequency allocation has been made

in Europe. With a wireless LAN, a mobile user can connect to a local area network (LAN) through

a radio connection.

X.500 Directory Service – the ISO/CCITT directory service protocol standard. X.500 Directory

Service is a standard way to develop an electronic directory of people in an organization so that it

can be part of a global directory available to anyone in the world with Internet access. Such a
directory is sometimes called a global White Pages directory. The idea is to be able to look up
people in a user-friendly way by name, department, or organization. Many enterprises and
institutions have created an X.500 directory. Because these directories are organized as part of a

single global directory, you can search for hundreds of thousands of people from a single place

on the World Wide Web.

The X.500 directory is organized under a common "root" directory in a "tree" hierarchy of:

country, organization, organizational unit, and person. An entry at each of these levels must have

certain attributes; some can have optional ones established locally. Each organization can

implement a directory in its own way as long as it adheres to the basic schema or plan. The

distributed global directory works through a registration process and one or more central places

that manage many directories. Providing an X.500 directory allows an organization to make it and

selected members known on the Internet.

XHTML (Extensible Hypertext Markup Language) – a reformulation of HTML 4 as an

application of the Extensible Markup Language (XML). For readers unacquainted with either term,

HTML is the set of codes (that's the "markup language") that a writer puts into a document to

make it displayable on the World Wide Web. HTML 4 is the current version of it.

XML is a structured set of rules for how one might define any kind of data to be shared on the

Web. It's called an "extensible" markup language because anyone can invent a particular set of

markup for a particular purpose. As long as everyone uses it (the writer and an application

program at the receiver's end), it can be adapted and used for many purposes—including

describing the appearance of a Web page. That being the case, it seemed desirable to reframe

HTML in terms of XML. The result is XHTML, a particular application of XML for "expressing"

Web pages.

APPENDIX I

TEXTS

liv. Text 1:

The difference between the Linux philosophy to server setup and administration vs. the Windows philosophy to setup and administration is, as stated earlier, perhaps the most critical differentiating factor between the two operating systems.

Windows encourages you to use the familiar interface, which means administering Windows Server 2003 at the server itself. Linux does not rely on or encourage local use of a graphical interface, in part because it is an unnecessary waste of resources to run a graphical desktop at the server, and in part because it increases security risks at the server. For example, any server that encourages you to use the graphical interface at the server machine also invites you to perform similar operations, such as use the browser at the server. This exposes that server to any browser security holes. Any server that encourages you to administer it remotely removes this risk.

If you administer a Linux server remotely from a desktop user account, a browser flaw exposes only the remote desktop user account to security holes, not the server. This is why a browser security hole in Windows Server 2003 is potentially more serious than a browser security hole in Red Hat Enterprise Server AS.

lv. Text 2:

Many of economists, experts & futurists believe that an evolution similar to industrial evolution has been occurred recently which has entered the world to the information age and has exposed or has come over many aspects of economic, social & cultural of man's life to profound changes. One of dimensions of this change is the profound changes that have been occurred in the economic relationship between people, companies & government.

Commercial exchanges between people with each other, companies with each other and people with companies and government have been exited rapidly from their conventional forms which are mainly on the base of paper documents and are moving to exchanges through enjoyment from systems on the base of electronic information.

Electronic learning contains all learning which is accomplished through Internet or computer and are related to the use of computer & technologies related to network with the aim of presentation management & support of learning which usually are performed independent of particular time and place.

E-learning apply to presentation of complete lessons which in that all aspects of learning from student participation to teacher activities are accomplished online. Universities which presented hosted learning services in fact present a particular system for electronic learning.

Some companies which are doing on the base of electronic learning are reckoned as new type of institution which hopes to create a learning atmosphere based on present e-commerce.

lvi. Text 3:

In modern world is base in life to use high-speed resources and cheep education has been very involvements of human being from many years ago so cooperation in this case has caused advancement in different sciences. In that days publication of books and distribution of it was very difficult and slow movement and it caused to slow development of sciences after simplification of this term growing of science got very high tend in last two/tree decades human's life made fast way to exchange information and if was background to development science and knowledge.

With globalizing this information via internet nowadays, every person can get every kind of info by paying low money. With this background and infrastructure in modern world, education has been simple affair, and by considering that info resources has very effective role in this way, matter of digital library has got special importance. In this article has been discussed about main and sub-base need to create a digital library.

lvii. Text 4:

Technologist Bill Joy recommended that we think not of one worldwide web, but of six different webs, developing at different rates and offering distinct capabilities. To gauge the potential impact of the digital nervous system of computers, communications and sensors, let’s consider how it influences each of these six webs. The *Near Web*, according to Joy, is the traditional web we experience when sitting in front of a computer monitor and taping on the keyboard. The *Here Web* is the mobile web that we carry with us wherever we go in the form of mobile phones, pagers or Personal Digital Assistants. The wealth of sensory data flowing in from the digital nervous system will be available in real-time to users of the Near and Here Webs. This will have profound impacts not only for scientific and industrial research but also for consumer applications.

The *Far Web* is the entertainment web that we access from afar using the remote control from the comfort of the couch. At the moment, the lack of infrastructure for broadband transmission to the home limits the Far Web to various kinds of audio/video entertainment and information. Joy, however, believes that the *Far Web* will expand to include virtual worlds with a high degree of interactivity and user participation enabled by new sensory and actuarial devices. In other words, users will soon be plugging themselves into some aspect of the digital nervous system in order to enjoy new forms of entertainment and simulated adventure.

The *Voice Web* is the realm of speech recognition and voice activation. It consists of all those devices that we can control with verbal commands or that can communicate with us via the spoken word. As devices become more and more capable of sensing and interacting with the environment via built-in digital nervous systems, the voice commands we can give them and the messages they send us will become more diverse and sophisticated.

lviii. Text 5:

Like a human being a company needs an internal communication system, a “nervous system” to organize its actions. All businesses concentrate on a few basic things, customers, products and services, costs, competitors, delivery and employees. A

company has to carry out the business processes in each area and make sure that they are working together, especially activities that cross departments.

An organization nervous system has parallels with our human nervous system. Every business has some processes that must continue for the company to survive, just as human heart must keep beating. A digital nervous system serves two primary purposes in developing business understandings. It extends the individual's capacity for analysis the way machines extend physical capacities, and it combines the abilities of individuals to create an company intelligence and act as one. To put it all together: a digital nervous system seeks to create company excellence out of individual excellence to serve the customer.

A digital nervous system gives is users an understanding and an ability to learn things that they would not otherwise have. To begin creating a digital nervous system, you should fist develop an ideal picture of the information you need to run your business and to understand your markets and your competitors. Think hard about the facts you need to know. Develop a list of the most important questions for your business. Then demand that your information systems provide the answers. If your current system won't do this, you need to develop one that will. If you don't, one or more of your competitors will.

Text 6:

Like a living creature, an organization will have the most output if it has a nervous system which can send the information very quickly to the parts that need. A digital nervous system can create a unity among the systems and processes of an organization by making flowers of information and letting the trading and business parts promote quickly in being more efficient and profitable. The information flow is the most vital part of your company, for enables you to get the most output of your employees and learn your customers something.

A digital nervous system provides the opportunity for ideas and innovations to move quickly come to the surface. Businesses should perform another sort of activities informative activities. This sort of activity was first proposed by Michael Erotizes. What we call information usually is a letter, picture or an economic report which is fixed and does not change. But Erotizes believes another kind of information is active. Informative activity actually is information processing by human brain or computer programs. We should put aside with idea that gaining and transferring information is difficult and expensive.

You should make your companies' information available for those who can use. Providing accurate, precise and useful information for the company directors is one of the characteristics of a good digital nervous system. They need accurate and useful data for those are the ones who are in charge to lead the company and they should not wait for higher authorities to receive information. Up to these days there was no direct path for McDonald Company to receive the selling data. Nowadays McDonald use an information system which can immediately process selling information in all its' restaurant. The restaurant manager is aware of whatever is sold, so he faces facts to investigate his selling's not supposed information.

Another characteristic of a good digital nervous system is the number of the useful ideas and suggestions which are offered by it's mid directors and counselors. When people analyze accurate and real data, they can suggest ideas in detail of how to do the works better and this makes them excited.

Text 7:

Today's universities are faced with a main transformation: From one side, budget deficiency and increasing number of students causes the university a fundamental change, to adopt themselves to the newly conditions. From the other side, there is a possibility that the advanced technology be replaced with the job of some of the teachers and change the universities to institutes which have the virtual nature. Universities are the organizations which show the most resistance against changes. These changes which usually occur unwanted result in formation of new facts.

Computer communication technology has the ability of providing the possibility of learning without time limitation proportional to the student's time, abilities, and needs. This method, compare to the current usual teaching method which ignores the student's needs and places a group in a specific time and place, is a fundamental way. From the other side, there is a possibility that computer communication technology affects the social structure in educational organizations and minimizes physical attendance.

Text 8:

This technology connects many users at the same time and requires further research and adaptations. Issues such as: advancing internet and using World Wide Web in all aspects of every day life, is the most important success in these years. One of its uses is to transfer information and educate from a distance and introducing virtual university. Possible examinations and evaluations of students is one of the essential elements in the education system. In recent years, there are different possible ways to examine through internet. These ways include from post electronic to auto evaluating exams and grading.

More about these kinds of evaluation through internet will be explored by Y University's project. In this project, student can connect to World Wide Web in his or her free time and after entering the student ID and password, take his or her exam. In this project, cumulative questions can be written by the professors. Also, there is time limit for exams and professors can set the maximum allowed time to answer questions. This project is written in visual basic environment and used CGI programming. To store student's information and question banks, SQL is being used.

Text 9:

XML builders are companies like IBM and Microsoft that designed it to build business software. For example the Gartner group, that product XML software, could give %70 of online business and dealing in 2001. XML with wireless application protocol (WAP) could represent advance ways to wireless tools expansion and usage in e-commerce connection in world.

Most of companies that with this way seal business information, write this data with XSI that wireless tools can use them. Most of companies try to use voice to work with this data form different ways. Motorola is one of big company in voice diagnosis language technology.

This technology is called VoXML and let user to search in web site with usage of voice processor in network and can receive information via saying or saying-writing. The saying-writing technology is access via Bevocal and Quack**.** com and lets to business site use limited from this way to represent their product. Usage of voice

technology makes e-commerce user encourage using saying search as a sample is dealing goods in Internet conference that this make network crowed. For example this way can help an employee to give complete information about seal's goods to customers. One of these methods is Customer Relationship Management (CRM). This relationship is possible by phone connection in network. Big companies have been using originality ways to expansion user data access via labor and wireless tools like mobile in connection CRM, like Sieble system.

WAP in trade representation of e-commerce, via y do security services in Internet, first is credit management (AH) that check information trusty and credit and second is Extra Sensory Perception (ESP) or security via protection with capsule that can protect credit and secret information both.

Text 10:

HTML success is become of simplicity, easily usage and height capacity for ignore errors. In this language upper and lower cases are same. Usage of end tags is not important and briefly, simplicity of this language makes it universality, but simplicity of HTML limits its powers. Because HTML's tags are formatted, they don't present so much information about web page's contain. For this reason renewed usage from information in other case is difficult Because HTML is not severe about lower and upper cases and dotting. To represent data, Browsers must been worked double.

Whereas HTML limits to dynamic and formatting concepts, affixes and suffixes are use to increasing its efficient. But, unfortunately, some Browsers don't support this suffixes and therefore pages that use this suffixes can be only observed by some user that have special Browsers.

XML is convenience reply to easy, but limited HTML. In the first look, XML is similar to HTML with the same tags and specialty and values.

But XML isn't only for web pages design, it is more over than it, it is a language to create others. You can use XML to create your special Markup Language and for forming and formatting your documents. A special Markup Language that in term called an application XML program, contain tags that explain its data. Now look at the XML power, if a tag defines a data, other works would possible to use that. Software with XML can design such only work with its information.

Instead of have been astringe in a HTML web page, the label information can be used times in necessary, but for every point, must be paid cost. XML is not as easy as HTML. And to work easy we need to XML compiler (program that read and translate independent or in a Browser) for a complete notice to upper and lower cases, (“”), end tags and other details that HTML user easily ignore them. However, this severely and pernickety characteristic maybe make to be imagined that it prevent XML be general to design personal web pages. But the special power of it lets web page designer managed data in large scale.

Text 11:

One of the primary missions of the MIT Center for e-Business is to conduct research on all aspects of e-Business. The unique core of our program is the custom matching of sponsor companies with MIT faculty to form research teams that address issues that are relevant to both industry and academia. This approach to applying rigorous research methodologies to solve some of industry's most relevant questions creates

generalizable knowledge that is valuable not only to the specific company involved, but to all our understandings of how to use digital technologies most effectively.

The result is a dedicated project mutually agreed to between a particular Founding or Research Sponsor and one or more members of the MIT Faculty. These projects involve active participation from the Sponsor. For example, British Telecom's senior management is working directly with MIT Faculty to select the best strategy for their e-Business organizational transformation. Other projects are addressing key issues at companies such as UPS, General Motors, Amazon and Intel Corporation.

The knowledge created through this research process is then disseminated through a variety of means, including daylong workshops; a 2-day annual sponsors conference, bi-weekly lunch seminars, site visits, and working papers, research briefs, newsletters and other publications.

Text 12:

The Communications Futures Program (CFP) is a partnership between university and industry at the forefront of defining the roadmap for communications and its impact on adjacent industries. CFP's mission is to help our industry partners recognize the opportunities and threats from these changes by understanding the drivers and pace of change, building technologies that create discontinuous innovation and building the enablers for such innovation to be meaningful to our partners.

The Communications industry is witnessing emerging and destabilizing events where an industry structure built around centralized intelligence and control is being challenged with intelligence and control in many instances shifting to end users and vice versa. Just as the Internet, the PC wave and Digitization of Multi-media were transforming events, this trend in communications is likely to have an even greater impact on industry. An example of this trend is VoIP, where control over a centralized switching application is moving to the edge of the network. In what ways will shifting control between the edge of the network and vice versa, play out?

CFP believes that while the role of technology in industry transformation is important, equally important business drivers in the communications industry can accelerate or slow this process. Drivers include widespread availability of broadband infrastructure, role of regulation, role for enabling capabilities such as privacy and security, and effective business models and rights management for companies to profit from. Other drivers include alignment across the communications value chain for speedy rollout of new services.

Text 13:

Businesses have become increasingly global and interdependent - the traditional enterprise has become the "extended enterprise." Disruptions anywhere in this "extended enterprise" can have dramatic and often unexpected impacts upon all the organizations involved. In recent years, acts of terrorism have introduced new and dangerous disruptions to business and society. Although we often think of national security from a governmental and military perspective, businesses play an extremely important role since much of a nation's infrastructure is run by the private sector.

This SIG will perform research, develop courseware (including case study materials), and facilitate discussions amongst academia, governments, and business on these important topics. Several current sponsors have provided seed funds for this

new area of research, and we seek relationships with other organizations to further develop both thought leadership and practical strategies around security of the extended enterprise.

Text 14:

While the term e-commerce refers to all online transactions, B2C stands for "business-to-consumer" and applies to any business or organization that sells its products or services to consumers over the Internet for its own use. When most people think of B2C e-commerce, they think of Amazon.com, the online bookseller that launched its site in 1995 and quickly took on the nation's major retailers. In addition to online retailers, B2C has grown to include services such as online banking, travel services, online auctions, health information and real estate sites. Peer-to-peer sites such as Craig list also fall under the B2C category.

B2C e-commerce went through some tough times, particularly after the technology-heavy NASDAQ crumbled in 2000. In the ensuing dotcom carnage, hundreds of e-commerce sites shut their virtual doors and some experts predicted years of struggle for online retail ventures. Since then, however, shoppers have continued to flock to the web in increasing numbers.

In fact, North American consumers love e-commerce so much that despite growing fears about identity theft, they spent $172 billion shopping online in 2005, up from $38.8 billion in 2000. And the future looks rosy for e-commerce. By 2010, consumers are expected to spend $329 billion each year online, according to Forrester Research. What's more, the percentage of U.S. households shopping online is expected to grow from 39 percent this year to 48 percent in 2010.

For a long time, however, companies have had a hard time making their websites dynamic and engaging enough for consumers to want to spend time on the site and actually spend their money there. That's getting easier as more and more Americans are connecting to the Internet via broadband. With more customers using broadband, companies can take greater advantage of newer, flashier technologies that were not possible with dialup connections.

In short, although online commerce still represents less than six percent of all retail sales, its growth and future prospects show that it has finally become as established and mainstream as a trip to the local mall.

Text 15:

Mainly because the stock prices of some of the early pure plays went through the roof. In the late 90s, dotcoms like Amazon.com and eBay - which were quickly gaining in size and market capitalization - posed a threat to traditional brick and mortar businesses. In many ways, these dotcoms seemed to be rewriting the rules of business - they had the customers without the expenses of maintaining physical stores, little inventory, unlimited access to capital and little concern about actual earnings. The idea was to get big fast and worry about profits later. By late 1999, Amazon had a market capitalization of close to $25 billion, eclipsing some of the largest and most established companies in America.

Retail giants such as Kmart and Wal-Mart - hoping to cash in on the dotcom frenzy - spun off separate companies to run their e-commerce operations. But many never made it to the initial public offering after the Nasdaq started to tumble in the spring of

2000. Almost as quickly as the dotcom phenomenon took over, the hype over B2C e-commerce dissipated along with the crumbling Nasdaq. Funding for Internet ventures started to dry up and major companies started to reel in their spinoffs, bringing e-commerce initiatives back under the corporate fold.

Companies that spun off their e-commerce operations as separate businesses were at a disadvantage when "multi-channel" commerce became popular in 2002. Those that kept their web operations in house, such as Sears, Office Depot and Circuit City, had a much easier time integrating their web sites with the rest of their brick and mortar operations and systems.

These companies were able, for example, to check local-store inventory via the web and could allow their customers to buy online and pick up and return at a store. Multi-channel commerce continues to be an important initiative today.

Amazon and eBay still dominate online retailing. But the fastest growing sites are now traditional merchants that have become more serious about their Internet operations. According to the research firm ComScore networks, traditional retailers had a surprisingly strong showing over the 2005 holiday season. In fact, Wal-Mart was the third most popular site, trailing Amazon and eBay, COM Score said. Target, Best Buy and Circuit City were close behind.

Text 16:

The world's leading expert on the global software industry and coauthor of the bestseller Microsoft Secrets reveals the inner workings of software giants like IBM, Microsoft, and Netscape and shows what it takes to create, develop, and manage a successful company - in good times and bad—in the most fiercely competitive business in the world.

In the $600 billion software industry it is the business, not the technology, that determines success or failure. This fact - one that thousands of once glamorous start-ups have unhappily discovered for themselves - is the well-documented conclusion of this enormously readable and revealing new book by Michael Cushman, based on nearly twenty years of research and consulting with software producers around the world.

Cushman builds on dozens of personal experiences and case studies to show how issues of strategy and organization are irrevocably linked with those of managing the technology and demonstrates that a thorough understanding of these issues is vital to success. At the heart of the book Cushman poses seven questions that underpin a three-pronged management framework. He argues that companies must adopt one of three basic business models: become a products company at one end of the strategic spectrum, a services company at the other end, or a hybrid solutions company in between.

The author describes the characteristics of the different models, evaluates their strengths and weaknesses, and shows how each is more or less appropriate for different stages in the evolution of a business as well as in good versus bad economic times. Readers will also find invaluable Cushman's treatment of software development issues ranging from architecture and teams to project management and testing, as well as two chapters devoted to what it takes to create a successful software start-up. Highlights include eight fundamental guidelines for evaluating potential

software winners and Cusumano's probing analysis, based on firsthand knowledge, of ten start-ups that have met with varying degrees of success.

Text 17:

Public exchanges are owned by industry consortia or independent investors and have their own boards of directors. Though each exchange sets its own rules, they are generally open, for a fee, to any company that wants to use them. Private exchanges are run by a single company for doing business exclusively with established suppliers and customers (although the systems that support it may be outsourced).

Which one your company uses depends on what you want to do. If you are buying and selling commodity products, public exchanges can be a good venue in which to find low prices or identify new customers. They're also becoming a popular way for a company to unload excess inventory. In some industries, however, suppliers have been reluctant to use public exchanges because they fear buyers will aggregate their purchases and force prices too low, squeezing their profit margins. Common types of transactions on public exchanges include purchasing through requests for quotations, buying through catalogs and auctions.

Companies that use private exchanges prefer them for the closer online relationships they can have with preferred customers and suppliers. They also think private exchanges are more secure, because data about their trades are at less risk of being exposed to competitors if there's a security breach. Companies use private exchanges to trade proprietary information like supplier performance metrics and sales forecasts in addition to orders and invoices. Companies also use private exchanges to establish central control over purchasing through contracts with established suppliers.

Text 18:

Start with buying so-called indirect supplies like pencils, chairs and copy paper. Most companies start here because it's easier to set up an online catalog of approved office supplies than it is to automate procurement of specially engineered parts and materials. Plus, you're not affecting day-to-day operations while you get your feet wet. While the payoff won't be as big as for more mission-critical purchases (so-called direct materials used to produce the goods or services you sell), it can be significant. The Burlington Northern Santa Fe railroad company lopped an estimated 3 percent to 28 percent off its indirect purchases and saved money internally by automating a manual process for approving purchase orders.

On the sales side, take your cues from your customers. Start with a project that makes it easier for them to do business with you or one that reduces your cost of sales and service. Greensboro, N.C.-based clothing manufacturer Vanity Fair and Delray Beach, Fla.-based office supply vendor Office Depot each built their online purchasing sites because customers asked for them.

Text 19:

It's marketing speak for integrating your supply chain, and it's a vision of e-commerce nirvana. You're not just sharing blueprints or your latest sales forecasts; you and your trading partners are giving each other real-time access to your ERP, product design, inventory and other systems. Companies that are doing it say it helps them get new

products to market faster, reduce manufacturing time, keep inventory low and adjust more quickly to changes in customer demand.

To collaborate successfully, you and your partners each need up-to-date, functioning systems to serve up whatever data you plan to share, and a way to deliver that information electronically. That can be a big hurdle when many companies still do a lot of business by phone and fax. The Goldman Industrial Group, a Boston-based manufacturer of machine tools for the automobile industry, has found it tough to convince its partners to invest in system upgrades needed for collaboration. There's cultural resistance as well.

Not every company sees the value of sharing what has been confidential information or trusts its partners with it. Some also fear online collaboration might result in layoffs.

Text 20:

Definitely the units that do purchasing, B2B e-commerce can drastically change how buyers do their jobs, especially if your company is one that still places orders the old fashioned way. Sales and customer service departments will need to be involved with projects that affect how you receive and process orders from customers. And don't forget the folks who manage your inventory. You may need to get other departments involved, too, depending on the functionality you're building.

Also involve your suppliers, distributors and customers, and make sure there's something in the project for them. B2B e-commerce doesn't only change how you do business internally, your partners have to change too. And unless you're the 900-pound gorilla in your industry-and sometimes even if you are-you can't force everyone to do things your way.

Text 21:

Exactly what you need depends on whether you're a buyer or seller, whether you're dealing in indirect or direct materials and the extent to which you're integrating your supply chain. Elements of a B2B system may include software for generating purchase orders or requests for quotations (RFQs), processing invoices, building and managing catalogs, responding to RFQs and processing orders. Depending on what you're trading and how, you'll want to look for specific features that support your needs. Some of these are online negotiation capabilities, dynamic pricing software, support for international transactions and the ability to generate and process bills of materials. To get the full benefits of B2B e-commerce, you'll need integration tools to connect these systems with forecasting and planning systems, inventory management, CRM, ERP, logistics and other applications you use for supply chain management and customer service.

Cost is also relative. In general, the more elements of your business you want to integrate with trading partners, the more you have to spend. Office Depot, with $11.6 billion in sales in 2000, put its catalog on the Web for $500,000, and pays $5 million a year to maintain the system. A March 2001 Forrester Research report pegged the cost for buyers to join an online marketplace at between $5.6 million and $22.9 million, including operating costs.

Text 22:

For many people, strategic technology planning is just another name for long-term financial planning. While this is a somewhat parochial view, it nonetheless underscores the central role of funding issues in technology planning. Traditionally, strategic funding requests and allocations involve many layers of authority and a substantial amount of justificatory detail, regardless of whether an institution is large or small, public or private. The amount of time it takes to analyze funding needs, gain approvals, and locate or create resources, is often out of sync with the windows of opportunity for technological innovation. Anecdotal evidence of this is plentiful. By the time an institution has dotted the last "i" and crossed the last "t" on capital funding for a campuswide network, the envisioned technology may have changed sufficiently to render the plan obsolete.

One way to address this problem is to earmark a significant amount of fungible capital resources for technology and allow it to be allocated as required. While it may not be possible to justify future technology needs in detail, good planning should permit an institution to estimate the level of financial resources that it can and should devote to technology for a period of several years. A further refinement of this approach is to create a "rapid reaction fund" as part of the annual technology operating budget. By allowing unused funds to carry forward across fiscal years, an institution can establish the type of budgetary flexibility that will allow it to maintain technical stability despite the peaks and valleys in user demand, infrastructure modification, and technology innovations.

Fungibility can also be increased with respect to staffing. Typically, institutions struggle with the choice of either outsourcing or providing internal support for technical operations. The problem of recruiting and retaining qualified staff—along with rapid changes in required skill-sets—impels many colleges and universities toward selective outsourcing despite their apprehensions about having staff members whose primary loyalties lie outside of the institution. There is a third alternative: closed-end contracts. Recognizing that it is becoming increasingly difficult to keep high-quality technical employees for more than three years, some institutions are designating certain positions as multi-year contract positions. While the turnover rate remains high, it occurs with greater predictability, hence with less disruption. More importantly, it enables the institution to modify position requirements as changes occur in technology and the needs of users. It is, in some sense, a way of introducing fungibility into staffing, a concept that is largely alien to the traditions of higher education and that makes sense only in the context of a job market as competitive as that of high technology.

Text 23:

Every year around this time, Americans lament our low voter turnout rate-44.9 percent in 1998, putting us 138th in a list of 170 voting nations. This explains the growing interest in Internet voting, which promises to do for democracy what Amazon.com did for books. Aside from making voting vastly more convenient, say its supporters, click 'n' pick elections could theoretically eliminate fraud, allow instant recounts, and save pots of money.

Buoyed by these hopes, election boards across the country have begun to take tentative steps toward wired elections (many private organizations-most notably universities and unions—already conduct internal elections online).

State officials in California, Florida, Washington, Iowa, Minnesota, and New Mexico are all examining online voting. In California, the Campaign for Digital Democracy is collecting digital petitions for a ballot initiative that would legalize Internet voting-though virtual signatures aren't legally valid, at least not yet. Software companies eager to showcase their e-voting wares have held mock online elections in Iowa, Washington, and Virginia. And today, under a pilot project run by the Department of Defense's Federal Voting Assistance Program, 350 military personnel posted overseas will vote online. If the test goes well, the FVAP will consider eventually making online voting available for all Americans living abroad.

E-voting isn't nearly as radical as it sounds, for two reasons. First of all, a large and growing proportion of Americans-about 50 percent of Washington state's electorate and a quarter of Californians-already mail in their votes via absentee ballot. Oregon, the most aggressive remote-vote state, has abolished polling places entirely and now conducts elections exclusively by mail. Local jurisdictions in 15 other states have conducted all-mail elections too. While online elections would use fancier technology, they're based on the same premise-that you can send polling authorities a document that will serve as your proxy.

Text 24:

Organizational performance is largely dependent upon the decision making processes that a particular organization uses. In every organization, decisions have to be made on a daily basis. These decisions range from small to large-scale in scope both in terms of the resources involved in making them and the impact that the decisions can have. For instance, a small-scale decision would be determining the type of copy machine to purchase for a company department. This decision involves resources (i.e., in the form of time and energy) of the users of this machine to clarify their needs as well as the purchasing representatives who research and acquire the copier. The ability of this copier to meet employees' needs decides the impact of this decision.

An example of a large-scale decision would be determining what product or service a company's customers need. This decision involves the time and energy of the individuals who research the consumer market, as well as the individuals who try to successfully develop and launch the product or service. This decision has the potential to make or break a company depending on the size of the organization.

As the preceding examples illustrate, the decisions and the processes involved in making them are not limited to the individual level. Moreover, the decision-making process is also performed at the group level, and it will be done so with increasing frequency given the need for high performance organizations in a competitive, global market. Group decision making is defined as the process of arriving at a judgment based upon the input of multiple individuals. This paper focuses on the group level of decision making.

Since the resources involved in the group decision-making process as well as the impact of these decisions affect organizational performance, it is crucial to make the group decision-making process as efficient and effective as possible. Utilizing a decision-making model is a systematic way of establishing group decision making proficiency. This statement is not intended to mean that the use of a group decision-making model is a panacea for group and organizational processes. This statement is

merely intended to mean that a group decision-making model when used appropriately can aid in the functioning of the group and the organization.

Text 25:

The first model is the rational model. This model is based upon an economic view of decision making. It is grounded on goals/objectives, alternatives, consequences and optimality. The model assumes that complete information regarding the decision to be made is available and one correct conception of a problem, or decision to be made can be determined. The model further assumes that the decision-makers consistently assess the advantages and disadvantages of any alternatives with goals and objectives in mind. They then evaluate the consequences of selecting or not selecting each alternative.

The alternative that provides the maximum utility (i.e., the optimal choice) will be selected. The rational model is the baseline against which other models are compared (Allison, 1971; Cheshire & Feroz, 1989; Lyles & Thomas, 1988).

An example of a scenario using a rational model is an executive group of a company trying to determine which consulting firm to hire in order to implement a business process reengineering (BPR) effort. The executive group's goal or objective is to become a leader in its industry, and it determines that the best way to accomplish this objective is through re-engineering. Numerous management consulting firms offer BPR services. Each firm's BPR approach has advantages and disadvantages. The executive group must evaluate each firm's approach by considering how the firm will enable the company to meet its objective. Based upon this evaluation, the group selects the consulting firm that provides the best means for the company to become a leader in its industry.

The most salient advantage of the rational model is that it utilizes a logical, sequential approach. Decisions are made deductively by determining the goals or objectives to be obtained, evaluating the potential alternatives based on the information at hand and choosing the optimal alternative. In other words, the model is simple and intuitive in nature.

The rational model does possess a salient disadvantage. The model assumes that there are no intrinsic biases to the decision-making process (Lyles & Thomas, 1988). This optimism may not be totally realistic, since individuals involved in the process bring their own perceptions and mental models into such a situation. Therefore, it seems that intrinsic biases are inevitable and something that should be addressed.

Text 26:

The second basic decision-making model considers the preconceived notions that decision-makers bring to the table in the decision process. This model is the political model. In contrast to the preceding model, the individuals involved do not accomplish the decision task through rational choice in regard to objectives. The decision makers are motivated by and act on their own needs and perceptions. This process involves a cycle of bargaining among the decision makers in order for each one to try to get his or her perspective to be the one of choice. More specifically, this process involves each decision-maker trying to sway powerful people within the situation to adopt his or her viewpoint and influence the remaining decision-makers (Allison, 1971; Cheshire & Feroz, 1989; Lyles & Thomas, 1988; Schneider, Shawver & Martin, 1993).

Furthermore, the political model does not involve making full information available or a focus on the optimal viewpoint like that of the rational model (Lyles & Thomas, 1988). Full information is highly unlikely, since the political model operates based upon negotiation that is often influenced by power and favors. In fact, information is often withheld in order to better maneuver a given perspective. Since information is often withheld and subsequently incomplete, the optimal viewpoint is not a key aspect of this model.

An illustration of the political model in action is a decision to hire a new manager for the Purchasing Department of a company. A group composed of the Human Resources (HR) Manager, staff members of the Purchasing Department, and the Director of Operations (i.e., whose division oversees the Purchasing Department) must make the decision among three candidates for the position. Each member has his or her own needs and reasons for endorsing certain job candidates.

The HR Manager is trying to fit the best person to the job, but would not mind if this individual has an innate liking for and understanding of human resources. This appreciation of HR would help decrease the cycle time of placing and receiving orders for necessities. The HR Manager would like to hire the first candidate. The Purchasing staff is also trying to find the best person for the position, but would prefer someone who does not micro-manage like their previous boss. The Purchasing staff would like to hire the second candidate. The Director of Operations also desires to find the best person for the job, but the Director would prefer an individual who unlike the previous Purchasing Manager is not overbearing and skeptical of the Director's decisions. The Director would like to hire the third candidate.

Since the group members have different agendas, they need to negotiate with each other and present their cases to the Director of Operations who has the final say in the decision. In the end, the Director understands the argument of the Purchasing staff and decides that the second candidate's hands-off approach would meet his needs as well. Therefore, the second candidate is hired.

The advantages of the political model remains that it provides a representation of the subjective manner in which the real world often operates, and it can minimize conflict. Individuals will always have their personal biases and agendas that influence their behavior. By identifying or acknowledging this fact in the decision-making process, potential problems and conflict can be foreseen and minimized. Conflict is also minimized by the swaying of powerful people to support a particular viewpoint. Once the powerful people support this perspective, other group members usually fall in line behind them.

While the political model has the advantage of emulating the way the real world operates (i.e., a cycle of bargaining related to personal agendas), this fact is also a disadvantage, because the best solution or decision may not be selected. Furthermore, the nature of bargaining and maneuvering (e.g., withholding information and social pressure) can produce effects that are long-lasting and detrimental. Once they discover it, the individuals involved in the decision may not appreciate the duplicity inherent in the process.

Text 27:

In contrast to the political model, the third basic model of decision making is more structured. This model is the process model. With the process model, decisions are made based upon standard operating procedures, or pre-established guidelines within

the organization. Actions and behaviors occur in accordance with these procedures or guidelines (Cheshire & Feroz, 1989; Allison, 1971).

Additionally, the organization of past, present, and future events, as well as conformity, are integral parts to this model (Cheshire & Feroz, 1989; Allison, 1971). The organization of the past, present and future events are important, because they can be used as a consistent foundation for decision making. Considering these time events provides further refinement of the guidelines that help to determine outcomes.

Conformity is an integral part of the process model since it is the means by which doubt, or incertitude is dealt with during the decision task. If decision makers are uncertain as to the potential effectiveness or the results of a decision, they conform to the pre-established standard. This conformity should not be construed to mean that the decision will not have a solid foundation. In this case, conformity merely relates to the fact that the reasoning for the decision is based upon pre-determined guidelines (Cheshire & Feroz, 1989).

An example of a scenario involving the process model of decision making is promoting a Marketing Representative of a company to a higher level. A group comprised of the Marketing Manager, HR Manager, and Compensation and Benefits Manager meet to discuss the promotion. Since the Marketing Manager has seen exemplary work from the representative, the Marketing Manager adamantly wants to promote the individual from a Marketing Representative I to a Marketing Representative III. In their negotiation, the HR Manager and Compensation and Benefits Manager point out to the Marketing Manager that company policy mandates that an employee can only be promoted one level at a time. Additionally, no precedent has been set to justify deviation from this policy. Therefore, the Marketing Representative is promoted to Marketing Representative II.

Text 28:

The fourth model of decision making is the garbage can model. This model is most appropriate for judgment tasks in organizations where the technologies are not clear, the involvement of participants fluctuates in the amount of time and effort given, and choices are inconsistent and not well defined (Cohen, March & Olsen, 1972; Lovata, 1987; Schmid, Dodd & Tropman, 1987).

In such an organization, an opportunity to make a decision is described as a garbage can into which many types of problems and solutions are dropped independently of each other by decision-makers as these problems and solutions are generated. The problems, solutions and decision makers are not necessarily related to each other. They move from one decision opportunity to another in such a manner that the solutions, the time needed and the problems seem to rely on a chance alignment of components to complete the decision. These components are the combination of options available at a given time, the combination of problems, the combination of solutions needing problems, and the external demands on the decision makers (Cohen, March & Olsen, 1972; Lovata, 1987; Schmid, Dodd & Tropman, 1987).

An example of the garbage can model is a company department trying to deplete its budget before the end of the fiscal year. This department, consisting of five employees, has additional money in its budget to use up by the end of the fiscal year. The employees do not want to lose the money. So, they create a bogus allocation in order to protect it, but really have no use for it. Two weeks after the end of the fiscal year, the department's computer system goes down. Fortunately, the solution (the

money from the budget to replace the computer system), the problem (inoperable computer system) and the individuals involved (the employees) are in alignment. In other words, the timing is perfect for the combination of components to solve this problem: The employees protected budget money which could be used at a later time, the computer system went down, and the protected money could be used to buy a new computer system.

The notable advantage of the garbage can model is that it provides a real-world representation of the non-rational manner in which decisions are often made within an organization. Not all decisions are made in a logical, political, or even standard fashion. Occasionally, decisions are made on an ad hoc basis or by "flying by the seat of the pants" when the solutions, problems and individuals involved in the task happen to align.

Despite its representation of the non-rational, real-world manner in which decisions are often made, the garbage can model does have an important disadvantage. It is not the most efficient means of making a decision. Decision making is considered a procedure for finding solutions to problems. Unfortunately, this often does not happen if the garbage can model represents the manner in which decisions are made within an organization. Problems are worked on in given situations, but choices are made only when the combination of problems, solutions and individuals allow the decision to happen (i.e., are in alignment). Consequently, the alignment of the problems, solutions, and individuals often occurs after the opportunity to make a decision regarding a problem has passed or occurs even before the problem has been discovered (Cohen, March & Olsen, 1972).

In discussing the four general models, the issue is not necessarily which model is the best one, because they all have advantages and disadvantages which may work or be appropriate for certain groups and situations. The purpose of using models to assess group decision making is to provide a base for comparison. A model is a starting point for evaluating a process, and group decision making is a process.

One way of evaluating this process is to determine which model, if any, a group is using to make decisions. Once the model is determined, the decision procedure can be analyzed in order to facilitate the improvement of the procedure. The procedure can be improved by anticipating potential problems and acting accordingly.

For instance, time wasted due to a lack of direction and organization can be eliminated. Knowing that a group makes decisions by following a rational model enables the decision makers to expedite the decision process. These individuals can expedite the process by preparing themselves for group meetings by becoming familiar with any goals or objectives, possible alternatives and consequences of these alternatives as well as potential optimal choices as they relate to a decision.

The knowledge that a group follows a political model in making decisions is also helpful. This knowledge can assist group members in preparing the supporting information for their perspective. This preparation can assist the individuals in presenting their viewpoint more persuasively. Consequently, their viewpoint has a better chance of being adopted as the one of choice.

Knowing that a group utilizes a process model for making decisions can also increase the effectiveness of the decision procedure. Being aware that judgments are made relative to standard operating procedures enables individuals to anticipate potential obstacles to a decision. Consequently, these individuals can research the pre-

established guidelines that may pose these problems and adjust their argument or point of view accordingly.

If group members are aware that decisions are made by using a garbage can model, they at least have the comfort of knowing that these decisions follow some sort of method. Granted the method is somewhat random and chaotic, but it is a method nonetheless.

Moreover, identifying the model when the decision process does not function effectively is of value, because the decision makers then know the method to avoid. They should avoid the current model that produced the ineffective results. This avoidance can be accomplished by agreeing as a group to try to adopt a different approach (i.e., a new model).

It should be pointed out that even if the group decision-making procedure does not fit one of the aforementioned general models, the process of analyzing the decision task in and of itself in order to identify a model is beneficial. This analysis provides valuable insight into the dynamics of how decisions are made within the group whether or not one of the four models is actually discovered. The cognitive flow of the group is important to note, because it enables an understanding of the other group members' rationale for judgment. Furthermore, this cognitive flow may spawn the creation of a novel group decision-making model.

In conclusion, models of group decision making can be helpful. They are not cure-alls for faulty decision procedures. They are merely a starting point for potential improvement. Models aid in assessing the interaction of group members regarding a judgment procedure. Group decision making models provide form to an intangible and abstract concept. Models promote the discovery and resolution of problems that can occur during the decision-making process.

Text 29:

In a sense, dialogue is not complicated. It is just good conversation, over the back fences of our lives. It is continued, thoughtful exchange about the things that most matter. It is a time to sit. In a sense, dialogue is not complicated. It is just good conversation, over the back fences of our homes, a time to get together and talk, as the ideas and thoughts come to us, without agenda, without time pressures. It is the kind of conversation that we have forgotten in the pace of western, modern life, a kind of easy exchange. It is learning what we have forgotten. Or, in the language of Maya Angelou and Paula Underwood Spencer, from cultures that practiced dialogue, it is reminding us of "that which we have forgotten to remember."

In his seminal book on systems thinking, *The Fifth Discipline*, Peter Senge talks about the important difference between "dialogue," which comes from the Greek *dialogos*, which means "to draw meaning through," and "discussion," which has the same root meaning as percussion and concussion and which suggests the banging together of ideas and points of view, and, I would add, heads. Senge notes that the dominant mode of communication in the contemporary organization is that of the crashing together of ideas and observations and different understandings, rather than drawing those ideas and observations and different understandings through a process which clarifies and deepens our personal and collective understanding.

But such a deepening of understanding is not automatic. We generally seem to prefer our more familiar model of sparring with ideas. Perhaps it is the nature of our

extroverted culture that in any gathering we spend most of our time waiting to race out of the starting gate with our own thinking. A friend of mine often describes extroverts as those who see communication as having only two stages: talking, and waiting to talk. She has not only defined the extrovert, but our extroverted culture as well. In such a competitively extroverted culture, real listening, that is listening to understand or listening as an ally, is indeed counter-cultural.

For most of us, the pattern of dialogue requires new ways of thinking about and evaluating communication. Understood in light of our dominant patterns of debate, disagreement, discussion and decision, dialogue seems like pointless meandering, and is most marked by the deficiency of not "arriving" at any conclusions, of not producing identifiable closure. Dialogue seems to have no structure, no point, and no direction. Even talking about it generates a mild sense of panic, particularly among those who haven't had a chance to settle into it.

If we see the goal of communication as to decide something or do something, we are unable to discern the way in which dialogue, without a seeming focus on decision or action, somehow enables individuals to focus their personal energies almost unconsciously so that once the dialogue has ended people go forth and act in a remarkable level of concert, without the need for action plans or coordination or checking. Such patterns have been noted in the modes of communicating of Asian and Native American cultures.

Dialogue should contribute to the development and deepening of a genuine interest in, curiosity about and concern for the thinking and observations of other people around the table. It is a collective process in which wisdom emerges not from our finding the appropriate path of thinking like the wise one at the head of the table, but where through a dialogue, we come to a deeper understanding than any one of us had to begin with.

We should note that dialogue is a different and often unfamiliar way of being together in communication, and we should acknowledge that and be prepared for it. If we overlook the unfamiliarity of this mode of communicating, we will also make it unlikely that others can evaluate accurately its value-added in our organizational lives. Instead we will mistakenly evaluate it in traditional modes (of decisions taken by meetings' end and measure of closure) and judge it within the time bounds of the meeting, rather than in the longer and more important time frames of future action and alignment.

I am reminded of the many stories of North Americans negotiating with Asians and considering the process of talking and silence without any seeming progress, as pointless and unproductive. The same North Americans have found the level of accord and speed of implementation quite astonishing, in comparison with the level of struggle over implementation in Western cultures. And seldom do they realize the relationship between the slowness of speaking and the ease of acting.

Text 30:

Finding a scholarship that suits your requirements and for which you are eligible can be a time-consuming and difficult process. Unfortunately, many students spend hours and hours finding a scholarship yet fail to put an equal amount of effort into their application. The application is by far the most important part of your scholarship search, make sure you spend as much time on it as is necessary to get it right.

Following are a list of simple tips to help you ensure you submit the best application possible and thereby maximize your chances of being awarded the scholarship.

1) **Make sure you get as much information about the scholarship as possible**. Write, call or e-mail the provider of the scholarship to ensure you have full details of application procedures and what will be expected of the successful applicant. If the scholarship entails a particular project, find out the full objectives and intended methodology of the project. If the scholarship is being funded by a private enterprise, gather as much information as you can about the company, its philosophy and its goals. You can never have too much information.
2) **Check thoroughly to ensure that you are actually eligible for the scholarship before you embark on the application process**. It is pointless to submit an application, no matter how perfect it may be, for a scholarship for which you are ineligible. Check for any gender, age, nationality, indigenous or other special group restrictions on applications and only apply if you definitely match the eligibility criteria.
3) Once you have confirmed your eligibility for a particular scholarship and received full application guidelines from the provider, **make sure you follow the guidelines to the letter**. Common complaints from scholarship providers are:-
   - both sides of application forms are not filled in or the form is not filled in properly;
   - all of the requested documents are not attached;
4) **Application presentation is very important**. If a list of documents is requested, supply the documents in the order in which they are requested. Use the same style of writing and pen throughout the application. Use neat, legible handwriting and type your application if this is not possible.
5) **Ensure that your referees are the appropriate people to provide the kind of information about you** that the selection committee will need to know. For example, if they need to know about your research capabilities, ensure the referee you provide has supervised your research work before or has some other knowledge of your capacities.
   Always make sure that your referees know of each and every scholarship you have applied for in which they are listed as a referee. If they are aware of the particular requirements of each scholarship, they will be more able to provide the appropriate information to each scholarship selection committee.
6) **Apply for each scholarship separately.** Do not use the same application to apply for two separate scholarships. Each scholarship will have its own particular requirements and if you use a previous application you will almost certainly miss addressing vital and particular criteria of the new scholarship. Each scholarship application should be approached as a separate undertaking in order to ensure you submit a valid application for each.
7) **Make a checklist for each scholarship application and check and double check it before you submit the completed application.** Ensure that you have completed all the necessary forms, supplied all the requested supporting documents in the form required, submitted all statements, names of referees and any and all other information requested by the provider.
   Don’t lose out on a scholarship because your application is incorrect or messy! Work hard on it and ensure yourself the best possible chance of winning a scholarship in today’s competitive environment.

8) Make sure you or a nominated

Text 31:

How can you narrow the list of possibilities before contracting for services? How can you ensure that your organization's business needs will be met? One solution is to write and distribute a *Request for Proposal (RFP)* in the marketplace.

An RFP is a written document that outlines specific information about your organization, the services and products you need, and the specific requirements suppliers must meet in order to win your business.

A written RFP increases market awareness of your organization's needs, thereby increasing the competition to serve those needs and increasing the formality of the relationship between you and the supplier. In short, an RFP places you - the buyer - in control of the desired service levels and related requirements and lets potential vendors know up front that your most important concern is the level of customer service you will receive.

Reasons to Write a Formal Request for Proposal:

To increase competition for your organization's money, which will increase the options and potentially could drive down the cost;

- To ensure a fair and equal opportunity for providing services;
- To identify and select qualified organizations capable of supporting high levels of service in the most cost-effective and administratively efficient manner possible;
- To select stable, organized and efficient organizations interested in developing long-term relationships;
- To award opportunities to the most capable and qualified organization — whose capabilities and experience can support demands and can grow as needs evolve;
- To outline the terms of a formal working agreement that holds both the buyer and the supplier liable to certain terms and conditions — the legalities of the opportunity.

RFPs are a lot of work, but they're worth it. If you were planning on purchasing a learning management system that you hoped to use for five years, it obviously makes sense to find the vendor whose product matches your needs as closely as possible.

It's certainly easy to take shortcuts. Industry gossip, anecdotal stories and conversations over lunch might provide you with a few tips, but let's face it, thousands or even millions of dollars might be changing hands. It's much different than using Consumer Reports to choose a lawnmower. You need to be educated, and there should be no guessing involved.

Text 32:

An RFP is a written document that represents an enormous amount of time, resources, and money in order to communicate an understanding of the business needs of a company to a group of suppliers. The resulting proposals represent an interpretation of those needs and involve the expenditure of a commensurate amount of time and resources on the supplier's part. Properly developed and written, RFPs are powerful tools for selecting the most appropriate solution and developing straightforward relationships with suppliers.

This is a nuts and bolts guide to writing an RFP. The purpose of this guide is to provide you with practical information about writing and organizing RFPs by focusing on their underlying mechanical aspects and processes. Whether you are a novice or senior RFP writer, you will find tips and techniques that will be beneficial to you.

Text 33:

The next generation of distributed computing has arrived. Over the past few years, XML has enabled heterogeneous computing environments to share *information* over the World-Wide Web. It now offers a simplified means by which to share *process* as well. From a technical perspective, the advent of *web services* is not a *revolution* in distributed computing. It is instead a natural *evolution* of XML application from structured representation of information to structured representation of inter-application messaging. The revolution is in the opportunities this evolution affords.

Businesses have been offering products and services on the World-Wide Web for the past few years. Have they not then been offering web services? In what way are *web services* actually new? In an article entitled The Web Services ®evolution - Applying Web Services to Applications" Graham Glass, the CEO and Chief Architect of The Mind Electric defines a web service as:

A collection of functions that are packaged as a single entity and published to the network for use by other programs. Web services are building blocks for creating open distributed systems, and allow companies and individuals to quickly and cheaply make their digital assets available worldwide."

Prior to the advent of web services, enterprise application integration was very difficult due to differences in programming languages and middleware used within organizations. The chances of any two business systems using the same programming language and the same middleware was slim to none, since there has not been a de-facto winner. These 'component wars' spelled headaches for integration efforts, and resulted in a plethora of custom adapters, one-off integrations, and integration 'middlemen'. In short, interoperability was cumbersome and painful.

With web services, any application can be integrated so long as it is Internet-enabled. The foundation of web services is XML messaging over standard web protocols such as HTTP. This is a very lightweight communication mechanism that any programming language, middleware, or platform can participate in, easing interoperability greatly. These industry standards enjoy widespread industry acceptance, making them very low-risk technologies for corporations to adopt. With web services, you can integrate two businesses, departments, or applications quickly and cost-effectively.

The vision for web services predicts that services will register themselves in public or private business registries. Those web services will fully describe themselves, including interface structure, business requirements, business processes, and terms and conditions for use. Consumers of those services read these descriptions to understand the abilities of those web services. Web services will be smart, in that once a service has been invoked, it will spontaneously invoke other services to accomplish the task and to give users a completely personal, customized experience. In order for these services to dynamically interact, they need to share information about the user's identity, or context information. That context information should only need to be

typed in once, and then made available at the user's discretion to selected web services.

Text 34:

A key difference between J2EE and .NET is that J2EE is platform-agnostic, running on a variety of hardware and operating systems, such as Win32, UNIX, and Mainframe systems. This portability is an absolute reality today because the Java Runtime Environment (JRE), on which J2EE is based, is available on any platform.

There is a second, more debatable aspect of portability as well. J2EE is a standard, and so it supports a variety of implementations, such as BEA, IBM, and Sun. The danger in an open standard such as J2EE is that if vendors are not held strictly to the standard, application portability is sacrificed. CORBA, for example, did not have any way to enforce that CORBA middleware did indeed comply with the standard, and thus there were numerous problems with portability. In the early days of J2EE there were the same problems.

To help with the situation, Sun has built a J2EE compatibility test suite, which ensures that J2EE platforms comply with the standards. This test suite is critical because it ensures portability of applications. At the time of this writing, there were 18 application server vendors certified as J2EE-compatible. There are a myriad of other vendors as well that are not certified[10].

Our opinion is that in reality, J2EE portability will never be completely free. It is ridiculous to think that complex enterprise applications can be deployed from one environment to the next without any effort, because in practice, organizations must occasionally take advantage of vendor-specific features to achieve real-world systems. However—and this is important—portability is exponentially cheaper and easier with J2EE and the compatibility test suite than with proprietary solutions, and that is a fact we stand behind through years of consulting with customers using a variety of J2EE solutions. Over time, as the J2EE compatibility test suite becomes more and more robust, portability will become even easier.

By way of comparison, .NET only runs on Windows, its supported hardware, and the .NET environment. There is no portability at all. It should be noted that there have been hints that additional implementations of .NET will be available for other platforms. However, a question remains - how much of the complete .NET framework will be (or even can be) supplied on other platforms? History has taught us to be skeptical of Microsoft's claims of multiple platform support. Microsoft ported COM to other platforms, but never ported the additional services associated with COM that were necessary to make COM useful. We find it hard to believe that .NET portability will ever become a reality given Microsoft's historically monopolistic stance.

Text 35:

A software development process defines a set of activities necessary to deliver a software system. All activities culminate in an artifact (or refinement of an existing artifact). The artifacts represent the result of working on the activities. The goal of a software development process is to facilitate people in their quest to effectively produce a software system.

Extreme Programming (XP)

Extreme Programming has been the pioneer in the modern movement toward lightweight processes. XP emphasizes a single major artifact, the code itself. This process uses 3" x 5" cards to capture requirements in user *stories* and design via CRC (class, responsibilities, and collaboration) cards, the minor artifacts of the process. XP is much more than user stories, CRC cards, and coding, however. Testing frameworks and innovative practices such as pair programming (working in groups of two people) make XP an interesting addition to the field of software development processes.

Crystal

Crystal is a lightweight process that contains 20 artifacts. This might sound like a heavier process than XP but most of the artifacts are informal and can take the form of "chalk talks" (working problems out on a chalk board), conversations, and e-mails. Of these 20 artifacts, only the final system, the test cases, and the documentation are formal. Crystal divides its artifacts into levels of precision (20,000-foot view, 5,000-foot view, 10-foot view) to allow developers to focus on their objectives.

Feature-Driven Development

Feature-Driven Development is an incremental approach that uses as few as four artifacts (feature list, class diagram, sequence charts, and code). The FDD process focuses development using two-week iterations to show quick tangible results. Among the contributions this process provides is a semantic-based class diagram template—called the domain neutral component, which differentiates types of classes by color—to aid class designers in developing a domain model.

Rational Unified Process

The Rational Unified Process collects many of the best practices of OO analysis and design to form a process framework with 38 different artifacts. RUP is not generally considered lightweight, although a lightweight configuration called dx ("xp" turned upside down) exists. Of course, not all 38 artifacts are required in either RUP or dx. In fact, the process framework is configurable to as few as two (use cases and code) artifacts. However, the general RUP-based process uses quite a few requirements, analysis, and design artifacts because its developers based this process on the activities of the OOA/D movement.

Text 36:

An open distance learning information system (ODLIS) can be used in order to provide virtual lectures, virtual conferences and collaborative work on projects which are shared among institutions, exchange of useful material, experiences among teachers, research results and conclusions as well as versatile and more attractive presentations of the subjects taught. In addition, such a system should manage the educational material and its users as well as the information that is useful for the educational procedure. The above requirements create two problems for the system: The first problem is the management of data in web-based applications, which have different characteristics and complexity. The management of information has many limitations of the file-oriented hypertext protocol. The second problem is the integration of different technologies and tools that support educational activities.

In our approach, all application's sensitive information is stored in a relational database management system that provides the mechanisms for the efficient indexing and ensures their consistency. More static data are stored directly on the file system, while the database maintains annotation about them and pointers to their location.

In this article, we present some tele-training tools as well as the architecture and the components of an ODLIS and particularly the data access components and the business logic regarding the manipulation of information. In addition, we catalogue the functional characteristics based on the user requirements, describe the network that supports the transport of information. Furthermore, we explain the types of data in our system, relationships between data, the issues of consistency, manageability, scalability, security, partitioning, transparency and we describe the characteristics of the mechanisms that are used for the reliable storing. Finally, we present the services provided by the system and our case study.

Text 37:

The user and lesson database issues had also an important role and needed special attention especially as far as the educational part is concerned. The database system had to take into consideration all the educational aspects that were imposed by the academic view of the project. The bureaucratic process had to pass into an electronic system of invitations, submission forms and responds that the database system had to keep track of. The elements of user registration requests had to be handled with an open-minded way because they involved comparisons and logging of two language words and phrases. Transformations had to be made in a formalized way so that everybody has an ASCII-based login name for the web access better compatibility. User database had to keep wait state status when registering a student for the cross-certification with the secretariat of the department involved.

Moreover, the database had to be ready for annual rebuilding – reutilization prepared for the next academic year. That means exhaustive packing and disengaging of all data of the past year from the main database.

At that time all outdated data had to be moved to the back up database keeping in mind all issues that may be needed in the following year for better indexing and quicker access and retrieval. In the new academic year, everything has to be ready to accept all the new data recording without, though, losing the capabilities to search and link to older elements especially records of grades, statistics and answers to sets of tests and exercises. The system had to be designed to keep alive the most educationally significant parts of data - the academic partners of the project insisted on that - so that would be easy to access them in the following years for several reasons. It is important that the database system provided easy and consistent access to every annual database because it is consisted of both scientific and other educationally vital information for the better designing and organizing of the academic year to come.

Text 38:

Learners are busy. They are working at their primary task and have little time for learning even if the need is urgent. For this reason, make the lesson as easily accessible as possible. If you simply send an e-mail message telling the learners to go the internal Sales website and check out the lesson that was just released, you will

have a low hit rate. To make it as easy as possible for the learner to access the e-learning lesson, use these approaches:

- Provide a link in the body of the e-mail invitation.
- Describe why taking this course immediately is important to both the learner and the corporation.
- Provide a complete-by date. Many people are motivated when confronted with a date rather than a vague time period like “complete within two weeks.”
- Develop a system for identifying lessons that need to be taken immediately versus lessons that can be taken when convenient. This could be a key word in the subject line of the e-mail message or a color-coding system.

Text 39:

Problem of network connectivity in the systems that use process migration as solution to problems such as load sharing has existed from the early advent of process migration. Solutions typically consist of modifications to operating systems or applications. Because of complexity of adding transparent migration to systems originally designed to run stand-alone, since designing new systems with migration in mind from the beginning is not a realistic option anymore at one hand and need to developing new applications because of impossibility of use of existing applications, has made process migration an unpopular approach.

Because of the increasing costs of operating system development and the lack of standard solutions for distributed systems and heterogeneity, middleware level solutions have be-come of more interest.

Our approach is to create a process called twin for each remote process. The twin is responsible for redirecting communications of the remote process. Every remote process has logically its own twin. But in practice there is not a one to one mapping between remote processes and twins. A twin can be responsible for more than one remote process. This approach works with existing operating systems and applications.

Text 40:

We are concerned with the study of autonomy as an essential prerequisite for the design and implementation of artificial intelligent systems. Collectivities of autonomous mobile robots are the focus of the present research. An autonomous mobile robot denotes for us a mechanism which is able to know its environment, navigate, avoid obstacles and recharge its battery. That is to say, an artifact capable to ensure its survival by itself, with the minimal human intervention.

This study deals with location (position and orientation) identification of mobile robots equipped with ultrasonic (sonar) sensors. Due to slippage, uneven floors, etc., location calculated from odometer readings deviate from the actual location of the robot. The situation becomes more severe especially when the robot makes many turns or the length of the path traveled increases. The task of identifying the location of a mobile vehicle using information from external sensors with respect to a global reference frame is referred to as sensor based *localization*. The objective of this study is to use solely sonar based information to identify the location of a mobile robot in a given nontrivial environment.

Localization can be performed by constructing a local composite map of the immediate surrounding and matching this with the global map of the environment.

This is also referred to as perception-based localization where the perceptual clues that naturally occur in the environment are identified and matched against a map of the environment. Our approach presented here identifies linear-features in the environment from imprecise sonar data and performs localization by matching these clues to the given global map.

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