Luvai F. Motiwalla   Jeff Thompson

SECOND EDITION
ENTERPRISE
SYSTEMS FOR
MANAGEMENT

UNIT 3

ENTERPRISE SYSTEMS ARCHITECTURE

Learning Objectives

- Examine in detail the enterprise systems modules and architecture.

- Understand the effects of a well-designed architecture on ERP implementation.

- Know the various types of ERP architectures and the related benefits and drawbacks of each architecture.

- Learn about the Service Oriented Architecture and its impact on ERP systems.

- Learn about cloud architecture and its impact on ERP systems.

Why Study Enterprise Systems Architecture?
****

- Help management and the implementation teams understand in detail the features and components of the enterprise system.

- Provide a visual representation of the complex system interfaces among the ERP application and databases, operating systems, legacy applications, and networking.

- Management can develop a better IT plan if the requirements for system infrastructure, training, change management, and business process reengineering are clarified.

Components of the Enterprise Systems Architecture
****

- Functional
    - Defines the *ERP modules that support the various business* functions of the organization. Examples include:
        - Accounting
        - Human Resources
        - Procurement
        - Fulfillment(**achieve**)
        - Etc.

- System
    - Defines the *ERP architecture through* the physical components of hardware, software, and networking angle.
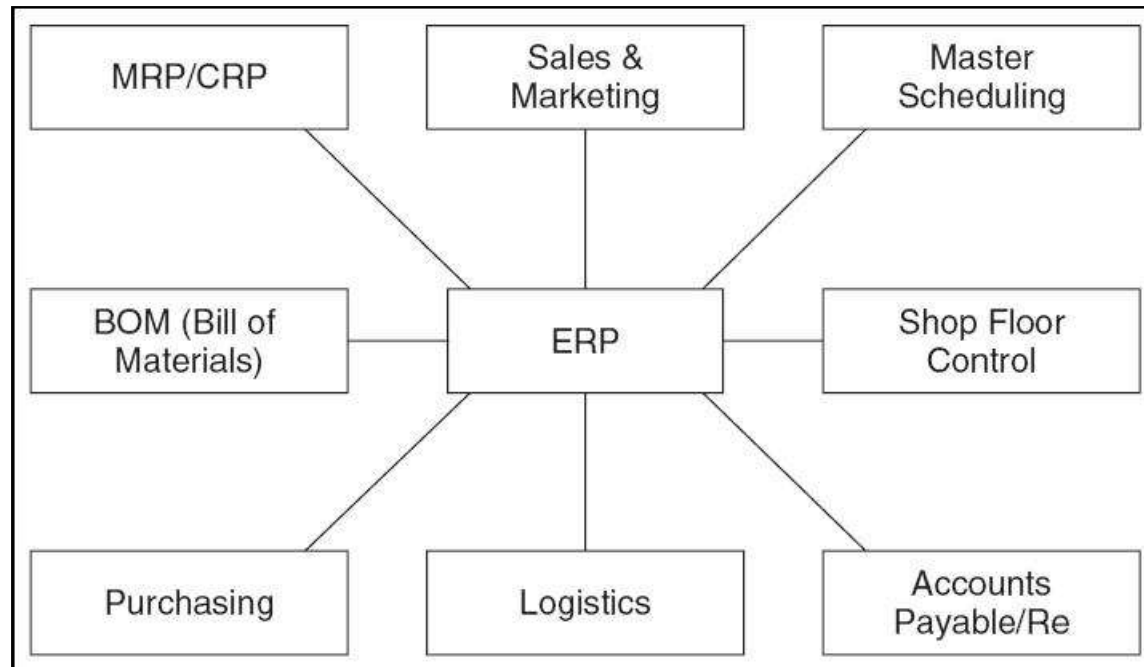
Figure 3-1 Enterprise Systems Architecture (ESA) Model
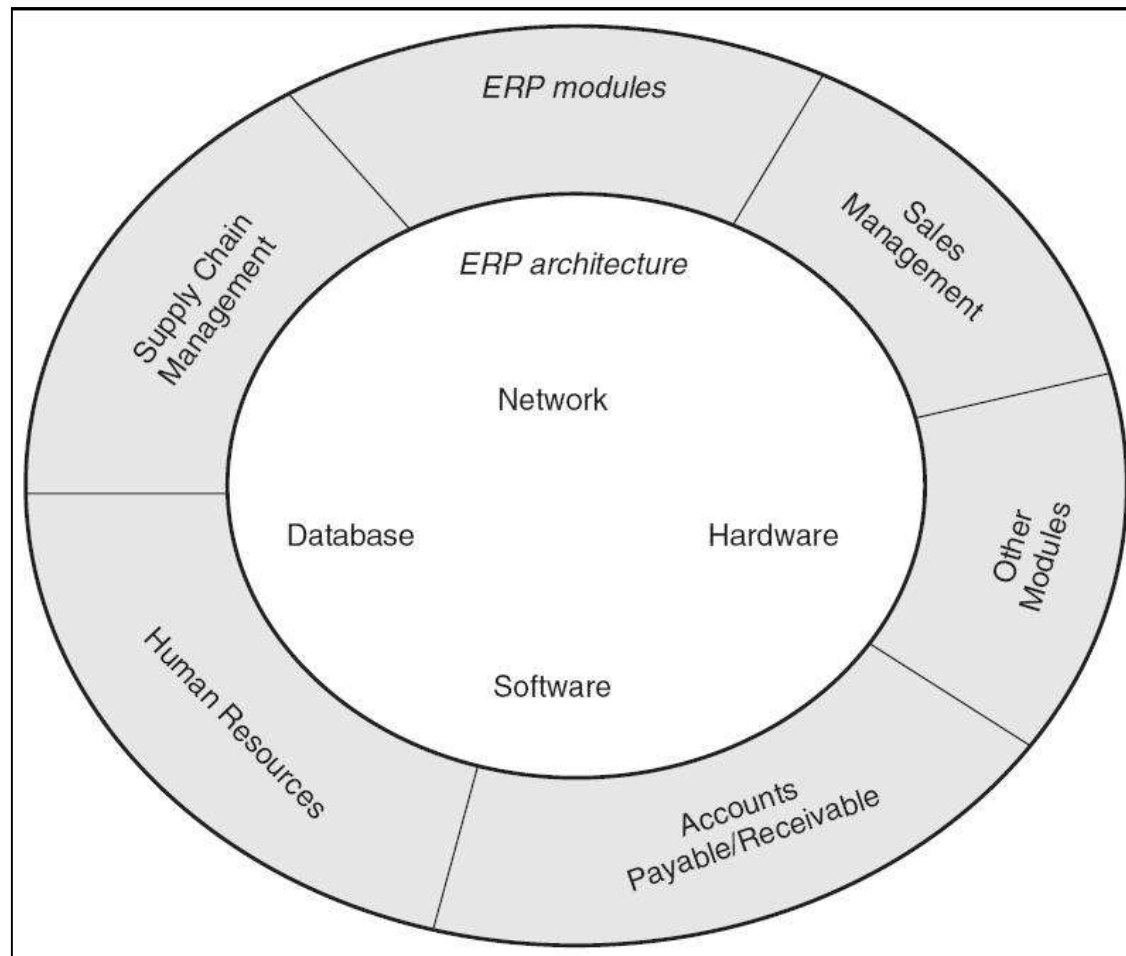
ERP Modules
*****

- The key role of an ERP system is to provide support for such business functions as accounting, sales, inventory control, and production.

- ERP vendors, including SAP, Oracle, and Microsoft, etc. provide modules that support the major functional areas of a business.

- The ERP software embeds(include) best business practices that implement the organization's policy and procedure via business rules.

Figure 3-2 Typical ERP Modules

MRP/CRP	Sales & Marketing	Master Scheduling
BOM (Bill of Materials)	ERP	Shop Floor Control
Purchasing	Logistics	Accounts Payable/Re

Overview of Modules
******

- ## Production
  - Helps in the planning and optimizing of the manufacturing capacity, parts, components, and material resources using historical production data and sales forecasting.

- ## Purchasing
  - Streamlines the procurement process of required raw materials and other supplies.

- ## Inventory Management
  - Facilitates the processes of maintaining the appropriate level of stock in a warehouse.

Overview of Modules (Cont'd)
****

- **Sales and Marketing**
  - Implements functions of order placement, order scheduling, shipping, and invoicing.

- **Finance**
  - Can gather financial data from various functional departments and generate valuable financial reports.

- **Human Resource**
  - Streamlines the management of human resources and human capitals.

- **Miscellaneous Modules**
  - Nontraditional modules such as business intelligence, self-service, project management, and e-commerce.
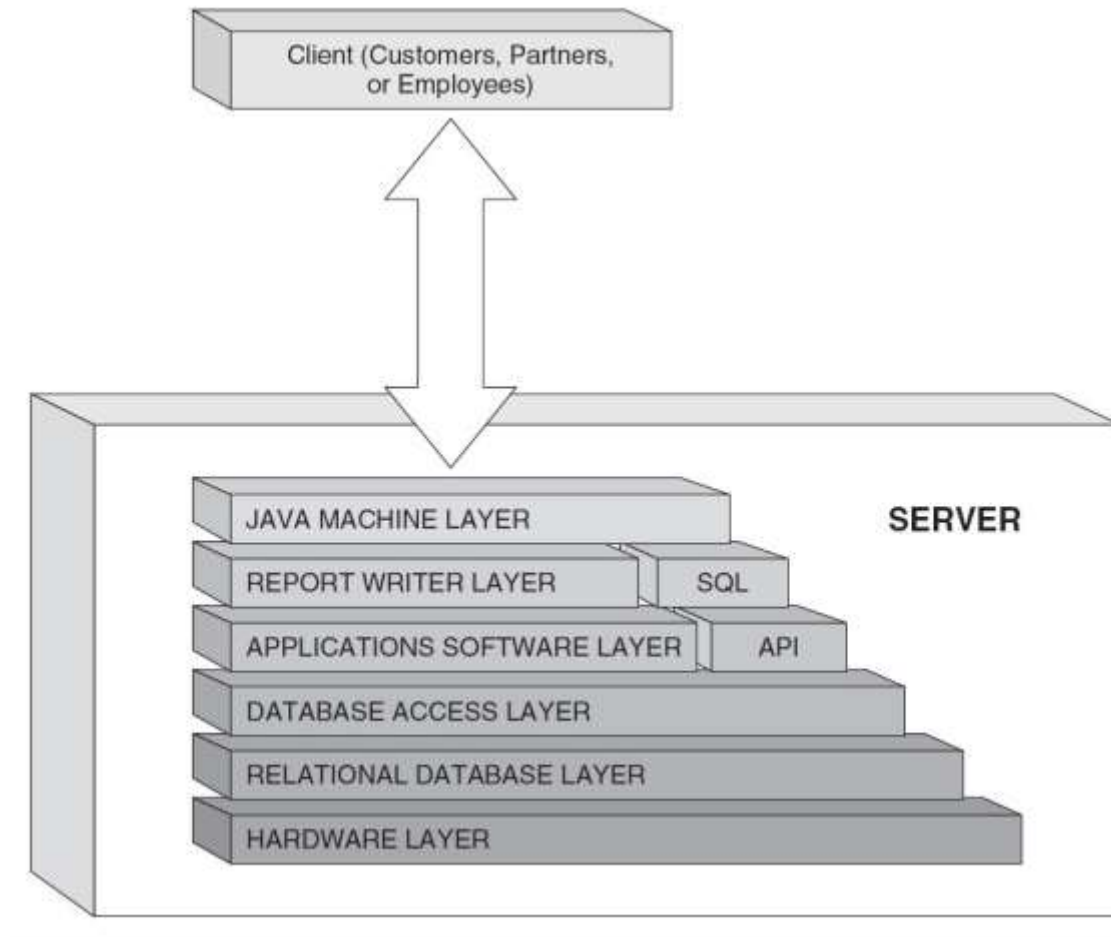
ERP Architecture
****

- ERP system architecture is organized in layers or tiers to manage system complexity in order to provide scalability and flexibility.

- Three-layer architecture (*the most reliable, flexible, and scalable architecture*) is the most prevalent today and includes:
  - Web Servers.
  - Application Servers.
  - Database Servers.

Layered Architecture Example (Info.Net)

- The Layered ERP architecture generalizes the functional layers to allow it to change with newer technologies.

- A Web-based user interface is provided.
  - Users can access the application via the Internet.
  - The PC needs to be capable of running a Java-enabled Web browser.
  - The PC is connected to both Intranet and Internet to be able to use one of Info.Net's servers.
  - The user interacts with the Java Virtual Machine™ Interface layer to establish a secure connection via a secure socket layer (SSL) connection.
  - The user is then communicating with the server through the applications software layer (ASL).

Figure 3-3 Example of Info.Net Architecture

Client (Customers, Partners, or Employees)

SERVER

JAVA MACHINE LAYER

REPORT WRITER LAYER   SQL

APPLICATIONS SOFTWARE LAYER   API

DATABASE ACCESS LAYER

RELATIONAL DATABASE LAYER

HARDWARE LAYER

Infrastructure Requirements

- Traditional networks require upgrading prior to the deployment of ERP systems and must be a component of the overall budget.

- A high-availability network is a requirement for a fully functioning ERP system, one that grows with the user population and supports continued expansion and integration of a supply chain.

- Integration with partner and customer systems allows "a company to manage important parts of the business such as order tracking, inventory management etc."

- Online analytical processing (OLAP) provides the ability to access, present, and analyze data across dimensions.
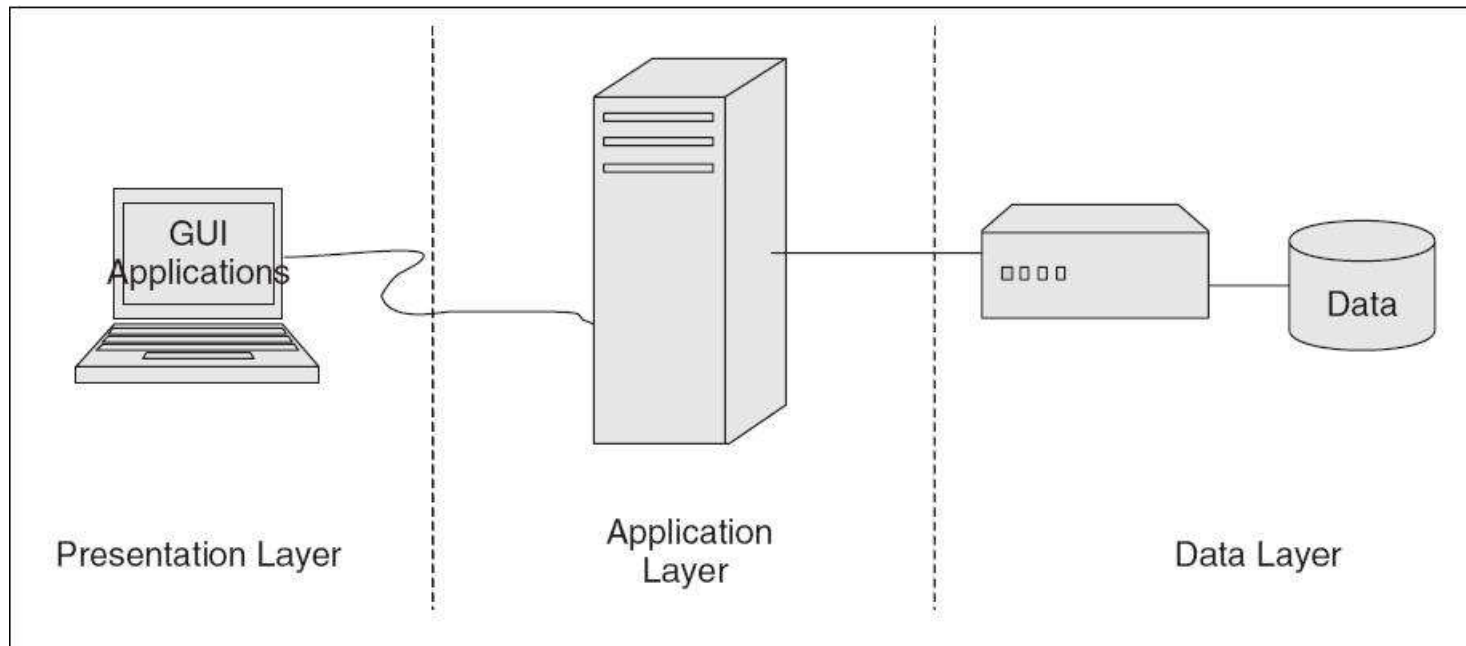
Three-Tier Architecture
****

- Most of the current ERP implementations follow a *three-tiered architecture, which consists of a Web tier, an application tier, and a data tier.*

- Benefits
  - Scalability - Easier to add, change, and remove applications.
  - Reliability - Implementing multiple levels of redundancy.
  - Flexibility - Flexibility in partitioning is very simple.
  - Maintainability - Support and maintenance costs are less on one server.
  - Reusability - Easier to implement reusable components.
  - Security - IT staff has more control system to provide higher security.

- Limitations
  - Can be very expensive and complex.

Tiers
****

- ## The Web Tier

  – Web-based portal allows users the ability to access and analyze information through their Web browser.

- ## The Application Tier

  – Consists of a Web browser and reporting tool where business processes and end-users interact with the system.

  – It shields the business users from the inner workings of an ERP system, but still provides the information relevant to their job and business process.

- ## The Data Tier

  – Focus is on structure of all organizational data and its relationships with both internal and external systems.

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Figure 3-4 A Three-Tier ERP Architecture

Presentation Layer   Application Layer   Data Layer

Web Services Architectures
****

- Web-based architecture often described as a fourth tier where the Web tier is split into Web Services tier and Web Browser tier.

- The ERP systems focus on the Internet to provide a powerful new functionality for Internet-based access and integration.

- This functionality is primarily supported through the following Internet access technologies:
  - Web Server.
  - ERP Portal.
  - Back-end Server Integration.
  - Browse Plug-ins or Applets.

Figure 3-5 Example of PeopleSoft's Server-Centric Internet Architecture

Adapted from: PeopleSoft Application Server Architecture (www.oracle.com)
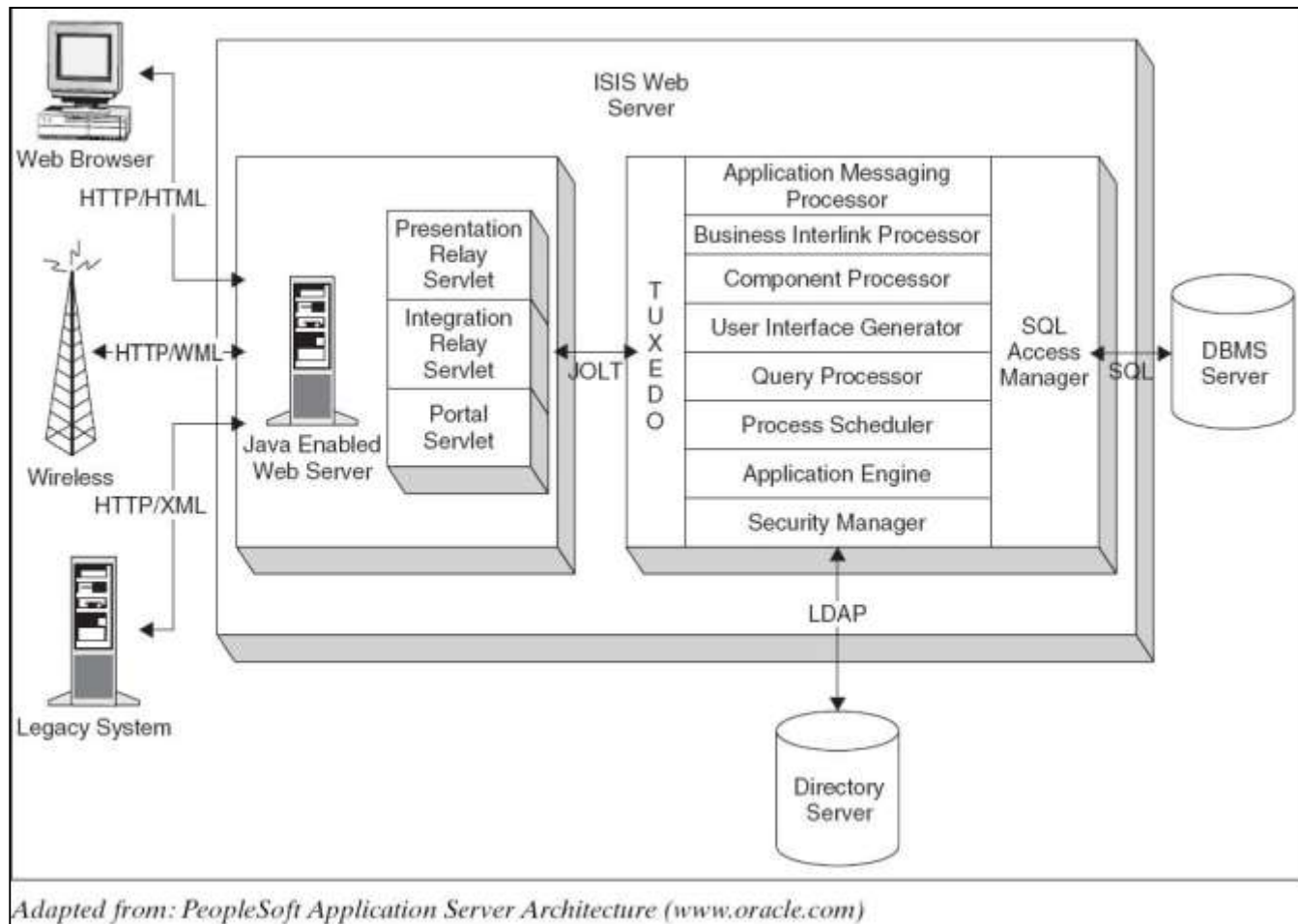
Benefits and Drawbacks

- Benefits
  - Large numbers of end-users have access to ERP applications over the Web.
  - Easily integrate ERP applications with existing systems.
  - Server-centric—No complex, expensive client software installation.
  - The server-centric architecture enables secure end-user access to ERP application.
  - Client-centric—Architecture has better response time because user requests are mostly processed on the client's computer.
  - Web-based architectures also allow better system-to-system integration.

- Drawbacks
 - Client-centric architectures lack security.
  - Server centric is slower.

Service-Oriented Architectures
*****

- Also known as object-oriented architectures for Web platforms.

- Breaks the business tier into smaller, distinct units of services, collectively supporting an ERP functional module.

- Allows message interaction between any service consumer and service provider.

- A consumer from a device using any operating system in any language can use this service.

Service-Oriented Architectures
******

- SOA is a software development model based on a contract between a consumer (client) and a provider (server) that specifies the following:

  - Functional description of the service.

  - Input requirements and output specifications.

  - Precondition environment state before service can be invoked.

  - Post condition environment state after service has been executed.

  - Error handling when there is a breakdown.

Figure 3-6 A SOA Architecture
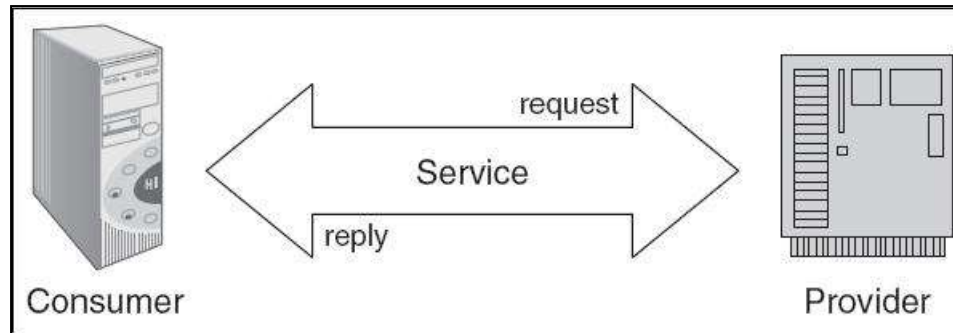
Benefits of Service-Oriented Architectures
****

- Business-level software services across heterogeneous platforms.

- Complete location independence of business logic.

- Services can exist anywhere (any system, any network).

- Loose coupling across application services.

- Granular authentication and authorization support.

- Dynamic search and connectivity to other services.

- Enhances reliability of the architecture.

- Reduces hardware acquisition costs.

Business Value Benefits of SOA
****

- Increases the ability to meet customer demands more quickly.

- Lower costs associated with the acquisition and maintenance of technology.

- Empowers the management of business functionality closer to the business units.

- Leverages existing investments in technology.

- Reduces reliance on expensive custom development.

Drawbacks of Service-Oriented Architectures
****

- SOA implementations are costly and time-consuming.

- Requires complex security firewalls in place to support communication between services.

- Performance can be inconsistent.

- Requires enterprise-level focus for implementation to be successful.

- Security system needs to be sophisticated.

- Costs can be high because services needs to be junked very often.

SOA and Web Services
****

- Web services basically are interfaces that allow different software application and components to be operated together.

- According to IT industry standards, different applications can interact with without communication problems.

- The only method of interaction by Web services is by receiving and sending messages.

- Services are developed using open standards such as WSDL (Web Services Description Language), UDDI (Universal Description, Discovery, and Integration), and SOAP (Simple Object Access Protocol).

- The protocols used in Web services are XML-based.

Enterprise Content Management and SOA

- Enterprise content management deals with enterprise software products that usually store, preserve, manage, and deliver content connected to business processes.

- Enterprise content management also about supporting business goals, not just managing content.

- Vendors have come to an understanding that content management takes advantage of technology and information assets across the business and is no longer application specific.

Cloud Architecture
****

- Cloud computing is basically a software service provided over the Internet, securely, by a service provider on a monthly or yearly lease.

- Companies leasing CC services save money by replacing their purchased software that requires a license fee per seat.

- Some cloud computing providers also let you build your own applications using their engines and then they would host those applications for you as part of the service.

Cloud Architecture
****

- The cloud computing platform provides a great alternative for organizations that do not want to:

    – Purchase, install, or maintain software applications.

    – Worry about security, privacy and legal issues associated with data storage.

- The cloud computing platform is risky for organizations as it forces them to rely on external vendors for reliability, security, and continuity of enterprise applications.

Benefits of Cloud Computing
****

- Pay for subscription, not for licenses and upgrades.

- Reduced capital and operating expenditures for IT equipment and support personnel.

- Accessed from everywhere, as long as you have an Internet connection.

- No need to install anything on the user's computer.

- Dynamic scalability available on demand.

- No maintenance fees for software or hardware.

- Promotes green computing environment as servers in cloud run on clean energy.

- Guaranteed reliability.

Drawbacks of Cloud Computing

- Data security.

- Vulnerability.

- Possible conflict of interest, if the company who stores your applications decides to create a similar application to what you created on their servers.

- Not suited for all highly competitive industries like biotech where intellectual property cannot be protected easily.

Implications for Management

- Enterprise architecture is an important technology for the long-term functioning of the organization.

- ERP architecture decisions are complex because their impact goes beyond systems and technology to people, organizational policy, and business processes.

- ERP architecture must be flexible to support a diverse set of hardware and software platforms.

- Management must learn how to filter out the hyped technologies that do not provide value to their organization.

Summary

- System architecture provides answers to questions like:

    - What will the system look like?

    - How will the system work?

    - How will it be developed?

    - Do we have the required infrastructure to support the system?

    - Can the system be used for any business function or just for a specific business function like human resources?

- System architecture includes ERP modules and ERP architecture.

Summary (Cont'd)

- Major vendors provide modules to support basic business functions as accounting, finance, marketing, and HR to such advanced business functions as self-service, compliance management, business intelligence.

- ERP systems have traditionally been organized in three-tiers or layers providing flexibility and scalability: data, application, and presentation.

- There are various types of layered architecture.
  - Two-tier architecture is the simplest form.
  - Three-tier architectures separate application from the presentation layer.
  - Web-based architectures facilitate better integration with Internet technologies.

Summary (Cont'd)

- Service-oriented architecture separates the service provider from the service consumer similar to object-oriented system architecture which has a higher degree of separation.

- Management must be involved in the design of the architecture from the very beginning of the ERP implementation project because the system has a wide and long-lasting implication on the organization.
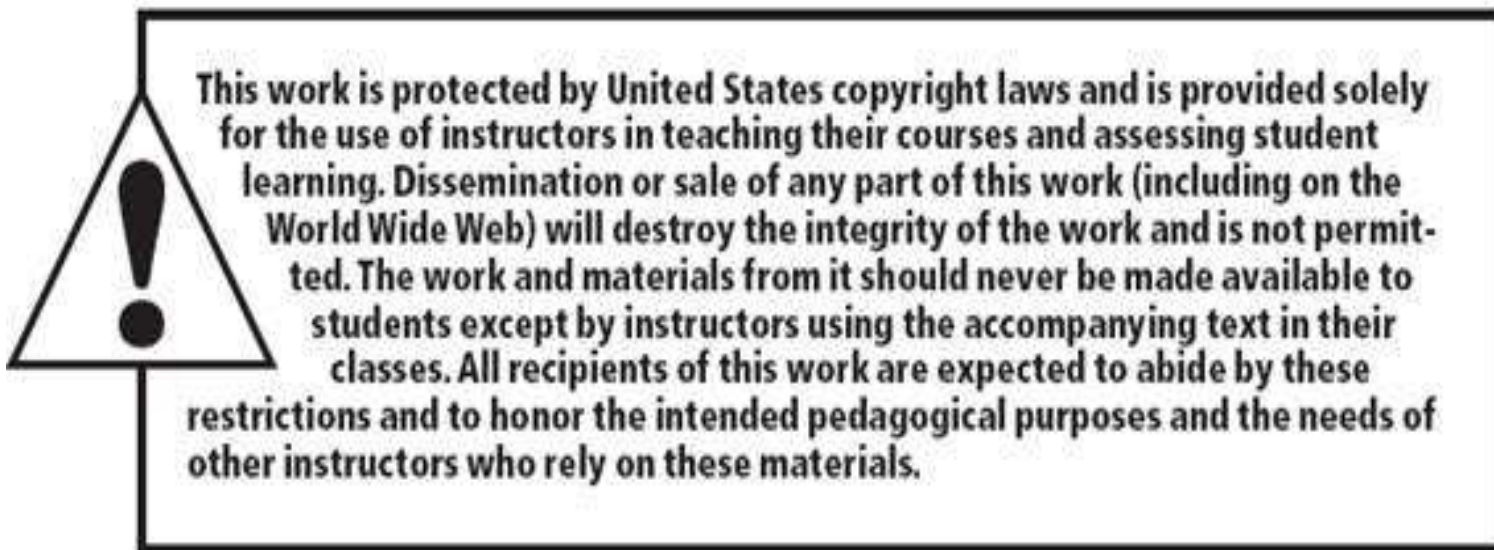
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UNIT 4

DEVELOPMENT LIFE CYCLE

Learning Objectives

- Review the Systems Development Life Cycle (SDLC).

- Examine the problems and alternatives with SDLC.

- Know the key issues in ERP implementation strategy.

- Understand ERP Implementation Life Cycle.

- Examine the rapid implementation methodologies.

- Compare and contrast SDLC and ERP Life Cycles.

- Examine the role of people like top in the ERP Life Cycle.

- Understand the importance of the PMO and the project organization to a successful ERP implementation.

- Know the components of a project organization and the roles and responsibilities of each.

Systems Development Life Cycle (SDLC)
****

- SDLC includes a systematic process of planning, designing, and creating an information system for organizations.

- It is often better to have a structured methodology to avoid mishaps and coordinate the design and development tasks properly among the members of a large systems development team.

- Systems Approach—Complex problems are broken up into smaller manageable problems using a systems' hierarchy, and then developing a solution for each problem within the hierarchy.

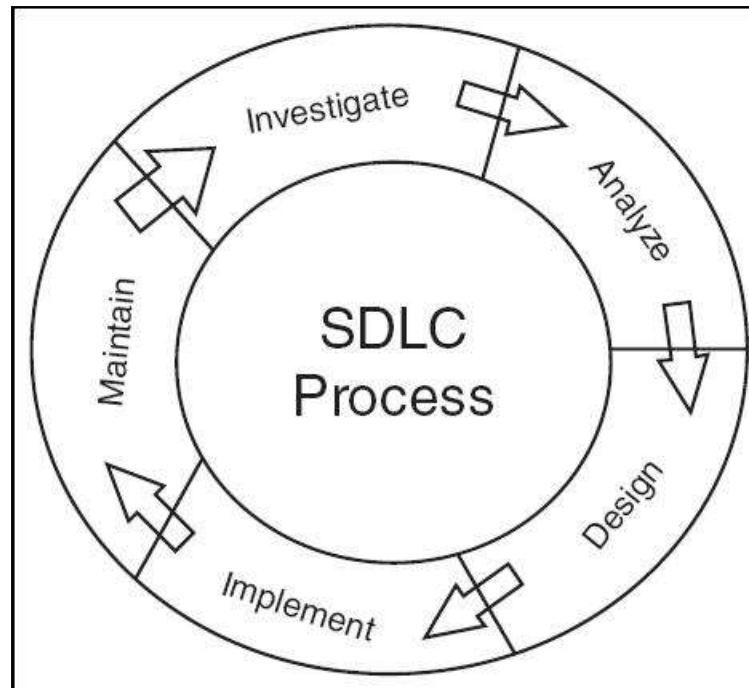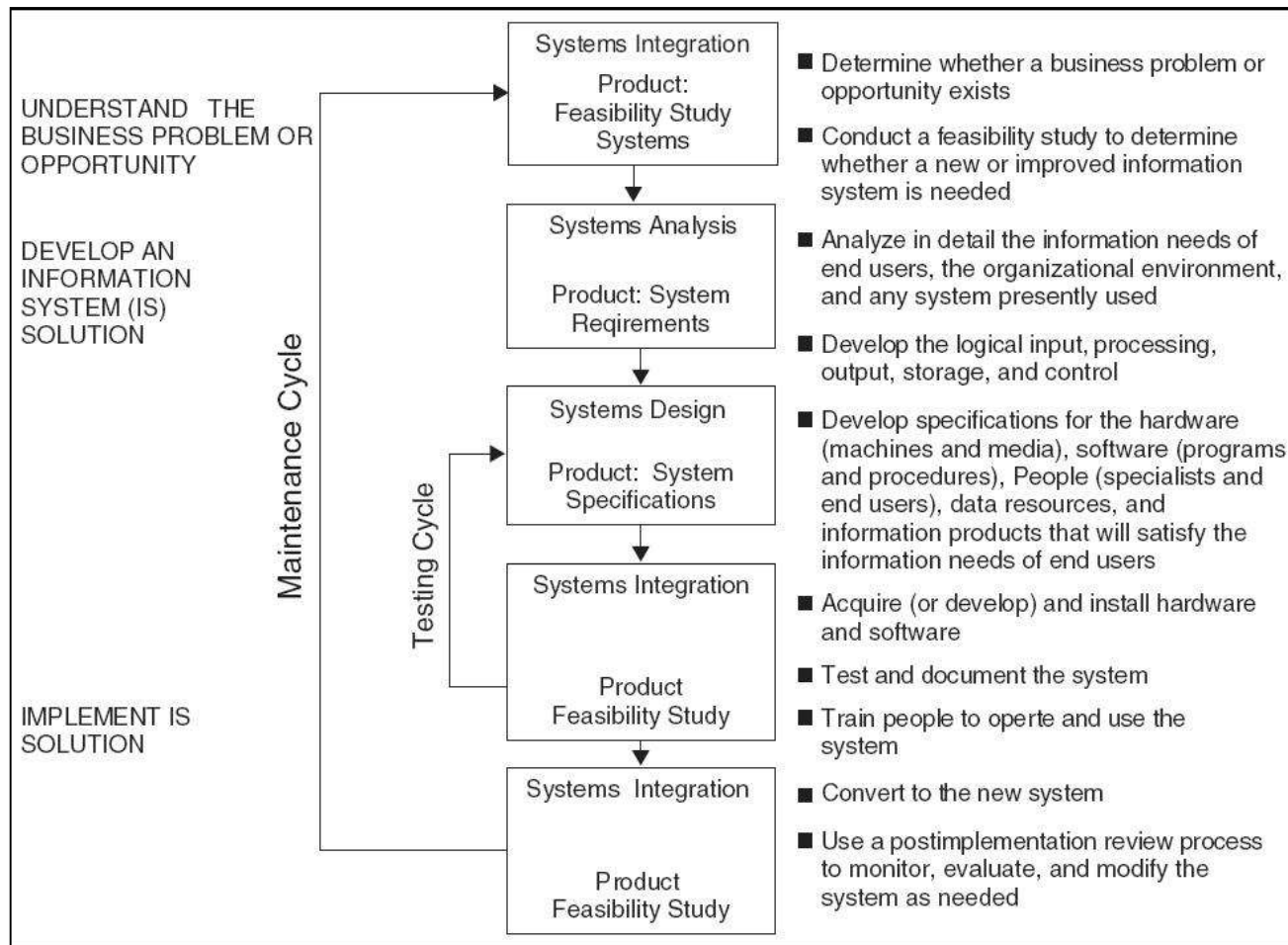# Figure 4-1 Traditional SDLC Methodology

****

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Figure 4-2 SDLC Approach

UNDERSTAND THE BUSINESS PROBLEM OR OPPORTUNITY

DEVELOP AN INFORMATION SYSTEM (IS) SOLUTION

IMPLEMENT IS SOLUTION

Maintenance Cycle

Testing Cycle

Systems Integration
Product: Feasibility Study Systems

Systems Analysis
Product: System Reqirements

Systems Design
Product: System Specifications

Systems Integration
Product Feasibility Study

Systems Integration
Product Feasibility Study

- Determine whether a business problem or opportunity exists
- Conduct a feasibility study to determine whether a new or improved information system is needed
- Analyze in detail the information needs of end users, the organizational environment, and any system presently used
- Develop the logical input, processing, output, storage, and control
- Develop specifications for the hardware (machines and media), software (programs and procedures), People (specialists and end users), data resources, and information products that will satisfy the information needs of end users
- Acquire (or develop) and install hardware and software
- Test and document the system
- Train people to operte and use the system
- Convert to the new system
- Use a postimplementation review process to monitor, evaluate, and modify the system as needed

Rapid SDLC Approaches
****

- ## Prototyping
  - This approach does not go through the analysis and design phase.
  - It implements a skeleton or a prototype of the actual system with a focus on data input and output.
  - The idea is to demonstrate the system functionality to the users.
  - Feedback is incorporated into the new system and demonstrated back to the users.
  - This approach has proven to be very effective with user interactive systems because the prototype is eventually converted into a full-scale system.

- ## End User Development (EUD)
  - Users are trained to develop their own applications (e.g., a departmental employee tracking system with an Access database).

Figure 4-3 Prototype Development
****
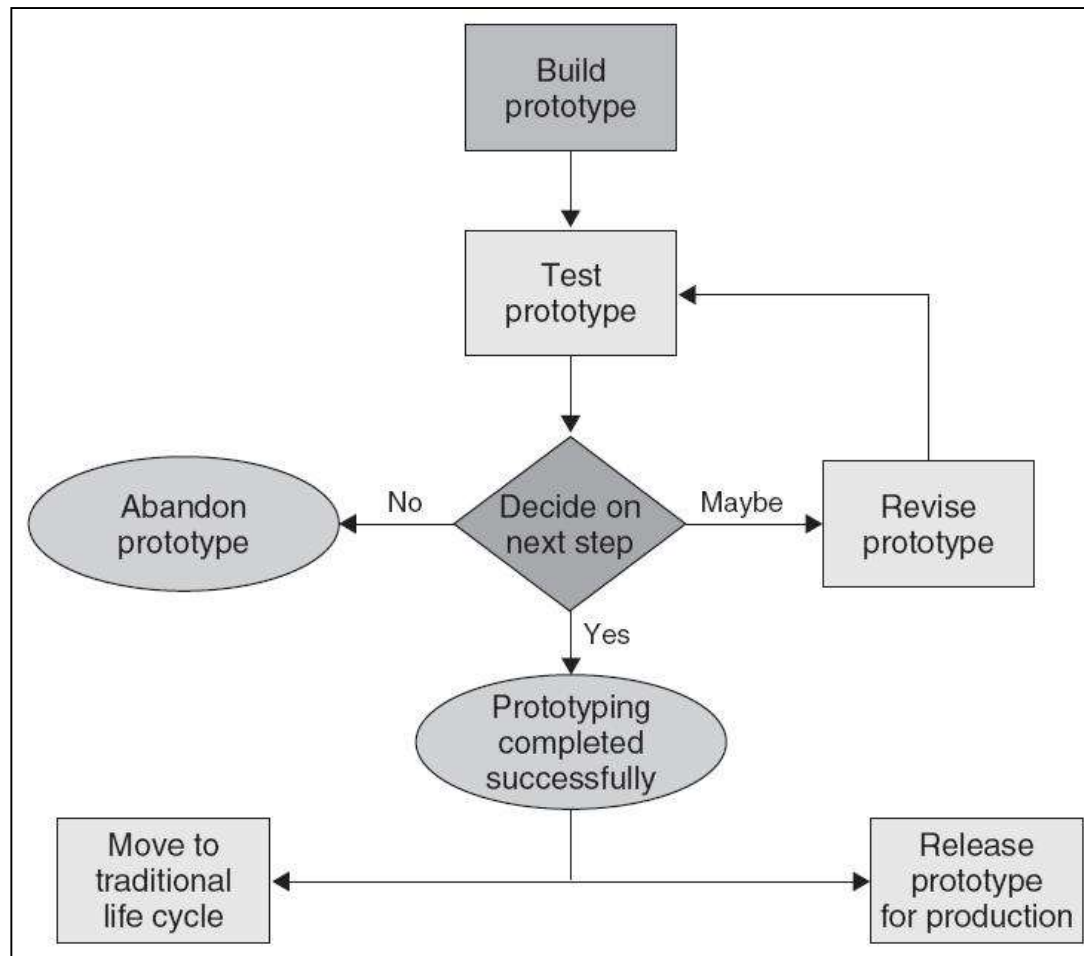
ERP Implementation Plan
****

- ## Comprehensive
  - Involves implementation of the full functionality of the ERP software in addition to industry-specific modules.
  - Requires a high level of business process re-engineering.

- ## Middle-of-the-Road
 - Involves some changes in the core ERP modules and a significant amount of business process re-engineering.

- ## Vanilla
  - Utilizes core ERP functionality and exploits the best practice business processes built into the software.
  - Business process re-engineering is eliminated.**(no need for reeng)**

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ERP Implementation Methodology
******

- An ERP development life cycle provides a systematic approach to implementing ERP software in the changing but limited-resource organizational environment.

- The traditional ERP life cycle accomplishes one stage at a time and requires formal milestone approvals prior to moving to the next stage.

- In a rapid ERP life cycle, once a company commits to the implementation, employees are empowered to make the decisions to keep the project moving forward.

Figure 4-4 Rapid Application Development Process
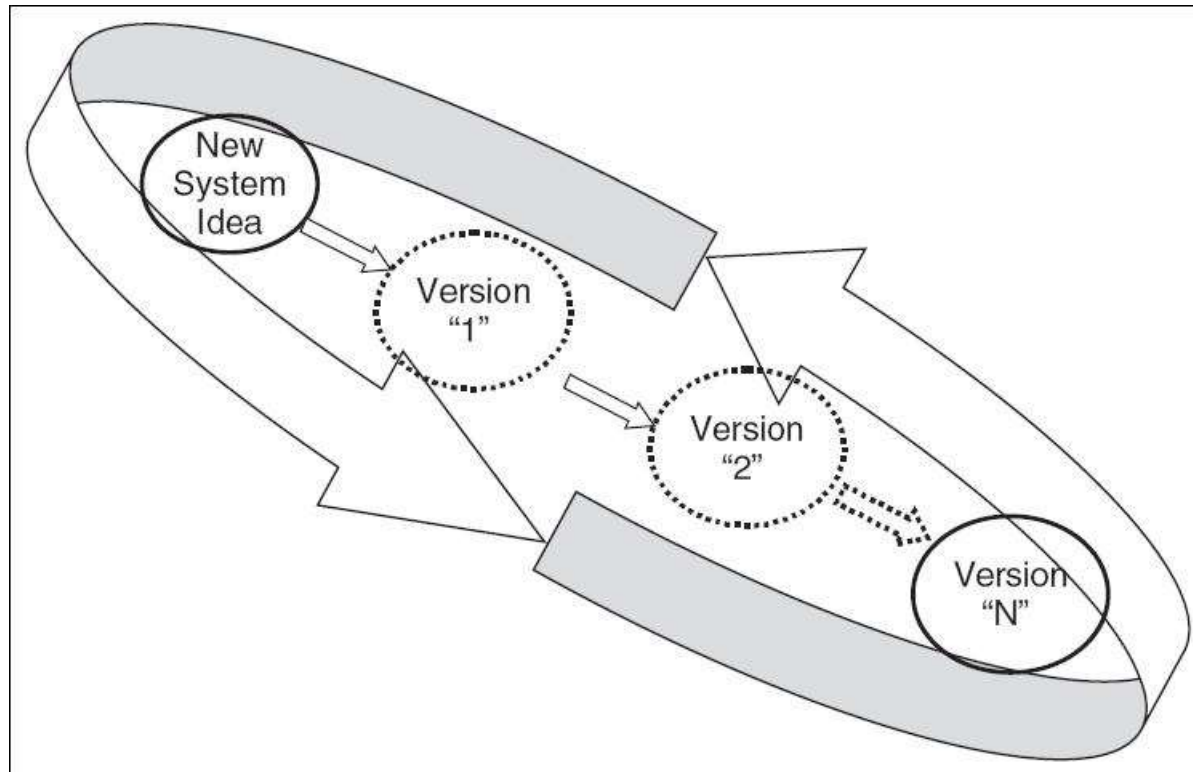
Traditional ERP Life Cycle
****

- **Scope and Commitment Stage**
  - In addition to conducting the feasibility study, a scope of the ERP implementation is developed within the resource and time requirement.

  - Characteristics of the ERP implementation are defined.

  - Develop a long-term vision for the new system and a short-term implementation plan and top management's commitment.

  - Vendor Selection.

Figure 4-5 Traditional ERP Life Cycle

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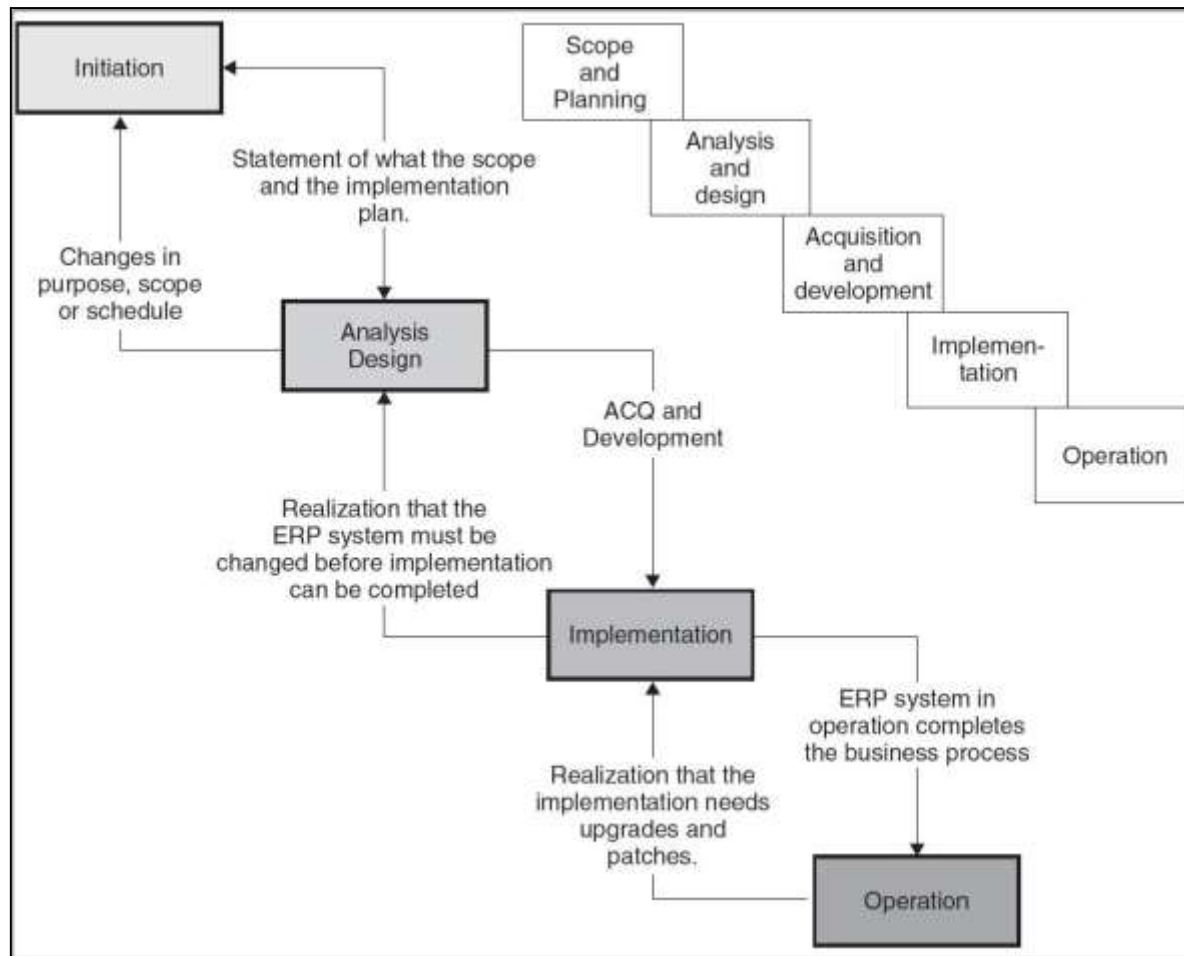
Traditional ERP Life Cycle (Cont'd)

- **Analysis and Design Stage**

  - A decision on the software is made and decide on consultants and SMEs.

  - Analysis of user requirements.

  - Map the differences between the current business process and the embedded process in the ERP software.

  - Design a change management plan, a list of embedded (**include**) processes, user interface screens, and customizable reports in the ERP software.

  - Data conversion.

  - System conversion.

  - Training.

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Traditional ERP Life Cycle (Cont'd)

- **Acquisition & Development Stage**

  - Purchase the license and build the production version of the software to be made available to the end-users.

  - The tasks identified in the gap analysis are executed at this stage.

  - Change management team works with end-users on implementing the changes in business processes.

  - Data team similarly works on migrating data from the old system to the new system.

  - Finally, the ERP system needs to be configured with proper security.

Traditional ERP Life Cycle (Cont'd)

- **Implementation Stage**
  - Focus is on installing and releasing the system to the end-users and on monitoring the system release to the end-users.

  - System conversion (4 Phases)
    - Phased.
    - Pilot.
    - Parallel.
    - Direct Cut or big bang.

  - Feedback received from system usage needs to be funneled to the post-implementation team for ongoing system support.

Traditional ERP Life Cycle (Cont'd)

- **Operation Stage**

  – Handover or knowledge transfer is the major activity as support for the new system is migrated to the help desk and support staff.

  – Training of new users to the system as ERP modules are released.

  – Managing of new releases of the software, installation of patches and upgrades.

  – Managing the software contract with the ERP vendor.

Role of Change Management
****

- System failures often occur when the attention is not paid to change management from the beginning stages.

- A vision for CM needs to be articulated from the first stage and then revised, monitored, and implemented on a constant basis.

- SMEs and other internal users have the role of working with the team and to guide the implementation team on all the activities of change management.

- Support of the top management as well as skills of the change management team are essential for successful implementation.

Methodologies used in ERP implementation
****

- **Total Solution (Ernst & Young, LLP)**
- **Phases**
  - *Value Proposition.* Does the solution make sound business sense?
  - *Reality Check.* Is the organization ready for change?
  - *Aligned approach.* Setting the right expectations that deliver both short-term and long-term value.
  - *Success Dimension.* Getting the right blend of people, skills, methods, and management in the team.
  - *Delivering Value.* Measuring results and celebrating success.

Methodologies used in ERP implementation (Cont'd)
****

- **Fast Track (Deloitte & Touche)**
- **Phases**
  - *Scoping and Planning:* Project definition and scope. Project planning is initiated.

  - *Visioning and Targeting:* Needs assessment. Vision and targets identified. As-is modeling.

  - *Redesign:* To-be Modeling. Software design and development.

  - *Configuration:* Software development. Integration test planning.

  - *Testing and Delivery:* Integration testing. Business and system delivery.

Methodologies used in ERP implementation (Cont'd)
****

- **Fast Track (Deloitte & Touche)**
- **Areas**
  - *Project Management* (project organization, risk management, planning, communications, budgeting, quality assurance).

  - *IT Architecture* (hardware and network selection, installation, operations, design, development, installation).

  - *Process and Systems Integrity* (security, audit control).

  - *Change Leadership* (leadership, commitment, organizations design, change-readiness, policies, performance measurements).

  - *Training and Documentation* (needs assessment, training design and delivery, management, end-users, operations, and helpdesk.

Methodologies used in ERP implementation (Cont'd)
****

- **Accelerated SAP (ASAP)**
  - *Project Preparation.* Proper planning and assessing organizational readiness is essential.

  - *Business Blueprint.* The engineer delivers a complete toolkit of predefined business processes.

  - *Realization.* Based on the business blueprint steps are taken to configure the R3 system.

  - *Final Preparation.* In this phase, the R3 system is fine-tuned. Necessary adjustments are made.

  - *Go-Live and Support.* Procedures and measurements are developed to review the benefits of the R3 investment on an ongoing basis.

Project Management
****

- A clear project plan and reporting structure will better ensure that the project receives the attention and accountability needed to be successful.

- The project owners, a project steering committee, and project executive must develop the hierarchy and determine responsibilities.

- Many businesses now have a project management organization within IT to provide the project management necessary for company projects.

- The functional, technical, and change management staff for the project will likely consist of existing staff from the business, new hires, and consultants.

Figure 4-8 Project Organization
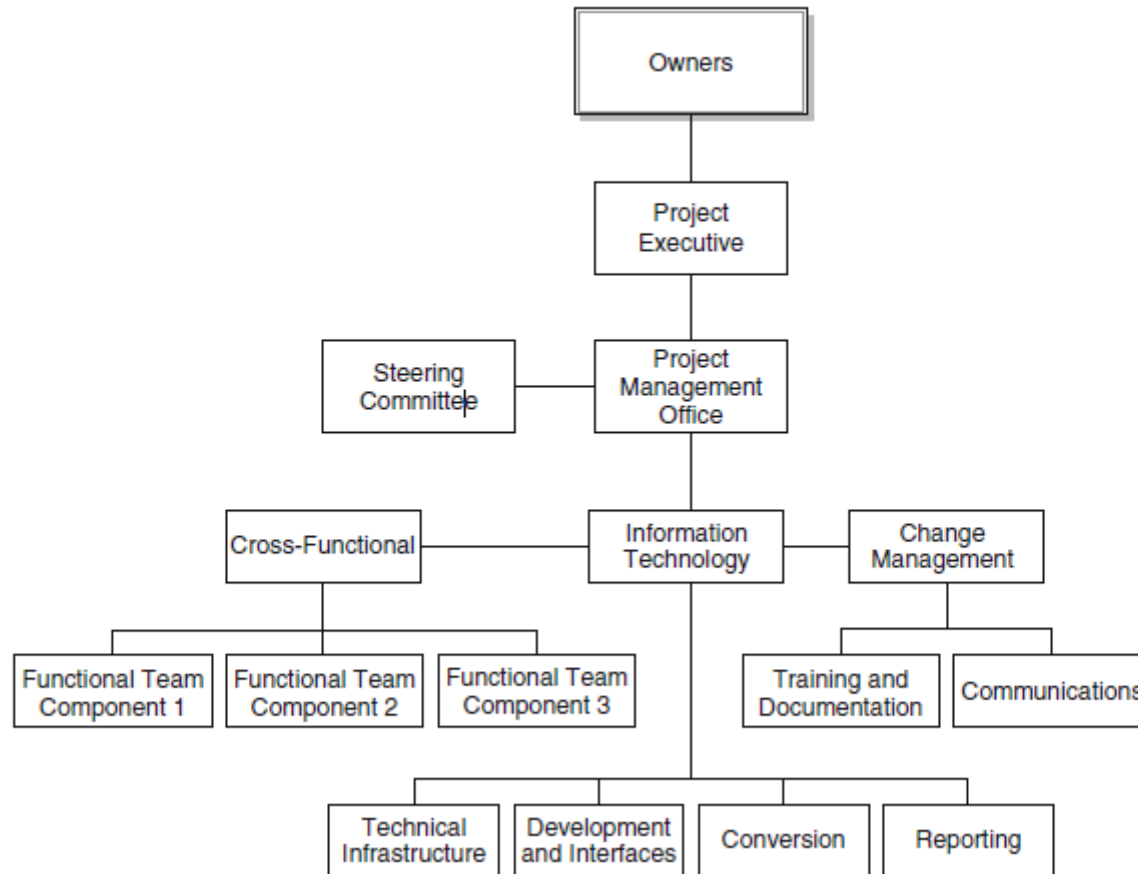
The Project Organization
****

- Project Management Office (PMO)
- Project Leads
  - They provide the input to management and coordinate team activities.
- Project Teams
  - The Functional Team- Knowledgeable staff from each area.
  - The Infrastructure Team- Implements hardware and software .
  - The Development Team- Modify the software to meet the goals.
  - The Conversion Team- Convert the legacy data to the new system.
  - The Reporting Team- Develops a reporting framework and initial set of reports to be included in the system implementation.
  - The Change Management Team- Training and communications plan for the project. Their role is to provide project implementation information to key areas within the organization.

Project Roles and Responsibilities

- Identifying and describing roles and responsibilities for project staff is necessary to ensure there is accountability within the project.

- Defining roles, often used as job descriptions on a project, will be the responsibility of the project management office.

- Each member of the project team will need to know what is expected of them, who they will report to, and what they will be evaluated on.

Implications for Management
****

- It is critical to have solid top management commitment.

- It is important to have strong and experienced program management.

- It is a good practice to minimize the type and number of customizations that are implemented.

- It is critical to emphasize training and change management.

  - Effective and frequent communication keeps everyone on the same page and give the greatest chance of problems being identified early.

Summary

- A review of the systems development life cycle—both traditional and alternative approaches—and points out the benefits and limitations of the traditional and the newer approaches.

- The ERP life cycle has variations from the SDLC process. The key reason is that organizations buy ERP as prepackaged software, and then have to customize them as well as change their company's business processes.

- There are three routes for the company in choosing an appropriate implementation strategy;
  - Comprehensive.
  - Vanilla.
  - Middle-of-the-road.

Summary (Cont'd)

- There are rapid implementation methodologies developed by ERP consulting firms.
  - Total Solution.
  - Fast-Track.
  - Rapid Application Development.
  - ASAP.
  - BIM.

- Accelerated implementation approaches are very popular and require the use of experienced consultants to leverage the knowledge of techniques that have worked well with other organizations.

Summary (Cont'd)

- ERP applications generally do not require the rigorous traditional SDLC process.

- ERP software is mission critical, has a major impact on the organization business processes, and impacts a lot of people.

- It is the role of the project management office to address teamwork initially and throughout the project as teamwork is paramount to the project.

- Each person on the project needs to understand their role and responsibility, thus making individuals and the project organization accountable to the project and the project's success.
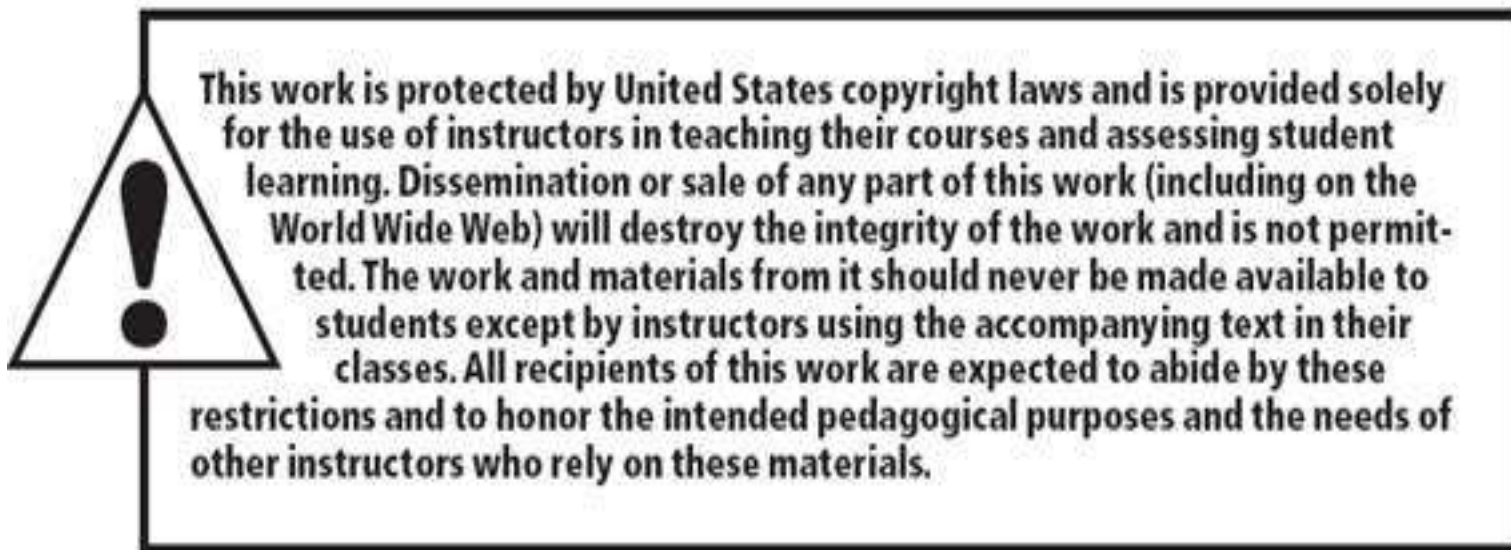
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UNIT 5

IMPLEMENTATION STRATEGIES

Learning Objectives

- Acquire a greater knowledge base of ERP components and how they work together to support business.

- Learn why third party products are needed to operationally round out ERP system functionality and the issues involved in using them.

- Appreciate the impact of an ERP implementation on platform components such as data security, system reliability, and sustainability.

- Understand implementation approaches, the differences between vanilla and chocolate implementations, and the short and long term impacts on the system and company.

ERP Components********

- ## Hardware
  - An ERP system will require a powerful set of servers for development, testing, and production environments.

- ## Key Resources
  - **Servers**. High-end multiprocessor systems, several gigabytes of main memory and several terabytes of secondary storage

  - **Clients**. People accessing ERP systems (e.g., end-users, IT support staff, and developers)

  - **Peripherals**. Print servers, printers, back-up power supply equipment, and networking hardware

ERP Components (Cont'd)
****

- ## Software
  - A set of operating instructions and logic called programs that control and direct the computer hardware to perform its functions.

- ## Key Components
  - **System Software.** Operating system platform (e.g., Microsoft Windows Server, Linux, and Sun Solaris)

  - **Database Management System (DBMS).** (SAP/R3 works with IBM-DB2, Oracle, Microsoft SQL)

  - **Application Software.** Project management software, development software, remote access software, and automated software for monitoring system traffic, virus protection, etc.

ERP Components (Cont'd)
****

- **People Resources**
  - **End-users.** Employees, clients, vendors, and others who will ultimately use the system

  - **IT specialists.** Database administrators, IT operations support, developers, change management, trainers, and others in IT

  - **The project manager.** Puts together a harmonious team, works with top management in getting support and resources for the project, and champion the system and its benefits to the end-users

- ERP implementation team includes various sub-teams from business or functional areas, change management, development, data migration, and system support.

ERP and Virtualization
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- A virtual machine (VM) server technology can be described as providing a "technique to run multiple and isolated virtual servers on a single physical device, thus optimizing hardware usage."

- Each virtual server that is installed in the same physical server operates under its own OS independently of the other VMs present

- The two more common models used for mission critical application are known as

  - Hardware virtualization
  - Paravirtualization

ERP Vendors and Virtualization

- **Microsoft**: The two virtualization choices available are Microsoft Virtual Server and Microsoft Virtual PC. "Microsoft does not test or support its software running together with non-Microsoft virtualization software"

- **Oracle**: Same as Microsoft. Oracle VM uses para-virtualization architecture based on the Xen open-source technology that brings with it both Linux and Windows support

- **SAP**: Strategy does not dictate what software customers can use to virtualize applications. They provide customers with tools, code tweaks, and support needed to make sure their SAP virtualization projects go smoothly.

Benefits of Virtualization

- Enhanced hardware utilization allowing an organization to consolidate underutilized servers

- Makes provisioning and deploying more agile. (**enhance the saving)**

- Through consolidation, virtualization can lower total cost of operations TCO at the data center by the following:

  – Deferred purchase of new servers

  – Smaller data center footprint

  – Lower maintenance costs

  – Lower power, ventilation, cooling, rack, and cabling requirements

  – Lower disaster recovery costs

  – Reduced server deployment costs

- Enhances business continuity and availability

Drawbacks of Virtualization

- Tendency to try to squeeze more performance out of a physical server by creating too many virtual machines leading to significant concerns when the server is operating at peak loads

- Security- If a hacker compromises the security of the hypervisor, he or she might get access to all virtual machines running on the host server

ERP Approaches
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- ## Governance

  - Governance should outline and define committees and workgroups that are responsible for the different components of the implementation, their interaction and decision making.

  - Components

    - Technical development

    - Hardware and software installation

    - Functional components

    - Communications and reporting

    - Change management

    - Project management

    - Project owners and sponsors

    - Budget management

    - Issue escalation process

Roles and Responsibilities
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- **Owners** (Consisting of Senior Management)— Determine overall policy, budget, and scope of the project.

- **Project Executive**—Oversees project activities, provides broad project oversight, resolves policy level issues, and ensures that the project stays within scope.

- **Steering Committee**—Oversee the project's efforts and ensure appropriate leadership.

- **Application Steward**—Works with the other business owners to develop an overall business direction of the system, developing consensus, and resolving functional issues raised to the steering committee.

Roles and Responsibilities (Cont'd)
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- **Chairperson**—Oversee the activities of the steering committee, ensuring that the committee functions in accordance with the overall project oversight. This includes budget, resources, deliverables, risk, and expectations management.

- **Project Management Office**—Consists of the project executive, business and technical project manager(s), and the implementation partner. Manage the day-to-day aspects of the project.

Roles and Responsibilities (Cont'd)
******

- **Project Teams—**Provide direction and ERP application knowledge with respect to business process design, configuration, conversion, testing, training, reporting, and implementation. The following teams will exist:
  - Cross-functional component team
  - Functional component teams
  - Technical Infrastructure team
  - Development team
  - Change management team
  - Conversion team
  - Reporting team

Roles and Responsibilities (Cont'd)
****

- **Project Team Leads—**Provide leadership and overall direction for the implementation, ensuring the quality of deliverables and adherence to the project plan and milestones.

  - The project team leads will inform the project managers of any and all issues that are identified by their respective project team.

- **Cross Functional Team—**The integration team will consist of the module or project team leads from the business modules and the development leads.

  - This group will meet as needed to discuss and resolve cross-module issues.

Sample Set of Meetings

- Project Sponsors Meeting

- Steering Committee Meeting

- Project Management Office Meeting

- Module or Project Leads Meeting

- Module or Project Team Status Meeting

- Issues Meeting

- Cross-Functional Module Meeting

- Database Planning Meeting

Implementation Methodology
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- When a system implementation does not have a well-defined methodology, deadlines will likely be missed, budgets overspent, and the functionality may not meet the client's requirements.

- ERP system implementations are very risky, but a well-defined project methodology will assist in managing those risks.

- The selected methodology should be able to address all components for the entire project including project start-up through system stabilization

Figure 5-2 Sample Project Methodology

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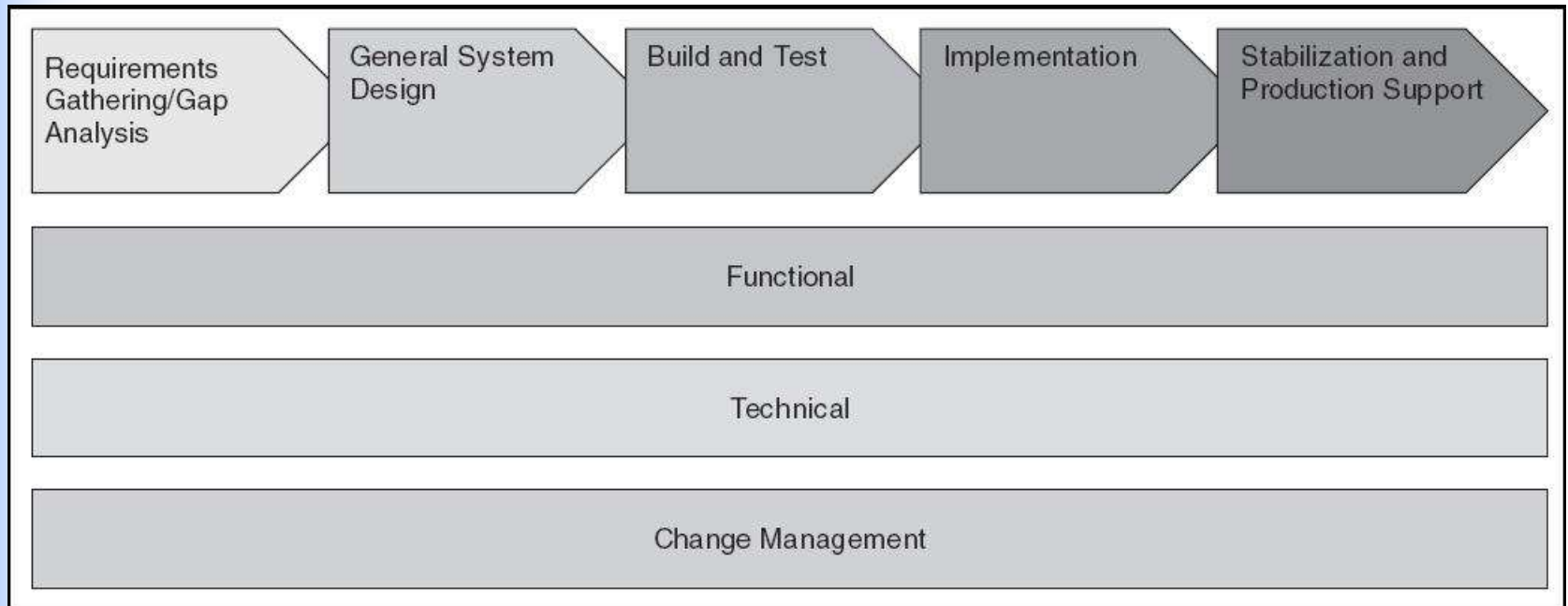
Vanilla Implementation

- A vanilla implementation is when the company chooses not to modify or customize the system, but instead to change business practices to fit the system.

- Reasons to consider Vanilla Implementation.
  - Businesses with relatively straightforward business practices that are not unique
  - Businesses that are not skilled or experienced at building or changing systems
  - For a company using a purchased ERP system where the financial component is critical for reporting
  - All of a company's branches are running the same system in a single instance, and entering and retrieving data in a similar fashion
  - For a competitive advantage, it is important to know the ability of what and where things are around the world with the business.

Modifying an ERP

- Businesses that have highly skilled IT developers and a proven process for managing modifications can choose to change the system to match their processes

- Benefits
  - A single-system instance is easier to maintain and support.
  - Assessing organizational change along with modifying the system to meet the needs of the business will help to minimize risk.

- Drawbacks
  - If a system is modified, each modification will need to be analyzed in light of the upgrade to see if it needs to be incorporated in the upgrade or removed.
  - An upgrade can sometimes turn into a re-implementation, which requires more resources and time.

Platform Issues

- ## Servers
  - Servers that make up the infrastructure will need to grow as the system grows and expands with enough storage to ensure data is quickly retrievable.

- ## Network
  - Businesses need a reliable and secure network in place.

- ## Security
  - Several components must be installed and implemented to ensure that the ERP system is secure from unauthorized access.

- ## Disaster Recovery and Business Continuity
  - Planning for a disaster and providing business continuity is a part of every ERP implementation.
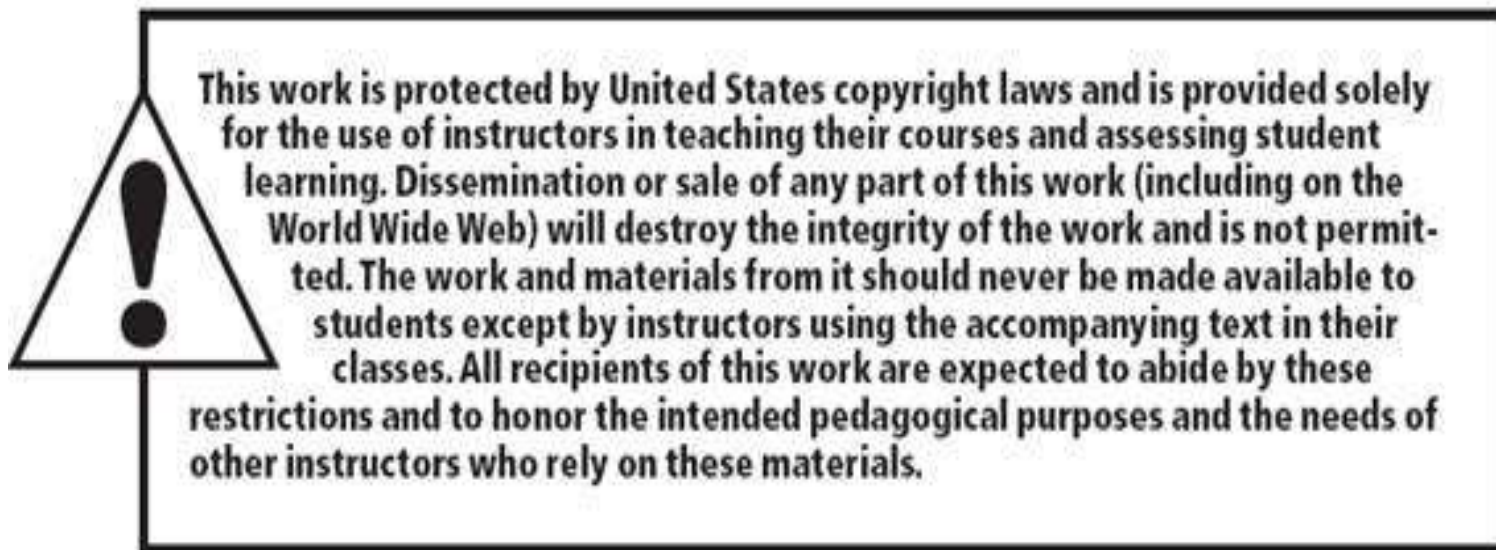
Implications for Management
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- An implemented ERP system can create opportunities for a business to grow and change for the better.

- Decisions around the hardware, software, governance, methodology, and level of modifications need to be based on the goals set out for the purchase of the ERP system.

- Two initial management decisions
  - Use of an implementation methodology
  - Whether or not to modify the system

- Management must decide on whether or not to customize prior to the start of the implementation process and it must be communicated to all on the project.

Summary

- Many components make up an ERP system. The software, as well as the surrounding operational software and third party software are needed to ensure that the business can accomplish its goals.

- ERPs are all about change, both to business flows and, more importantly, to employees making it very high risk.

- Managing the risk throughout the project with a proven implementation methodology is key to being successful.

- One key decision to make before the implementation is whether or not to modify the system, change business processes, or use some combination of modification and business change.

Summary (Cont'd)

Hardware	Software
•Application servers •Database servers •Web servers •Personal computers •Storage devices •Printers •Networking equipment •Uninterruptible power supply	•Operating system •Database management system •ERP system •Software development •System performance •Virus protection •Report distribution •Batch run control •Software version control

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