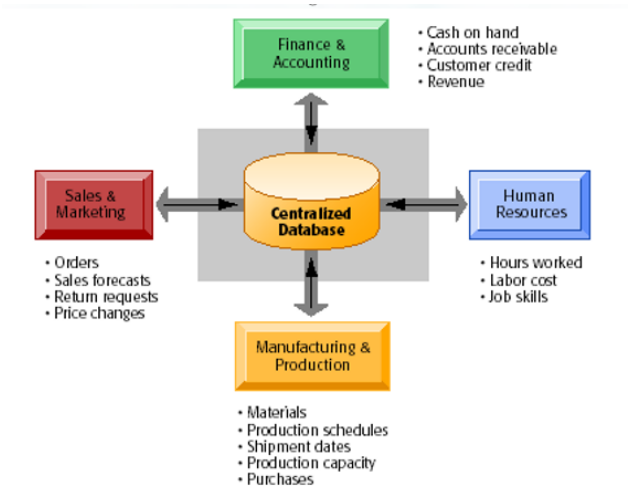
ENTERPRISE APPLICATIONS AND BUSINESS PROCESS INTEGRATION

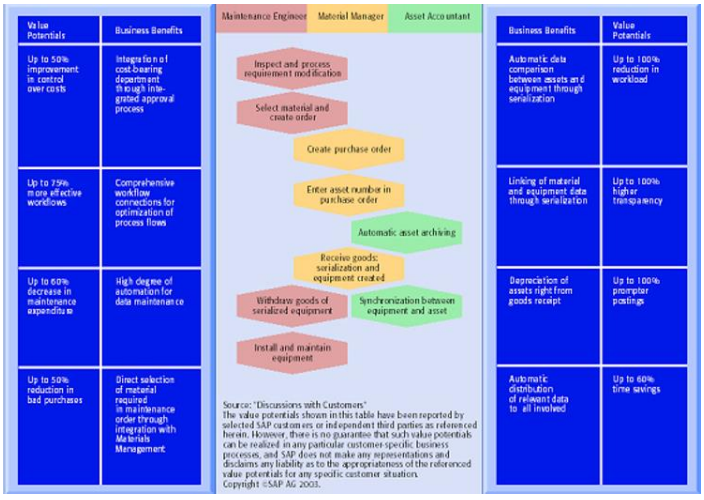
What Are Enterprise Systems?



How Enterprise Systems Work

- **Enterprise Systems:**
  - Enterprise Resource Planning (ERP) systems
  - Interdependent software modules with a common central database that support basic internal business processes for finance and accounting, human resources, manufacturing and production, and sales and marketing
  - Enables data to be used by multiple functions and business processes for precise organizational coordination and control.

Process Map for Procuring New Equipment



Business Value of Enterprise Systems

- A more uniform organization
- More efficient operations and customer-driven business processes
- Firmwide information for improved decision making

The Supply Chain

- **Supply chain:**
  - Network of organizations and business processes for procuring raw materials, transforming into products, and distributing them to customers
  - Materials, information, and payments flow through the supply chain in both directions.
  - Coordination of business processes to speed information, product, and fund flows up and down a supply chain to reduce time, redundant effort, and inventory costs

Supply Chain Processes

- **SCOR (Chain Operations Reference Model) identifies five major supply chain processes:**
  - **Plan:** Balancing demand and supply to meet sourcing, production, and delivery requirements
  - **Source:** Procurement of goods and services needed to create a product or service
  - **Make:** Processes that transform a product into a finished state
  - **Deliver:** Processes to manage order transportation and distribution
  - **Return:** Processes associated with product returns and post delivery customer support
  - **Logistics:** Planning and control of all factors that have an impact on the supply chain

Key Supply Chain Management Processes

Information and Supply Chain Management

- Inaccurate or untimely information causes inefficiencies in supply chain, such as shortages, excessive inventory
  Just-in-time strategy :
  - Scheduling system for minimizing inventory by having components arrive exactly at the moment they are needed and finished goods shipped as soon as they leave the assembly line
- **Bullwhip effect:**
  - Distortion of information about the demand for a product as it passes from one entity to the next across the supply chain

Supply Chain Management Applications

- **Supply chain management systems:** Automate flow of information between company and supply chain partners
- **Supply chain planning systems:** Generate demand forecasts for a product (demand planning) and help develop sourcing and manufacturing plans for that product
- **Supply chain execution systems:** Manage the flow of products through distribution centers and warehouses to ensure that products are delivered to the right locations in the most efficient manner

Supply Chain Performance Measurement

- **Metrics for measuring supply chain performance:**
  - Fill rate (the ability to fill orders by the due date)
  - Average time from order to delivery
  - The number of days of supply in inventory
  - Forecast accuracy
  - The cycle time for sourcing and making a product

Internet-based supply chain management applications:

- Provide standard set of tools
- Facilitate global supply chains
- Reduce costs
- Enable efficient customer response
- Allow concurrent supply chains

Push-based model:

- Production master schedules based on forecasts of demand for products, and products are “pushed” to customers

Pull-based model:

- Supply chain driven by actual customer orders or purchases

Business Value of Supply Chain Management Systems

- Improved customer service and responsiveness
- Cost reduction
- Cash utilization

Customer Relationship Management and Partner Relationship Management

- **Customer Relationship Management (CRM):**
  - Business and technology discipline for managing customer relationships to optimize revenue, profitability, customer satisfaction, and customer retention
- **Partner Relationship Management (PRM):**
  - Automation of the firm's relationships with its selling partners using customer data and analytical tools to improve coordination and customer sales

Customer Relationship Management Applications

- **CRM systems:**
  - Capture and integrate customer data from all over the organization
  - Consolidate and analyze the data
  - Distribute results to various systems and customer touch points across the enterprise
- **Touch point:**
  - A method of interaction with a customer, such as telephone, e-mail, customer service desk, conventional mail, Web site, or retail store

Customer Relationship Management (CRM) Software

- Can range from niche tools to large-scale enterprise applications
- Can link to other major enterprise applications, such as supply chain management
- Can include modules for PRM and employee relationship management (ERM)
- Typically include capabilities for
  - Sales Force Automation (SFA)
  - Customer service
  - Marketing

Operational and Analytical CRM

- **Operational CRM:**
  - Customer-facing applications, such as sales force automation, call center and customer service support, and marketing automation
    Examples: Campaign management, e-marketing, account and contact management, lead management, telemarketing, teleselling, e-selling, field sales
- **Analytical CRM:**
  - Applications that analyze customer data generated by operational CRM applications to provide information for improving business performance
    Examples: Develop customer segmentation strategies and customer profiles; analyze customer or product profitability; identify trends in sales length cycle; analyze leads generated and conversion rates

Business Value of Customer Relationship Management Systems

- Increased customer satisfaction
- More effective marketing and reduced direct marketing costs
- Lower costs for customer acquisition and retention
- Increased revenue from identifying most profitable customers and segments for marketing, cross-selling, up-selling
- **Reduce churn rate:**
  - Number of customers who stop using or purchasing products or services from a company

The Importance of CRM Performance Measurement

- Successful CRM implementations require that financial and operation goals, and metric for evaluation, are clearly defined at outset of project
- **Metrics for CRM may include:**
  - **Cost per lead**
  - **Cost per sale**
- Number of repeat customers
  Reduction of churn
  Sales closing rate
  Customer Lifetime Value (CLTV): Difference between revenues and expenses minus the cost of promotional marketing used to retain an account

Service Platforms and Business Process Management

- **Service Platform:**
    - Integration of multiple applications from multiple business functions, business units, or business partners to deliver a seamless experience for the customer, employee, manager, or business partner

Business Process Management:

- A methodology for dealing with the organization's need to change its business processes continually to remain competitive
- **Portals:** Frameworks for building composite services, integrating information form enterprise applications and in-house legacy systems

Management Opportunities:

- Improvement of process coordination and management decision making
- Reductions in inventory costs, order-to-delivery time, and more efficient customer response and higher product and customer profitability

Management Challenges:

- High total cost of ownership
- Organizational change requirements
- Realizing strategic value

Solution Guidelines:

- Look at business objectives first
- Attention to data and data management
- Senior management commitment and employee support
- Education and training

THIN CLIENT SUPPORT

- **WHAT IS THIN CLIENT SUPPORT**
  - is a lightweight computer that relies on a central server to perform most of its computational tasks.
  - have minimal hardware components & store no data locally.
  - an interface that allows users to access applications and data hosted on a remote server.
  - By offloading the processing power and storage requirements to the server, thin clients offer a cost-effective and low-maintenance computing solution.
  - ideal for organizations where security is paramount and for organizations with remote workers and budget constraints.
- **THIN-CLIENT SUPPORT**
  - initially designed solely for displaying text and were known as “text terminals”.
  - Over time, they progressed from this basic functionality to supporting graphical displays as well.
  - The versions capable of graphical display were initially termed “Windows terminals” before being rebranded as “thin clients.”
  - This name change reflects their nature as slim version of traditional PCs (also known as fat clients).
- **How do thin clients work?**
  - Thin clients rely on a technology called Virtual Desktop Infrastructure (VDI) to function.
  - VDI environment, the central server hosts virtual desktops, which are essentially individual user sessions running in the datacenter.
  - The thin clients act as endpoint devices, displaying the virtual desktops to the users and relaying their inputs to the server.
  - When a user interacts with a thin client device, such as launching an application or inputting data, the thin client forwards the user’s actions (keystrokes and mouse clicks) to the server.
  - The server then processes the commands and sends the output (graphical display) back to the thin client for display.
  - This process allows users to interact with the virtual desktop as if it is running locally on their device.

Thin client architecture components

- Thin client devices
- Central server
- Networking infrastructure
- Virtualization software
- Thin client management software
- **Thin client devices**
    - These devices serve as the interface between the user and the remote server. They display the virtual desktops and relay user input to the server.
- **Central server**
    - The central server hosts the virtual desktops and performs the computational tasks on behalf of the thin clients.
- **Networking infrastructure**
    - A stable network connection is essential for thin client operations. The networking infrastructure ensures that data transmission between the thin clients and the server is reliable and fast.
- **Virtualization software**
    - Virtualization software, such as VMware Horizon, Microsoft RDS, Citrix Virtual Apps and Desktops, etc. enables the creation and management of virtual desktops on the server.
- **Thin client management software**
    - This software enables remote management of thin clients from anywhere globally. With this tool, you can easily update configurations, install software, and remotely troubleshoot various issues.

What is a thin client OS?

- is a specialized software that runs on thin client devices.
  Unlike traditional desktop operating systems, thin client OSes are designed
    - to be very secure
    - Lightweight
    - optimized for graphical display
    - remote server connections
- They primarily provide the necessary components to establish and maintain a secure connection to the central server.
- contains client applications to connect to your VDI (Citrix, VMware, Nutanix, Microsoft, etc.) and some common browsers such as Chrome, Firefox, MS Edge, etc.
- Popular thin client OS options include ZeeOS, Microsoft Windows, and Linux-based distributions like Ubuntu Thin Client.

Characteristics of thin clients

- **Minimal local storage:**
    - Unlike desktop computers that often have large drives (128 GB), thin clients typically have minimal local storage (8 GB).
      All the critical files and applications are stored securely on the central server, this reduces the risk of data loss even if something happens to the device.
- **Centralized management:**
    - Thin clients can be easily managed and updated remotely from any location.
      over the Internet, IT administrators can apply software patches, deploy new applications, and enforce security policies across multiple devices simultaneously
- **Instantaneous connection to the virtual desktop:**
    - Thin clients often have a short startup time and can connect straight to the central server.
      This allows users to begin working almost immediately after turning on their thin client devices.
- **Longer lifespan:**
    - Thin clients are fanless, contain only a flash disk, and lack mechanical parts.
      contribute to a longer lifespan compared to desktop computers, leading to lower hardware replacement and upgrade costs.
- **Environmentally friendly**
    - thin clients offer a sustainable solution. Instead of replacing all individual devices, you only need to upgrade a central server, and the thin clients continue to perform well.
    - This approach is not only environmentally friendly but also cost-effective.
    - thin clients are energy-efficient, contributing to both economic and environmental savings.
    - These characteristics make thin clients an attractive option for organizations looking to streamline their IT infrastructure and reduce operating costs.

Types of thin clients

- **Hardware thin clients**
    - These are physical devices that resemble small desktop computers, often referred to as “thin clients.”
      They typically feature low-power processors, minimal storage, and no moving parts.
- **Hardware zero clients**
    - Zero clients are similar to hardware thin clients but have even fewer hardware components.
    - Zero clients are designed to work specifically with VDI environments and rely entirely on the central server for processing and storage.
    - However, zero clients typically offer limited performance for graphical display and face challenges in frequent and easy updates compared to thin clients. This difficulty arises because they contain firmware instead of software, making the update process more complex.
- **Software thin/zero clients**
    - differ from dedicated hardware by utilizing your current devices, such as PCs or laptops.
    - By replacing the existing operating system on these devices with the thin client OS, they can operate as thin clients and connect to remote servers.
    - This approach is particularly beneficial for organizations with existing PCs looking to transition to thin clients, as it helps save on capital expenditure (CAPEX).
    - This option eliminates the need to purchase new hardware extending the lifespan of current PCs for a few more years.

Advantages of thin clients

- **cost-efficiency**
    - initial purchase and ongoing device management compared to traditional PCs.
    - When dealing with PCs in your infrastructure, the time and effort spent on updating each physical device can lead to higher management costs, often surpassing the initial device purchase cost.
- **Utilizing a thin client management tool**
    - Can easily update and maintain thin clients without the need for physical intervention on each device.
    - This remote management of thin clients also leads to simplified IT management.
    - the need for local firewalls and antivirus solutions for individual PCs contributes to increased costs, which are not required for thin **clients.**
- **enhanced security**

    - Thin clients contain a secure and lightweight read-only operating system, preventing local configuration changes.
    - Any necessary changes can only be made by the admin through the remote management console.
    - This setup enhances security by ensuring that even if someone obtains the credentials, they are unable to launch remote attacks due to the restricted access and control limitations.

Disadvantages of thin clients

- **reliance on a stable network connection**
    - Since thin clients heavily rely on server connections, any network downtime or interruptions can disrupt productivity and prevent users from accessing their applications and data. You cannot work if it is not connected to a network
- **have limited processing power and storage capacity.**
    - This means that tasks requiring substantial computational resources, such as graphic-intensive applications or video editing, may not perform optimally on thin client devices.

What is a thin client used for?

- Business environments
- Educational institutions
- Healthcare facilities
- Financial organizations
- Call centers
- Kiosk systems

- **Business environments**
    - Thin clients are commonly used in corporate environments, providing employees with secure access to their virtual desktops.
      This allows users to securely work from any location, enhancing productivity and flexibility.
- **Educational institutions**
    - Educational institutions often deploy thin clients in computer labs, classrooms, and libraries.
      Thin clients simplify management for IT departments, provide consistent user experiences, and reduce the risk of unauthorized software usage or installations

- **Healthcare facilities**

    - Thin clients offer secure access to Electronic Health Records (EHRs) and medical applications within healthcare facilities.
    - This ensures patient data privacy and enables seamless collaboration between healthcare professionals.
    - thin clients emit low electromagnetic emissions due to the absence of a magnetic disk, making them suitable for healthcare facilities.
- **Financial organizations**
    - Thin clients are crucial for securing financial organizations, boasting a read-only OS and no local data, the data remains safe even if the endpoint is compromised.
    - Their remote management capabilities simplify IT tasks, providing control and auditability.
    - they support legacy applications, streamline disaster recovery, and enable secure remote work, making them indispensable for the evolving financial landscape.
- **Call centers**
    - Call centers often utilize thin clients due to their scalability and ease of management.
      Thin clients provide an efficient and consistent interface for call center agents, ensuring smooth customer interactions.
- **Kiosk systems**
    - Thin clients are commonly employed in self-service kiosk systems found in airports, hotels, and retail establishments.
    - By using thin clients, businesses can offer secure and controlled access to information and services without the need for complex local installations.
    - The adaptability and flexibility of thin clients make them invaluable in these real-world applications and many more.

Thin clients vs Thick clients

- Thin clients and thick clients represent two different computing paradigms, each with its advantages and considerations.
- Thick clients, also known as fat clients, are traditional desktop computers or workstations that possess robust hardware components, including powerful processors, ample storage, and dedicated graphics cards.
- Thick clients can run applications locally and are suited for resource-intensive tasks that require substantial computing power.
- They can also be used without a network connection. On the other hand, thin clients rely on central servers for processing and storage.
- They offer a more lightweight and cost-effective computing solution, ideal for tasks that do not require substantial local processing capabilities.

- Thin clients are especially advantageous in environments where data security, centralized management, and cost-efficiency are paramount.

Selecting the right thin client

- **Performance requirements**
    - Consider the computing power and performance needed for your specific applications and VDI protocol (Citrix, VMware, RDP, etc.). Ensure that the chosen thin client can handle the intended graphical workload without sacrificing user experience.
- **Connectivity options**
    - Evaluate the available connectivity options, such as Ethernet, Wi-Fi, and USB ports. This ensures seamless integration into your existing network infrastructure and peripheral devices.
- **Peripheral support**
    - Check if the thin client supports the peripherals required for your workflow, such as printers, scanners, and specialized input devices (COM ports for example). Compatibility with existing hardware saves additional costs and simplifies device management.
- **Management capabilities**
    - Assess the management features provided by the thin client, such as remote management capabilities, automatic firmware updates, data reporting, actions monitoring, etc. These features contribute to ease of administration and user support.