Hardware and Software Requirements for Implementation of ERP in Technical Education Institutes in India

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Abstract - ERP provides an integrated solution within which all facets of an organization and its data can interoperate. Most of the big ERP firms market products for higher technical education. For the most part, these vendors have taken a corporate solution and refashioned it to fit the specific needs of the nonprofit academic sector. In this paper we study and analysis of Hardware and Software Requirements for Implementation of ERP in Technical Education Institutes in India through venders of EPR and system administrators in educational institutes.

Index Terms — Database, Database Layers, Modules, Systems, erp, implementation

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INTRODUCTION - ERP Systems

Enterprise resource planning systems or enterprise systems are software systems for business management, encompassing modules supporting functional areas such as planning, manufacturing, sales, marketing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, transportation and e-business. The architecture of the software facilitates transparent integration of modules, providing flow of information between all functions within the enterprise in a consistently visible manner.

Corporate computing with ERPs allows companies to implement a single integrated system by replacing or reengineering their mostly incompatible legacy information systems. American Production and Inventory Control Society (2001) has defined ERP systems as "a method for the effective planning and controlling of all the resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company." We quote several definitions from the published literature to further explain the concept:

"ERP (enterprise resource planning systems) comprises of a commercial software package that promises the seamless integration of all the information flowing through the company–financial, accounting, human resources, supply chain and customer information" (Davenport, 1998). "ERP systems are configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization" (Kumar & Van Hillsgersberg, 2000). "One database, one application and a unified interface across the entire enterprise" (Tadjer, 1998).

"ERP systems are computer-based systems designed to process an organization's transactions and facilitate integrated and real-time planning, production, and customer response" (O'Leary, 2001). The concept of the ERP system can be illustrated, following Davenport (1998), with
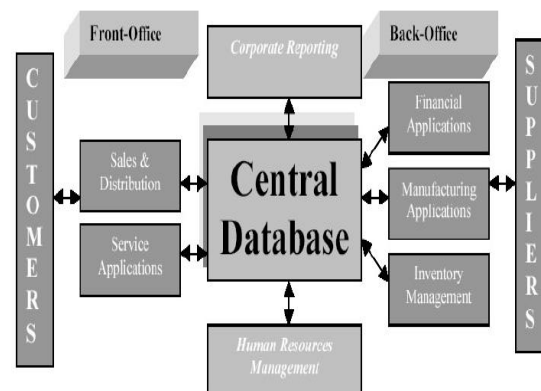

Figure 1: ERP systems concept

the diagram in **Figure 1.**

ERP Systems Architecture

ERP vendors, mostly experienced from the MRP and financial software services fields, realized the limitations of the old legacy information systems used in large enterprises of the 1970s and 1980s. Some of these old systems were developed in-house while others were developed by different vendors using several different database management systems, languages and packages, creating islands of noncompatible solutions unfit for seamless data flow between them. It was difficult to

increase the capacity of such systems or the users were unable to upgrade them with the organization's business changes, strategic goals and new information technologies.

An ERP system is required to have the following characteristics:

- Modular design comprising many distinct business modules such as financial, manufacturing, accounting, distribution, etc.

- Use centralized common database management system (DBMS)

- The modules are integrated and provide seamless data flow among the modules, increasing operational transparency through standard interfaces

- They are generally complex systems involving high cost

- They are flexible and offer best business practices

- They require time-consuming tailoring and configuration setups for integrating with the company's business functions

- The modules work in real time with online and batch processing capabilities

- They are or soon they will be Internet-enabled

Different ERP vendors provide ERP systems with some degree of specialty but the core modules are almost the same for all of them. Some of the core ERP modules found in the successful ERP systems are the following:

- Accounting management

- Financial management

- Manufacturing management

- Production management

- Transportation management

- Sales & distribution management

- Human resources management

- Supply chain management

- Customer relationship management

- E-Business

The modules of an ERP system can either work as stand-alone units or several modules can be combined together to form an integrated system. The systems are usually

designed to operate under several operating platforms such as UNIX, MS Windows NT, Windows 2000, IBM AIX, and HP-UX systems. SAP AG, the largest ERP vendor, provides a number of modules with its famous R/3 ERP system, which are shown in Table 1. New modules are introduced by SAP and other vendors in response to the market and technological demand such as the Internet technology.

Table 1

ERP MODULES

Financial Accounting	FI	Controlling	CO	Asset Management	AM
Project System	PS	Workflow	WF	Industry Solutions	IS
Human Resources	HR	Plant Maintenance	MM	Quality Management	QM
Production Planning	PP	Materials Management	MM	Sales & Distribution	SD
Investment Management	IM	Enterprise Controlling	EC	Treasury	TR
mySAP Supply Chain Mgmt. mySAP Customer Relationship Mgmt. mySAP Financials		mySAP Product Lifecycle Mgmt. mySAP Business I		mySAP Human Resources mySAP Marketplace by SAPMarkets mySAP Hosted Solutions mySAP Technology	

Enterprise systems employ thin client/server (C/S) technology or client/ fat server (C/FS) architecture, creating a decentralized computing environment. In a C/S system a number of client devices operated by end users such as desktop PCs request services from application servers, which in turn get the requested

service-related information from the database servers. The requests may be simple data files, data values, communication services, transaction processing or master file updates. The general practice is to have three-tier architecture such as in Figure 2. In this three-tier system the user interface runs on the client. To run ERP systems relatively powerful PCs (clients) and powerful servers are required where most of the hundreds of thousands of operations are performed. The client/server system functions are performed following three layers of logic:

Presentation Layer: Graphical user interface (GUI) or browser for data entry or accessing system functions.

Application Layer: Business rules, functions, logic, and programs acting on data received/transferred from/to the database servers.

Database Layer: Management of the organization's operational or transactional data including metadata; mostly employs industry standard RDBMS with structured query language (SQL) provisions as shown in Figure 2.
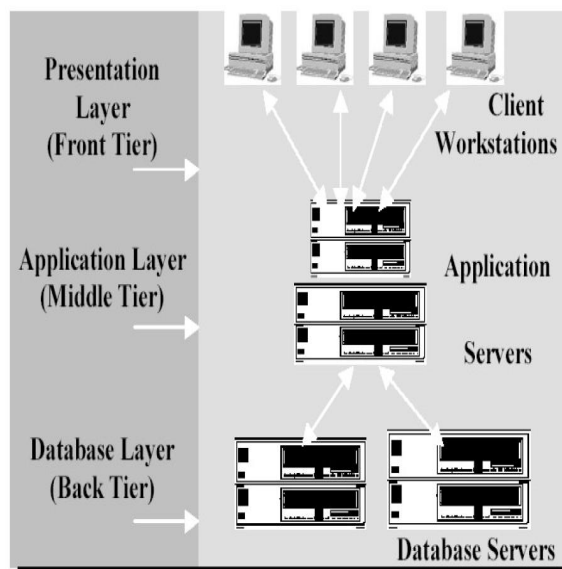

Figure 2: Database Layer

This logical arrangement helps the ERP user interface to run on the clients, the processing modules to run on the middle-tier application servers, and the database system to run on the database servers.

The introduction of the ERP in higher education in India has resulted in yet a further layer of change in universities to replace old administrative and management systems with new ones. However, one of the reasons that universities have adopted ERP systems is to improve performance and learning services, and also to become more efficient in their operations, in part to deal with the range of other changes they have been facing.

Consequently, universities began to implement ERP systems to replace old and outdated systems with more efficient ones. In the process, ERP systems have become a standard feature of most Indian higher education institutions. To date, most of the literature on ERP implementation in the Indian higher education sector has focused on the early stages of the ERP lifecycle: adoption decision, acquisition and implementation. Furthermore, in higher education institutions that have invested in ERP systems, the magnitude of the implementation project easily becomes the biggest information system project in the organization's history.

System Requirements

The minimum system requirements to install SAP ERP should be known before you decide to install it. Some minimum hardware and software requirements are essential and must be looked into so as to install SAP ERP. Since SAP is client server architecture software, the application would be running on the server and the clients would be connected to this server. A user interface has to be installed at the user's end which may be a desktop, laptop or some other device. The number of clients running on the server will decide the capacity of the server.

Sizing

A sizing is an approximation of the hardware resources required to support a specific software implementation. Several resources are available to assist with sizing. Solution Sizing Sheets are available to help you effectively respond to customer requests for ballpark sizing information. Sizing questionnaires are available to help you gather customer requirements.

Sizing application systems is an iterative process. Preliminary sizing's, based on limited information, may be rough estimates. As more information about the implementation becomes available, the sizing estimates can provide a better understanding of hardware requirements.

Many hardware vendors provide sizing questionnaires. Some of the tips to use these questionnaires are given below:

- For user-based sizing inputs, enter the number of concurrent, active users. Do NOT enter the number of licensed users, do NOT double count users (if some of your users work with several different components

attribute them to the component with which they work most of the time). IBM uses the following guideline, @35% of licensed users are concurrent active users. For example if 1,000 user licenses have been purchased there are 350 concurrent, active users.

You may also need to account for different time zones when determining the number of concurrent active users.

• Read and understand the user definitions for the different components. For ERP and CRM users, expect most of the users to be low or medium workload users. The guideline is that 10-20% of ERP or CRM users will be high workload users. When in doubt, assume users to be medium workload users.

BW user definitions are different than the user definitions for ERP and CRM. SAP guidelines are; @70% of the users are Info-consumer users, @25-27% is Executive users and @3-5% or less are Power users.

Portal SAP's default think time for Portal users is 211 seconds (In a previous version of the Net Weaver Portal Sizing, the Quick Sizer assumed a distribution of 60% concurrent active users with a think time of roughly 600 seconds between two Portal navigation steps, 34% with about 180 seconds think time and 6% with a think time of 30 seconds. These results in an average think time of 211 seconds, which is quite realistic for an Intranet scenario (NW-EP-INT). Think times of less than 60 seconds or less will result in large workload estimates.

• Throughput based inputs – Specify the average number of line items per transaction. For example if during peak processing you need to process 10,000 sales orders each with an average of 6 line items, specify "6" and not 60,000. Also use whole numbers (round up or down, the tool will not accept "6.5" line items).

• Keep in mind that there are many inputs which require in-depth knowledge of the application and will require that you work with a functional consultant to determine the inputs (e.g. SCM, Utilities, BW Infocubes and Datastore objects).

It is important to understand that "sizing" the hardware for each customer's ERP Software applications implementation is an iterative process, which may be

refined and repeated a number of times. If you are in the early stages of planning, you will probably have limited information about your planned environment. In this case, we can complete the sizing estimate with general information about your ERP Software applications users. When you are further along in your implementation planning, you will know more about ERP Software applications, the modules you plan to use, the number of users and your potential transaction activity. At that time, you may request another sizing estimate based on more detailed information. In any case, after receiving the results of a sizing estimate, you may choose to revise your input and request a re-sizing.

We cannot generalize the software and hardware requirements for any ERP Implementation as the requirements differ from one implementation to other.

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