White Paper on SAP

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S.A.P

1. What is SAP

Systems Applications Products in Data Processing (SAP) is a multinational software development and consulting corporation, which provides enterprise software applications and support to businesses of all sizes globally. Headquartered in Walldorf, Germany, with regional offices around the world, SAP is the largest software enterprise in Europe and the fourth largest software enterprise in the world. The company's best known product is its SAP Enterprise Resource Planning (SAP ERP) software.

1.1   ERP

SAP ERP application is an integrated enterprise resource planning (ERP) software manufactured by SAP AG that targets business software requirements of midsize and large organizations in all industries and sectors. It allows for open communication within and between all company functions that is effective communication and integration between all departments in an organization.

A complete architecture change took place with the introduction of my SAP ERP edition 2004. R/3 Enterprise was replaced with the introduction of ERP Central Component (SAP ECC). The SAP Business Warehouse, SAP Strategic Enterprise Management and Internet Transaction Server were also merged into SAP ECC, allowing users to run them under one instance. Architectural changes were also made to support enterprise services architecture to transition customers to a services-oriented architecture.

The following is the SAP ERP cycle.

Fig 1.1

Advantages & Disadvantages of SAP

The following are the advantages and disadvantages of SAP ERP

Advantages

- ERP allows easier global integration.
- Updates only need to be done once to be implemented company wide.
- Provides real-time information, reducing the possibility of redundancy errors.
- Creates a more efficient work environment making it easier for employees to do their job which leads to effectiveness.
- Vendors have past knowledge and expertise on how to best build and implement a system.
- No hardware purchase or maintenance costs.
- No developer training costs and the vendor will train the users.

Disadvantages

- Locked into relationship by contract and manageability with vendor - a contract can hold a company to the vendor until it expires and it can be unprofitable to switch vendors if switching costs are too high.
- Inflexibility- vendor packages may not fit a company's business model exactly and customization can be very expensive.
- Return on Investment may take too long to be profitable.

SAP ERP systems effectively implemented can have cost benefits. Integration is the key in this process. "Generally, a company's level of data integration is highest when the company uses one vendor to supply all of its modules." An out-of-box software package has some level of integration but it depends on the expertise of the company to install the system and how the package allows the users to integrate the different modules.

2. History of SAP

SAP was founded in 1972 as System analyse und Programmentwicklung ("Systems Applications and Products for Data Processing") by five former IBM engineers in Mannheim, Baden-Württemberg (Dietmar Hopp, Hans-Werner Hector, Hasso Plattner, Klaus E. Tschira, and Claus Wellenreuther).

 Since its foundation, SAP has made significant development and marketing efforts on standard application software, being a global market player with its R/2 system for mainframe applications and its R/3 system for open client/server technologies.   After the introduction of SAP R/3 in 1992, SAP AG has become the world's leading vendor of standard application software.

One of the reasons for SAP's success is that since it is a standard package, it can be configured in multiple areas and adapted to the specific needs of a company. To support those needs, SAP includes a large number of business functions, leaving room for further functionality and enhancements or adaptability to business practice changes. More and more, corporations are deciding to use standard software systems that are highly flexible and configurable and able to support most of their business practices and information needs. This kind of package leaves the development of custom software only for exceptional cases.

SAP AG has become the top European software vendor. It has formed a considerable number of subsidiaries in more than 40 countries; SAP America is the largest one, with corporate headquarters in Wayne, Pennsylvania. It has also established a technology development center in Foster City, California, and sales and support offices throughout North America. The company is committed to further expand into new international markets and to gain multinational support. That is one of the reasons SAP has developed a Kanji version of the R/3 system for the Japanese market and a new Mandarin version for the Chinese.
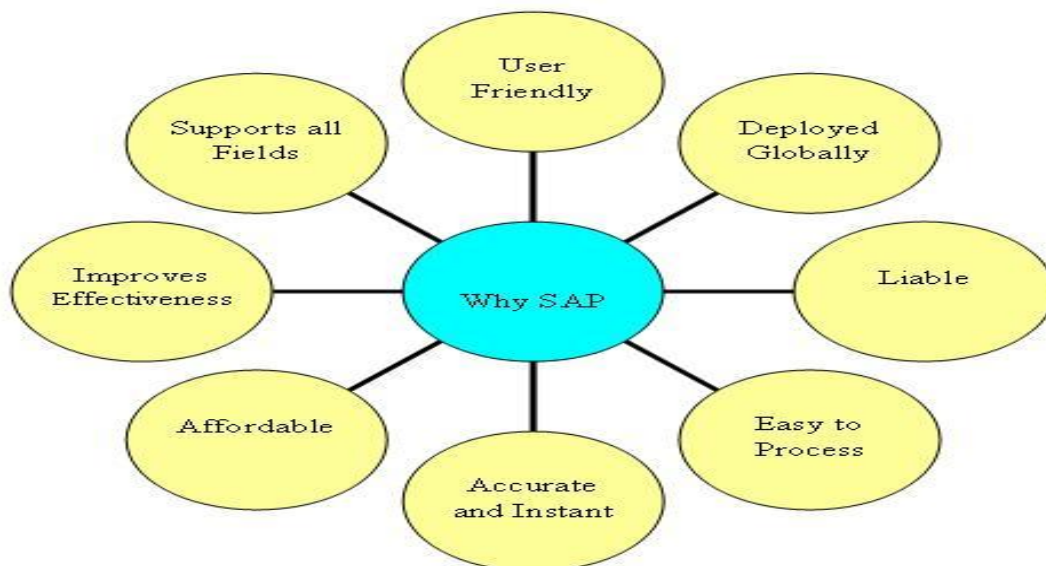
The following is the SAP Cycle.

Fig 2.1

SAP has greatly based the functionality of its R/2 and R/3 software systems in the business process concept where R stands for Real time and 3 stands for 3 tier architecture in real time SAP software systems a very valuable tool for executive planning and decision making.

3. R/2 Mainframe Solution

R/2 is SAP AG mainframe software that runs on IBM, Siemens, Amdahl, and compatible equipment. This type of solution cannot claim to be open, although with the help of Application Link Enabled (ALE) technology, R/2 can be linked to R/3 systems and share online data.

R/2 is the antecedent of the client/server R/3 system and also offers comprehensive, fully functional business applications to satisfy the demands of mainframe users.SAP will still continue to support R/2 systems till the year 2004, and so it is advising customers to migrate to R/3.

4. R/3 Client/Server Solution

SAP R/3 technology is the logical evolution of the SAP R/2 system, and it is the product that has really fueled the expansion of SAP since its introduction in 1992, establishing itself as the leader and de facto standard in the industry.
SAP consultants divide themselves into **Functional** and **Technical** categories. *Functional* SAP consultants are experienced people in some business areas who have learned how to customize those modules to meet their customers' needs. On the other hand, *technical* consultants get acquainted mainly with the *basis system* of R/3–installation, operating system management, network and database administration, and so on. Administrators clearly fall into this category.

The following fig clearly illustrates the difference between Functional and Technical consultants.
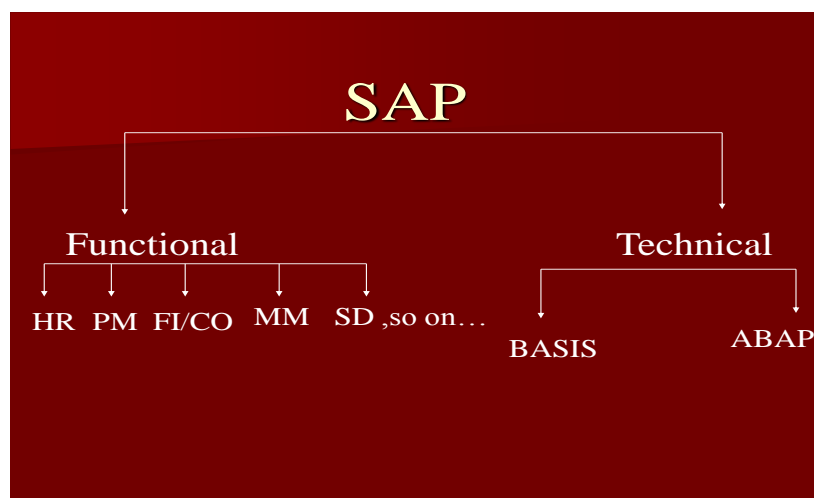

Fig 2.2

The logical and natural evolution from R/2 to an open systems environment led to the birth of R/3 in 1992. SAP R/3 was developed through SAP AG's 20 years of accumulated experience in solving the business problems of its customers, along with experience in computing and managing complex networks. The company had experience and enough technological background for R/3 to succeed. In a few years, the growth in the number of customers of the R/3 system was exponential 900 installations.

5. Installation of SAP R/3

Installation of SAP involves 3 phases

1. Pre Installation
2. Installation
3. Post Installation

1. Pre Installation: In this phase we prepare the system for the installation i.e. we will provide and IP address and call it as MS loopback address (Microsoft Loop back address) after the installation SAP software will use this IP address, also we have to define the size of the ram we are using, at the time of installation the system will install very fastly depending upon the size of ram it can be mention by using the formula **3*ram+ 500.**
2. Installation: After the pre installation we are supposed to install the SAP software using the DVD's.
3. Post Installation: After Installation we need to connect the SAP software to all the system in a network by using different IP address.

6. Basic SAP Architectural concepts

The R/3 system uses some widely known terms to which SAP gives specific meanings.

6.1. Transaction

6.2. Dialog Step

6.3. Logical Units of work

6.4. Clients

6.1 Transaction: Generally, a *transaction* is an operation that lets a user make changes to a database. The overall R/3 system must be seen as a business transaction processing system. This means that the whole data flow that runs across application modules is executed using transactions. The transactions usually contain two phases: an interactive phase and an update phase.

The interactive phase may be at least one step, but can have many. This phase is responsible for preparing the database records that can update the database. The update phase may have no steps or many. This phase processes the previously prepared records and updates the database.

6.2 Dialog Step: A *dialog step* is a SAP R/3 screen, which is represented by a dynpro. A *dynpro*, or *dynamic program*, consists of a screen and all the associated processing logic. It contains field definitions, screen layout, validation and processing logic, and so forth. A dialog step is controlled exactly by a dynpro. The processing logic means that the dynpro controls what has to be done before the screen is displayed (process before output or PBO) and what has to be done after the user finishes entering information (process after input or PAI).When users are navigating in the SAP R/3 system from screen to screen, they are actually making dialog steps. A set of dialog steps makes up a transaction.

6.3 Logical Units of work: Conceptually, a *logical unit of work* (LUW) is defined as an elementary processing step which works as a locking mechanism to protect the transaction's integrity. A LUW is a set of steps within a transaction, and all of those steps must be correctly completed to go ahead with the transaction logic. If there are errors before the end of the transactions, the current LUW is canceled, but not the previous ones. Within the SAP system, three conceptually different types of transactions may be distinguished:

- A database transaction, known as LUW or database LUW, is the period of time in which the operations requested must be performed as a unit. This is known in the database world as an *all or nothing* operation. At the end of the LUW, either the database changes are committed they are rolled back.
- An update transaction or SAP LUW is the equivalent to the database concept for the SAP systems. It means that as a logical unit, these SAP LUWs are either executed completely or not at all. Generally, a SAP LUW can have several database LUWs. The special ABAP command, COMMIT WORK,
- A SAP transaction or ABAP transaction is made up of a set of related tasks combined under one transaction code. This concept is related more to the programming environment, in which an ABAP or SAP transaction functions like a complex object containing screens, menus, programming logic, transaction code, and so forth.

6.4 Clients: A *client* is defined as a legally and organizationally independent unit within the R/3 system, for example, a company group, a business unit, or a corporation At the beginning of the R/3 technical phase of the implementation, right after installation of the software, one of the first things that usually must be done is to copy one of the standard clients included in the package. With the copied clients, customers can make tests, can use them for training, or can start real customization.SAP comes with three standard clients: 000, 001, and 066. Client 000

contains a simple organizational structure of a test company and includes parameters for all applications, standard settings, configurations for the control of standard transactions and examples to be used in many different profiles of the business applications. For these reasons, 000 is a special client for the R/3 system since it contains the client–independent settings.

Client 001 is a copy of the 000 client, including the test company; if this client is configured or customized, its settings are client–dependent. It does not behave like 000. It is reserved for the activities of preparing a system for the production environment. SAP customers usually use this client as a source for copying other new clients. Client 066 is reserved for SAP access to its customers' systems to perform the Early Watch service.

7. Work Process

There are 7 types of work process in SAP they are

7.1. Dialog Work process

7.2. Background Work process

7.3. Spool Work process

7.4. Enqueue Work process

7.5. Update work process

7.6. Message Server

7.7. Gateway server

7.1 Dialog work process: A dialog work process performs the dialog steps corresponding to the interactive user sessions.

7.2 Background work process: The background work processes are in charge of executing ABAP programs submitted for background execution.

7.3 Spool work process: The spool work process is in charge of formatting the data for printing and passing it to the host spool system.

7.4 Enqueue work process: The enqueue work process, also known as the lock work process, is in charge of the lock management system. It allows multiple application servers to synchronize their access to the database and maintain the data consistency.

7.5 Update work process: The update work process is in charge of executing database changes when requested by the dialog or background work processes. An update request can contain a primary update component (V1) and several secondary ones (V2).

The time−critical processes are held inside the V1, the less critical within the V2. In order to be able to initiate the V2 components of the log record, the V1 component must have finished. However, the V2 components can be executed in any order and even in parallel if there is enough update processes defined. The execution of primary components (V1) corresponding to different log records can be also done in parallel using several update work process.

7.6 Message server: The message server is a service used by the different application servers to exchange data and internal messages. This server does not have the structure of the typical work processes.

7.7 Gateway server: The gateway service allows the communication between R/3, R/2, and external applications. This service is a CPIC handler which implements the CPIC protocol for communication. This is commonly known as a *SAP gateway*.

8. Usage of SAP

SAP can be used in both Product and Project based companies, it is platform independent software, it works on both Windows and UNIX environments. Most of the companies install servers of SAP on UNIX, because of security reasons as UNIX has more security when compared to Windows machines, so many companies prefer using UNIX rather than using Windows operating systems.