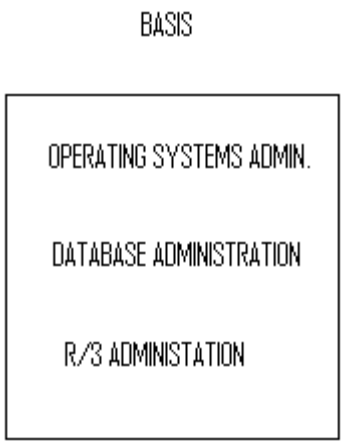
SAP Hana Admin

BASIS

BUSINESS APPLICATION SOFTWARE FOR INTEGRATED SOLUTIONS (BASIS)



SAP:

Systems applications products for data processing.

Developed in Germony.
Its an ERP

ERP: Enterprise Resource Planning.
Planning the resources in an organization is called ERP.

What are the functionalities in a company?

A company is having different modules like

- Sales
- Financial
- Purchasing
- Production
- Human Resources

Integration of all the modules done by ERP – SAP.

Basics to startup with BASIS Administartion

Computer
A **computer** is a machine for manipulating data according to a list of instructions or an electronic device for the storage and processing of information or a programmable machine which runs with two principal characteristics as

- ✓It responds to a specific set of instructions in a well-defined manner.
- ✓It can execute a prerecorded list of instructions (a program).

Software
Written coded commands or set of instructions that tell a computer what tasks to perform or Computer instructions or data. Anything that can be stored electronically is called as software. The storage devices and display devices are hardware.

Software is often divided into two categories:

✓**systems software :** Includes the operating system and all the utilities that enable the computer to function.

✓**applications software :** Includes programs that do real work for users. For example, word processors, spreadsheets, and database management systems fall under the category of applications software.

Program
An organized list of instructions that, when executed, causes the computer to behave in a predetermined manner. Without programs, computers are useless.
A program is like a recipe. It contains a list of ingredients (called *variables*) and a list of directions (called *statements*) that tell the computer what to do with the variables. The variables can represent numeric data, text, or graphical images.

Computer Hardware
Hardware is the physical medium built with electronic technology lies between input and Output.
As an example objects that you can actually touch, like disks, disk drives, display screens, keyboards, printers, boards, and chips.
In contrast, software is untouchable. Software exists as ideas, concepts, and symbols, but it has no substance.

The distinction between software and hardware is sometimes confusing because they are so integrally linked.

Computer Hardware devices

Random Access Memory (RAM) – The temporary storage device and part of CPU which is used for program execution and short term data storage, so the computer does not have to take the time to access the hard drive to find the file(s) it requires. More RAM will normally contribute to a faster PC. RAM is almost always removable as it sits in slots in the motherboard, attached with small clips. The RAM slots are normally located next to the CPU socket.

Motherboard – It is the main component inside of a computer designed using electronic technology with all circuits internally within it. It holds the processor, memory, and any add-

in boards. It's inside the case and is the component that all of your peripherals plug into. It is also called the "main board," or, "mobo," for short.

Processor - The exact term processor is a sub-system of a data processing system which processes received information after it has been encoded into data by the input sub-system. These data are then processed by the processing sub-system before being sent to the output sub-system where they are decoded back into information. However it is usually termed as the microprocessor, the brains of the modern day computers.

Hard disk – Its is a permanent storage area of a computer and a hardware device part of CPU which can store anywhere from 20MB to more than 200GB. Hard disks are also from 10 to 100 times faster than floppy disks.
It is physically a round plate, Magnetic or Optical, on which data can be encoded.

Operating system

It is what is needed to run the programs on a computer. It makes the link between programs and hardware.

Computer Network
It is combination of multiple computers connected together using a telecommunication system for the purpose of sharing data, resources and communication. For a while, a home computer network may consist of two or more computers that share files and a printer using the network. The size and scalability of any computer network are determined by the hardware used as well as which protocols are being implemented.

Or a network consists of two or more computers that are linked in order to share resources (such as printers and CD-ROMs), exchange files, or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

The three basic types of networks include:

Local Area Network:

A Local Area Network (LAN) is a network that is confined to a relatively small area. It is generally limited to a geographic area such as a writing lab, school, or building. Rarely are LAN computers more than a mile apart.

✓ A local area network (often called a LAN) connects two or more computers in a house or an office.

Wide Area Network:

Wide Area Networks (Wans) connect larger geographic areas, such a Solar Soft , Ameerpet , the India, or the world. Dedicated transoceanic cabling or satellite up links may be used to connect this type of network.

✓ A corporate network enables communication among various offices of the same organization.

In fact, two computers connected over the Internet is *not* considered a computer network. Some basic types of computer networks include:

✓ An "internetwork", sometimes called a Wide Area Network (because of the **wide** distance between networks) connects two or more smaller networks together. The largest internetwork is called the Internet.

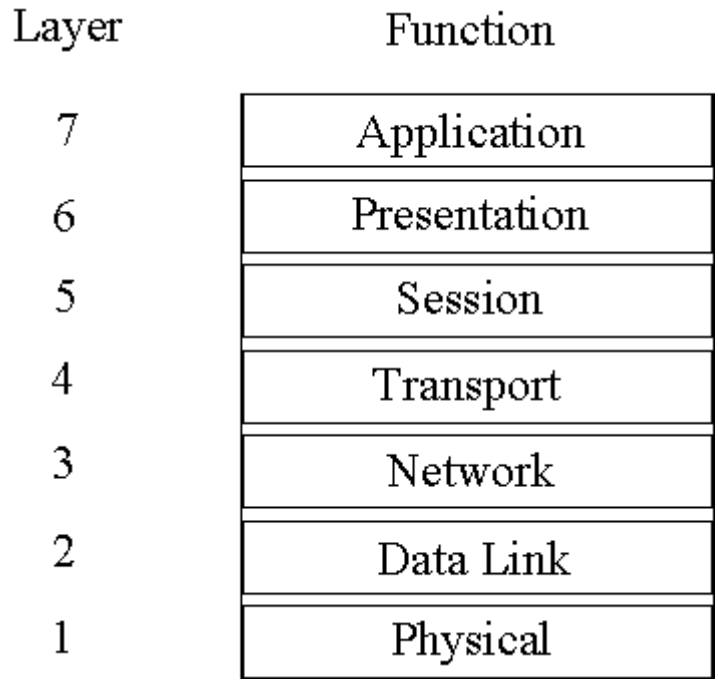
Computers can be part of several different networks. Networks can also be parts of bigger networks.

If we consider as the *local area network* in a department store is usually connected to the *corporate network* of the parent company, and may have privileges with the corporate network of a bank. Any connected machine at any level of the organization may be able to access the *Internet*, for example to demonstrate computers in the store, display its catalogue through a web server, or convert received orders into shipping instructions.

Where in the network technology, there are two different computers existing, known as
Server Computer - A computer that delivers information and software to other computers linked by a network
Client Computer - A computer that recieves information and software from server computer linked by a network

OSI Model
The OSI (Open System Interfconnection) model serves as a logical framework of protocols for computer-to-computer communications. Its purpose is to facilitate the interconnection of networks. It is the seven-layer Reference model was developed by the ISO subcommittee and defined as below…

The 7 Layers of the OSI Model



The OSI, or Open System Interconnection, model defines a networking framework for implementing protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, proceeding to the bottom layer, over the channel to the next station and back up the hierarchy.

Application (Layer 7) -This layer supports application and end-user processes. Communication partners are identified, quality of service is identified, user authentication and privacy are considered, and any constraints on data syntax are identified. Everything at this layer is application-specific. This layer provides application services for file transfers, e-mail, and other network software services. Tiered application architectures are part of this layer.

Presentation (Layer 6)- This layer provides independence from differences in data representation (e.g., encryption) by translating from application to network format, and vice versa. The presentation layer works to transform data into the form that the application layer can accept. This layer formats and encrypts data to be sent across a network, providing freedom from compatibility problems. It is sometimes called the syntax layer.

Session (Layer 5)- This layer establishes, manages and terminates connections between applications. The session layer sets up, coordinates, and terminates conversations, exchanges, and dialogues between the applications at each end. It deals with session and connection coordination.

Transport (Layer 4)- This layer provides transparent transfer of data between end systems, or hosts, and is responsible for end-to-end error recovery and flow control. It ensures complete data transfer.

Network (Layer 3)- This layer provides switching and routing technologies, creating logical paths, known as virtual circuits, for transmitting data from node to node. Routing and forwarding are functions of this layer, as well as addressing, internetworking, error handling, congestion control and packet sequencing.

Data Link (Layer 2)- At this layer, data packets are encoded and decoded into bits. It

furnishes transmission protocol knowledge and management and handles errors in the physical layer, flow control and frame synchronization. The data link layer is divided into two sublayers: The Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. The MAC sublayer controls how a computer on the network gains access to the data and permission to transmit it. The LLC layer controls frame synchronization, flow control and error checking.

Physical (Layer 1)- This layer conveys the bit stream - electrical impulse, light or radio signal -- through the network at the electrical and mechanical level. It provides the hardware means of sending and receiving data on a carrier, including defining cables, cards and physical aspects. Fast Ethernet, RS232, and ATM are protocols with physical layer components.

What is a Protocol?

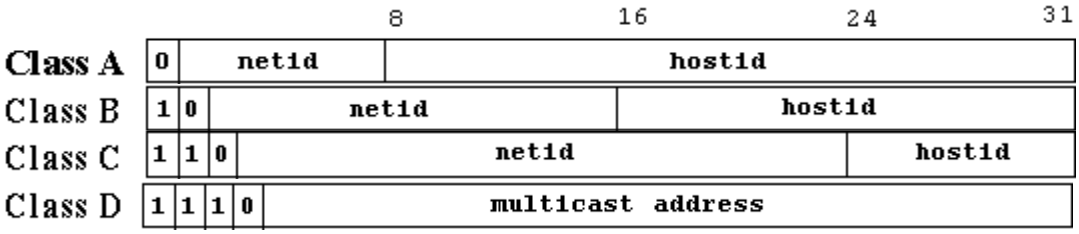
A protocol is a set of rules that governs the communications between computers on a network. These rules include guidelines that regulate the following characteristics of a network: access method, allowed physical topologies, types of cabling, and speed of data transfer.

What is IP Address ?

IP addresses

- are unique, 32-bit addresses which are correspond to connections, not hosts (generally, move connection ==> change IP address) & are referenced by humans via dotted decimal (or dotted quad) notation, one number per 8 bits (1 octet or byte), e.g., 128.192.6.7 which consist of three primary classes A, B, and C (class D is for multicast) of the form [netid,hostid]

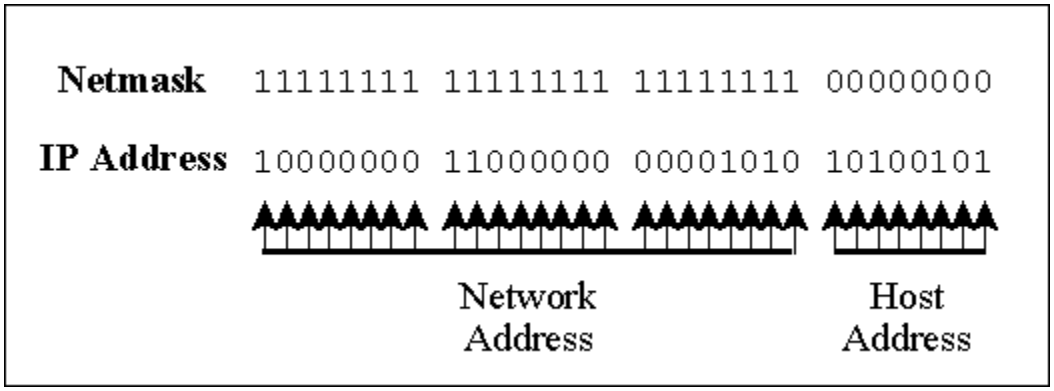
Class formats



Subnet Mask (netmask)

- 32-bit value generally used to subdivide (subnet) a given IP class network into smaller (sub)networks and Netmask determines which portion of an IP address is the network address and which is the host address
- An IP address bit is a **network** address bit if the corresponding netmask bit is 1
- An IP address bit is a **host** address bit if the corresponding netmask bit is 0

- "Natural netmask" has all netid bit locations = 1 and all hostid bit locations = 0 (e.g., 255.0.0.0, 255.255.0.0, and 255.255.255.0 for class A, B, and C networks, respectively)
- Netmask example:



Netid and hostid conventions:

- Network addresses have hostid with all bits = 0 (e.g., 128.192.0.0 with netmask=255.255.0.0 and 128.192.6.0 with netmask=255.255.255.0)
- Directed broadcast addresses have hostid with all bits = 1 (e.g., 128.192.255.255 with netmask=255.255.0.0 and 128.192.54.255 with netmask=255.255.255.0)
- "Limited" broadcast has all bits = 1 (e.g. 255.255.255.255)
- Loopback address 127.xxx.yyy.zzz used for internal testing, no traffic generated (typically 127.0.0.1)

IP network ranges by class:

- Class A ==> 1.0.0.0 - 126.0.0.0
- Class B ==> 128.xxx.0.0 - 191.xxx.0.0
- Class C ==> 192.xxx.yyy.0 - 223.xxx.yyy.0
- Class D ==> 224.xxx.yyy.zzz - 239.xxx.yyy.zzz (multicast IP)

What is Database and uses:

1) Storing data in an organized way
2) Duplication of data avoided.
3) Indexing for fast retrivals or access.
4) Normalisation

What is Normalisation:

It is the process removing duplication by splitting tables into different parts.

Difference between i) On site and ii) Off site

What is Data Centre?

Data centre is the server room, where all the data of the company will be stored.

Different OSs:

1) Windws 2) Unix 3) Linux 4) Solaris 5) AIX

Databases:

1) Oracle 2) SQL server 3) DB2 4) Sybase 5) Informaix
3) MAX DB - > It is installed on memory.
If system restarts or shutdown all the data will be lost.

End users:

People who are using for productive work for the company are called as end users.

High Availabiligty: for HDs

1) Mirroring.
2) RAID – Redundant Array of Independent Disks
3) SAN – Storage area network.
4) Clustering - (In case of Overload)
5) Stand by server – Incase of Disaster Recovery
    i) Log shipping
    ii) Replication
6) Backups.

Mirroring:

It is used in case of operating system as well as database log files. If one hard disk fails another hard disk will take care.

In this technique data is written to two duplicate disks simultaneously. Using this way if one of the hard disk fails the system can initially switch to another disk without analysis of data or server.

RAID: (Redundant Array of Independent Disks)

Storing the same data in different place on multiple hard disks.

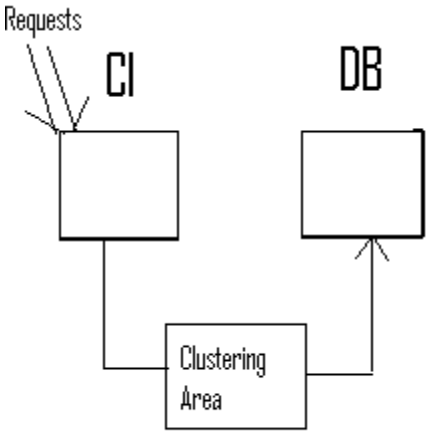
If any one of the hard disks fails the data will store automatically in a disk called hotspare by RAID.

SAN:

If we are having 5 applications for each application here we are having 5 servers. Maintaining 5 servers is tough. So here SAN came into scenario, where we will store all data in a common place.

SAN is also having mirroring. So there is no chance to lose of data.

5) Clustering (In case of Overload):-



->Here when the load is more on CI (central Instance) automatically it will transfer the transactions to DB directly is called as clustering.

- ➔ In other words connecting 2 or more computers together in such a way they behave like a single computer which is also called as clustering.
- ➔ Clustering is used for parallel processing.
- ➔ If any one of the above server fails another server will take of user.

5) Stand by servers (In case of Disaster Recovery)

In case of any disaster/calamatees…there may be chance of nor working of server. If one server is not working aother server will take response an will give service for the users.

a) Log shipping :- It is time consuming.
If server is slow we have chance of lose of our data

b) Replication:- It will directly done at database level.
Exact copy will pass to all related server, wherever the servers were located. So there is no chance of lose of data.

6) Backups:

a) OFF line Backups: -

During offline backup we shutdown the server and we will take back up. It is also called as cold backup.

b) ON line backup:-

When the system is up and running then we take the backup which is called as ON line backup. It is also called as HOT backup.

Connectives:

1) HUB
2) SWITCH
3) ROUTER

Advantages of SAP:

1) Rich set of modules.
2) Data Integrity.
3) Data Sharing between modules is easy.
4) Easy administration.
5) Only one databse.
6) It will support all the available databases and os.
7) Upgrade from time to time.
8) 24X7X365 Global support.
9) User Friendly.
10) Security.
11) Supports interface to other SAP/non-SAP systems
12) SAP supports multilanguages available using UNICODE>
    Unicode :- It is R/3 software provides access to almost all languages in the world. It uses 2 bytes.
    Non-Unicode:- It is the version of R/3 which supports only few languages in the world.
13) One GUI for all R/3 systems.
14) Common Programming Language which supports OOPS and ABAP.
15) SAP supports JAVA.
16) Easy Add-ons
    ----- To add funtinality to existing system.

Hour Glass State:

When the user con't navigate from one screen to another screen that situation is called as hour glass state.

Hardware Sizing:

To analyse the business requirements of an organization level depending upon the users data will allocate the hardware resources.

We can give over business time, standby time, legacy data, o/s and DB version, data archiving.

There are 2 types of Hardware sizing.
1) User Based 2) Object based / through put

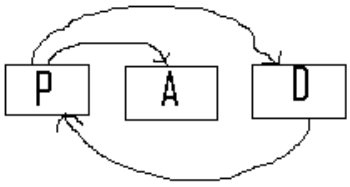
1) User based: In this again of 2 types i) Named users i) concurrent users.

Names Users:

Low	Normal	0-480 dialog steps.
Medium	Transactional	480-4000 ds
High	Power Users	4000-14,000 ds

Dialog step:-

User communicating with system through application server & database.



*** Who are logged into the system is called as Named users.**

Concurrent Users:

- ➔ Users who are creating more load on the system is called concurrent users.
- ➔ These are also Named Users.
- ➔ These are also called as High Users.

Steps for Hardware sizing:

1) Contact SAP
2) Get OSSID (Online SAP Service ID)
3) Login to www.service.sap.com/qsizing (It is sap official site)
4) Go to Quick Sizer Tool
5) Enter project name/Customer Number
6) Create Project
7) No. of Users (Low/Medium/High Activities)
8) Amt. of legacy data.
9) No. of modules.
10) I) user based ii) object based.
11) Select operating system of SAP
12) Select database and its version.
13) Select the peak load time.
14) High availability.
15) Data Security[Mirroring/Raid/Clustering ….etc.,]
16) Save the details.
17) Calculate the Results.

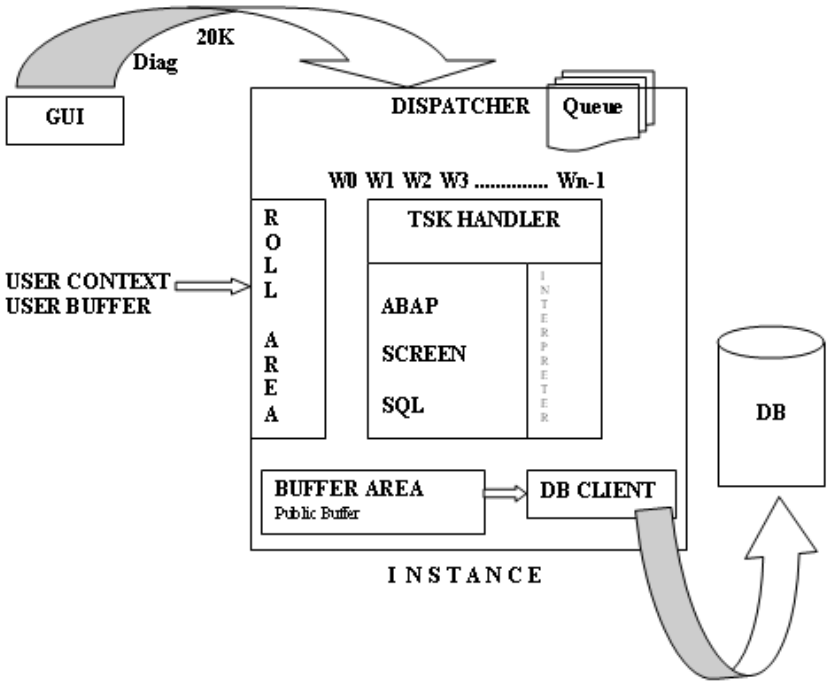
Output:

1) Disk size.
2) Memory requirement in MB
3) CPU requirement in SAPS [System Application Benchmarks for Performance standards]

- SAPS are calculated based on the usage of processors.
- Analysis says that each 1500 saps we require one CPU.

SSCR: SAP Software Change Registration.

Architecture of SAP R/3:



Presentation layer/tier/server:

It is the interface to a user. This is the only layer from where users connect to the SAP system. DIAG (Dynamic Information Active Gateway) is the protocol which is used to communicate b/w user and SAP system. Using this we can have

I) Our own font settings
II) Our own langnguage settings.
III) It is user friendly.
IV) With the help of message server which identifies favourate server and logs onto it.
V) It is intelligent server.
VI) It is operating system & db independent.

Presentation layer is nothing but SAP GUI: SAP GUI is to facilitate users to log into R/3 system. This logon can be used to all the components of SAP (CRM,APO,BW,XI etc.,)

Types of SAP GUI:

1. SAP GUI for Windows.
2. SAP GUI for HTML.
3. SAP GUI for JAVA.

SAP GUI for Windows: It is for the windows environment. Support platforms includes windows 98,windws NT4, Windows 2000 and windows XP.

SAP GUI for HTML: Front end requires only a web browser, an ITS is necessary to conver the presentation into HTML.

SAP GUI for JAVA: It is used only where java is supporting.
It supports Windows 98,windws NT4, Windows 2000 and Windows XP
MacOS 9
MacOS x
Linux, HP UX, Solaries, AIX
OS/2.

R/3 Version	GUI Version
3.1i	3.1i
4.6C	4.6C
4.6D	4.6D **(BASIS)**
4.7 EE	6.00 **SAPWEBAS (BRTOOLS)**
ECC 5.0	6.40 **SAPWEBAS**

SAPGUI version: GUI versions are released from time to time based on the component releases. Upto 4.6D version it is following the release of the R3 component. From 4.7D onwards it following the release of SAPWEBAS.

GUI initialization: GUI is initialized by the following INI files.

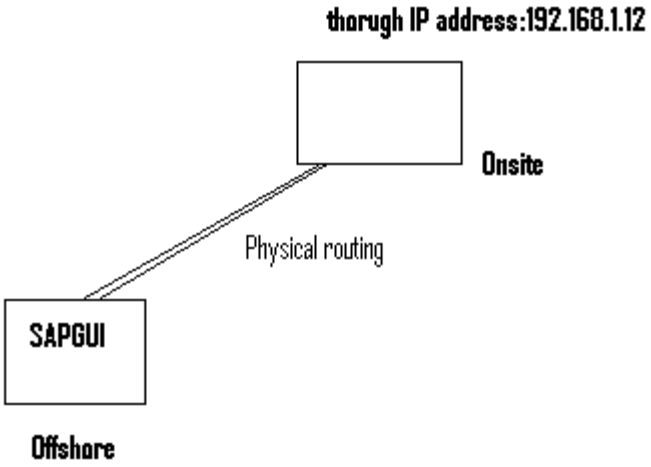
1. saplogon.ini
2. sapmsg.ini
3. saproute.ini
4. sapdoccd.ini

1. **saplogon.ini** : This files consists of the system details like name of the server, SID and instance umber. When we click on new tab in SAP GUI to enter description of the new server after saving it will be entered into this file.

Without this file we cannot logon into the system and there will be no entries to logon from SAPGUI.

2. **sapmsg.ini**: This file is used to identify least loaded server in the logon group, if logon load balance is configured. This file consists of message server details.

3. **saproute.ini**: This file is used to communicate with SAP systems over the saprouter.



4. **sapdoccd.ini:** This files is initialized when the library is accessed. It contains the path of library.

Application layer/tier/server:

It is used to :

i) Provides business areas
ii) Configure work process
iii) Reduce traffic on DB.
iv) Configure memory areas.
v) Business logic & presentation logic handled.

It consists of dispatcher, work processes, memory areas, buffer areas and interpreaters,

Dispatcher: This represents an instance, there will be only n e dispatcher per instance. This is used to handle the user requests. Dispatcher receives the users request and keeps them in the queue (dispatcher queue) based on the available free resources, user request will be assigned with work process on FIFO basis. Dispatcher runs by an executable disp+work.exe. This can be monitor by using a command line tool dpmon(It listens on the port 3200+instancenumber.

Work process: Dispatcher assigns the user request to a dialog process, dialog is the only process which will handle user request.

Dialog process: It is used for handling generation of reports, updating the temporary tables, updating the spool tables, updating the background tables so that update, spool background processes reads those tables for execution.
Dialog work process runtime is restricted to 600 sec. Which is manipulated by rdisp/
Dialog work processes should be 1:5 to 1:10.

Update work process: This process is used to update the database initially update requests are handled by dialog work process as they couldn't execute within the specified time. The task has been moved to update process. It is also the reason for obtaining the transaction consistency because dialog process handles starightfull request. Dialog process updates the temporary tables. Update process reads the temporary tables and update the database.

Enque process: Enqueue process is used to lock and unlock SAP objects. It will update the database and takes the users request. In order to handle this mechanism SAP has defined enqueue and dequeue (unlock) modules. Enqueue process will issue locks to message server to all the dialog instances. That is dialog communicates with message server & message server in term talks to enqueue to get the lock.

- Dialog process communicates with the message server and message server communicates to enqueue
- Dialog processes on central instance can communicate with enqueue directly to obtain locks.

Background Process: The long running, time consuming and expensive reports or updates will be used to schedule in the non-dialog mode using the background process. Dialog work process receives the background request & updates background request & updates background job tables. Background work process reads the job tables for every 60 sec & executes them

Message Server: Message server is used to communicate with all the available dispatchers. If logon load balance is configured, message server identifies the least loaded server in the logon group. It is run by an executable msg_server.exe. This is also used to communicate with enqueue to issue locks to the work process coming from dialog instance.

Gateway: There will be one gateway work process for each instance. Gateway is used to communicate with external system. It listens on the port 3300 + instance no.

Spool Process: Spool process is used to output the documents to the printer, fax, email, pager and sms. Dialog process receives the spool request and updates spool tables or stores spool data at OS level. Spool process reads the spool tables or spool data and output to specific device.

Note: All the work process runs with executable disp+work.exe

Memory Areas:

In order to define a work process we should have enough resources at the rate of 75mb to 150mb for each work process. When the user request is assigned to a work process, work process requires certain amount of memory to execute the user request.

Ex: Roll memory, extended memory, heap memory

Buffer Areas:

There are two types of buffer areas

1. User related buffer (user specific)
2. R/3 buffer (non-user specific)

User buffers are nothing but user context.

User Context: User context is the area where user logon attributes, parameters, authorizations and earlier accessed content are stored. These are valid until the user session. User logout, buffers are lost.

R/3 buffers: Frequently accessed contexts like programs, tables, fields, currencies, calendar, measurements are stored in R/3 buffers.

The data which is frequently accessed and rarely changed is eligible for buffering. These buffers are accessed by all the users. These will remain until the restart of the instance. If the instance is restarted, buffers are lost.

Interpreters:

1. ABAP Interpreter: This is used to interpret the ABAP code embedded in the user request
2. Screen Interpreter: This is used to interpret the screens.
3. SQL Interpreter: This is used to interpret SQL Statements in the ABAP program.

Note: Task handler which is a part of work process handles the interpreters.

Dispatcher: It receives user request and assigns work process or keep user request in dispatcher queue.
Task Handler: It is the agent which process the user request by segregating into screen , abap, SQL interepreters. As it consists 3 interpreaters. context
User Context:
The user context is the buffer area where it stores user logon attributes, authorization parameters.
Despatcher Queue: It is the queue where user exists when work processor is busy. It follows FIFO.

Database Layer/tier.

It is the layer where database is hosted. It has its own memory areas, buffer areas, work processes etc., A central RDBMS realizes the database layer of an SAP R/3 systems. Communication between the application and the database layers occurs exclusively over SQL. SAP R/3 work processes typically use only the Open SQL interface.

Processes:

Dialog : Dialog work processes fulfill all

Installation:

Pre-Requisites:

5. Proper hardware is received according to H/W Sizing.
6. Verify SAP Software.
7. Installation document from SAP → www.service.sap.com
8. Read the document and highlight the steps involved inst. guides.
9. Internet connection to resolve the runtime issues.
10. Get the known problems in installation [ECCS] from SAP Market place [www.service.sap.com/notes].
11. Install o/s and patches [h/w vendor
12. Get a static IP address from N/W team
13. Install db & patches (SysDBA, Basis)
14. Specify an entry in \etc\hosts
15. Dump the s/w into server
16. Setup Virtual Memory
17. Install current version of JAVA because SAP Installation too requires JAVA Runtime Environment [JRE]
18. Set the environment variable JAVA_HOME & Path
19. Set the Ethernet Card/LAN/ for mass file sharing.

[Landscape : Arrangement of systems.]

There are 2 installation tools:

1. R/3 setup <= 4.6C
2. sapinst >=4.7 EE

Services:

1. saposcol.
2. SAP<SID>_instace<number>
3. oracle services.
4. osservices.

SAP Installation consists of 3 Types:

1. Centrol Instance:
2. Database Instance:
3. Dialog Instance:

Control Instance: This is the instance where all the services are configured and it manages all the instances through message server. CI is named as "DVEBMGS"00&instance number. The services of instance number are as follows:

D -> Dialog
V -> Update
E -> Enque
B -> Background.
M -> Message
G -> Gateway
S -> Spool

4. Go to dump
   NT/386/sapinst.exe
5. Select centrol instance.
6. Specify the <SID> and instance number.
   <SID> : System Identifier which is of 3 character and it should be unique in the landscape. It should not be either SAP , ERP or other reserve words. The main objective of <SID> is used to identify the Instance.
7. Specify the host name.
8. Specify the ORACLE home path.
9. Assign 60% of memory to CI. (for productive 70%(CI)+30%(DI))
10. Specify the path for usr directory C:,D:, or E….
11. Specify passwords for <SID>ADM,SAPSERVICE<SID>..

<SID>ADM: Is R/3 system administrator which is used to start & stop R/3 systems and has administrative previlieges.

SAPSERVICE<SID>: This is a service user which is used to run all the SAP services like **SAPOSCOL, SAP<SID>_instancenumber**.

12. Specify kernel path.
13. Specify the Dispatcher/Gateway/Message server port numbers.
14. Continue installation.

Database Instance:

1. Select Database Instance.
2. Specify SID,host name and Instance number.
3. Specify the installation on new database or use existing database.
4. Specify the database, SchemaID (SAP<SID>)
   SchemaID : It is the owner of the database.
5. Specify the memory 40% of physical memory.
6. Specify the log files location.
   i) Mirror logA, OriglogB -> 1 disk
   ii) OriglogA, Mirror Log -> 1 disk
   Log files contains the changed data.
7. Specify the path of Kernal Directory.
8. Specify the path for SAP directory
   [sapreorg, spacheck, sapbackup, saptrace, saparch, oraarch]
9. Specify the path for data directory.
   [sapdata1,….sapdata2]

10. Specify the export DVD/dump path.
11. Specify passwords for **<SID>ADM and SAPSERVICE<SID>.**
12. No. of parallel processors to expedicate the installation process.
13. Select MNLS [Multi National Language Support].
14. Specify passwords for system,sys,DB etc.,

Dialog Instance: This is an additional application server which is to install and to provide more number of work processors to cater more number of users. [Provides additional memory and CPU).

1. Select the dialog instance.
2. Specify the CI. (Host name)
3. Specify the DI (Host name) (This is where data is stored).
4. Specify the host name and number
   D<Instance number>
   D01, D02……
5. Specify the kernel path.
6. Specify the passwords.

Installation of GUI:

1) If users are minial:
   (10-15) users goto user desktop & install.
2) If we have more number of users. Copy the GUI installation CD into a file server. Share the folder to every one.
3) Write a logon script to network system administrator to trigger during the user logon user login.
4) Using a 3rd party tool like Microsoft monitoring server where all the users desktops are monitored centrally.

Check CI installation:-

1. Check the services.
   a) Saposcol : SAP Operating system collector. This is only one SAPOSCOL in the system.
   b) sap<SID>_00: It is an instance service whichis used to start the SAP instance.
   c) oraTNSlistener:
   d) oraService_SID: This is oracle service user <SID> which is used to start oracle.
2. Check users: <SID>ADM and SAPSERVICE<SID> and DB users.
   OP$<SID>ADM and OP$SAPSERVICE<SID>

   To see them connect system/mananger
   SQL> select * from dba_users.

OP$ mechanism: It is used to logon on to the database by O/s users without prompting a password.

3. Logs:

   i) syslog in MMC
   ii) Application system logs in Event Viewer.
   iii) sapint.log
   iv) aler<SID>.log
   v) Developer traces in work directory.

R3trans –d : It generates a trans.log in home directory where command is executed.

Note: sapstartsrv.exe : When we were not getting MMC. Type details of the SAP system which is asking.

4. Directories:

   i) \\usr\sap\trans
   ii) \SID\sys\exe\run\sys\profiles
   iii) Check al lthe sapdata…
   iv) Check all the folders in /oracle/SID

Starting R/3 system.
Stopping R/3 system.

Profiles:

Profiles are used to configure various system parameters. For R/3 system we have 3 types of profiles.

1) Startup profile.
2) Default profiles.
3) Instance profile.

Startup profile: - START_DVEGMGS00_hostname.pfl

It is used to start i) database database startup executable-> **strdbs.cmd**
ii) Start message server. **msg_server.exe**
iii) start dispatcher : **disp+work.exe**

Default profile:- (Default.pfl)
It consists of global parameters which will be applicable across all the instances in an R/3 system. It consists:

SAPSYSTEMNAME = S47
SAPDBHOST = lolla
rdisp/mshost = lolla
rdisp/sna_gateway = lolla

rdisp/sna_gw_service = sapgw00
rslg/collect_daemon/listen_port = 37
rslg/collect_daemon/talk_port = 13
rdisp/bufrefmode = sendoff,exeauto
ms/http_port = 8100
dbs/ora/tnsnames = S47

Instance profile:- This profile is sued to set the parameter for an instance.

<SID>_DVEGMGS00_hostname.pfl

SAPSYSTEMNAME = S47
INSTANCE_NAME = DVEBMGS00
SAPSYSTEM = 00
rdisp/wp_no_dia = 7
rdisp/wp_no_btc = 2
rdisp/wp_no_vb = 5
rdisp/wp_no_vb2 = 2
rdisp/wp_no_enq = 1
rdisp/wp_no_spo = 1
SAPGLOBALHOST = lolla
PHYS_MEMSIZE = 1222
DIR_TRANS = D:\usr\sap\trans
icm/server_port_0 = PROT=HTTP,PORT=8000,EXTBIND=1
DIR_ORAHOME = D:\oracle\ora92

Path Of the profiles

/usr/sap/<sid>/sys/profile

The naming conventions for the profile:

1) START_DVEBMGS00_HOSTNAME.pf; -> CI
   START_D01_DVEBMGS00_HOSTNAME.pfl -> DI

2) Default.pfl

3) <SID>_DVEBMGS00_HOSTNAME.pf; -> CI
   <SID>_D01_DVEBMGS00_HOSTNAME.pfl -> DI

DVEBMGS : Specifies centrol instance i.e., all the work processors are configured here.

Note: Here there is only one Default.pfl which Global.

Startup profile in DI consists of startup of dispatcher.
Instance profile in DI will be same as Instance profile of CI.

The parameters which are configured in default profile will be overridden by Instance profile.

Startup problems:

1) Check all the services.
2) Check for syslog in MMC.
3) Check for applicationlog, system log in even viewer.
4) Check alert<SID>.log
5) Check memory.
6) Check all the environment variables.
7) Check all the executables.
8) Stderr0,1,2
   7 & 8 files are available in
   \usr\sa\p\<SID>\DVEBMGS\work directory
9) Enough space is not available.
10) Archive stuck
11) Changes in profile parameters.
12) Tablespace overflow.
13) Check n/w connective between CI/DB.
14) Kernal executable corrupted.

Post – Installation Activities:

1) SICK / SM28 (SAP Installation Consistence CheK)
2) Slience (Used to install saplicense) Get hardware key -> saplicence –get
   Goto to SAP market place get license key with the help hardware key.
3. SE06 -> Click perform-post installation
4. SR13
5. SMLT :- Perform any additional language installation.
6. RZ10 :- Utilities -> import profiles of all the active servers.
7. SU01-> Create super user and change passwords of sap* and ddic and lock them.
8. STMS
9. SCC4 - > Client creation.
10. SCCL -> Local client copy.
11. SPRO -> Allow for customizing. SE38 and SE80

SAP GUI problems:

Reason: User couldn't logon to the system First, ask the user to send the screenshot of the error msg.

1. Network Interface problem.
2. N/W connectivity b/w GUI & SAP system.
3. Check the entries.
4. GUI showing special characters.

ASAP Methodology:
It stands for Accelerated SAP.

1) Preparation.
2)
3) Business Blue print.
4) Realisation.
5) Pre-go-live.
6) Go-live & support.

Transaction codes in SAP Basis:

SUPPORT PACKAGES: or Patches / Hot packs / LCP/CRT's

Support packages or support stats provides enhanced functionality, changes to the existing data dictionary elements, repository objects like reports programs, transactions etc.,

Support packages of various types, few of them are:

1) Basis support packages -> SAPKB620050
2) ABAP support packages -> SAPKA620050
3) APL support packages -> SAPKH470050
4) HR support packages 2324 -> SAPKE470050

In order to display the current support package level.

- ➔ Go to system + status + click on Magnifier.
- ➔ Then all the package levels will be displayed.

Pre-requisites for support packages:

- ➔ There should be 2 Background jobs.
- ➔ The latest SPAM/SAINT versions should be applied on the system.
- ➔ There should be enough space to hold the support packages in EPS/in
- ➔ There should be no aborted packages.
- ➔ Support packages should be applied on this sequence of nos. of support packages level.
- ➔ Upgrade the Kernel version if required.
- ➔ Apply support packages in order of BASIS/ABAP/APPL/HR.
- ➔ Technical and functional consultants needs to be informed while applying support packages because when the system updating DD elements, repository objects functional and technical objects. Functional and Technical team are the right people to advice whether to keep the existing functionality or move on the current functionality which comes in SP.
- ➔ Scheduled down time and inform users.
- ➔ Go through composite note thoroughly before applying support packages.
- ➔ If the support package is more than 10MB, UNCAR the file using

sapcar –svf <filename>.sar.

When we uncar two files are generated with extension .ATT or .PAT.

➔ When the support pack is aborted and could not be resolved the final remedy is to delete entries in the these 2 tables.

➔ Packages once applied cannot be reverted back.

➔ If we want to revert, then contact SAP technical support.

APPLYING SUPPORT PACKAGE OR PATCHES

1) Go to SPAM (SAP Patch Manager).
2) Load packages from the Presentation Server/Application Server.
3) Display all the new Support Patches to be applied (Queue).
4) Import the Queue or Display in Define Queue.
5) Support pack starts upgrading the system and it goes into various phases like TP Connect To DB, DDIC import , DDIC activation …(all these 27 steps can be found in PAT01) while applying support package, it stops to run the SPDD/SPAU.

SPAD:

This is the transaction which is used to update the data dictionary tables which applying SP. This is the phase where functional consultant assistance is required.

SPAU:

This is the transaction which is used to update the repository objects like programs, reports, functional modules while applying support packages. This is the phase where technical consultants required.

Note: If the objects are changed earlier with the help of SAP notes, Now these notes are parts of the support package which are modifying the system, during this scenario each and every object which was modified earlier with the help of the note are popped on the screen whether to keep the original or change to version.

KERNAL UPGRADE/PATCHES.

Kernel is the heart of SAP system and located in run directory \usr\sap\<SID>/run. If consists of various executables which are required for smooth functioning of R./3 system.

Sometimes these executables gets outdated and needs to updated from time to time.

The following are the reasons for Kernel Upgrade:

1) During OS upgrade, DB upgrade and OS,DB patches.
2) It is a pre-requisite to upgrade the kernel to certain level before applying support packages.
3) Some of the executables are
   Msgserver.exe , dispatcher.exe , sapcar.exe , TP.exe , R/3 trans.

4) Kernel upgrade is the process of replacing the existing executables with current executables.

Process of Kernel Upgrade:

1) As part of the upgrade, complete Kernel Directory can be replaced or a group of executables or single executable can be placed.

   Ex:- While import6ing transporting request:
   1) TP gets aborted with an error, TP outdated then replace only TP.
   2) While uncaring the files SAPCAR may be outdated in this replace only sapcar.
   3) DB executables like SAPDBA, BRBACKUP, BRARCHIVE, BRRESTORE, BRCONNECT are grouped to be upgraded.

   There are 2 types of executables:

   1) R/3 executable with DB dependence.

   2) R/3 executable with DB Independent.

   1) Go to marketplace www.service.sap.com and download the current version of Kernel.
   2) UNCAR files into a directory called newrun.
   3) Schedule downtime and inform users.
   4) Shutdown SAP DB,R/3 , A Servers.
   5) Stop all the services including saposcol.
   6) Go to exe directory rename the existing run directory to old run and rename the new run to run directory.
   7) Start sap, run SICK any problems it will show.

SAP NOTES:

SAP maintains a knowledge base of problems and resolutions which are accessed from marketplace. www.service.sap/notes SAP provides resolutions in the form of a note which is a number. Note can be searched on number [if we know] or we can search with the problem code, error number etc.,

Note provides info. Regarding the problem, as follows:

1) Problem 2) Pre-requisites. 3)Cause of the problem.
3) Solution, Corrections, attachments and note may redirect one or more number of notes.

Notes are of 2 types:

1) Informative note: Which consists of details to solve the problem.
2) Corrective note: This provides changes to the data directory elements or repository objects.

If there is a repository changes i.e., program code change can be done using SNOTE. If there are any changes in data dictionary elements or customizing (Keying entries) to provides entries manually in tables which are detailed in attachments.

- ➔ To change repository objects we need ACCESS KEY.
- ➔ While correcting the program SSCR key note required. SAP software change request.

Applying Snote:

1) Go to SNOTE.
2) Load the NOTE, when we load the note status will be known.
3) Implement the NOTE, while implementing the note status is **in process**. After NOTE is applied it is completed. Once the implementation is **completed**

Before going live R/3 system needs to be tested for its optimal runtime.

PROCESS MANAGEMENT **SM50/ SM66**

Work process list is displayed in SM50/ SM66. Each process has the following

- **Serial Number** : Starts with 0 (DEV_W0) in work directory
- **Type of Process** : (DVEBS) Message and Gateway are not displayed
- **Process PID**: The identifier at OS level. It is used to kill the process at OS Level. They are displayed as [DISP+WORK] on windows in the Task Manager.

DW - dispatcher work process in UNIX
0 to 11 [12]
And 1 is for dispatcher 13 Total

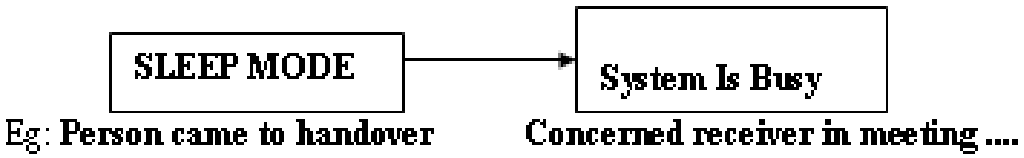
-**status** : Waiting, Stopper, Running

Waiting : The process is waiting "Available" to serve the user request.
Stopped : The process is stopped due to an error.
Running : The process is executing the task (SM50 running with our Userid should not be considered)
On Hold : The user request is on hold by process for waiting certain Resources on the other systems (RFC, CPIC)
Shutdown : The process is killed/ shutdown but restart mode set to NO

Waiting for

PRIV Mode: The process goes into Heap mode. It will be completed only after the task completion/ timeout.

SLEEP MODE: The work process goes into sleep mode waiting for resources (RFC problem)



- Restart YES/ NO : if the process is terminated and it will restart automatically (Yes), not restart(NO)

- Error : No of times the process is restarted
- Semaphore : The block that hold at OS Level (DISK)
- CPU : The amount of time WP spends utilising CPU resources
- Runtime : The amount of time the process spends on the user request.
- Report : The name of the program/ report the WP is executing
- Client: The client number logged in
- User name : Name of the user
- Action : Select, Update, insert i.e. action on the database.

- Table : Name of the table.

SM66 GLOBAL WORK PROCESS OVERVIEW

It displays the processes based on status. It displays the processes belongs to all the instances.

From SM66 - Click on SELECT PROCESS

The major advantage of this is it displays the memory consumed by work process. Double click on the WP to display (Extended, Roll and the Heap Memory)

On Oracle execute

PS -ef |grep ora* (lgwr, smon, pmon, dbwr, ckpt, arch)

SM04 : is used to display the logged in users along with the sessions. We can terminate the session or the user completely using End session or logoff user.

From User > Logoff User > Local or End the session

BACKGROUND PROCESS SM36

It is used to run the expensive programs, reports that consumes more time in the background mode. i.e. a job is scheduled to run at a specific time or periodically.

Example: Daily report, Weekly sales report or expensive to run in the peak hours so they are scheduled to run in the background mode during off peak hours.

Process Flow

1. User submits the request via dispatcher to a WP.
2. The Dialogue work process handles the request and updates the tables
3. Tables **TBC*** are used to store the BTC Jobs
4. A program **SAPMSSYS** starts in the dialogue mode at frequency that is defined in the parameter **rdisp\btctime=60Sec**

SAPMSSYS - Checks for every 60 sec into the TBTC* table.

* To delay the BTC processing increase the time as much as possible.
Example : 100000 seconds 27Hrs
RZ11 (rdisp/btctime)
Refer - BTCTRNS1 from SE38
We can also use BTCTRNS2 to resume the background jobs (Execute the program)

5. BWP looks into the table and identify the jobs which are in the **Ready** State.
6. BWP runs the job in the Active mode till completion/ Cancelled.

BWP are defined by using **rdisp/wp_no_btc=2** (Min 2 per system)
We can increase as many as possible depending upon the resources.

** Note: We can pause jobs by setting the value to 0 zero **

BWP jobs are defined in SM36
Specify **Jobname**: Daily report
JobClass: C A, B, C (High, Medium, Low Priority)

Class A requires a dedicated BTC of class A which are defined in operation modes.
Class B has medium priority over class C jobs
Class C jobs runs with Normal Priority

JOB STATUS

1. Scheduled: The job is defined but time to execute is not specified.
2. Released: The time to execute is specified
3. Ready: The Time to run the job is reached
4. Active: BWP processing the task
5. Cancelled: The job is cancelled
6. Completed: The job is completed or finished

Execution server - Name of the instance that provides BWP to run the job
Exec Target - Lolla_<SID>_00
Click on step

JOB STEPS

We need to specify the following for the JOB Execution
1. ABAP Program
2. External Command
3. External Program

1. ABAP Program - Is a predefined program that will be run in the background with user inputs as variants.

Variant - Is a predefined value that is populated during the runtime.

Eg: consider RSPO1041 from SA38
Goto SA38 and define variant for 7 & 15 days
Prog: RSPO1041
Variant: lolla SAVE

Click on **start condition** - IMMEDIATE or DATE....

2. External Commands: The job can be executed by external commands which are defined in SM49/ SM69. These commands are OS commands that will be executed at command level.

Eg: BRBACKUP, BRARCHIEVE, BRRESTORE, BRCONNECT

Use DB13 to schedule the jobs. The jobs in DB13 uses OS Commands.

3. External Programs:

NAME: Name of the program
Parameter:
Target Host:

Name : Specify the name of the program and the parameters. Specify the name of the target host.

Specify the **start condition**

Immediate/ Periodic/ Jobstart, Event (SM62)/ Operation. Modes.

Job Started: When dependent job started this gets triggered.
Event: When an event triggered in SAP it also triggers the job as well.

OPERATION MODES RZ04 SM63

It is the process of switching DIA to BTC and vice versa during the peak hours as we need more dialogue process and during off peak we need more BWP to run the BTC jobs.

RZ04 > Define

1. Instance
2. Operation Modes (Peak and Off Peak)
3. Specify the processes for modes

Goto SM63 to define timing for the modes

RZ04 > click on Create [Instance Operation Mode]

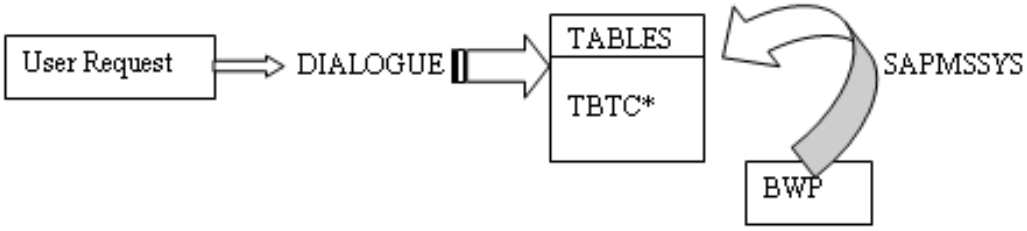
Peak_mode
Peak_mode operations
Default

SAVE

Off peak
Off peak Mode

Create new Instance lolla28
Start profile
Save.

BACKGROUND JOB MONITORING SM37



rdisp/wp_no_btc = 2
rdisp/btctime = 10

Operation modes - to make use of the resources optimally

SM37 is used for BTC monitoring

Execute SM37

Specify username, date & time, job name, status ----- Execute F8

1. The jobs with status **RELEASED** indicate the jobs are released with scheduled time and waiting for their turn/ time.

2. The jobs with status **READY** indicates the jobs are ready to pickup by the scheduler

Eg: Consider a CAB - might come late

No sufficient CABS

Long time in ready status indicates

1. The existing jobs are running for a long time i.e. expensive programming or sql statements/ fetching huge amount of data.

2. The configured BTC processes are not sufficient to handle the requests in Ready status.

3. May be due to heavy load on the system

4. Also due to passing the jobs by extending scheduler time/ making BTC to 0 by running the program BTCTRNS1.

Action:

1. Increase BTC work processes based on the available resources by using the parameter **rdisp/wp_no_btc = 2**

2. Schedule the jobs appropriately during off peak hours.

3. ACTIVE BTC in active status (long time recorded)

The job is running an expensive activity like client copy, pay roll run.

Jobs that fetch information from BW systems, annual reports, dunning reports may take hours together or even days to complete successfully.

Active indicates the following

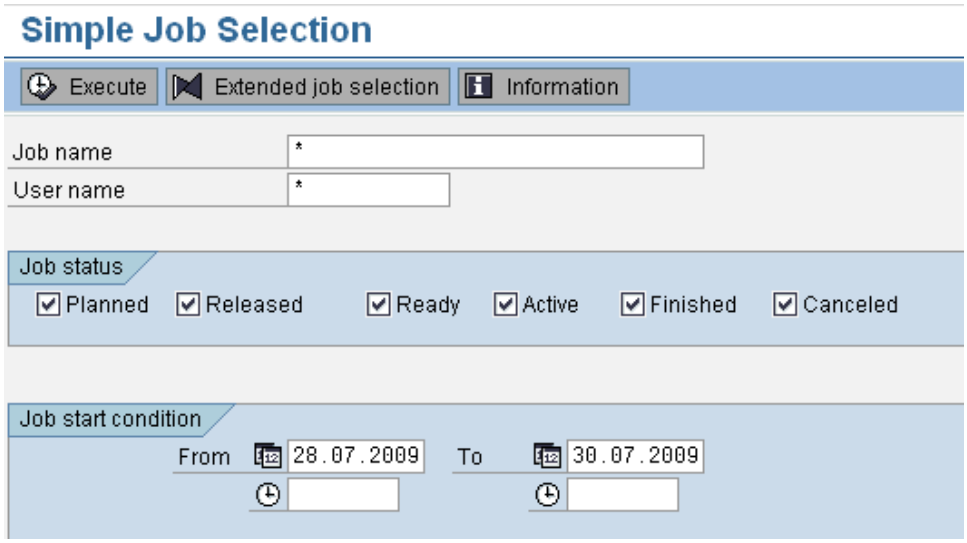
1. Jobs are expensive and running to fetch the content.
2. Jobs are waiting to be processed by the target system (RFC, CPIC)
3. Jobs are waiting for the locks to update the records.

Reasons and Resolutions ACTION.

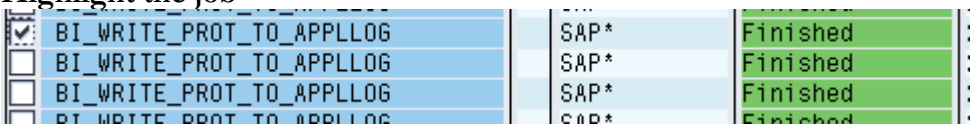
1. Some jobs are bound to run for hours and based on history leave them to run.
2. Check the bottle neck on the target system (ERP-BI-EP-SRM-SCM-SRM)
3. Wait until the locks are released/ jobs are completed. Report to SAP in case of dead locks.

Select the status - Db click - and click on Job Logs

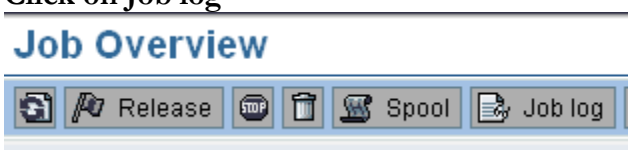
Execute SM37



Highlight the job



Click on Job log



Sap takes at most care to avoid dead locks.

4. FINISHED

The jobs are completed successfully but check the log for further information/ completion.

5. CANCELLED

Job status cancelled/ finished but failed in the log.

Reasons for cancellation of Job

1. User and password Issues (Authentication/ Authorization) user lock, userid expiry, password change, lack of roles etc.

2. File system problems: BTC reads from the file system to update the database. File not opened, or corrupted, file sharing issues, file came with different characters, file not found as well.

3. Variants are not properly defined.

4. Dead locks issue (Lock mechanism congested)

5. Update mechanism failed

6. Table space over flow (ORA-1653; ORA-1654)

7. Table space max extent reached (ORA-1631; ORA-1632)

8. Archive struck (ORA-255; ORA-272)

9. The memory is not sufficient and errors
(No Roll Area, PXA (Buffer), Page Errors)

10. Problem in the program and inputs (Indefinite loops like 1/0)

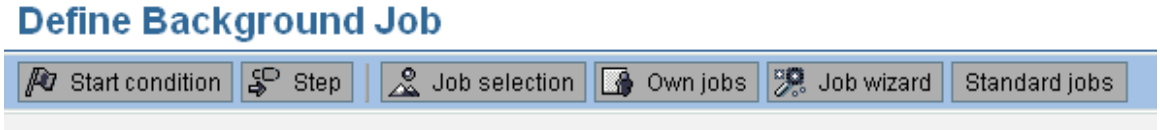
11. Dependent jobs/ events failure

12. Target systems are not available to process the jobs.

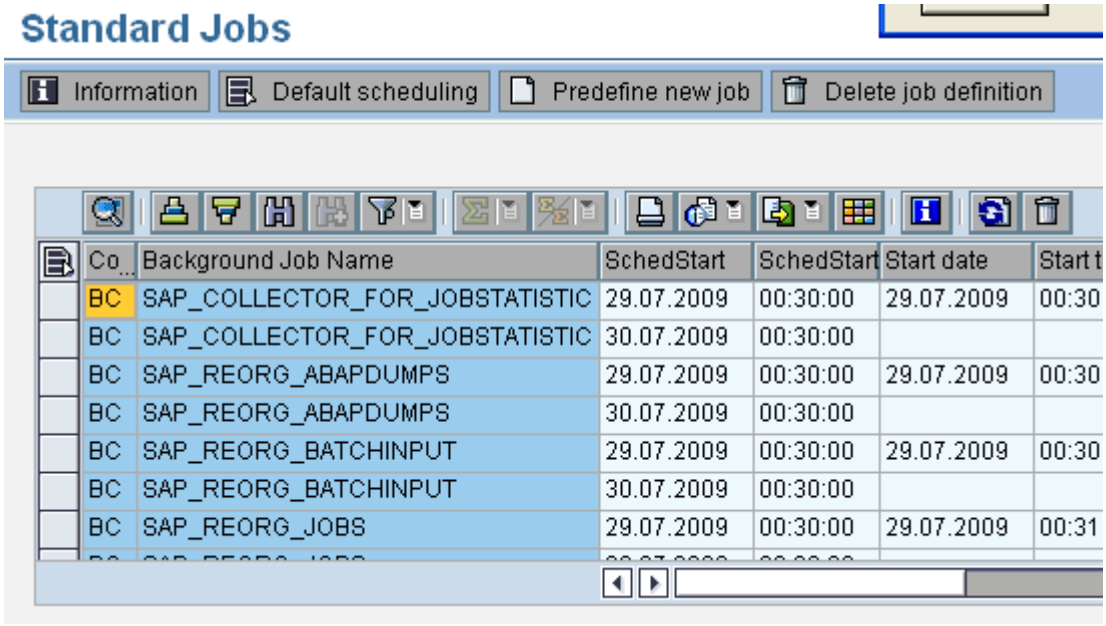
Standard Background House keeping Jobs

1. As a part of the post installation we need to schedule house keeping jobs in SM36

Execute SM36
Click on "Standard Background Jobs"



Click on "Default Scheduling"



And schedule the BTC jobs with default time.

1. RSBTCDEL - Used to delete the background jobs
Reporting structure "BTC" "DEL"

2. RSSNAPDEL - Delete the old ABAP Dumps

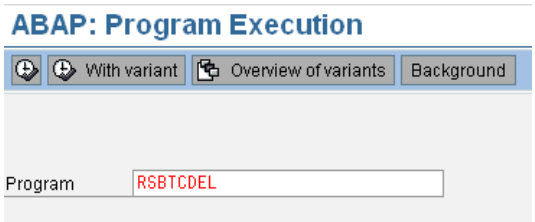
3. RSPO1041 - Delete the old spool logs and files

4. RSMO13002 - Delete old update requests/ logs

5. RSCOLL00 - Collects performance info in transaction ST03.

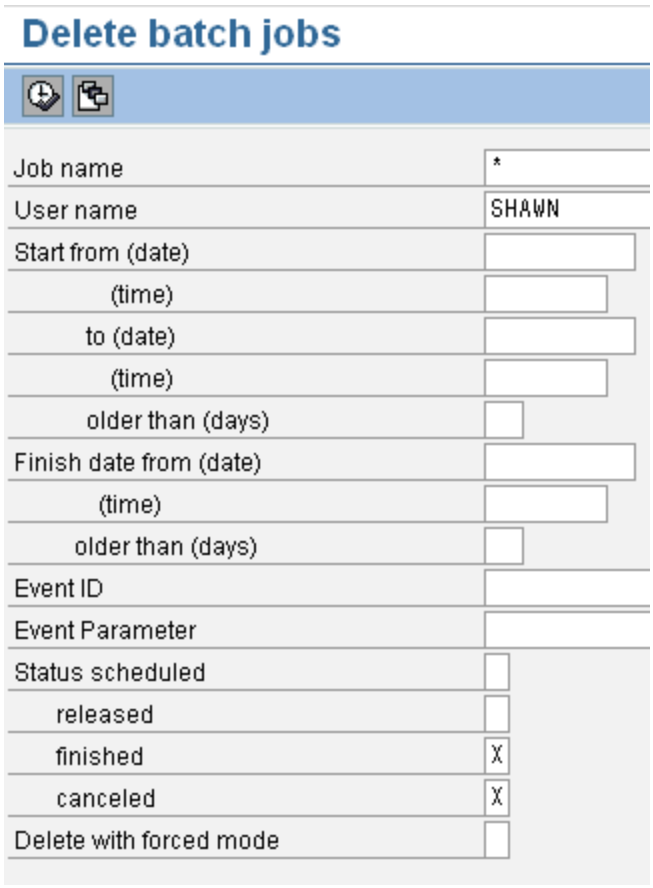
6. RSPO1043 - Spool Reorganization

Eg: from SA38



Click on Execute

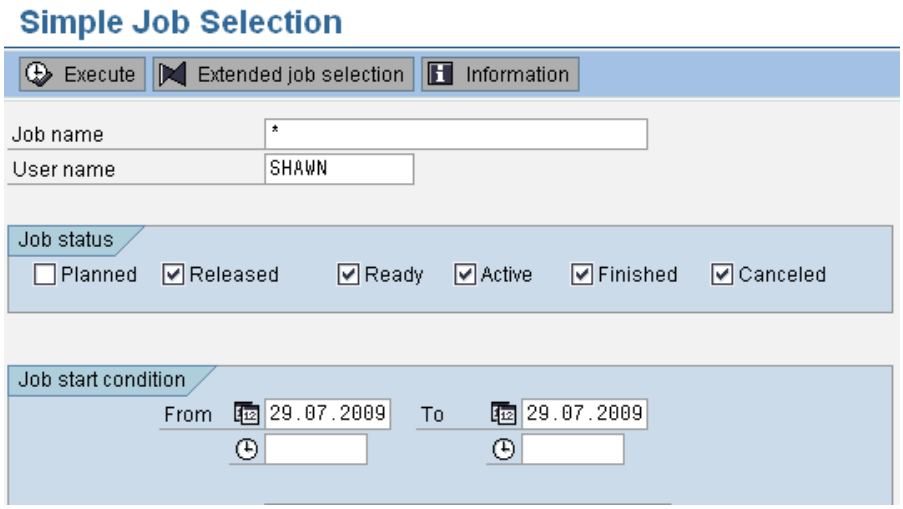
And Specify the Days ...



From GOTO Menu > Variants > SAVE as Variant

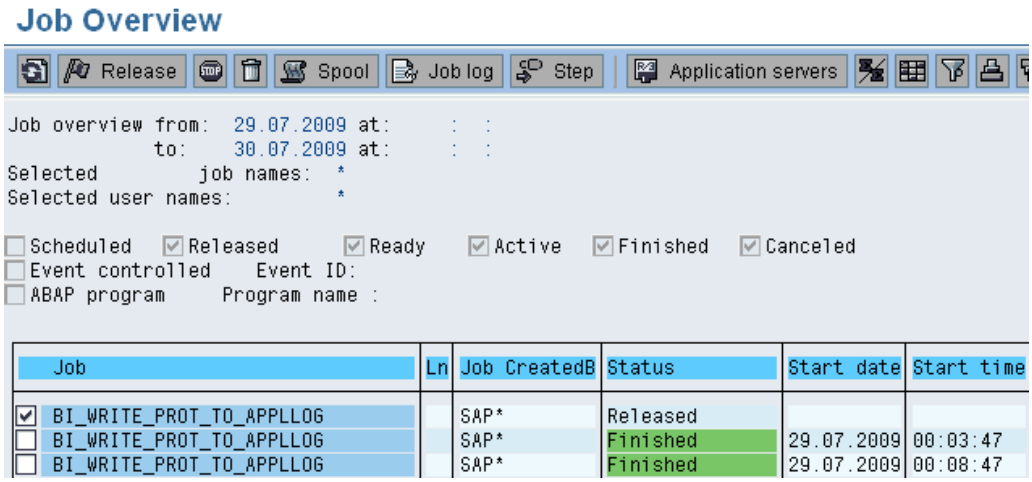
SM37 - MONITORING BACKGROUND JOBS.

1. Used to display the jobs based on job, username, date and status



2. It displays the job logs

By highlighting a job and click on **Job Log**



3. Do not kill the active job unless it is permitted by the owner

4. We can repeat the scheduling of the job if required

5. Background job out put is a report to a spool (Printer), fax or email or even updating a database (Eg. Client Copy)

6. We can move the jobs from one instance to another instance.
From Menu Job > Move to different server. (Consider the above screen)
Active jobs can be moved.

There are Third Party BTC Job Schedulers

1. CONTROL-M Scheduler
2. RED WOOD Scheduler
3. TIDEL Scheduler
4. SAP Job Scheduler
5. MAESTRO Scheduler / IBM

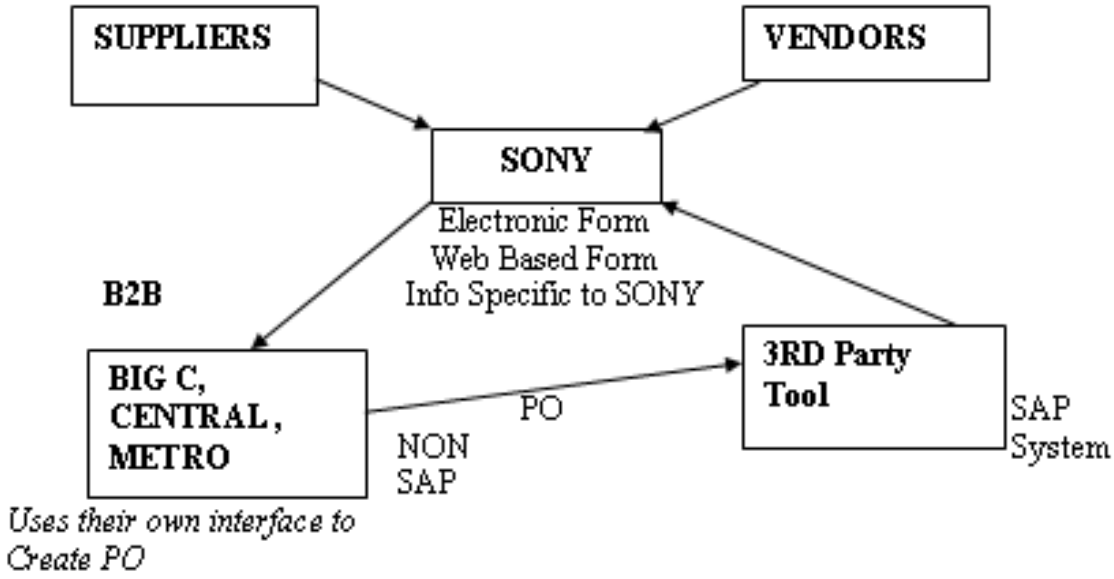
These Third party schedulers are not specific to SAP but we can customise these to SAP
These job schedulers are intelligent to work based on the status of Predecessors.
The tool defines when to trigger, how to handle various statuses and alert users accordingly.

Eg. KODAK Runs 14,000 Jobs/ day
HP Runs 20,000 Jobs/day

BTC - Business Case

Sony an electronics company communicates with suppliers for the TV Cabinets/ Circuit boards, Picture tubes, assembling & packing.

Vendors instead of communicating in hand documents they are advised to communicate in soft documents. SAP also sends soft documents as well.
i.e. the communication is performed electronically.



BTC Jobs performs the following:

1. Run long running reports for an End User

2. Runs payroll for the employees

3. Client copy for the technical consultants

4. R/3 BIW Replication

5. Communication with NON SAP Systems to fetch the data

6. Dunning report for Finance team

7. Weekly, Monthly and Annual Reports

8. Runs standard jobs for House Keeping

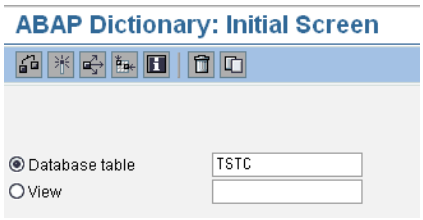
9. To run Database jobs using external commands DB13 (**SM49** provides commands)

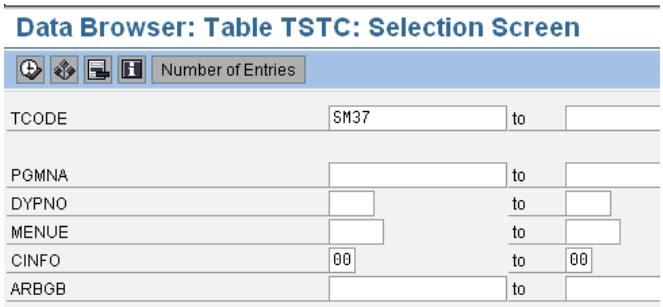
External Operating System Commands

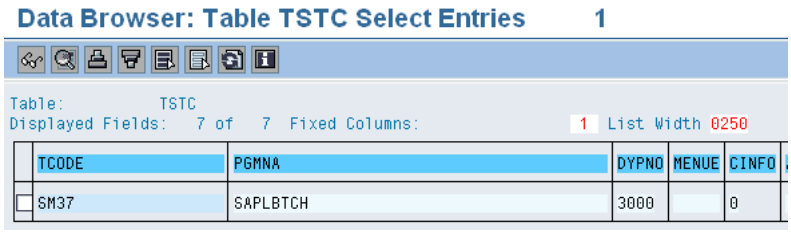
Type	Command name	Op.system	Name of external program
SAP	ARCAUTO	ANYOS	arcauto
SAP	BACKUP_HISTORY	ANYOS	sddb6his
SAP	BRARCHIVE	ANYOS	brarchive
SAP	BRBACKUP	ANYOS	brbackup
SAP	BRCONNECT	ANYOS	brconnect
SAP	BRTOOLS	ANYOS	brtools
SAP	BTC_CHECK_STATE	ANYOS	sapchkst
SAP	CAT	UNIX	cat

NOTE: In table **TSTC**, we can get a list of all existing Tcodes and which programs are called by those transactions.

From SE11 - Provide the table name TSTC and execute providing the T-Code to find the Program







No bother of "Schedule/ Released" Will not in our scope
We need to take care about the Status
Ready for longer time
Active for the longer time.

BTC logs are deleted by scheduling **RSBTCDEL** which deletes the log files from TBTC* based on the time interval in the Variant SA38.

UPDATE PROCESS

It is used to update the database from Temporary tables. There are three 3 Types of updates

V1 - Handles High Priority Updates
V2 - Handles low priority updates
V3 - Reserved by SAP (Currently no use)

Updates are defined by the parameter
Rdisp/wp_no_vb=1
Rdisp/wp_no_vb2=2 from RZ11

Technically for every 5 dialogue work process there should be one update of type V1/ V2

Update Flow:

1. User submits the request for an update
(Let us say a Purchase Order)

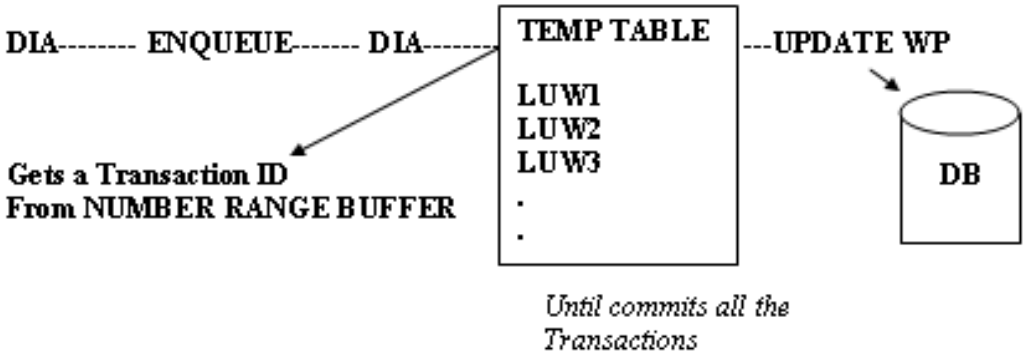
Eg: Bearers won't go to the Pantry
Similarly All dialogue won't go to the.... DB

2. Dispatcher handles the request and provides a dialogue process to it.
3. Dialogue process interprets the request and communicates with enqueue process to provide a lock to update the record consistently.

4. Dialogue process updates the temporary tables called as VB* asynchronously

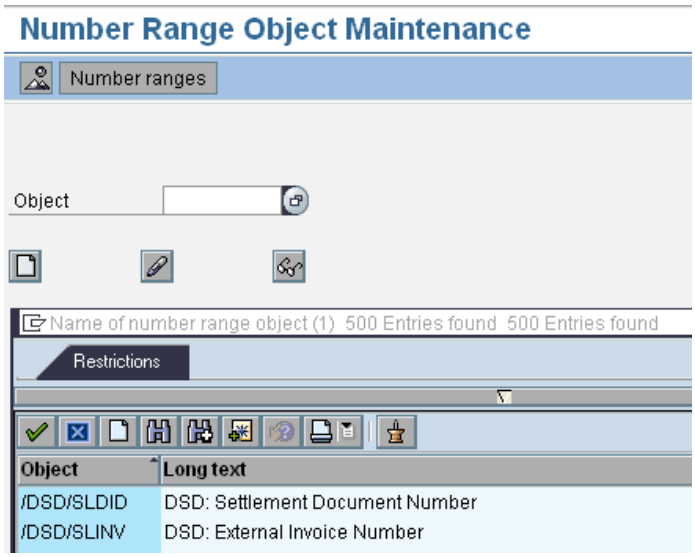
VBHDR - To store update header information
VBDATA - To store data that needs to be updated
VBMOD - The modules through which the data is updated
VBERR - Update Error Table

DIA → ENQUEUE → DIA → TEMP TABLE ⟶ DATABASE
LUW

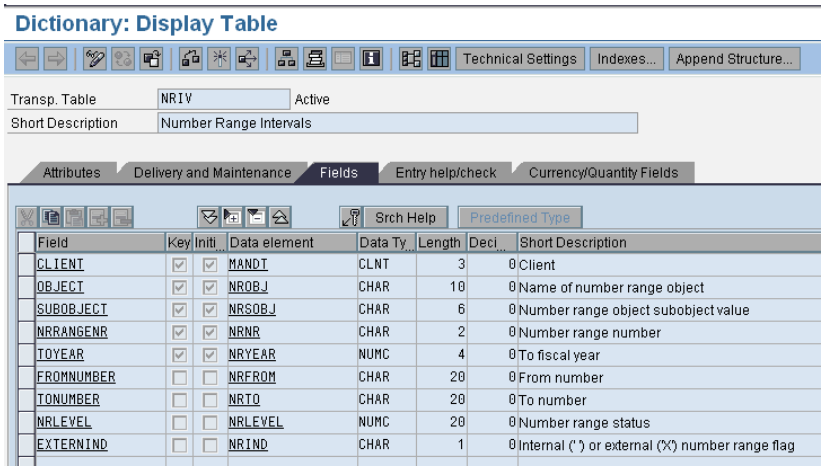


And gets a transaction ID from Number Range Buffer (Transaction **SNRO** and Table **NRIV** Number Range Interval Table)

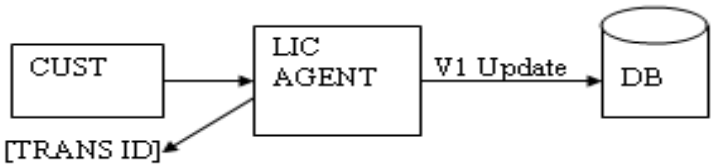
SNRO



NRIV



Eg:



Dialogue Updates - Update Releases the lock.

5. Update gets initialized and reads from Temp Tables and updates the permanent tables synchronously. Update inherits the locks and releases them upon updating permanent tables. Update updates the record based on transaction-ID using VBMOD Table (Every update is module based in SAP)

6. When the Dialogue updates the temp tables the record is displayed in SM13 which will be processed by update.

UPDATE MONITORING SM13

The record that needs to be updated by update process is displayed in SM13 with status INIT. If the records stays for longer time in **INIT** status that indicates the updates are busy or there are no sufficient update processes or update mechanism is deactivate from SM14.

Update handles the record and change the status to **"RUN"**

If the update stays long time in status RUN

1. Longer Update
2. Dead Lock (Needs to inform SAP for Program correction)

Updates which could not be updated will be thrown into ERR Status.

1. Update deactivated in SM14

2. Programming problems in LUW
3. Table Space overflow (ORA-1653; ORA-1654)
4. Max Extents reached (ORA-1631; ORA-1632)
5. Archive Struck (ORA-255; ORA-272)

BATCH/ BTC/ BACKGROUND

Each SAP transaction is considered as Single LUW (Logical unit of work) which in turn contains multiple LUW's needs to be committed to commit the SAP Transaction. If any one of the LUW is failed the entire transaction is rolled back. That is the reason why dialogue updates Temp Table.

1. User submits the request.
2. Dialogue handles the request.
3. Obtains lock from Enqueue so the data consistency is achieved and the records are only for display.
4. Updates the request in Temp tables (VBHDR, VBDATA, VBMOD, VBERROR)
5. Gets the transaction ID from NRIV (Number Range Interval Table)
6. Update gets initiated to update the VB* content permanently into the database.
7. Update inherits the locks.
8. Updates the database based on transaction ID.
9. Update releases the lock from the record.

UPDATE Statuses.

The following are the statuses displayed in SM13 Transaction.

INIT The record is waiting to update by an update process.
ERR The record runs in to an Error (Update Error)
RUN The update is executing the record into DB
AUTO The error records are reprocessed after a system restart/ update activation Automatically.

SM13 - Repeat Update

Used to repeat the ERR updates. The update are terminated or cancelled due to the following reasons

1. Table space overflow
2. Max Extents reached
3. Archive struck
4. Programmatical Error
5. Update Deactivation (SM14)

Running updates during deactivation

DEACTIVATE ----------> THROWS TO ERROR ----------> GOES TO AUTO

At this point of time we need to select the update (put a check mark of the update from SM13) and click on [Repeat Update]

Refer modules from SM13

The updates can be repeated with status ERR
Rdisp/vbmail = 1 to send email to the users if an update is failed.

Update mechanism can be deactivated by setting the parameter
rdisp/vb_stop_active=0 to deactivate the update mechanism in case of DB errors.
It can be activated from SM14.

rdisp/vbdelete=30 to delete the update records older than 30 days irrespective of the status.

Rdisp/vbreorg =1 to delete the incomplete update request during a system restart.

Report in SA38 RSM13002

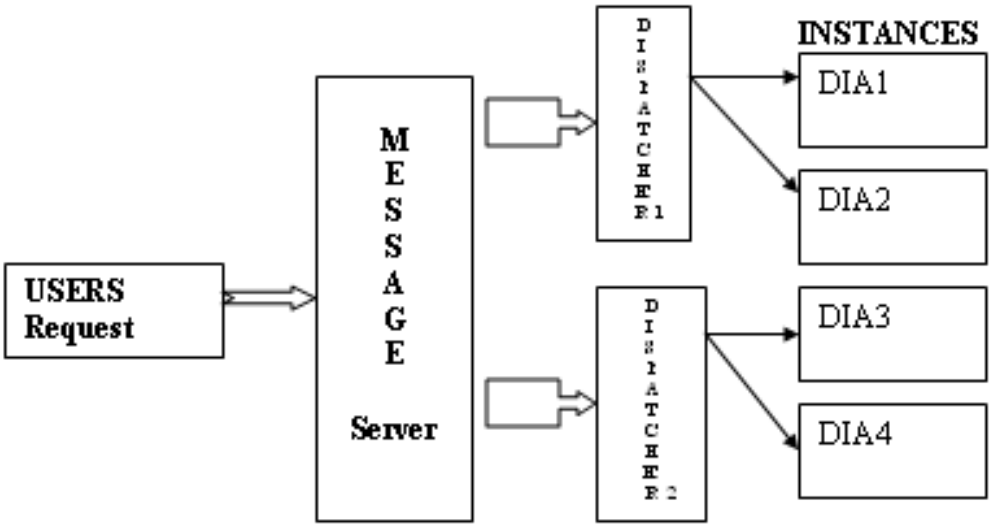
To delete the old update requests.
Deletes the executed update requests. Reorganize the update tables. (Its a background job)

V1 and V2 updates needs to be defined in the system.
V1 handles critical updates and V2 handles the non-critical updates which are defined by the programmers.

We can see either V1 or V2 in the standard SAP Program **SAPMV45A** by executing SE38

MESSAGE SERVER/ PROCESS

1. There will be only one message server through out the System.
2. It is used to manage all the dispatchers and identify the least loaded dispatcher and forward the user request to the dispatcher provided logon load balancing is configured in transaction SMLG



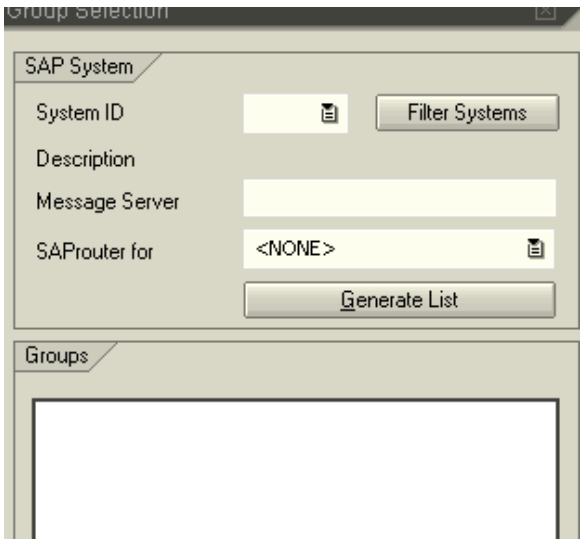
Logon Groups **SMLG**

SMLG > Create

Provide GROUP: For Eg: **MARKETING**
INSTANCE: **dewall36_R3I_00**

Now from SAP Logon Screen

Click on Groups > and Provide **SID** and **Message Server.**



We can find the Active servers from **SM51** and on db click on the Host name to view all the Processes.

CONFIGURING SMLG

1. Define a logon group from TCode SMLG

2. Assign the instance.

3. Open GUI > Select groups and create entry by choosing group.

4. Add an entry in etc/ services
   As **sampsDEV** (Message Server Name) **3200/tcp**

Entry should be made on all GUI systems.

Note: The load is calculated based on in ST07

5. create a file sapmsg.ini if not exists from (x:\windows)
Sapmsg.ini > open [MESSAGE SERVER]
DEV = <hostname>

Mechanism

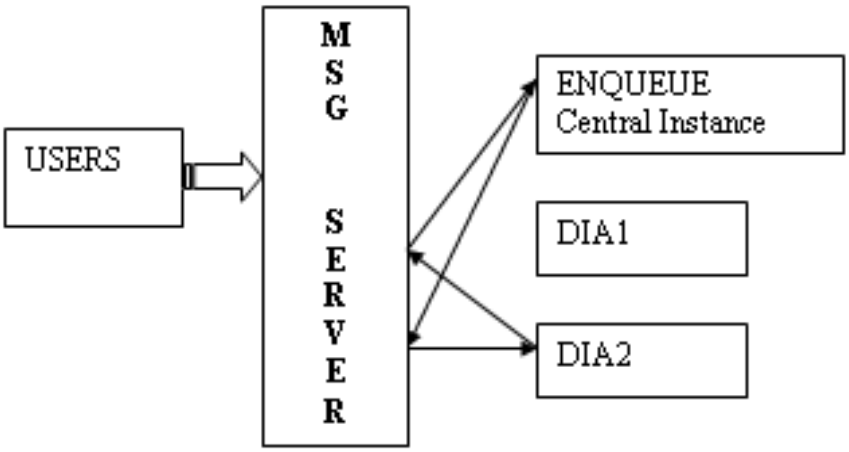
1. User communicates using GUI.

2. **sapmsg.ini** gets evaluated and checks the port in **etc\services** to communicate with the message server.

3. Message server maintains the details of favorite server and routes the request to that dispatcher

4. Dispatcher handles the request - Queue - Dialogue

Message server obtains the lock for dialogue process if the request is coming from the Dialogue instances.



SMMS: MESSAGE SERVER MONITORING

ENQUEUE PROCESS / SERVER **SM12 Monitoring**

Note: Server Naming convention is used because each of the process serving the user requests (Dialogue, BTC, Update, Enqueue, Message, Gateway and Spool DVEBMGS)

It is also possible to install and configure all the above servers on different instances or hosts.

ENQUEUE:

It is used to provide data consistency while updating the system. It provides locks from a lock table before a record gets updated and ensure that the record is available for display during an update.

There will be 1 One Enqueue process installed during installation. It is also possible to increase Enqueue processes to more than one depending upon the updates but most of the customer environments there will be only 1 One enqueue process.

It is configured by the parameter
rdisp/ wp_no_enq = 1

DEAD LOCK

SAP TRANS ------ MULTIPLE LUWS

MM Dept **Sales Dept**

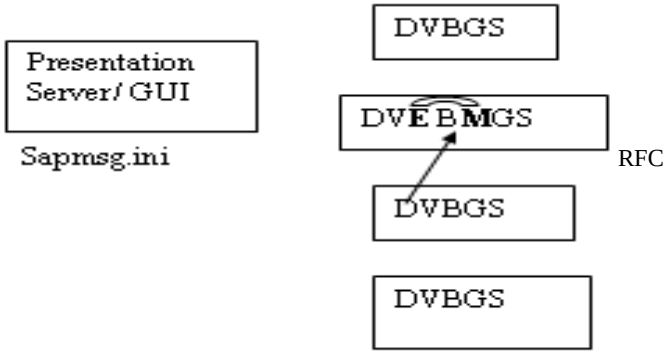
X + Y (LUW1)	→	A + B (LUW1)	
Z + M (LUW2)		**X + Y (LUW2)**	**Dead Lock**
Q + R (LUW3)		R + Q (LUW3)	

Enqueue process the locks and unlock the record during an update.

Enqueue server maintains the lock table on the shared memory of the Central Instance (or on the instance where it is installed)

It is recommended to increase the Enqueue processes only on the Central Instance.

Technically the Message and the Enqueue should reside on the same instance (It is not mandatory). If both are installed on the same machine then it will be more comfortable for message server to communicate with Enqueue process to obtain locks for Dialogue process that are coming from other instances.



DIA - MSSG - ENQ - MSSG - LOCK - DIA

TCODE - SM12 (Lock Management)
Enqueue table size is defined by the parameter
Enqueue/table_size=4MB (Earlier 1 MB to 4 MB) in Netweaver systems this can be increased to 100MB

LOCK MONITORING/ ENQUEUE MONITORING SM12

Shared Mode
Exclusive Mode.

Locks are monitored in transaction SM12. In principle the lock which are older than one hour should be reported to the escalation manager. If the lock table is filled (**Enque/ Table_size)** an overflow occurs in the lock table.

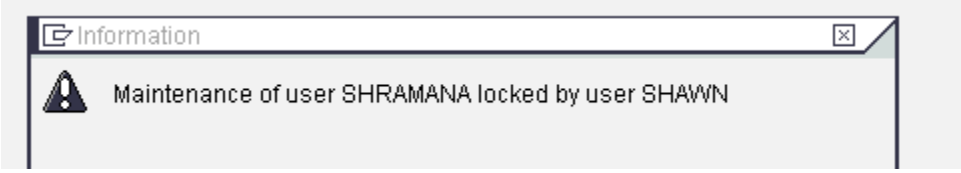
1. Check whether the update server is still performing the updates. If the updating has stopped, then the lock table can quickly become over filled with the locks held by update

requests. We can resolve the problem by restarting the updates. If updating has not been interpreted, then we must enlarge the lock table.

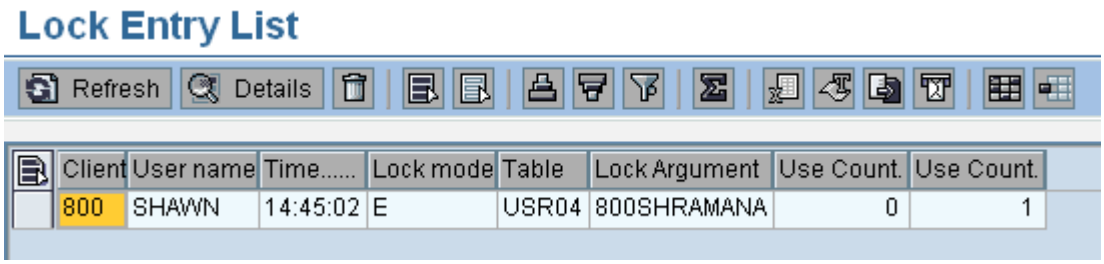
Note: Enque table overflow is recorded in **SM21 and ST22**

Eg: Execute SU01 from **Shawn** user/ 800 and edit **shramana** user
Execute SU01 from **Shawn** user/800 and edit **shramana** user

Following message is displayed



And now execute SM12 which displays the **E**xclusive Mode lock



2. Enque time is too high
As a part of the response time enqueue time should be 1ms - 5ms for Central instance and 100Ms in case of the request that is coming form Dialogue instance.

Then we can consider the following

1. Lock table is overflow and the locks are held in SM12

2. Update is deactivate (SM14) due to any of the issues in DB. If the update gets deactivated then the locks are not released.

3. If the Enqueue time increases i.e. there could be RFC issue or Enque wait time is increasing then consider increasing Enqueue work processes.

4. Dead locks (Usually never occurs, but there is a collision between PP, Manufacturing and Material Module, so highlight this issue to SAP)

In some instances we may need to release the locks but we need to follow certain process.

Do not release the lock in SM12 (Even though there is an option)

Lock deletion is recorded in SM21.

1. Users complaint that he could not update a record and message pop up stating that the record is locked by user XYZ.

2. Check the period of lock (if it is older than 1 hour inform to the escalation manager)

3. Get the written B&W approval from the user and terminate the session of that user using SM04. (Only Terminate or End that session)

All the transaction activities are recorded in CDHDR

Note: Initially 20Kb Mem is given from ztta_roll_first.

We may need to allow some locks for more than one hour or days (Eg. Payroll update processing) consumes lot of time. We need to ensure that dialogue process should not held for longer time, but however BTC is allowed.

SPOOL PROCESSING

User request - DIA - (Tables TBT*) BTC---- (TST01, TST03)--SPOOL -- PRINT

User request - DIA-- (TST01, TST03) --- SPOOL ------ PRINT

PROCESS/ FLOW:

1. User request to print a purchase order (or) user schedule to print dunning reports (LEGAL Notices, Credits, LOANS etc)

2. These print request are processed by the respective Dialogue/ BTC and stores the content in TEMSE - Temse is a temporary sequential objects that are stored at OS (File system) or Database level which is defined by the parameter

rspo/store_location=G or DB

(G Means Global Directory **\usr\sap\SID\sys\global**)
(DB Means - Database tables TST01 and TST03)

Note:

DIALOGUE - Multiplexing
BTC - Single Process

The Advantages of TEMSE.

TEMSE size is 99000

Refer:
SU22 - (s_spo_act) - To identify the tcode/ Authorization objects
SP01
SU24

The Temse can be stored in database or OS level. Temse remains in the DB/OS unless they are deleted explicitly by SAP standard reports.

TEMSE AT OS OR DB (WHICH ONE IS RECOMMENDED?)

OS [G]

1. It is recommended because the print request are printed faster than database. i.e., from Global directory requests can be converted to output request at faster rate than database.

2. This is only recommended when the requests are small in nature. (Every day 50-100 Docs) if the size increases the search at file level consumes more time as (No indexes at file system)

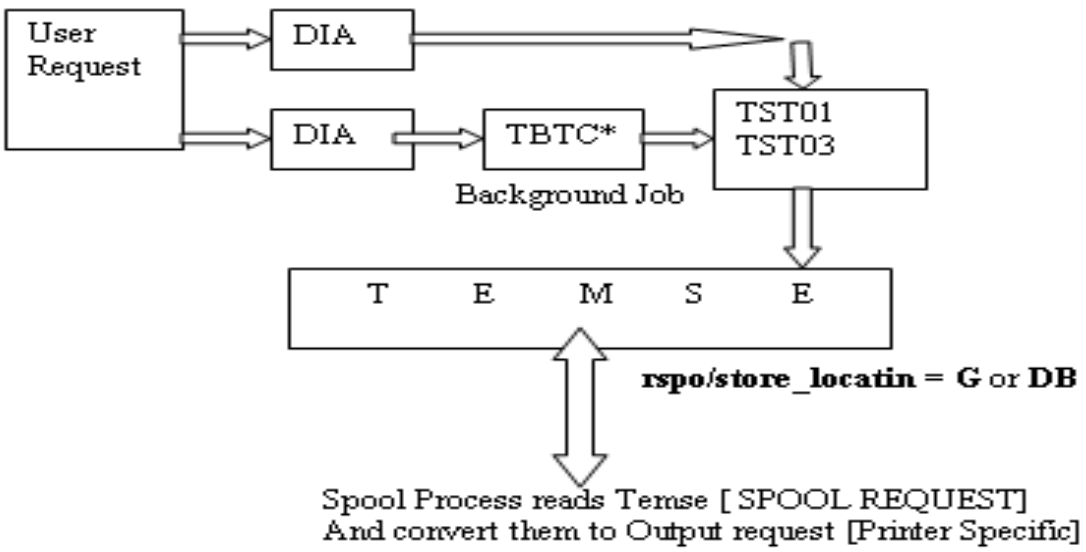
3. File system is not backup frequently as Database. File system backup will be weekly, fortnight, monthly whereas database is hourly (Redo Logs) and daily DB Backup. That is Temse is not secured at file system.

DB [DB]

1. Consumes more time than Temse at OS when there are less no of records. but shows the performance by using Indexes when the user grows (Temse can handle 90000 Requests)

2. Backup is a regular activity on database so the Temse is secured. As it is stored in tables.

Temse is a part of Normal Database (TST01 and TST03) no separate memory is required.



DIALOGUE - BTC request - Spool Process
DIALOGUE - [TST01, TST02] - Spool Process

OUT PUT REQUEST

FRONT END > Spool process comes at our Desktop

Default setting is **DB**
RZ11 : rspo_location
: rdisp/ btctime

3. The Spool process reads from TST01 and TST03 i.e. the name of the author (USER), Name of the Printer, No of copies are procured from TST01 and Printable data from TST03

Spool Process formats or converts spool requests to output requests i.e. Printer specific format. If the format is performed locally then it is said to be LAN (Local Access Method). If it is performed remotely then it is said to be RAM (Remote access Method)

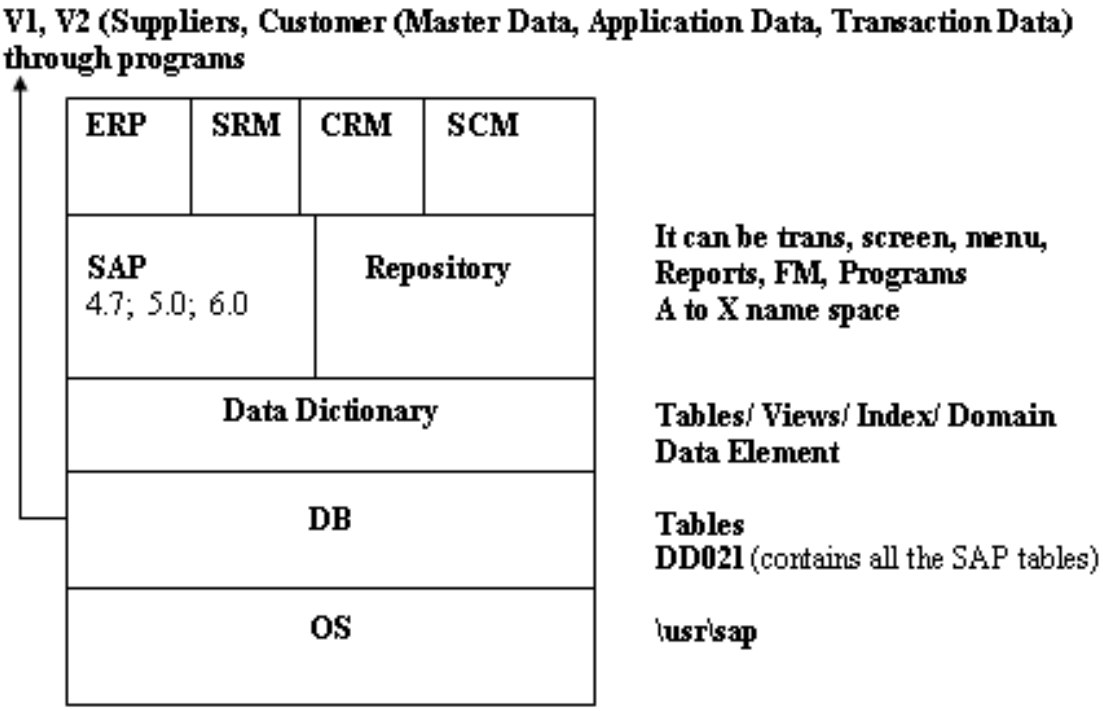
Spool processes are configured by **rdisp/wp_no_spo** (Rdisp indicates instance specific)
There should be at least 1 one Spool process in the entire system.
We can configure as many as we can depending upon the available resources.
It is also possible to have dedicated instances which will provide only spool processes
PROGRAM[**RSPO1041**] to maintain TEMSE.

Refer: From SE12

TPFYPROPTY

Flag for changes
Obj_name = parameter Rdisp/time
Type T denotes Dynamic
X - Whether Changeable or not.

SAP System



Note: We should not touch the Repository data of name space 'A' to 'X'.
SE11 > table name : /* (/ is a customer name space)
TADIR is the repository
TSTC - Is the T-Codes with the program name.
Market place > keys & Reqs > Development Name space.

Note: STMS > System > Transport Tool
no_import_all = 0 (No Mass Transportation)

SPOOL MECHANISM

Dialogue - BTC - TBTC* - TS* Tables
Dialogue ---------- TS* Tables

Spool process reads from TEMSE and convert spool requests to the output requests (Printer specific requests).

SPOOL ADMINISTRATION TCODE - **SPAD**

LPD - Line Print Demon
Drivers are specific to O/S and not to SAP

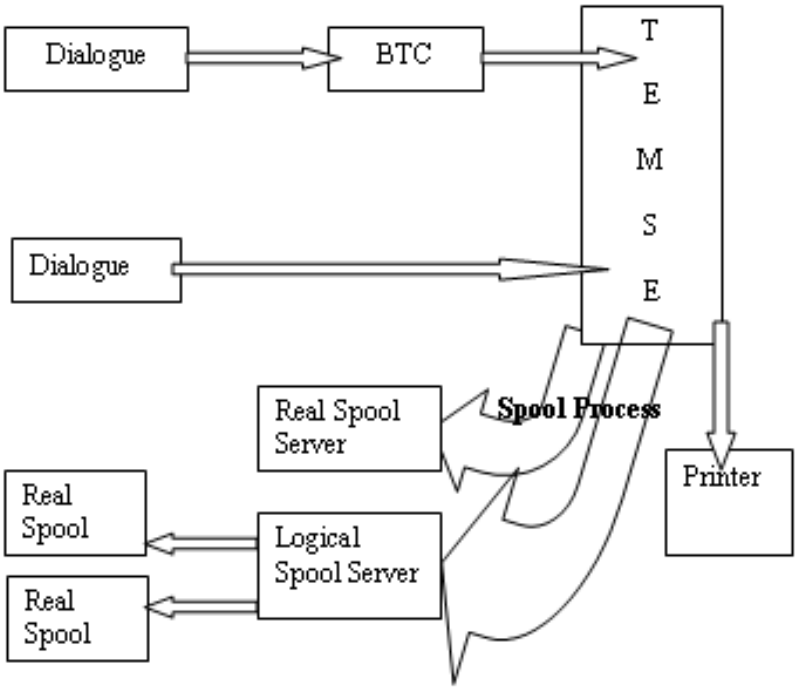
1. It is used to define output devices/ Spool servers and access methods

Defining a Spool Server:

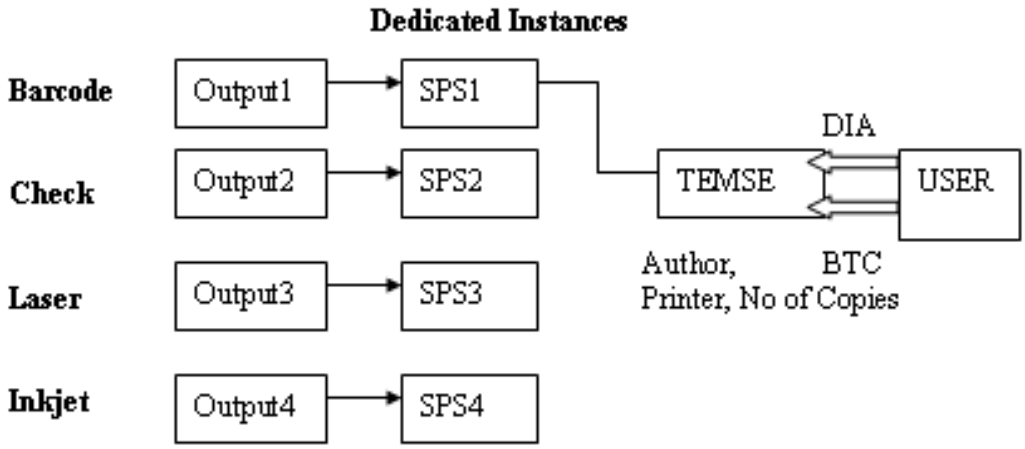
The instance with atleast one spool process is referred as spool server. It is also referred as Real spool server. (Existing)

Logical Spool Server.

This is not existing but pointed to a Real spool/ another logical spool server. This is used for load balancing the spools.



Note: We can set up a dedicated instance for spool process.



CONFIGURING THE OUT PUT DEVICE.

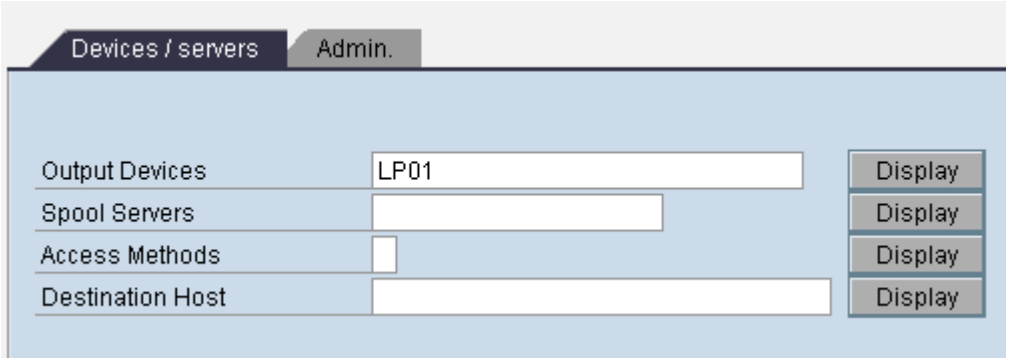
1. Execute SPAD
2. Click on the Spool Server - Display then Change
3. Click on create

Server Name: LOGICAL SP1
Server Class : Mass Printing

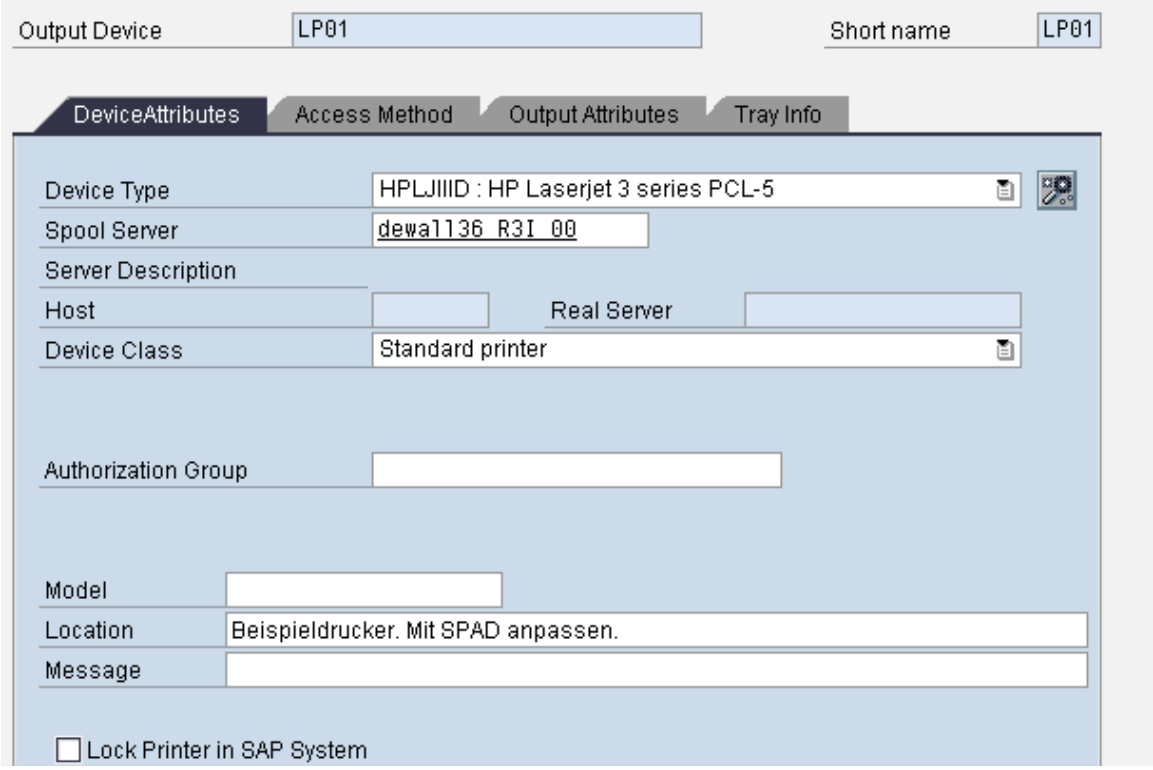
Logical Server: Mapping : lolla28_00
Alt server: .....

DEFINING OUTPUT DEVICE/ PRINTER

1. Execute SPAD
2. Click on output device



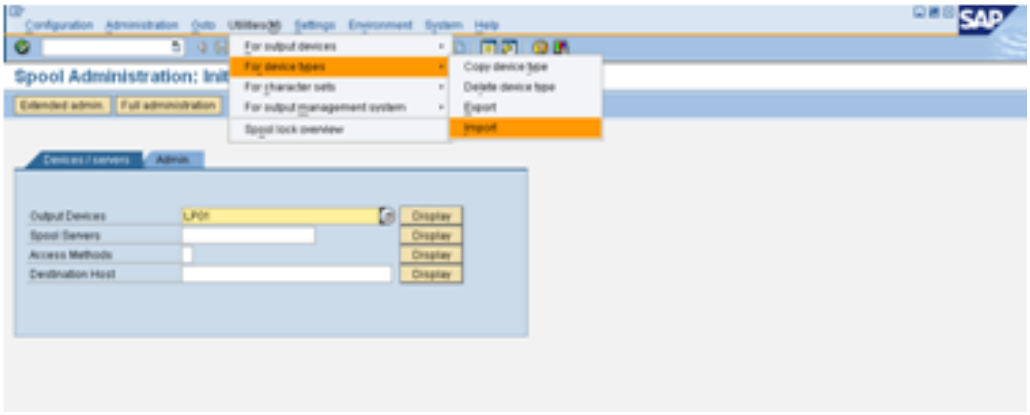
3. Click on display
4. Click on change
5. Click on create

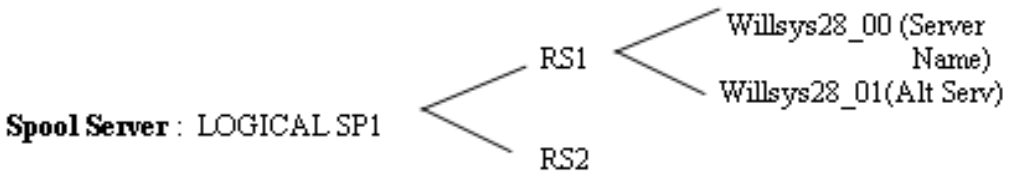


6. Specify the **Output device name**
Specify the description : Local Printer

7. **Device type**: HP Model & Manufacturer
Device type specifies that the output device is recognized by SAP. If there is no device type available then select SAPWIN. If required write to SAP and try to get the device type. SAP sends programs in terms of Patches.

SPAD > Utilities > For device types > Import
If the character set is required.





Device Class: (Standard, Fax, Telex etc)

Authorization Group : Specifies the access control methods

Model:2200

Location : 5th floor A wing...

Message : Only used by Pay Roll.

Note:

Dialogue --- TEMSE -- Author, Printer, Number of copies
When printer is defined Spool server (LS/ RS) is assigned
In order to print we need the spool process from the assigned instance to convert the spool request in to the output request.
Spool process uses Access Methods to format the request. (either Local, Front End, Print server...)

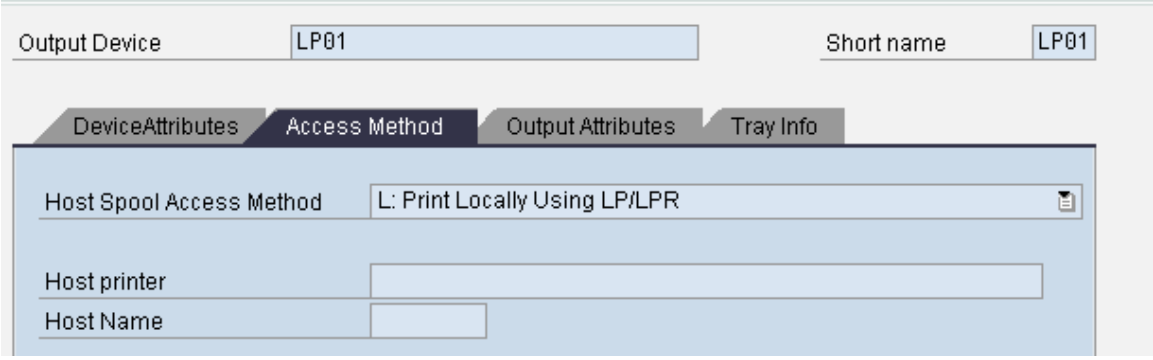
ACCESS METHODS

It specifies the process of formatting the spool request to printer specific output request.

LOCAL ACCESS METHOD

The spool work process and the host spool resides in the same machine i.e. the work process transfers the spool request to the spool system locally.

Select **L** for UNIX based system (Local Print Method)
Select **C** for Windows (which uses direct operating system call)



Select **F** for **FRONT END** printing
Spool work process goes to the user desktop and format the request based on the printer that is connected to desktop. This is more expensive, time consuming than any other methods.

Disadvantages: No user can print in the background because the desktop initiation is not possible in the background during off peak hours.

Advantages: Check printing, Sensitive docs, label printing.

Restrict the no of work process that can go into front end mode using the parameter.
rdisp/wp_no_spo_fro_max = 2

i.e. two work processes can be used for front end printing. If this parameter is not used spool congestion occurs.

Specify **I** for Achieving device (Optical Devices, HSM, Jukebox (stores each copy (output doc)) Hierarchal storage machine

REMOTE ACCESS METHODS

The formatting by spool work process is performed on remote system.

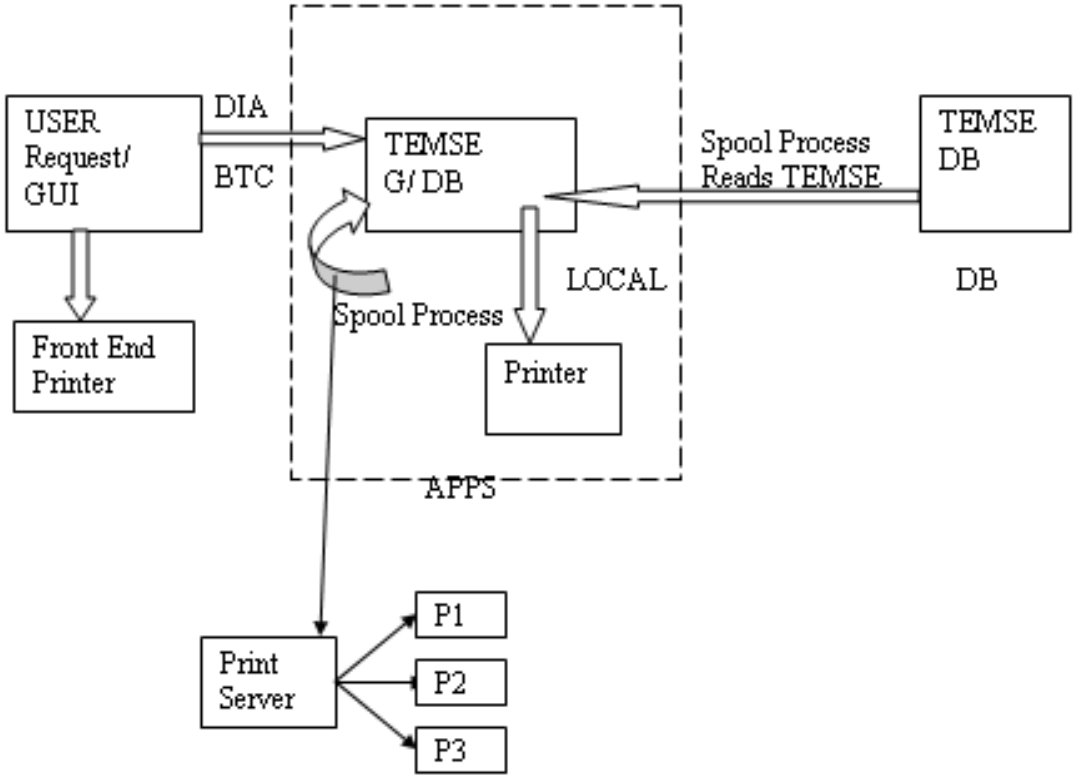
Specify **U** for UNIX operating system where formatting is performed on the remote machine (Print server) using Berkeley protocol.

Specify **S** for windows operating system. It will transfer the formatting to remote system using SAP specific protocol **SAPLPD**

For LOCAL & REMOTE > Needs the printer models
For FRONT END > SAPWIN

When Remote access method is specified we need the following

HOST Printer:
Destination HOST:
i.e. the printer should be configured on destination HOST. It can be a print server.

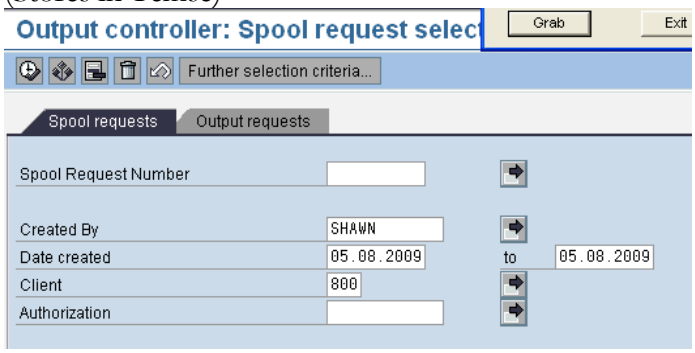


Note: Front end cannot be scheduled in the background.

SPOOL MONITORING SP01; SP02

The spool requests are monitored in SP01. users can monitor the requests using SP02.

Spool Requests Output Requests
(Stores in Temse)



Note:

Put a check mark [ ] Do not query host spooler for output requests. If this option is checked, It improves performance. If we need the exact status then uncheck the box.
Output Attributes: Depends upon the company requirements. Tray info is also similar.

The Major advantage of TEMSE is the documents can be displayed even before it is printed.

SP01 is used to monitor the spool requests based on statuses.

1. Status '- Minus' :		Indicates not yet sent to the host system (No output requests exist) The spool process is busy/ congested, if too many requests with this Status indicates need for increasing spool WP.
2. Status '+'	:	Spool request is being generated (Stored in Spool system)
3. Waiting	:	Waiting for processing by spool
4. In Process	:	The spool WP is formatting the output for printing
5. Printing	:	The host spool is printing the output request. If the SAP spool system does not receive any status information from the host spool, this status displayed for approximately one minute. The system then sets the status to Complete (Competed or Error)
6. Completed	:	The output request printed successfully. In systems where the spool system does not receive any information about the host spool , the system changes to complete as soon as the output request is sent to the host spool.
7. Error	:	It indicates a server error such as network error. The requests have not printed and remain in the spool system until they are deleted or until they reach their expiration date and are deleted during a reorganization.

1. Printer issues like (Page setting issues, cartridge issues, printer not available) paper out, print server not available) these printer specific issues will be resolved by Network Team/ Print Team.

2. User complain that they could not print documents to a specific printer.

- Check the availability of the printer, if required we can change the printer and reprint the document.

From SP01 --- Select the request -- Use Menu "Spool Request and print directly" or select print with changed parameters.

While changing the parameter we can set the priority between 1 - 10 (1 as High)

3. Spool request cannot be generated

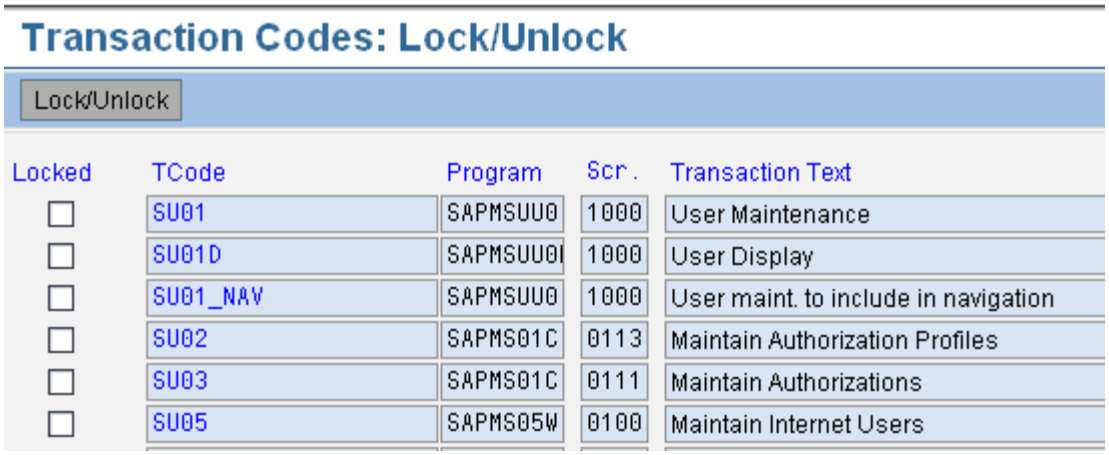
- The TEMSE is full i.e. TEMSE will be full when it reaches 99,000 requests and log is generated in **SM21 (System Log)**

- We need to reorganize the spool requests using the SAP standard reports. **(RSPO1041, RSPO1043, RSPO0041, RSPO0043).** These are used to delete the old spool requests based on selection criteria. In general the spool requests which are older than 14 days will be deleted if standard jobs are scheduled in **SM36** they also checks the consistency of TEMSE periodically.

- We can also use SPAD for reorganization of spool (but the logic is same)

For this
Execute - **SPAD** > Full ADMIN > ADMIN > Delete old spool requests
Or from **SA38** execute the program - **RSPO0041**

Refer SM01 - Transaction Codes [Lock/ Unlock]



SP12 - SPOOL TEMSE ADMINISTRATION
It is used to monitor the memory allocated for TEMSE

Note: If we need to forward a spool request select the request in SP01 and forward it to another user where user can print from alternative printer.

SP01 : Spool request > Forward >
(Client to client) Recipient : DDIC

Use **SBWP** (SAP business work place) to display the request in inbox.

PRINT QUEUES

Note: Should have enough spool work process to format the requests to printer specific requests. Similarly we should have enough output devices to avoid the print queues.

SETTING DEFAULT PRINTER

From **SU01** we can specify default printer to the user but do not check the box "**delete the request after output immediately**" which improves the spool performance.

The printer can be locked during maintenance in **SPAD**

To process the requests sequentially based on serial numbers
Select the option -- [ ] print sequentially in SPAD from **OP devices attributes** tab.
Print sequentially consumes time to print in the order. If this is unchecked it prints faster but sequence is not maintained.

Dialogue

2 Min / Instance
75 - 150 MB
5 - 10 Users (Refer **ST07**)
Handles request Interactively
Multiplexing
Rdisp/max_wp_runtime = 600
SM50/ SM66
wp_no_dia
DPMON
It initiates update, BTC, spool, Message server and enqueue

BTC

Expensive, long running, time consuming
No time limit
Off peak time
Scheduled to run periodically using variants
Statuses
(Scheduled, Released, ready, active, finished, cancelled)
Job step
Program (SA38), OSCommands (SM49, SM69), External Programs (on Tar. Systems)

TBTC* tables
Standard background jobs
Pause(rdisp/btctime, wp_no_btc=0, btctrans1)
Atleast 2 for the entire system
SM36; SM37
Operation modes (RZ04, SM63)
RSCOLL - gathers performance into ST03
BTC communicates with enqueue for locking and spool for print.

GATEWAY WORK PROCESS SMGW

SMGW is used to monitor the gateway process. Gateway is used to communicate between SAP and NON-SAP systems. There will be only 1 gateway/ instance. If required we can also install a standalone gateway on a JAVA engine.

Gateway listens on port '3300'+instance number (3300, 33**01**,33**02** where 01, 02 are the instances).

Gateway provides an interface so that the external system can communicate with SAP system on the specified port.

When RFC's are defined between the systems they use SAP gateway when (ALE, EDI, IDOC are transferring they use gateway)

INSTANCE MANAGEMENT

Instance is managed by using profiles. Profiles will resides in
(usr/sap/<SID>/sys/profiles)

There are three types of Profiles

1. Default
2. Startup
3. Instance Profile

As part of post installation we import the profiles of Active servers from **RZ10**.
The profiles resides at OS level in the directory (**usr\sap\<SID>\sys\profile**). They can be managed/ edited using a notepad. But the consistency is not checked (say for eg. if we modify the instance profile WP DIA=2000 and there is no error message and versions are not maintained under OS level)
DEV_DVEBMGS00_lolladel.

So these profiles are imported into database management for consistency check and version management.

Startup Profile

Startup profile consists of startup parameters like

Starting Database
Starting Message Server
Dispatcher + Work.
Do not modify these parameter under any circumstances on OS level.

Default Profile

It is used to provide global parameters for all the instances, buffer parameters, security parameters (Password, User restrictions), Message server host, enqueue host)

Instance Profile

This is specific to instance configuration such as work process, timeout parameters etc.

Starting Sequence

1. Startup profile is read by the system to start the engine by starting database, message server and dispatcher in Central Instance.

2. Startup profile is read by the system to start the engine by starting (DISP+WORK) on dialogue instance.

3. There will be only one default profile in the entire system which provides global values.

4. Instance specific profile - This is used to set the instance specific parameters.
Eg. How many profiles are available on a system with 10 Dialogue instances.

Total = 11 (including Central Instance)
11 X 2 per instance (Start + Instance)
22
22 + 1 (Default Instance) = 23

PROFILE MANAGEMENT

Documentation for profiles are available in RZ10
Profiles resides in the table - TPFYPROPTY

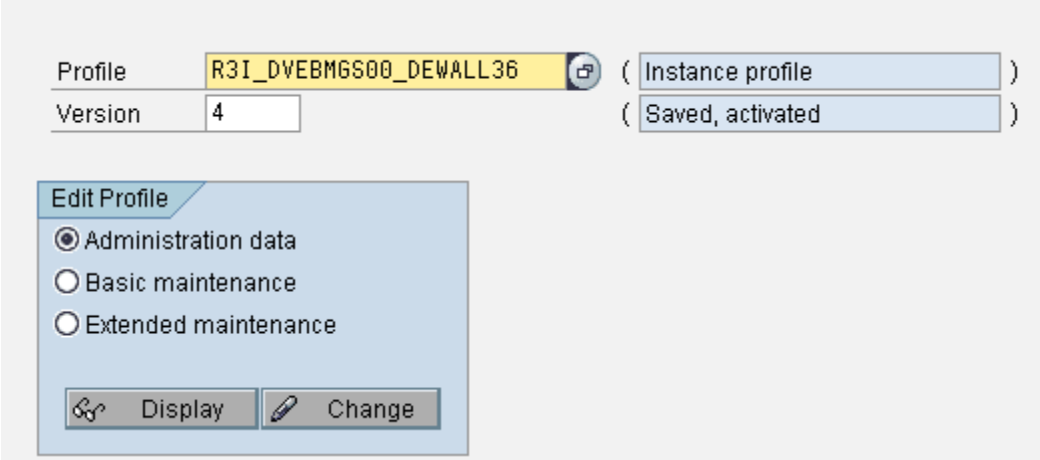
RZ11 is also used to change some parameters dynamically without restarting the system but they will be reset once the system is restarted.

RZ10 changes are permanent

The field type 'T' Specifies the dynamic parameters.

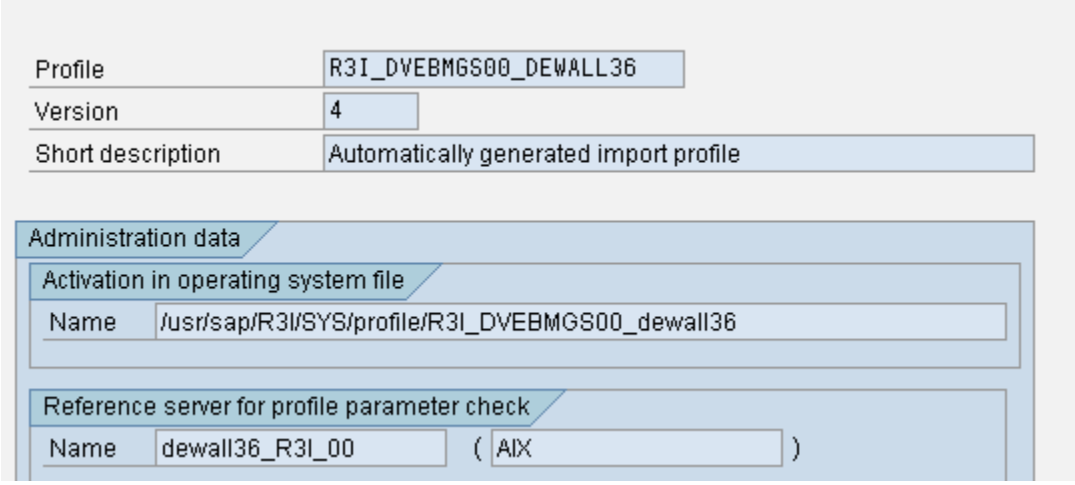
RZ10

There are three types of Administration.



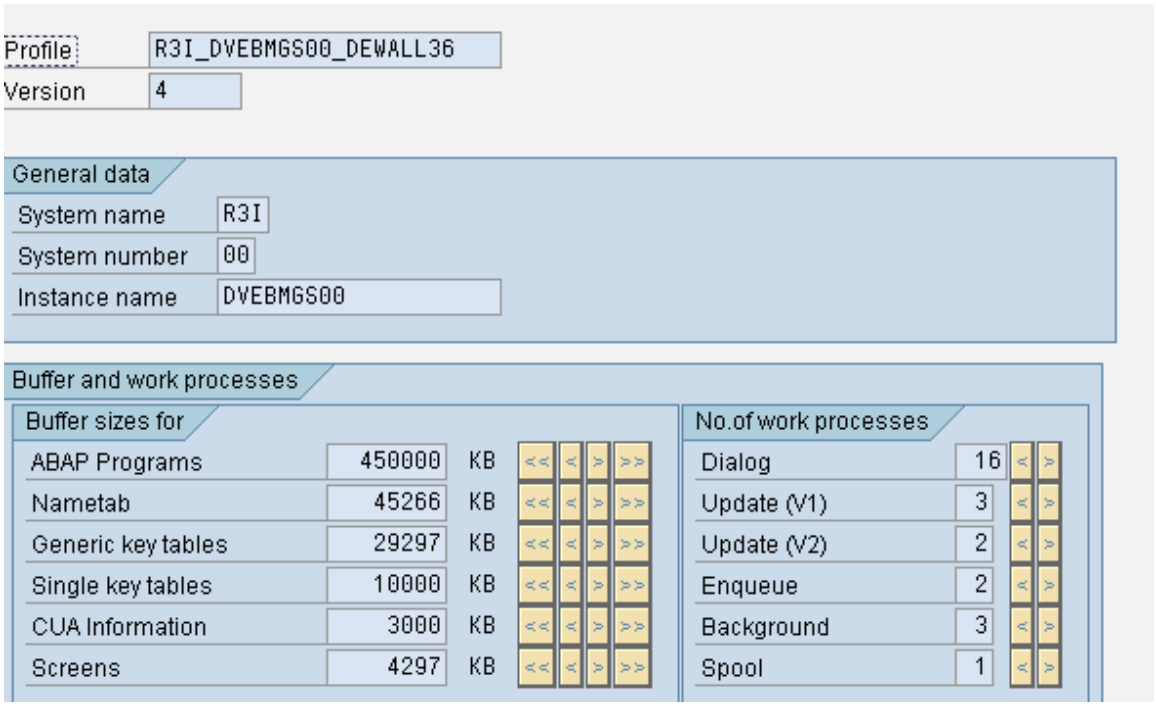
1. Administration data

No need to maintain using this option. It only specifies the path of the parameters.



2. Basic Maintenance:

It is used to maintain the profile parameters without any technical names. GUI based using mouse



3. Extended Maintenance

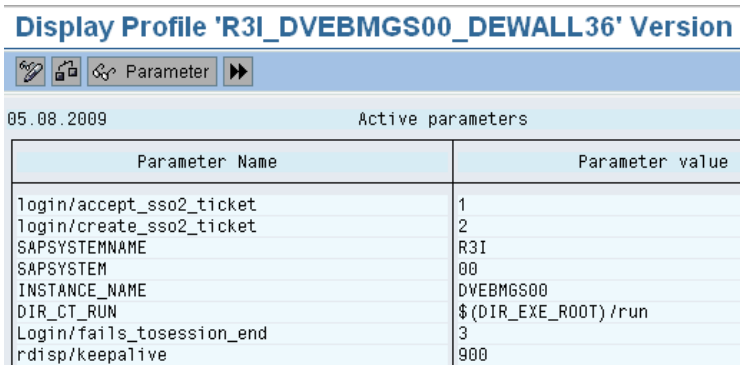
Used by administrator using parameter names

Specify the input by including new parameters or modify the existing one.

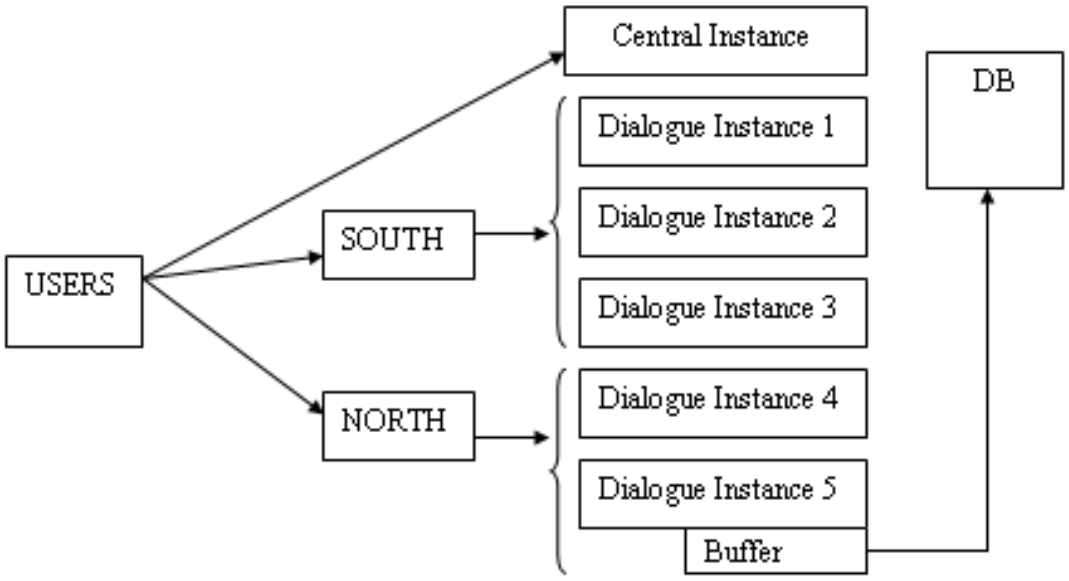
Copy > Save and Activate the profile.

The profile changes are updated at OS level and the existing profile is marked as .BAK and a new profile is created in the profile directory. It will effect only after restarting the Server.

Profiles are changed on SAP recommendation or based on experience. Do not change any of the profiles on trail and error method. System will hang and may not restart.



LOGON LOAD BALANCING **SMLG**

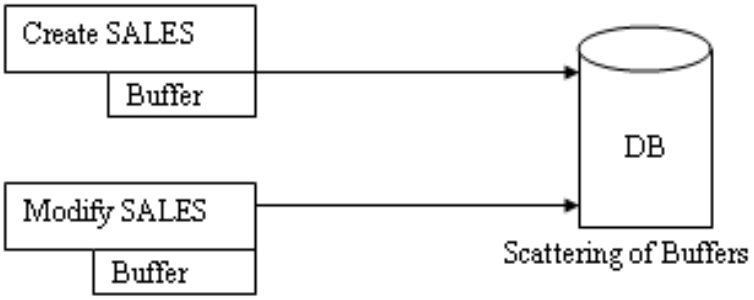


ST07 - Application Monitor: User Distribution
SMLG - Logon groups sapmsg.ini

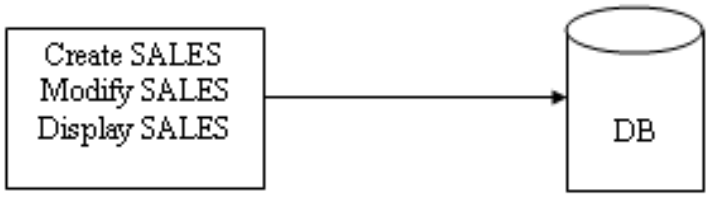
Logon Load Balancing SMLG

It is used to route the requests to the least loaded instance of that group.
Factors to define LLB.

Identify the components along with users. If the users are logging to different instances the buffers are scattered therefore they are not effectively used.



So for this



* Note: **DDLOG** is the synchronization table

User A A+B =50 }
User B A+B =75 } Buffer Synchronization

1. Buffers are optimally utilized.
2. Load balancing to avoid long queues
3. Fail over (Logical) (As we are configuring logical system)
   Load balancing provides the following logon groups which are defined in SMLG.

SMLG > Define the groups and assign the instances.

Mechanism

1. User uses SAP GUI -groups option to login
2. Saplogon.ini is used to display the available entries
3. User select group and click on logon.
4. When the user select group. It looks for **sapmsg.ini** to identify the message server and etc/services for message server port. **saproute.ini**, **saprfc.ini, sapdoccd.ini** (For library), **saplogon.ini**

5. Message server communicates will all the dispatchers and identifies the least loaded server and mark it as a favorite server in SMLG. The request is routed to the favorite server.

6. The dispatcher process the request normally.

Sapmsg.ini ---- IP Address --- Hostname of the message server
Central instance (but not always)

DATA TRANSFER TECHNIQUES

During the implementation of the legacy system needs to be preserved or used in the current system.

Example: A customer/ company is running business for the past 30 Years. He is maintaining customer details, vendor details, supplier details, employees and salaries, account payables, account receivables and P&L (Profit and Loss). This information is required by the customer in SAP System. So there is need to transfer the legacy system data to SAP system.

Example: Customer implemented SAP but the employees who are old cannot make use of SAP system. They would like to work on the traditional systems. After go live both systems SAP and legacy travel parallely. The data entered in the legacy system i.e. PO's, Invoices, Billing, Shipping are to be transferred periodically(Hourly) bi-hourly(for every 4 hrs) or daily

SO --- PO
BI ---- INV

Example: Reliance, Hero Honda [B2B Company to Dealers] not B2C [Distributers to customers] they communicate with dealers, suppliers, using SAP. But dealers and suppliers use non-SAP system so it is required to establish communication between SAP and NON SAP systems and perform the data transfer periodically.

ETL - Extract - Transfer - Load

SAP	-	Non SAP
Hero Honda	XML	Dealers

RFC: REMOTE FUNCTION CALL **SM59**

RFC is used to communicate between SAP systems and SAP to Non-SAP systems using TCP/IP protocol. RFC's are defined in [SM59]. There are 4 types of RFC's

1. Asynchronous RFC
2. Synchronous RFC
3. Transactional RFC
4. Queue RFC

1. **Asynchronous RFC** - (Like a post card). The sending system may or may not receive it. i.e. there is no acknowledgement from the receiving . The transmission is not reliable.

2. **Synchronous RFC** - It is not like ARFC. It gets an acknowledgement from the target system. (like a register post).

If the receiving system is not available the process goes into RFC/ CPIC/ Sleep mode and waits until it is wakened by the target system. Target system/ Receiving system may be busy i.e. all the resources are used up. This is reliable but time consuming and expensive (Client Copy) the job should get finished.

Note: SAP uses CPIC protocol SAP specific (Common Programming Interface for Communication) to communicate between system.

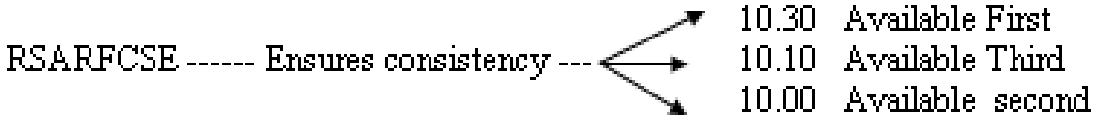
Berkley	UNIX	PRINTER
	CPIC	SRFC

3. **Transactional RFC - TRFC** - It is an advanced version of ARFC and SRFC. The request goes to receiving system if it is not handled a Transaction ID is generated by the source system. A program RSARFCSE is scheduled in the background to run for every 60 seconds.

Transaction **SM58** is used for Transactional RFC. It is used to document all the transactional ID's and ensure that they are received by the recipient system.
This is consistence and reliable.

Example : Central user administration.

A user is created in the parent client and transferred to the child client when they are available?



4. **Queued RFC** - It is an advanced version of TRF and ensures that the transaction is committed based on FIFO/ Queue. It ensures transaction consistency of LUW and reliability of data transmission.

SMQ1 - to monitor the outbound queues of a sending system refer SCOTT for FAX...
SMQ2 - Provides interface to monitor Inbound queues.

DEFINING SYSTEMS - SALE

SAP systems consists of more than one client - technically 1000 client can be created in one system. So we need to identify which client is the business client. Preciously SAP is client based (A mandatory field while login)

Each client is defined with a logical system name that is defined in **SALE**. (Sap System linking and enabling). Each system is identified by SID, client by 3 digit number. So, Logical system number should be **<SID>CLNT<CLNT_Number>**
Eg. **DEVCLNT900**

To identify the systems easily by name
1. Goto > SALE > Basic Settings > Logical System
2. Define Logical System (<SID>CLNT009)
3. Assign logical system to the client.

There should be unique SID in the Landscape.

Defining RFC Connection - SM59

1. SM59 - Provide the name of the logical system

2. Select the connection type '3'
3. Description about the connection
4. Technical settings (Host name and Instance No)
5. Logon Security (Client, UID, PWD, Logon Language)
6. Save the connection, Test Connection, Remote logon

Perform three times to add 3 systems.

Central User Administration **SCUA**

Goto > BD64 or SALE > To define the sending systems and receiving systems
Or
Use the SAP standard moral for that application.

Example: To configure central user administration **SCUA** Tcode is used.

From 000/ Sapuser
Execute **SCUA** / - **model** : lolla > Create
(The logged in system is treated as Sending system)
We need to define recipient/ receiving systems

DEVCLNT001
DEVCLNT000
DELCLNT001 save to configure CUA

Goto back end systems
Try to execute SU01 and create an user .. It wont allows us to create because the receiving systems will become a Child system.

SCUM is performed only in the Parent System

Eg: Consider a Scenario

- Being in parent create an user assigning profile SAP_ALL
- define systems and SAVE
- Stop the other systems
- Execute SM58 (Transactional RFC)

Users are distributed to the child client using TRFC(SM58) and if the client system is not Available the record hangs in SM58 and ensure that is updated in the child client.
To delete : Execute report : RSDELCUA or SCUA select the client and delete.

EDI - Electronic Data Interchange

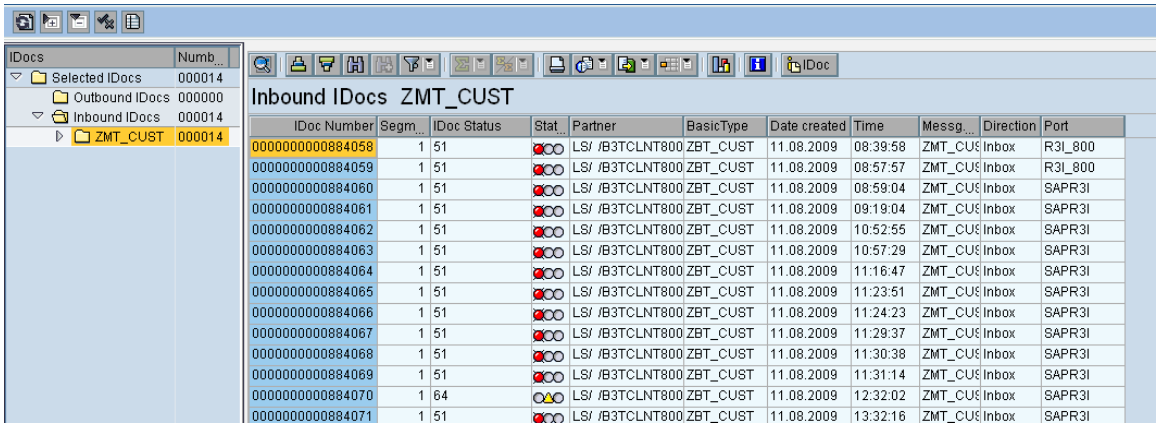
It is used to communicate between SAP to NON-SAP systems.

ALE - SAP to SAP only.

IDOCS (Intermediate Documents) are used to transfer the data. It will be in the Understandable format of both sending and receiving systems. SAP - NON SAP.

WE05 is the Tcode to monitor the IDOCS
SCUL to check the logs

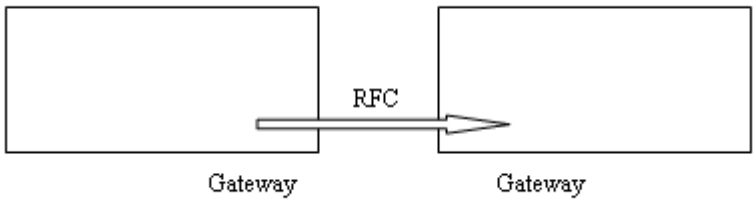
WE05 > Status



IDoc Number	Segm...	IDoc Status	Stat...	Partner	BasicType	Date created	Time	Messg...	Direction	Port
0000000000884058	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	08:39:58	ZMT_CUS	Inbox	R3I_800
0000000000884059	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	08:57:57	ZMT_CUS	Inbox	R3I_800
0000000000884060	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	08:59:04	ZMT_CUS	Inbox	SAPR3I
0000000000884061	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	09:19:04	ZMT_CUS	Inbox	SAPR3I
0000000000884062	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	10:52:55	ZMT_CUS	Inbox	SAPR3I
0000000000884063	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	10:57:29	ZMT_CUS	Inbox	SAPR3I
0000000000884064	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	11:16:47	ZMT_CUS	Inbox	SAPR3I
0000000000884065	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	11:23:51	ZMT_CUS	Inbox	SAPR3I
0000000000884066	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	11:24:23	ZMT_CUS	Inbox	SAPR3I
0000000000884067	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	11:29:37	ZMT_CUS	Inbox	SAPR3I
0000000000884068	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	11:30:38	ZMT_CUS	Inbox	SAPR3I
0000000000884069	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	11:31:14	ZMT_CUS	Inbox	SAPR3I
0000000000884070	1	64		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	12:32:02	ZMT_CUS	Inbox	SAPR3I
0000000000884071	1	51		LS/ /B3TCLNT800	ZBT_CUST	11.08.2009	13:32:16	ZMT_CUS	Inbox	SAPR3I

0 to 49 - are the outbound IDOCS
50 and above are the inbound IDOCS
52 - States that the application document not posted fully.
53 - states that the document is posted
02 - states that there is error in the port
07 - states there is a syntax error.

Tcode **IDOC** to check the consistency
WE21 to identify the ports for IDOC processing.



SYSTEM MONITORING

Gateway is a port that listens on 3300.
It is used to monitor the health of systems in terms of storage, memory and CPU technically.

Status (Killed, Ended, Free... Instance is down)
But on SAP front we need to monitor the process utilization, pending updates, dead locks, system logs, database logs, system dumps, btc failures, RFC failures, Failed spool requests, work load on the system (Users, Reports, Transactions, Programs)

PROCESS MONITORING SM50 (INSTANCE)/ SM66 (GLOBAL)

Monitor the instance specific processes in SM50 and Global Specific Process overview based on status in SM66.

Monitor the processes with status(reasons) running, hold, stopped, sleep, RFC/ CPIC, PRIV.
Identify the user, time, client, Action.

If BTC is running for longer times check whether it is permissible as per the process document.

Dialogue process should not consume more than 1-2 seconds for normal tasks. It will be automatically down (Killed) by system in 600 Seconds. If it is not killed the process might be occupied by dedicated resource and uses heap memory with status PRIV. The process has to complete the job or Heap Memory should exhaust, so that process comes out. We may need to kill the processes with status PRIV using DPMON, Task Manager or Kill -9 Command on UNIX.

If more number goes into PRIV we may need to restart the instance.

Refer **: select MANDT, Count(*) as Total from DEV.USR02 group by MANDT.**

Note : Rdisp/gui_auto_logout = 900 sec

---- Example ---
User pwd forgotten and all the users are locked if SAP* is deleted. It will be created with Password pass. Do not change the status of users in the USR02 Table.

Select MANDT, BNAME, UGLAG from USR02
128 - Self Locked
64 Administrator Lock never becomes 0

Refer

SM12 - Select Lock Entries
SM13 - Update requests
SM14 - Update program Administration (Deactivate)
SM36 - To define the Back ground Job
SM37 - JOB monitor
SM21 - System Log
ST22 - ABAP Dumps/ Runtime Error

RZ04 - Maintain Operation Modes
SM63 - Display/ Maintain Operation Mode Set
SP01 - Output controller - Spool

Standard Jobs

- RSBTCDEL - Deletes the batch job logs
- RSSNAPDL - Delete Old ABAP Dumps
- RSPO1041 - Delete Old spool logs and files
- RSMO13002- Delete old update request logs
- RSCOLL00 - Collects performance info in Transaction ST03
- RSPO1043 - Spool Reorganization.

DPMON - When the user could not login to the system (Experience Hour glass)

Process the list @ OS Level
DPMON
K
Provide SR. Number
Provide PID.

SM59 - RFC Destination
SM50 - Process Overview
SM51 - Active SAP Servers
SM66 - Global Work Process overview
WE05 - IDOC List
SMQ1 - QRFC (outbound) queue
SMQ2 - QRFC (Inbound) queue
SM04 - User List.

WORK PROCESS MULTIPLEXING

(Consider Restaurant Activities).

Each user transaction may be served by one or more processes with out restricting to the user similarly each work process serve multiple users with out restricting the user. (No dialogue process remains ideal)

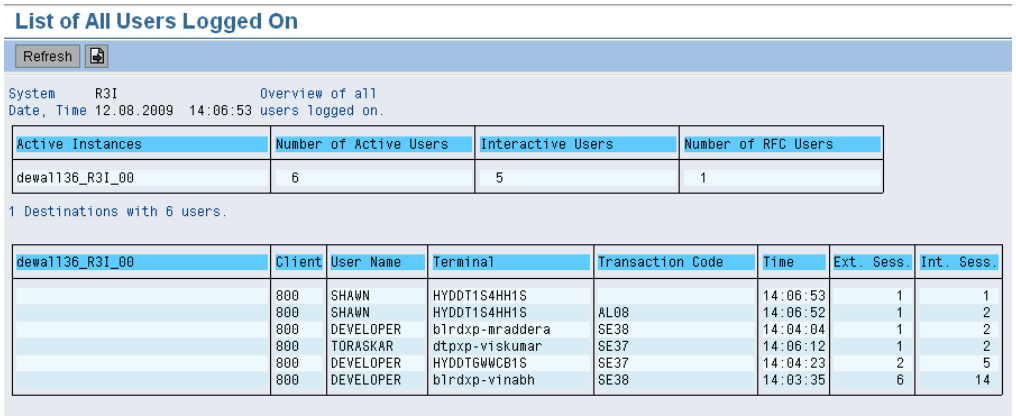
Each process can serve 5 - 10 users and Each SAP transaction consists of multiple (LUW - Logical unit of work) Each LUW contains task which should be completed/ rollback as a group. Each LUW is a commit or rollback (no intermediate stage ... which makes the system inconsistency)

SYSTEM MONITORING

SM51
SM50/ SM66
SM13
SM14
SM37
SP01

SM04/ AL08 : Used to identify the number of users logged on to the instance. Identify the users who are consuming more memory and also identify the transactions and identify why it is consuming more time. This TCODE is also used to logoff the user session if required.

AL08


List of All Users Logged On

Refresh

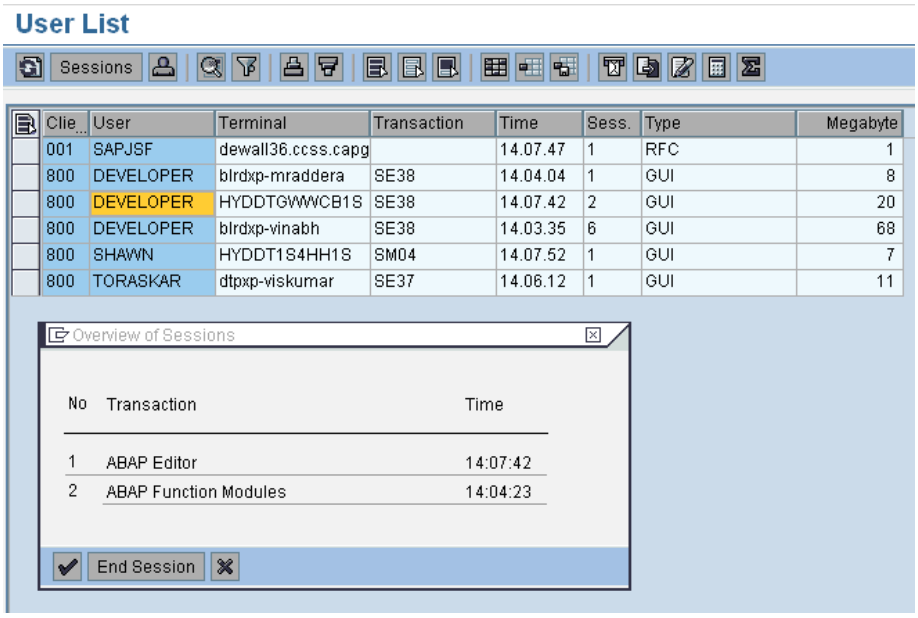
System R3I Overview of all
Date, Time 12.08.2009 14:06:53 users logged on.

Active Instances	Number of Active Users	Interactive Users	Number of RFC Users
dewal136_R3I_00	6	5	1

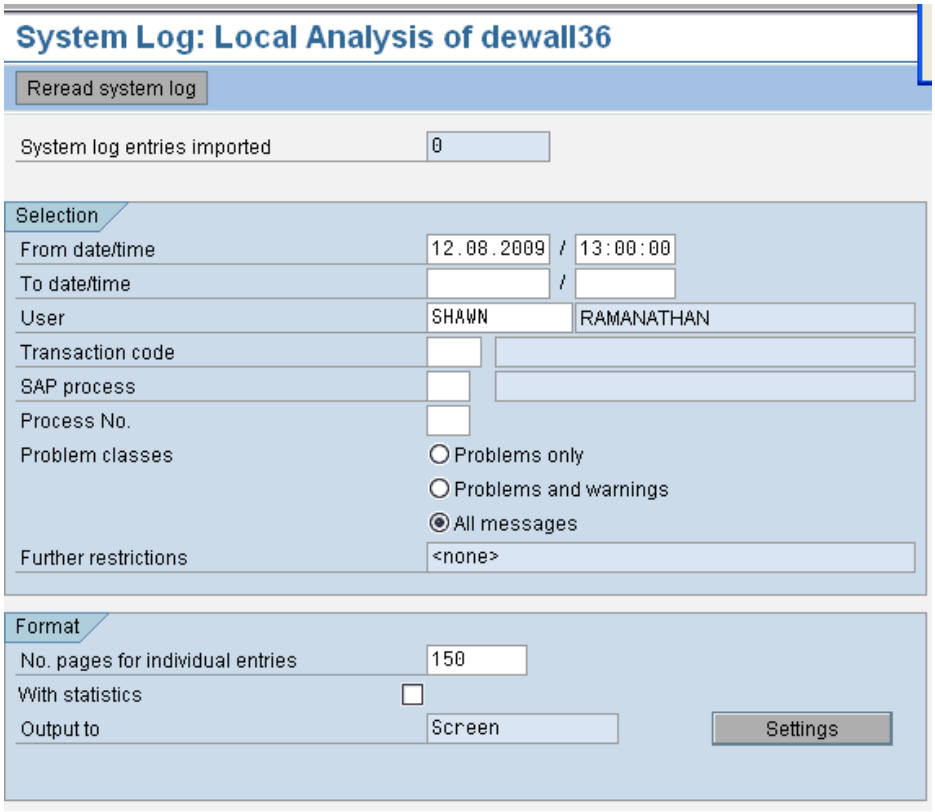
1 Destinations with 6 users.

dewal136_R3I_00	Client	User Name	Terminal	Transaction Code	Time	Ext. Sess.	Int. Sess.
	800	SHAWN	HYDDT1S4HH1S		14:06:53	1	1
	800	SHAWN	HYDDT1S4HH1S	AL08	14:06:52	1	2
	800	DEVELOPER	blrdxp-mraddera	SE38	14:04:04	1	2
	800	TORASKAR	dtpxp-viskumar	SE37	14:06:12	1	2
	800	DEVELOPER	HYDDTGWWCB1S	SE37	14:04:23	2	5
	800	DEVELOPER	blrdxp-vinabh	SE38	14:03:35	6	14

SM04



SM21: System logs specific to the instance. We can also identify the logs of other instances.
System log > Remote system
It is used to display the logs for the following activities.



1. System Startup/ Work process log

2. All ABAP dumps are documented
3. When we delete SM12 the locks are logged.
4. All the database related errors like Space issues, Segment Management, Archive Stuck.
5. Illegal attempts and user locks
6. Session Termination due to network failures.
As a part of monitoring we need to identify the messages with color red.
7. Time out errors
    Identify the error message from the log and search in the market place.
8. It displays the logs based on date/time, user, t-code & problem class.

ST22 ABAP DUMPS

When ever a SAP Program (ABAP program) could not be executed due to an error it will be thrown out from the GUI- Screen and a dump is recorded in ST22.

ST22 recovers the following

1. Divide Error 1/0
2. Update (Lags in Memory)
3. Infinite Loops.

1. **TIME_OUT error**: The program requires more time than the time defined in **rdisp/max_wprun_time**

2. Memory related issues with error message PXA, SWAP, PAGE, OUT OF MEMORY.
This error requires memory corrections to the parameters.

3. **Program Corrections**: The problem is with SAP standard program for which SAP provides a correction through notes (The correction can be applied through **SNOTE**)

4. **Customer defined programs** ('Y', 'Z') consumes more memory, endless loops, improper select statements etc. The program need to be corrected by the developer.

5. **Enqueue Table Overflow:** SM12

6. **Update Deactivation** : SM14

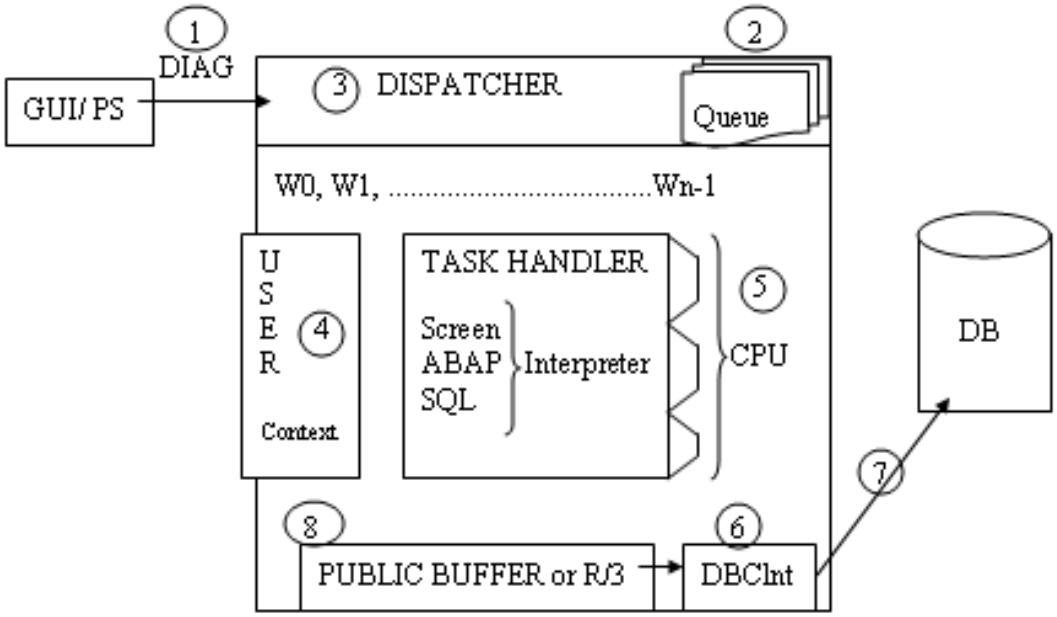
7. **Database issues** like table space over flow, max-extents reached, archive stuck.

8. **Illegal time**: (Day light savings) - During day light savings the system date and time has to be changed. Stop the AS and change the date if not, the above error occurs.

Note

TSTC - Holds the transaction and the Program name
TSTCT - Holds the description/ text of a T-Code.

PERFORMANCE TUNING **ST02**



This complete journey should be completed within 600 Milli seconds on an average or goes up to 600 Seconds Max.

1. **Front End Time/ GUI Time** : Time taken by the user to reach the dispatcher is called as Front end time. The GUI time should not exceed more than 200 M.Sec. If it exceeds this consider the following.

    1. User desktop is slow

2. If this is same with all the users, network might be congested.

3. The user request is expensive (FI and basis will logon to the central instance. Rest of all the users are allowed to login to Dialogue instance)

Note: GUI response time is not considered as a part of the Dialogue response time because the request is not received by the dispatcher.

2. **Wait Time:** The amount of time the user request sits in the queue. Generally it should not be more than 50 M.Sec or 10% of the response time. If the time exceeds, consider the following.

1. The work process are not sufficient to handle the user requests. (1:5)

2. There are sufficient processes but the existing process are held with expensive request.

Login/disable_multi_gui_login.

3. **Roll in Time**: The work process copies the Roll in User context into WP task handler. The time taken by the work process to copy the context (Roll In) is referred as Roll in time. Generally it should not be more than 50 M.Sec. If it is more than this consider the following.

1. The user context is heavy to Roll in (User might having more authorizations, parameters)

2. Minimize the authorizations.

4. **Roll Out Time:** The time taken by the work process to copy the information from its local memory to Roll Area/ Roll File/ User context/ Roll buffer and it should not be more than 50 M. Sec.

5. **Roll Wait Time:** During the processing when a dialogue process communicates with RFC's and waiting for the response at this time the user context is copied/ rolled back to

BTC ---- RFC --- Target system.
Roll wait time Sleep

Note: Roll wait time is not considered as a part of response time. If the roll wait time increases consider there is a bottle next on the RFC communication.

6. **Processing Time**: The time taken by the work process to process the user request using interpreters. The processing time should not be more than 200 M.Sec. If the processing time is more we can consider either ABAP program is expensive, screen is expensive or SQL statements are expensive.

7. **CPU Time**: When the request are processed using interpreters an amount of CPU is utilized to process the request using CPU resources is referred as CPU time.
As CPU time is included in processing time it is not calculated in the response time.
CPU time should not be more than (40% of the Dialogue response time - Wait time). If CPU time is more consider tuning ABAP Programs Refer to ABAP development team (Also Refer **SE30** ABAP Run time Analysis, **ST05** Performance Analysis)

8. **LG Time**: Load and Generation Time: Time required to load the objects such as source code, GUI info, screen info from the database and generate these objects.
(Refer **LC10** : Live Cache). It should not be more than 200 M.Sec.
Run **SGEN** tcode after patch application, upgrade, new installation or when there is a mass change in the programs.

9. **Enqueue Time**: The time taken by the process to communicate with enqueue for obtaining the lock while updating a record is referred as Enqueue time. Enqueue time should be 5 M.Sec. on a Central instance and 100 M.Sec on a Dialogue instance. If it exceeds more than this time we can consider that the enqueues are not sufficient or Enqueue table overflow. or WP waiting for a lock.

10. **RFC or CPIC Time**: The time taken by the process to communicate with external interfaces is referred as RFC time. It should be as minimal as possible. (Communication between any BW/ CRM/ SCM system). There wont be any threshold value as it depends on External system.

11. **Database Time**: The time taken by the process to reach the database and process the request. Generally it should not be more than 40% of (Response time - Wait time). It is similar to the CPU time. IF DB Time is more consider the following.

1. The DB statistics job is not scheduled in DB13.
2. The DB resources are stake(CPU and Memory Utilization) i.e. Resource bottle neck on DB.
3. The DB Buffers are not sufficient.
4. Missing indexes in DB02.

12. **Dialogue Response time**: The time taken by the Dialogue process to process the request which includes [Wait time ..... To ..... Roll Out Time]

[Wait time + RI + RO + PI +LG + RFC + DB +ENT]

Note: Team Viewer is the Remote Desktop support Software
BOMGAR.

Φ Indicates - Average Time
 # Indicates - Total Time

WORK LOAD ANALYSIS ST03

ST03 It is used to calculate the work load analysis. Select Expert Mode to identify the expensive programs, transactions, reports and users.

While calculating the average consider the number of dialogue steps of the transaction user. If the response time is more and dialogue steps of fewer 1 or 2 then the

average response time could not be worked out. The response time should be worked out only when there are atleast 10,000 dialogue steps.

MEMORY

Physical Memory: The memory that is available or the memory that is configured on the instance using the parameter PHYS_MEMSIZE.

* PHYS_MEMSIZE: This parameter restricts the usage of memory by that instance.

Virtual Memory: The physical memory and SWAP memory/ Pagging Memory on the disk

The physical memory will not be sufficient to provide the users for temporary work area/ Calculations/ so a part of the disk which is configured for SWAP is used.

On UNIX during installation assign atleast 20GB of SWAP. On windows assign atleast 3*RAM size/ 20 GB which ever is higher.

Shared Memory: The memory that is used by all the applications (OS, DB, R/3)

Extended Memory: The memory that is used by SAP work processes is referred as Extended Memory.

Local Memory: The memory that is assigned to work process is referred as Local Memory

Roll Memory/ Roll Buffer: The memory that is used by work process to store the user context information is referred as Roll memory.

Private/ Heap Memory: The memory that is used by work process exclusively by restricting itself.

MEMORY ALLOCATION

1. User submits the request.
2. Dispatcher assigns the WP
3. WP requires memory to Roll -In the user context.
4. WP gets memory from local memory which is defined in the parameter **ztta/roll_area**. It gets only a part of it which is defined by parameter **ztta/roll_first** (20KB)
5. If the allocated memory is not sufficient then it gets allocated from Extended memory **ztta/roll_extension**.
6. If that is also not sufficient then it uses the remaining ROLL Area.
7. If that is also not sufficient then it uses HEAP/ PRIVATE Memory and the WP goes into PRIVATE Mode.
8. Heap memory is defined by the parameter

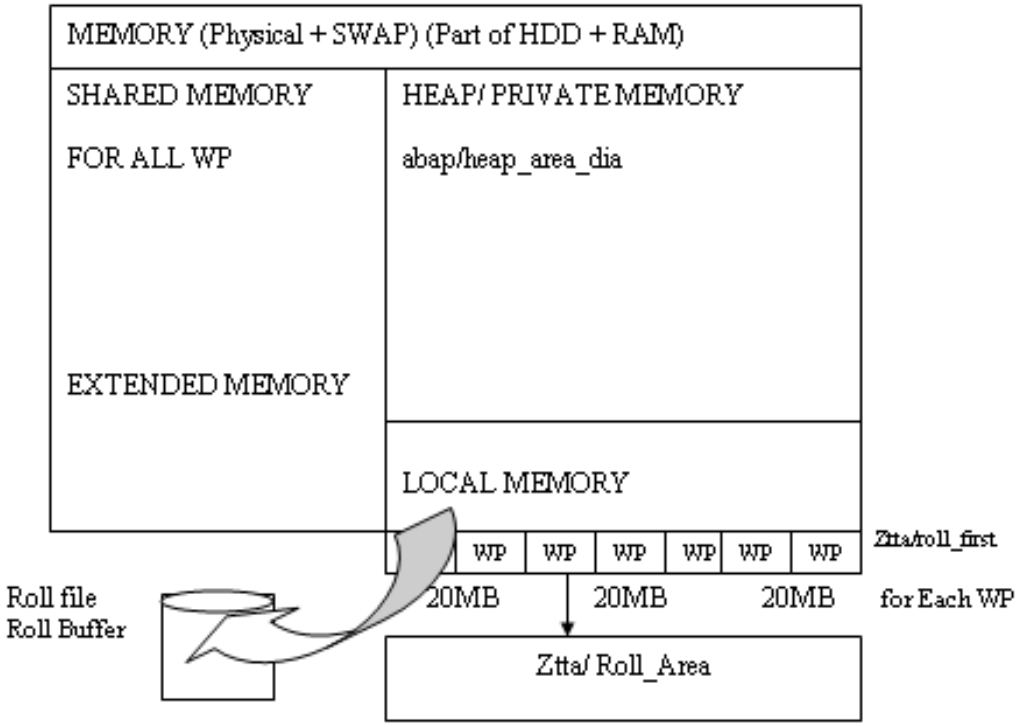
Abap/heaplimit=4GB

Abap/heap_area_dia

Transaction ST02 provides the memory utilization

9. Each dialogue uses **abap/heap_area_dia** and non dia uses **abap/heap_area_nondia** both process should not exceed **abap/heap_area_total**.

Memory : RAM is the first Memory. Out of this we don't want to allow SAP to utilize the whole memory.
Virtual Memory: Pagefile.sys



User ---> Dispatcher ---> WP ---> Rolls Its Memory
Requires Memory to Roll In to the Task Handler
Ztta/roll_first - 20KB
Extended Memory is used by all the Work Processes.
20 KB ztta/roll_first through ztta/roll_area
Extended Memory ztta/roll_extension : 512 MB
Come back to local Memory
If all the memory is consumed it cant come back so goes to the Heap/ Private Memory.

CASE STUDY

We have configured 20 WP in the Instance and we know pretty well that each user request consumes a minimum of 25MB of Memory

WP	**MEMORY**	**4GB**		**8GB**	**STATUS**
	Roll_first	**Roll_extn**	**Roll_Area**	**Heap**	

1	20KB	512MB	19.980MB	2GB	PRIV
2	20KB	512MB	19.980MB	2GB	PRIV
.					
.					
8					
9	20KB	0MB	19.980MB	5MB	PRIV

Rdisp/max_priv_time

When the process uses Heap Memory it is used in Heap/ Private mode. The processes which are in PRIV Mode cannot be timed out by

Rdisp/max_wprun_time
Rdisp/max_priv_time

So configure so that the process is timed out after this time (600 Seconds/ 10 Minutes) when the work process goes into PRIV mode it will not listen to rdisp/max_wprun_time=600sec. It will be released only after the task completion or Memory is exhausted(Abap/heap_area_dia)/ timed out by rdisp/max_priv_time. This situation is referred as Hour Glass Mode or WP Congestion. At this situation we can use **DPMON** or **SM04** to terminate the user session. If not kill the process at OS level based on PID.

Q. The user complains that he could not login to the system - Hour Glass Mode?
A. 1. WP into PRIV Mode
2. ARCHIVE STUCK (The user could not update any record and results in hour glass mode)

BUFFERS ST02

The frequently used content and less frequently modified is eligible for buffering. Company Name, GUI, screens, calendars, table definitions, programs etc are eligible for buffering.

Data such as Exchange Rates, Transactional Data(PO, Sales Order, Invoice, Billing) are not eligible for buffering.

Buffering is specific to instance. Each buffered element is stored in the memory of the instance in terms of **Directories** and **Space**.

Eg. Programs can be stored up to 150000 KB, 150 MB in 37,500 directories. If the directories/ size is full then **Buffer Swaps** occurs in **ST02**.

When SWAP occurs the content needs to be fetched again from Database which increases the response time.

RAISING A REQUEST TO SAP FOR A SAP ROUTER

From the Market Place **www.service.sap.com**
> click on SAP Support Portal.
> From Help and Support Tab
> click on **Report a Product Error**

From Here Provide

Customer	:	Company Name
Installation	:	
System ID	:	JOD

Next >

Search Term	:	SAP Router
Or Go with Message		
Select the system & select the component		

Raise a request as follows:

Dear SAP,

We have installed solution manager and 3 ERP systems in the landscape. Before we start implementation we would like to establish connecting with SAP using SAP Router.

Name of the Server	: JOMLSOLMAN
IP Address	: 213.210.213.197

(This is where our SAPRouter is going to be configured)
We are using dedicated public IP Address

SID	: JOS
INSTANCE NO	: 00

Please send us certificate details.

{ Open the connectivity, How many hours it needs to be opened; Provide Userid and password/ Client }

Provide your name — R. Shunmugam
Phone No:

Hit **SEND**

Note: from Market Place > My Profile > Maintain Single Sign on Certificate > Specify Password.
From Market place > Check the email.
SAP : 213.210.213.197
JOLSOLMAN
194.39.131.34

Earlier from the Back End system say for eg: SOLMAN system

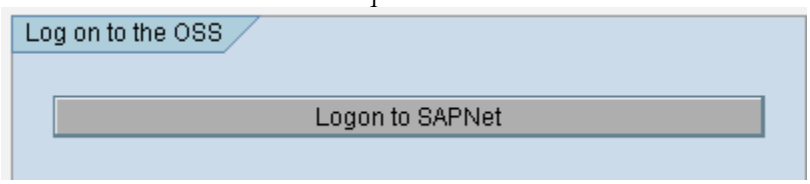
001/ DDIC > Login to the SOLMAN system

Discontinued from 2006 -

TCODE > OSS1 (Online SAP Service)
From Menu Parameter > Technical Settings
Hit Change
SAPRouter at SAP

Note: Instance 98 (Is for SOLMAN Diagnostic Tool), 99(SAP Router)

All kind of services can be acquired from OSS1



Over the web using DIAG protocol. (It is discontinued)
---

4 systems in the landscape

SAP Router is a software program which is used to restrict to access the customer systems using the table SAPROUTTAB.

SAPROUTTAB is a text file with out any extension in the router directory with prefix P, D and S (Permit, Deny and Secure sometimes)

STEPS TO CONFIGURE SAP ROUTER

1. **Create a directory** with name saprouter in usr\ sap\directory.
   usr\sap\saprouter
   Ensure that the folder has full (Read + Write permissions)

Note
SAPRouter is an executable in the kernel directory (usr\sap\SID\sys\exe\uc\NTi386).
Nipping is an executable to ping to the router. This two executables needs to be copied to the router directory. However we can also download from market place.

On Windows> Check whether the SAPRouter service is running or not to make sure whether the SAPRouter is already configured or not.

2. From Market Place > My Company App Components
   Look for **SAPROUTER700**
   Windows server X64
   Click on Add to download basket.

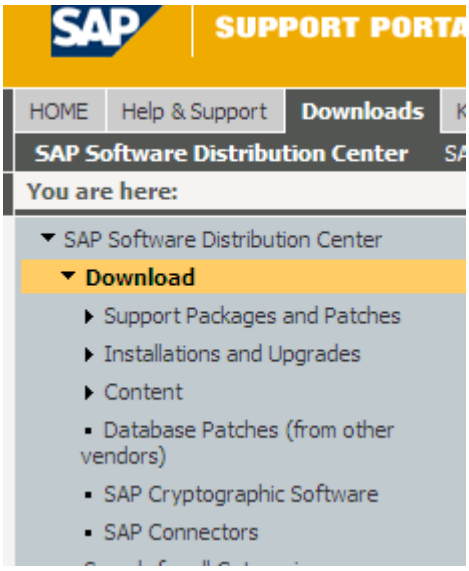
3. Login as <SID>ADM

4. Create a sub directory E:\usr\sap\saprouter

5. From Command Prompt
   Change directory to trans as it is holding the downloaded files
   E:\usr\sap\trans> **sapcar -xvf saprouter_12_100004305.sar**

6. copy the two uncared files in to the saprouter directory.

7. From market place click on Download Area > SAP Cryptographic Software
   .sar file.



It depends on OS
We can download either CAR or SAR file

Paste the file in usr\sap\saprouter
sapcar -xvf 90000114.car

Note: Download Manager > Configuration
> SUSERID and PWD
---

8. Create a service called **SAPRouter service**.

From Command Prompt > Saprouter>
ntscmgr install SAPRouter -b E:\usr\sap\saprouter\saprouter.exe - p "JOSADM"
It will create a service.

JOS is the SID

9. Define a file SAPROUTTAB
Create a file **SAPROUTTAB** in the saprouter dir with out any extension

10. SNC (Secured Network Connection Needs to be added)
For this
Goto > **www.service.sap.com/SAPROUTER-SNCADD**
Apply
Copy [Shows the Distinguished Name] > Hit Continue

11. Define the Environment Variable.
My Comp > Properties > Advanced>

Variable : **SECUDIR**
Path: **E:\usr\sap\saprouter**

Variable :**SNC_LIB**
Path: **E:\sur\sap\saprouter\nt-X86_64\sapcrypto.dll**

Sapcrypt.dll to encrypt and decrypt the messages.

12. Generating certificate from Customers End (SOLMAN System)
Use the command
Sapgenpse.exe will be in nt-X86_64 so goto

Saprouter> CD nt-X86_64
Saprouter\nt-X86_64>

sapgenpse get_pse -v -r certreq -p local.pse "Paste the distinguished name"
Prompts for PIN : any password
Twice
Sapgenpse - SAP Generic Personal Security Encryption

13. Work file **certreq** in \nt-X86_64
Open with notepad
And copy from BEGIN to END
Paste in the STEP **10** in the text box and hit Continue
Click on request certificate
It generates a text with BEGIN to END.
Now copy from BEGIN to END from SAP that site/ Screen
Paste it in a notepad file(without extension) with file name **srcert** in the folder nt-X86_64

14. Importing the Certificate
Nt-X86_64> **sapgenpse import_own_cert -c srcert -p local.pse**

15. being in nt-X86_64 > **sapgenpse seclogin -p local.pse -o JOSADM**
Will create a file **cred_v2**

16. SAPROUTTAB > open with notepad
> copy the whole content (from already configured system)
> provide> SAP IP
> Our IP.

17. TO check the Distinguished name
Sapgenpse get_my_name -v -n issuer

18. Router as Service
Services.msc > saprouter
From Logon Tab
Select This Account : JOSADM
Apply

To Uninstall
Ntscmgr install saprouter -b E:\.....

SAPSR3 - 14
SAPSR2 - 9
SAPSR1 - 6
---

19. Execute SM59
SAPOSS > Change
IP Address of SAPRouter at Customer Side
And also change at SAP Side Router String

Goto Market Place
Download service connection
Maintain Data > System Data
SOLMAN
Production System
Goto DB Server
Hostname > SOLMAN
IP Address : 124.12.124.19
OS : NT/ INtel
Version : Win2003
DB Release : 9.2.0.8.0

Router String:> H/220.227.194.202/s/3299
Create New Connection RFC Connection
Logon Security
E1
001
SCO4013677
AISUSER tcode

SAP ROUTER
Theory

1. Maintain our systems in the Market Place
2. SAP able to connect and we need to provide authentication
3. SAP Router provides the authorization and we need to provide the authentication.
The password will be visible [ ].

SAP router side will restrict the user.
Market place > connect to SAP
> R/3 Support
> Open connection
Take out the access from SCC4, SE38, SA38...

SAP Router is an executable which is used to restrict the access to the customer systems over the network. It works like a firewall/ proxy to permit and deny the access to the SAP systems.

It needs to be configure before implementation Part of SAP.

RMMAIN tcode only in SOLMAN
Implementation Road Map > Technical Infrastructure Planning
> Order for Remote Connection to SAP
Project Preparation Phase.

SAP Router

1. Create message to SAP along with your SAP Router [Hostname], IP Address and Customer Number (SAP Router need not to be installed on Solution Manager /DEV/ QAS/ PRD. It can be installed on any desktop, but it is advised to install on SOLMAN system to ensure that it is monitored periodically.

Cust Number : When we buy SAP we will be provided with the customer number.

.SAR - SAP Archive
.CAR - Compressed Archive

Kernel comes with .SAR only
[Global Host] - DB - Central Instance - Dialogue Instance
Usr\sap

2. SAP responds with Distinguished name.
3. Create SAP Router directory and copy the executables from exe\uc\NTi386 or download from the market place. (www.service.sap.com/swdc) copy only SAPCAR.exe, SAPROUTER.exe and NIPPING.exe

4. Download the Cryptography files from Market place related to OS and bit version (Download *.SAR files)

5. Uncar the files into SAPRouter directory
6. sapgenpse..... executable used to generate the personal security environment.
SAPROUTETAB is a file (without any extension) used to have ACL (Access Control List) S - Secure; P - Permit; D - Deny; K -SNC (Secure network connection)

7. Generate the certificate using distinguished "DN" name with executable SAPGENPSE.

8. Copy and Paste certificate from Begin to End the market place url
/Saprouter-SNCADD

9. Request a certificate from the market place copy into **srcert**.

10. Import the certificate into router system using SAPGENPSE

11. Start the router using command **saprouter -r -k "DN"**

12. Goto SMP ---- Report Error --- Connect to SAP
Select the system - Maintain System Data -- Download service connector -- Maintain Router details ------- Start service connector -- Open connection by selecting the service---- Specify no of days and hours. Similarly maintain all the other systems in the landscape. Inform SAP to connect to our systems.

13. On each backend system we need to maintain the RFC details in OSS1 Transaction. It will update SAPOSS RFC Connection.

SAPOSS, SAP-OSS, SAPSNOTE are created on communicating with the Market Place.

ST02 continuation.

Used to monitor the buffer swaps on the Application Server/ Instance
LRU - Least Recently used.

Buffer swaps occurs when there are no sufficient directories or space. When more swaps occur they are displayed on ST02 in swaps column.

Analysis:

Identify the buffer areas whose swaps/ Database access are more.

BUFFER SWAPS indicate the following

1. No Sufficient space or directories
2. The content is frequently modified
3. Mass transportation of objects
4. The configured buffers are small
5. During the restart and when support packages are applied and when upgrade is performed.

Do no take any decisions based on the readings on a specific day. Analysis has to be carried out if there are atleast 10,000 requests.

BUFFER HIT RATIO.

SAP recommends this value to be around 98%
{For every 100 request '2' request goes to database and the remaining should be from the buffers}

Key areas that effect the performance are program buffers, table buffers and Table and Field definitions. Change the program buffer using **ABAP/ buffer_size** to a maximum of 600 MB on 32 bit Machines.
Remaining parameters based on SAP recommendation from RZ11.

TABLE Buffering
SAP stores the content in tables (Every data except start and stop logs is stored in DATABASE, no prog/ no data is available in the file system)

There are four types of Buffering

1. **FULL Buffering**
2. **Generic Buffering**
3. **Single Record Buffering**
4. **No Buffering**

This is maintained for each table SE13 refer **USR02** Table.

1. **Full Buffering**: The tables which are frequently used and rarely modified are eligible for buffering. (Also which are small in size)

Eg: T000 have all the clients and required to create a client copy. (This is fully buffered)

2. **Generic Buffering**: Tables which are relatively large, frequently used, rarely modified using a set of keys (Fields)

Eg: USR02; T001 Company info

3. **Single Record Buffering**: The tables which are large in size, frequently used and rarely modified are buffered using a primary key.

4. **No Buffering**: The tables which are large frequently used, and frequently modified are not eligible for buffering.. VBAK (SALES), EKKO (PURCHASE)

BUFFER SYNCHRONIZATION

When more than one application server is configured then buffers between different instances may not be synchronized. In order to synchronize buffers set the parameter

Rdisp/ buffermode = Send on; exec auto.
Rdisp/ buffertime = 60 Sec.

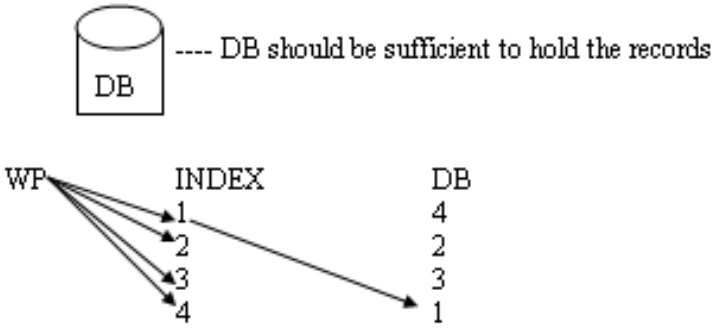
Mechanism

1. User1 request to APP1 for update Sales order to Rs. 500 @ 10:00:01
2. User2 request to APP2 for update the same sales order to Rs.550 @ 10:00:20
3. User3 request APP1 for display @ 10:00:40

WP will ask DDLOG table to check for recent update within 60 Sec. (DDLOG is a buffer synchronization table).
If there is any change then it will fetch from DB and swap out the buffer. IF there are no updates fetches the same from APP1 Buffer. If the content is requested after 60 Seconds, by that time it will be synchronized between APP1 and APP2.
DDLOG is a synchronization between instances and maintain TIMESTAMP

Note: DB13, DB02, DB buffer.

Refer - All the programs are stored in TADIR,
TSTC, T001, EO70, SE01



All the programs is in Uncompiled mode in TADIR table.
SGEN - Compiles the programs

ST04 DB PERFORMANCE MONITOR

- SQL server performance analysis. It is used to display the database buffer hit ratio. It is recommended that it should not be less than 94% i.e. for every hundred reads only 6 should goes to the database.

- Database hit ratio comes down below 94% then consider the following.

1. Frequent updates on the database
2. DB Buffer size is not sufficient to hold the content fetched from the database.

It is calculated by using formulae
[Logical reads - Physical Reads]/ Logical Reads * 100

Logical Reads is the sum of [**Physical reads and Buffer Reads**] (Buffer Gets/ Reads)

FROM ST04

Data Buffer

Size (kB)	425.984	Logical reads	6.126.297.366
Quality (%)	95,1	Physical reads	299.892.150
Size default pool (kB)	425.984	Physical writes	15.000.244
Size keep pool (kb)	0	Buffer busy waits	260.352
Size others (kb)	0	Buffer wait time (s)	630

Physical Reads: The reads from the database.
If the buffer hit ratio comes down it effects on the DB response time.

Ensure that DB Buffers are configured as per the available memory. Some times complete memory will be dedicated to DB Buffers.

ST06 OSMONITOR

It Fetches the data using service SAPOSCOL and it displays CPU Utilization, Memory Utilization and disk response time.

The CPU idle time should not be less than 30% [For Portal up to 80% to 85%]
If it is below 30% we can consider the following.

1. The ABAP programs are expensive with multiple conditions and endless loops.
2. The CPU is not sufficient to handle the load because the hardware is not procured as per sizing.
Probably the hardware is procured as per sizing but the number of users grown dynamically (300-600). In this scenario we advice to deploy additional instances.

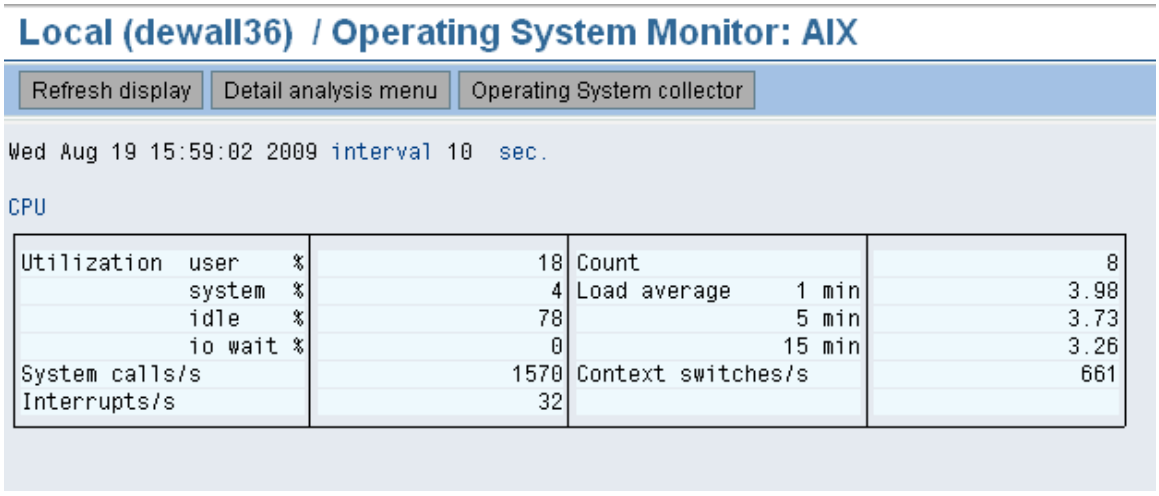
3. If the programs are expensive then refer to development team.

It also displays the memory installed on the machine, Memory available(Free) along with the SWAP space. Ensure that physical memory free is available to handle the user requests. If not memory bottleneck.

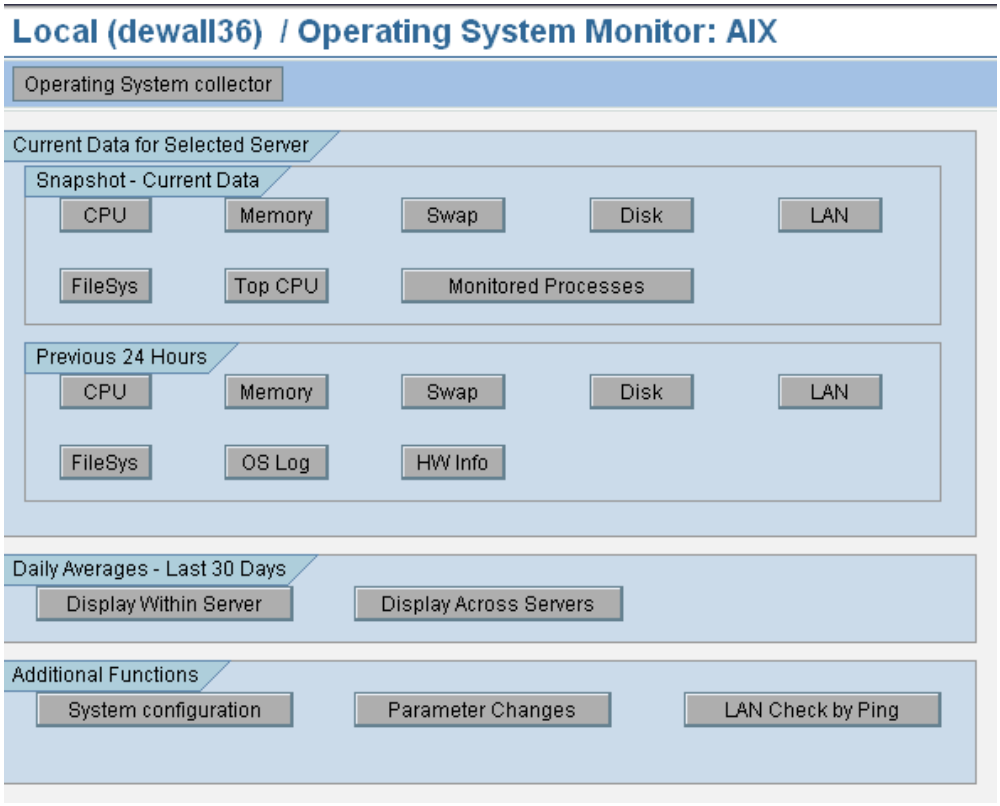
It is also used to start and stop SAPOSCOL (during Upgrades)

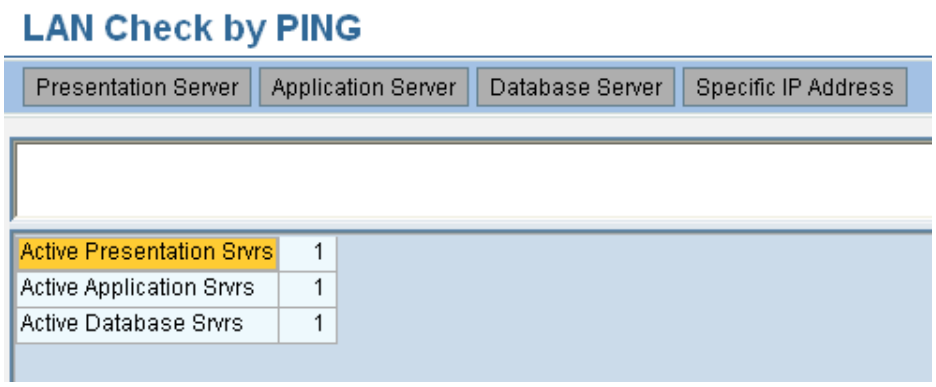
Note: OSCOL brings the operating system information into ST06. If OSCOL is not started ST06 will be blank.

We can check TOP CPU utilization for the current in the last 24 Hrs.

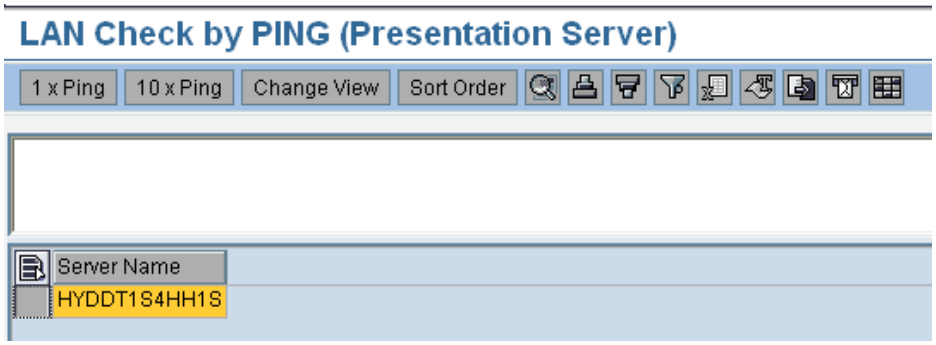


LAN CHECK BY PING is used to ping to all the systems in the Network/ Landscape.
If a user complaints that he could not connect to the server (Ping to the desktop)





Click on Presentation Server



LAN Check by PING (Presentation Server)

Details

19.08.2009 16:10:11 1 Ping to Presentation Servers from dewall36 (dewall36)

Servername	Server-IP	Min (ms)	Avg (ms)	Max (ms)	Loss %
HYDDT1S4HH1S	10.109.13.219	148	148	148	0
		148	148	148	

ST07 Used to identify whether the system is **optimally designed** or not.
Say for Eg: from the below screen.
Users are 9944 and the WP are 27 so each WP serves 5-10 Users so 27*10 = 270
Here users are including Active and Inactive Users.

Application Monitor: User Distribution

Choose | Sort | SAP buffer | DB accesses | DB memory | Response Time | Quantity structure | History

Database	Name	R3I	SAP Release	700
	Server	dewall36	Time	16:01:22
	System	ORACLE	Date	19.08.2009
User		9.944	all clients	
Number of servers		1	Work processes	27

Application	Number of users			Sess.per	Appl.
	LoggedOn	Active	In WP	User	Server
Basis Components	2	2	1	1,00	1
Total	2	2	1	1,00	1

Ask the customer to provide the list of Active users.
Each work process serves around 5-10 Users. Calculate the number of Process Vs Users to determine no of Users/ Process.
Based on the number of servers we can also define logon load balancing. It is also used to identify the memory utilized.
This is also used to identify Response time and Buffers Utilization.

AL11 : List the SAP Directories on Application Server.

ST11: It is used to display the work directory. It displays the log files related to work process.

ST01 and ST05

Used to trace the following

1. RFC Trace
2. Buffer Trace
3. Enqueue Trace
4. SQL Trace

} Available in ST01 and ST05

5. Authorization Trace
6. Kernel Trace

} Only in ST01

1. When the RFC/ CPIC time are going beyond threshold value then switch on RFC Trace.

2. When more buffer swaps occurs in the table buffering **ST02**. Switch on Buffer Trace.

3. **Enqueue Trace**: When the enque or enque wait time is increasing by 5 M.Sec on CI(Central Instance) 100 M.Sec on Dialogue instance (Consider switching enqueue trace)

4. When there are too many expensive SQL Statements which are increasing the database response time in **ST04** then switch on SQL Trace. (Identify those statements in ST04)
Eg. Select * from can be fine tuned by using select single * from with appropriate where conditions.

ST04 > Detailed > Oracle Session > SQL Statements.

5. **Authorization Check**: Whenever user encounters missing authorizations and could not be traced in SU53 can be traced out by switching the trace on User.

6. **Kernel Trace**: Used to identify the consistency of Kernel. It records all the calls that are made to kernel when the trace is ON.

Note: Do not switch on the traces when they are not required. It will populate enormous log files and occupies the complete disk place and system stands still. As a practice switch on the trace and inform the user to run the transaction. Switch Off the trace.
RC=0 (Return Code)

Note: Tuning is not testing we need enormous analysis and data to justify the conclusion.

IMPLEMENTATION OF SAP

Pre-Requisites

1. **Motivation of SAP for an ERP Software**
2. **Landscape Deployment Plan**
3. **Hardware Sizing**
4. **Hardware and Software Order**
5. **Installation of the Software**
6. **Post Installation Steps**
7. **User management**
8. **Router ------ Remote connection to SAP**
9. **Landscape Configuration**
10. **Transport Management**
11. **Testing Strategy**
12. **Go Live Strategy**
13. **Parallel Run**
14. **Go-Live**
15. **Support - Phase**

1. MOTIVATION OF SAP FOR AN ERP

1.1. Customer wanted to deploy an application that suites to his requirements by replacing the existing software due to the following reasons.

1. The existing Hardware is old and the response times are high.
2. The software is out of maintenance with no updates, or with no company (Company Bankrupt/ Merger etc.)

3. The customer could not be competitive in the market due to the legacy methods deployed

B1 - C++

No ABAP, BASIS, NW

4. The existing software is not capable to communicate with other systems
5. The software is not user friendly to take the user inputs.
6. It cannot communicate with print, fax, sms, paging devices.
7. Too many legacy systems, too little integration, manual inputs, monitoring are the various issues with the current software.

Customer enquires in the market and calls for the Auditors to identify the software, hardware and the Implementer.

Delloite, Bearing Point, KPBG, PWC (Price Water Coupons) are the auditors to identify the requirements in the company. They define the pain points of every business user owner and document them.

Example:

- The software should be installed on all the operating systems and databases.
- The GUI should be compatible, user friendly, ergonomically designed, colors, fonts, languages, password change.
- The software should be unicoded language to support all the languages.
- The software should support (Online, Offline, incremental, partial, table level backup)
- The software/ Hardware should support mirroring, RAID, clustering, Disaster Recovery, Restore etc.
- The software should support Mobile devices, Email, Fax, SMS, Pager, PDA etc.

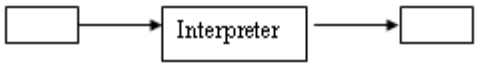
Note: **ATP** Server - Available to Promise -----> Ware House.

Issue --- Description ---- Possible/ Not Possible/ Customizable/ If customizable Amount of effort.
These requirements list will be floated as RFQ feasibility of software.

SAP is Strong in Manufacturing, Weak in Retail } Tcode-**SFW5(Switch Framework)**
SA38 - GETSYSDEF

- These list will be submitted to Oracle Apps, NAVISION, Hyperion, Peoplesoft, Seibel (CRM) implementing partners.

Note: **Toughly Coupled/ Hardly**



- Preparatory costs has to be borne by vendors

TDMS - Test Data Migration Server
QAS
PRE PROD

SAND
DEV/ CUST/ GOLDEN
UNIT TESTING
INTEGRATION
PAYROLL/ TDMS
TRAINING
PRE PROD
PROD

} 8

- Customer decides software with the help of feasibility reports and assistance from auditors.

- Customer calls for quotation to implement SAP
This is the first official document released to implement SAP.

- Support partners like IBM, TCS, WIPRO, MAHINDRA submits the proposal. They can also raise questions in the form of **RFI** (**Request for Information**)

C:\pf\sapinst_instdir\ERP\system\ORA\central\AS
Ensure that there should not be any .**bck** files while reinstalling the SAP

Refer: **sapfans.com; sapconsultant.com; sapbasis.com**

Auditor gather info from - Business partner owners - Software Vendors.

RFQ - Request for Quotation (Released by customers)
RFI - Request for information

It can contain as follows
1. Module specific questions
2. Technical questions related to Hardware, Desktops, Routing, Access, VPN, Backup, Disaster, Recovery etc.
3. Risk and mitigation

Incremental
1->2->3->4->5

Cumulative
1->2 3 4 5

1. Project Implementation Methodology
2. Process
3. Company Strengths
4. Financial Background and Share Value
5. Past Projects and experience in that area
6. Average man power experience going to be deployed
7. Case studies and customer references
8. Implementation of solution manager (Provides Roadmap, Business Scenarios, Documentation (Upload, Download) etc.
9. Certifications (CMMI - Capability Maturity Model, SIX SIGMA, Sap Partnership)
10. Challenges in the project, risks and mitigations
11. Assumptions

Based on the above proposal customer and audit team shortlist the two or three software vendors (IBM, TCS, WIPRO etc) - Implementation Partners and call them for Interview (technical discussions) to exhibit their capabilities.

Based on 4th and 7th vendor will be finalized to implement SAP

Note:

External Security

Routing
Switching
Proxy
Firewall

Internal Security

Authenticating Authorized users is Internal Security.

Project Costing:

1. Number of hours required/ No of Man days/ No of Man Months

2. Cost of the	Man hours/	Man Days/	Man Months
Offshore	20-30$	160-240$	
Onsite	60-100$	1000$	20000$

3. Project can be a fixed bid let us say 2,00,000 (i.e. @ Million Dollars for completion all inclusive (Fares, accommodation, staff, Replacement, Holidays, vacations, sick etc).

Payment will be released in Parts ---- Project Start 10%, Blue print - 20% Realization - 20%, Final Preparation - 20%, Go-Live - 30%.

4. Let us say the Project Manager is SAP. We need to provide manpower to SAP to implement @ customer site. Eg. SAP Project bidder is SAP for 28 Crores in Singareni Collories ... They out sourced to Seal Infotech for training and implementation.

5. Critical Tasks are based on Man days/ Man Hours
Example : Disaster Recovery

1. Fixed Bid
2. Time and Material (T&M)
3. Resource Based
4. Activity Based (Try to include Wait time)

The scope of work needs to be defined properly before sign-on. If SOW is not defined properly, it is vendor responsibility.

Risks and mitigations has to be clearly stated in the SOW.
Delay in Software, Hardware requirements from customers are to be documented.

II. LANDSCAPE DEPLOYMENT PLAN

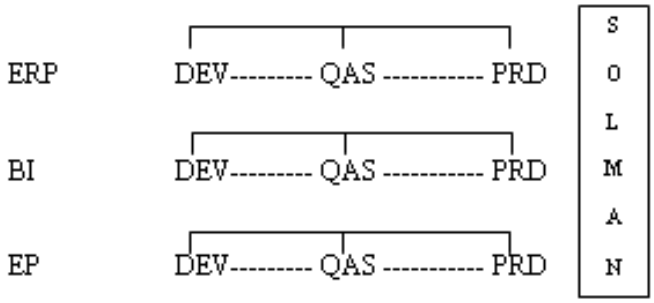
1. RFQ and RFI (Customer and Vendor)
2. RFP (Customer and Vendor)
3. SOW and Project Award (Customer and Vendor)

4. Landscape Deployment..... (Basis Consultant)

Landscape Deployment Plan:

It consists of the number of systems that are going to be deployed in the customer data center. It may serve the customer as an overview of the SAP systems. But exact number of systems will be known only after the Hardware sizing

1 CPU / 2 Parallel Process
By default 3 Parallel Process.



III. HARDWARE SIZING

It is an exercise carried out by Basis consultant with the help of the customer business process owners, Project Manager and Hardware vendors (IBM, HP, SUN, DELL). It is used to determine the CPU's, Storage (Hard disks) and Memory.

SAP Provides quick sizing toll (http://service.sap.com/sizing)

Goto> Sizing tool > Click on Quick sizer
It will be opened on new window
Provide customer number, Provide Project name and create a Project for sizing.
1. Provide Customer details to SAP
   (Name of the contact, Email Id, FAX)
2. Platform and communications
3. OS, DB, Mirroring, RAID, CLUSTERING
   Standby server or do you need any suggestions.

Note: Legacy database size (get the details from customer what amount of data they are planning to migrate into SAP, Example Customer Database size is 400GB but they want to migrate 250GB into SAP (Customer, Vendor, Supplier, Material, Address, FI Transactions)
High Availability options (Time of Availability)
These are the general details that are required for sizing.

Load On the System:

Users work on the system on various modules
MM - Logistics

SD - Sales
FI - Financial

40% More to the sizing result.
SAP's - SAP Application Benchmark for Performance Standards)
It is calculated in terms of Hardware vendors provide CPU in terms of the CPU's

Eg. IBM P Series generates 800 SAP's/ CPU.

Note:

IBM - DB2 [AIX O/s - DB2 Database]; I Series V5R4 - DB2]
SAP - MAXDB
Oracle
SQL Server - Microsoft
P Series, X Series (I Series V5R4) is the O/s

Clustering (Mechanism : PING PONG)

DD02L - ALL Sap tables will be stored
65,611

SQL>Select bname, mandt from SAPSR3.USR02;

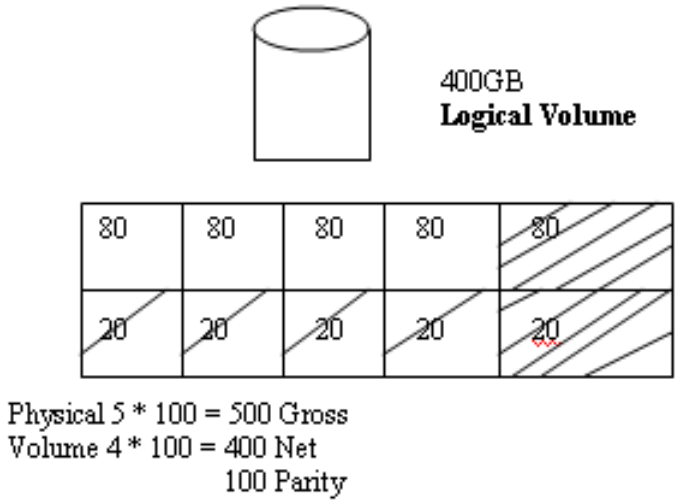
SAPSR3 - Database schema owner
SAPSR3DB - JAVA

Sizing is performed by quick sizer which is proprietary by quick sizer which is proprietary tool of SAP. Sizing is based on the following.

1. High Availability
2. Type of Users
3. Modules used

1. High Availability

    1. RAID1 - Mirroring (1:1) on disk goes down other should take over.
    2. RAID5 - (5 Disks---- Util -4; 1 Spare/ Parity)

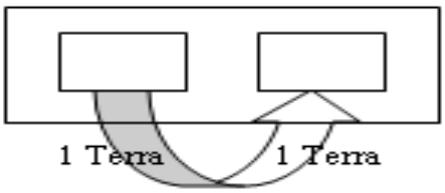


3. SAN - Storage Area Network
4. Backup - SAN
5. If disaster occurs ------ Setup DR Server in a different geographical location
6. If the connectivity fails ..... buy more leased lines from different vendors
7. If the existing server collapses -- due to power cable --- multicables -- UPS -- etc -- Generator

Network Cable --- More than one cable
CPU's -- Multiple CPUS
Memory - Hosted on Multiple slots
DISK - RAID and SAN

8. If the complete system collapses due to hardware failure use clustering -- Two Parallel systems (Used for failover or Load balancing)

Eg. **IBM P-Series**



Unless unlocked by IBM we cannot make use of the additional Hard Disks

Note: For Upgrade - Sizing
Capacity - Sizing

Module Selection: Select the modules that are going to be implemented like Logistics, Financials, Product life cycle Management (Currently HR is not going to be implemented but, there is a plan to implement in future, If it before three years consider HR in sizing if not.

1. User - 480 Dialogue Steps with the system
- 40 HRS * 60 Mins

1Dialogue Step - 40*60/480 = 5 Min = 300 Sec

2. 480 - 4800 Dialogue Steps - 40 Hrs - 30 Sec

3. 480 - 14400 - 40 Hrs - 10 Secs

Eg. Purchase Order / Week - 200 * 10 Dialogue Steps = 2000.

Service Desk >

1.Need to activate some services
2. SICF
3. Execute
4. Default Host
- SAP
- Public
- bsp
- SAP
- htmlb RT Click > Activate Service

Note: This should be done as Post Installation Steps
SPRO > SAP Solution Manager
> General Configuration

Activating BC Sets (BC- Business Configuration)
Tcode: scpr20

> From End user system
If any one stuck @ point executing a command SM59 > Help
> Create Mssg.

Component BC-MID-RFC
Test
Low
Test -- TKT No: 008000000001
The Strategy is to migrate/ upgrade the hardware for every three years. The sizing is based on

1. High Availability
2. Modules and
3. No of users

Along with legacy database and future growth of users

User	Low	Medium	High
FI	50	250	250
CO	50	250	250

The sizing is also called as T-Shirt sizing which determines your servers as (S, XS, M, L, XL, XXL) Sizing output determines the memory, storage and CPU in terms of Saps'.

SAPS is (SAP APPLICATION BENCHMARK FOR PERFORMANCE STANDARDS)

SAPS are calculated based on Sales module. SAP assumes that a sales order/ Purchase order consumes around 8-12 Dialogue steps. For every 2000 sales documents that are generated per hour requires 100 SAPS.

CPU cannot be arrived directly because the process speed depends upon the hardware vendor. (The hardware vendor determines the CPU Size based on SAPS example an ISeries machine single CPU generates 800 SAPS.

If the sizing output requires 3200 SAPS then we need 4 CPU's.
The Hardware resources are required for the following which needs to be considered while sizing

1. OS
2. Database
3. Interfaces (Like Fax, Email, SMS, Pager etc.)
4. Printers
5. Third party communication (Batch processing etc)

So we can consider adding 30-50% to the sizing results.

IV. HARDWARE ORDER

1. Customer calls the RFQ from various vendors to supply hardware.
- Based on companies stability, consistency, reliability, past experience, case studies, price and support (warranty)...

- Hardware vendors take 3 weeks to 4 weeks to deliver based on the availability of the hardware.
HP ships from Singapore, Philippines and Malaysia
IBM ships from US

V. ORDERING SAP SOFTWARE

ISUSER (INDIAN SAP USER FORUM)
ASUSER(AMERICAN SAP USER FORUM)

Communicate with SAP vendor (Channel Partners) and purchase the license.

License is a single user based. i.e. If we buy one license we can access ... ERP, SRM, BI, PI, EP, Solution Manager, MI etc.)

SCM. SRM CRM are charged Separately.

If we buy MYSAP business suite then all comes under one license.
* There is no lock for licensed users in the system. We can buy 100 Users and used for 10,000 Users.
* Every year we need to run USMM and send the report to SAP.

License Cost varies based on Geographical Location
MySAPFI - Oracle Apps
MySAPSCM - Peoplesoft
MySAPCRM - Sieble

Each license cost 2000 USD
Each Developer Cost 4000 USD
After negotiation in Indian Market the Single user cost comes to 40,000 to 1,00,000 depending upon number of users.

For 40,000 we should have atleast 150-200 Users for 10+1 cost 18 Lakhs.

Note:

Heap Memory - Part of the Physical Memory (RAM Memory)
Physical Memory - RAM
Virtual Memory - Part of the Memory from the Hard disk

Buffer
Bin - Points to the target system

BIN contains default.pfl

SAP_BC_ADMIn
S_Transports
CTS_Admin

Disp+exe (PING, Etc Entry, Any Kernel upgrade has been done (DEV_DISP.log)
