



BC310 Technical Core Competence **(NT/ORACLE)** **BC310**

R/3 System Release 46C 08/10/2001

The background of the cover is a vibrant, abstract digital scene. It features a central computer monitor displaying a software interface with various data fields and buttons. To the left, another monitor shows a line graph with a blue line fluctuating over time. The background is filled with glowing blue and green lines, suggesting a network or data flow. A green circuit board is visible in the lower right, and a red component is partially seen on the far right. The overall color palette is dominated by blues, greens, and reds, with a bright blue circular area in the lower right.

Technical Core Competence (NT/Oracle)

BC310

R/3 Release 4.6B

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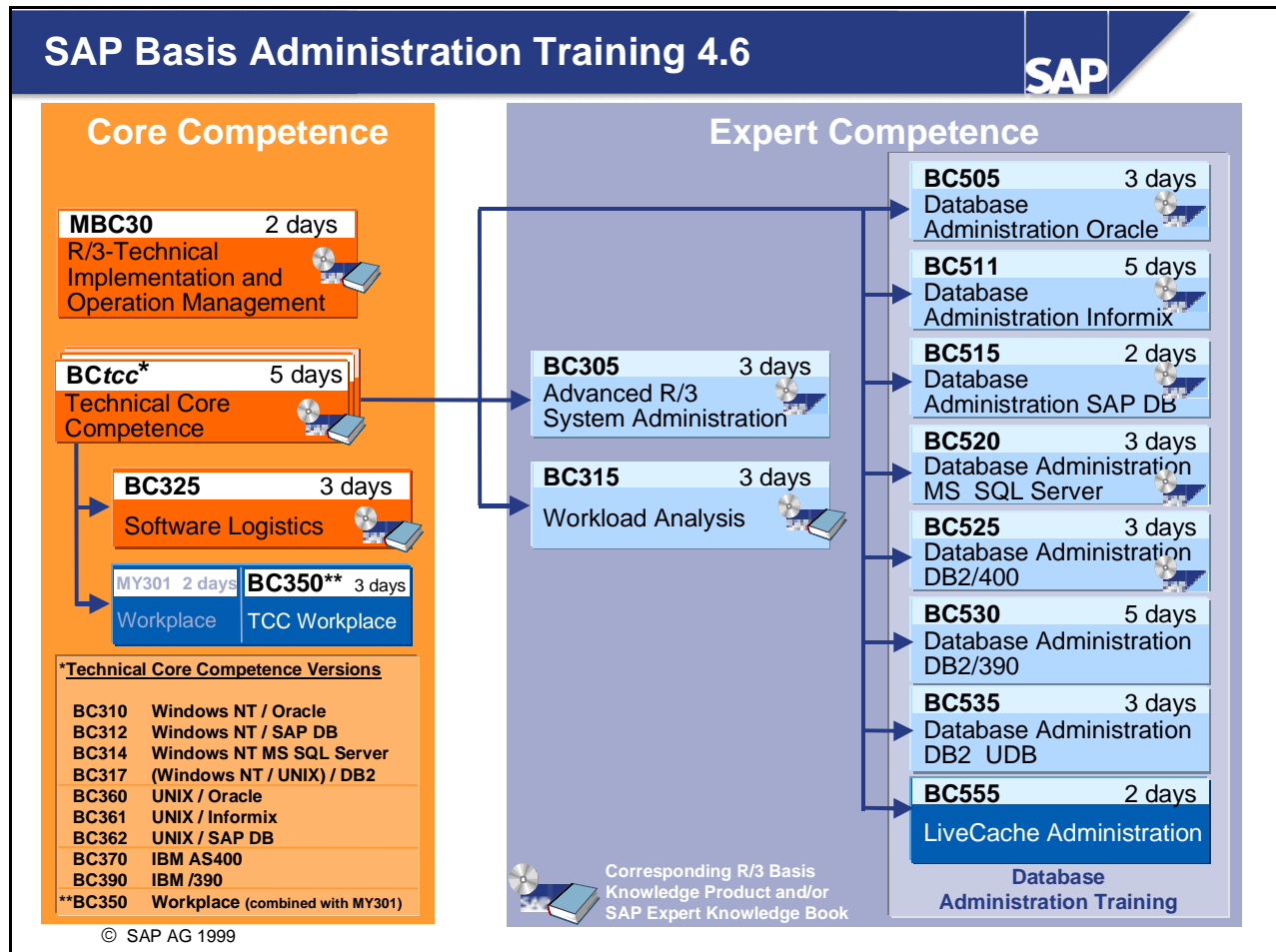
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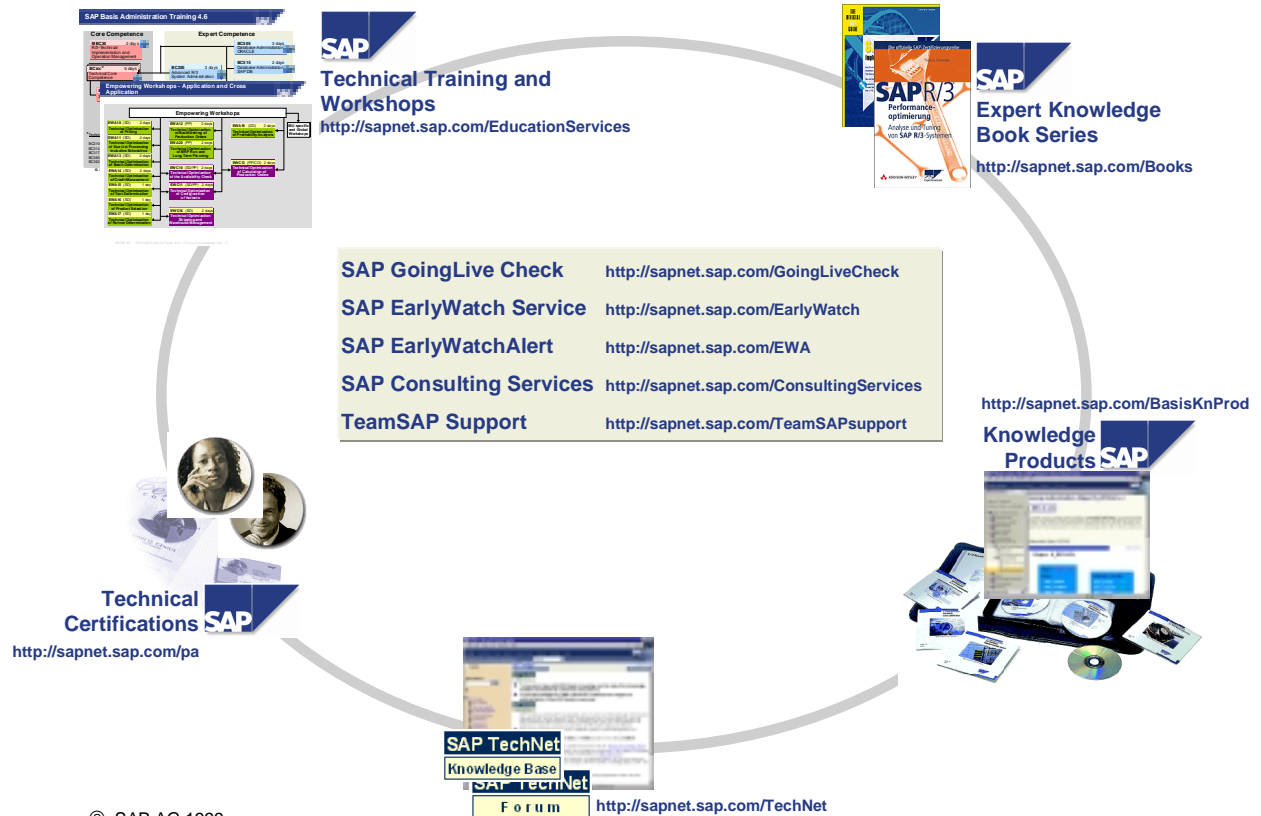
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SAP's Knowledge Transfer Model

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- **Prerequisites:**
 - **SAP50 - Basis Technology**
 - **Basic Knowledge of Windows NT and Oracle**

- **Audience:**
 - **R/3 System administrators**
 - **Database administrators**
 - **IT staff**

- **Duration: 5 days**



This course will enable you to:

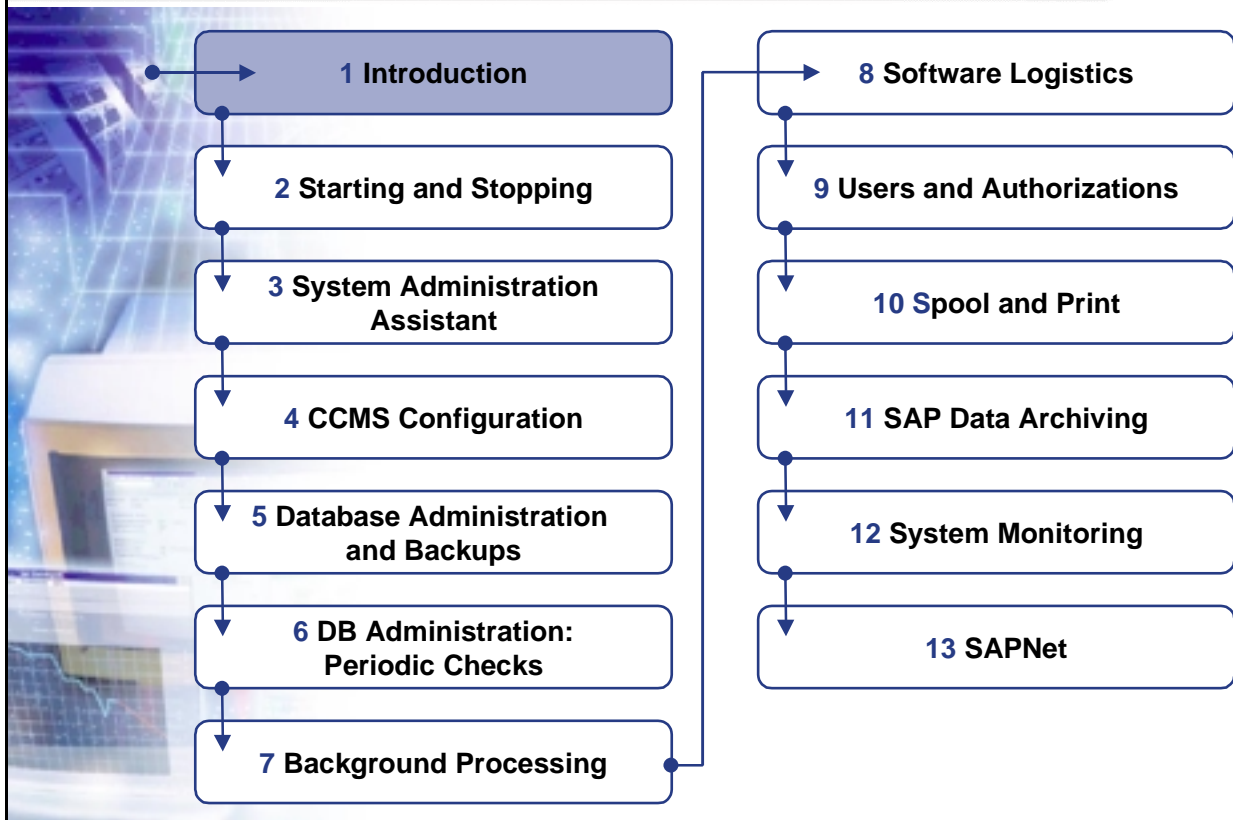
- **Administer your R/3 System**
- **Back up your system**
- **Check and use the transport system**
- **Schedule background jobs**
- **Handle the spool system**
- **Archive R/3 data**
- **Monitor and analyze your R/3 System**

Course Overview

Unit 1	Introduction	Unit 7	Background Processing
Unit 2	Starting and Stopping	Unit 8	Software Logistics
Unit 3	System Administration Assistant	Unit 9	Users and Authorizations
Unit 4	CCMS Configuration	Unit 10	Spool and Print
Unit 5	Database Administration and Backups	Unit 11	SAP Data Archiving
Unit 6	DB Administration: Periodic Checks	Unit 12	System Monitoring
		Unit 13	SAPNet

Conclusion

Appendix 1 Installation Check
Appendix 2 System Administration Assistant





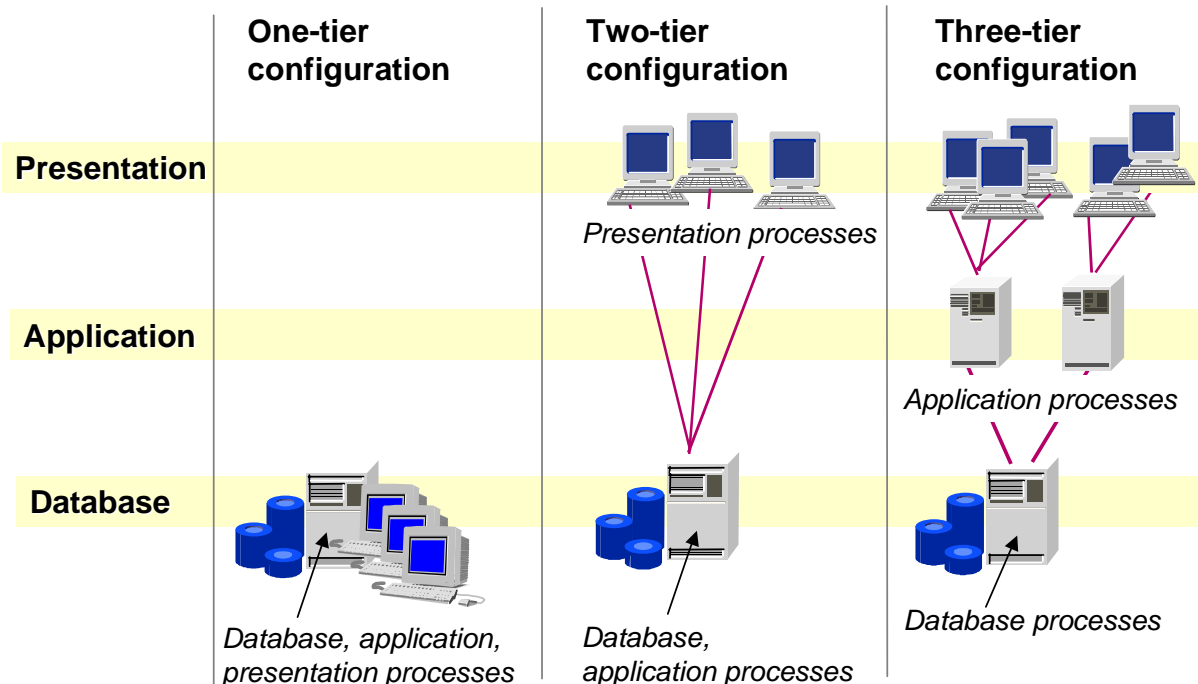
Contents

- Review of essential R/3 terms and concepts
- Outline of some basic R/3 System steps
(as described in SAP50)

Objectives

At the end of this unit, you will be able to:

- Explain certain important R/3 concepts and terminology
- Describe the system steps triggered during an R/3 logon
or while a transaction is being executed

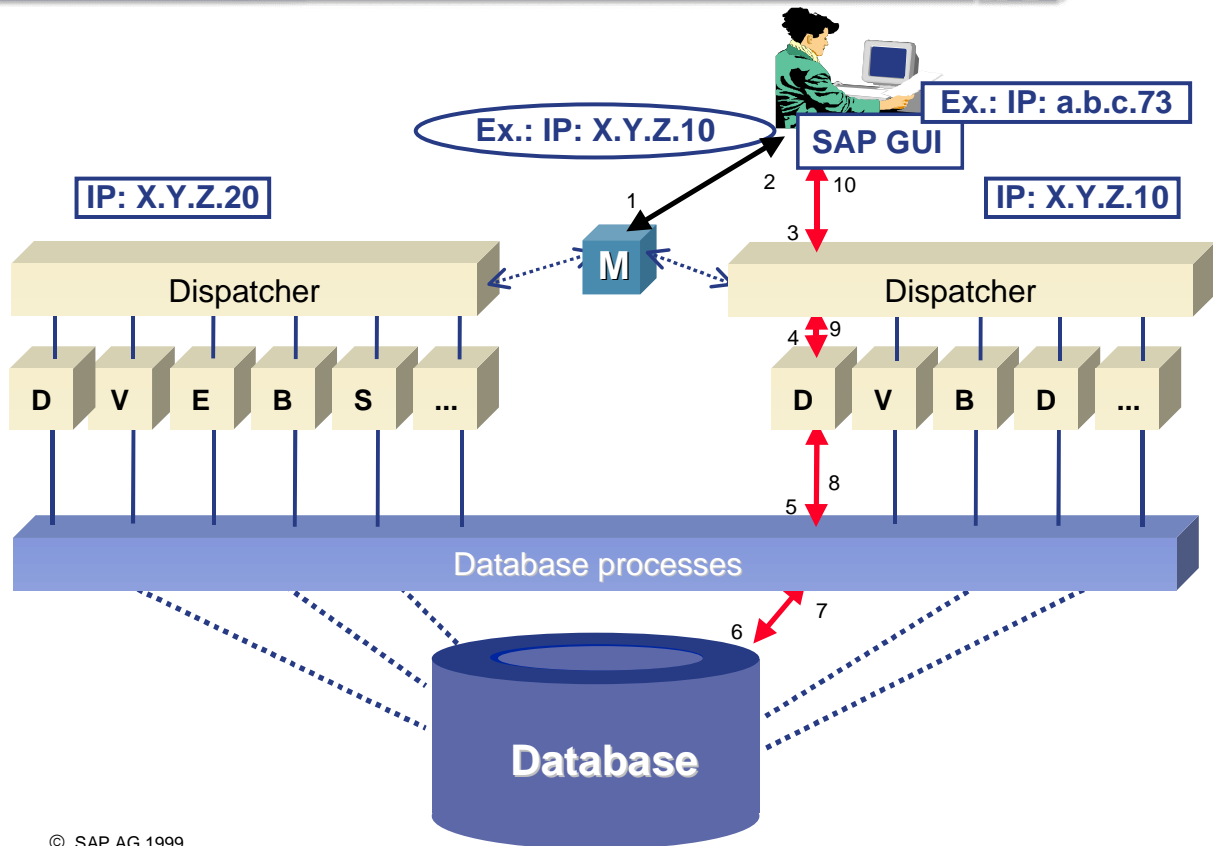


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- The fundamental services in a business application system are presentation services, application services, and database services.
- In a one-tier R/3 System configuration, all processing tasks are performed on one server, as in classic mainframe processing.
- Two-tier R/3 System configurations are usually implemented using special presentation servers that are responsible solely for formatting the graphical user interface. Many R/3 System users use Windows PCs for example as presentation servers. An alternative two-tier configuration (not shown) is to install powerful desktop systems and to use these for presentation and applications also (two-tier client/server). This type of configuration is particularly useful for processing-intensive applications (such as simulations) or for software developers, but due to the additional administration requirements is usually used for test purposes only.
- In a three-tier configuration, separate servers are used for each tier. Using data from the database server, several different application servers can operate at the same time. To ensure that the load on individual servers is as even as possible and to achieve optimal performance, you can use special application servers for individual application areas such as distribution or financial accounting (logon and load balancing).

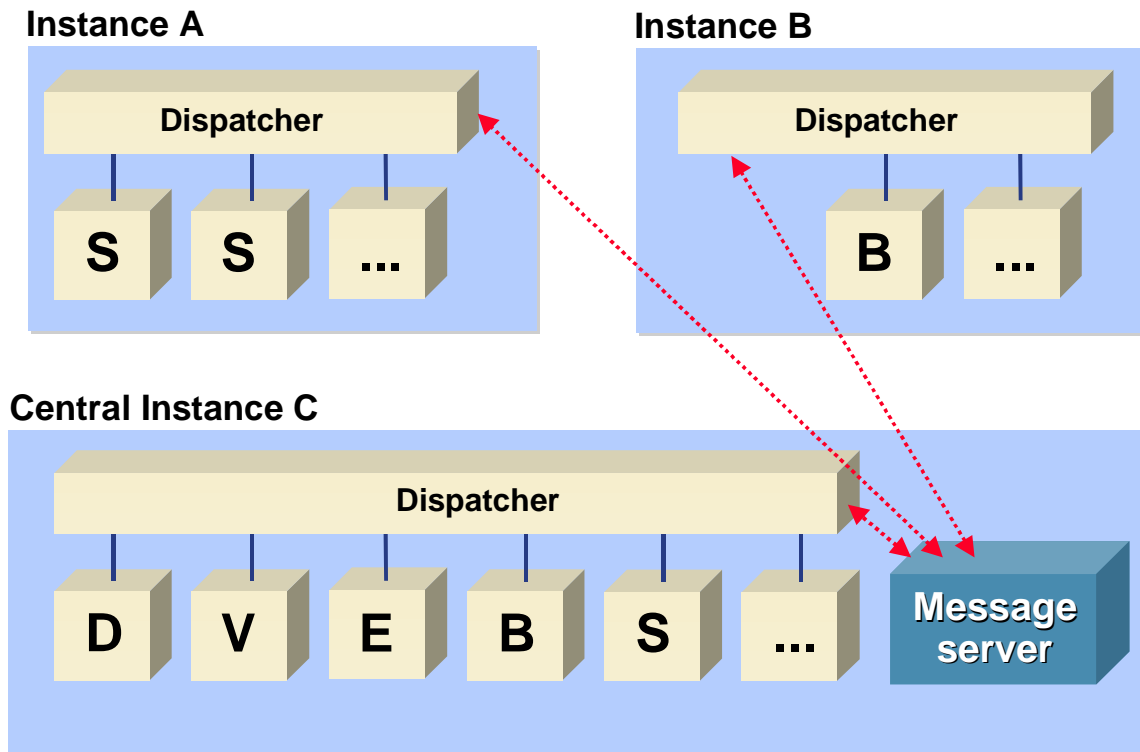
R/3 System Logon Steps

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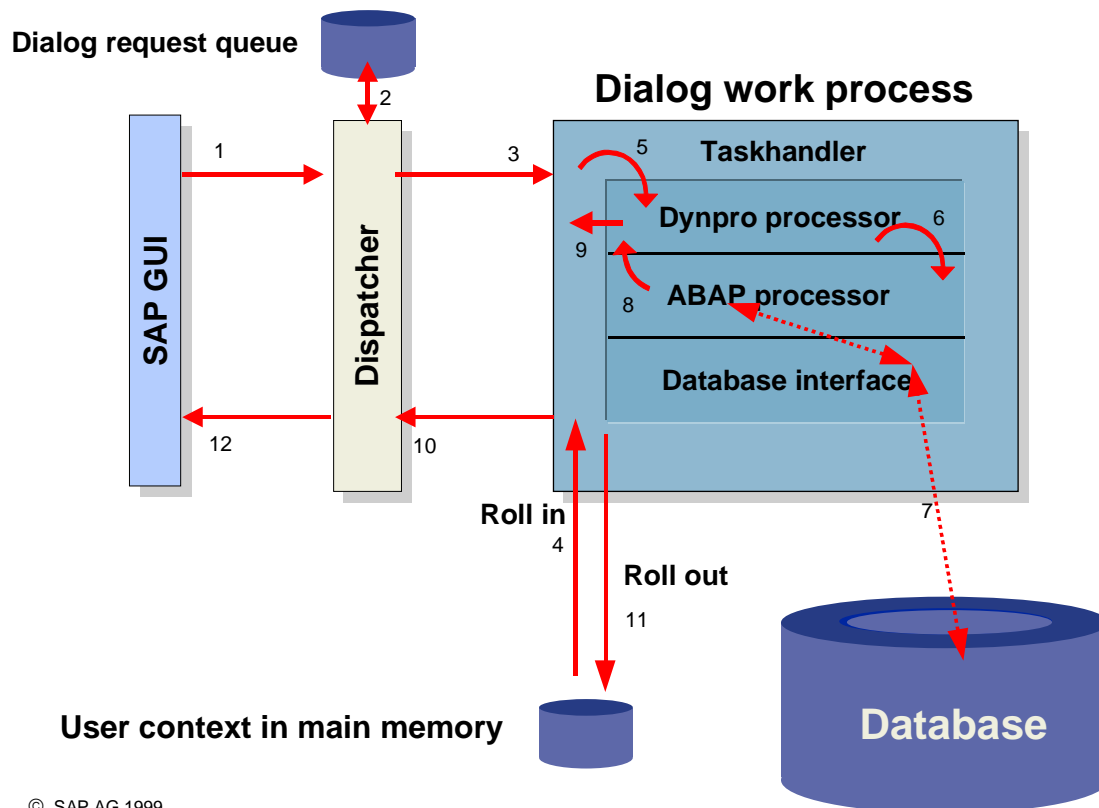
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- When a SAP GUI process is started on the front end, a command line parameter is sent, indicating one of the following:
 - A specific dispatcher can be accessed directly (go directly to 3)
 - The logon must first be sent to the message server (1) for logon load balancing
- When logon load balancing is used, the message server returns the IP address and instance number (2) of a specific dispatcher. The number of dispatchers available for a particular logon is configured in the system. Logon load balancing is useful if certain user groups are assigned to work on specific servers.
- The message server returns the IP address of one of the assigned dispatchers, for example the dispatcher that has shown the best response time during the last five minutes. Response times are stored in the collected workload data.
- The frontend process then connects to the assigned dispatcher (3), which selects a free dialog work process (4) to compare the logon user data with the user data stored in the database (5, 6).
- If the logon user data does not agree with the stored user data, no logon is allowed. If the logon is successful, the SAP GUI is established with the user (7-10). This dispatcher and its work processes are used for the duration of the session.
- If a user logs off and then logs on again to the system, logon load balancing may cause the message server to select another dispatcher for the user to work with.



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- An instance is a group of R/3 services that are started and stopped together. Usually, an instance is one dispatcher with its work processes, although other standalone services such as a gateway can be called an instance.
- A central instance is a dispatcher offering all the R/3 System processes: DVEBMGS. In the graphic, Instance C shows all the processes except the gateway (G).
- An R/3 application server is a computer where one or more R/3 instances are running.
- An R/3 System consists of one or more R/3 instances. The instances can run on one or more computers. Each instance belongs to exactly one R/3 System.
- From the hardware point of view, however, an application server can be defined as a computer on which at least one dispatcher, also called a dialog instance, is running.
- The following restrictions apply to the number of each type of work process:
 - Dialog (D): each dispatcher needs at least 2 dialog work processes (not shown above)
 - Spool (S): at least 1 per R/3 System (more than 1 per dispatcher allowed)
 - Update (V): at least 1 per R/3 System (more than 1 per dispatcher allowed)
 - Background (B): at least 2 per R/3 System (more than 1 per dispatcher allowed)
 - Enqueue (E): exactly 1 per R/3 System (only 1 E work process is required and allowed)

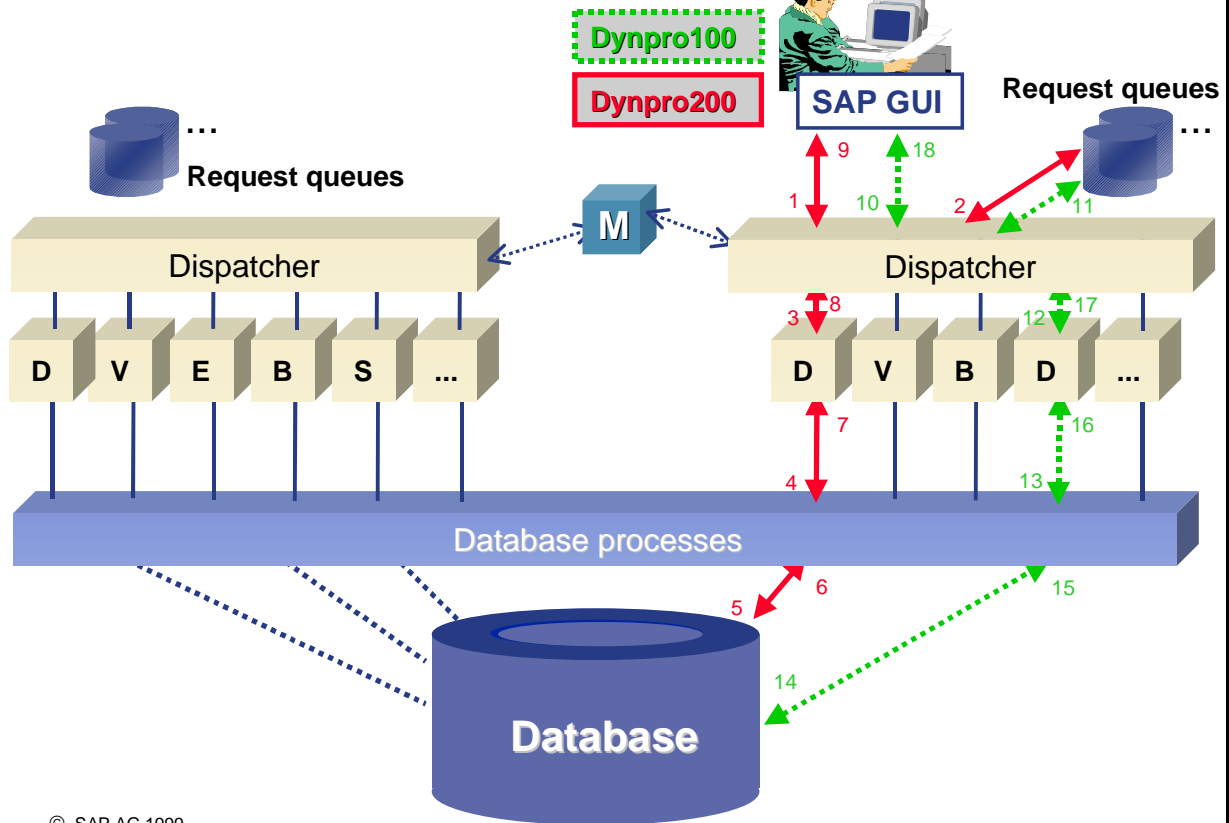


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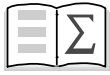
- Once you have established a connection with a dispatcher through the SAP GUI, and a session is started for you in the system, the following steps are executed for each request:
 - Data is passed from the SAP GUI to the dispatcher using the SAP GUI protocol (based on TCP/IP).
 - The dispatcher classifies the request and places it in the appropriate request queue.
 - The request is passed in order of receipt to a free dialog work process.
 - The subprocess taskhandler restores the user context in a step known as roll-in. The user context contains mainly data from currently running transactions called by this user and its authorizations (that is, you and your authorizations).
 - The taskhandler calls the dynpro processor to convert the screen data to ABAP variables.
 - The ABAP processor executes the coding of the process-after-input (PAI) module from the preceding screen, along with the process-before-output (PBO) module of the following screen. If necessary, it also communicates with the database.
 - The dynpro processor then converts the ABAP variables again to screen fields. When the dynpro processor has finished its task, the taskhandler becomes active again.
 - The current user context is stored by the taskhandler in shared memory (roll-out).
 - The resulting data is returned through the dispatcher to the frontend.

Work Process Multiplexing

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- If a transaction involves the use of more than one screen, the system dialog steps shown on the preceding page are normally performed by several different dialog work processes in a dispatcher. This is known as work process multiplexing.
- Each dialog request is:
 - First, placed by the dispatcher in the dialog request queue
 - As soon as possible, assigned to a free dialog work process
- The work processes do not perform database operations. They pass data and commands to the assigned database processes using their own database interface.



In this unit, you have reviewed the following:

- The steps executed in R/3 during logon
- The terms “instance” and “application server” as used in the R/3 environment
- Processing of a system dialog step
- Work process multiplexing as performed by dialog work processes



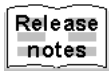
- **SAP50 - Basis Technology**



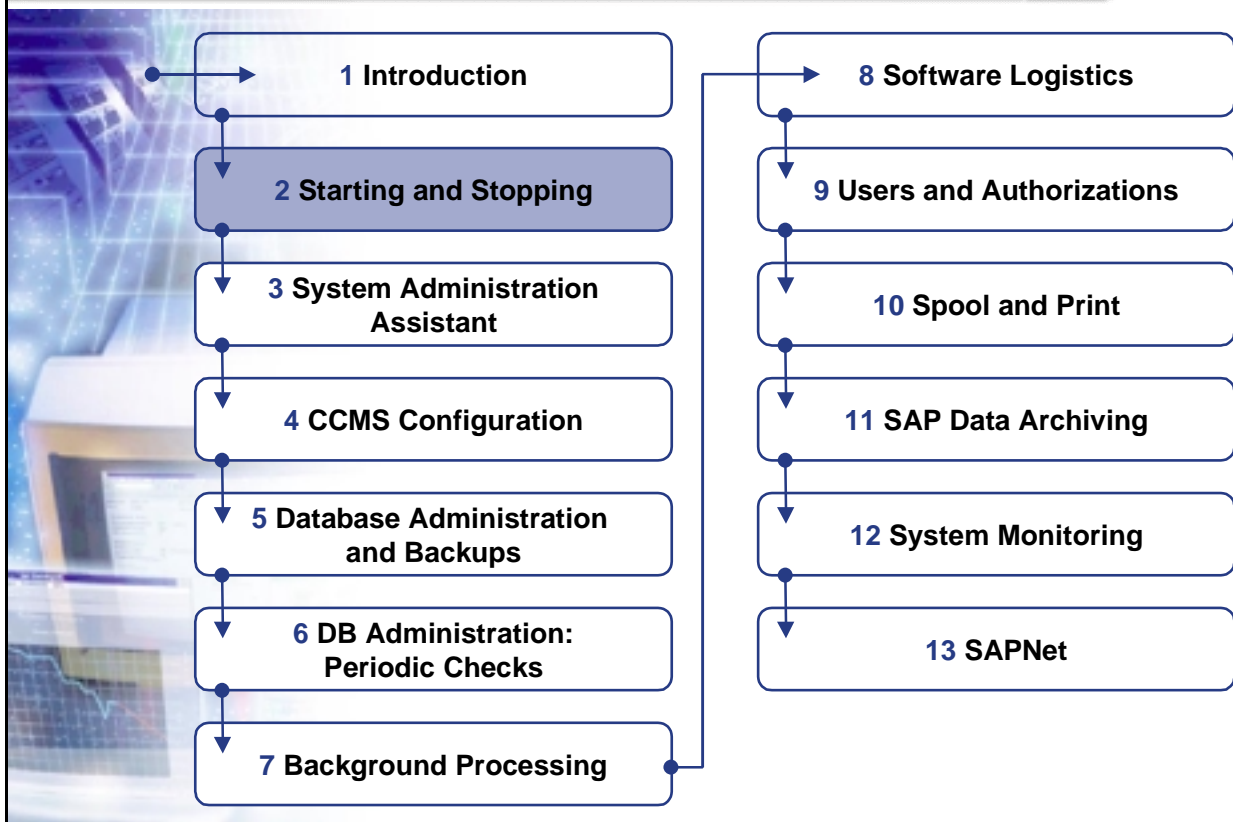
- **SAP Technology Infrastructure**
Brochure available in SAPNet under:
Information → R/3 System → Basis Technology



- **SAP Online Documentation**



- **SAP Notes:**
 - 39412 Number of workprocesses
 - 21960 Two instances on one computer
 - 5424 FAQ: enqueue/locking
 - and others in BC-KRN-CST





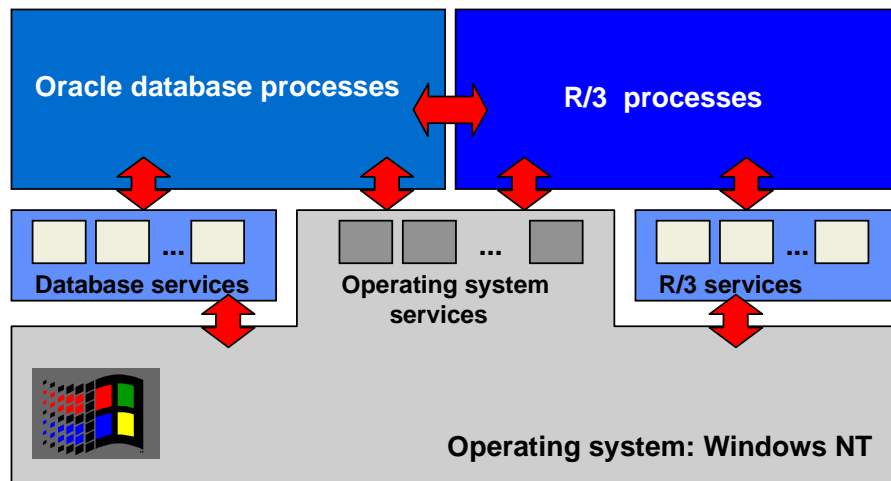
Contents

- Processes and services in an R/3-NT-Oracle environment
 - Start and stop processes and procedures
-

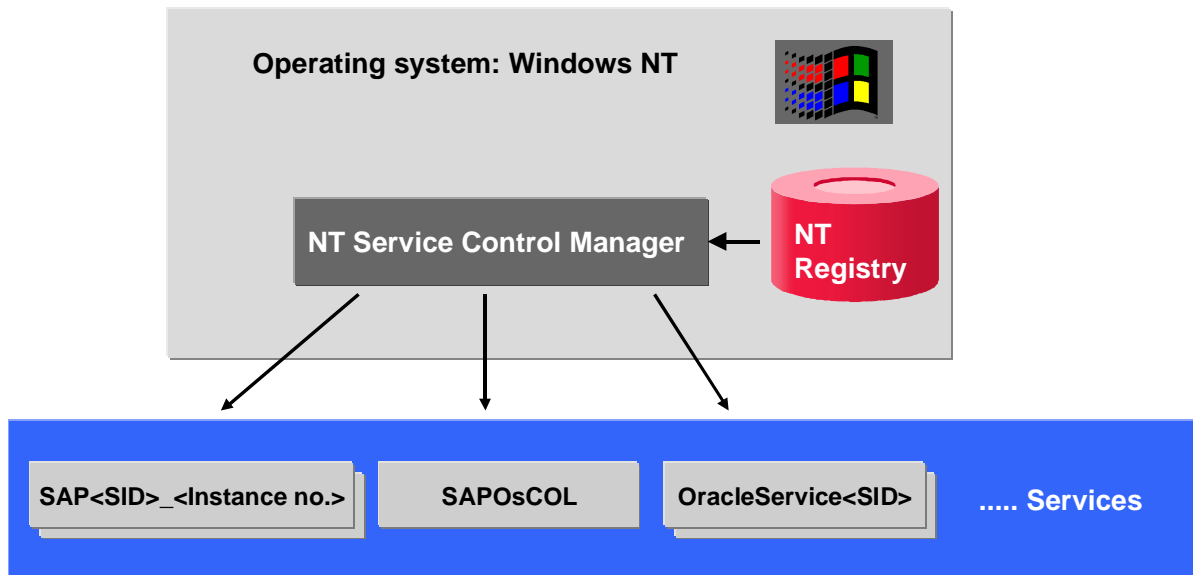
Objectives

At the end of this unit, you will be able to:

- Explain the concept of services
- Describe R/3 start and stop processes
- Explain the relationship between database processes, R/3 processes, and operating system processes
- Start and stop an R/3 System
- Analyze error situations during startup or shutdown

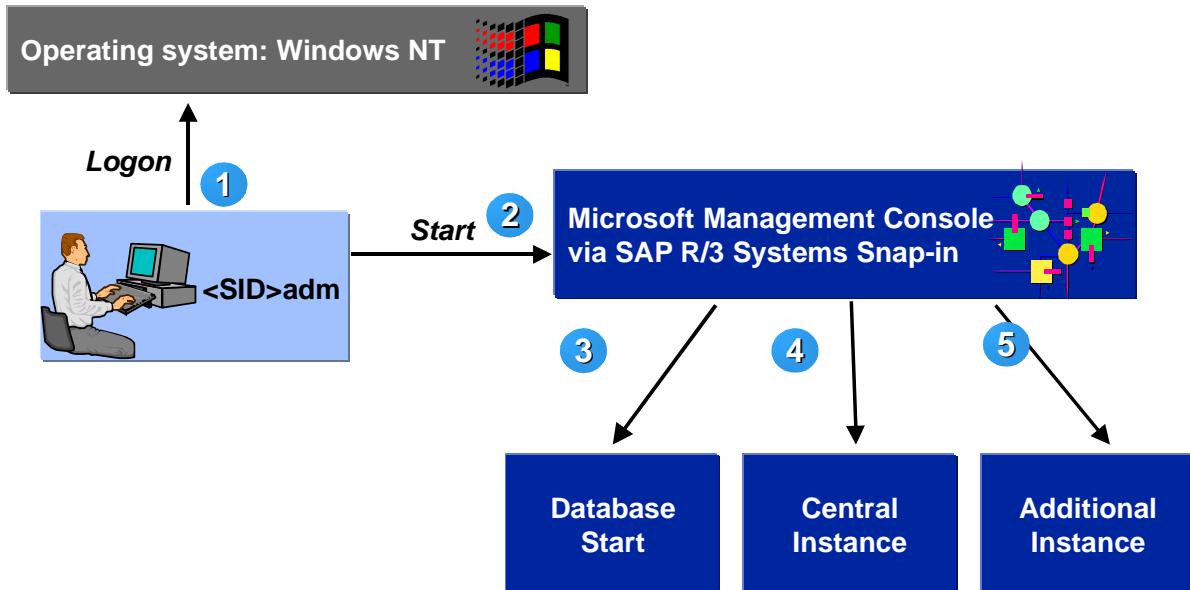


- The graphic shows the structure of processes and services when R/3 is used with an Oracle database on a Windows NT operating system.
- The operating system services are implemented with the NT services concept. Oracle and R/3 also require their own services, which are installed during installation of the R/3 System package.



- During startup of the operating system Windows NT, the NT Service Control Manager starts all the services in the service list that are configured for automatic startup. The information relevant to these services is stored in the registry and is read by the Service Control Manager during startup.
- Several services of type "SAP<SID>_<Instance no.>" (the SAP service) and "Oracle Service<SID>", but only one SAPOsCOL service, can be run on one computer.
- The SAP service, SAPOsCOL, and OracleService<SID> should be configured for automatic startup.

Starting R/3: R/3 Administrator Tasks



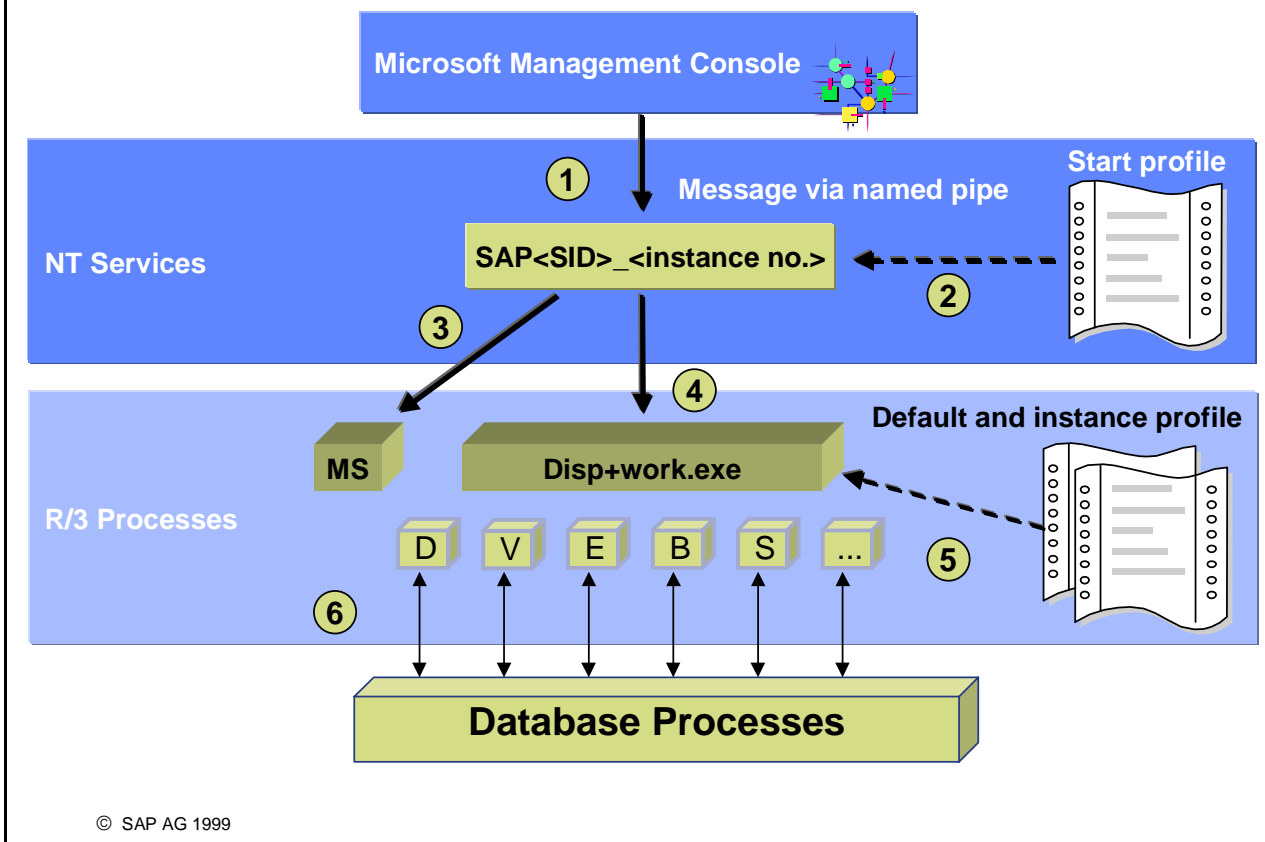
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- To start the Oracle database and the R/3 System, the administrator performs the following steps:
 - Log on to the operating system Windows NT as user <sid>adm.
 - To start the R/3 System, open the Microsoft Management Console (MMC) using the SAP R/3 Systems Snap-in. Right-click on the system icon and select Start. The sapstartsrv.exe executable sends a message using a named pipe to the SAP Service, SAP<SID>_<instance no.>.
 - The SAP service starts the database by executing an NT script that calls the Oracle Server Manager. The Oracle Server Manager executes an SQL script that starts the database if it is currently not running. Once the database is up and running, the SAP service starts the Message Server (msg_server.exe) and the Central Instance dispatcher (disp+work.exe).
 - The R/3 System has been started successfully when the icon for the central instance changes color to green. The colors displayed in the MMC have the following meanings: red - the process terminated abnormally; yellow - the process is being started; green - the R/3 System has been successfully started; gray - the process is not running, status unknown.
- You can also start the R/3 System with the NT scheduler called "at". For this kind of start, SAP provides the executables *startsap* and *stopsap* which are executed locally. Use
 - startsap name=<SID> nr=<nr> SAPDIAHOST=<hostname> to start an R/3 instance and
 - stopsap name=<SID> nr=<nr> SAPDIAHOST=<hostname> to stop an R/3 instance (the executables sapstart.exe, sapsrvkill.exe and sapntwaitforhalt.exe must be in the same directory)

- See SAP Online Documentation: choose *BC Basis Components* → *Computing Center Management System* → *BC Computing Center Management System* → *Starting and Stopping the R/3 System*.

Starting R/3: Process Startup Sequence

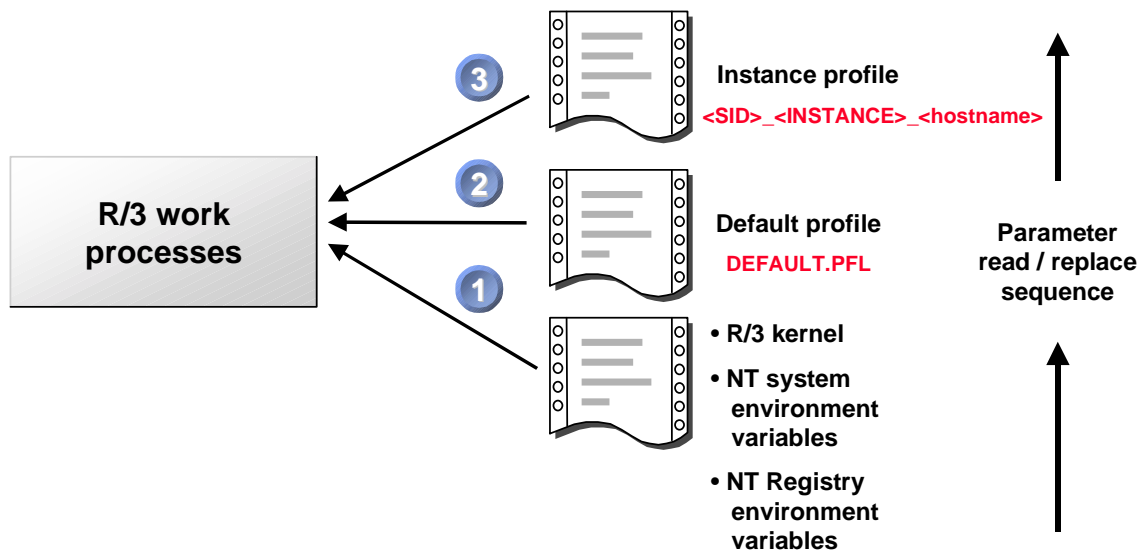
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- When the start command is issued from the MMC, a message is sent using a named pipe to the SAP Service via the executable sapstartsrv.exe.
- To find out which components have to be started, the SAP service reads the Start Profile from directory `\\<SAPGLOBALHOST>\sapmnt\<SID>\SYS\profile`. To view this profile for an instance from the MMC, right-click on the instance icon and choose *All tasks* → *View Start Profile*.
- If necessary, the SAP service starts the database; then it starts the message server and the dispatcher.
- To determine the runtime configuration for the instance, the dispatcher reads the default profile and the instance profile. The shared memory areas, work processes, and gateway reader are generated accordingly.
- Once the necessary resources are configured, the work processes connect to the ORACLE threads of the database as user `sapd3`.
- To view the startup trace file `sapstart.trc` and the developer traces, right-click on an instance and choose an option under *All tasks*.
- The database may be started using the MMC, the SAPDBA, the Oracle Instance Manager, or the Oracle Server Manager.

Parameter Read Sequence

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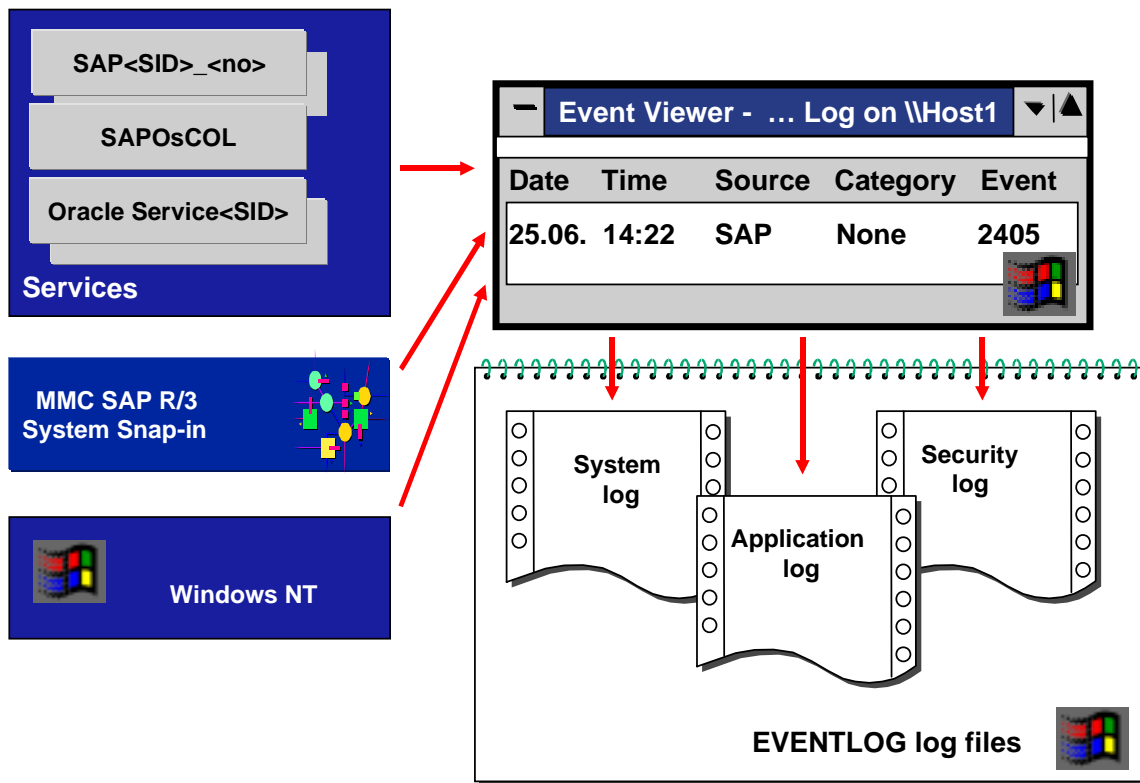


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- To provide a stable startup procedure, a parameter read sequence (also known as the parameter replace sequence) is defined during startup as follows:
 - R/3 processes read the appropriate parameters from the R/3 kernel, from the NT system environment variables, and from the NT Registry environment variables.
 - The default profile “\\<SAPGLOBALHOST>\sapmnt\<SID>\SYS\profile\default.pfl” is read. Profile values already defined in the R/3 kernel are replaced with the values in the default profile.
 - The instance profile “\\<SAPGLOBALHOST>\sapmnt\<SID>\SYS\profile\<SID>_<Instance>_<hostname>” is read. Profile values already defined in the default profile or in the R/3 kernel are replaced with the values defined in the instance profile.
- This procedure ensures that system parameter values reflect not only the instance profile but also the values in the default profile and the R/3 kernel.
- To display the replace sequence for a particular parameter, execute the report RSPFPAR in Transaction SE38 or SA38.
- The SAP service reads only the start profile and the default profile. The R/3 kernel (disp+work.exe) reads only the default profile and the instance profile. If you change the default profile, you must restart the SAP service (including the R/3 instance). If you only change the instance profile, you only need to restart R/3 using the MMC.

Startup Logs and Traces in Windows NT

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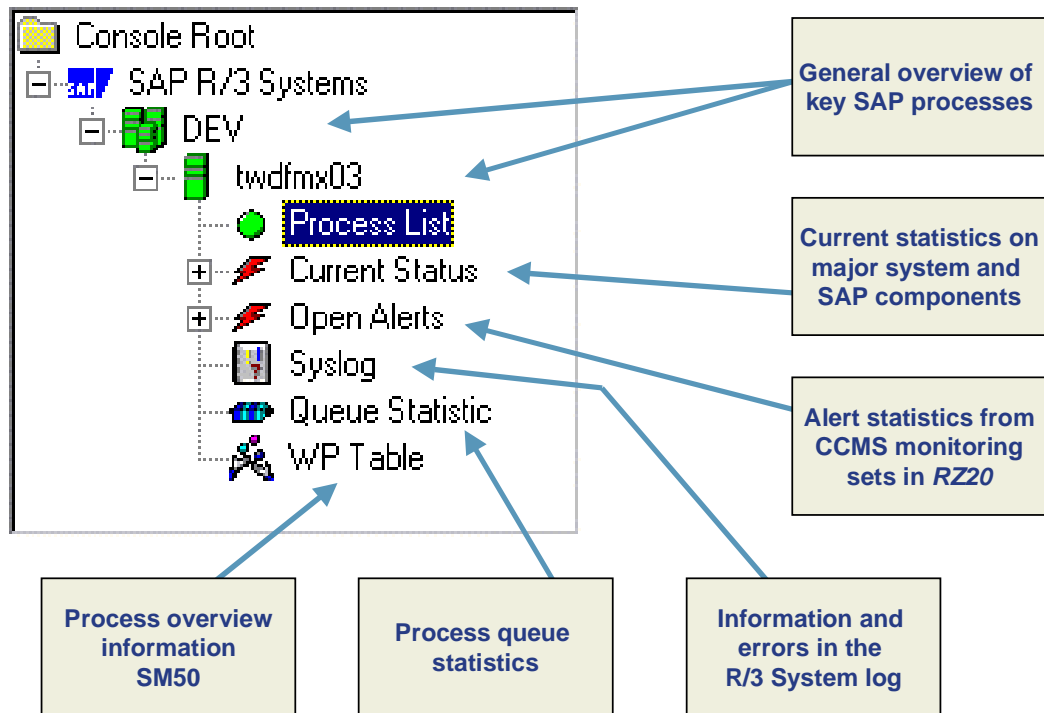


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- All Windows NT messages generated by any services, by the SAP Service Manager, or by the operating system, are recorded by the NT Event Viewer. The Event Viewer writes the event log, which consists of three log files:
 - System Log
This contains operating system messages and messages produced by R/3 or Oracle applications and returned by the operating system.
 - Application Log
This contains events that occurred in, for example, the R/3 or Oracle applications and returned by these applications.
 - Security Log
This contains such events as logon, logoff, and user file access, depending on the security auditing properties of the file system.
- The Event Viewer is located in the group Administrative Tools (Common) or can be called at a command prompt using the command eventvwr.

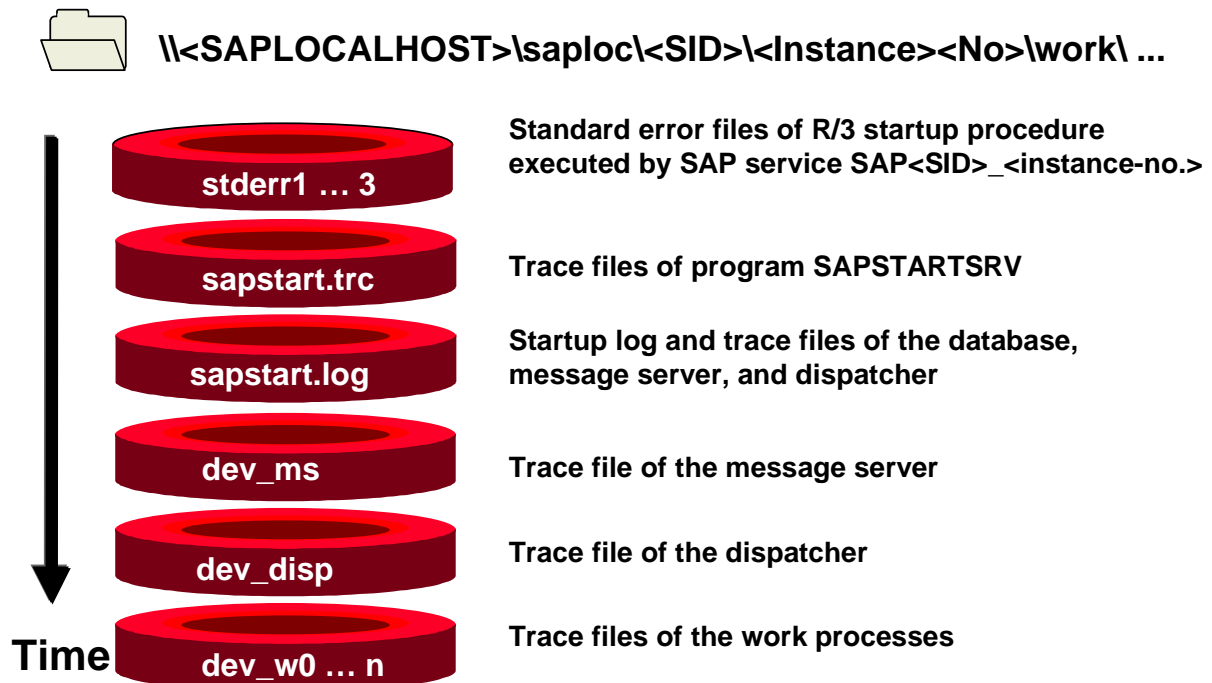
MMC SAP R/3 Systems Snap-In

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- Using the MMC, an R/3 System administrator can monitor multiple R/3 Systems and application servers remotely from a Windows NT System using the SAP R/3 Systems Snap-in.
- The SAP R/3 Systems Snap-in enables you to:
 - Start and stop all R/3 instances with a mouse click
 - Display the R/3 Process List (status of message server and all instances)
 - View all R/3 startup and trace files
 - Display the R/3 System environment
 - Display alert status tree (transaction *RZ20*) and acknowledge current alerts
 - Start analysis tools in R/3 for nodes in the alert tree
 - View the R/3 syslog (transaction *SM21*), for both an online and offline R/3 System
 - Remote logon to an application server
 - Displaying the queue statistics (dpmon) and process overview (transaction *SM50*)
- The MMC is shipped as follows:
 - Windows NT: the MMC is installed with the R/3 Systems Snap-in during R/3 installation.
 - Windows 2000: the MMC is preinstalled in the operating system. Only the R/3 Systems Snap-in is installed during R/3 installation.



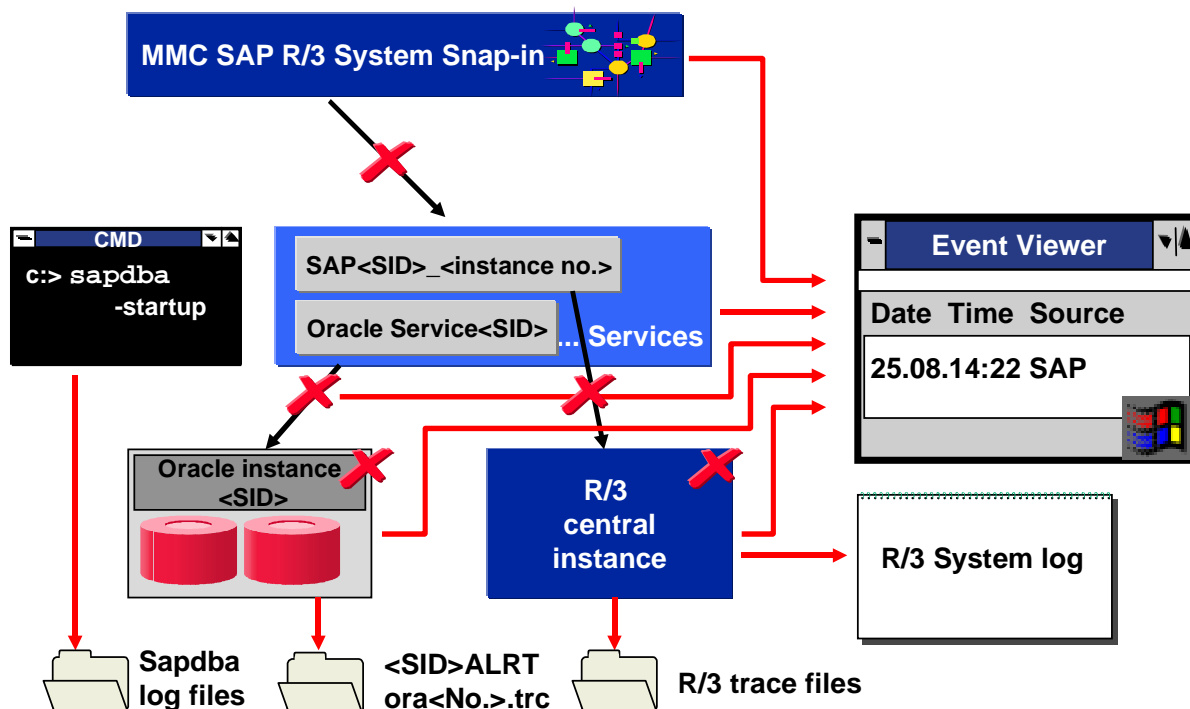
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- R/3 work directories contain trace files and error files for messages relating to the startup of work processes. Each R/3 instance has a separate work directory containing information that may not be found in the R/3 System log.
- The work directory files are initialized in chronological order. During startup, the SAP service executable SAPSTARTSRV.EXE writes:
 - Database logs to the file STDERR1
 - Message server logs to the file STDERR2
 - Dispatcher logs to the file STDERR3
- To define the level of information written to the developer trace files, set the profile parameter “rdisp/TRACE” in the instance profile. The possible values for this parameter are:
 - 0: Write only errors (no traces)
 - 1: Write error messages and warnings (default)
 - 2: Write error messages and a short trace
 - 3: Write error messages and the complete trace
- You can also change the trace level for single work processes in the process overview (using transaction SM50).

- To view all startup logs and developer traces for an instance using the MMC, right-click on the instance in the console tree and choose *All Tasks* → *View Developer Traces*. To see the startup trace files, select the appropriate file type.

Startup Diagnostics

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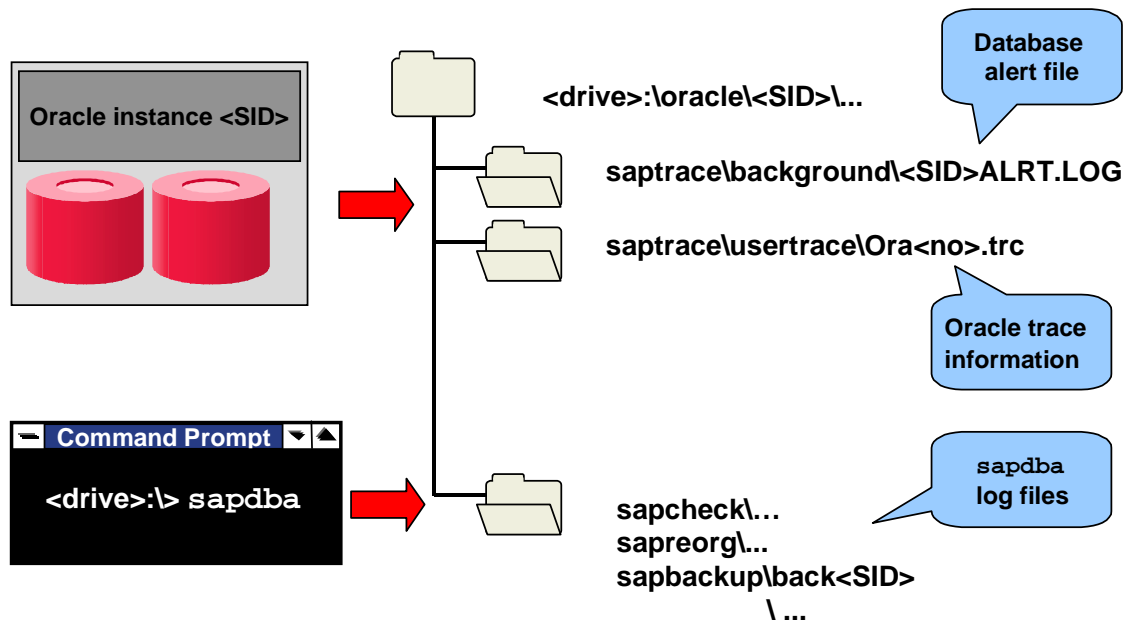
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- If the R/3 System fails to start correctly, the R/3 System administrator should try to find out why.
- The graphic shows the possible points of startup failure, and the locations of the corresponding error messages. If the database has not been started, the work processes cannot connect to the database and the R/3 System cannot be started.
- Further reasons for startup failure include:
 - The MMC SAP R/3 System Snap-ins cannot connect to the SAP service because the SAP service is not running or not properly configured.
 - Services do not start, as the service executable is not accessible, Registry entries are lost or damaged, or the service is not correctly configured (for example, the user password is wrong).
 - Database startup fails, for example, if environment variables are not correct, if the database is running in DBA mode, if database files are lost or corrupt, or if data files have been renamed in the database but not at operating system level.
 - R/3 Startup fails, for example, if NT shares are not accessible, if a service is not correctly configured (wrong user), if there are permission problems on the file system or errors in TCP/IP configuration (hosts, services, DNS, hostname), or if no connections to the database are possible.
- R/3 can be configured to write messages both to the R/3 System log and to the NT EVENTLOG using transaction *RZ20*.

- If you can log on to the R/3 System, you can also use the CCMS Monitoring sets to analyze the problems (transaction *RZ20*).

Logs and Traces for Database Startup

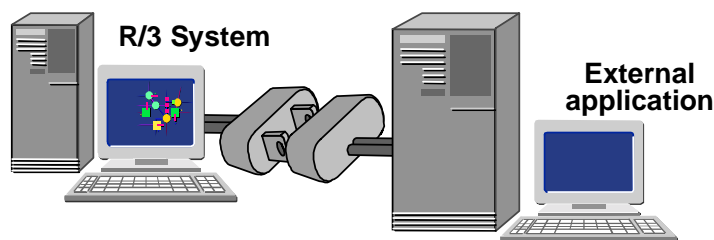
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- All significant system events, including database start, stop, and errors, are logged in the Oracle alert file “<drive>:\oracle<SID>\saptrace\background\<SID>ALRT.LOG”.
- Detailed error information is logged in the Oracle trace file, “<drive>:\oracle<SID>\saptrace\usertrace\Ora<no>.trc”.
- If the R/3 System administrator uses sapdba to start the database, sapdba writes additional log files to the following directories according to the activity performed:
 - <drive>:\oracle<SID>\sapreorg
 - <drive>:\oracle<SID>\sapcheck
 - <drive>:\oracle<SID>\sapbackup

- Check background and batch input jobs with **SM37** and **SM35**:
 - Are any jobs active/planned?
 - Will R/3 jobs be triggered from external systems?
- Check update status with **SM13**
- Send system messages with **SM02**
- Check logged-on users with **SM04**
- Check external interfaces

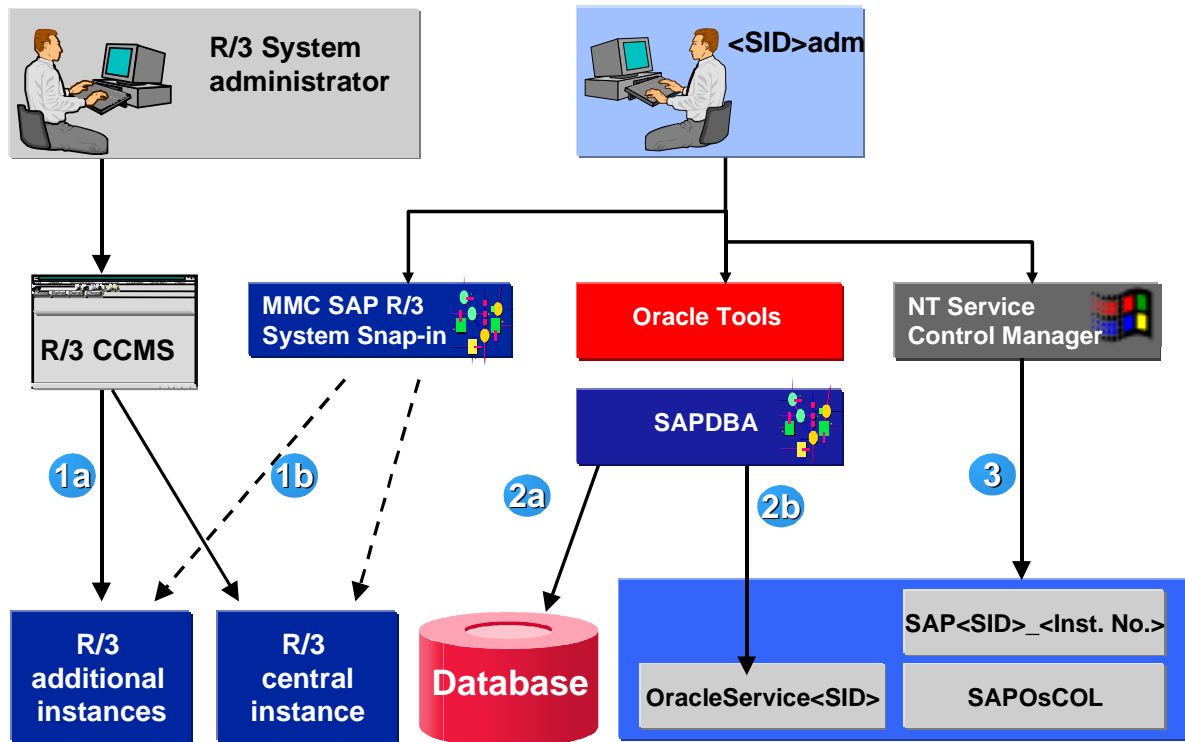


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- Before the R/3 System is stopped, the R/3 System administrator should check the:
- Job Overview
Check if any background jobs from any application server are active or have been triggered externally. Use transaction **SM37**, or choose *Tools* → *CCMS* → *Jobs* → *Job Overview*.
- Process Overview
Check if a background work process (BTC) is active on any application server. Use transaction **SM66**.
- Batch Input Overview
Check if any Batch Input jobs are running. Choose *System* → *Services* → *Batch input* → *Edit* → *Overview* (or use transaction **SM35**).
- Update Records
Check if any update records are open. When the system is stopped, these records are rolled back and set to status init. At startup, the records are processed again. Use transaction **SM13** or **RZ20**.
- In each case, the R/3 System administrator should decide whether to interrupt the jobs or wait until they are finished.
- Prior to shutdown, inform users by setting a system message through transaction **SM02**. Before shutting down the system, use transaction **SM04** to check whether any users are still logged on, and ask them to log off. The R/3 System administrator and administrators of external systems should keep each other informed about data transfers between their respective systems.

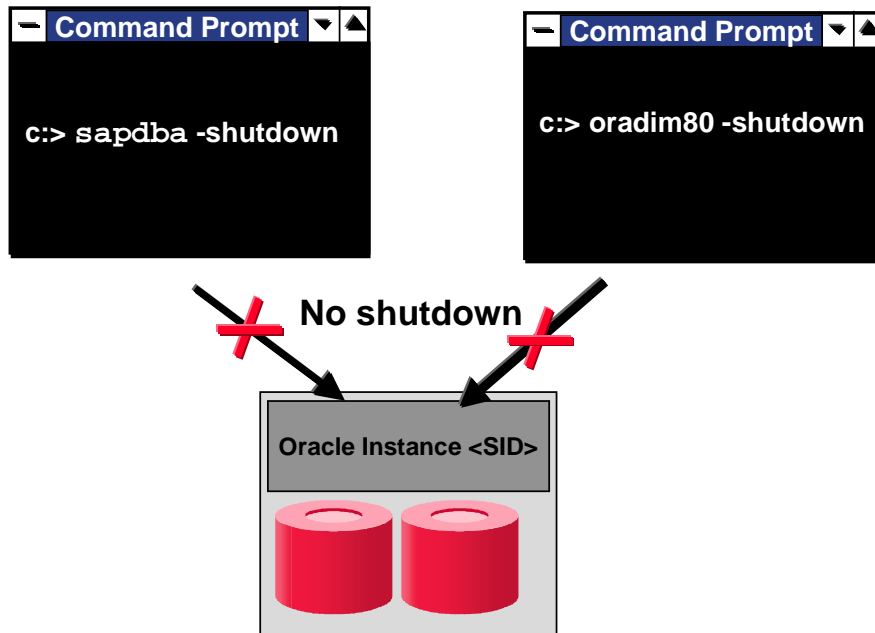
Stopping the R/3 System

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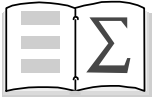


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- To stop the R/3 System, the R/3 System administrator must:
 - Stop the application servers (dialog and central instances), by using one of the following:
 - The CCMS in R/3 (1a in the graphic)
 - The MMC SAP R/3 Systems Snap-in, which sends a message through a named pipe to the SAP service and stops the R/3 instances locally (1b in the graphic)
 - Stop the SAP service
 - Stop the database, if necessary, by using one of the following:
 - SAPDBA (2a, 2b in the graphic)
 - Oracle Instance Manager in command line mode
 - Oracle Enterprise Manager
- Although the database is started automatically when starting R/3, you must stop the database manually, unless you have specially created your own scripts for shutdown.
- See also SAP Online Documentation: choose *BC Basis Components* → *Computing Center Management System* → *BC Computing Center Management System* → *R/3 System Administration*. Here you will also find examples of startup and shutdown scripts for the entire R/3 System, including the database.

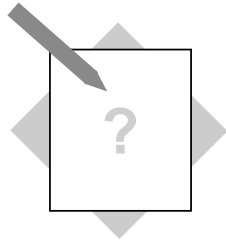


- Reasons why the database may be unable to shut down when the R/3 System is stopped include:
 - The database is performing a rollback of aborted transactions caused by the shutdown of R/3. Depending on the last commit and the application, this can take a long time.
 - An online backup is running. You should wait until the online backup is finished.
 - The archiver is stuck just at the moment when you are stopping the R/3 System. You should save the archives to tape, in order to free the file system.
- If there is no obvious reason, the database administrator should check the R/3 System log (with transaction *SM21*) and the database alert file. The problem should be solved before further attempts are made to stop the database.
- See also SAP Online Documentation: choose *BC Basis Components* → *Database Interface, Database Platforms (BC-DB)* → *Database administration (Oracle) with SAPDBA*.

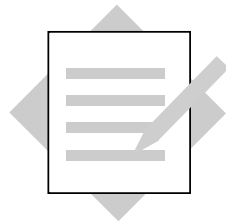


Now you are able to:

- **Explain the NT services concept**
- **Describe R/3 start and stop processes**
- **Explain the relationship between database processes, R/3 processes, and operating system processes**
- **Start and stop an R/3 System**
- **Analyze error situations during startup or shutdown**



- **Exercises**



- **Solutions**

Starting and Stopping: Exercises

The start and stop exercises are divided into two parts:

Part 1 requires pcANYWHERE access to the remote server and should be performed first by groups working on development systems (DEV).

Part 2 requires Telnet access and should be performed first by groups working on quality assurance systems (QAS).

All groups should perform the exercises in both parts.

No.	Exercise
	Part 1 (pcANYWHERE)
1	Log on at your workstation at NT level (ask your trainer for a user name).
1.1	Log on to the NT operating system from pcANYWHERE as user <sid>adm. Which services related to the R/3 System are activated by the operating system?
1.2	Using the Microsoft Management Console, check if your R/3 System is running.
1.3	If your R/3 System is active, shut it down using the Microsoft Management Console.
1.4	The Microsoft Management Console only stops the R/3 instance(s); the database is still running. Shut down the database.
2	Starting
2.1	Start your R/3 System using the Microsoft Management Console. Trace the startup phase by monitoring the processes of your system.
2.2	Make a list of the R/3 and Oracle process types that are running at the end of the startup phase.
2.3	Look at the log files and the trace files for errors and warnings.
2.4	Log on to your R/3 System.
2.5	Take a look at the Process Overview in R/3 at operating system level and from the WP Table in the Microsoft Management Console.
3	Stopping
3.1	Which users are active in your system? Send a system message that you are stopping the system.
3.2	Stop the R/3 System using the Microsoft Management Console. Shut down the database using sapdba .
	Part 2 (Telnet)
4	Log on at your workstation at NT level (ask your trainer for a user name).
4.1	Log on to the NT operating system using Telnet as user <sid>adm. To see if the R/3 System is running, run sapdba .

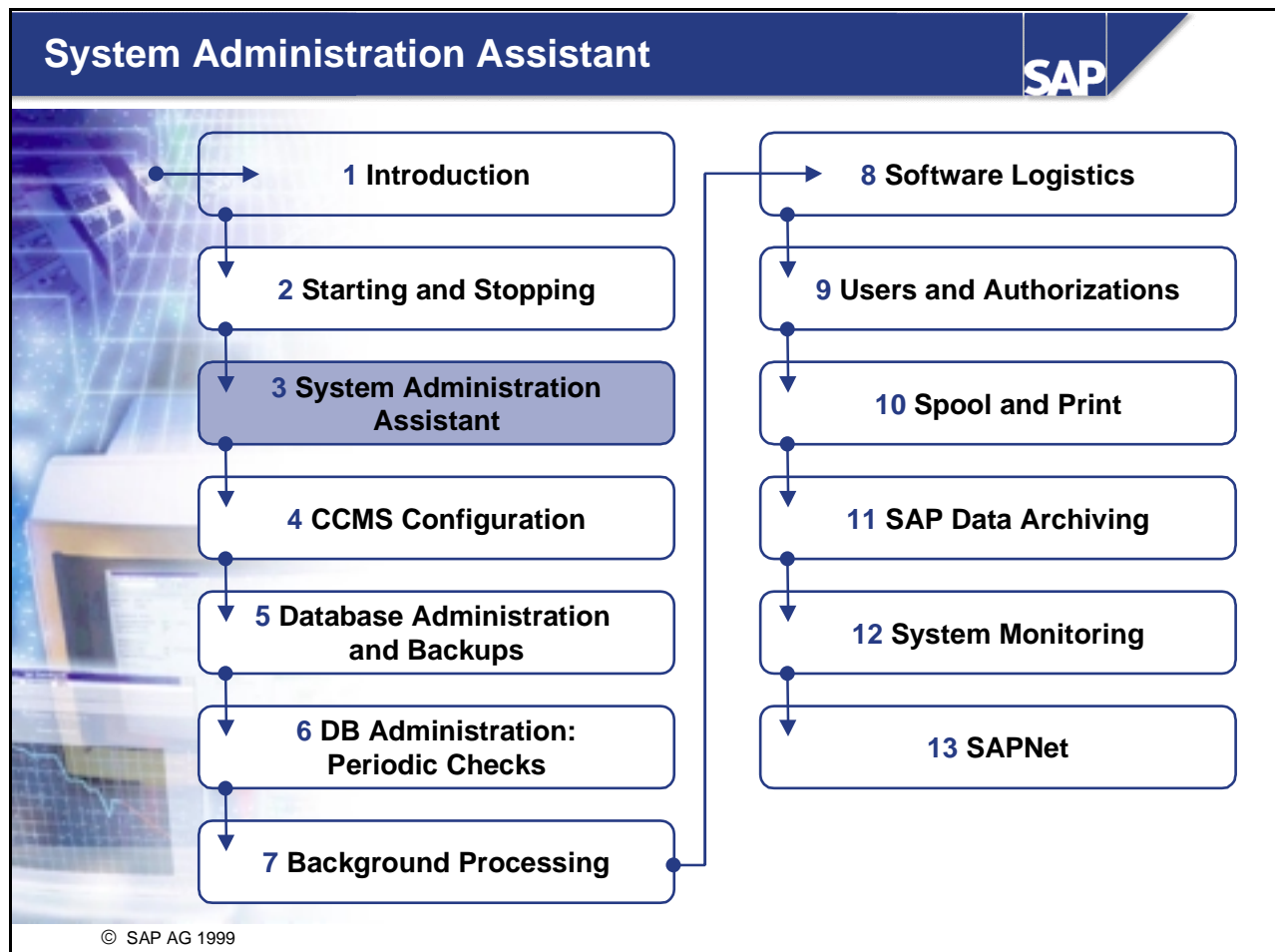
4.2	If your R/3 System is active, shut it down (all instances) using the operating system command stopsap with appropriate parameters. Check the result on sapdba .
4.3	Command stopsap only stops the R/3 instances you specify; the database is still running. Shut down the database.
5	Starting
5.1	Start your R/3 System using the command startsap . If it is not already running, the database starts automatically.
5.2	View R/3 and Oracle processes at the operating system level.
5.3	Log on to your R/3 System.
5.4	Compare the R/3 work process overview with the process list at the operating system level.

Starting and Stopping: Solutions

No.	Solution
	Part1 (pcANYWHERE)
1	Log on at NT level (ask your trainer for a user name). Then choose <i>Start → Programs → pcANYWHERE</i> or double-click on the desktop icon.
1.1	Log on to the NT operating system from pcANYWHERE as user <sid>adm. To determine which services are active, use the NT Services Manager (choose <i>Services</i> or <i>Start → Settings → Control Panel → Services</i>). In addition to other services, the R/3-related services SAPOSCOL and SAP<SID>_<instance number> are displayed.
1.2	Using the Microsoft Management Console (from the icon on the desktop), check the icons for the instances in your R/3 System. A green icon indicates that your R/3 System has been started.
1.3	Using the Microsoft Management Console, right-click on the application server and choose <i>Stop</i> . A dialog box appears: choose <i>Confirm</i> . The instance icon fades to gray, although it may take several minutes for dispatcher to stop.
1.4	To shut down the database, use one of the following methods: - From the MSDOS Prompt, enter command sapdba - Choose <i>Start → Run</i> and enter command sapdba - From SAPDBA, choose <i>Startup/Shutdown instance → Shutdown → Shutdown normal</i> .
2	Starting
2.1	Using the Microsoft Management Console, right-click the application server and choose <i>Start</i> . To monitor the processes, use the tool Quick Slice: choose <i>Start → Run</i> and enter qslice .
2.2	Using the tool Quick Slice, you should see the following R/3 work processes: oracle80.exe, tnslnr80.exe, saposcol.exe, msg_server.exe, gwr.exe, and multiple disp+work.exe.
2.3	Use Windows NT Explorer to check the log and the trace files in the directory G:\usr\sap\<SID>\<instance name>\work . Pay particular attention to the dispatcher trace file dev_disp and the trace files of work process 0 and 1 (dev_w0 and dev_w1 , respectively). To see these logs and trace files using the Microsoft Management Console, right-click your instance and choose <i>All Tasks → View Trace File</i> .
2.4	From SAP Logon, select the icon for your R/3 System. Use your desktop window (do not start a SAP GUI from pcANYWHERE).
2.5	From the R/3 initial screen, choose <i>Tools → Administration → Monitor → System monitoring → Process overview</i> (transaction SM50) and use Quick

	<p>Slice at the operating system level. Compare the number of work processes. At the operating system level, you can also see the work processes of the second system running on this server. For each instance, the dispatcher is also displayed as a disp+work process.</p>
3	Stopping
3.1	<p>To display the users active in your R/3 System, from the R/3 initial screen, choose <i>Tools → Administration → Monitor → System monitoring → User overview</i> (transaction <i>SM04</i>). Or choose <i>Tools → Administration → Monitor → Performance → Exceptions/Users → Active users → Users global</i> (transaction <i>AL08</i>).</p> <p>To send a message to the active users, choose <i>Tools → Administration → Administration → System Messages</i> (transaction <i>SM02</i>).</p>
3.2	Review solutions 1.3 and 1.4.
	Part 2 (Telnet)
4	To access Telnet from your workstation, log on at NT level (ask your trainer for a user name).
4.1	As user <code><sid>adm</code> in your Telnet terminal, run command <code>sapdba</code> . In the entry screen, you can see from the system information how many times SAPR3 is connected (if SAPR3 is connected, the R/3 System is not stopped).
4.2	<p>Shut down all the instances in your R/3 System as follows:</p> <p>Change to drive G and enter <code>cd \usr\sap<SID>\sys\exe\run</code></p> <p>To stop first the additional instance and then the central instance, enter <code>stopsap name=<SID> nr=<number> SAPDIAHOST=<hostname></code></p> <p>Run <code>sapdba</code> again or, if you are still in, choose <i>Instance Information → Refresh</i>.</p>
4.3	To shut down the database, run <code>sapdba</code> and choose <i>Startup/Shutdown instance → Shutdown → Shutdown normal</i> .
5	Starting
5.1	<p>Start all the instances in your R/3 System as follows:</p> <p>Change to drive G and enter <code>cd \usr\sap<SID>\sys\exe\run</code></p> <p>To start first the central instance and then the additional instance, enter <code>startsap name=<SID> nr=<number> SAPDIAHOST=<hostname></code></p>
5.2	To view the processes, use command <code>tlist/t more</code> .
5.3	From SAP Logon, select the icon for your R/3 System. Use your desktop (do not start a SAP GUI from pcANYWHERE).
5.4	From the R/3 initial screen, choose <i>Tools → Administration → Monitor → System monitoring → Process overview</i> (transaction <i>SM50</i>) and compare with the output from step 5.2 at the operating system level. The operating system level also shows the work processes of the second system running

on this server, but you can identify the processes by their process IDs. For each instance, the dispatcher is also displayed as a disp+work process.





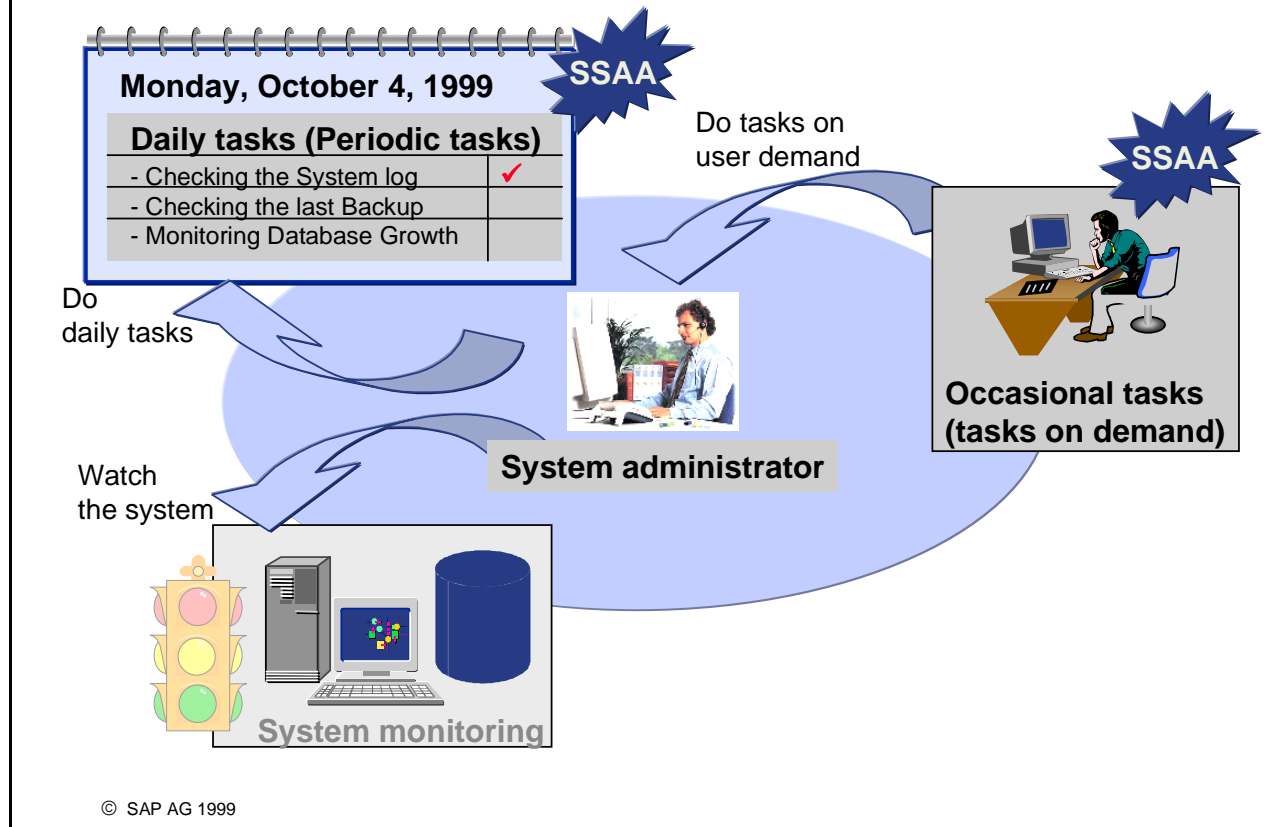
Contents

- Using the System Administration Assistant
- Maintaining the System Administration Assistant
- Configuring the System Administration Assistant

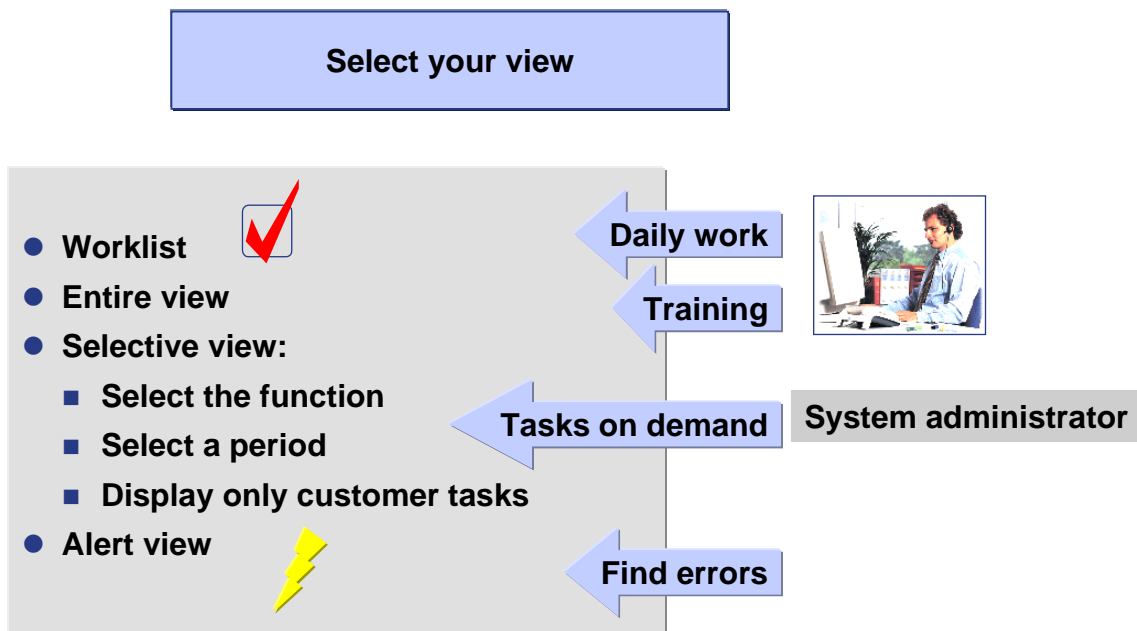
Objectives

At the end of this unit, you will be able to:

- Use the System Administration Assistant
- Maintain the System Administration Assistant
- Configure the System Administration Assistant

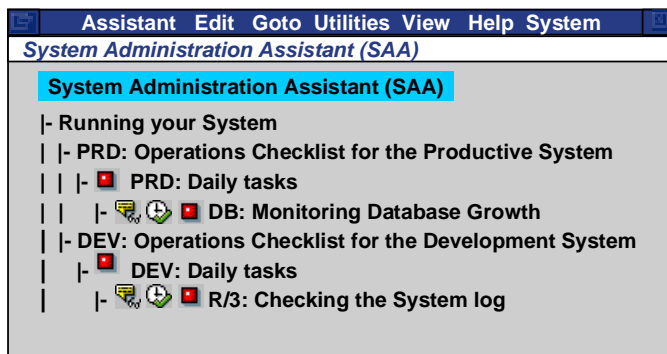


- The main tasks of a system administrator are to:
 - Perform all periodic tasks to check system health
 - Perform tasks as required (such as “Add user”)
 - Watch the system for error and alert situations
- All the periodic and occasional tasks of a system administrator can be performed using the System Administration Assistant (transaction SSAA)
- The System Administration Assistant provides a single point of control for the entire system landscape.



■ The System Administration Assistant features:

- **Worklist**
 - Display only tasks that must be done today
 - For use during daily operation
- **Entire view**
 - Display all tasks
 - For training
 - To find an occasional task
- **Selective view**
 - Display tasks by function or by period
 - Reduce the list and display only customer tasks
- **Alert view**
 - Display only tasks for which an alert determination is defined
 - Display critical tasks after execution of all daily tasks



- Only tasks that should be done today are displayed
- Tasks that are done are not displayed when calling the System Administration Assistant
- Tasks can be flagged as done
- Task status can be reset

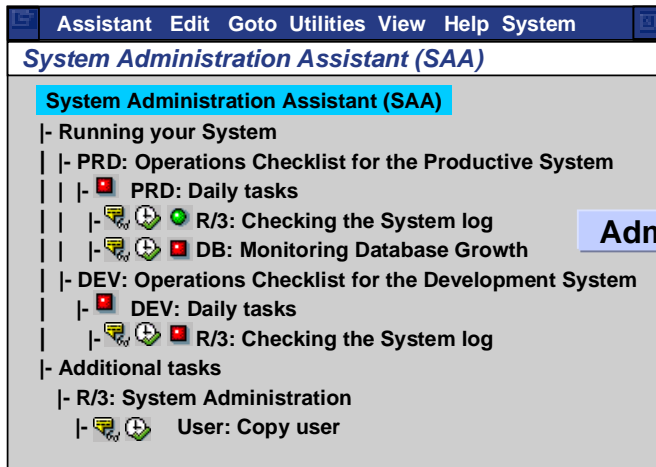
- Worklists only contain the tasks that must be done today.
- You can reset the status of a task:
 - If not all task activities are done
 - If you want to start the task more than once
- You can flag a task as done:
 - If a periodic task was done earlier than planned
 - If more than one task leads to the same transaction and all tasks were done when the transaction was called the first time.
- View Worklist is available as of Release 4.6B.

Using the System Administration Assistant

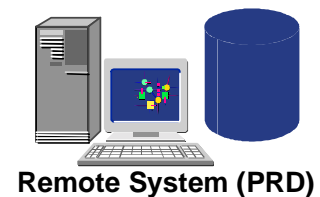
SAP

Use the System Administration Assistant (transaction SSAA)

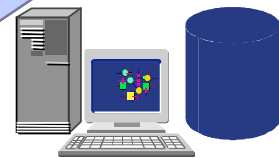
- To perform *periodic tasks*
- To perform *occasional tasks*



Administer



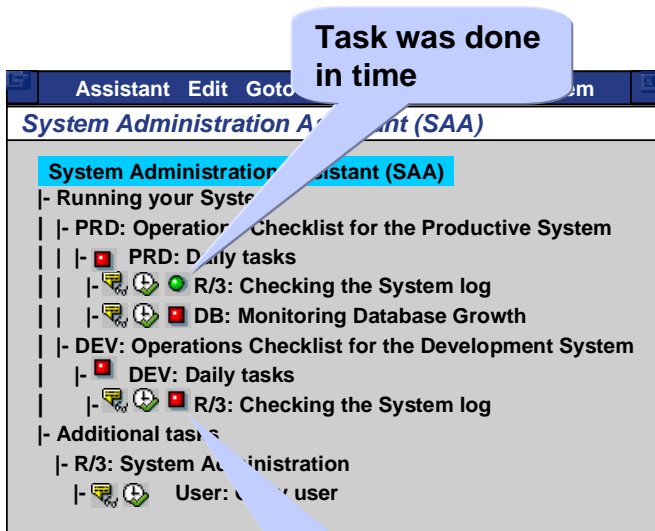
Remote System (PRD)



Local System (DEV)

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- Transaction SSAA is an administration tool for performing the most important administrative tasks.
- The System Administration Assistant contains a set of periodic tasks preconfigured
 - For a development system
 - For a production system
- The tasks are grouped by period. In a development system, there are relatively few periodic tasks to perform. In a production system, there are many periodic tasks that are designed to prevent system errors or downtime. Therefore, the period of a task in a development system can be different from that of the same task in a production system. Also, the tree structure in a production system is more complex than that in a development system, and paths to the same transactions are sometimes different.
- The System Administration Assistant also contains:
 - Tasks requested by users
 - Tasks that should be done at irregular intervals.
- All tasks are presented in one tool. You do not need to navigate to different menus.

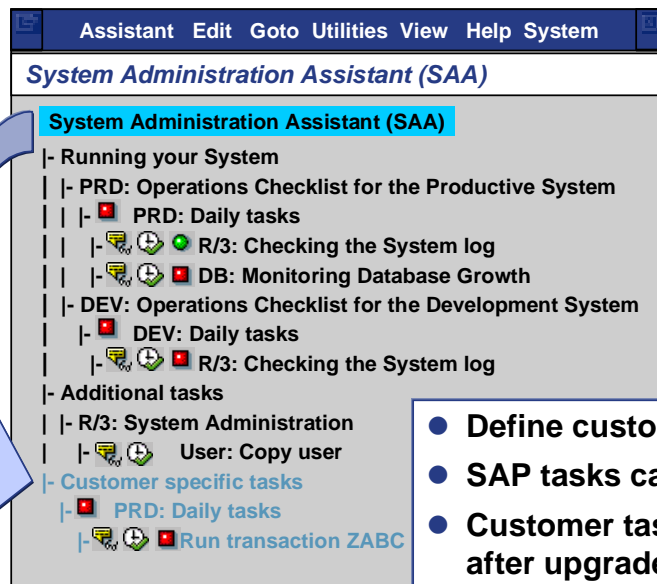


The status displays:

- Tasks that are already done
- Tasks that must be done today

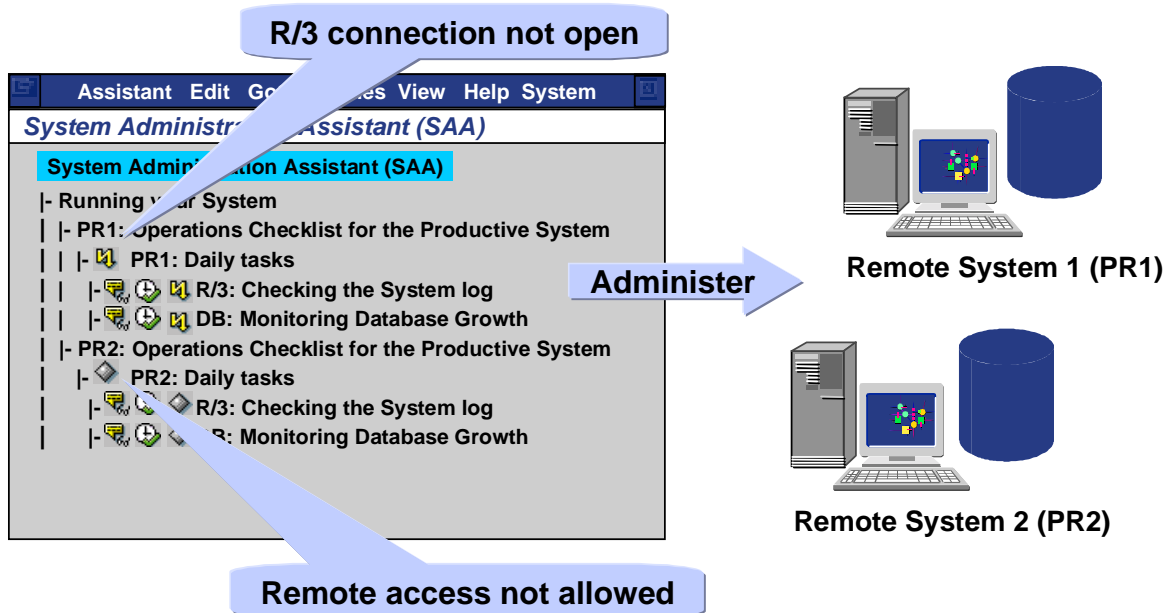
Occasional tasks have no status information

- Status information for periodic tasks is displayed by a light:
 - Green if the task was done in time.
 - Red if the task must be done today.
- To see date and user of the last execution, select the green or red light.
- Occasional tasks do not have any status information.
- The status is set after execution of a task.
- If remote access is allowed, status information is also available for remote systems.

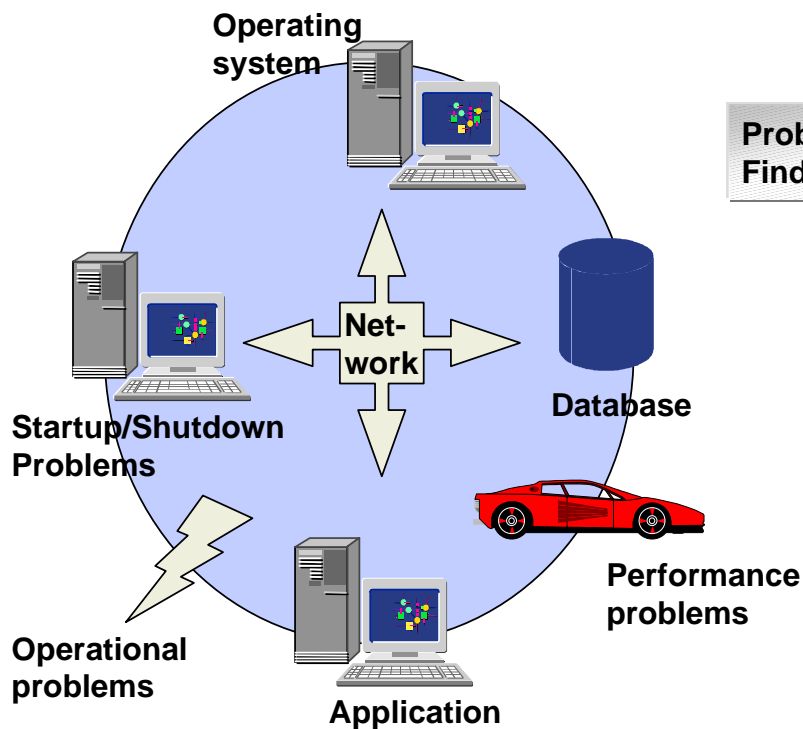


- Define customer-specific tasks
- SAP tasks can be used as template
- Customer tasks remain unchanged after upgrade
- SAP tasks cannot be modified in customer systems

- You can add new customer tasks at the end of the list by defining your own customer subtree below the first node.
- If necessary, copy SAP tasks to the customer subtree.
- If tasks are added or copied, they inherit some attributes of the father node (such as period, function, operating system dependence, database dependence, and system dependence). These attributes define the structure of subtrees.
- You cannot modify SAP tasks in customer systems.
- Starting with Release 4.6B:
 - A customer tree is offered automatically.
 - You can define your own customer subtrees depending on customer namespaces.
- For further information on this topic, see Appendix 2.



- When the System Administration Assistant is used in a system landscape, the status information for the remote systems is displayed with:
 - A green light if the task was done in time
 - A red light if the task must be done today
 - A gray light if no remote access is allowed for the system
 - A yellow flash if the R/3 connection is down
- For further information on this topic, see Appendix 2.
- As of Release 4.6B, you can use the SAA to administer your entire system landscape as configured in TMS.



**Problem occurred:
Find the solution or a hint**

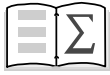


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- The troubleshooting guide has been developed to help you administer your R/3 System. It helps you to find the solutions to some common problems as well as to analyze unusual difficulties.
- The guide offers a "roadmap" view of problems. You can use this structured roadmap to analyze the problem through a question-and-answer procedure. You can also use the technical views to go directly to the area that you suspect is causing the problem.
- To find the Troubleshooting Roadmap, choose *Running your system* → *Troubleshooting, Service and Support* → *Troubleshooting*

Object	Fields	Value	Meaning
System Admin. Assistant (S_SAA_ADMI)	Administrator functions in System Admin. Assistant	ADM PROJ USER	<p>Administrator authorization: display and execute SSAA, define and maintain new entries</p> <p>Project manager authorization: display and execute all tasks in the customizing / development areas and client-specific entries</p> <p>Use authorization: display and execute all tasks in the development and Customizing areas that have been assigned to members of the implementation team.</p>

Transaction SSAA allows you to go directly to other transactions, so you also need authorization for any transactions you want to call from the System Administration Assistant



Now you are able to:

- **Work with the System Administration Assistant**
- **Interpret status information**
- **Maintain the System Administration Assistant**
- **Configure the System Administration Assistant**



- **SAP Online Documentation:**

- Use the help icon

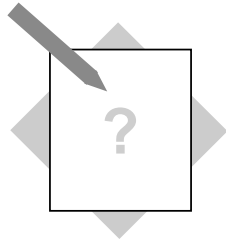


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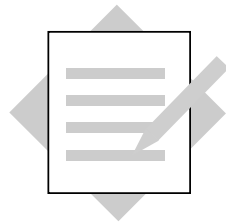
- Use the *Help Assistant* for detailed information on the main topics



4.6B



- **Exercises**



- **Solutions**

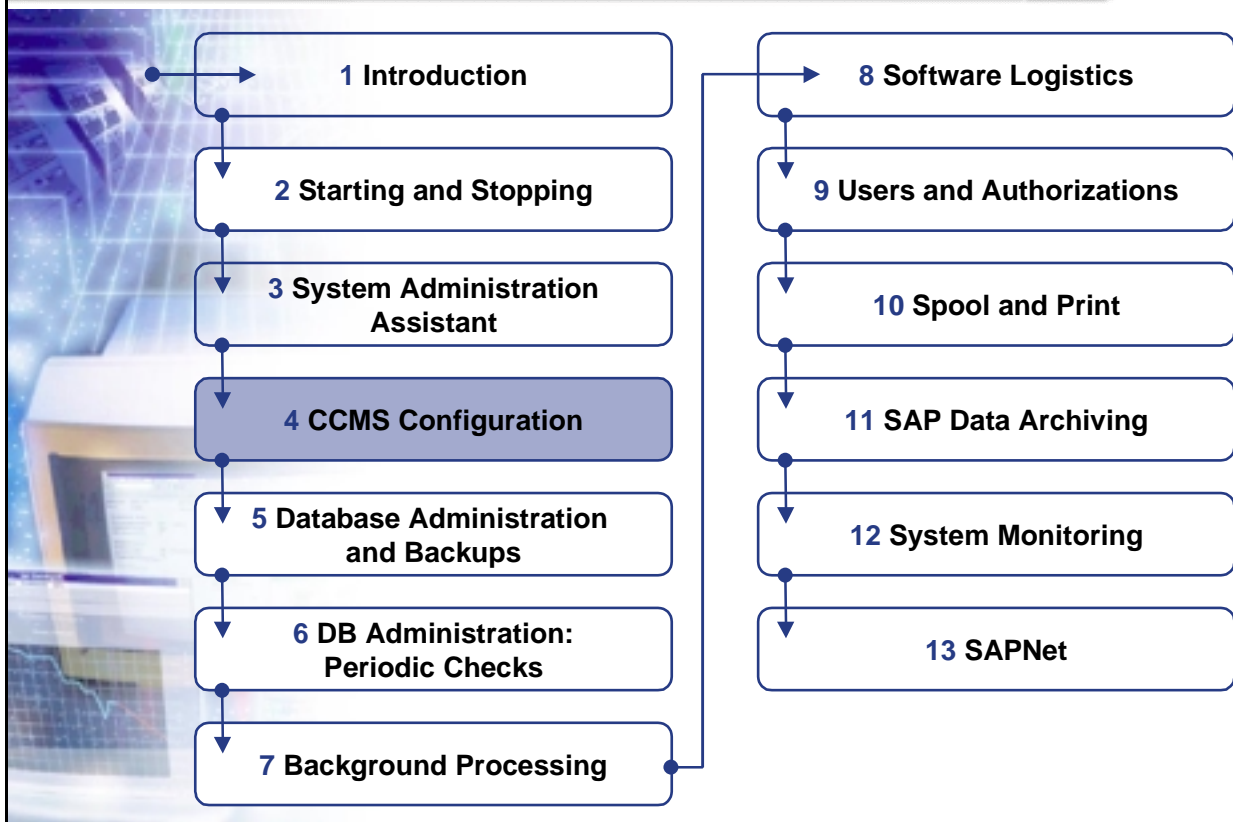
System Administration Assistant: Exercises

No.	Exercise
1	Working with the System Administration Assistant
1.1	Start the System Administration Assistant (SAA). Which views are available? Select the view that displays the complete administration tree and display this tree.
1.2	Confirm that (because TMS is configured) the SAA offers you a suggested system landscape for administration. System DEV is treated as a test system, QAS as a production system. What consequences does this have for the administration tree? (Compare subtrees DEV and QAS.)
1.3	Expand the tree of your local system. Where do you find the task <i>SAP: Checking the System Log</i> for systems DEV and QAS? Why is there a difference? Choose <i>Execute</i> . What happens?
1.4	Start the Troubleshooting Roadmap.
2	Administer a System Landscape from the SAA In this exercise, you learn how to configure the SAA so that you can administer both systems of your system landscape from the system you are logged into.
2.1	Verify the current settings by choosing <i>Utilities → Check system landscape</i> . If necessary, change <i>Test system name</i> to <i>DEV</i> and <i>Production system name</i> to <i>QAS</i> . (You cannot include a virtual system such as PRD.)
2.2	Enable remote access to the remote system by choosing <i>Utilities → Define remote access</i> . Which changes do you see in the administration tree?
2.3	Choose <i>Utilities → Check R/3 connection</i> . Maintain the fields in the dialog box that appears (an RFC destination for remote access is created from this data).
2.4	Expand the subtree for the remote system and execute task <i>SAP: Checking the System Log</i> . What happens?

System Administration Assistant: Solutions

No.	Solution
1	Working with the System Administration Assistant
1.1	Call transaction SSAA. The tabs shows the available views: <i>Worklist</i> , <i>Entire view</i> , <i>Selective view</i> , and <i>Alert view</i> . <i>Entire view</i> displays the whole tree for system administration. Select tab <i>Entire view</i> and choose <i>Display tasks</i> .
1.2	When you choose <i>Display tasks</i> for the first time, a dialog box presents a suggested configuration for your system landscape. Choose <i>Save</i> . Because system DEV is defined as a test system and system QAS is defined as a production system in the SAA, the tree shows different subtrees for systems DEV and QAS. Subtree DEV has fewer daily tasks than subtree QAS, and the entire subtree for system DEV contains fewer tasks than subtree QAS. The icons beside the remote systems show that no information is currently available from the remote system.
1.3	<p>Subtree DEV:</p> <p>Choose <i>Running your system</i> → <i>DEV</i> → <i>DEV: Unscheduled/Occasional Tasks</i> → <i>SAP: Checking the System Log</i></p> <p>In a test system, you do not normally take a daily look at the system log.</p> <p>Subtree QAS:</p> <p>Choose <i>Running your system</i> → <i>QAS</i> → <i>QAS: Daily Tasks</i> → <i>SAP: Checking the System Log</i></p> <p>In a production system, you must monitor the system log daily (QAS is defined as a production system in SAA).</p> <p>Choose <i>Execute</i>. This takes you directly to the system log (transaction SM21). To go back to the SAA, choose <i>Back</i>.</p>
1.4	Choose <i>Running your system</i> → <i>Troubleshooting, Service, and Support</i> → <i>Troubleshooting</i> . Choose <i>Execute</i> . Now you see the initial screen of the Troubleshooting Roadmap. From here, you can perform a structured analysis of problems in different areas.
2	<p>Administer a System Landscape from the SAA</p> <p>To configure SAA for your entire system landscape, perform the following steps.</p>
2.1	In the SAA, choose <i>Entire view</i> and <i>Display Tasks</i> . From the next screen, choose <i>Utilities</i> → <i>Check system landscape</i> to verify that DEV is configured as test system and QAS as production system. If necessary, use the pencil icon and <i>Save</i> to adapt the current settings. If the settings are already correct, choose <i>Continue</i> .
2.2	Choose <i>Utilities</i> → <i>Define remote access</i> and flag <i>Remote</i> for the remote target system. Save these settings. In the next dialog box, choose <i>Continue</i> . Expand the tree <i>Running your system</i> → <i><SID of the remote system></i> and

	notice that the color of the icons has changed from gray to red (this indicates that the status has changed from <i>No information (no remote access)</i> to <i>Function must be executed</i>).
2.3	<p>To define the necessary data for remote access to the remote system, choose <i>Utilities</i> → <i>Check R/3 connection</i>. In the next dialog box, fill in the following data:</p> <p>System number: If remote system is DEV, 00 If remote system is QAS, 10</p> <p>Server: <hostname of your local system> (because DEV and QAS are on the same hardware installed in the training environment)</p> <p>Client: 200</p> <p>Save these settings. A dialog box appears: enter a valid user and password for the remote system (client 200). In the next dialog box, choose <i>Continue</i>. Restart transaction SSAA.</p>
2.4	Expand the subtree of the remote system and execute <i>SAP: Checking the System Log</i> . This takes you directly to transaction <i>System log</i> on the remote system.





Contents

- Setting up the CCMS
 - Starting and stopping instances with the CCMS
-

Objectives

At the end of this unit, you will be able to:

- Set up the CCMS:
 - Import and maintain profiles
 - Define operation modes
 - Maintain instance definitions
 - Schedule operation modes
- Start and stop instances with the CCMS

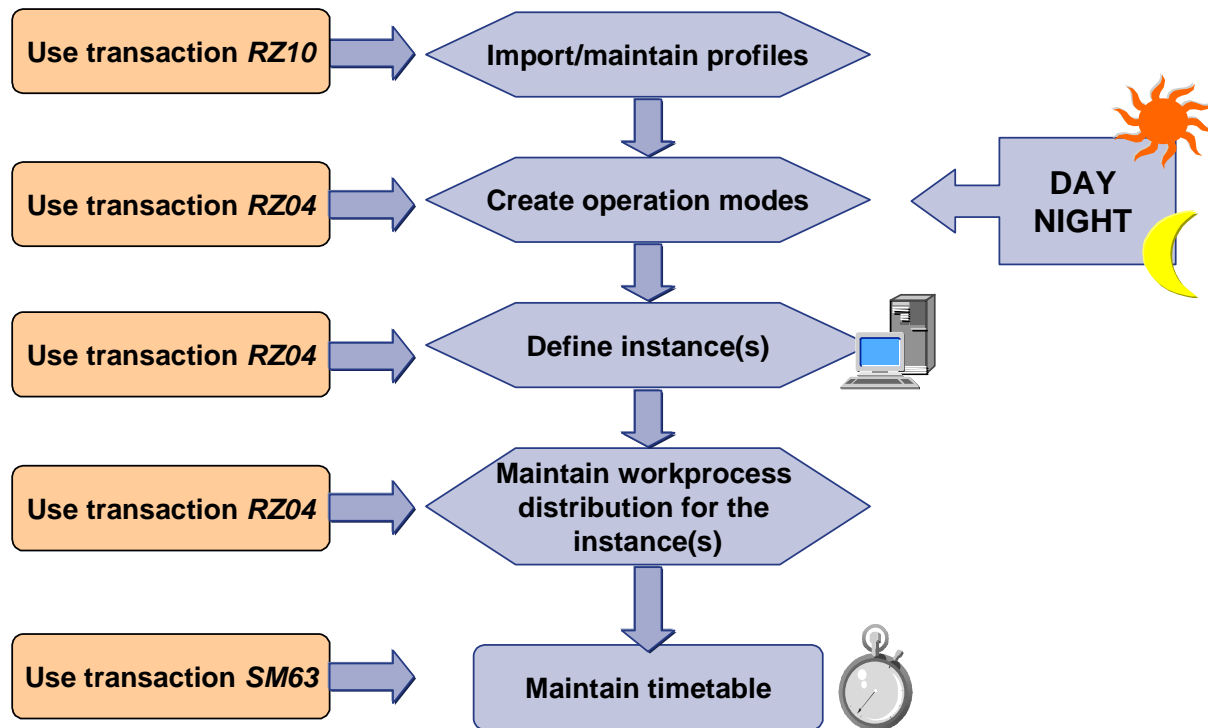
- **The Computing Center Management System (CCMS) allows you to monitor, control, and configure R/3**
- **It provides functions for:**
 - **Profile maintenance**
 - **Unattended 24-hour system management using operation modes, instance definitions, and scheduling**
 - **Starting and stopping instances**
 - **Processing and controlling background jobs, scheduling database backups**
 - **Automatic reporting of system alerts**
 - **Dynamic logon load balancing**
 - **System and network monitoring and analysis**

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- The Computing Center Management System (CCMS) is an integral part of the R/3 Basis. CCMS provides tools for managing:
 - R/3 System and performance
 - Database and archiving
 - Workload
 - Output
 - Security
- You can use the CCMS to analyze and distribute client workloads and report on resource consumption for system components. The CCMS also provides graphical monitors and management utilities.
- CCMS provides 24-hour unattended system management functions from within R/3 through operation modes and instances.

Setting Up the CCMS

SAP

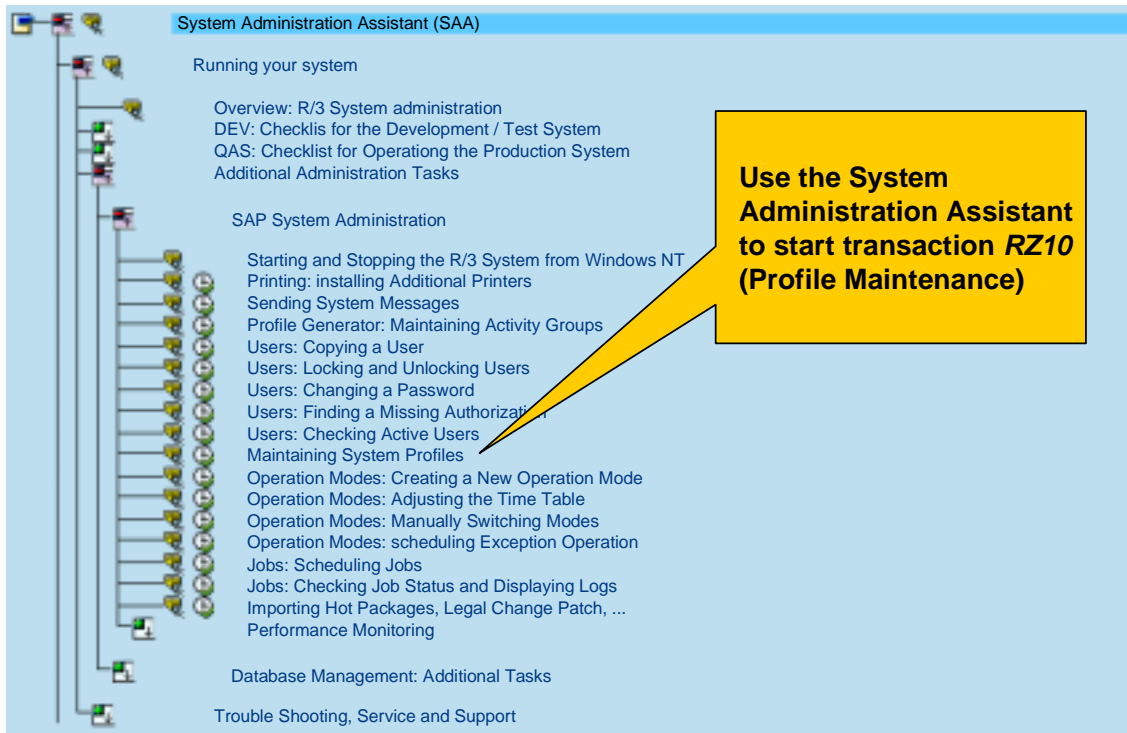


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- Before you can work with the CCMS, it must be configured set up correctly for your environment. How you initially configure the CCMS largely determines the consistency and accuracy of its functioning.
- Set up the CCMS in the following steps:
 - Maintain R/3 profiles. Normally, you import the profiles of all active servers after installation. They are then automatically saved to the database and activated.
 - Define at least one operation mode.
 - Generate instance definitions for the instances created during R/3 System installation.
 - If necessary, assign instance definitions to operation modes and adapt the work process distribution.
 - Define the timetable for normal operation for a full 24-hour cycle.
- If operation modes, instances, or timetable are not correctly defined, the CCMS may display incorrect data.

Using the System Administration Assistant

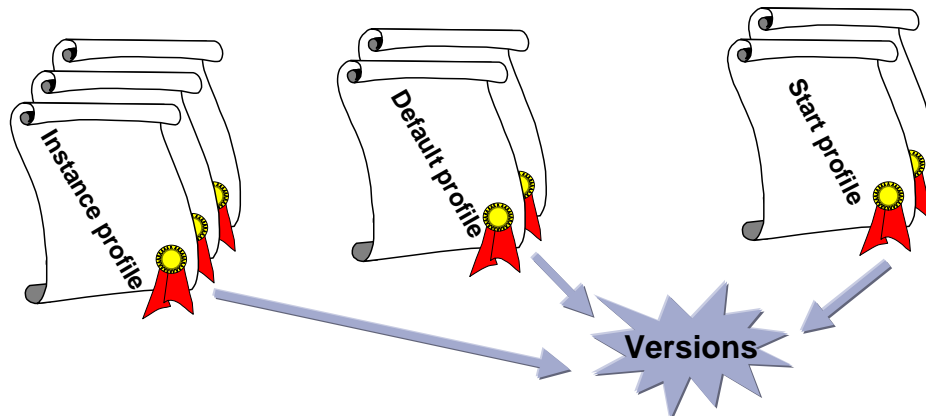
SAP



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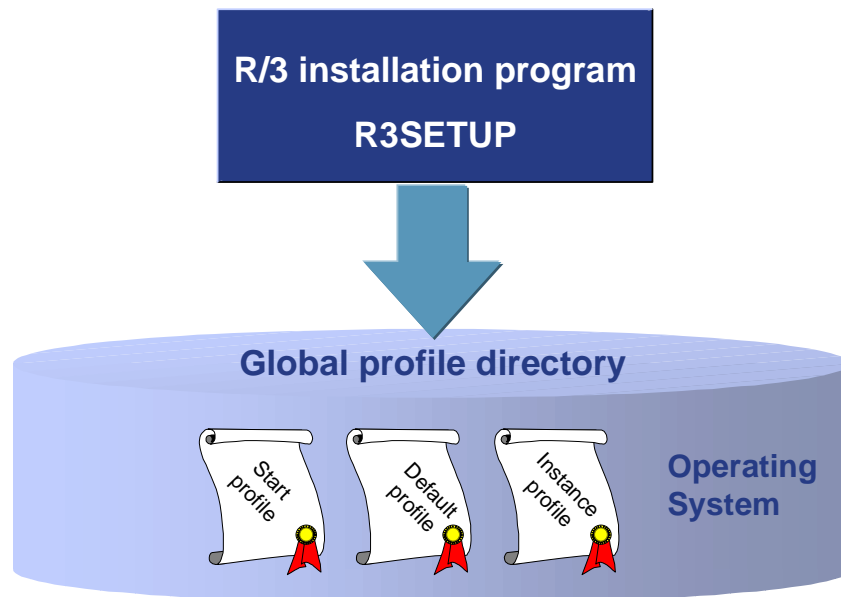
- You can use the System Administration Assistant to go directly to transaction *RZ10* in order to maintain your system profiles.

- **Used for maintenance of all R/3 profiles:**



- **Allows you to change profile parameters using basic mode or extended mode**
- **Lets you list the active parameters of application servers**

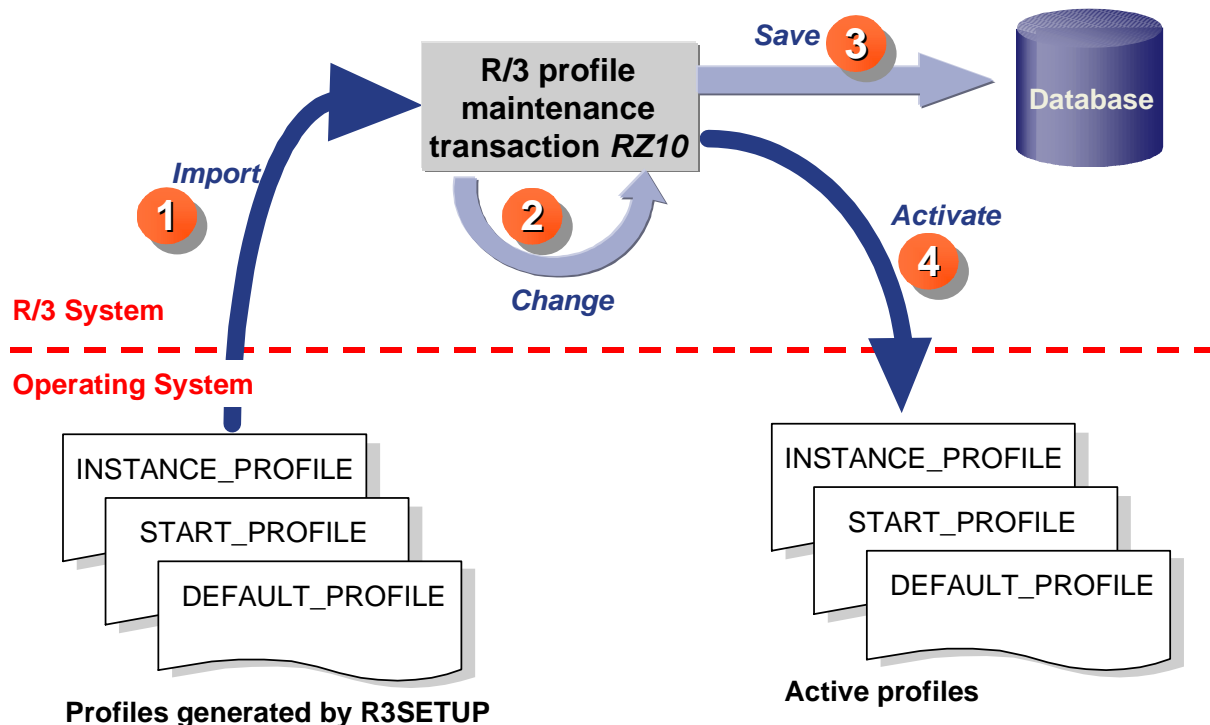
- Before you set up your R/3 operating modes, import R/3 profiles using transaction RZ10. This transaction is the CCMS tool for R/3 profile maintenance. You can either call it directly, use the System Administration Assistant or, from the main R/3 menu, choose *Tools* → *CCMS* → *Configuration* → *Profile Maintenance*.
- In transaction RZ10, you can display administrative data for each profile, including profile name, type, version, operating system file, reference server, and modification and activation data.
- There are two modes for editing profiles:
 - In basic mode, you can edit a set of parameters that are changed most frequently. You do not need to know the technical parameter names. Interdependent parameters are grouped together. If you change a parameter, any parameters that depend on it are adjusted automatically.
 - In extended mode, you can use a editing tool. You need to know the technical names of parameters and their dependencies.
- Additionally, you can delete a single version or all versions of a profile, compare profiles in the database with active profiles, and check profiles in various ways.



- The profile parameter values corresponding to resources (such as main memory, start profile, and instance profile) are created automatically during R/3 installation by the R/3 installation program R3SETUP.
- When the first R/3 instance is installed, a default profile is generated in addition to the start profile and the instance profile. During installation of subsequent instances, the existing default profile is updated. When the installation is complete, the profiles are used as parameter files for the R/3 instances and the instances are started using the values of the parameters in these profiles.
- R3SETUP assigns shared memory on the server where the R/3 instance is installed.
- In a distributed R/3 environment consisting of application servers of the same platform type, you should set up a global profile directory in a shared file system.
- If you set parameters to incorrect values, you may find that your instances do not start. Always take care when changing parameter values and save the last version of your profiles.

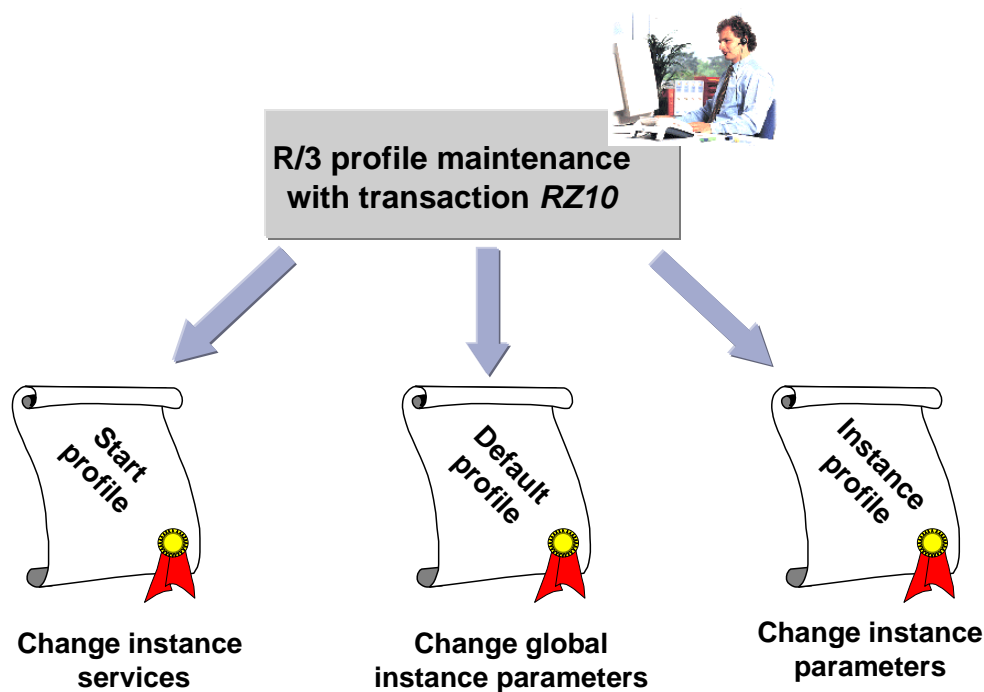
Maintaining R/3 Profiles

SAP



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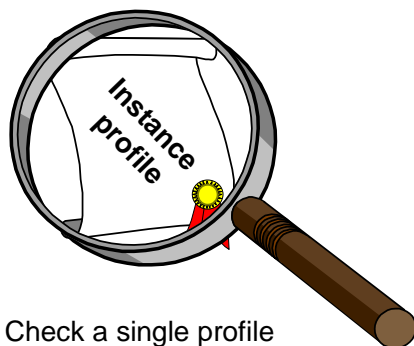
- After installation, profiles are stored at operating system level. Before you can change profiles for different application servers from a single screen, you must store the profiles in the database. To import them into R/3, from the profile maintenance screen, choose *Utilities* → *Import profiles* → *Of active servers*. All three types of profiles are imported and a first check on parameters is performed. The profiles are automatically saved in the R/3 database and are activated when they are written back to the operating system level. If you import single profile files or create profiles, you must check, save, and activate the profiles manually.
- You can also create and maintain several profiles in the database under the same name, by assigning different version numbers to different files. Each time you save an altered profile, a separate version is created. The database thus contains mirrored operating system profile files, old versions, modification histories, and parameter documentation.
- The R/3 application server is always started using the profile file at the operating system level. A profile consists of two logical parts: entries in database tables and an operating system file in the global profile directory. To activate a profile, you must write it to the operating system level and restart the R/3 System. When you activate a profile from the database, if another profile file exists with the same name, a dialog box asks you to confirm that you want to overwrite the previous file. Additionally, a backup file is written. When the profile is activated, a header is inserted in the operating system file, containing the name of the profile, the user who modified the profile, and date and time of the change. You can only activate the most recent version of a profile.



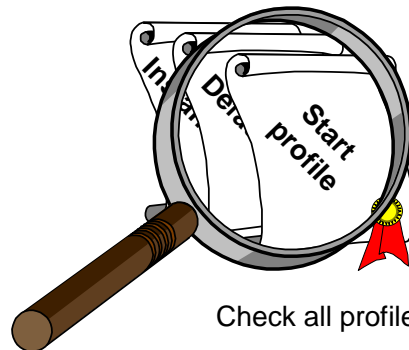
- In almost all cases, you should use the standard profile parameter values proposed by the system. Before changing the standard values, you should obtain the agreement of SAP or a SAP partner. For example, the EarlyWatch service may recommend changing certain parameter settings. You may need to change the standard settings for the following reasons:
 - To start or delete an additional SAP service process on a given computer, for example, a message service (in this case, change the start profile)
 - To change a global system parameter that is valid for all instances, for example, if you want to move the R/3 database from one computer to another to improve performance (in this case, change the default profile)
 - To change a parameter value for an R/3 instance, for example, the number of background work processes (in this case, change the instance profile used at startup)
- Before you leave either the basic or the extended maintenance mode, profiles changes are checked automatically and any errors or inconsistencies are displayed. After activation, all parameter changes are documented in the operating system file.
- When you modify profile parameters, the changes do not take effect immediately. Dynamic switching (activation of parameters without system restart) is possible only for the memory management parameters of an instance profile.

Checking and Comparing R/3 Profiles

SAP

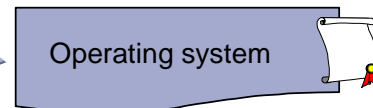
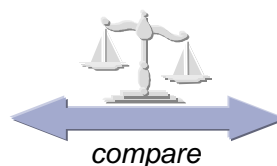


Check a single profile



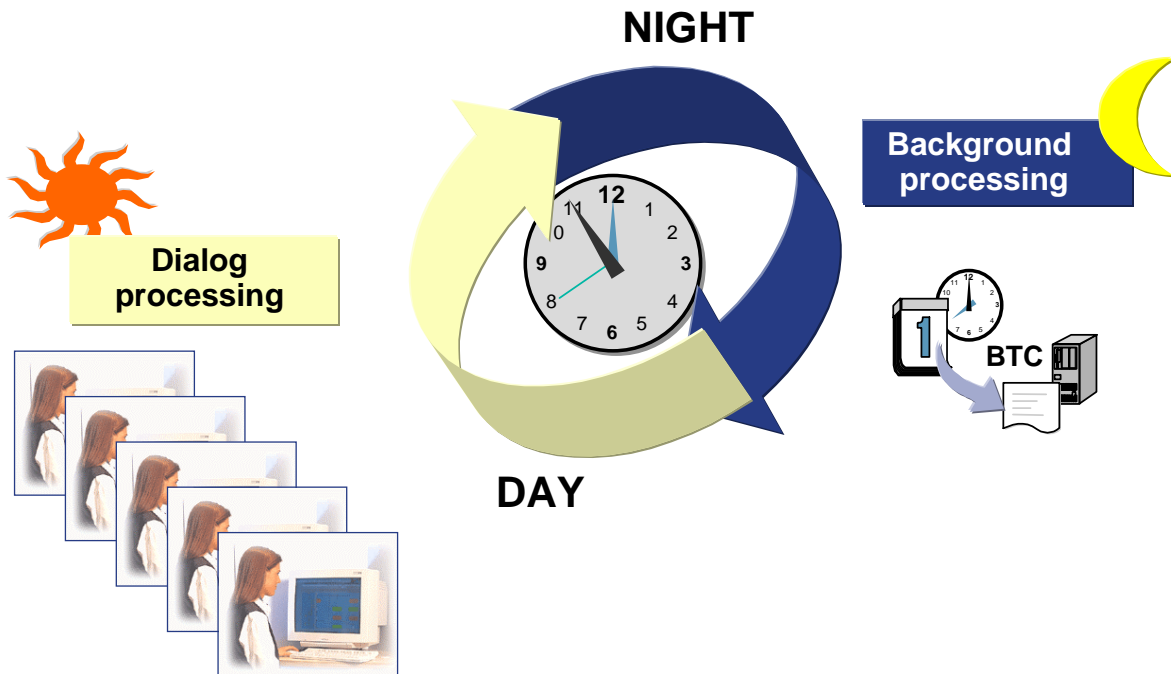
Check all profiles

**R/3 profile
maintenance
(transaction RZ10)**



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- You can carry out extensive health checks for one or more profiles. You can check profile syntax, the spelling of parameter names, and semantics. When you run these checks, a log is generated for any warnings and error messages.
- When you check single profiles, the parameters are divided into classes. For each class, there is a separate check rule. For example, the check rule for parameter class *time value* reports an error if the value of a parameter in this class (such as *rdisp/btctime*) is less than 0.
- When you check all profiles, you can also check whether all profiles of one type used in an R/3 System are consistent with each other. For example, all start profiles can be checked to see whether exactly one message server is started, or all instance profiles can be checked to see whether an enqueue work process was configured. You can check either all profiles of active servers or all profiles in operation modes.
- After an application server has been started, an automatic check is performed to see whether the server's profile data as stored in the database still matches the active profiles at operating system level. If this is not the case, an alert is triggered in the Alert Monitor. This allows you to determine whether the operating system files have been changed manually. You can also perform this check manually.
- Parameter attributes and documentation are available in transaction *RZ11*.

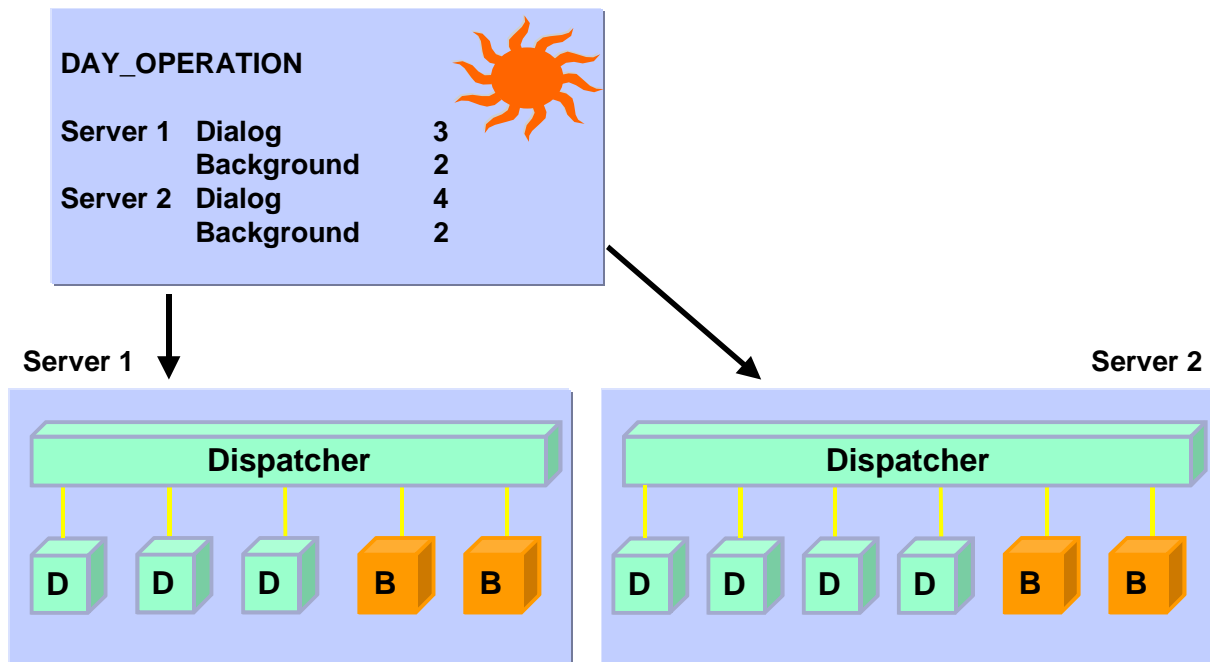


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- Typically, customers require more dialog processes during the day and more background processes during the night. To adjust the proportions of the various R/3 work processes to suit different phases of system activity, you can:
 - Maintain the instance profile and restart the system (for unusual changes)
 - Define operation modes and use the operation mode switch (for daily changes)
- Operation modes optimize system resources for different phases of system activity. Operation mode switching reconfigures your R/3 System dynamically, so you do not need to change the instance profiles for your server and you experience no system downtime.
- An operation mode configures the use of resources for all the instances in your R/3 System based on:
 - The services or work processes you need
 - The time interval you choose

Choosing an Operation Mode 1

SAP

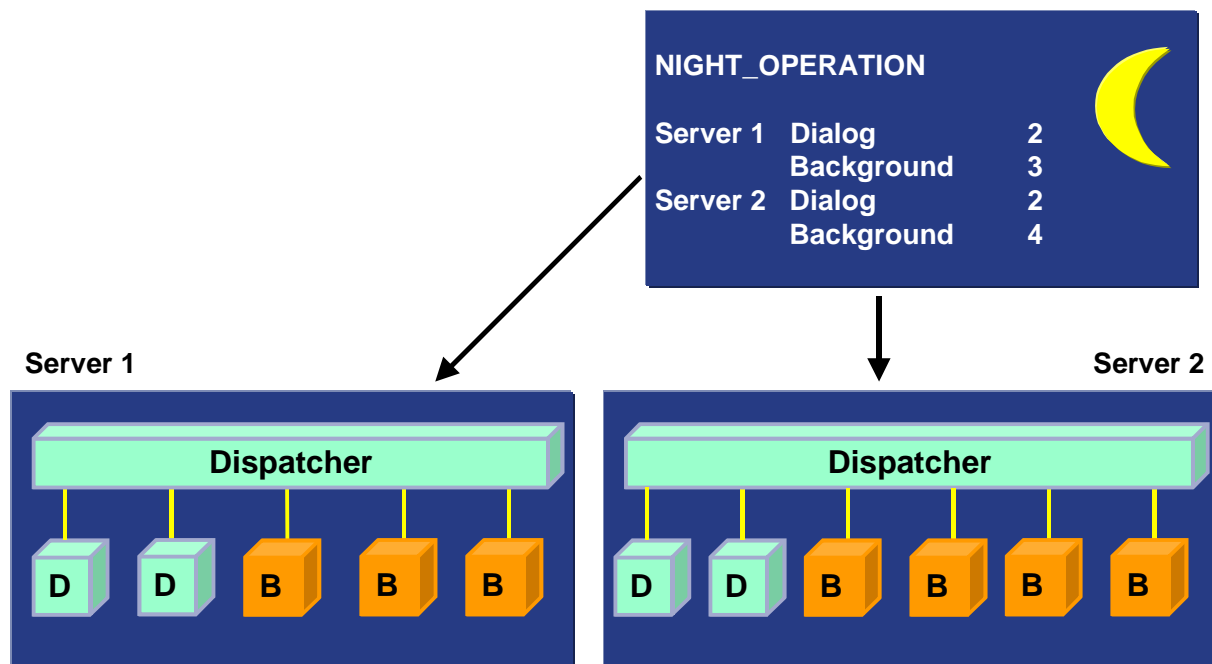


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- Day operation usually requires more dialog processes. Good response times must be guaranteed for important data entry transactions, for example, SD order entry.
- Dialog processing is used for:
 - Interactive processing, such as posting documents or creating sales orders
 - Sending a limited data volume to be inserted and updated in the database
 - User activity with limited transaction steps
 - Time-critical processing

Choosing an Operation Mode 2

SAP

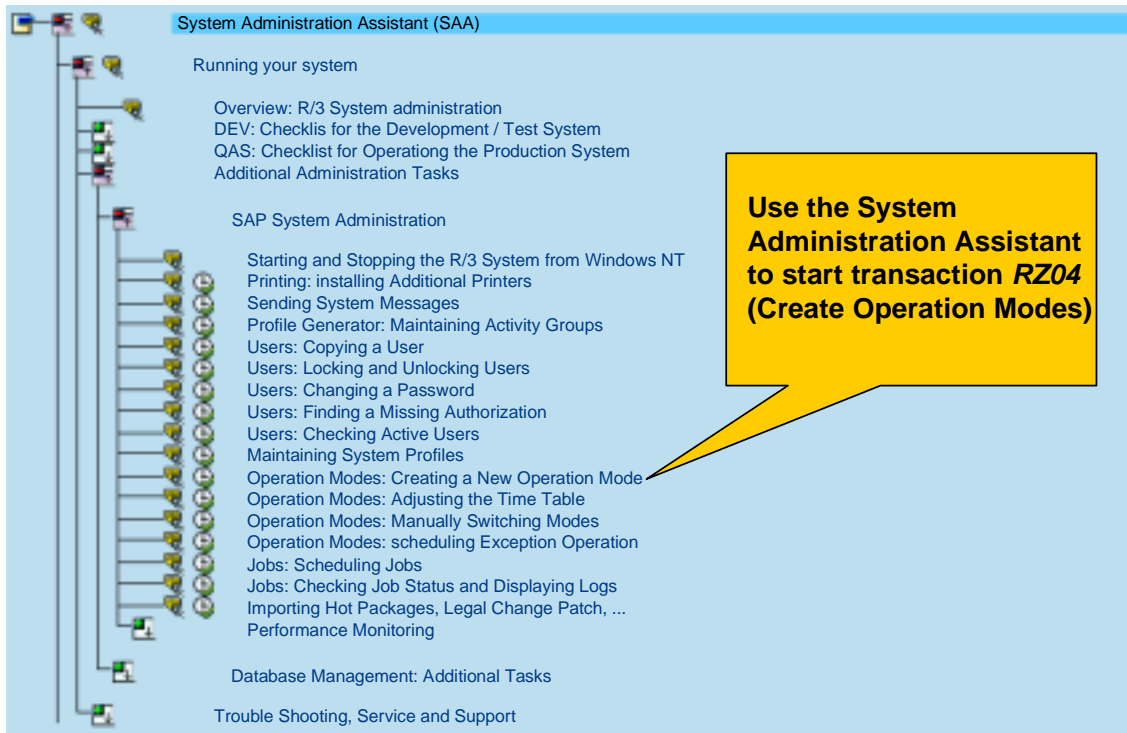


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- Night operation usually requires more background processes. Background processing resources must be available for high priority jobs.
- Background processing is used for tasks requiring database activity that is too time-intensive for dialog processing, such as:
 - Background tasks (list balances, payments, . . .)
 - List processing
 - Periodic processing
 - Inserting and updating large data volumes

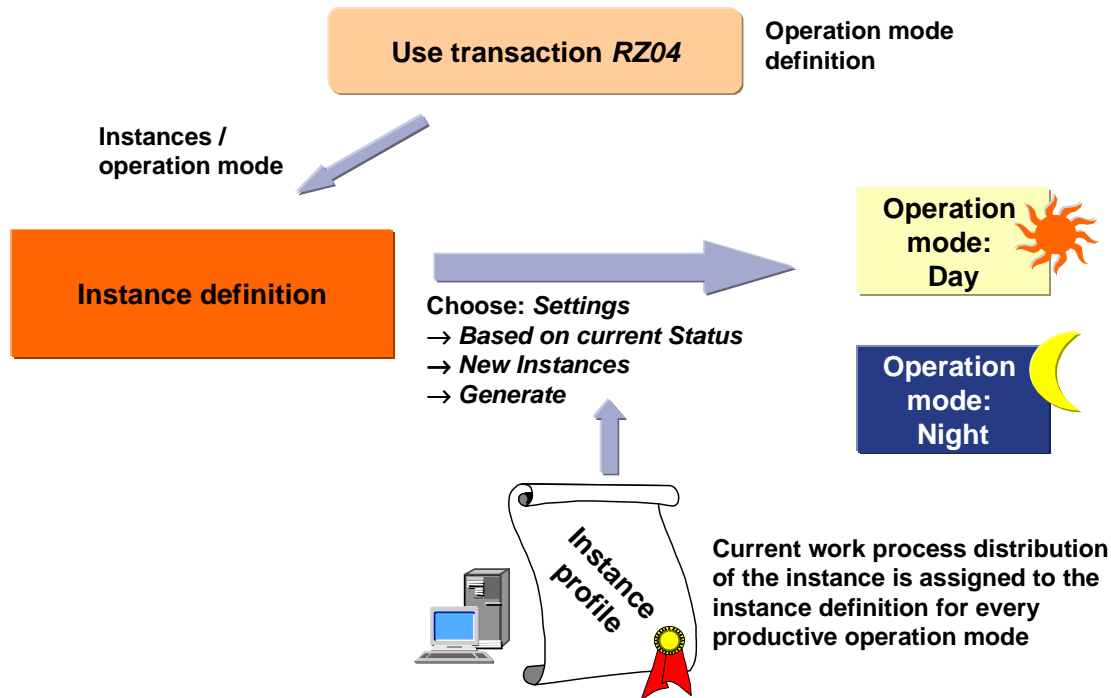
Using the System Administration Assistant

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- You can use the System Administration Assistant to go directly to transaction *RZ04* in order to configure and maintain your operation modes and instances.



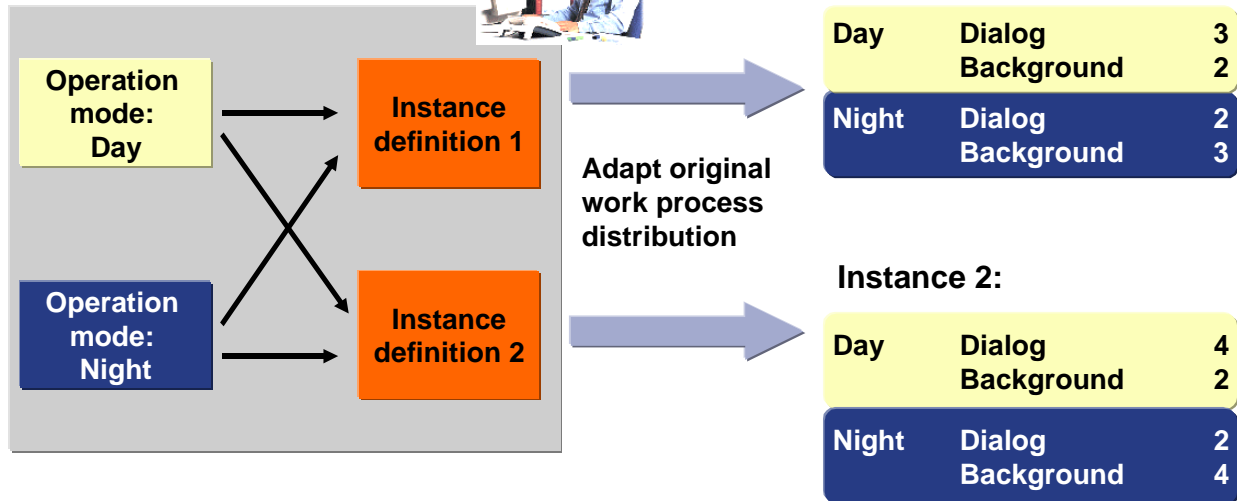
- To set up the CCMS, define at least one operation mode in one of the following ways:
 - Call transaction *RZ04*
 - Use the System Administration Assistant
 - From the main R/3 menu, choose *Tools* → *CCMS* → *Configuration* → *Operation modes/instances*
- If no operation modes have been defined, the test operation mode DUMMY is displayed. Operation mode DUMMY is automatically configured for monitoring system functions, and cannot be used for operation mode switching. That is, it cannot be assigned in a timetable.
- Operation modes can be of type productive or test. Only productive operation modes can be assigned in the timetable.
- Instances are created during R/3 System installation. R3SETUP automatically creates a profile for each R/3 instance.
- Before you can create instance definitions in R/3, you must at least one production operation mode.
- It is not advisable to create instance definitions manually. The CCMS offers two non-manual methods:
 - If you have several servers, you can generate the current instance definition for all the active servers (shown in the graphic).
 - If you have few servers or if you want to add new servers, you can create an instance definition for one server by taking current settings from an active instance.

- When generating instance definitions, the system imports the current instance data of every application server that is active.

Adapting Instance Definitions and Operation Modes



Transaction RZ04

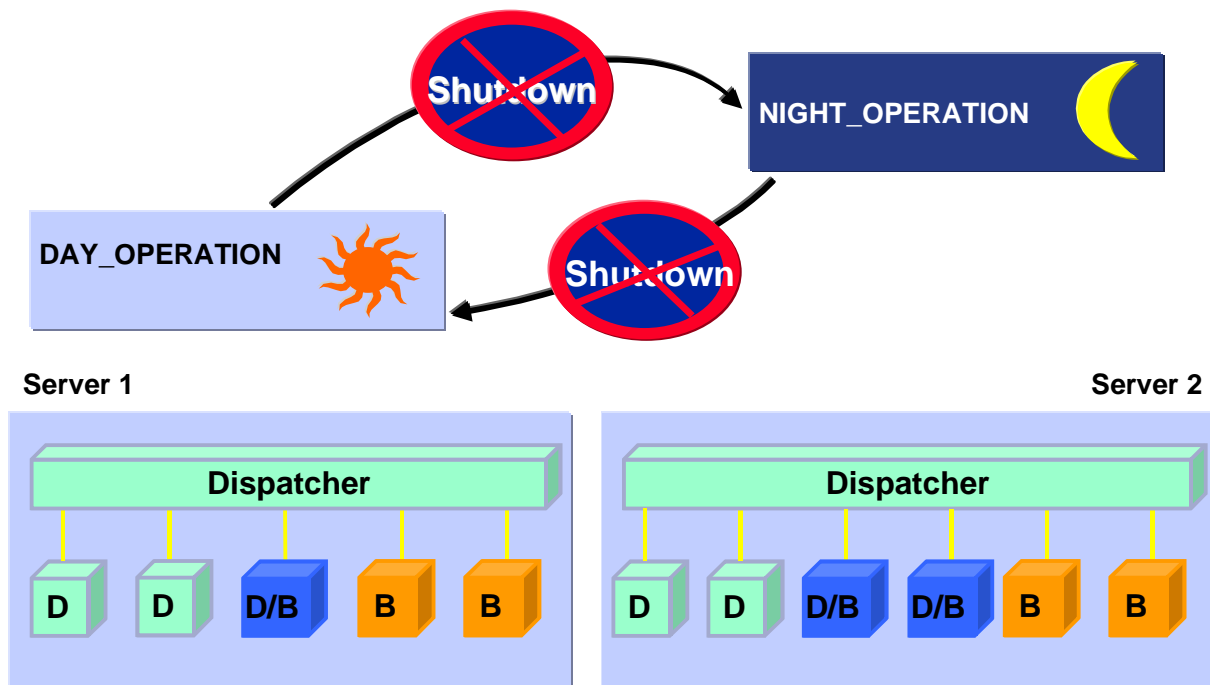


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- If you generate an instance definition by using the current settings from an active instance, each previous production operation mode as well as the current work process distribution of the instance are assigned to the definition.
- If you create a new instance definition that is not based on the current settings of an active instance, you must assign operation modes manually.
- For each assigned operation mode, you can adapt the related work process distribution for the instance definition. You can change the type of work processes. You cannot change the total number of work processes, because it is determined in the instance profile.
- The minimum number of work processes for dialog and also for background processing is 2. The total number of dialog work processes is always the total number of all work processes minus all non-dialog work processes.
- You can reserve one or more background work processes exclusively for high priority jobs (Class A jobs). The reserved background processes are counted in the number of background work processes.

Operation Mode Switch: Advantage

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- When R/3 switches between operation modes, work processes are redistributed automatically, without stopping and restarting the instances. There is no system downtime. Only work process types are changed. The total number of work processes remains unchanged after the operation mode switch.
- If processes still have jobs at switch time, they are switched one by one when the jobs are completed. Thus, normal system operation is not interrupted. No program is cancelled. System performance is maintained, as R/3 buffers such as ABAP buffers and table buffers are not refreshed.
- Operation mode switches are recorded in the system log. The old and the new process type are recorded for each switched work process.

Scheduling Operation Modes

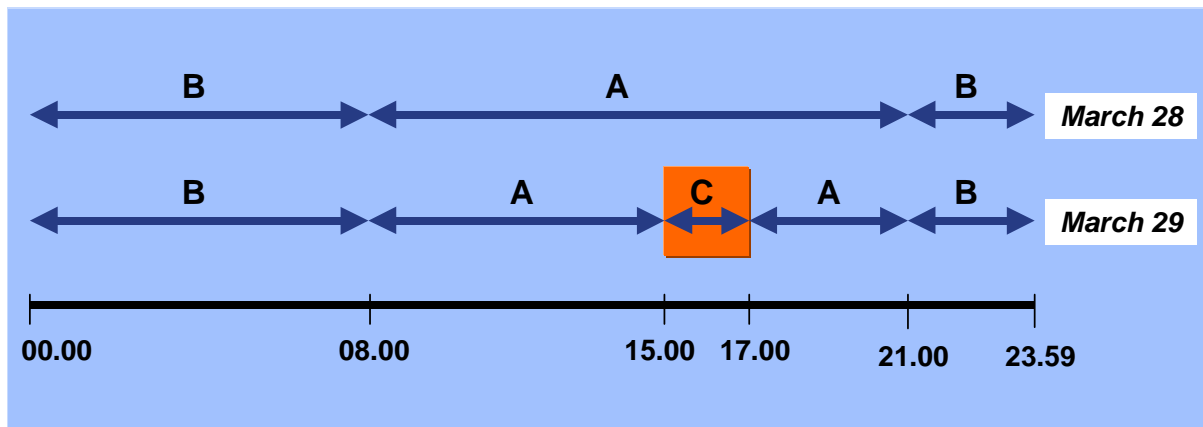
SAP

Timetable for normal operation (24-hour cycle)

08.00 - 21.00	Op. mode A
21.00 - 08.00	Op. mode B

Timetable for exceptional operation on March 29

March 29	
3 p.m. - 4 p.m.	Op. mode C



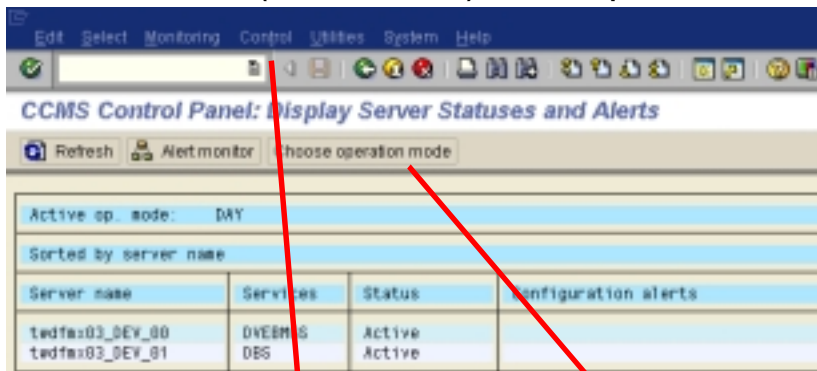
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- The automatic switching of operation modes is controlled by timetables. You must also maintain timetables for CCMS monitoring. Maintain or check the timetables in one of the following ways:
 - Call transaction SM63
 - Use the System Administration Assistant
 - From the main R/3 menu, choose *Tools* → *CCMS* → *Configuration* → *Operation mode calendar*
- The timetable allows scheduling in terms of 24-hour days, divided into intervals of 60, 30, or 15 minutes. You can define normal and exceptional operation.
 - In normal operation, the defined time intervals for operation modes are repeated in a 24-hour cycle. You must schedule a complete period of 24 hours, not just part of a day. Otherwise, problems may occur during operation mode switching.
 - In exceptional operation, the defined time intervals for operation modes are activated once for a specified time period. The timetable has a higher priority than the timetable for normal operation. You can specify part of a day (without defining a 24-hour cycle).
- Only productive operation modes can be switched automatically (that is, entered in a timetable).
- If the timetable for normal operation is not defined, the start configuration according to the profile remains active and no automatic operation mode switch occurs.

Switching Operation Modes Manually

SAP

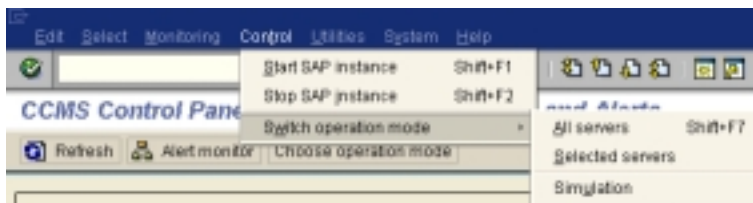
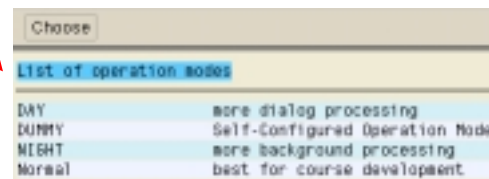
Use the Control Panel (transaction RZ03) to switch operation modes manually:



1 Call transaction RZ03 and select the server you want to switch

Before you can switch to an operation mode, you must select one

2

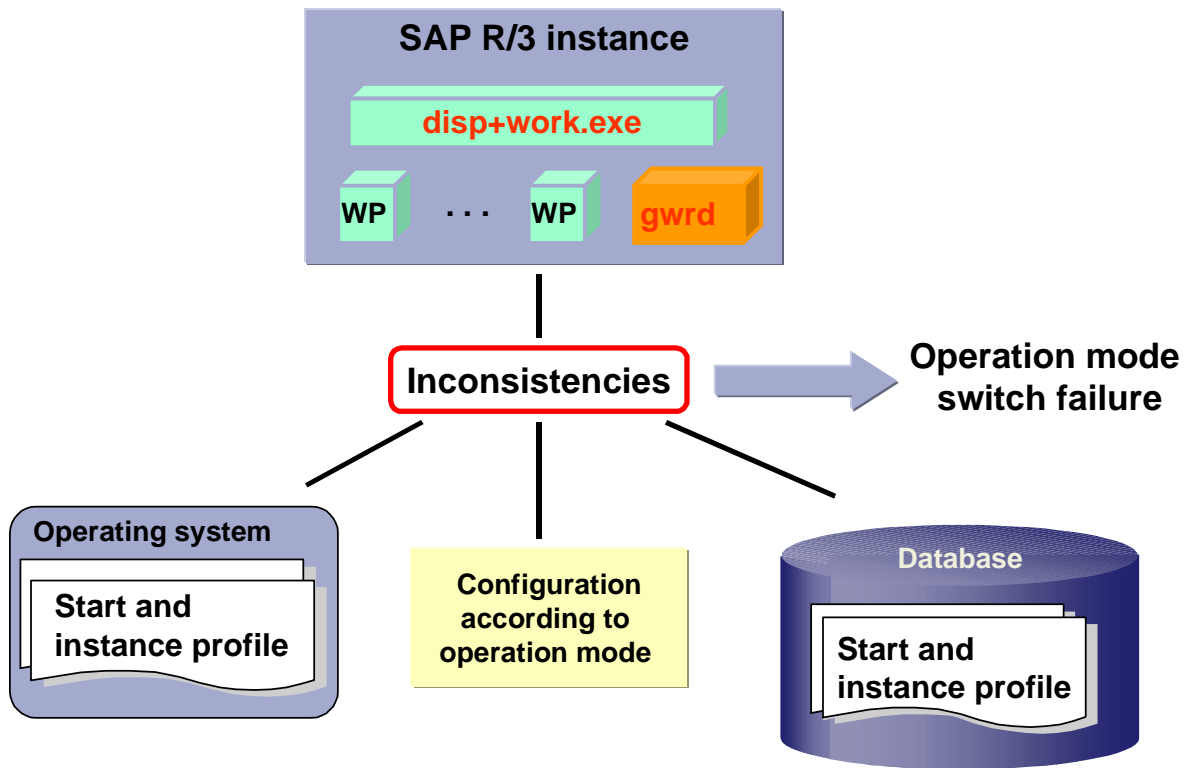


3

Switch the operation mode for one or all servers

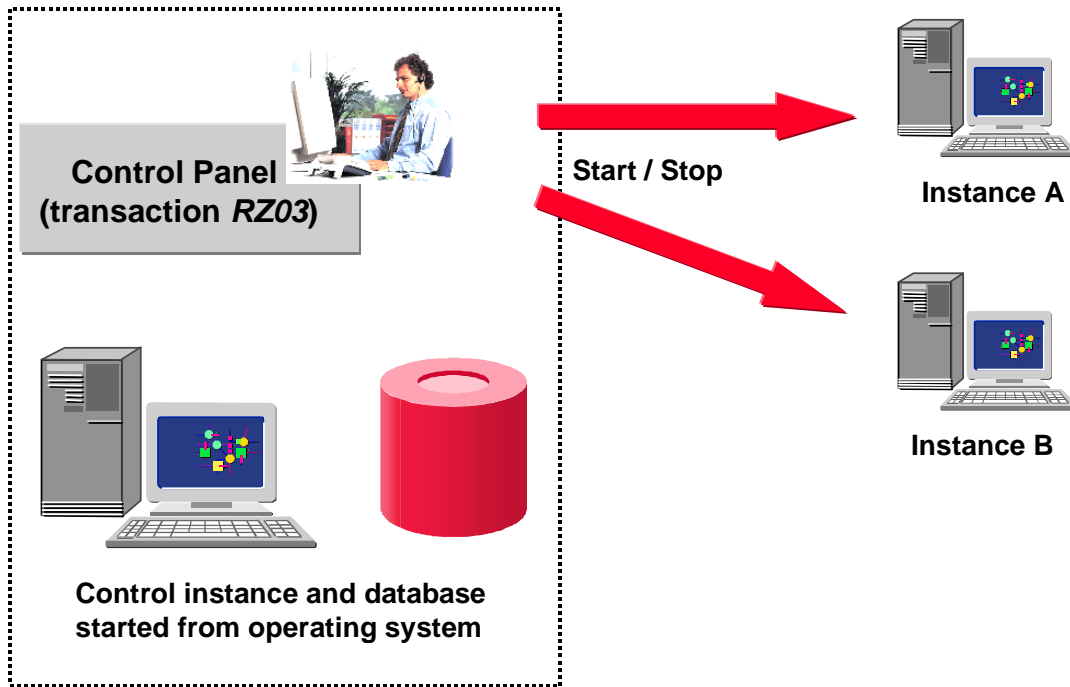
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- Sometimes, you may need to switch operation modes manually. Do so only in exceptional cases, for example, when automatic switching did not work correctly. Either call transaction RZ03 or, from the System Administration Assistant, choose *Entire View* → *Display* → *Running Your System* → *Additional Adminsitration Tasks* → *R/3 System Administration* → *Operation Modes: Manually Switching Modes*.
- From the control panel, you can switch to a particular operation mode either on all servers or on an individual server.
- Ensure that a manual operation switch does not disrupt system operation (for example, by providing too few dialog processes).
- Before you make a manual switch of operation modes, always test it by performing a simulation of the switch. To simulate a switch, choose *Tools* → *CCMS* → *Control/Monitoring* → *Control Panel* → *Control* → *Switch operation mode* → *Simulation*. A test log describes which switches are possible and which errors may occur when a real switch takes place.
- To switch the operation mode after a simulation, choose *Control* → *Switch operation mode*. The servers remain in the manually activated operation mode until the next switch time.



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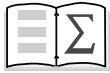
- If the operation mode switch fails, you should investigate the cause of the failure. The cause is most likely to be inconsistencies in the system. Inconsistencies can occur, for example, if there are different numbers of work processes:
 - In the instance profile on the operating system
 - On the database
 - In the operation mode definition
- You should check regularly whether the number of work processes that are currently running is the same as the number entered in each of these three parts of your system.
- If you change profiles and restart the system, you must adapt operation modes as well as instance definitions to correspond to the current status.
- To check the operation mode switch and the work process switch within the system log, use transaction *SM21* or, from the main R/3 menu, choose *Tools → Administration → Monitor → System monitoring → Process overview*.
- To check the work process switch within the process overview, use transaction *SM50* or, from the main R/3 menu, choose *Tools → Administration → Monitor → System monitoring → Process overview*.



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- You can start and stop R/3 instances with the CCMS.
- When starting instances with the CCMS:
 - The database and at least one R/3 instance (the control instance) must have been started from the operating system.
 - You can use the CCMS control panel (transaction *RZ03*) to select an operation mode and start the remaining instances remotely. You can start multiple instances or special instances. The control panel enables you to check the startup log for each instance that has been started.
- On UNIX platforms, command *rexec* is used to start servers remotely. For this command to function, you need to define a startup user and password in the instance definition.
- On platforms without *rexec*, you need to use a tool with the same function as *rexec*. For example, to start Windows NT server instances from a UNIX server, a *rexec* daemon must be running on the Windows NT server.

Object	Fields	Value	Meaning
Check for Transaction Start (S_TCODE)	Transaction Code	<TCODE>	Transaction Code
<hr/>			
CC Control Center (S_RZL_ADM)	Activity	01 03	all management functions display authorization



Now you are able to:

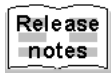
- **Set up the CCMS:**
 - **Import and maintain profiles**
 - **Create operation modes and instance definitions**
 - **Maintain operation modes and instance definitions**
 - **Schedule operation modes**
 - **Switch the operation mode manual**
- **Start and stop instances with the CCMS**



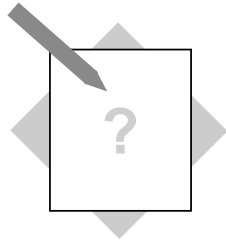
- **SAP Basis Knowledge Product:
System Management**



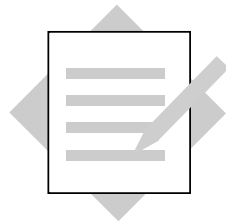
- **SAP Online Documentation:
BC Computing Center
Management System**



- **SAP Notes under components:**
 - BC-CCM-CNF-OPM
 - BC-CCM-CNF-PFL



- **Exercises**



- **Solutions**

CCMS Configuration: Exercises

No.	Exercise
1	Preparing your R/3 System to start For these exercises, you should restart your R/3 System.
1.1	Under Windows NT , proceed as follows. Group 1 (QAS) using pcANYWHERE: Go to the global profile directory using Windows Explorer. Create a subdirectory called BACKUP and copy the existing profiles into it. Group 2 (DEV) using Telnet: Go to the global profile directory. Create a subdirectory called BACKUP and copy the existing profiles into it. Under UNIX , proceed as follows. Use Telnet. Go to the global profile directory. Create a subdirectory called BACKUP and copy the existing profiles into it.
1.2	In R/3, to see if any profiles have been imported to the database, use profile maintenance (either call the transaction directly or navigate with the System Administration Assistant). If no profiles have been imported, what method would you use to import the profiles into the R/3 System?
2	Importing, maintaining, and activating profiles
2.1	Import all profiles at once into the R/3 System.
2.2	(Optional) Import a single profile (an instance profile) into the R/3 System.
2.3	Perform a check of the individual profiles you just imported.
2.4	Determine the number and the types of the R/3 System work processes.
2.5	Change the number of work processes that are configured in the instance profile for your second instance, so that the new settings take effect during the next instance restart. Add 1 more dialog work process and 1 more background work process.
2.6	Check the changes to your modified instance profile at the operating system level. Can you see the changes that you made?
3	Activating your changes To activate your profile changes, you must stop and start your instance.
3.1	Group 1. Use the Microsoft Management Console to stop your instance. Once your instance has successfully shut down, restart the relevant R/3 instance. Group 2. To shut down your R/3 instance, use stopsap with the appropriate parameters. To restart your R/3 instance, use startsap with the appropriate parameters.

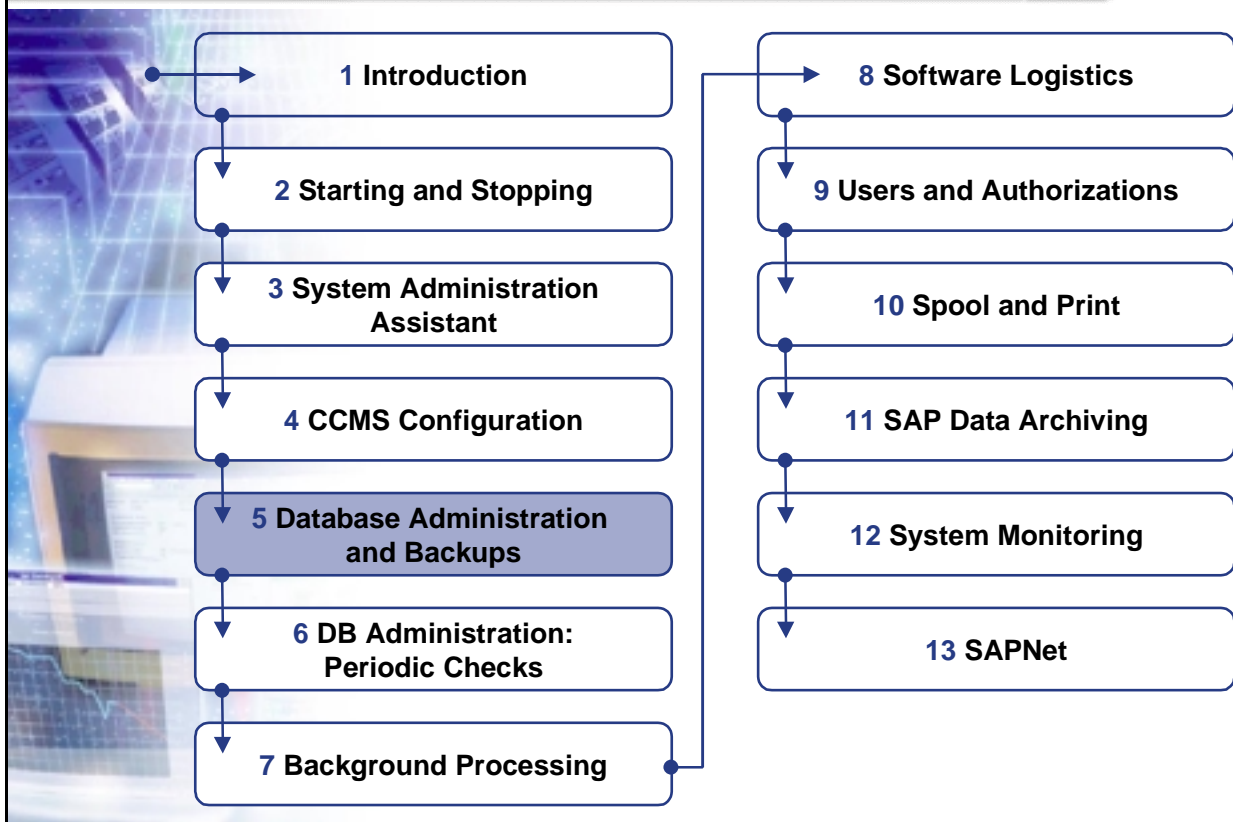
3.2	Use the process overview and compare the number of work process that are now running with the number that were running in step 2.4. Is there a difference?
4	Creating operation modes and instance definitions
4.1	In CCMS, create two operation modes: <i>Day</i> and <i>Night</i> . Either call the transaction directly or navigate with the System Administration Assistant.
4.2	Create the instance definitions for your R/3 System. What is the easiest way to create all instances in one step?
4.3	Maintain the work process distribution of your instances. Keep the current operation mode <i>Day</i> for both instances and set your operation mode <i>Night</i> to have 4 background processes on the central instance and 3 background processes on the second instance. Configure the central instance to have 2 additional update processes for <i>Night</i> . What happens to the dialog work processes when you add the background and update work processes? Remember to check that, after this exercise, at least 2 background work processes are configured in all operation modes.
5	Schedule operation modes
5.1	Maintain the operation timetable. Select operation mode <i>Night</i> to become active within the next hour.
6	Manual switch of operation mode
6.1	Switch the operation mode for all instances manually to operation mode <i>Night</i> .

CCMS Configuration: Solutions

No.	Solution
1	User Profile
1.1	<p>Under Windows NT, proceed as follows.</p> <p>Group 1. In the directory G:\usr\sap\<SID>\sys\profile create a subdirectory BACKUP. Copy the profiles into folder BACKUP one by one: for XXX =</p> <pre> DEFAULT.PFL START_DVEBMGSxx_<hostname> START_Dxx_<hostname> <SID>_DVEBMGSxx_<hostname> <SID>_Dxx_<hostname> </pre> <p>choose <i>Edit</i> → <i>Copy</i> XXX and then <i>Edit</i> → <i>Paste</i> XXX into BACKUP.</p> <p>Group 2. Change to directory G:\usr\sap\<SID>\sys\profile. To create the subdirectory, use command mkdir backup. To copy the profiles into the subdirectory, use:</p> <pre> copy DEFAULT.PFL backup copy START_<instance name>_<hostname> backup copy <SID>_<instance name>_<hostname> backup </pre> <p>Under UNIX, proceed as follows.</p> <p>Change to directory /usr/sap/<SID>/sys/profile. To create the subdirectory, use command mkdir backup. To copy the profiles into the subdirectory, use:</p> <pre> cp DEFAULT.PFL backup cp START_<instance name>_<hostname> backup cp <SID>_<instance name>_<hostname> backup </pre>
1.2	<p>Check transaction <i>RZ10</i> (from the System Administration Assistant, transaction <i>SSAA</i>, choose <i>Entire view</i> → <i>Display Tasks</i> → <i>Running Your System</i> → <i>Additional Administration Tasks</i> → <i>SAP System Administration</i> → <i>Maintaining System Profiles</i>). If you try to select a profile, you will see that no profiles have been imported. The best way to import the profiles of all active servers is all at once (see solution 2.1).</p>
2	
2.1	<p>To import all relevant profiles at once, use transaction <i>RZ10</i> and choose <i>Utilities</i> → <i>Import profiles</i> → <i>Of active servers</i>. Once the import has been completed, a log file is displayed.</p>
2.2	<p>(Optional) Use transaction <i>RZ10</i> or, from the SAP standard menu, choose <i>Tools</i> → <i>CCMS</i> → <i>Configuration</i> → <i>Profile Maintenance</i>. For the profile that is to be imported, select the instance profile name <SID>_<instance name>_<hostname>. Choose <i>Create</i> and enter a short description. In the administrative data path name, overwrite the capital letters in the hostname with lowercase letters. The type of profile you are importing is already known.</p>

	<p>Choose <i>Copy</i>.</p> <p>Choose <i>Profile</i> → <i>Import</i> and select the path of the profile you are importing. Example: G:\usr\sap\<SID>\profile\SID_DVEBMGSxx_<hostname></p> <p>Choose <i>Copy</i>, then <i>Save</i>. In the following dialog box, choose <i>Yes</i> to activate the profile.</p>
2.3	To perform a consistency check from within transaction <i>RZ10</i> , select a profile and choose <i>Check</i> .
2.4	Use transaction <i>SM66</i> (<i>System Wide Work Process Overview</i>) or, from the SAP standard menu, choose <i>Tools</i> → <i>CCMS</i> → <i>Control/Monitoring</i> → <i>Work Process overview</i> . To see the processes with status <i>wait</i> , choose <i>Select process</i> and flag status <i>wait</i> . Note the work process type and numbers.
2.5	<p>Use transaction <i>RZ10</i> and select the instance profile of your additional instance. Select <i>Basic Maintenance</i> and choose <i>Change</i>. Change the number of work processes: add 1 more dialog work process and 1 more background work process.</p> <p>Choose <i>Copy</i>, then <i>Save</i>. In the following dialog box, choose <i>Yes</i> to activate the profile.</p>
2.6	Call transaction <i>AL11</i> and double-click <i>DIR_PROFILE</i> . This takes you into the profile directory. To display your instance profile, double-click it.
3	
3.1	<p>Group 1. To stop and start your R/3 instance, use the Microsoft Management Console. You do not need to restart your central instance.</p> <p>Group 2. To shut down your R/3 instance, use stopsap with appropriate parameters. To restart your R/3 instance, use startsap with appropriate parameters.</p>
3.2	Use transaction <i>SM66</i> (<i>System Wide Work Process Overview</i>) or, from SAP Easy Access, choose <i>Tools</i> → <i>CCMS</i> → <i>Control/Monitoring</i> → <i>Work Process overview</i> . To see the processes with status <i>wait</i> , choose <i>Select process</i> and flag status <i>wait</i> . For your second instance, you should see 1 more dialog (DIA) work process and 1 more background (BTC) work process.
4	
4.1	From transaction <i>RZ04</i> , choose <i>Operation mode</i> → <i>Create</i> , and create an operation mode <i>Day</i> . Enter Day and a short description of the operation mode. Choose <i>Save</i> . Repeat this procedure for operation mode <i>Night</i> .
4.2	Use transaction <i>RZ04</i> and choose <i>Instances/operation modes</i> → <i>Settings</i> → <i>Based on current Status</i> → <i>New instances</i> → <i>Generate</i> . You should see that both instances for your system have been created and that operation modes <i>Day</i> and <i>Night</i> have been assigned with the current system work process distribution from the instance profiles.
4.3	For the central instance, double-click on operation mode <i>Day</i> or <i>Night</i> . If necessary, select <i>Other operation mode</i> . To specify 4 background work processes at night for the central instance, select the background work

	process number and click the plus sign. To add 2 update work processes at night, select the update process number and click the plus sign. Then choose Save . Notice that the number of dialog work processes decreases. This is because you cannot exceed the number of configured work processes in your profile, and the number of Class A background work processes cannot exceed the number of background processes. For the second instance, double-click operation mode <i>Night</i> and specify 3 background processes.
5	
5.1	Using the System Administration Assistant (transaction SSAA), to access transaction SM63, choose <i>Entire view → Display Tasks → Running Your System → Additional Administration Tasks → SAP System Administration → Operation Modes: Adjusting the Timetable</i> . Select <i>Normal Operation and Change</i> . Double-click the beginning and the end of the time interval and assign this interval to a defined operation mode (operation mode <i>Night</i> should become active within the next hour). Fill out your timetable completely and save it.
6	
6.1	<p>To go to the control panel (transaction RZ03) from the System Administration Assistant (transaction SSAA), choose <i>Entire view → Display Tasks → Running Your System → Additional Administration Tasks → SAP System Administration → Operation Modes: Manually Switching Modes</i>. Choose <i>Execute</i>, select <i>Choose operation mode</i>, and double-click operation mode <i>Night</i>. Then choose <i>Control → Switch operation mode → All servers</i>. A dialog box appears: choose Yes.</p> <p>Call transaction SM50 and check the work process distribution. This should match what you defined for your instances in operation mode <i>Night</i>.</p>





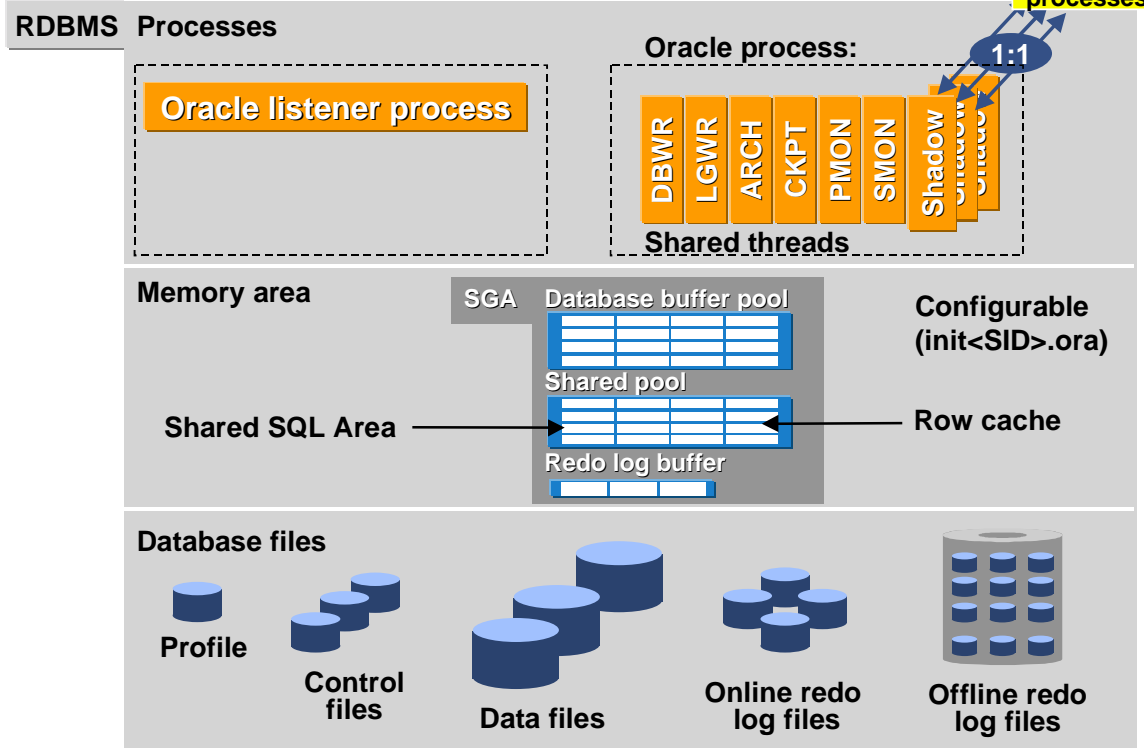
Contents

- Database fundamentals
 - Backup strategies
-

Objectives

At the end of this unit, you will be able to:

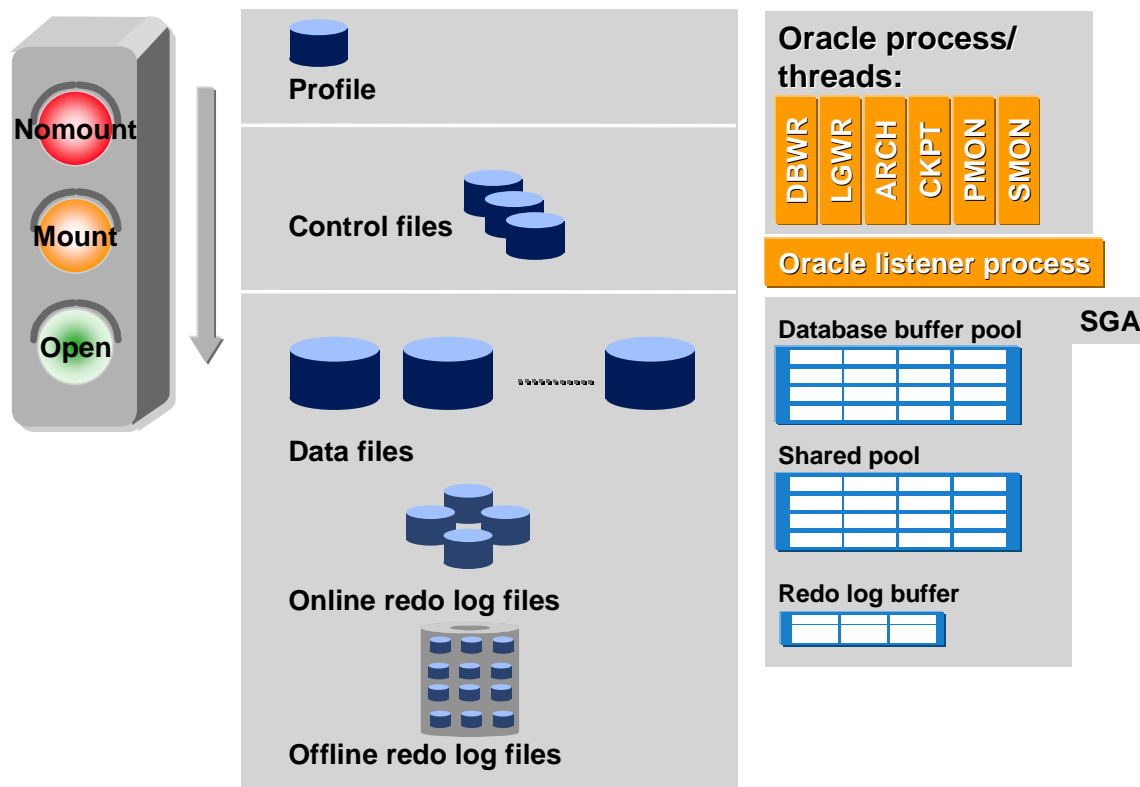
- Set up the database for performing backups
- Schedule and perform database backups
- Schedule and perform offline redo log file backups
- Verify the backups
- Verify the database structure on disk
- Recognize and solve error situations



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- When an Oracle database instance is started, two processes are created, the listener process and the Oracle process. Oracle on the Windows NT operation system uses the Windows NT implementation of threads. The Oracle process consists of the shared threads and the dedicated shadow threads.
- Database data is stored in 8 KB blocks in data files on disk. To accelerate read and write access to data, these data blocks are cached in the database buffer pool in main memory.
- Modifications to database data are logged in the online redo log files. This procedure ensures data security. To ensure fail-safe database operation, without using additional operating system utilities, the control files and the online redo log files of the database system should be mirrored.
- The Oracle database management system holds the executable SQL statements in the Shared SQL Area, which is part of the shared pool.
- Each R/3 work process:
 - Connects to the database as one database user, SAPR3
 - Handles database requests for the different R/3 System users
 - Communicates with a corresponding shadow thread on the database
 - Can reconnect to the database if the connection is lost due to database errors

Oracle: Starting and Stopping the Database



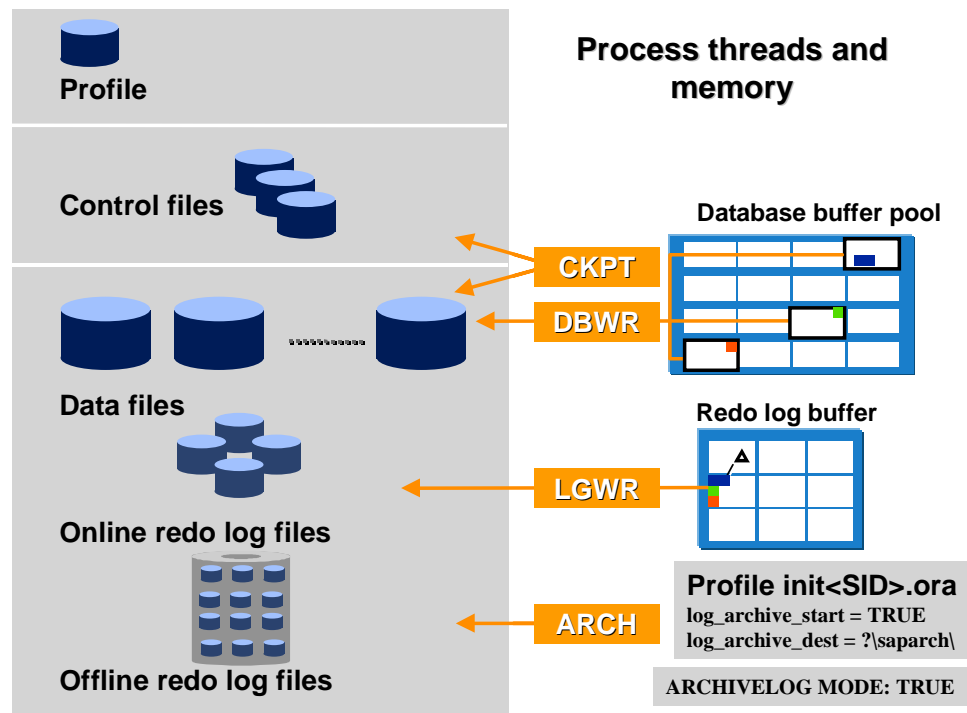
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■ When an Oracle database is started, it goes through 3 phases:

- In the *No mount* phase, the database instance is built up. Operating system resources are allocated using configuration information stored in the profile `init<SID>.ora`.
- In the *Mount* phase, the control files of the database are evaluated. The system reads the information about the file structure of the database. Data files and logs are not yet opened.
- In the *Open* phase, all files in the database system are opened. If required, an instance recovery is performed immediately after opening the database. Pending database transactions are ended.

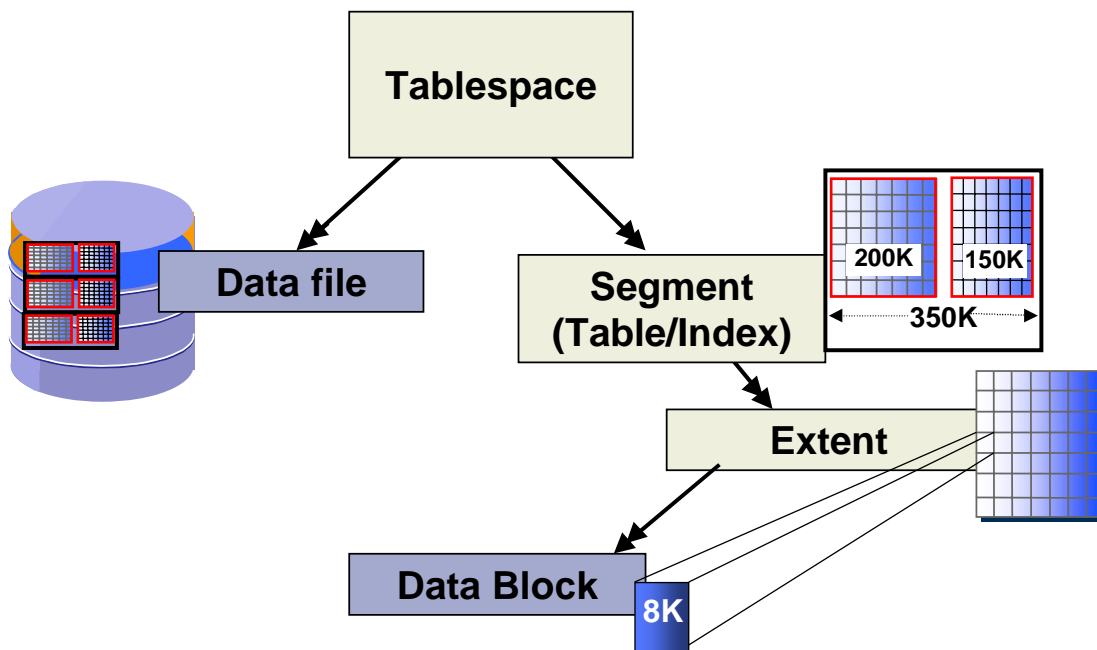
■ You can shut down the database using one of three commands:

- **SHUTDOWN NORMAL:** No new database logon possible. After all database user have logged off, the database is closed systematically: All files are closed, the database is dismounted, and the instance is shut down. The database is consistent after shutdown.
- **SHUTDOWN IMMEDIATE:** Only the current commands are executed. PMON ends all sessions and performs a rollback of the open transactions. The database is then closed systematically (as for a normal shutdown). The database is consistent after shutdown.
Caution: DBWR and ARCH may require up to 1 hour post-processing time.
- **SHUTDOWN ABORT:** Emergency database shutdown. Users are not logged off, and a rollback of the open transactions is not performed. The database is **not** consistent after shutdown. An instance recovery is automatically performed at the next database startup.



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- An Oracle database system has three threads that write information from the Shared Global Area (SGA) to the appropriate files:
 - During a checkpoint, the *Database writer* (DBWR) asynchronously writes the changed blocks from the SGA to the database data files.
 - To speed up the writing of checkpoints, the *Checkpoint* (CKPT) thread starts.
 - The *Logwriter* (LGWR) synchronously writes the change log from the SGA redo log buffer to the currently active online redo log file.
- In a production database system, you must always run the database in ARCHIVELOG mode and ensure that the *Archiver* thread (ARCH) is started (*init<SID>.ora: log_archive_start = TRUE*). ARCH archives a completed online redo log file into an offline redo log file in the archive directory.
- ARCH determines the archive directory from the *init<SID>.ora* parameter *log_archive_dest* (default: *?\saparch*) and determines the file name from the parameter *log_archive_format*.
- Once the offline redo log file has been successfully created, the corresponding online redo log file is released to be overwritten with new log information.
- If there is no freespace available in the archive directory, or if a file with the same name already exists in the archive directory, the Archiver does not archive the file. After a corresponding number of redo log switches, the database becomes "stuck". Database changes cannot be committed as long as this *archiver stuck* situation persists.



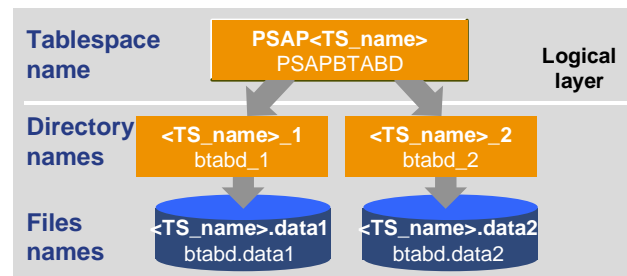
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- A database is divided into logical storage units called tablespaces. Tablespaces are divided into logical units of storage called segments (tables or indexes). Segments are further divided into extents, which consist of contiguous data blocks. A data block (normally 8 KB) is the smallest unit of I/O used by a database.
- A tablespace in an Oracle database consists of one or more physical data files. A data file can be associated with only one tablespace. You can increase a tablespace in two ways:
 - Add a data file to a tablespace. When you add another data file to an existing tablespace, you increase the amount of disk space allocated to the corresponding tablespace.
 - Increase the size of a data file.
- Storage parameters such as INITIAL, NEXT, and MAXEXTENTS allow you to manage space allocated to a table. In the next unit, we discuss how to manage storage with these storage parameters.

R/3 Naming Conventions



Prefix	Abbreviation	Extension
PSAP	<TS_name>	D (data) or I (index)

















Prefix	Tablespace name	Ext.	Meaning	Used by
	SYSTEM		Oracle DDIC	Oracle RDBMS
PSAP	ROLL		Rollback segments	Oracle RDBMS
PSAP	TEMP		Sort processes	Oracle RDBMS
PSAP	EL<Release>	D or I	Development environment loads	R/3 Basis
PSAP	ES<Release>	D or I	Development environment sources	R/3 Basis
PSAP	LOAD	D or I	Screen and report loads (ABAP)	R/3 Basis
PSAP	SOURCE	D or I	Screen and report sources (ABAP)	R/3 Basis
PSAP	DDIC	D or I	ABAP Dictionary	R/3 Basis
PSAP	PROT	D or I	Log-like tables (for example, spool)	R/3 Applications
PSAP	CLU	D or I	Cluster tables	R/3 Applications
PSAP	POOL	D or I	Pool tables (for example, ATAB)	R/3 Applications
PSAP	STAB	D or I	Master data and transparent tables	R/3 Applications
PSAP	BTAB	D or I	Transaction data, transparent tables	R/3 Applications
PSAP	DOCU	D or I	Documentation, SAPscript, SAPfind	R/3 Applications
PSAP	USER1	D or I	Customer tables	R/3 Applications

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- The R/3 naming convention for tablespace names is defined as follows:
PSAP<tablespace_name><extension>.
- The abbreviations in the tablespace name are part of the directory name and file name of each data file. Directories and data files are numbered.
- The objects located in the tablespaces SYSTEM, PSAPROLL, and PSAPTEMP belong either to the Oracle database users SYS or SYSTEM. Do not create any objects owned by other users in these tablespaces.
- The objects located in the other tablespaces belong to the SAP R/3 database user SAPR3. R/3 System users do not have a database system user.
- The R/3 System and SAP tools, such as SAPDBA, require that the naming conventions be observed. The installed system constitutes a logical unit, which you should not change. In this way, SAP can ensure that you receive fast and efficient support.

Oracle Directory Structure in R/3



Directory	Contains	File name examples
 db s  bin	SAP and Oracle profiles, first control file Oracle executables	init<SID>.ora, init<SID>.dba, init<SID>.sap
 saptrace  sapdata1 . .  sapdata<n>	Background (Oracle alert file) usertrace Datafiles 	/btabd1/btabd.data1, system.data1, /btabi1/btabi.data1, /cntrl/cntrlDEV.dbf
 sapbackup  saparch  sapcheck  sapreorg	BRBACKUP, BRRESTORE logs BRARCHIVE logs, Oracle archive dir SAPDBA logs (-next, -check, -analyze) SAPDBA (default), default compression directory	<SID>00205.001, <SID>00206.001
 origlogA  origlogB  mirrlogA  mirrlogB	Online redo log files Online redo log files Online redo log files Online redo log files	log_tg101_m1.dbf, log_tg103_m1.dbf log_tg102_m1.dbf, log_tg104_m1.dbf log_tg101_m2.dbf, log_tg103_m2.dbf log_tg102_m2.dbf, log_tg104_m2.dbf

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- Directory and file names are standardized in the R/3 environment. We recommend that you use the following standards:
 - Tablespace files reside in the *sapdata<n>* directories.
 - The online redo log files reside in the *origlog* and *mirrlog* directories.
 - The offline redo log files are written to the *saparch* directory.
 - There should be at least 3 copies of the Oracle control file.
 - The profile *init<SID>.ora* configures the Oracle instance, and resides in directory *database*.
 - The profile *init<SID>.sap* configures the backup tools *brbackup* and *brarchive*, and resides in directory *database*.
 - The profile *init<SID>.dba* configures the *sapdba* tool, and resides in directory *database*.
 - The Oracle alert file is written to directory *saptrace\background*.
 - Trace files of the Oracle shadow processes are written to the directory *saptrace\usertrace*
 - During reorganization, export datasets are written to directory *sapreorg*.
- The directories *saparch*, *sapcheck*, *sapreorg*, and *sapbackup* are used by the SAP database tools.