

SAP® MaxDB™

Expert Session – CCMS Integration
Integration into the SAP System



MaxDB/liveCache Development Support
November 2009

THE BEST-RUN BUSINESSES RUN SAP™ 

Expert Session

CCMS Integration

MaxDB/liveCache Development Support

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Agenda



1. Introduction to Transaction DB59

- Central Monitoring with DB59
- Database Integration
- Connection Test

2. Introduction to Transaction DB50

- Menu Structure
- Administrative Tasks

3. Alert Monitor RZ20

4. Preview of DBACockpit

- Menu Structure

Objectives



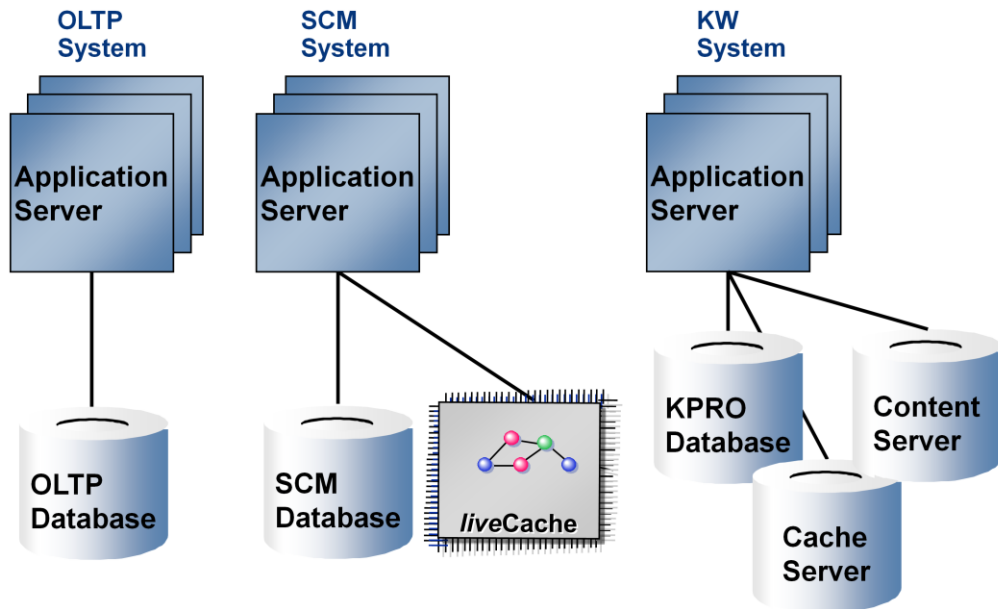
After this presentation, you will be able to:

- Integrate your SAP MaxDB databases into your monitoring landscape in transaction DB59
- Use transaction DB50 to monitor your SAP MaxDB database
- Schedule backups and other administrative tasks using the DBA Planning Calendar
- Use the Alert Monitor for your SAP MaxDB instances
- Start working with DBACockpit

In this chapter, you will learn how to integrate SAP MaxDB databases into one central monitoring system using transaction DB59. Furthermore an overview of the database assistant transaction DB50 is given and you'll learn how to schedule regular administrative tasks using the planning calendar. Finally you get an overview of transaction RZ20 – the SAP Alert Monitor.

Additionally a preview of the planned functionality of DBACockpit is given. You'll get an impression on how it will work and where to find the administrative tasks.

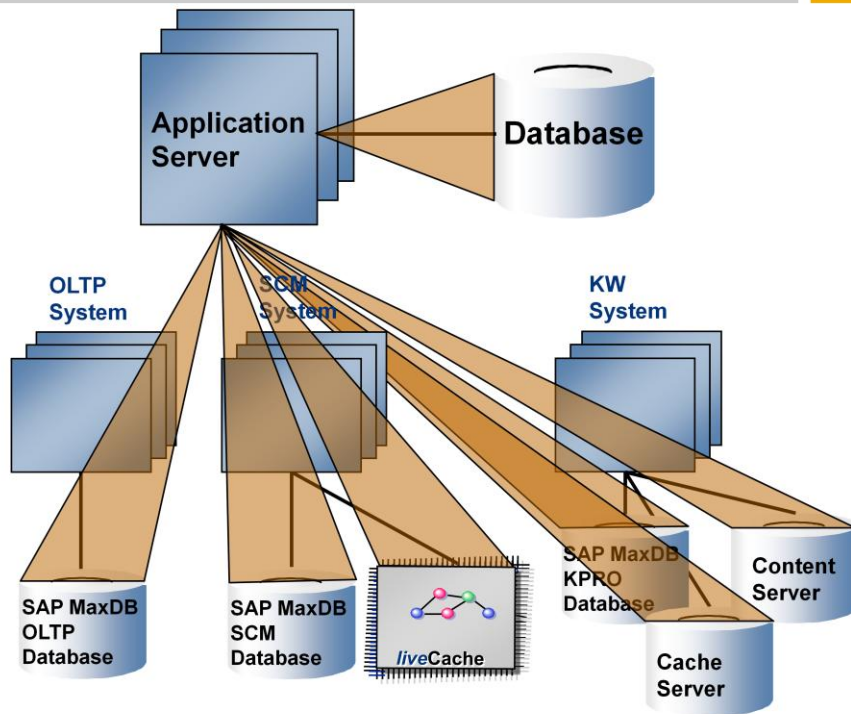
Which Instances Can Be Monitored?



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Your system landscape can consist of several different SAP and non-SAP systems. You might have an OLTP, an SCM and a Knowledge Warehouse system.

The OLTP system uses one SAP MaxDB instance, the SCM system two (the SCM database and the liveCache) and the Knowledge Warehouse system uses three SAP MaxDB instances (the KPRO database, Content Server and Cache Server). All of these databases should be monitored.



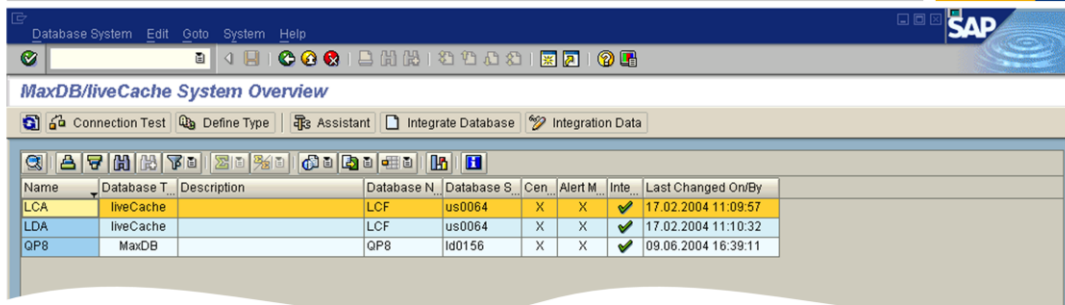
To make things easier you can choose any of your SAP systems and use that as your central monitoring system. This could be e.g. a Solution Manager system.

You can integrate all SAP MaxDB instances of your system landscape into this central monitoring system and use just one transaction to monitor all databases.

This central monitoring system may run on SAP MaxDB but monitoring transaction DB59 is also available on systems running on a different database system.

Central Monitoring – Transaction DB59

SAP



Name	Database T.	Description	Database N.	Database S.	Cen.	Alert M.	Inte.	Last Changed On/By
LCA	liveCache		LCF	us0064	X	X	✓	17.02.2004 11:09:57
LDA	liveCache		LCF	us0064	X	X	✓	17.02.2004 11:10:32
QP8	MaxDB		QP8	id0156	X	X	✓	09.06.2004 16:39:11

Initially DB59 only contains an entry for the system's own MaxDB instance. In case of an APO/SCM system there are additional connection identifiers for liveCache.

To be able to monitor other SAP MaxDB instances within this system, you have to integrate the corresponding database instance - i.e. you have to enter the user information to connect to this database instance.

Initially transaction DB59 only contains an entry for the system's own SAP MaxDB instance and - in case of an APO/SCM system - the two liveCache connection identifiers LCA and LDA. As of SCM 5.0 the connection identifier LEA is used as well.

Additionally all other SAP MaxDB Databases of your system landscape can be entered. Choose *Integrate Database*.

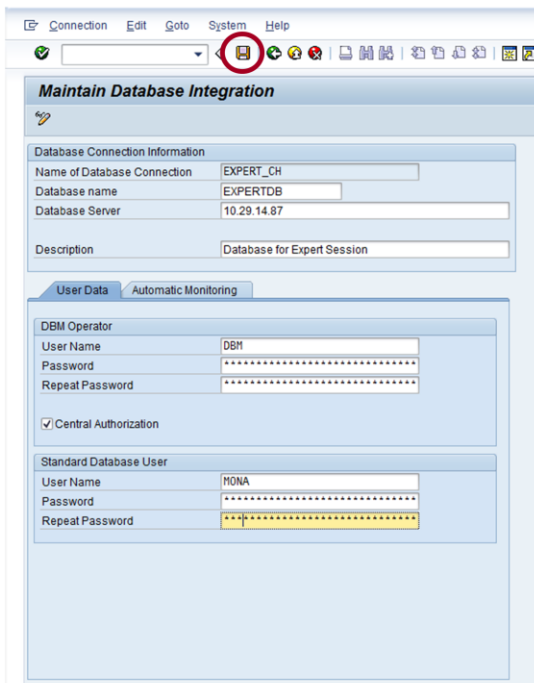
Central Monitoring – Transaction DB59 on Demo System



The screenshot shows the SAP MaxDB/liveCache System Overview window. The 'Integrate Database' button in the top toolbar is circled in red. A 'Define Database Type' dialog box is open, showing 'MaxDB' selected as the database type and 'EXPERT_CH' as the DB Connection Name. The main table lists various databases and liveCaches, including DBAN_07, DBAN_07, DBAN_07, DBM1_MA, DBTRES, DORN_76, DORN_77, DORN_ABC, DORN_OXX, DWIKI4, EB5, ECDB, EXPERTDB, HWI, HYD, JAN, JYI, JZV, KAY_SBSC, LC_FH, LC1, LC6, LCA, LCA_SMA, LDA, LDB_LCA, LDB_LCG, and M0377.

Name	Database	Description	Database	Database	Ce...	Alert...	Info...	Changed On	Time	Changed By
DBAN_07...	MaxDB	DB Analyzer Dummy-DB. Kun...	072	pwdf2763	X		✓	22.10.2009	09:50:35	S70
DBAN_07...	MaxDB	DB Analyzer Dummy-DB. Kun...	074	pwdf2763	X		✓	28.10.2009	10:02:33	S70
DBAN_07...	MaxDB	DB Analyzer Dummy-DB. Kun...	075	pwdf2763	X		✓	28.10.2009	10:20:21	S70
DBM1_MA...	MaxDB		M1	10.29.14.1...	X		✓	13.08.2009	16:16:50	S70
DBTRES	MaxDB	DB ProcProvider Test Connection	B77	maxdb://10...	X		✓	19.05.2006	11:22:25	S70
DORN_76	MaxDB	MaxDB 7.6 auf Adrian's PC	DORN_76	10.29.14.1...	X		✓	05.06.2009	15:55:51	DORN
DORN_77	MaxDB	MaxDB 7.7 auf Adrian's PC	DORN_77	10.29.14.1...	X		✓	10.07.2008	14:56:47	DORN
DORN_ABC	MaxDB		DORN_76	10.29.14.1...	X		✗	09.05.2009	01:57:48	DORN
DORN_OXX	MaxDB	existiert_nicht	existiert_ni...	existiert_ni...	X		✓	02.05.2009	22:38:19	DORN
DWIKI4	MaxDB		DWIKI4	is2384	X		✓	26.10.2009	13:06:37	S70
EB5	MaxDB	DB aus einer CSN-Meldung	EB5	uxdbs5	X		✓	08.08.2008	13:15:46	DORN
ECDB	MaxDB		MAX_STBY	10.33.166...	X	X	✓	17.06.2008	05:18:44	CALYAD
EXPERTDB	MaxDB	Database for Expert Session	EXPERTDB	10.29.24.81	X		✓	14.10.2009	09:14:14	S70
HWI	MaxDB		OE1	HWI055	X		✓	05.05.2009	14:14:14	S70
HYD	MaxDB	Martinkö (Hydac Test-DB)	HYD	ux3008	X		✓	12.12.2008	11:28:35	DORN
JAN	MaxDB		MAXDB1	WDFN001	X		✓	09.09.2008	15:15:15	S70
JYI	MaxDB	interner Supportfall Martinkö	JYI	cbs2052	X		✓	23.12.2008	14:14:14	S70
JZV	MaxDB	low cat cache hitrate	JZV	pwdfm247	X		✓	30.09.2008	12:12:12	S70
KAY_SBSC	MaxDB	Testsystem Kay Zhang	SBSC	10.56.91.62	X		✓	29.12.2005	10:10:10	S70
LC_FH	liveCache	Franky Test liveCache	FH77	is4007	X		✓	06.03.2009	10:10:10	S70
LC1	MaxDB	4.6c System	LC1	us0062	X		✓	25.03.2008	15:15:15	S70
LC6	MaxDB		LC6	USDBLC6	X		✓	06.12.2007	18:18:18	S70
LCA	liveCache	LiveCache on S70	LC743	pwdf2763	X		✓	16.09.2009	10:10:10	S70
LCA_SMA	liveCache	liveCache vom System SMA	SMO	us4244	X		✓	18.11.2005	11:11:11	S70
LDA	liveCache	LiveCache on S70	LC743	pwdf2763	X		✓	06.12.2007	18:18:18	S70
LDB_LCA	liveCache	LCA aus LDB-System	LCS	pwdf0679	X		✓	14.03.2006	17:28:35	DORN
LDB_LCG	liveCache	LCG aus LDB-System	LCG	pwdf1006	X		✓	14.03.2006	10:37:02	S70
M0377	MaxDB		M0377	berd00185...	X		✓	19.11.2007	10:37:02	S70

Within our demo system (database S70) already a lot of different MaxDB databases and liveCaches have been integrated. If you want to add a new one choose *Integrate Database* and specify with *Define Database Type* if your system is a MaxDB or a liveCache instance.



To be able to connect to the database instance you have to enter:

- The name of the database instance.
- The hostname or IP address of the server on which the database instance runs.
- The DBM operator and his password. This is the user used to connect to the Database Manager GUI or CLI. Default: CONTROL with password CONTROL. Here DBM is used.
- The Standard Database User, which for SAP applications is SAPR3 or SAP<SID> as the default. In our demo system the tutorial user MONA is used

Make sure that the checkbox for the central authorization is marked, that the connect information is stored in tables DBCON and DBCONUSR of the monitoring system.

On the next screen enter the requested information:

- *database name* and *database server*,
- an optional *description*,
- *dbm operator* and his *password*
- *standard database user* and his *password*

Then save your changes.

Connection Test (1)



Database System Edit Goto System Help

MaxDB/liveCache System Overview

Connection Test Define Type Assistant Integrate Database Integration Data

Name	Database ...	Description	Database ...	Database ...	Ce...	Alert ...	Inte...	Changed On	Time	Changed By
ECDB	MaxDB		MAX_STBY	10.33.166...	X	X	✓	17.06.2008	05:18:44	CAHYADI
EXPERT_CH	MaxDB	Database for Expert Session	EXPERTDB	10.29.14.87	X		✓	03.11.2009	09:59:36	S70
EXPERTDB	MaxDB	Database for Expert Session	EXPERTDB	10.29.24.81	X		✓	14.10.2009	09:59:07	S70

Application Server Edit Goto System Help

Connection Test: Application Server <--> Database Connection

Connection Test Log DBMRFC Server Connection

Connection Test for Selected Database Connection: EXPERT_CH

Server Name	Host	Ch...	DBMRFC Release	DBMCLI Release	Kernel R...	Kernel P...	DBSL R...	DBSL P...	SQLDBC Runtime
pwdf2763_S...	pwdf2763		7.7.04.16	7.7.04.16	700_REL	173	700.08	173	7.6.04.10

To check, if the entered connect information works, mark the entry of the concerning database instance and choose *Connection Test*.

You'll get a list of all application servers. Select one and choose *Connection Test* to check one after another if the connection works from all application servers.

Connection Test (2)

SAP

Application Server Edit Goto System Help

Connection Test: Application Server <--> Database Connection

Connection Test Log DBMRFC Server Connection

Connection Test for Selected Database Connection: EXPERT_CH

Server Name	Host	Ch...	DBMRFC Release	DBMCLI Release	Kernel R...	Kernel P...	DBSL R...	DBSL P...	SQLDBC Runtime
pwdf2763_S...	pwdf2763	✓	7.04.16	7.7.04.16	700_REL	173	700.08	173	7.6.04.10

Application Server Edit Goto System Help

Connection Test: Application Server <--> Database Connection

Connection Test Log DBMRFC Server Connection

Connection Test for Selected Database Connection: EXPERT_CH

Server Name	Host	Ch...	DBMRFC Release	DBMCLI Release	Kernel R...	Kernel P...	DBSL R...	DBSL P...	SQLDBC Runtime
pwdf2763_S...	pwdf2763	✗	7.04.16	7.7.04.16	700_REL	173	700.08	173	7.6.04.10

The connection test first checks the DBMCLI connection, then the command and session mode of DBMRFC and afterwards the SQL connection. If everything is OK, a green check mark appears for this application server, otherwise a red cross is shown. In this case you have to check the log file.

Wrong Standard Database User Password



The screenshot displays the SAP Log Display interface. The main window shows a 'Connection Test Log' for connection 'EXPERT_CH'. The 'General Connection Data' section lists: Connection Name: EXPERT_CH, Database Name: EXPERTDB, Database Server: 10.29.14.87, Profiles: no_longer_used, and DBM User: DBM. The 'Test Scope' section lists four steps: 1. Execute an external operating system command (DBMCLI), 2. Determine status using TCP/IP connection SAPDB_DBM (DBMRFC command mode), 3. Determine status using TCP/IP connection SAPDB_DBM_DAEMON (DBMRFC session mode), and 4. Test the SQL connection (Native SQL at CON_NAME). The 'Application Server' section shows 'pwdf2763_S70_50 (Windows NT)'. The test results show steps 1, 2, and 3 as 'Successful', and step 4 as 'No connection'. The error message is: 'SQL Code: -4008 POS(1) Unknown user name/password combination For detailed information, see the developer trace for work process: 1'. Below the log, a developer trace shows the error message in red: '*** ERROR => Connect to database failed, rc = -4008 (POS(1) Unknown user name/password combination) [dbdsbsql.cpp 208]'. The trace also shows the connection attempt details: '***LOG BY2=> sql error -4008 performing CON [dbds#1 @ 1044] [dbds 1044]', '***LOG BY0=> POS(1) Unknown user name/password combination [dbds#1 @ 477] [dbds 0477]', and '***LOG BY4=> reconnect state is set for the work process [dblink#5 @ 1958] [dblink 1958]'. The trace ends with '***LOG BYY=> work process left reconnect status [dblink#5 @ 1959] [dblink 1959]'.

This is an example for a frequent connect problem.

If the DBM Operator and his password have been entered correctly, the DBMCLI and DBMRFC connection work.

Then the native SQL test may fail because the database user has not been entered correctly.

In this case you can find more information in the corresponding developer trace in transaction ST11.

Error **-4008 (Unknown user name/ password combination)** indicates that the user data for the database user is not correct.

Go back to the *Integration data* in transaction DB59 and reenter the user information.

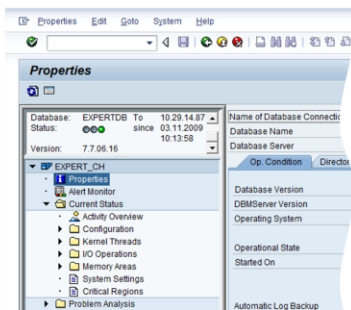
Remote Monitoring (via Central Entry Point in DB59)

SAP

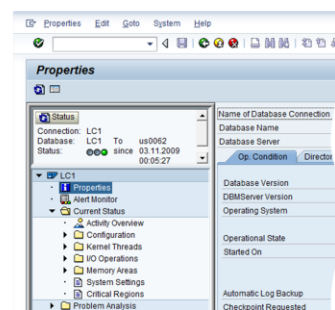
Name	Database ...	Description	Database ...	Database ...	Ce...	Alert ...	Inte...	Changed On	Time	Changed By
ECDB	MaxDB		MAX_STBY	10.33.166...	X	X	✓	17.06.2008	05:18:44	CAHYADI
EXPERT_CH	MaxDB	Database for Expert Session	EXPERTDB	10.29.14.87	X		✓	03.11.2009	09:59:36	S70
EXPERTDB	MaxDB	Database for Expert Session	EXPERTDB	10.29.24.81	X		✓	14.10.2009	09:59:07	S70

SAP MaxDB
Monitoring
DB50

liveCache
Monitoring
LC10



Monitoring of remote instances is possible. Even stand-alone databases like small test databases can be monitored in the SAP system.



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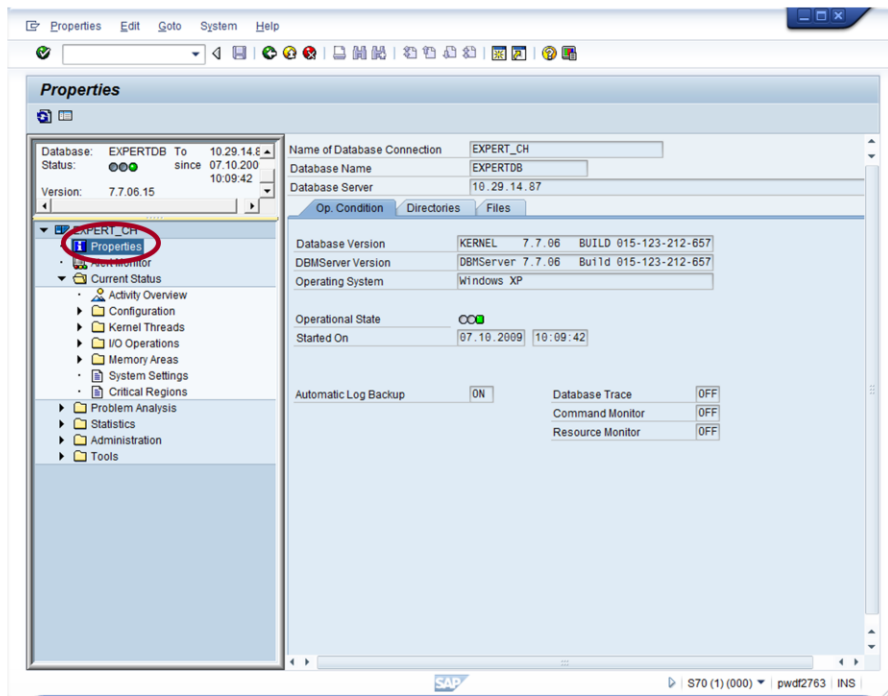
When the entered connect information is correct and the connection test does not return any errors, you can open the *Assistant* for the integrated database.

Select the newly created entry in the list of databases and choose *Assistant* or double-click the line.

For a SAP MaxDB instance transaction DB50 is opened, for a liveCache instance transaction LC10 is used.

These transactions are very similar – however, transaction LC10 contains some additional liveCache specific applications.

Transaction DB50 – Properties



Further improvement of transaction DB50 is done continuously. The tree structure in the version you are using might differ slightly from the shown screenshots.

As it should not be allowed for all users to execute all administrative tasks there is a special user concept. You can define different roles which are described in note 452745 (and also in the documentation) specifying which tasks can be executed by the user. F.e. access to dbmcli should be restricted because not everybody should be able to start and stop the database.

This is the *Properties* section of transaction DB50.

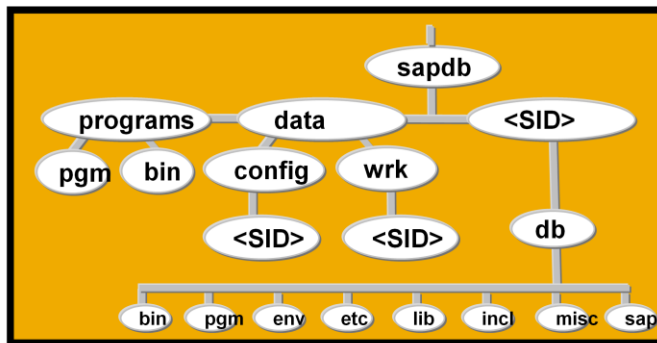
In the properties section you can find some general information like the database name, the database server, the database version and the operational state of the database instance.

SAP MaxDB and liveCache Directory Structure



Name of Database Connection	EXPERT_CH
Database Name	EXPERTDB
Database Server	10.29.14.87
Op. Condition Directories Files	
IndepPrograms	C:\Program Files\SDB\programs
IndepData	C:\SAPDeveTop\data
InstallationPath	C:\maxdb\maxdb_77
Rundirectory	c:\maxdb\data\wrk\EXPERTDB

Name of Database Connection	S70
Database Name	S70
Database Server	pwdf2763
Op. Condition Directories Files	
IndepPrograms	D:\sapdb\programs
IndepData	D:\sapdb\data
InstallationPath	D:\sapdb\s70\db
Rundirectory	d:\sapdb\data\wrk\S70



The second tab on the *Properties* window provides information about the directories in which the database software is installed.

In the first picture you find the directory structure of the stand alone test database. The software of S70 (second picture) is installed as it is usual in SAP environments. It is recommended to use the default for SAP installations as it simplifies error diagnosis.

The *IndepPrograms* directory contains programs and libraries shared by the SAP MaxDB instances and SAP MaxDB applications. These programs are downwards compatible.

The *IndepData* directory contains the configuration data and rundirectories of SAP MaxDB instances.

The location of these directories is specified during the first installation of SAP MaxDB software. They exist only once on the server.

The *InstallationPath* contains the server software that depends on the database version (e.g. kernel). Several dependent directories can exist alongside each other.

The *rundirectory* contains the status files of a SAP MaxDB instance and is the most important directory for monitoring and error analysis.

SAP MaxDB Status and Log Files



The screenshot shows the SAP MaxDB Properties window for the EXPERTDB database. The 'Files' tab is active, displaying a 'File Overview' table. The table lists various log files with their respective IDs, names, sizes, dates, times, descriptions, and file types.

File ID	File Name	Size	Date	Time	Description	File Type
KNLMSG	KnlMsg	1.103.967	03.11.2009	10:13:53	Database Messages	ASCII
KNLMSGARC	KnlMsgArchive	151.552	30.10.2009	19:44:00	Database Errors	ASCII
KNLMSGOLD	KnlMsg old	1.112.725	30.10.2009	19:44:00	Database Messages (OLD)	ASCII
KNLTRC	knltrc	6.873.088	03.11.2009	10:13:54	Database Trace (Raw/Binary)	BINARY
BACKHIST	dbm.knl	19.603	28.10.2009	15:59:59	Backup History	ASCII
BACKMDF	dbm.mdf	24.118	28.10.2009	15:59:58	Backup Media History	ASCII
DBMPRT	dbm.prt	408.292	03.11.2009	12:33:37	Database Manager Log File	ASCII
DBMMDF	dbm.mmm	1.124	14.10.2009	12:09:44	Database Manager Media	ASCII
DBMPAHI	EXPERTDB.pah	326.425	13.10.2009	15:05:03	Database Parameter History	ASCII
LCINITCMD	lcinit.bat	3.047	21.08.2009	07:16:19	LiveCache Initialisation Script	ASCII
INSTPRT	dbm.ins	809.009	09.10.2009	13:10:52	Installation Log File	ASCII
KNLTRCPRT	EXPERTDB.prt	378.469	13.10.2009	15:05:36	Database Trace (Readable)	ASCII
DBAHIST	dbahist.prt	565	14.10.2009	12:11:03	DBA Action Log	ASCII
DIAGDIR	File	0	03.11.2009	10:13:53	Diagnose History	DIRECT
ANALYZER	analyzer	0	30.10.2009	00:00:25	DB Analyzer File	DIRECT
EDCFGFI	dbm_ed_inter...	232	03.08.2009	10:04:48	Event Dispatcher Configuration (inter...	ASCII

On the third tab in the *Properties* window you can access the database log files.

The most important log files are:

KNLMSG or *KNLMSGARCHIVE* - contains status and error messages of the database kernel.

knlmsg is used up to version 7.6, *knlmsg* is used as of version 7.7.

KNLMSGARCHIVE - contains all error messages since database installation

UTLPRT - contains administrative commands sent to the database kernel (e.g. SHUTDOWN, BACKUP, CHECK DATA) including their return code(s). This logfile is obsolete as of version 7.7.

BACKHIST - contains all backup and recovery actions

DBMPRT - contains all (administrative) commands sent to the dbmserver

Volume Configuration



The screenshot shows the SAP Volume Configuration interface. On the left, a tree view under 'EXPERT_CH' has 'Volumes' selected and circled in red. The main area is divided into three sections: 'Log Area', 'Data Area', and 'System and Data Volumes'. The 'Log Area' shows 1 volume of 51,200 KB. The 'Data Area' shows 3 data volumes totaling 240,000 KB. The 'System and Data Volumes' table lists three data volumes (DATA001, DATA002, DATA003) each 80,000 KB. The status bar at the bottom indicates 'S70 (1) (000) | pwdt2763 | INS'.

Name	Size in KB	Physical Name
LOG001	51,200	c:\maxdb\volumes\EXPERTDB\LOG_001

Name	Size in KB	Physical Name
DATA001	80,000	c:\maxdb\volumes\EXPERTDB\DAT_0001
DATA002	80,000	c:\maxdb\volumes\EXPERTDB\DAT_0002
DATA003	80,000	c:\maxdb\volumes\EXPERTDB\DAT_0003

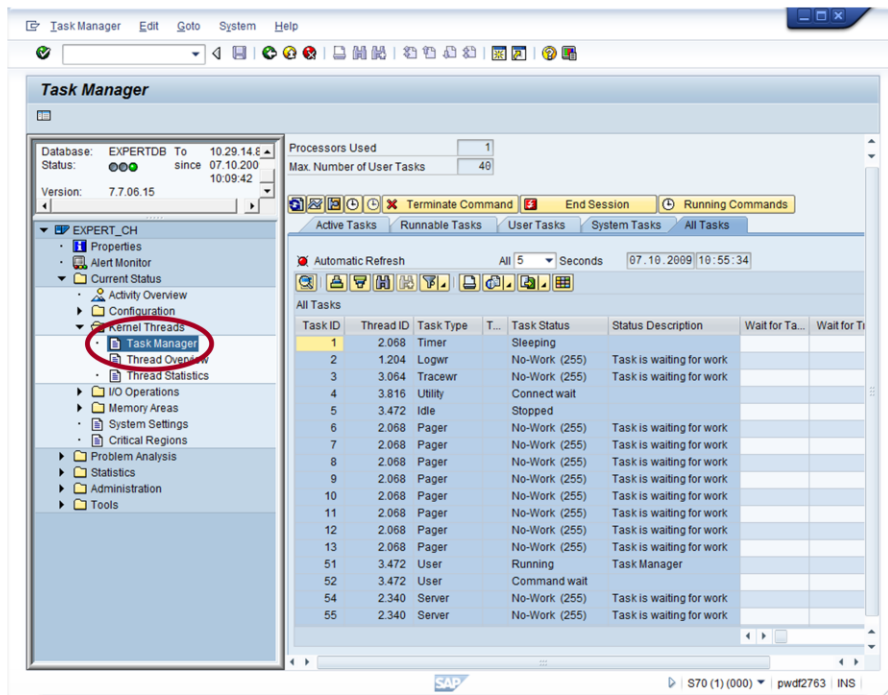
Open the tree item *Current Status* -> *Configuration* -> *Volumes*.

The *Volumes* section shows all configured log and data volumes including their locations and sizes.

You can also see, how many data volumes could be added while the database is ONLINE.

This is limited by the database parameter MAXDATAVOLUMES.

New volumes can be added using the Database Manager GUI or Database Studio.



This is the tree item *Current Status* -> *Kernel Threads* -> *Task Manager*.

The *Task Manager* shows the status of database tasks. With the tabs you can choose if you only want to check the currently active tasks, the runnable tasks, the user or system tasks or all tasks.

In a running system, possible states are e.g.:

Running – task is in kernel code of SAP MaxDB and uses CPU

Runnable, Vsleep – task is in kernel code of SAP MaxDB and waiting for a free slot in its thread (UKT)

LogIOWait – task waits for completion of its log request by the archive log writer

IOWait (R) or IOWait (W) – task waits for data I/O completion (read or write)

Vbegexcl or Vsuspend – task waits to acquire an internal lock in SAP MaxDB

Vwait – task waits for an SQL lock held by another application process to be released (locks are released after a COMMIT or ROLLBACK)

Memory Areas: Caches



The screenshot displays the SAP Cache Overview interface. The left sidebar shows a tree view with 'Caches' highlighted under 'Memory Areas'. The main content area is divided into several sections:

- Database Information:** Database: EXPERTDB To 10.29.14.6, Status: ●●● since 07.10.200 10:09:42, Version: 7.7.06.15
- Database Server:** 10.29.14.87, Database Name: EXPERTDB, Date / Time: 07.10.2009 11:13:09, Database Start: 07.10.2009 10:09:42
- Cache Sizes:**

	Size in KB	Size in pages
I/O Buffer Cache	24.000	3.000
Data Cache	23.424	2.928
Converter	200	25
Other	376	47
Catalog Cache	40.000	5.000
Sequence Cache	8	1

- Cache Accesses:**

	Accesses	Successful	Unsuccessful	Hit Rate
Data Cache	16.531	16.461	52	99,58%
Undo	0	0	0	100,00%
OMS Data	0	0	0	100,00%
SQL Data	16.531	16.461	52	99,58%
Catalog Cache	2.176	1.844	332	84,74%
Sequence Cache	0	0	0	100,00%

- Cache-Specific Parameter Settings:**

CACHE_SIZE	3000
CAT_CACHE_SUPPLY	5000

Information about the different memory areas and the hit rates of these caches can be found in *Current Status -> Memory Areas -> Caches*.

The Data Cache hit rate should always be above 98%.

Memory Areas: Data Area



The screenshot shows the SAP Memory Areas interface. On the left, a tree view shows the navigation path: EXPERT_CH > Memory Areas > Data Area, with 'Data Area' highlighted by a red circle. The main area displays a table titled 'Data Area Usage' with the following data:

Description of Value	in KB	in Pages	in %
Total Size	240.000	30.000	100
Used Area	100.920	12.615	42
Permanent used Area	100.824	12.603	42
Temporary Used Area	96	12	0
Free Area	139.080	17.385	58
Changed Since Last Data Backup	98.608	12.326	41

The *Data Area* can consist of several data volumes.

The *Total Size* shows the sum of the sizes of all data volumes.

You can see the filling level of the data area as well as the proportion of temporary data.

The data is automatically distributed to all volumes equally. You don't have to define table spaces.

Empty data pages are reused by the database automatically. No reorganization is necessary.

Memory Areas: Log Area



Database: EXPERTDB To 10.29.14.6
Status: since 07.10.200 10:09:42
Version: 7.7.06.15

Log Area Usage

Description of Value	in KB	in Pages	in %
Total Size	50.368	6.296	100
Log Segment Size	2.664	333	5
Used Log Area	1.408	176	3
Unsaved Log Area	1.408	176	3

Mirroring of Log Area: Not activated
Automatic Overwriting of Log Area: Not activated
Redo Log Administration: Switched on
Automatic Log Backup: Switched on

Last Log I/O Sequence Number: 24.608

The *Log Area* can consist of several log volumes - however they are used as one single log area.

The *Log Segment Size* determines how large the log backups are created by the *Automatic Log Backup*.

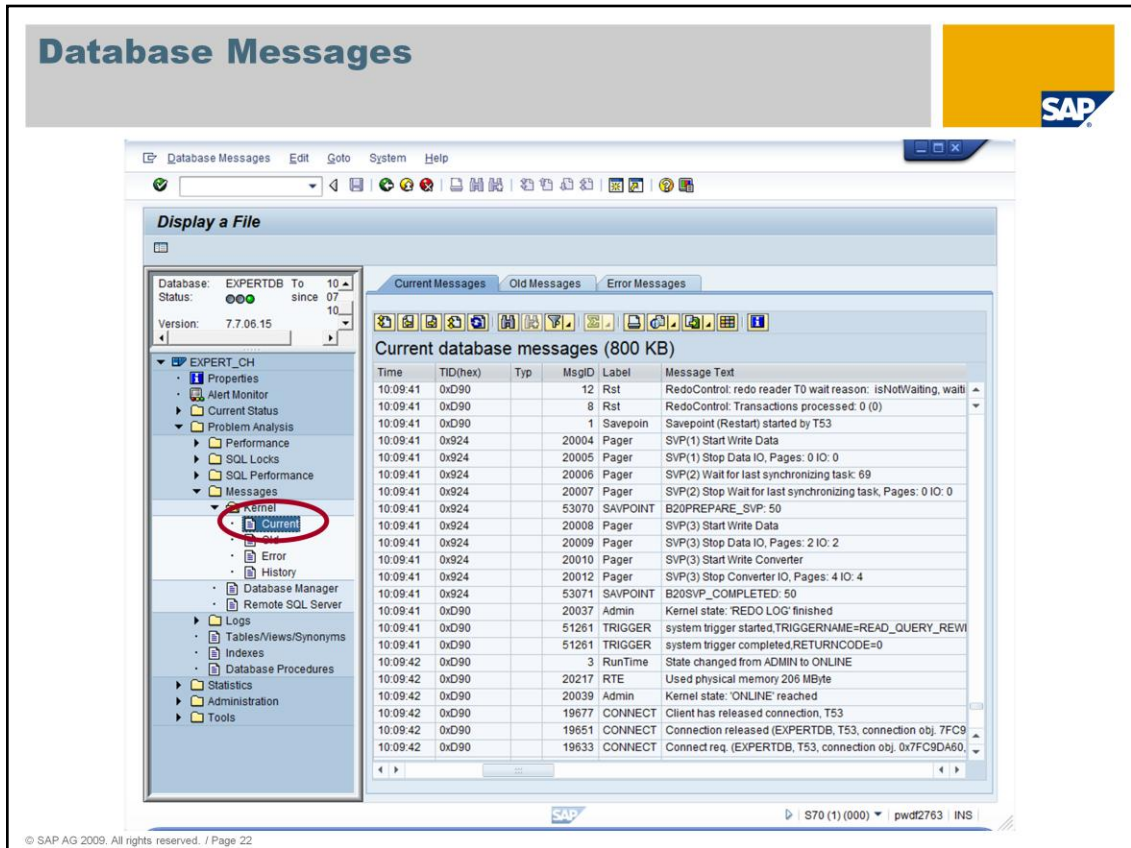
Whenever *Log Segment Size* log pages are written, they are copied to the log backup file and the pages in the log volume can be overwritten.

For test or demo systems it is possible to activate an overwrite mode for the log volumes - then you don't have to take log backups before the information on the log volume can be overwritten.

It is also possible to switch off the writing of log information.

Both of these possibilities are not recommended for productive systems as you won't be able to restore the database to the latest state.

Database Messages



This is an example for the *knldiag/knlmsg* file. It can be displayed using tree item *Problem Analysis -> Messages -> Kernel -> Current*.

File *knldiag/knlmsg* has a fixed size. It is initialized when the database is started.

The last version of this file is then copied to *knldiag.old/knlmsg.old*.

knldiag/Knlmsg consists of two parts:

the first part contains information about the database start and is not overwritten.

In the second part information is logged during the runtime of the database. This part is overwritten cyclically. The current write position is marked with '--- current write position ---'

In this example restart information is provided. You may check the proceeding of the restart, identify savepoint phases and watch redo states. When the database is online, connects are logged.

In case of problems with the database you should always check file *knldiag/knlmsg* for error messages.

Database Error Messages



The screenshot shows the SAP Database Messages window. The left sidebar displays a tree view with 'Error' selected under 'Messages'. The main area shows a table of 'Database Error Messages' with columns: Date, Time, TID(hex), Typ, MsgID, Label, and Message Text. The messages are dated 2009-10-23 at 13:51:39 and have a TID of 0xD54. The messages are categorized as 'ERR' and 'DIAG'. The message text includes stack traces and diagnostic information.

Date	Time	TID(hex)	Typ	MsgID	Label	Message Text
2009-10-23	13:51:39	0xD54	ERR	0	DIAG	0x7e410000 0x7e4a0000 C:\WINDOWS\sys...
2009-10-23	13:51:39	0xD54	ERR	0	DIAG	----> Symbolic stack backtrace <----
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	0: SQLMan_SyntaxTree:operator[] + 0x40
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	SFrame: IP: 0x006db320 (0x006db2e0+0x40) FP
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Params: 0x9f56f28
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Source: sqlman_syntaxtree.hpp:369
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Module: C:\maxdb\maxdb_77\pgmkernel.exe
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	1: Query_SyntaxTree:GenerateSQLStatement + (
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	SFrame: IP: 0x00b65b42 (0x00b65b20+0x22) FP
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Params: 0x79d96f28, 0x79d5ca30, 0x79d4015c
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Source: query_syntaxtree.cpp:84
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Module: C:\maxdb\maxdb_77\pgmkernel.exe
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	2: Query_ColumnSpec:GenerateSQLStatement
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	SFrame: IP: 0x00b819e2 (0x00b819b0+0x32) FP
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Params: 0x79d5ca30, 0x79d4015c
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Source: query_columnspec.cpp:105
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	Module: C:\maxdb\maxdb_77\pgmkernel.exe
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	3: Query_OutputColumn:GenerateSQLStatement
2009-10-23	13:51:43	0xD54	ERR	0	DIAG	SFrame: IP: 0x00b817b5 (0x00b817a0+0x15) FP

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This is an example for the *knldiag.err/knlmsgarchive* file.

It contains message '--- Starting...' whenever the database has been started from state OFFLINE to state ADMIN and another message when the database is stopped.

All other messages are error messages - e.g. information about a crashes, including a back trace which can be used by the developers to find the cause of the crash.

Database Terminations



The screenshot shows the SAP Message History window for database 'EXPERTDB'. The left navigation pane shows a tree structure with 'History' highlighted under the 'Kernel' folder. The main window displays a table of message files:

Time of File/Save	Type	Size	Date	Time
▼ History of Kernel Message Files				
· KnIMsg (03.09.2009 16:29:26)		1.113.417	26.08.2009	14:44:16
· KnIMsg (29.09.2009 13:16:37)		1.107.459	09.09.2009	17:14:13
· KnIMsg (02.10.2009 14:40:42)		1.108.587	02.10.2009	14:40:34
· KnIMsg (07.10.2009 08:30:04)		1.116.177	06.10.2009	20:38:04
· KnIMsg (07.10.2009 10:09:36)		1.114.658	07.10.2009	10:01:47
▶ 07.10.2009 10:09:36 (Terminatn)				
▼ 07.10.2009 08:30:05 (Terminatn)				
· KnIMsg		1.116.177	06.10.2009	20:38:04
· knldump		3.129.344	06.10.2009	20:38:01
· knltrace		6.873.088	06.10.2009	20:38:04
· rtdump			06.10.2009	20:37:53

If the database is not stopped correctly the most important log files are saved in the *DIAGHISTORY* folder during the next start of the database instance.

This ensures that they are not overwritten and can still be analyzed to determine the cause of the crash.

These files can be seen in the *History* section.

As a default two sets of log files are held in the *diaghistory*.

DBA History: Backup/Restore (DBMServer)



The screenshot displays the SAP Database Administration Actions window. The left sidebar shows a tree view under 'Problem Analysis' with 'DBA History' selected. The main area shows a table of 'Backups and Restores (DBM Server View)' with one entry: 'Data Backup' at 14.10.2009 13:10:31. A detailed log file is open, showing the following information:

```
File: F:\File ID: DBADTL#20091014131031.sda
*** DBA Action starts:
Timestamp: 20091014131031  Function: sda  Object: DATA
*** SAVE/RESTORE request:
SAVE DATA QUICK TO 'c:\maxdb\backup\data\EXPERT_CH_FULL' FILE BLOCKSIZE 8 NO CHECKPOINT MEDIUM
*** SAVE/RESTORE request accepted:
OK
*** SAVE/RESTORE result:
OK
Returncode: 0
Date: 20091014
Time: 00131031
Server: BER000185327A.dhcp.ber.sap.corp
Database: EXPERTDB
Kernel Version: Kernel 7.7.06 Build 016-123-219-400
Pages Transferred: 1924
Pages Left: 0
Volumes: 1
Medianame: EXPERT_CH_FULL
Location: c:\maxdb\backup\data\EXPERT_CH_FULL
ErrorText:
Label: DAT_000000008
Is Consistent: TRUE
First LOG Page: 25348
Last LOG Page:
DB Stamp 1 Date: 20091014
DB Stamp 1 Time: 00131031
DB Stamp 2 Date:
DB Stamp 2 Time:
Page Count: 12593
Devices Used:
Database ID: BER000185327A.dhcp.ber.sap.corp:EXPERTDB_20090625_103808
Max Used Data Page: 0
Converter Page Count: 19
```

The *DBA History* contains information about administrative tasks and is available in *Problem Analysis* -> *Logs* -> *DBA History*.

E.g. you can see information about executed backup and recovery actions or consistency checks.

You can display a detailed log file for each of these actions. To do so perform a double-click on the corresponding entry or use the marked button.

The *log file* of a backup contains the backup command and its return code and detailed information like:

- the creation date of the backup
- the number of pages transferred
- the backup label
- the location of the backup file

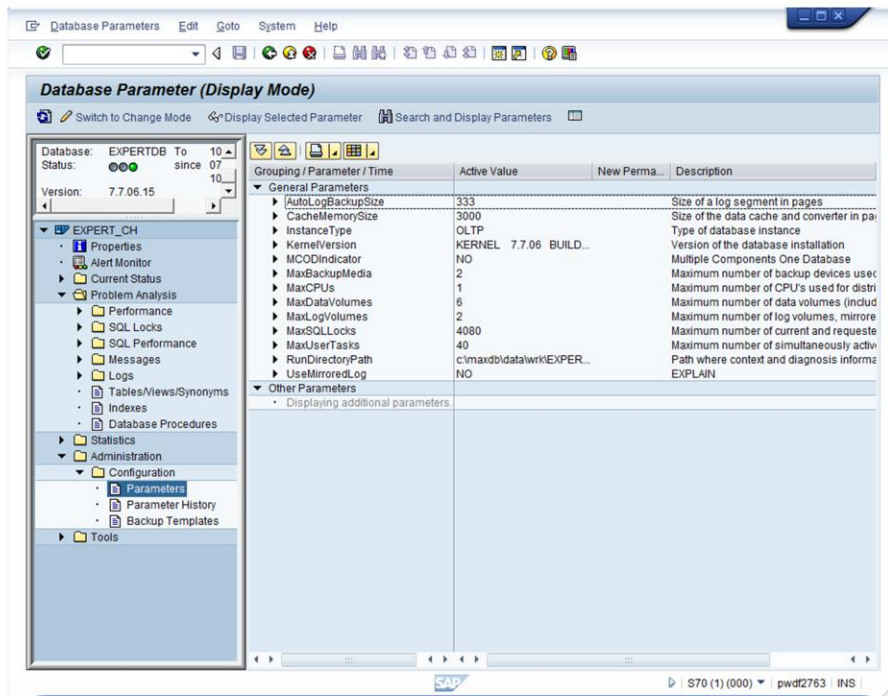
DBA History: Backup/Restore (Kernel)



Backup Label	Action ID	Error Co.	Start Date	Start Time	End Date	End Time	Number of...	L...	Bac
LOG_000000015	SAVE WARM	0	30.09.2009	02:49:27	30.09.2009	02:49:28	344	LOC	
LOG_000000014	SAVE WARM	0	30.09.2009	02:49:26	30.09.2009	02:49:27	344	LOC	
LOG_000000013	SAVE WARM	0	30.09.2009	02:49:25	30.09.2009	02:49:26	344	LOC	
LOG_000000012	SAVE WARM	0	30.09.2009	02:49:24	30.09.2009	02:49:25	344	LOC	
LOG_000000011	SAVE WARM	0	30.09.2009	02:49:23	30.09.2009	02:49:24	344	LOC	
LOG_000000010	SAVE WARM	0	30.09.2009	02:49:22	30.09.2009	02:49:23	344	LOC	
LOG_000000009	SAVE WARM	0	30.09.2009	02:49:21	30.09.2009	02:49:22	344	LOC	
LOG_000000008	SAVE WARM	0	30.09.2009	02:49:18	30.09.2009	02:49:21	344	LOC	
LOG_000000007	SAVE WARM	0	30.09.2009	02:49:14	30.09.2009	02:49:17	344	LOC	
LOG_000000006	SAVE WARM	0	30.09.2009	02:49:13	30.09.2009	02:49:14	344	LOC	
LOG_000000005	SAVE WARM	0	30.09.2009	02:49:12	30.09.2009	02:49:13	344	LOC	
LOG_000000004	SAVE WARM	0	30.09.2009	02:49:11	30.09.2009	02:49:12	344	LOC	
LOG_000000003	SAVE WARM	0	30.09.2009	02:49:09	30.09.2009	02:49:11	344	LOC	
LOG_000000002	SAVE WARM	0	30.09.2009	02:49:09	30.09.2009	02:49:09	344	LOC	
LOG_000000001	SAVE WARM	0	30.09.2009	02:49:08	30.09.2009	02:49:09	344	LOC	
DAT_000000005	SAVE WARM	0	25.08.2009	10:38:06	25.08.2009	10:38:23	12600	NO	EXF
	HISTLOST	0	24.08.2009	13:06:42					
DAT_000000004	SAVE WARM	0	03.08.2009	11:39:54	03.08.2009	11:39:59	6472	NO	EXF
	HISTLOST	0	03.08.2009	11:27:07					
DAT_000000003	RESTORE	0	03.08.2009	11:26:47	03.08.2009	11:26:50	6488	NO	EXF
	HISTLOST	0	03.08.2009	11:26:47					
	HISTLOST	0	03.08.2009	11:25:17					
	HISTLOST	0	03.08.2009	11:25:17					

This is the *Backup History* from the point of view of the database kernel. Each log backup action might create several log backup files - each of the size of one log segment. The HISTLOST entries are created whenever the log volumes are initialized - e.g. during the installation. Then you have to create a complete backup again to start a new backup history.

Parameter Settings



You can check the current parameter settings and the change history of each parameter. Therefore open the tree item *Administration -> Configuration -> Parameters*.

To be able to change the parameter settings you have to switch to the change mode.

Most parameters can be changed in online mode and take effect immediately. For some parameters it is necessary to restart the database before they are valid.

(See note #814704 for online changeable parameters).

Parameter History

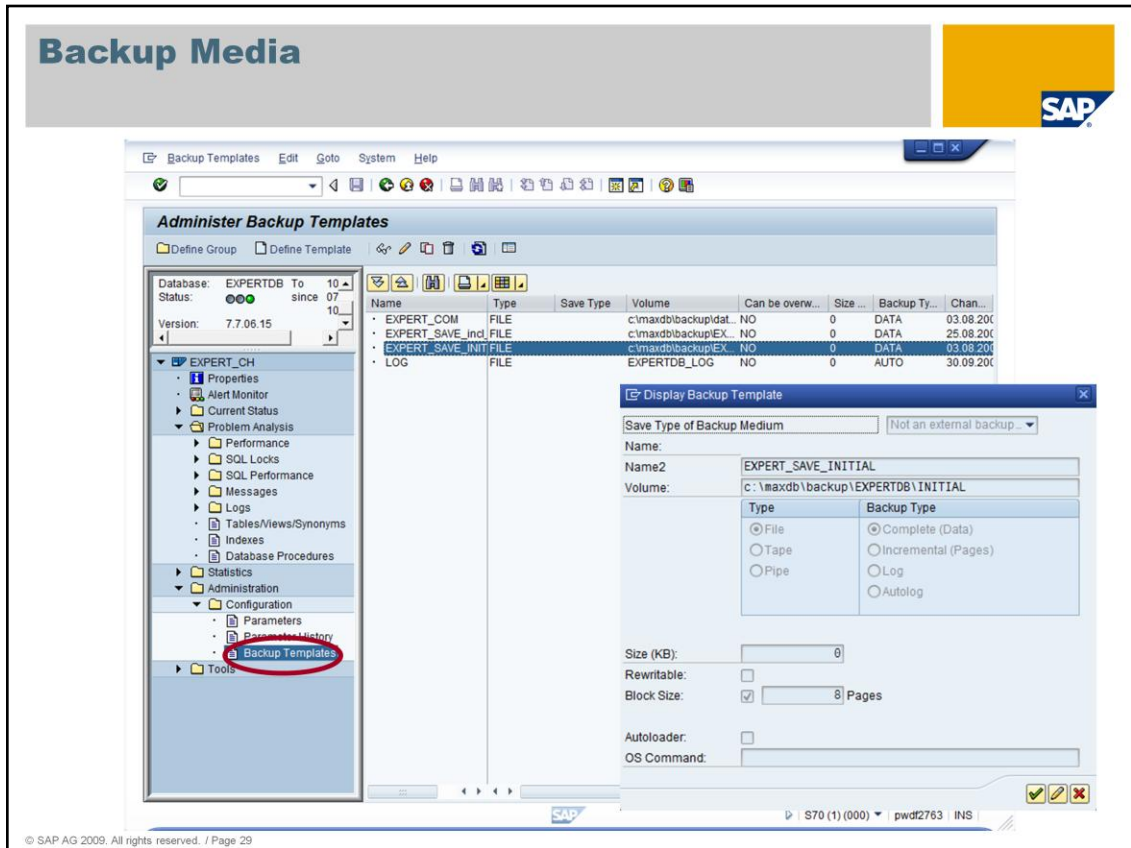


The screenshot displays the SAP DB Parameter History tool interface. The main window is titled "Database Parameter History" and shows a list of parameter changes for the database "EXPERTDB". The interface includes a navigation pane on the left with a tree view showing the database structure, including "Administration" and "Configuration". The main area displays a table with columns for "Date / (Time)", "Parameter", "New Value", and "Old value". The table lists various parameters such as "LogVolumeName001", "LogVolumePartition001", "LogVolumeSize001", "DataVolumeName0001", "DataVolumeSize0001", "DataVolumeType0001", "RunDirectoryPath", "ADMIN", "AUTOSAVE", "BACKUPRESULT", "CALLSTACKLEVEL", "CHECKDATA", "CHECK_BACKUP", "CHECK_QUERYREWRITE", "CHECK_TABLE_WIDTH", "COLUMNCOMPRESSION", "CallStackLevel", "CheckBackup", "CheckQueryRewrite", "DATABASEFULL", "DBAnalyzerDays", "DBFILLINGABOVELIMIT", "DBFILLINGBELOWLIMIT", "DDLTRIGGER", "DataOCclusterMode", "DeprecatedParameter19", "DeprecatedParameter20", "DeprecatedParameter37", and "ENABLE_SYSTEM_TRIG". The status of each parameter is indicated by a green dot (active) or a red dot (inactive). The status bar at the bottom shows "S70 (1) (000)", "pwdf2763", and "INS".

Date / (Time)	Parameter	New Value	Old value
30.09.2009			
13.08.2009			
03.08.2009	LogVolumeName001	c:\MAXDB\volumes\EXPERTDB\LOG_0...	c:\sdb\MYDB\volumes\LOG_001
11.24.48	LogVolumePartition001	1	
11.24.48	LogVolumeSize001	6400	1250
11.24.48	LogVolumeType001	F	F
11.24.10	DataVolumeName0001	c:\maxdb\volumes\EXPERTDB\DAT_0...	c:\sdb\MYDB\volumes\DAT_0001
11.24.10	DataVolumeSize0001	10000	10000
11.24.10	DataVolumeType0001	F	F
11.20.51	RunDirectoryPath	c:\maxdb\data\wrk\EXPERTDB	c:\sdb\data\wrk\MYDB
11.20.22	ADMIN	<<parameter inactive>>	
11.20.22	AUTOSAVE	<<parameter inactive>>	
11.20.22	BACKUPRESULT	<<parameter inactive>>	
11.20.22	CALLSTACKLEVEL	<<parameter inactive>>	
11.20.22	CHECKDATA	<<parameter inactive>>	
11.20.22	CHECK_BACKUP	<<parameter inactive>>	
11.20.22	CHECK_QUERYREWRITE	<<parameter inactive>>	
11.20.22	CHECK_TABLE_WIDTH	<<parameter inactive>>	
11.20.22	COLUMNCOMPRESSION	<<parameter inactive>>	
11.20.22	CallStackLevel	0	
11.20.22	CheckBackup	NO	
11.20.22	CheckQueryRewrite	0	
11.20.22	DATABASEFULL	<<parameter inactive>>	
11.20.22	DBAnalyzerDays	0	
11.20.22	DBFILLINGABOVELIMIT	<<parameter inactive>>	
11.20.22	DBFILLINGBELOWLIMIT	<<parameter inactive>>	
11.20.22	DDLTRIGGER	<<parameter inactive>>	
11.20.22	DataOCclusterMode	MIXED	
11.20.22	DeprecatedParameter19	NO	
11.20.22	DeprecatedParameter20	8192	
11.20.22	DeprecatedParameter37	1	
11.20.22	ENABLE_SYSTEM_TRIG	<<parameter inactive>>	

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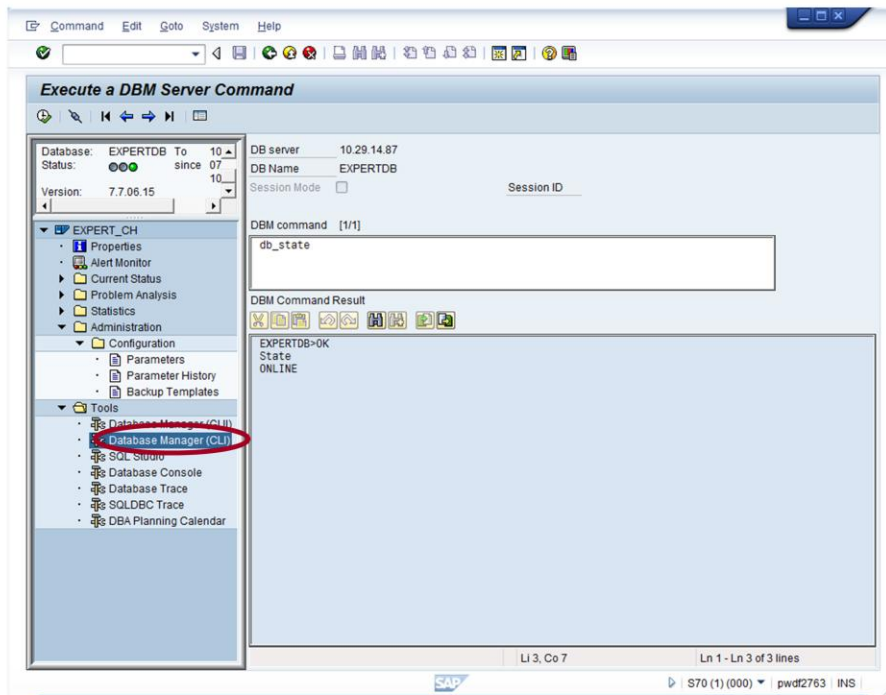
In the *Parameter History* you can check when and how database parameters have been changed.



The *Backup Templates* section provides an overview of all defined backup templates. It is also possible to define new backup templates. For faster backups SAP MaxDB supports parallel backups to several files/tapes/pipes. Therefore a template group has to be defined which consists of several single backup templates. If a template group is used for a backup the data is distributed to the specified files/tapes/pipes. These are created in parallel which makes the backup faster. In case of a recovery all files/tapes/pipes used for the backup are needed. However, parallel created files/tapes/pipes can also be restored sequentially.

The following external backup tools can be used to create backups:

- Tivoli Storage Manager
- Networker
- Tools which support the Interface BackInt for Oracle or Backint for SAP MaxDB



In the *Tools* section you can execute *Database Manager CLI* commands.

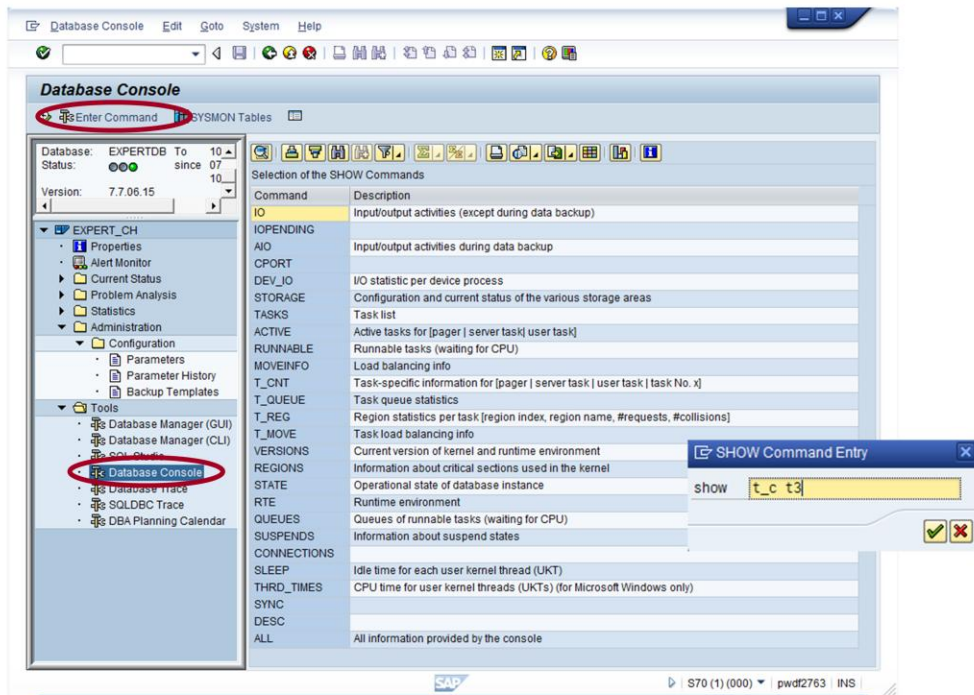
Some of the most important commands are:

db_state – determines the database state

dbm_version – determines the version of the dbmserver

db_offline – stops the database instance – should not be executed for the systems own database instance!

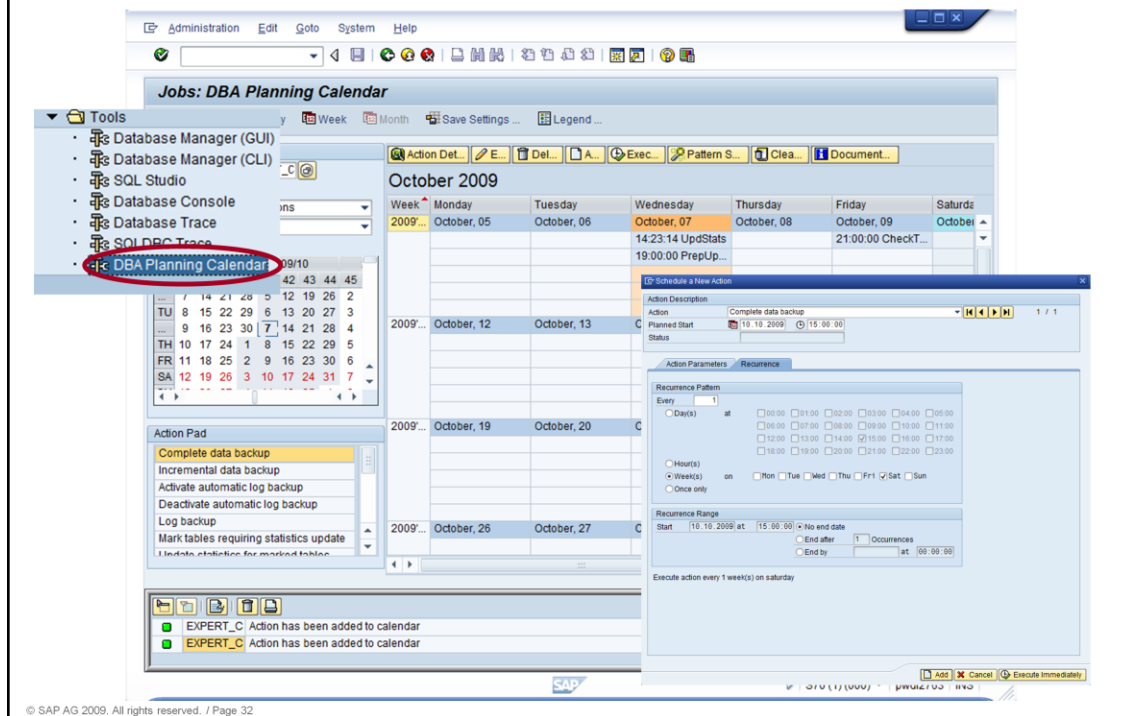
db_online - starts the database instance



In the *Tools* section you'll find a list of commands that can be issued in the *Database Console*.

If you choose the button „Enter Command“ you can directly specify commands for the Database Console tool x_cons which might be some more sophisticated.

DBA Planning Calendar



The *DBA Planning Calendar* allows to schedule important database tasks like backups or consistency checks (like transaction DB13/DB13C in earlier SAP releases). Double-click a line in the calendar view or in the *Action Pad* to schedule a task.

For some tasks parameters are necessary – e.g. the backup template for a backup. These parameters can be specified in this window. Furthermore you can specify if the task should be executed immediately or if it should be executed at a specific date/time and if it should be executed in a certain interval (daily, weekly, every few hours, ...)

DBA Planning Calendar



Display Details of Action

Action Description

Action: Update statistics for marked tables

Planned Start: 07.10.2009 21:00:00

Status: Finished successfully

Action Started: 07.10.2009 21:00:00

Action Finished: 07.10.2009 21:01:09

Action Parameters Job Log Program Log

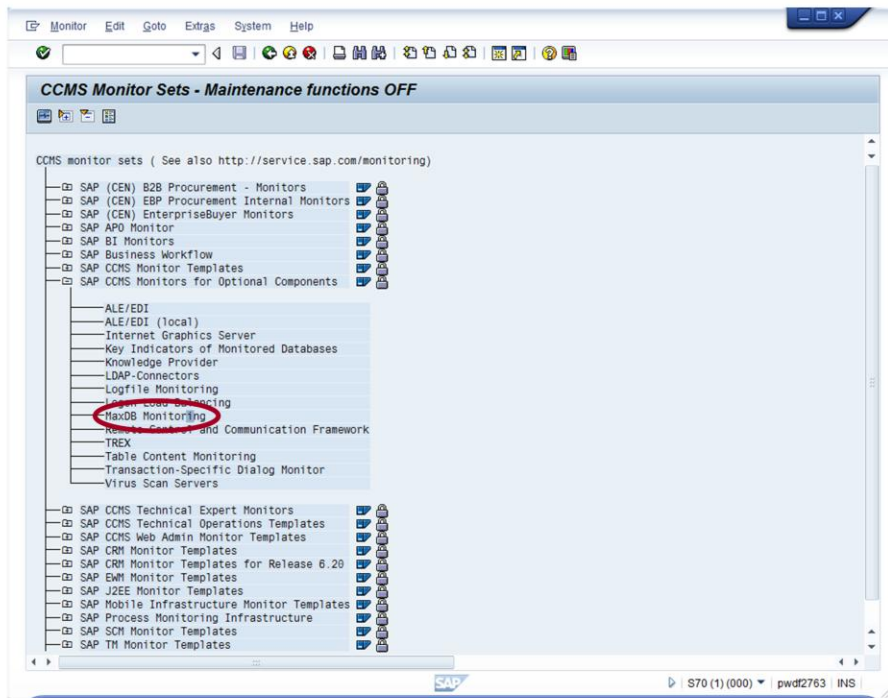
Date	Time	Message
07.10.2009	21:00:55	Job started
07.10.2009	21:00:55	Step 001 started (program RSDBAJOB, var
07.10.2009	21:00:55	Job finished
07.10.2009	21:00:56	Job started
07.10.2009	21:00:56	Step 001 started (program RSADALIP3, var
07.10.2009	21:01:09	The action was performed successfully
07.10.2009	21:01:09	Job finished

Action Parameters Job Log Program Log

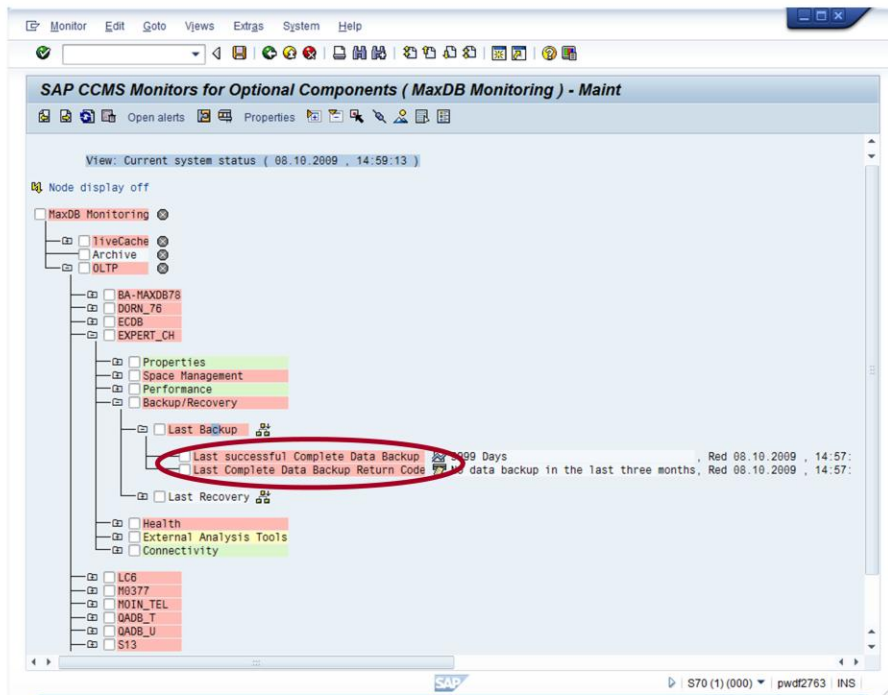
```
Start Update Statistik (REFRESH_ESTIMATE) : Wed Oct 07 21:00:57 2009
-----
DATABASE      : MONA0BERD00185327A-EXPERTDB
MAXDB version : Kernel 7.7.06 Build 015-123-212-657
trace level   : 0
UPDATE STAT "HOTEL"."BKEX" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."BKPF" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."CITY" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."CUSTOMER" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."EMPLOYEE" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."HOTEL" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."RESERVATION" ESTIMATE , rc = 0
UPDATE STAT "HOTEL"."ROOM" ESTIMATE , rc = 0
-----
executed      :      8 tables | UPD STAT COLUMN :      0 tables
UPD STAT errors :      0 tables | UPD STAT TABLE :      8 tables
UPD STAT excluded :      0 tables |
-----
End Update Statistik (REFRESH_ESTIMATE), rc = 0 : Wed Oct 07 21:01:09 2009
```

Continue Re-Execute Cancel

If you perform a double-click on a finished action you can have a look at the log files of this task.



If you want to have a look at monitoring information call transaction RZ20. Under *SAP CCMS Monitors for Optional Components* you find *MaxDB Monitoring*.



The *Alert Monitor* collects e.g. data concerning the filling level of the log and the data area, the cache hit ratio and the creation of backups.

If you perform a double-click on a node in the tree, you get detailed information about this node - e.g. the backup history. In this example no data backup exists.

Creating a Complete Backup

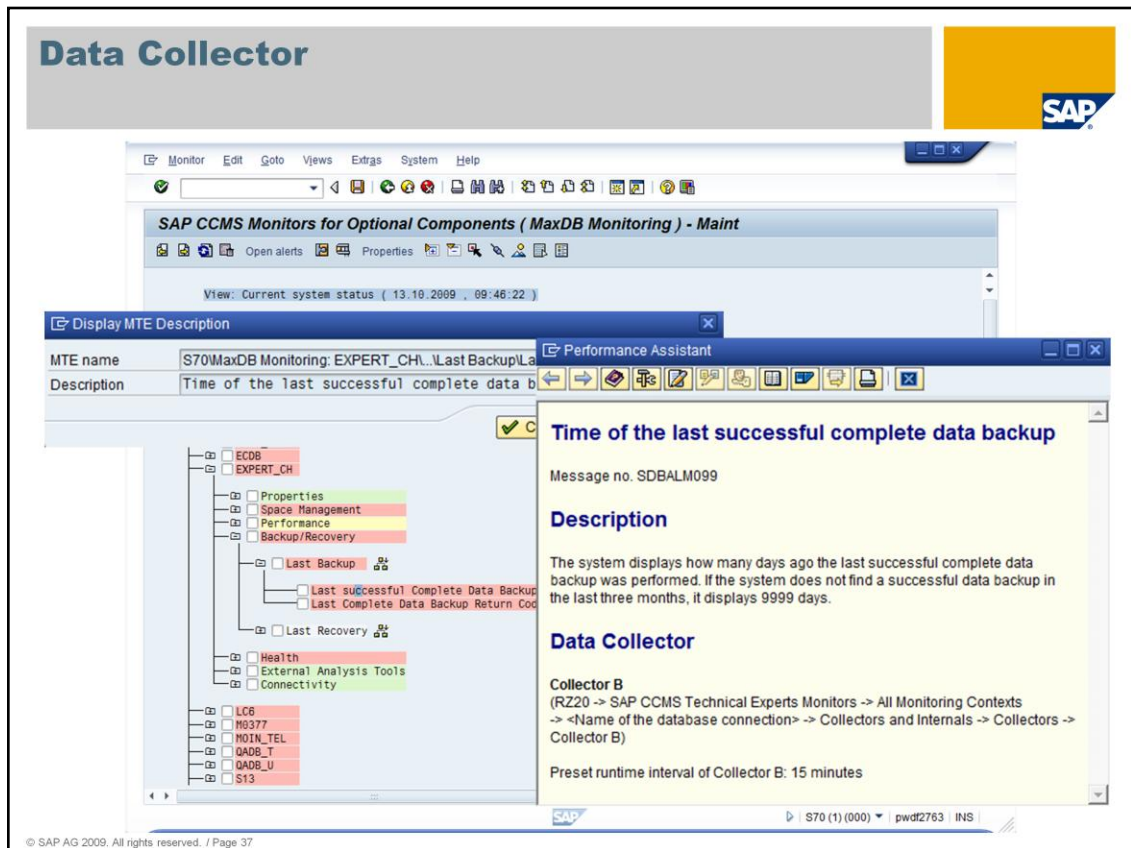


The screenshot displays the SAP DBA Planning Calendar interface. The main window is titled "Jobs: DBA Planning Calendar" and shows a calendar for October 2009. A "Schedule a New Action" dialog box is open, allowing the user to configure a backup action. The dialog includes the following fields and options:

- Action Description:** Complete data backup
- Action:** Complete data Backup
- Planned Start:** 13.10.2009, 09:30:50
- Status:** 1 / 1
- Backup Template:** EXPERT_CCM
- Buttons:** Reread Backup Templates, Define New Backup Templates
- Action Pad:** Complete data backup, Incremental data backup, Activate automatic log backup, Deactivate automatic log backup, Log backup, Mark tables requiring statistics update, Update statistics for marked tables, Update all optimizer statistics, Check database structure, Check database structure (only tables)

The calendar shows a grid of dates from October 12 to October 16, 2009. The "Action Pad" on the left lists various database maintenance tasks. The bottom status bar shows the user ID "S70 (1) (000)", the password "pwdf2763", and the instance "INS".

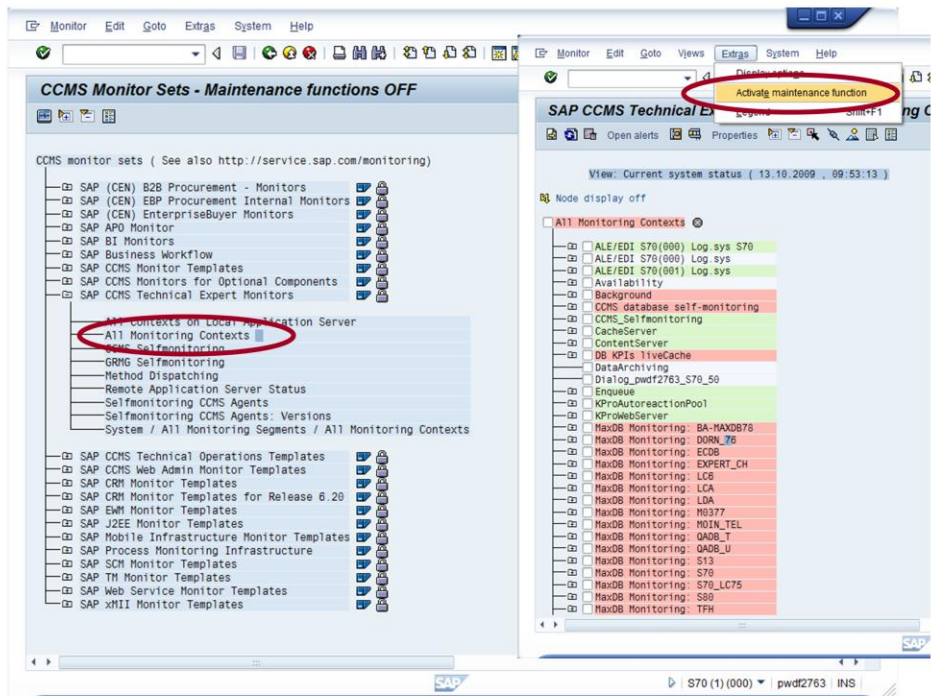
You can use the *DBA Planning Calendar* to create the backup.



For the *MaxDB Alert Monitor* there are 4 data collectors which collect the data for all nodes. These collectors run in different intervals.

After you have solved the problem, you can either wait until the responsible data collector runs the next time or start the data collector manually. To figure out which data collector is responsible for this node, place the cursor on this node and press *F1* then choose *Long Text*.

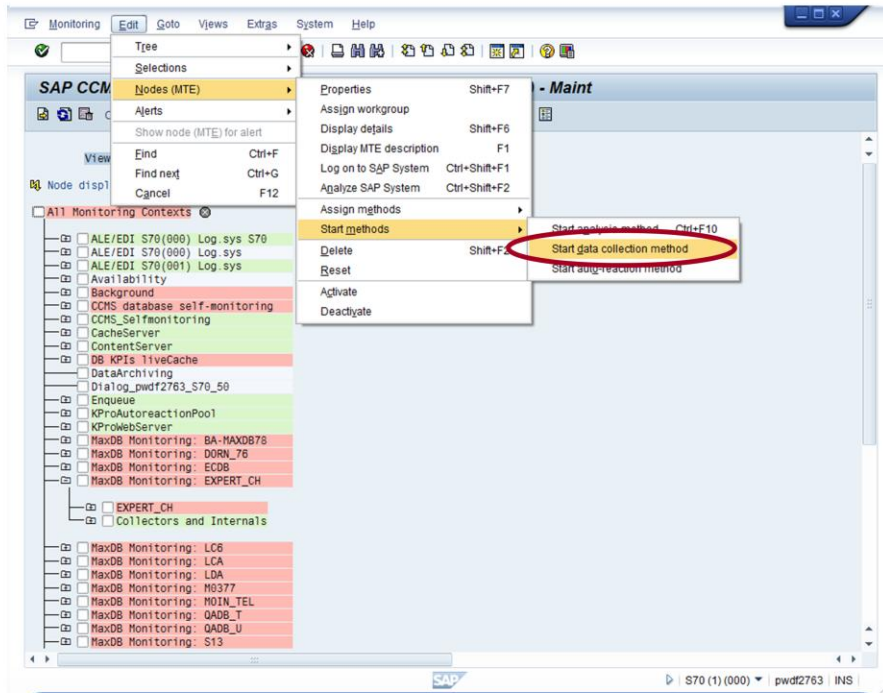
Manual Start of Data Collection for Alert Monitor



To be able to start the data collector, you have to activate the maintenance function in transaction RZ20. Choose *CCMS monitor sets -> SAP CCMS Technical Expert Monitors -> All Monitoring Contexts*.

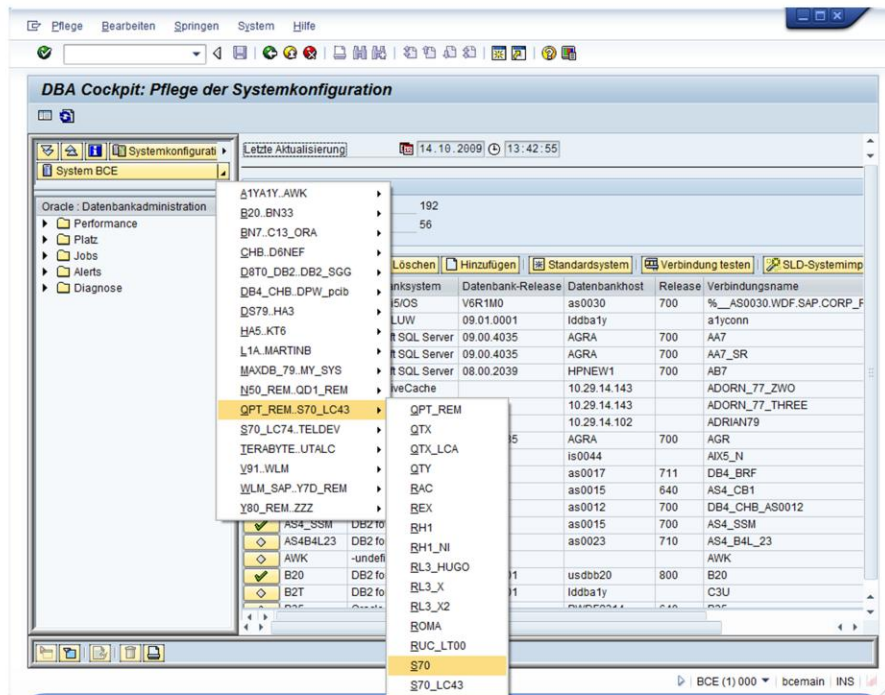
Then choose *Extras -> Activate maintenance function*.

Start Data Collection Method



Then you can select the data collector (make sure the checkbox is marked) and choose *Edit -> Nodes (MTE) -> Start methods -> Start data collection method*. If you *refresh* the display in RZ20 then, the backup node will be green.

Preview of DBACockpit



DBACockpit functionality will sooner or later replace *DB50* and *DB59*.

You will find all functions described so far also in a newly ordered tree of *DBACockpit*. Furthermore if you have to administer different databases you will locate similar administrative tasks under the same titles.

Firstly choose the database in a list of system names which are ordered alphabetically.

The screenshot displays the SAP DBACockpit interface. The left sidebar shows a tree view with 'System S70' selected, and 'Current Status' expanded to show 'Attributes'. The main area is titled 'Attributes' and contains the following information:

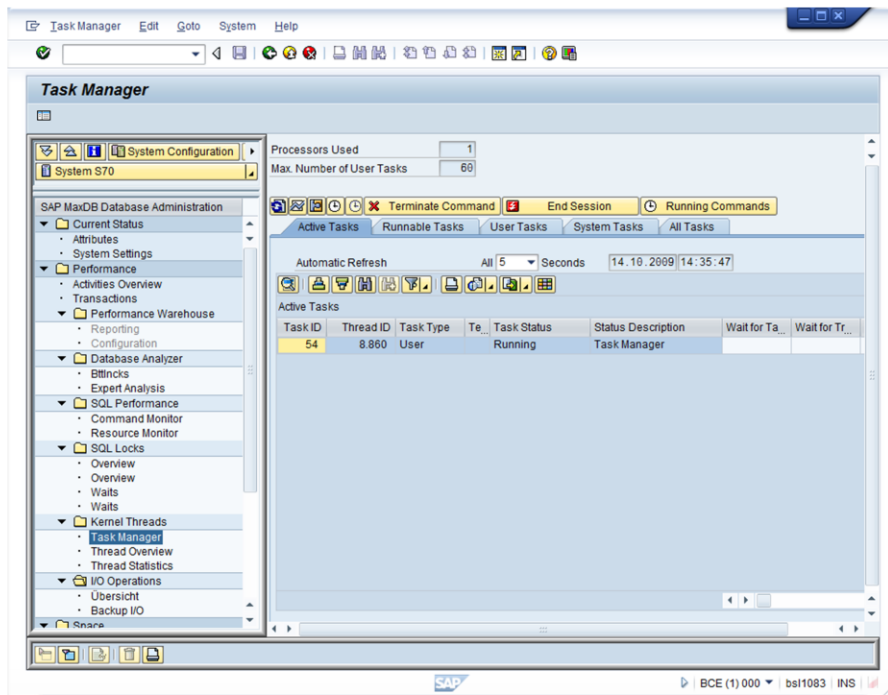
Status		Last Update	
Name of Database Connection	S70	Version	7.7.04.16
Operational State	CO	Online Since	03.08.2009 09:41:20
Standard Database User	SAPS70	SQL access is possible	Yes
DBM Operator	CONTROL	DBM access is possible	Yes

Attributes	
Database Name	S70
Database Server	pwdf2763

Settings			
Automatic Log Backup	ON	Command Monitor	OFF
Database Analyzer	ON	Resource Monitor	OFF
Database Trace		Database Trace	OFF
Snapshot exists	No		

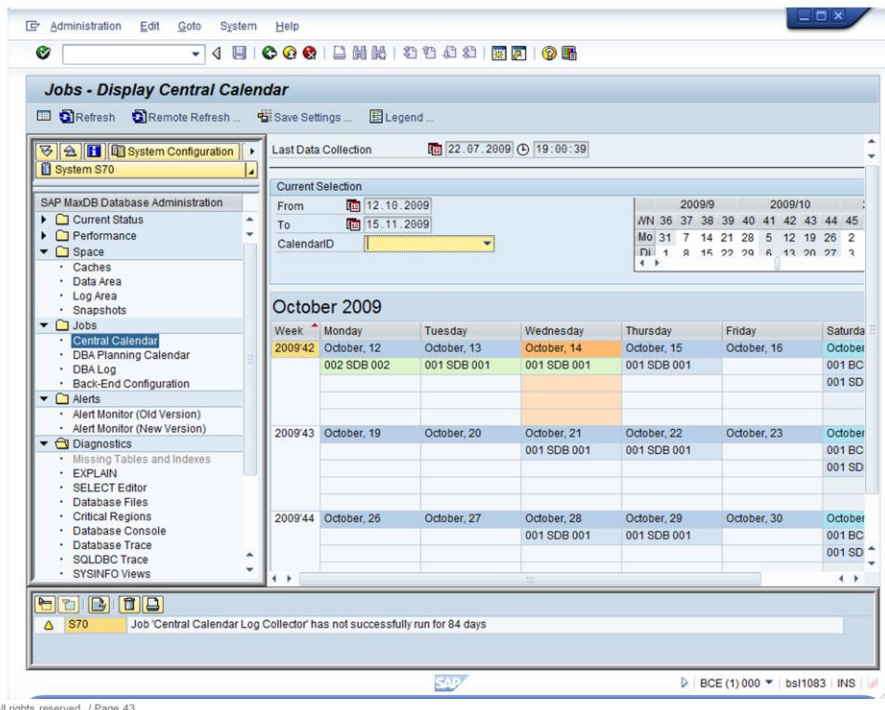
At the bottom of the interface, the status bar shows '© SAP AG 2009. All rights reserved. / Page 41' and system information: 'BCE (1)000 | bsl1083 | INS'.

Under *Current Status* -> *Attributes* you'll find some general information about the database that was located under *Properties* before. An overview of the most important settings is provided to get a first impression of the database state and which monitoring is activated.



Under *Performance* all functionality is summarized that might help to investigate performance problems on your system. The known MaxDB tools Database Analyzer, Command and Resource Monitor are located here. As SQL locks that are hold too long or erroneously might seriously affect the performance of a system relevant information can also be found under this subtree.

Details about kernel thread behaviour and their states can be found in the *Kernel Thread* section, administrative tasks are possible with the known task manager (e.g. cancelling of a command or ending a task). I/O operations can be checked as well.

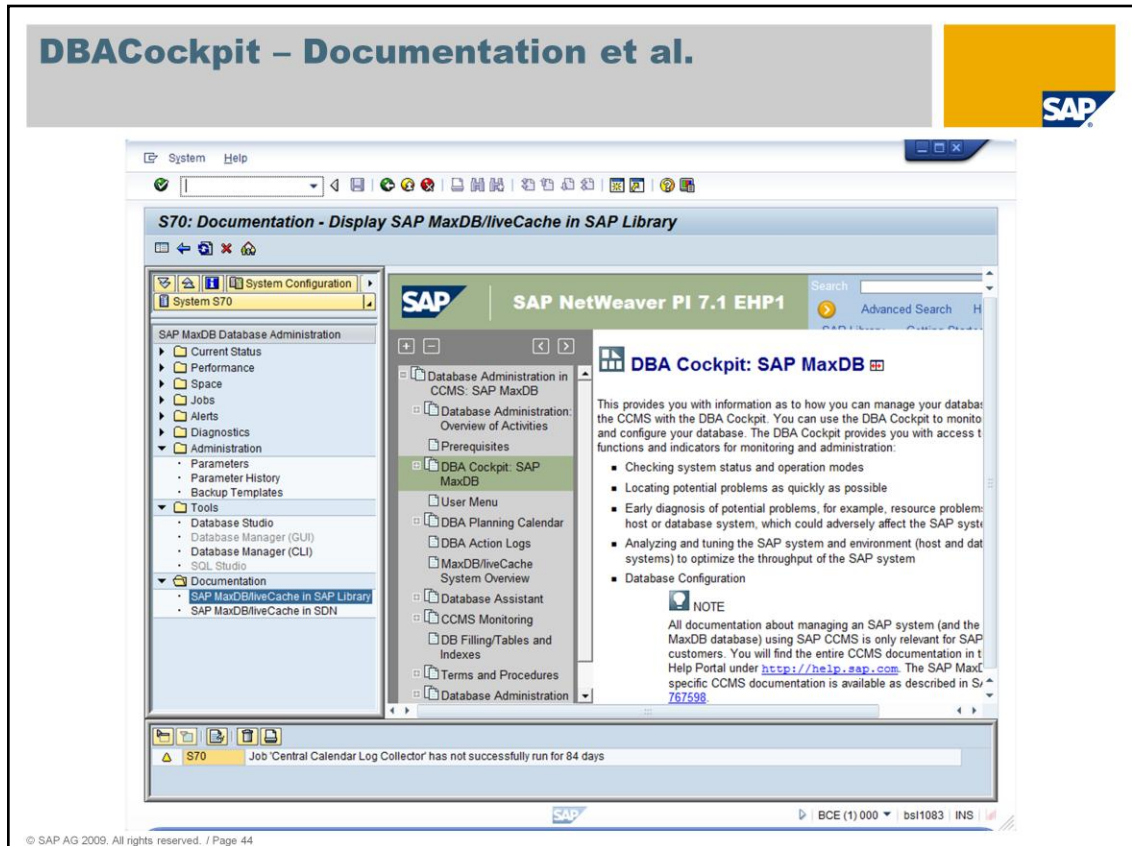


Under *Space* different filling levels can be checked. Hit ratios of the caches are provided as well as filling degree of the data and log area on the disks.

Scheduling of actions like backup, update statistics and check data is located under *Jobs* and can be done with the *Central Calendar*.

The *Alert Monitor* is integrated in DBACockpit.

Tracing possibilities and different tools for error diagnosis can be found under *Diagnostics*. Direct access to the diagnosis files is provided here.



As known from DB50 under *Administration* database parameters can be checked and backup templates created and maintained.

Direct access to the MaxDB tools is provided under *Tools*.

Find more detailed information about MaxDB/liveCache and the DBACockpit in the documentation which can be accessed directly.

Transactions DB59 and DB50 help you to monitor and administer all SAP MaxDB databases in your system landscape.

- Transaction DB59 is the central entry point where the databases can be integrated into the monitoring system. Using this transaction you can easily switch to the Database Assistant for each of your databases.
- Transaction DB50 is the Database Assistant which allows to monitor your SAP MaxDB database.
- The DBA Planning Calendar enables you to schedule important database tasks like backups or consistency checks.
- In transaction RZ20 a special branch for the SAP MaxDB instances can be created, so that critical situations are reported using the SAP Alert concept.
- DBACockpit is the administrative transaction of the future.

Now you know how to integrate all SAP MaxDB databases into a central monitoring system. You got an impression of the numerous functions of transaction DB50 to monitor and administer SAP MaxDB databases. You also know how to schedule administrative tasks in the planning calendar and how to check the log files of these actions.

Questions and Answers



Thank You!

Bye, Bye – And Remember Next Session



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