SAP® MaxDB™ Expert Sessions

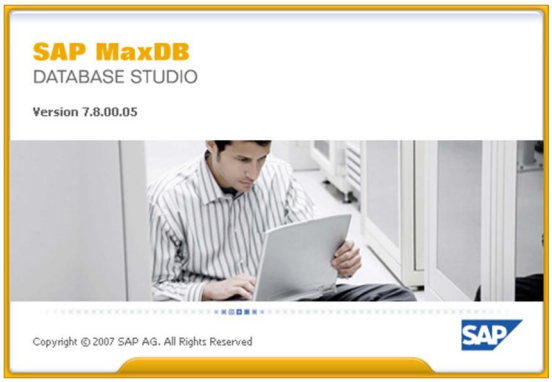
Session 2:
Basic Administration with Database Studio

Martin Koerner, SAP AG
Thorsten Zielke, SAP AG

November 3, 2009

THE BEST-RUN BUSINESSES RUN SAP™

Objective of this session



- How to use the new tool Database Studio
- Get a feeling of the range of functions
- Make it easier to learn the ropes

© SAP AG 2009. All rights reserved. / Page 2

Agenda

1. Introduction
   - 1.1. Prime advantages of Database Studio
   - 1.2. Preliminary remarks
   - 1.3. Screen areas
2. Database administration using Database Studio
   - 2.1. Add existing and create new database instances
   - 2.2. Using the administration editor
3. Managing SQL objects in Database Studio
4. Running SQL commands via Database Studio
5. Useful information resources

© SAP AG 2009. All rights reserved. / Page 3

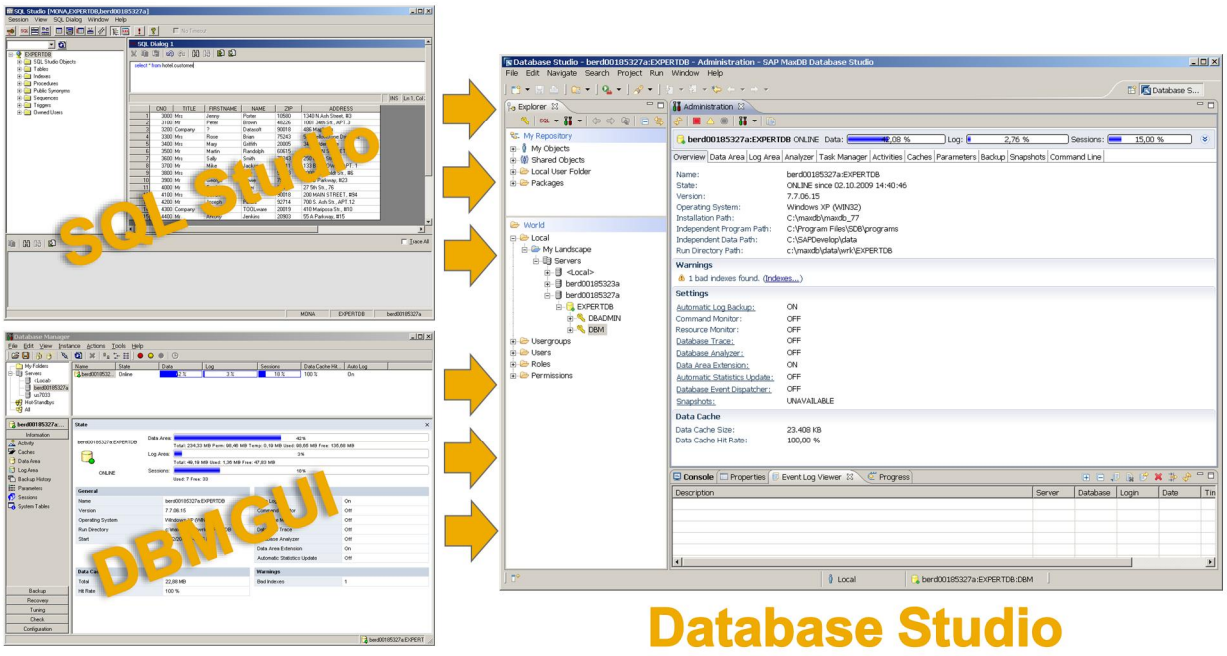
Agenda

Please read the notes of the slides !

© SAP AG 2009. All rights reserved. / Page 4

1. Introduction

1.1 Prime advantages of Database Studio (1)



© SAP AG 2009. All rights reserved. / Page 5

Database Studio is the new tool to administrate SAP MaxDB database instances as of version 7.5.

It replaces the previous tools Database Manager GUI and SQL Studio from SAP MaxDB version 7.7 onwards and is a component of the SAP MaxDB software.

Database Studio, Database Manager GUI and SQL Studio can be installed on the same server.

In addition Database Studio integrates a user interface for functionality of SAP MaxDB tool Loader.

Database Studio is not bound to the Windows platform as the previous tools.

At present it is available for Linux and for Windows.

1. Introduction

1.1 Prime advantages of Database Studio (2)

Summary of most important tasks which can be performed with Database Studio:

- create, configure, monitor databases
- define, change, delete database objects
- backup and restore databases
- import and export data
- creating users
- performance analysis
- access to log files
- execute arbitrary SQL commands (complying SQL standard)

© SAP AG 2009. All rights reserved. / Page 6

Database Studio runs on the Eclipse platform.

To use Database Studio Java runtime environment version >= 5 has to be installed before.

Working with Database Studio requires that the SAP MaxDB X Server (communication server) has been started (if not done already Database Studio automatically starts X Server upon program startup).

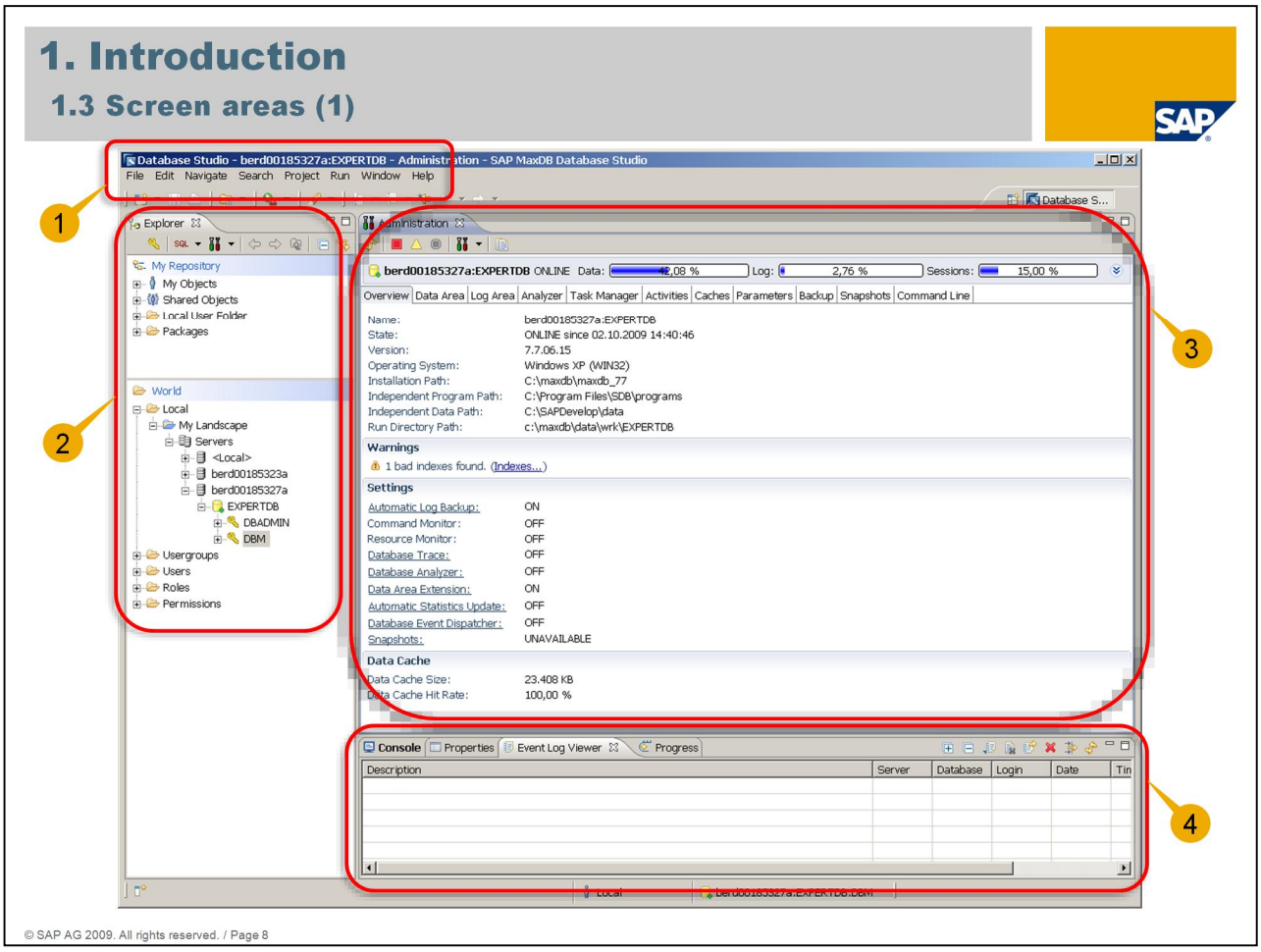
Database Studio can be started directly via shortcut or from command line : <independent_program_path>\DatabaseStudio\dbstudio[.exe].

Different call options are possible (e.g. to preselect a landscape or database within the explorer tree).

After started for the first time a “Welcome Page” is displayed which allows access to some related resources like documentation, tutorials and websites.

To start working with Database Studio choose “Workbench”.

Please note: The installation of Database Studio includes the update of parts of the independent MaxDB software to the software version of Database Studio (if no higher version is already installed).



Within Database Studio Perspective there are different screen areas:

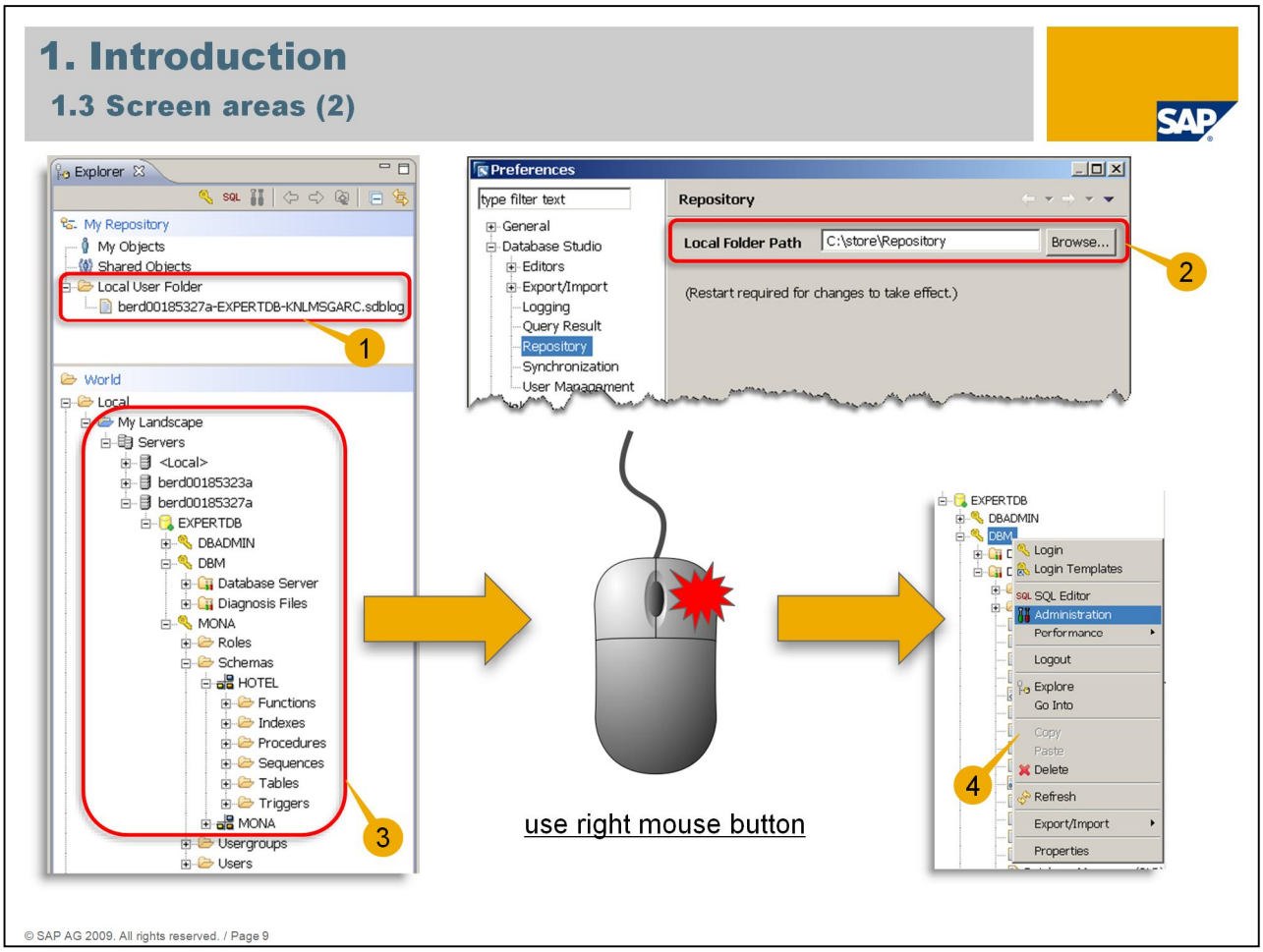
~ at the top: Menu (1)

~ on the left: view for Repository, Explorer tree (2)

~ main window: editor (3)

~ at the bottom: view for console, event log etc. (4)

Views can be hidden to have more space for the editor .



My repository: Local User folder is used as tray for saved files (1).

To configure via “Window” – “Preferences” – “Database Studio” – “Repository” (2).

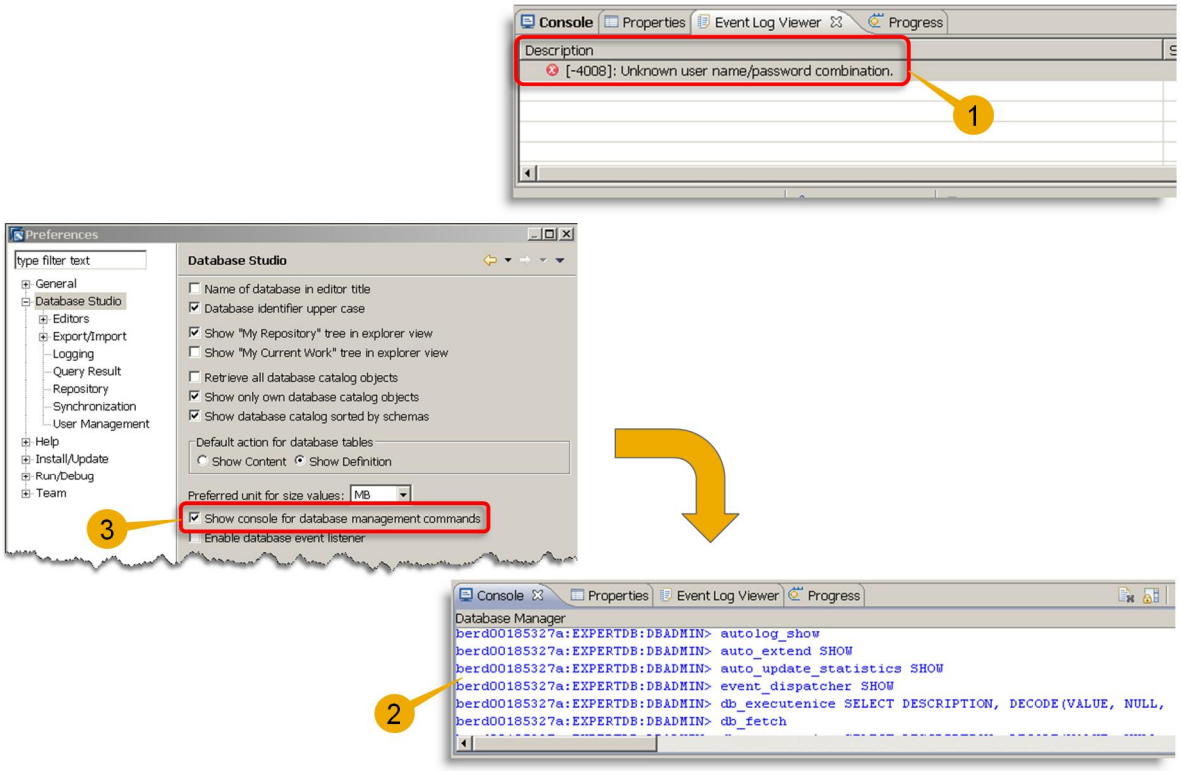
Various settings for Database Studio can be configured via “Preferences” in menu “Window”.

Explorer tree hierarchy: Landscape - Servers - particular server - database name - database users - tree elements depending on user rights (3).

Navigation in Database Studio mainly is done via context menus (activated by right mouse button) (4).

1. Introduction

1.3 Screen areas (3)

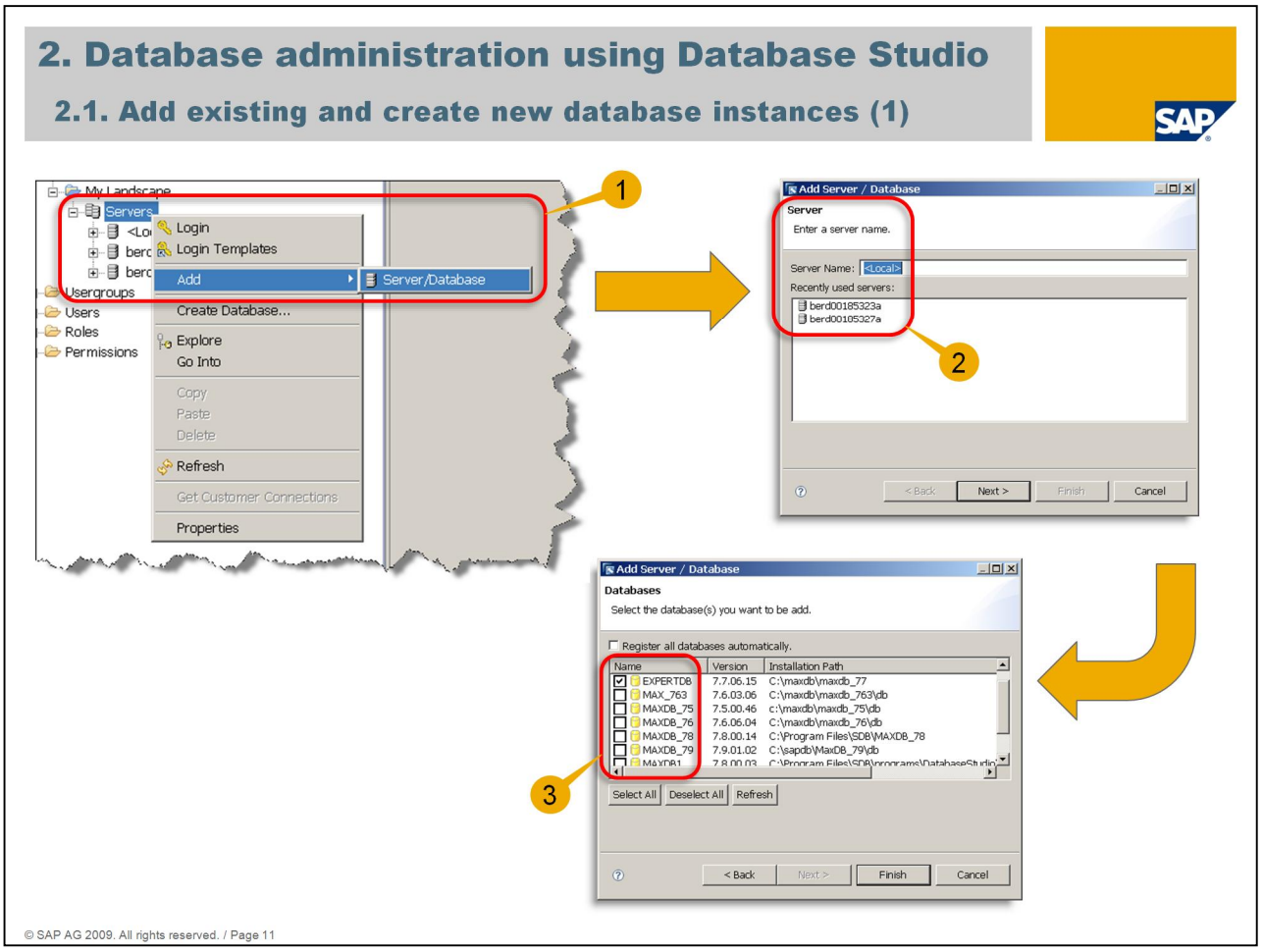


© SAP AG 2009. All rights reserved. / Page 10

Event log viewer shows error messages e.g. for user management, connection issues etc. (1).

Console for Database Manager shows dbm commands executed by Database Studio (2).

To configure via “Window“ – “Preferences“ – “Database Studio“ – “Show console for database management commands“ (3).



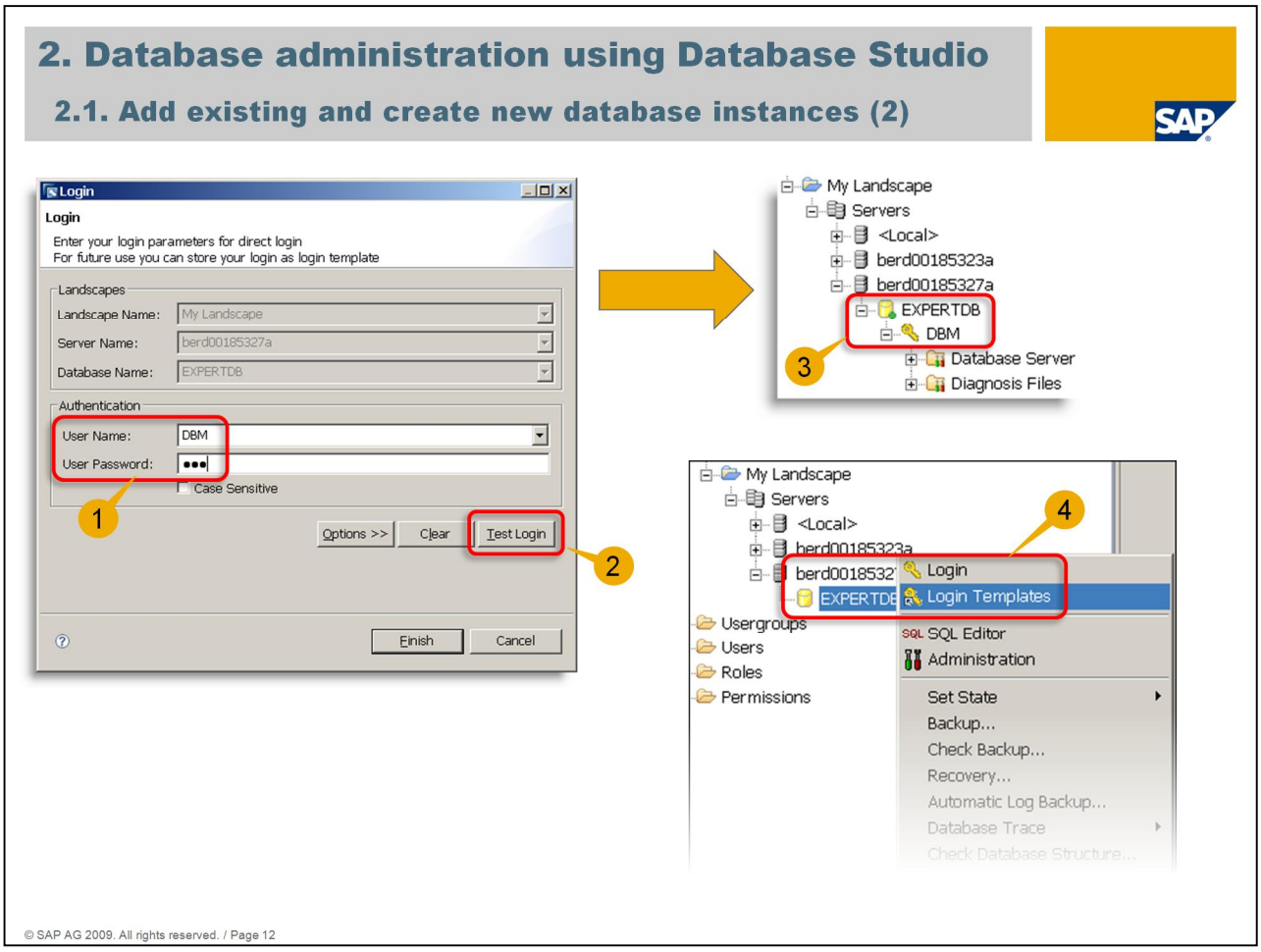
Entries in context menus correspond to the tree item they are opened from.

Landscapes can be added and named corresponding to the organizational requirements.

To add an existing database the context menu of explorer tree item “Servers” and afterwards “Add” – “Server/Database” has to be opened (1).

Server name <Local> is the default entry in field “Server Name:” but a remote server within the network can be entered here (2).

The existing databases on the specified server are listed and can be marked (you can add more than one at once) (3).



To work with an added database valid user and password is required (1).

It is possible to test the entered combination before closing the login input mask (2).

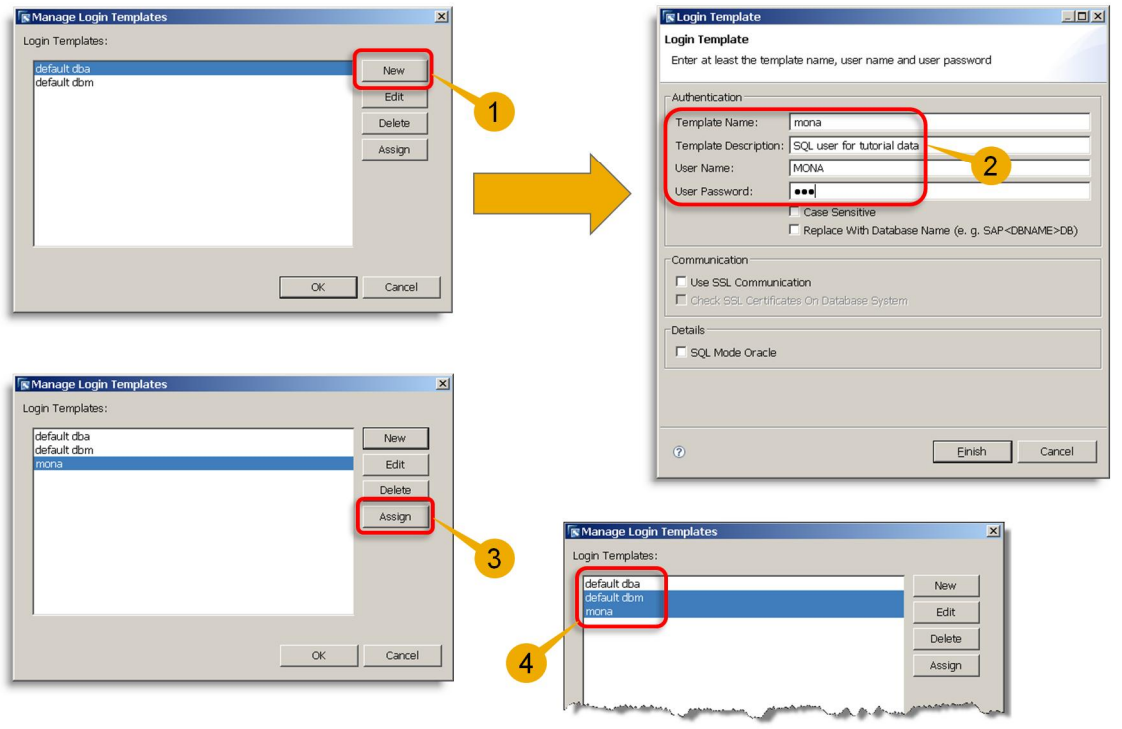
Within the explorer tree valid users are listed below the database (3).

If fixed user password combinations are used for different databases they can be stored in login templates.

Within the context menu of the database the standard login input mask can be called as well as a login template list (4).

2. Database administration using Database Studio

2.1. Add existing and create new database instances (3)



© SAP AG 2009. All rights reserved. / Page 13

A new login template can be created using “New” within “Manage Login Templates” input mask (1).

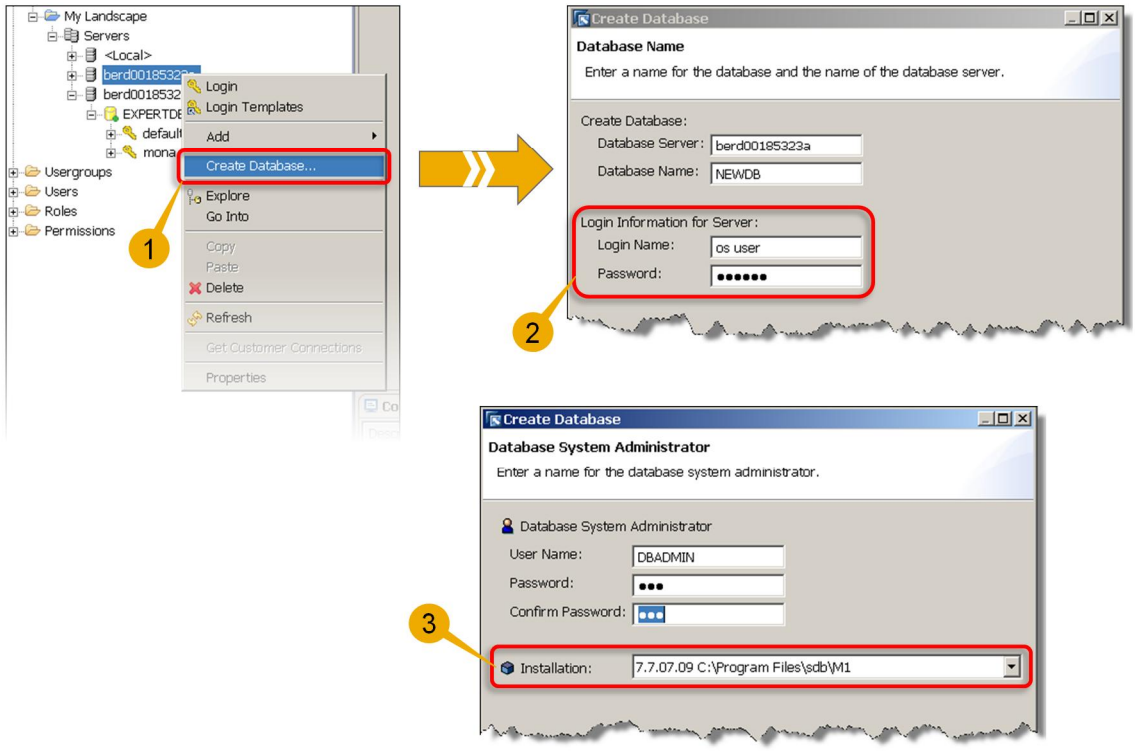
To remember what the template was created for a description can be added (2).

To assign the stored user and password of a template select the appropriate template and choose “Assign” (3).

More than one template can be chosen at once to add the required users at one step (4).

2. Database administration using Database Studio

2.1. Add existing and create new database instances (4)



© SAP AG 2009. All rights reserved. / Page 14

To create a new database instance the “Create database…” entry within context menu of the server tree item has to be chosen (1).

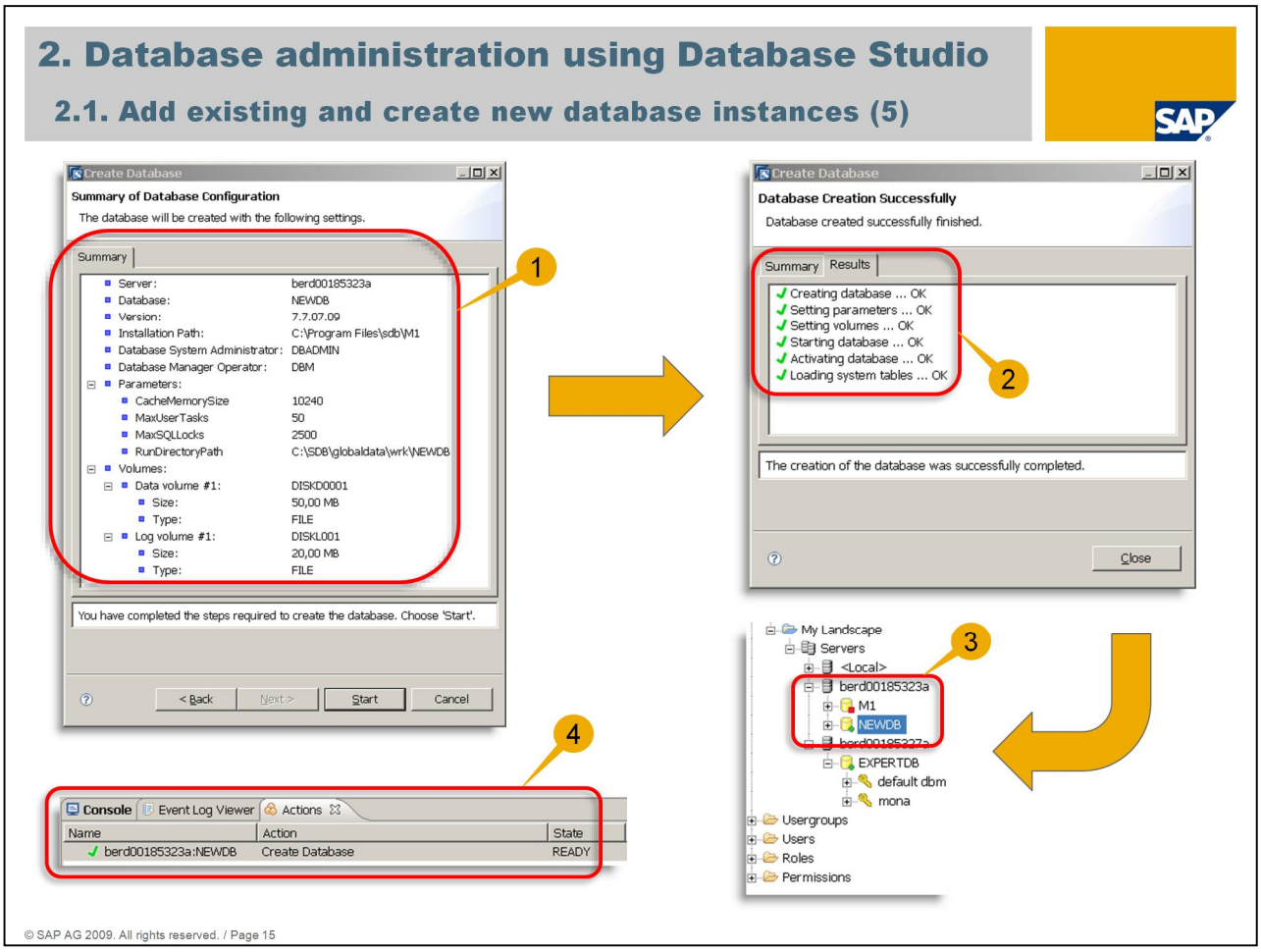
A wizard guides through the required steps.

It is possible two choose from an easy and an advanced installation mode (latter allows more individual settings).

User and password for a remote server has to be entered (permission of login as batch job required for this user) (2).

The MaxDB software installations which could be found on this server are listed and a choice can be made (3).

A couple of input masks for settings e.g. parameters, volumes and log settings will appear.

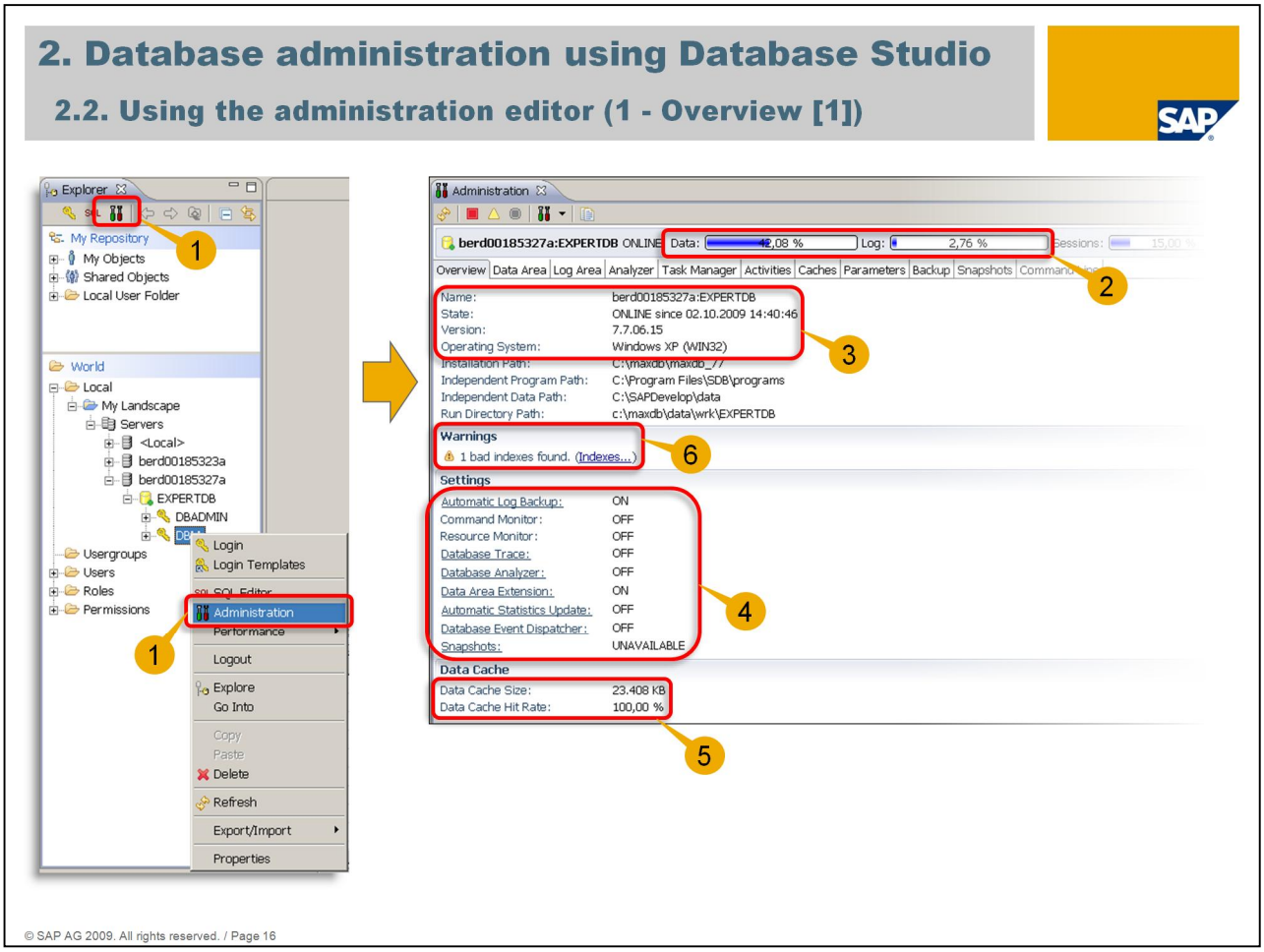


Before starting with the creation a summary is listed (1).

During the creation the running steps are shown as well as the particular success after ending of each step (2).

When finished the new database is listed within the explorer tree (3).

If view “Actions” is active an information is visible about action “Create database” (to activate view “Actions”: Menu “Window” – “Show View” – “Actions”) (4).



The administration editor can be opened via context menu of a corresponding user or by selecting the user and choosing the administration icon within the toolbar of the explorer view (1).

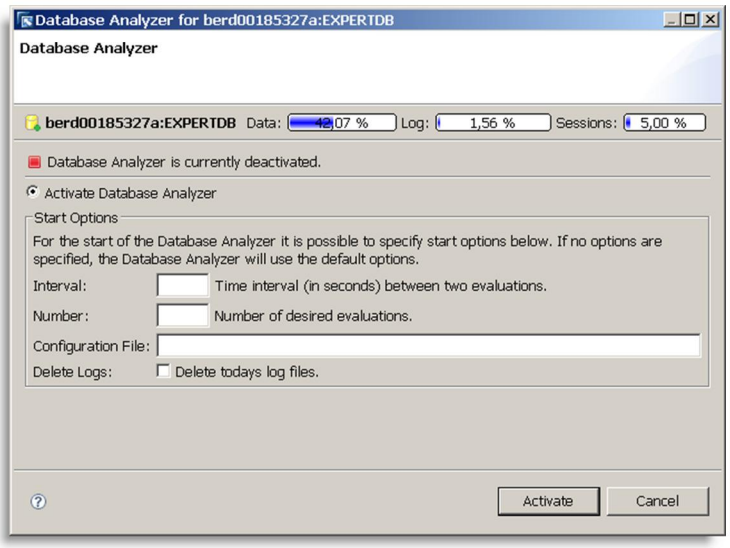
Only database manager operator users and the database system administrator user are allowed to open the administration editor (for other users the login input mask is shown).

Per default tab “Overview” is active which shows general information about the database at a glance, e.g. filling level (2), name, state, database version, operating system of database server (3), if monitoring, tracing, Database Analyzer etc. is switched on or off (4), Data Cache size and hit rate (5).

There is also a warning line (only visible if the corresponding situation exists) (6).

2. Database administration using Database Studio

2.2. Using the administration editor (2 - Overview [2])



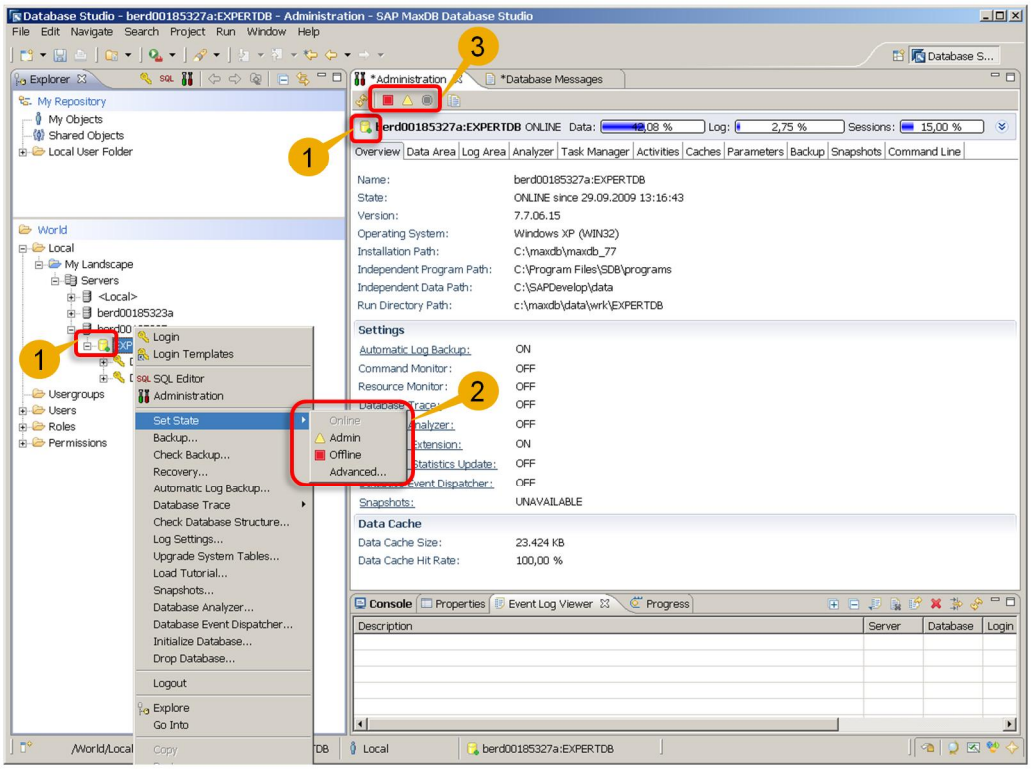
© SAP AG 2009. All rights reserved. / Page 17

Underlined entries are linked to the corresponding configuration mask which allows to switch from OFF to ON or vice versa after specifying details. They are to be used like hypertext links (use left mouse button).

In this example it is shown for Database Analyzer (1).

2. Database administration using Database Studio

2.2. Using the administration editor (3 - Database state)



© SAP AG 2009. All rights reserved. / Page 18

The state of the database can be spotted when looking at the database icon (looks like a ton) within explorer tree or in the header line of the administration editor (1).

To switch to the corresponding state within context menu of the database: choosing item ´Set State´ opens a further menu where the states are listed (the active state cannot be chosen, “Advanced” is only for very special purposes by Development Support) (2).

State can also be changed by choosing the item of the requested state in the header line of the administration editor (3).

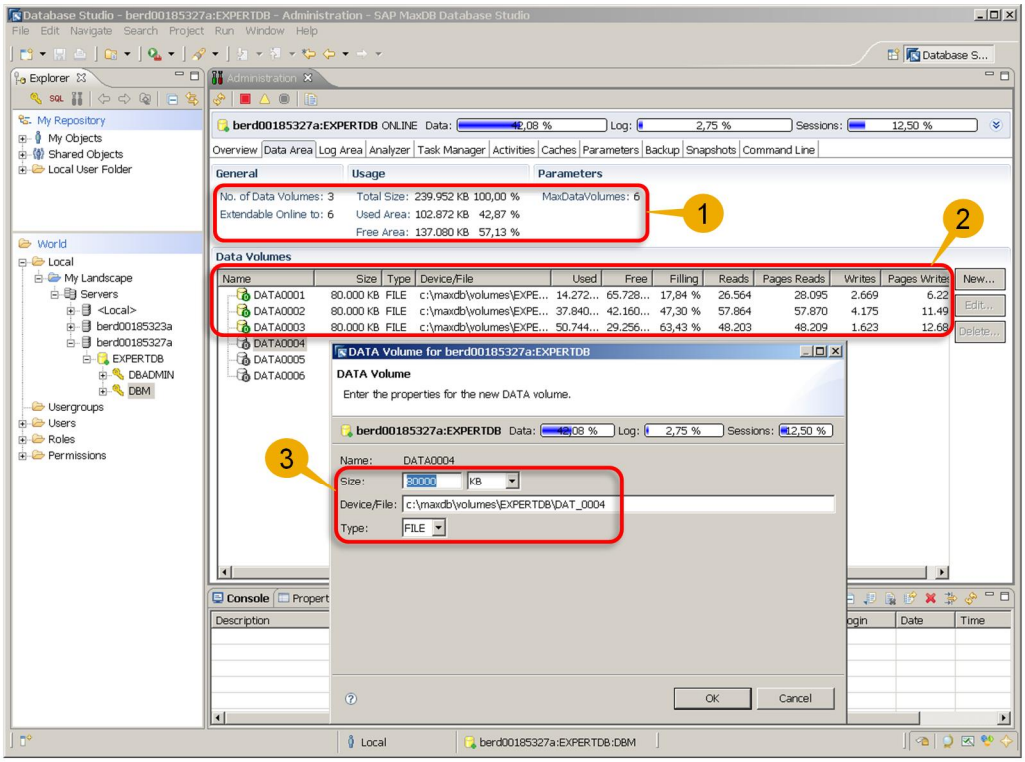
State ONLINE means: database can be used for (most) administration tasks and SQL commands can be executed by the users.

State ADMIN means: no SQL commands can be executed, state is used for special administration tasks, e.g. recovery, check database structure with additional functionality.

State OFFLINE means: database cannot be used at all.

2. Database administration using Database Studio

2.2. Using the administration editor (4 - Volumes)



© SAP AG 2009. All rights reserved. / Page 19

Choosing tab “Data Area” lists the number of configured data volumes as well as how many data volumes can be configured currently according to parameter MaxDataVolumes (1).

In addition size information (total, used, free) is given (1).

The list of data volumes below shows detailed information about each volume (2).

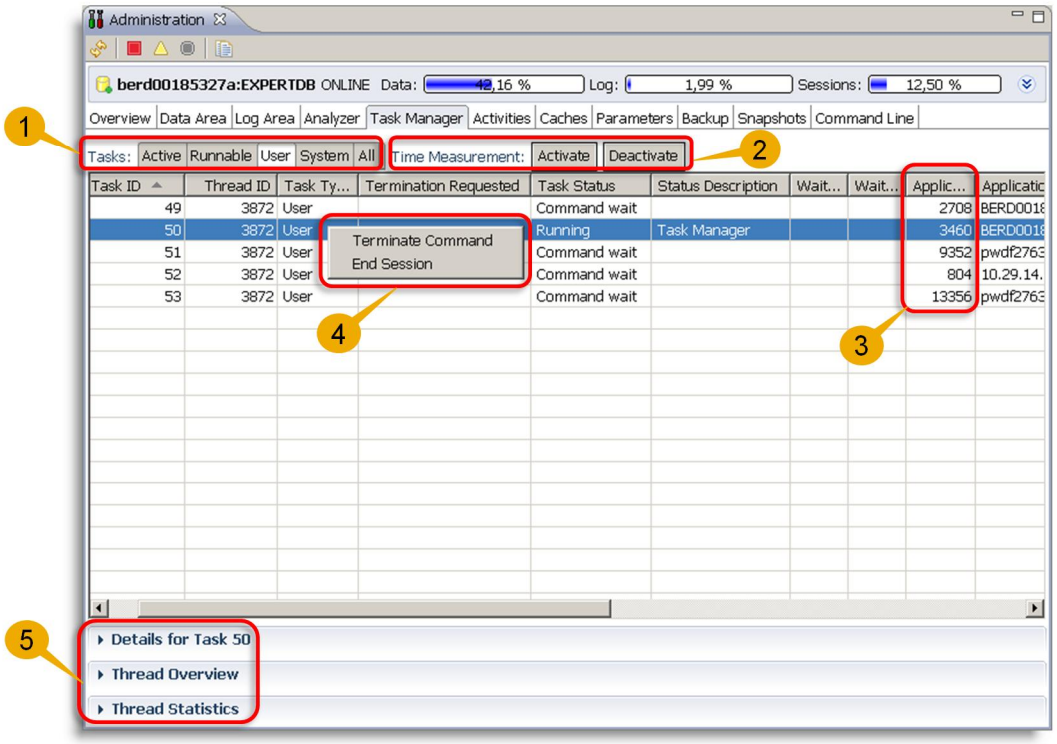
To add a data volume (e.g. in case of database full situation) just double click (use left mouse button) on one of the listed but still unused data volumes or choose button “New…” on the right hand side.

In the corresponding configuration mask per default size, type and location of the last used data volume are proposed (but can be changed) (3).

The same applies for the log volumes (giving also log specific information like Log Mode, Automatic Log Backup etc.).

2. Database administration using Database Studio

2.2. Using the administration editor (5 - Tasks)



© SAP AG 2009. All rights reserved. / Page 20

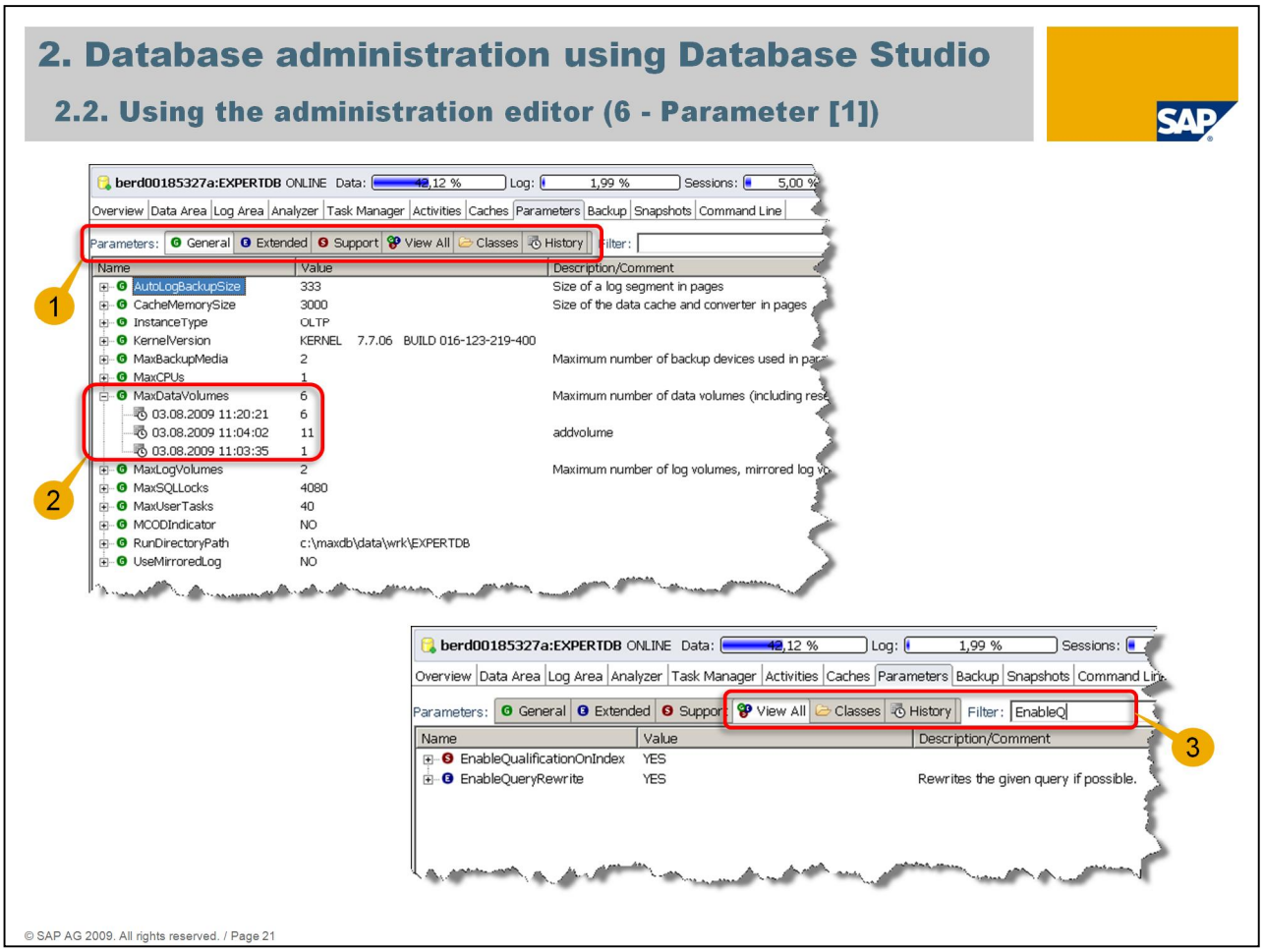
Using tab “Task Manager” gives information about the tasks and their status (can be filtered, e.g to show only active tasks or only user tasks) (1).

“Time Measurement” can be enabled for more detailed information regarding runtime environment (used in console and Database Analyzer output) (2).

Application PID is shown to figure out which application is connected to the particular task (3).

It is even possible to cancel the running command of a task or to disconnect a task (use right mouse button) (4).

Details of a task and information/statistics about the threads where the tasks are running in can be looked up by choosing the corresponding item below the task list (use left or right mouse button) (5).



Parameter administration is quite easy with Database Studio. Parameter lists to be displayed can be sorted out by group, class or change date (1).

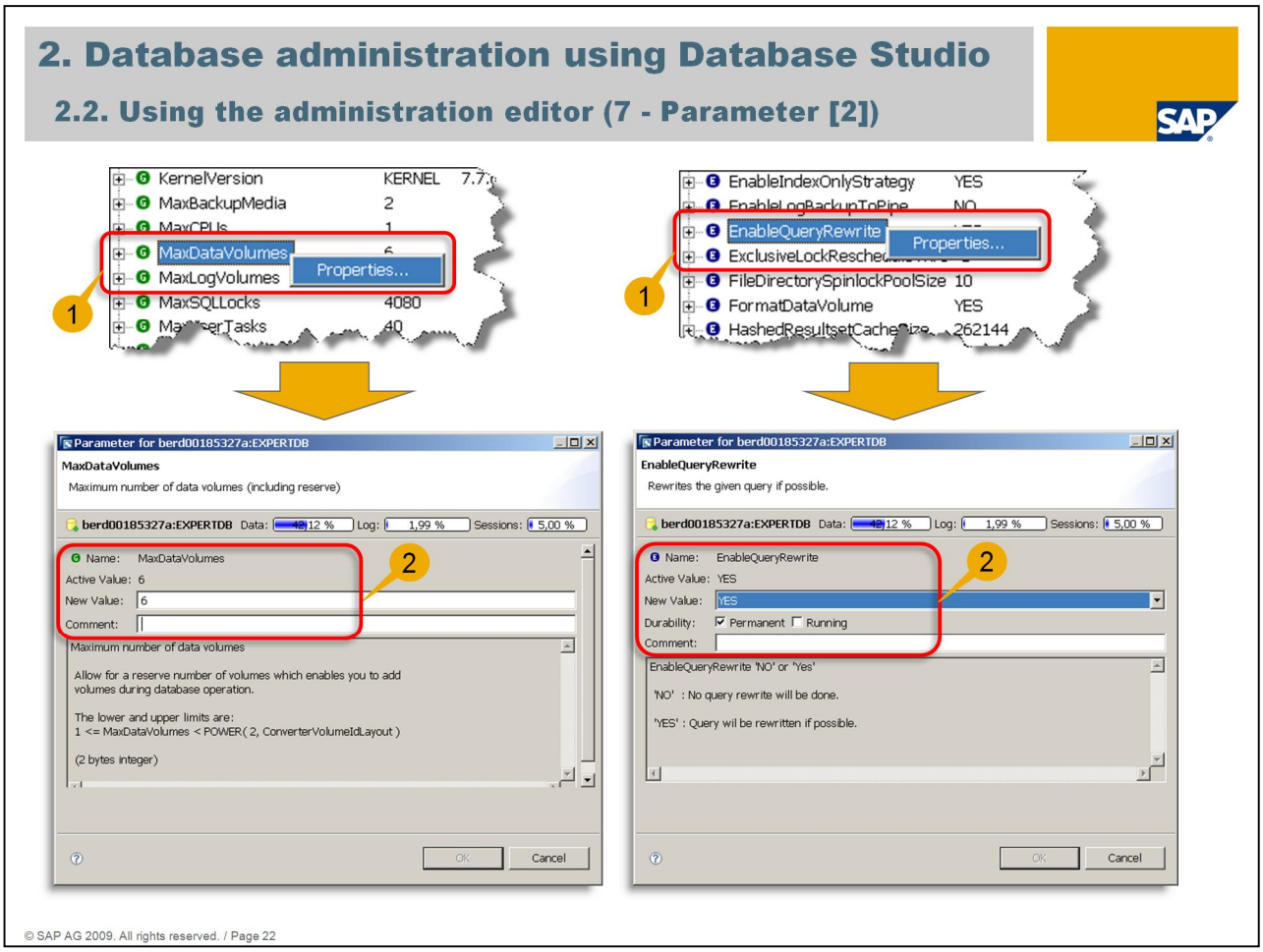
Choosing the plus sign in front of the parameter name shows the change history of this parameter (2).

There is a very comfortable filter function: select “View All” and start typing within input field “Filter” (3):

~ matching parameter names are displayed immediately while typing

~ it is not necessary to know the beginning of the parameter name

~ matches are also displayed when entering a substring of the parameter name



Context menu of a parameter name allows to open the properties of this parameter (use right mouse button) (1).

Several parameters can be changed when the database is in mode ONLINE.

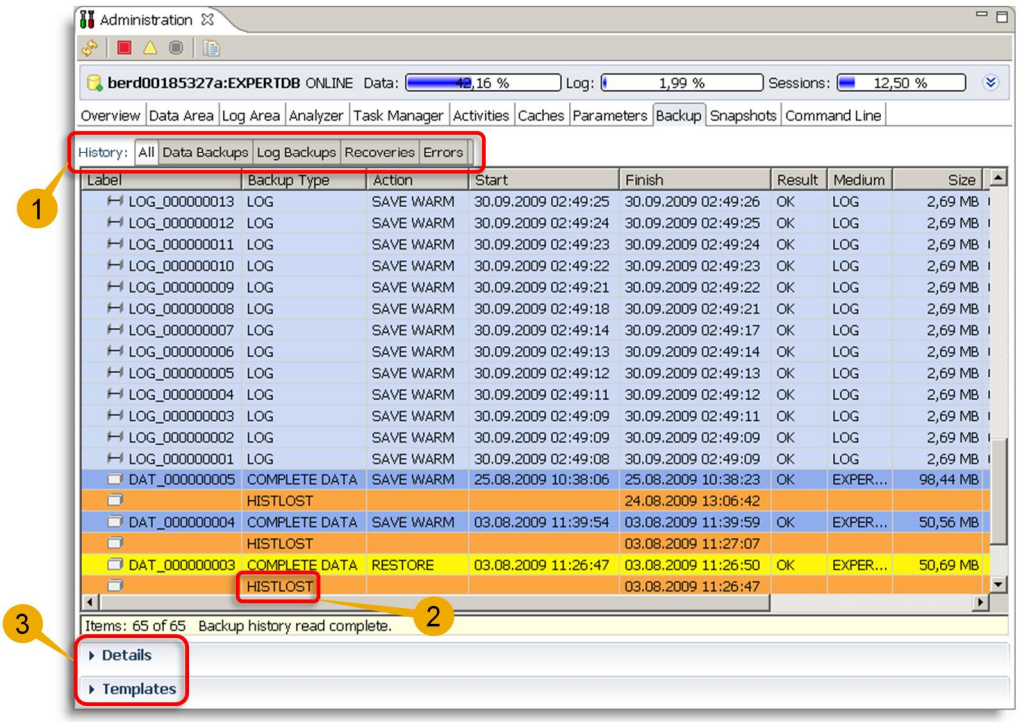
Depending on changeable in mode ONLINE or not the property mask offers to set up if the change will take effect immediately or after next restart (2):

~ Permanent: change will take effect after next restart and is always valid from then on

~ Running: change will take effect immediately and is valid until next restart

2. Database administration using Database Studio

2.2. Using the administration editor (8 - Backup [1])



© SAP AG 2009. All rights reserved. / Page 23

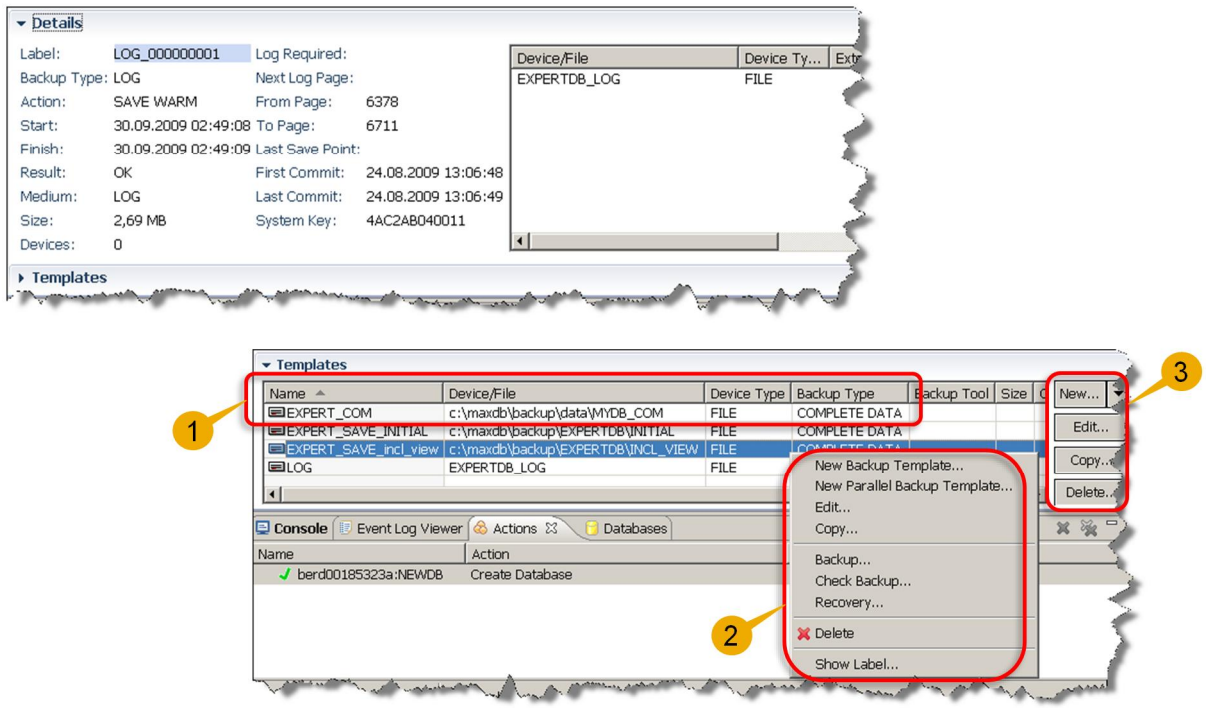
Using tab “Backup” opens the backup history, per default all backups and recoveries are shown.

Backup history display can be filtered regarding data backups, log backups, recoveries and errors (1).

HISTLOST means a new backup history was started (2).

For every backup/restore details can be shown (use left or right mouse button) (3).

Backup templates can be listed and configured as well (use left or right mouse button) (3).



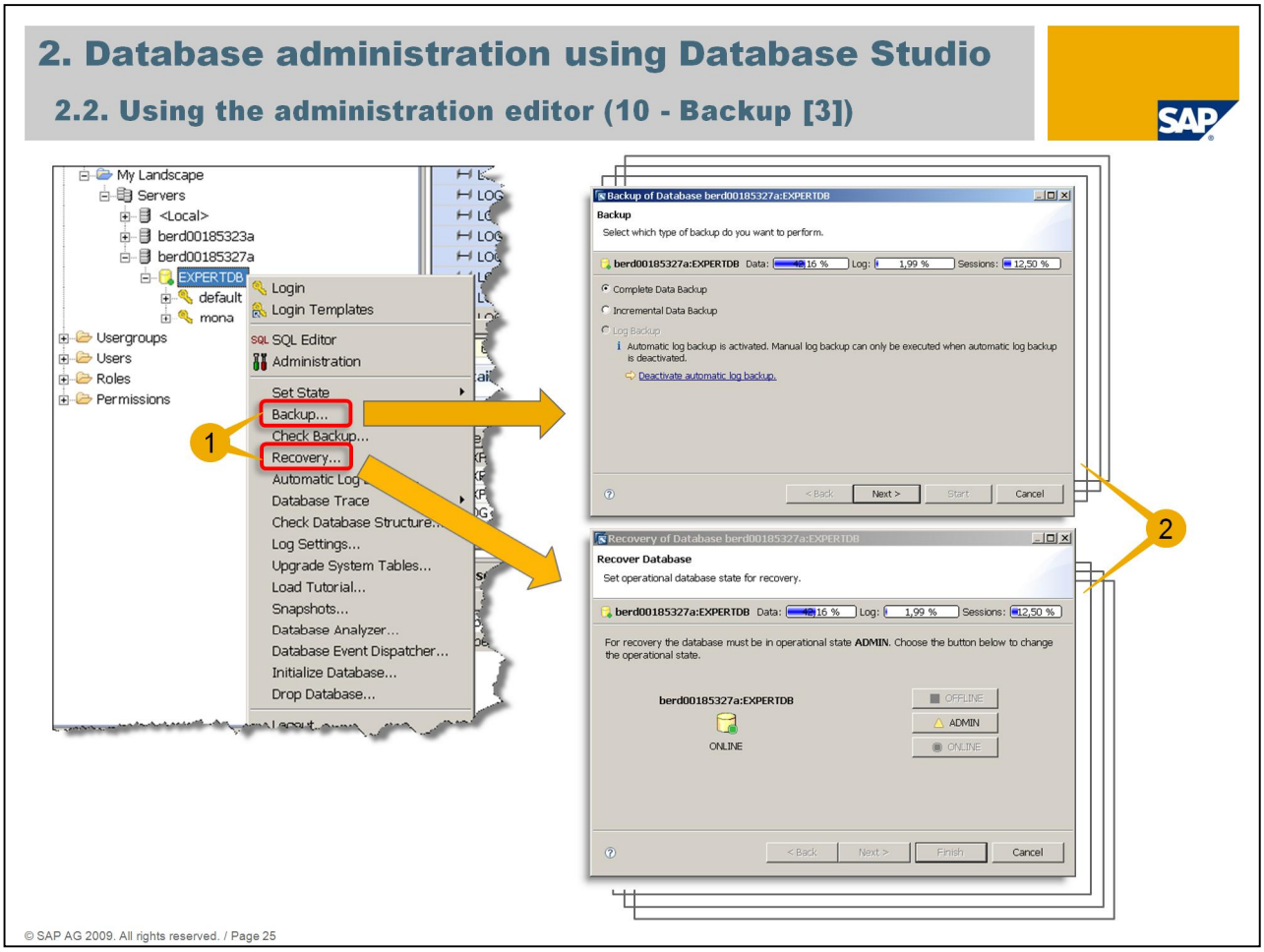
© SAP AG 2009. All rights reserved. / Page 24

Details view of the selected backup shows information like start and end date, used template (medium) and size.

The templates view lists for all configured templates among others the name, the used file or device and its type and the backup type (1).

Via opening the context menu for a specific template (use right mouse button) there are a couple of options like template administration, starting a backup and checking the last backup using this template, starting a recovery directly and showing the label of the template (2).

Creating, editing, copying and deleting of templates can also be done via the corresponding buttons on the right hand side (3).

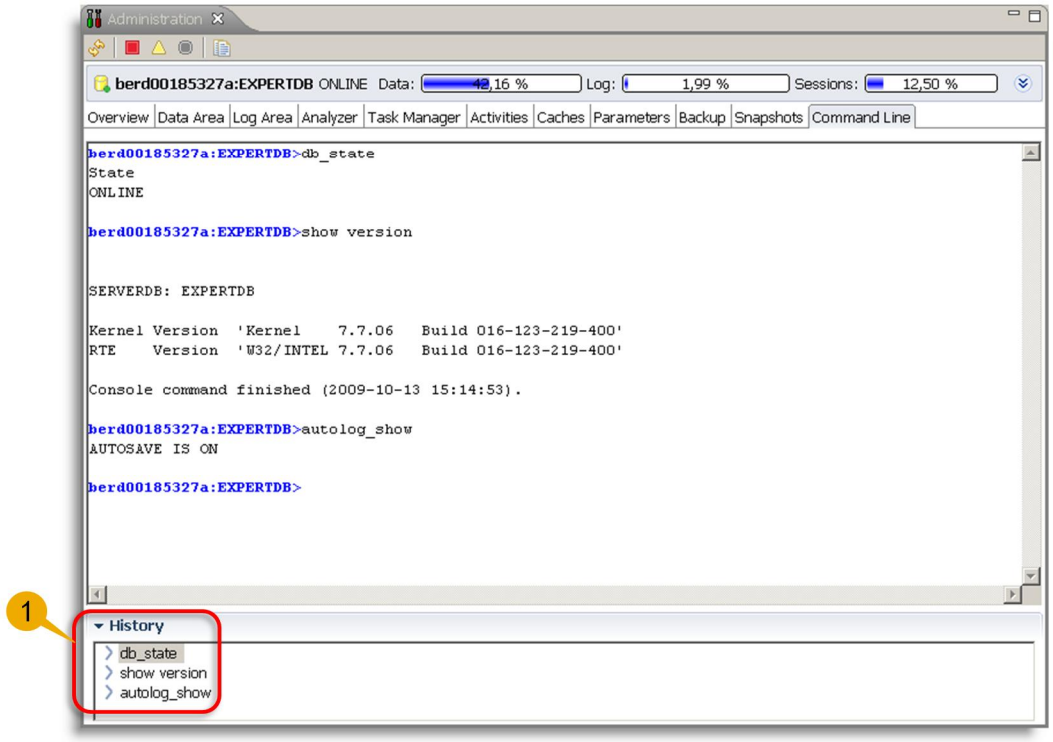


Backup and recovery can also be started via context menu of the database (use right mouse button) (1).

In each case a wizard guides through the required steps (2).

2. Database administration using Database Studio

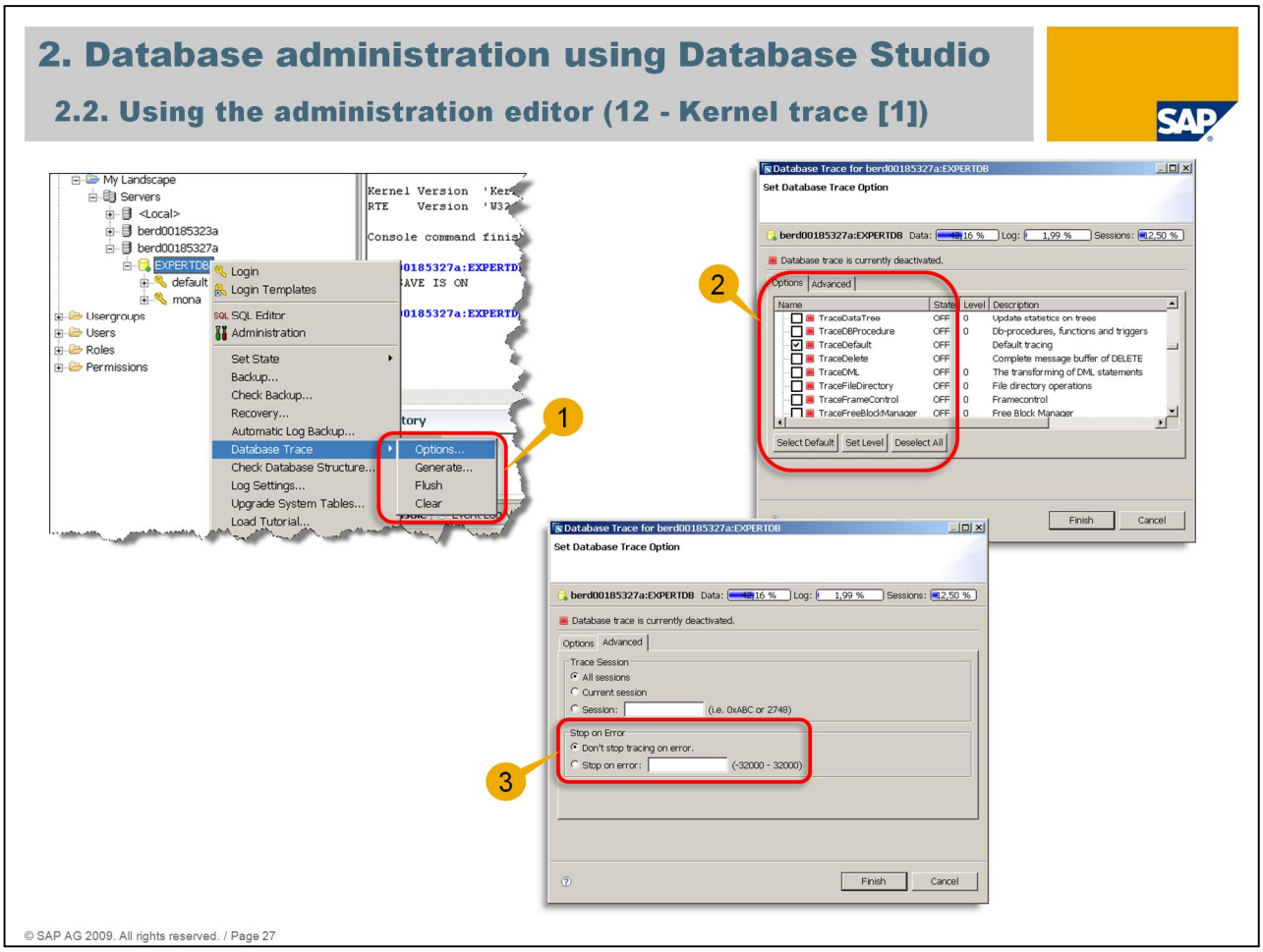
2.2. Using the administration editor (11 - Command line)



© SAP AG 2009. All rights reserved. / Page 26

The command line tab provides an open DBM server session to execute DBM commands.

There is also a command history available for convenient execution of the same commands several times (1).



The database kernel trace can be activated via context menu of the database (use right mouse button) (1).

At first it is recommended to choose “Clear” to get only the trace output starting from the current trace activation.

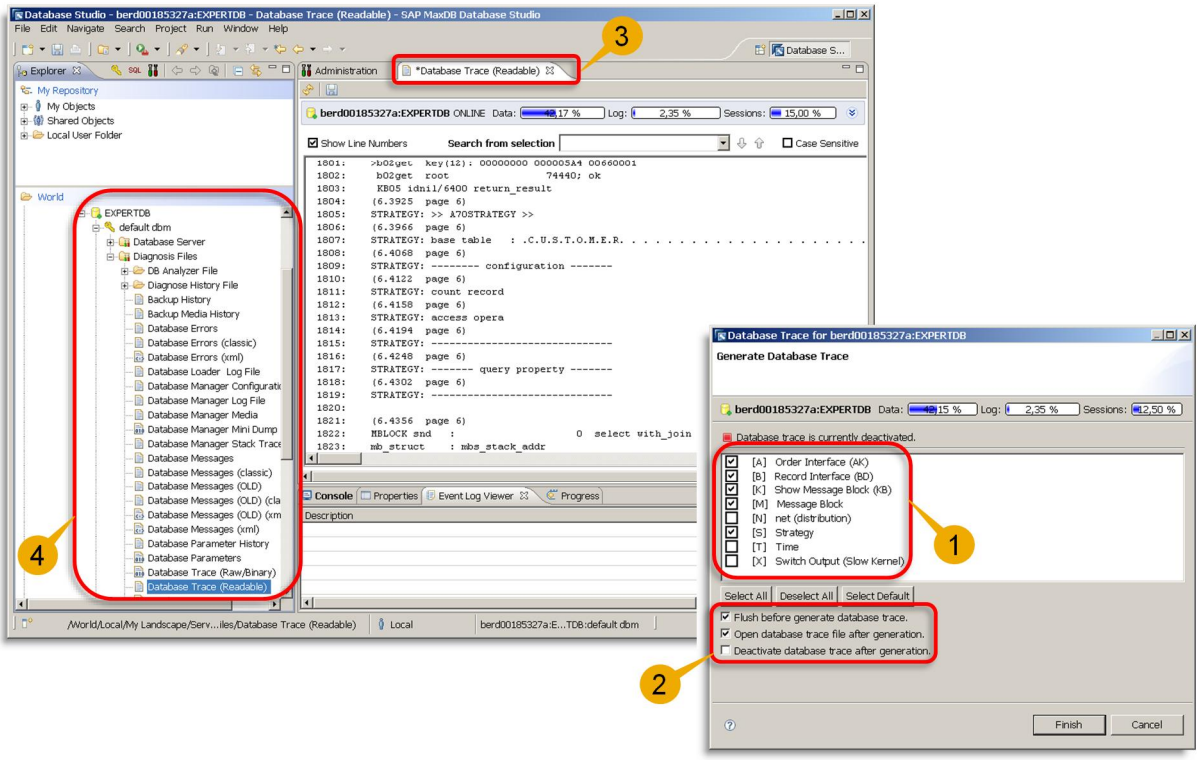
Within the input mask of the trace options the required options can be marked. As often a default trace is sufficient there is a button for this (“Select Default”), so scrolling through the options is not necessary (2).

If tab “Advanced” has been chosen (next to tab “Options”) it is possible to enter an error code to get writing of trace output stopped just when this error occurs (3).

Choosing “Finish” will activate the trace with the selected settings.

2. Database administration using Database Studio

2.2. Using the administration editor (13 - Kernel trace [2])



© SAP AG 2009. All rights reserved. / Page 28

Trace writing will be finished when all trace options are deselected again or if the configured error occurred. As the trace output is in binary format it is required to generate the readable trace log file.

Choosing “Generate…” from the sub context menu “Database Trace” opens an input mask where the trace content can be specified (mostly ABKMS is sufficient) (1).

There are three check boxes below (2): The first one “Flush before generate …” has to be checked if flushing hasn’t been done already via sub context menu “Database Trace”. The second and third one specifies if the trace should be opened just after generation and if trace writing should be switched off after generation.

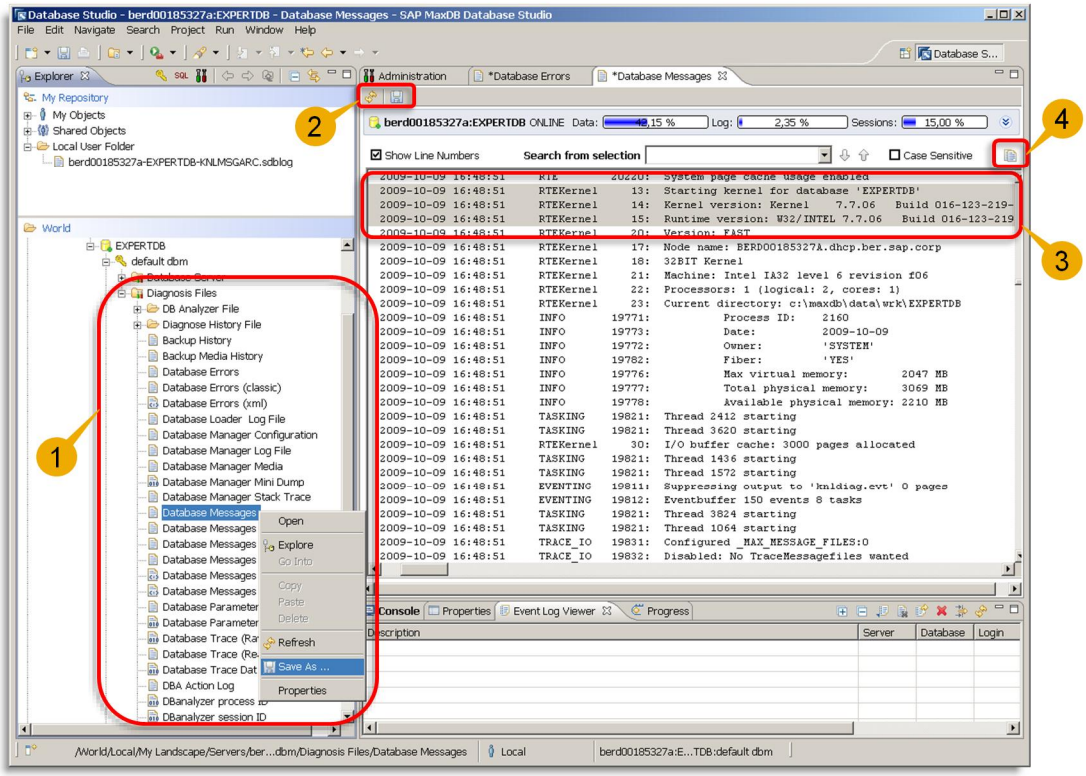
The readable trace log file will be displayed in the editor via a separate tab (3).

It can be opened later on via explorer tree “<database name>” – “<dbm user>” – “Diagnosis Files” – “Database Trace (Readable)” (4).

Trace output is difficult to read and only of interest if requested by MaxDB support.

2. Database administration using Database Studio

2.2. Using the administration editor (14 - Log files)



© SAP AG 2009. All rights reserved. / Page 29

Sub tree “Diagnosis Files” enables access to a folder containing the log files of Database Analyzer (for every day with existing log files a separate folder is created) (1).

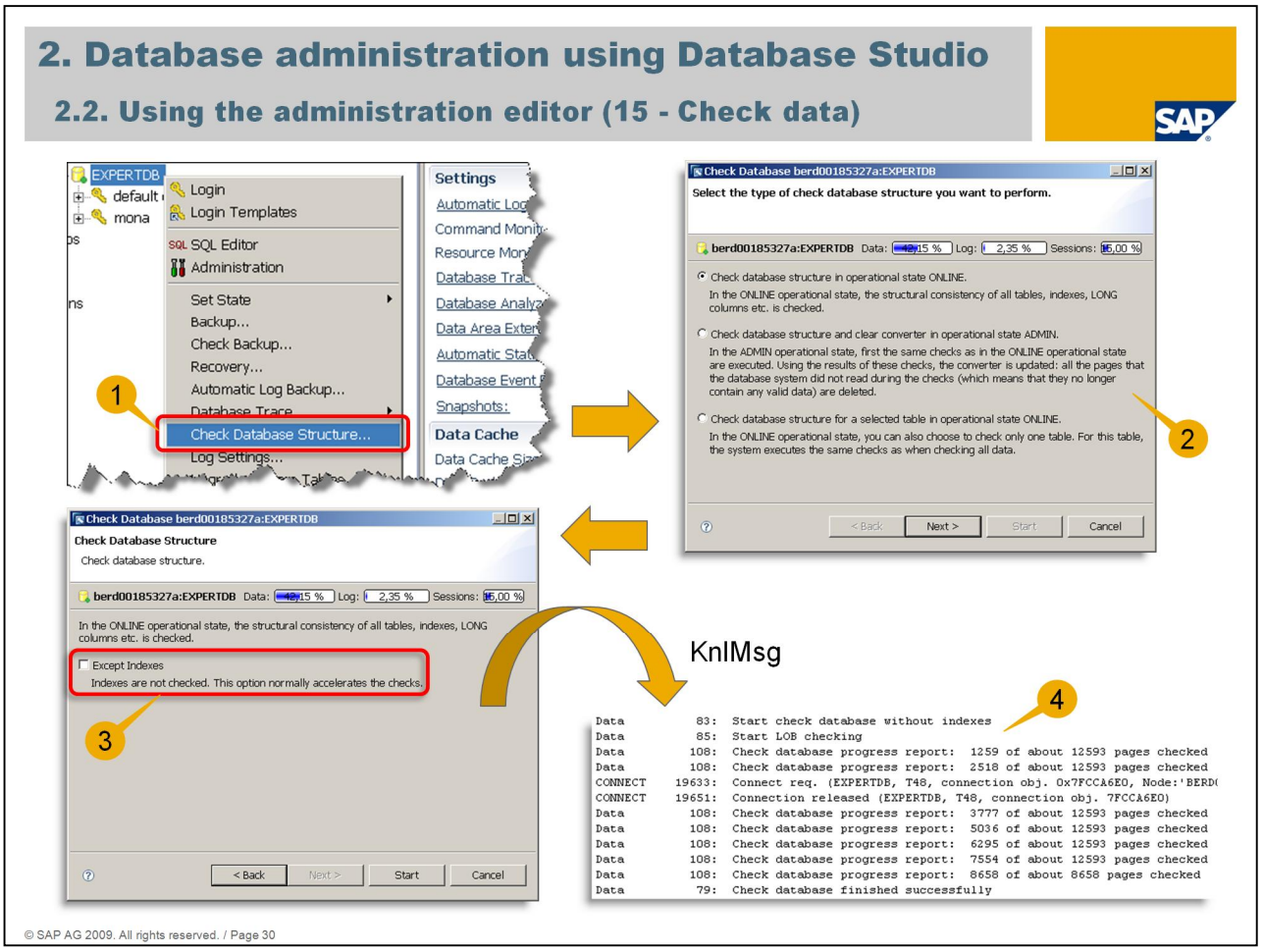
There is a second folder containing the log files of Diagnose History (several important log files are saved here (in a separate folder) in case of a database crash to save them for later analysis) (1).

Directly below “Diagnosis Files” current log files like Database Messages (KnlMsg resp. knldiag), Database Errors (KnlMsgArchive resp. knldiag.err) etc. are stored. Files with the same name and the appendix “(classic)” and “(xml)” refer to the file format change from plain text to xml with MaxDB version 7.7. The xml versions contain more information, Database Studio converts them into a readable format automatically. Via context menu of each file (use right mouse button) it is possible for instance to open this file, save it and show file properties (e.g. file size) (1).

To refresh the display in the editor the refresh button can be used, also saving is possible there (to the configured local folder) (2).

To copy an extract of the file to the clipboard the requested range can be marked (for the first line of the range use left mouse button, for the last line right mouse button) (3).

The copy button is on the top right (4).



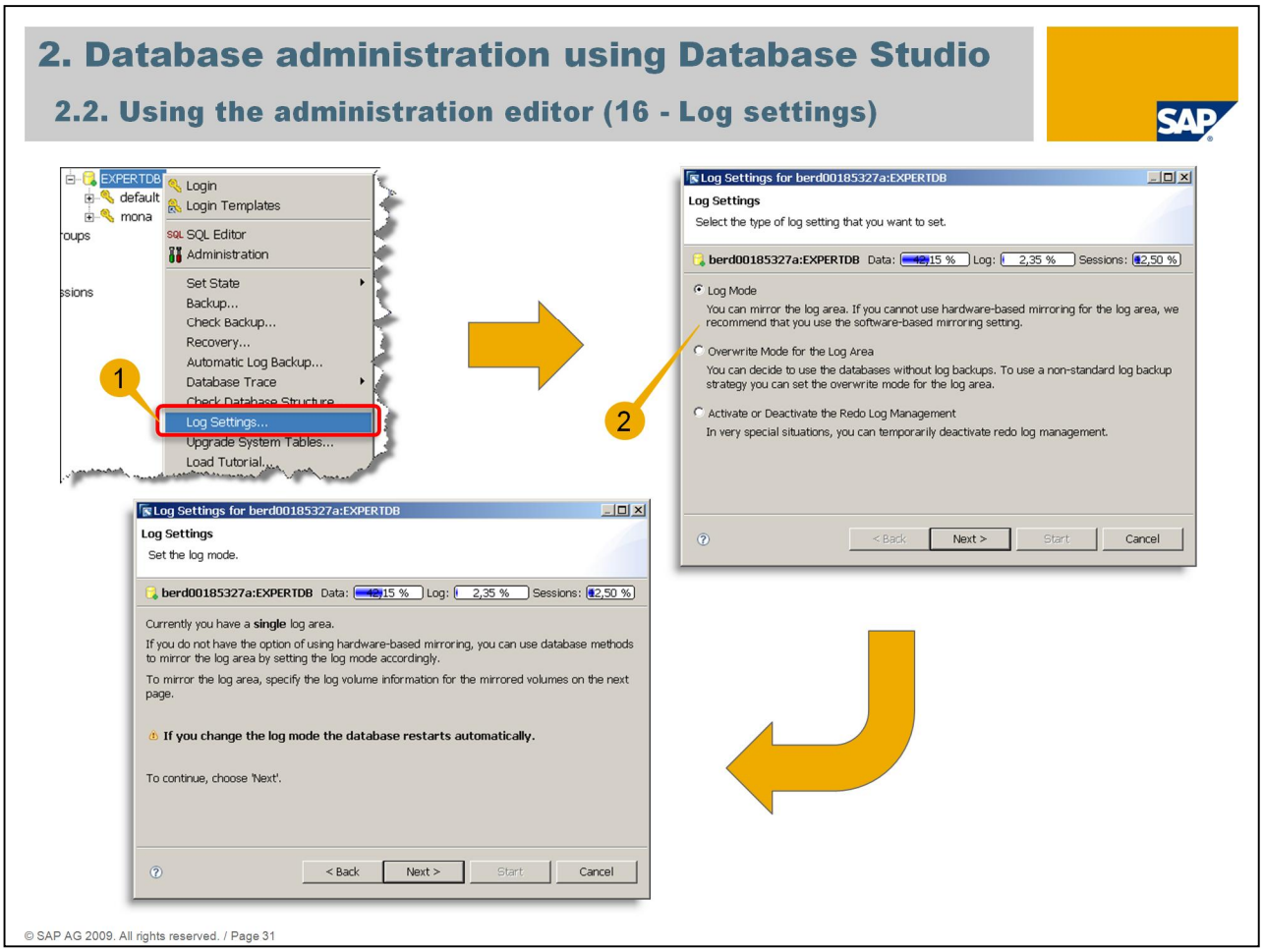
© SAP AG 2009. All rights reserved. / Page 30

To check the structural consistency of the database entry “Check Database Structure” can be chosen in context menu of the database (use right mouse button) (1).

It offers the following options (2): Firstly, to start the check for the entire database in mode ONLINE. Secondly, to start the check for the entire database in mode ADMIN which includes a clean up of unused converter entries. Thirdly, to start the check for a specific table in database mode ONLINE.

The following input mask shows the selected decision and offers to exclude indexes from the check (3).

Log file “Database Messages” shows information and possible errors (errors are also logged in file “Database Errors”) (4).



Via context menu of the database (use right mouse button) it is also possible to change the log settings (1).

Offered options are (2):

~ changing the log mode between “single log” and “mirrored log”

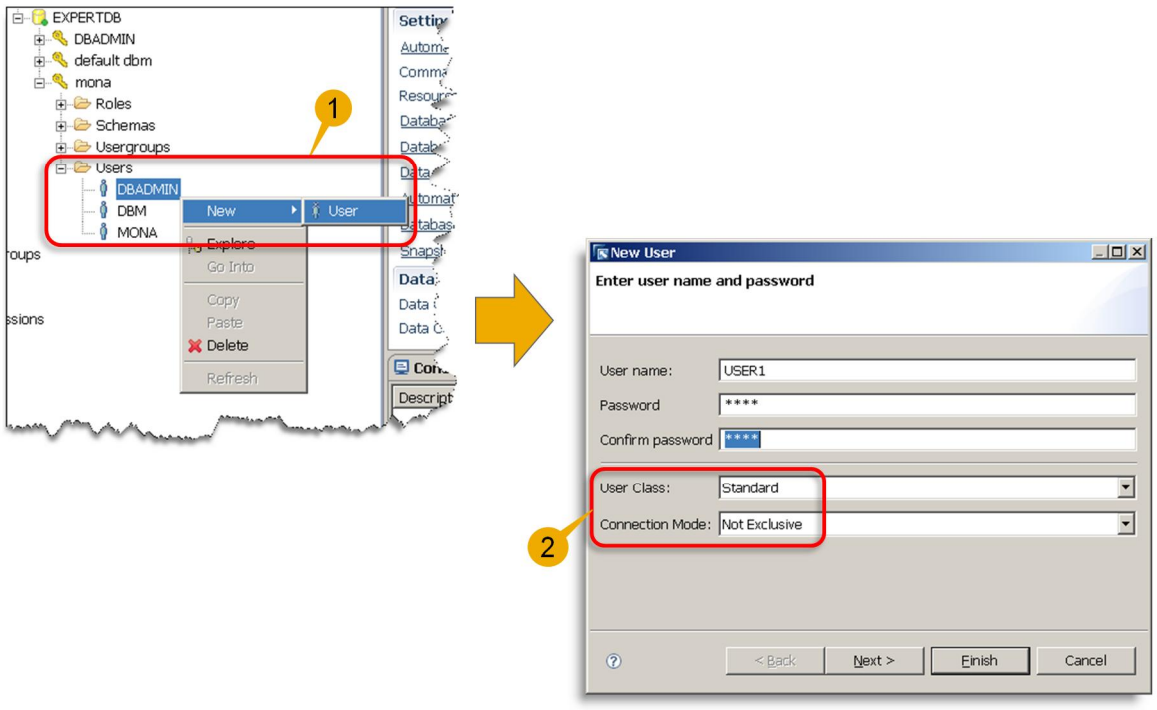
~ switching on and off the “Overwrite mode” of the log area

~ activate or deactivate redo log management

Be very careful: using “Overwrite mode” and deactivating redo log management can lead to data loss.

2. Database administration using Database Studio

2.2. Using the administration editor (17 - Creating users)



© SAP AG 2009. All rights reserved. / Page 32

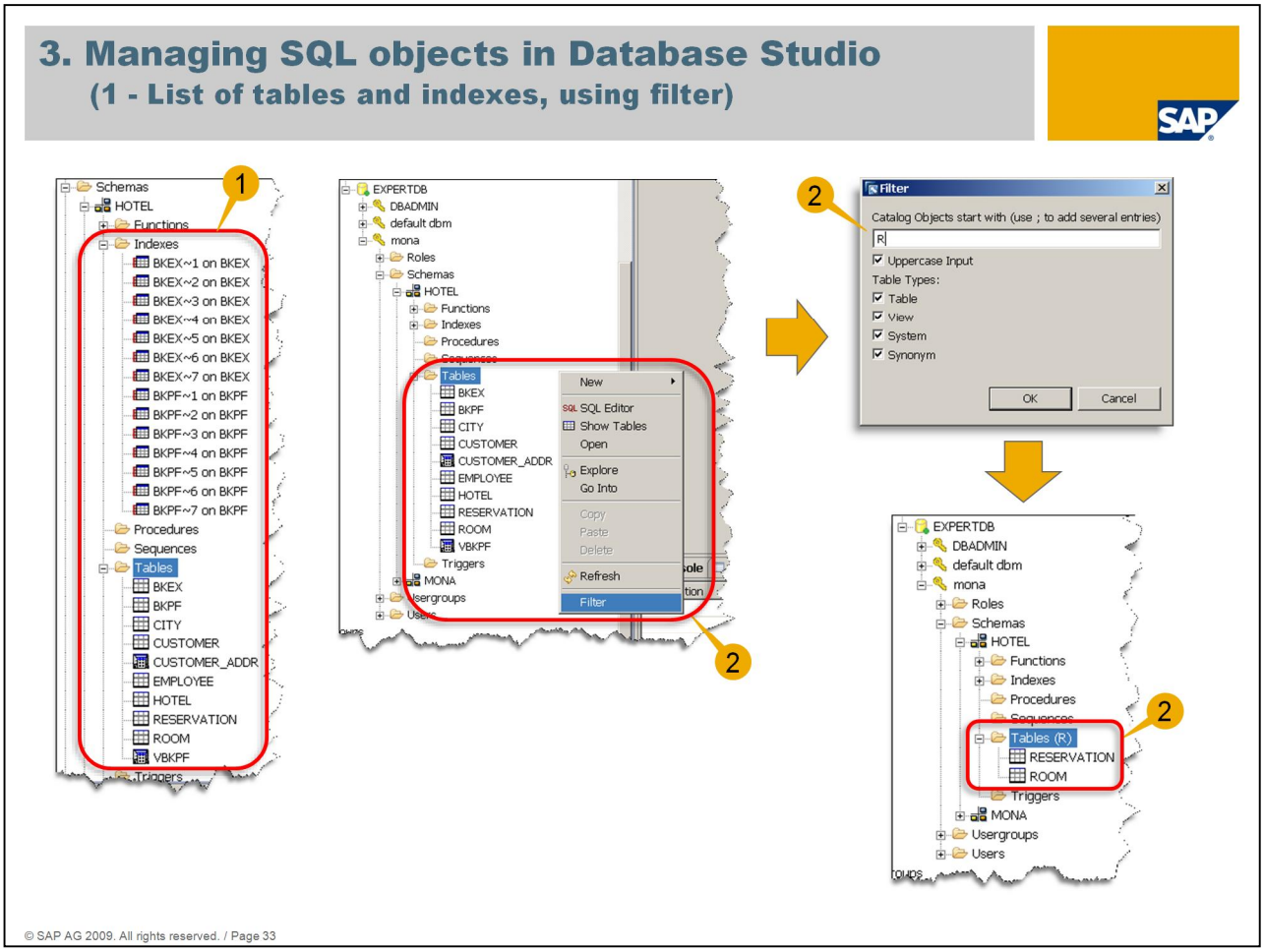
Current implementation of user management in Database Studio allows only to create new SQL users.

Within sub tree of SQL users there is the tree item “Users”. All users with a valid login for this database stored in Database Studio are listed.

Via opening the context menu (use right mouse button) it is possible to create new SQL users (1).

Input mask also allows to specify ´User class´ (DBA, Resource, Standard) and ´Connection Mode´ (Exclusive, Not Exclusive, Disabled) (2).

See MaxDB documentation for more information about user management.



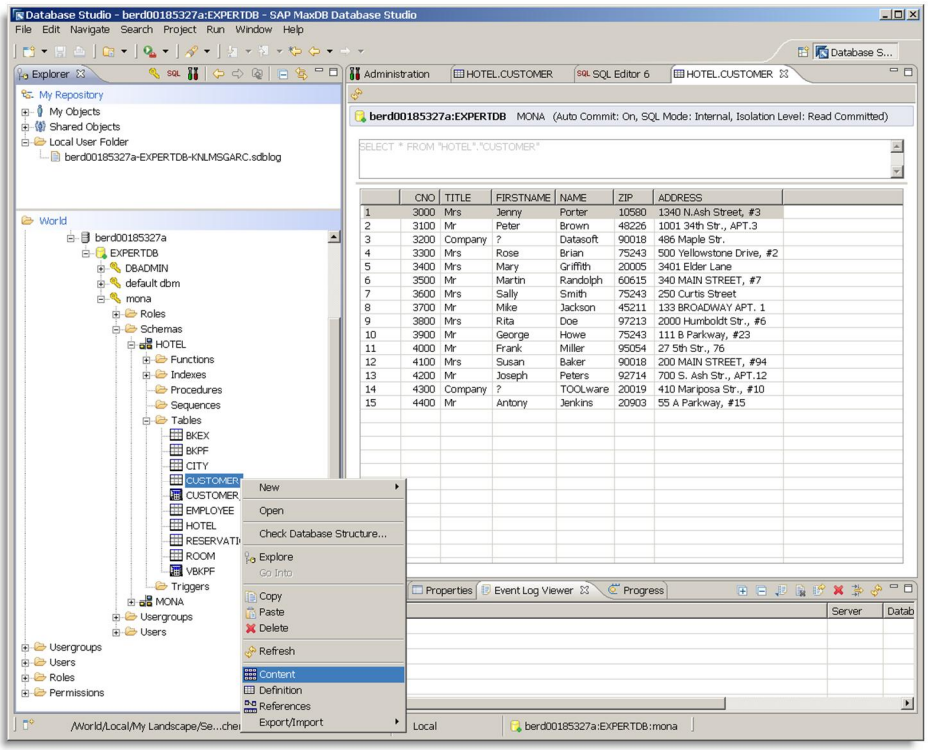
The sub tree of an SQL user contains the “Schemas” and at the next level further nodes e.g. for contained tables and indexes. Different object types can be distinguished by different icons (e.g. tables, views) (1).

Within “Tables” all tables are listed in alphabetic order (if a large number of tables exists only the first ones are listed with a follow-up marker).

If the name (or the first part of it) is known a filter can be used to get the display more convenient (filter is shown in brackets after “Tables”). Context menu of “Tables” has to be opened (use right mouse button) and “Filter” to be chosen for this (2).

3. Managing SQL objects in Database Studio

(2 - Displaying table content [1])

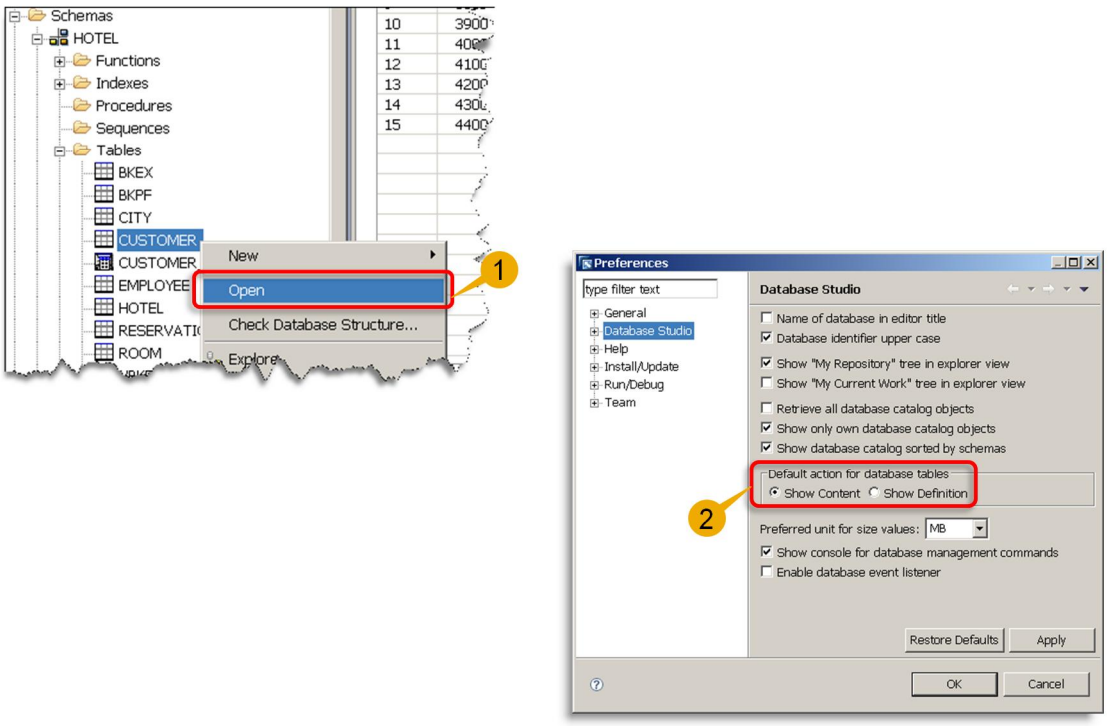


© SAP AG 2009. All rights reserved. / Page 34

The context menu of a specific table (use right mouse button) offers several options for this table, e.g. showing the content. Only the visible table rows are fetched (makes sense at large tables).

3. Managing SQL objects in Database Studio

(2 - Displaying table content [2])



© SAP AG 2009. All rights reserved. / Page 35

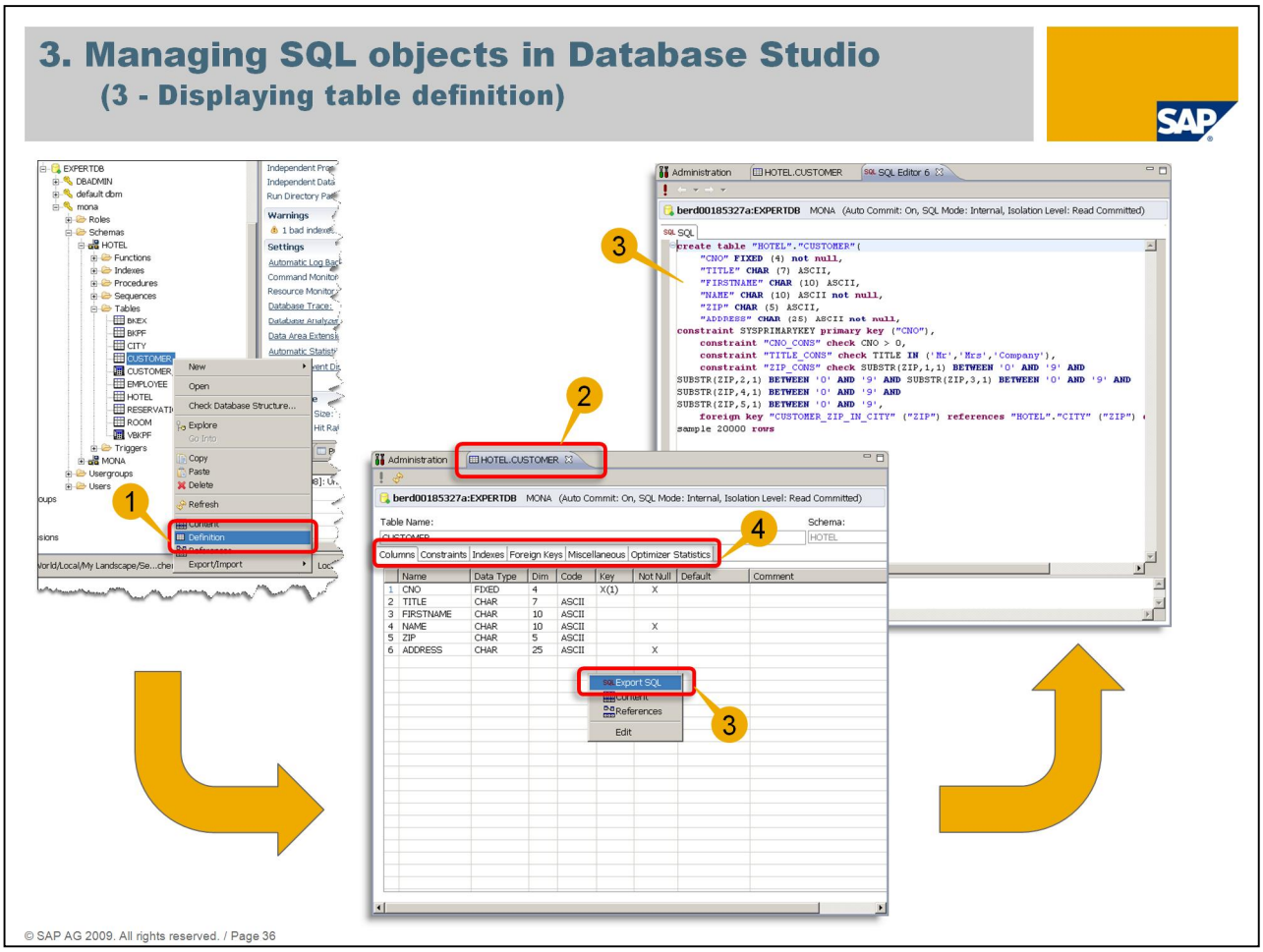
When choosing “Open” within the context menu of the database one of two different actions is done (1) :

~ display of the table definition or

~ table content will be shown

What happens depends on the corresponding setting within “Preferences” – “Database Studio” (2).

A double-click (left mouse button) done on a table within the explorer tree causes the same action like choosing “Open” within the context menu of the database.



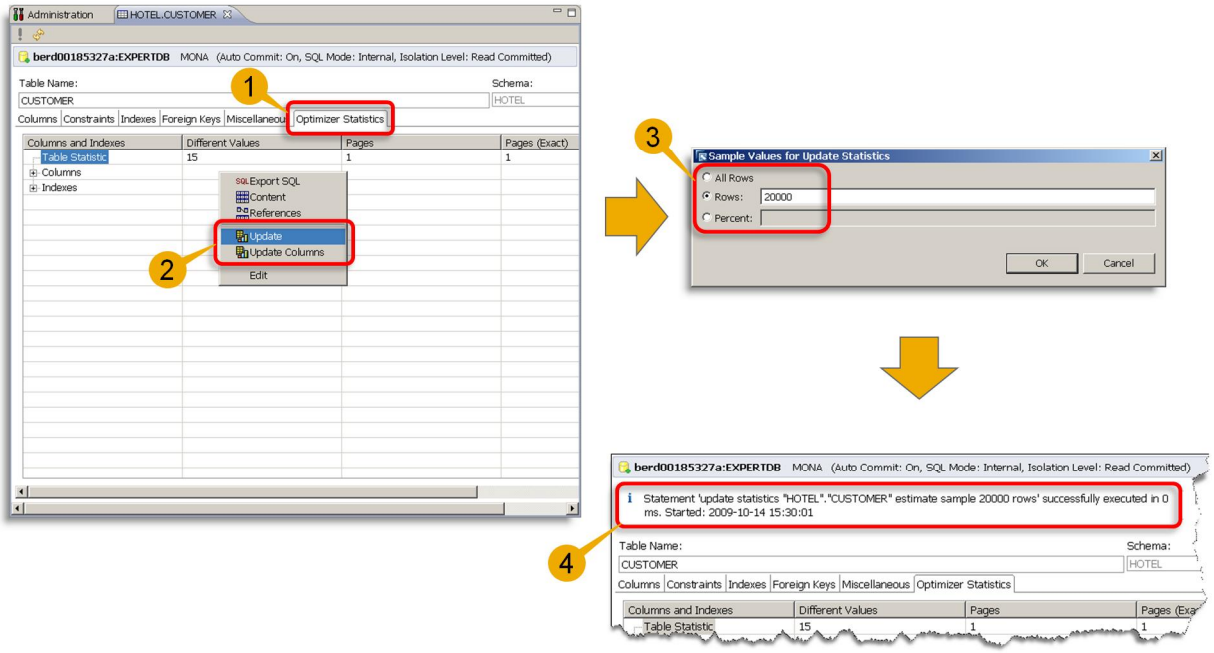
Choosing “Definition” in the table’s context menu (use right mouse button) is showing the defined columns (each line in the list represents a column) (1).

This display is shown in a separate tab within the editor (2).

To see the SQL command for the table definition it is required to open the context menu within the column list (use right mouse button) and to choose “Export SQL” (3).

Table related information, e.g. defined indexes, are available via tabs inside this editor table display (4).

3. Managing SQL objects in Database Studio
(4 - Update statistics for a table)



© SAP AG 2009. All rights reserved. / Page 37

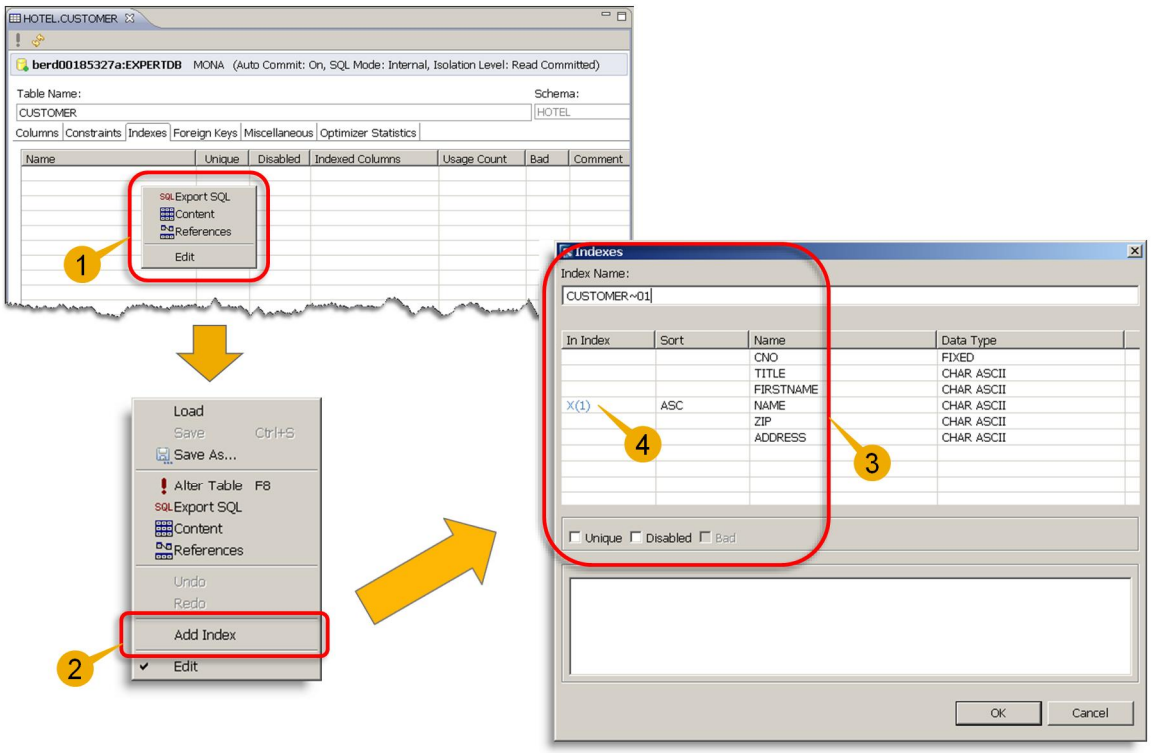
Choosing tab “Optimizer Statistics” inside the editor table display shows the existing table specific statistic values (1).

The context menu opened within this display (use right mouse button) offers to update table and column statistics (2).

The next step allows to set up the number of sample rows or sample percentage for this update or to calculate the statistics exactly using all rows (3).

A status message informs about the success (4).

3. Managing SQL objects in Database Studio
(5 - Creating an index for a table [1])



© SAP AG 2009. All rights reserved. / Page 38

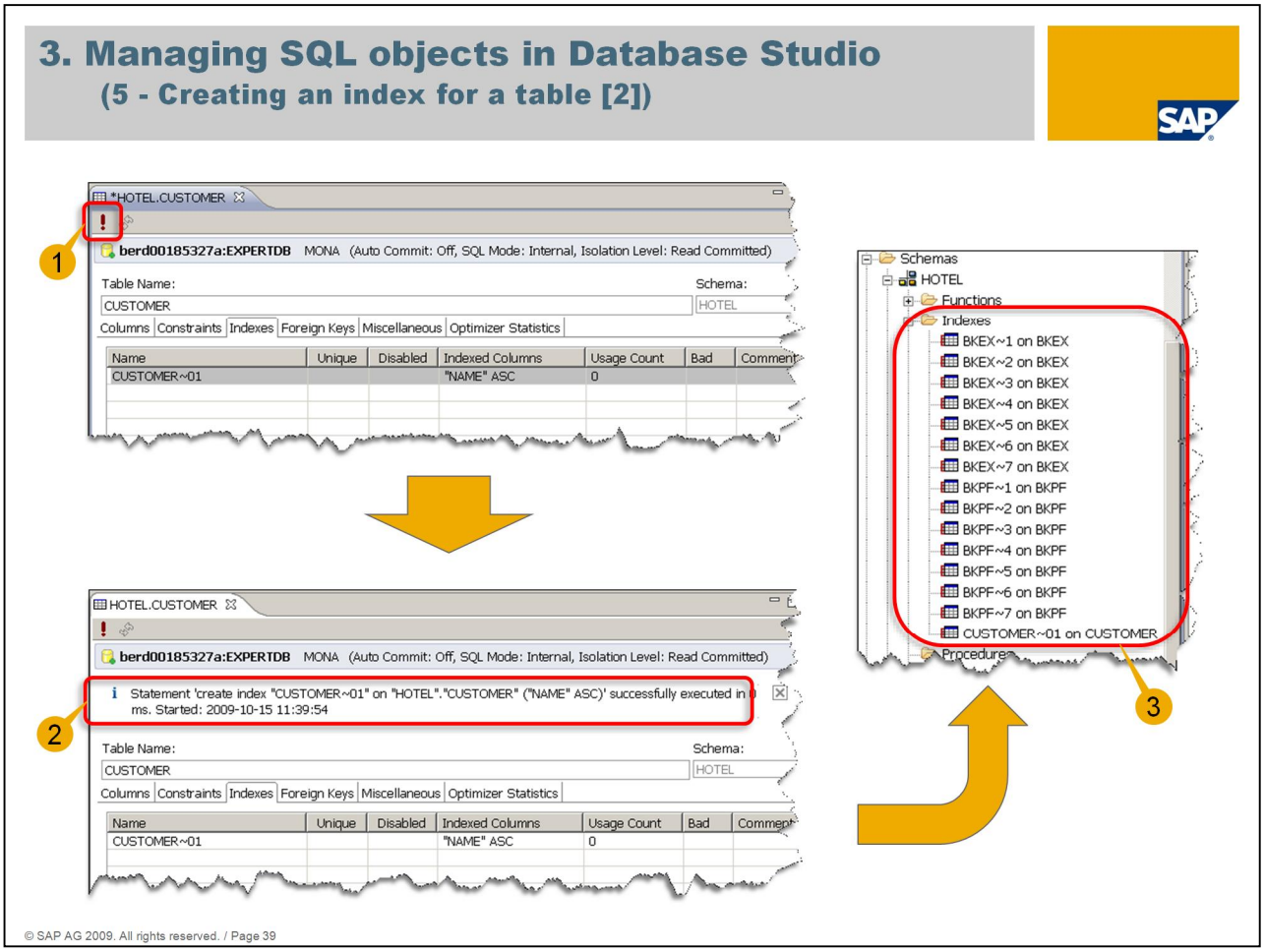
After choosing tab “Indexes” inside the editor table display all existing indexes for this table are listed. Inside this list a context menu can be called (use right mouse button) (1).

Via “Edit” this context menu can be expanded to a longer version with more items, e.g. “Add Index” (2).

“Add Index” opens an input mask which allows to enter the index name, select the required table columns for the new index and index properties (3).

To add a column of the table to the index just select it within column “In Index” of the input mask (use left mouse button). Selecting the same column repeatedly toggles between adding and removing of this table column to/from the index (4).

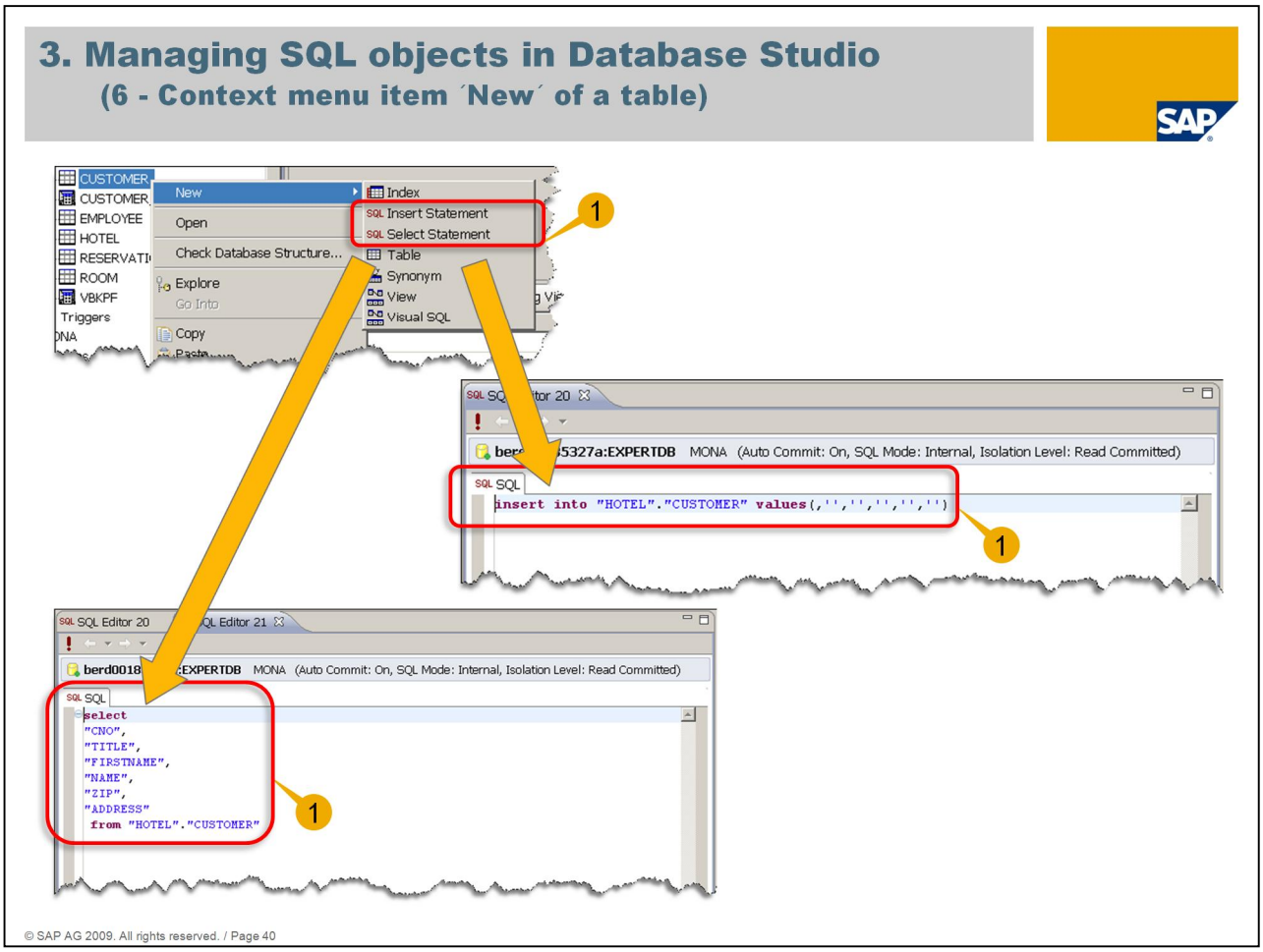
After finished “OK” has to be chosen.



Afterwards the index appears in the list but has not been created yet. For this it is necessary to choose the exclamation mark (use left mouse button or press F8) (1).

There will be a status message informing about the success (2).

When successfully created the new index is sorted into the index list of the explorer tree (3).



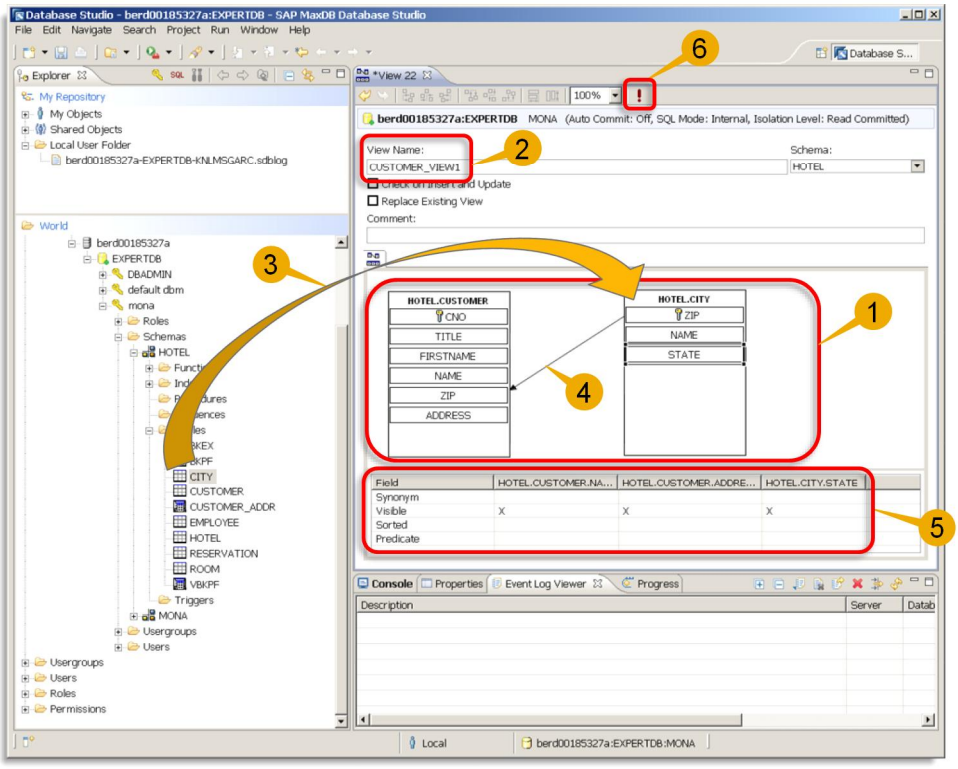
Creating a new index is also possible via context menu item “New” of a table which opens a submenu.

In addition via menu item “New” further helpful things can be done. So it is possible to create preconfigured SQL commands for INSERT and SELECT which have to be customized for the particular needs then (1).

Furthermore a synonym and a table (with the selected one as template) can be created.

Creating a view and ´Visual SQL´ is explained next.

3. Managing SQL objects in Database Studio
(7 - Creating a view without typing SQL)



© SAP AG 2009. All rights reserved. / Page 41

Creating a view without to have to type the required SQL is quite comfortable. After opening “New” – “View” in table’s context menu (use right mouse button) a schematic display of the table appears in the editor (1).

At first a name for the new view should be entered (2).

Now the tables which are intended to be involved in the new view can be dragged and dropped next to each other within the schematic display (3).

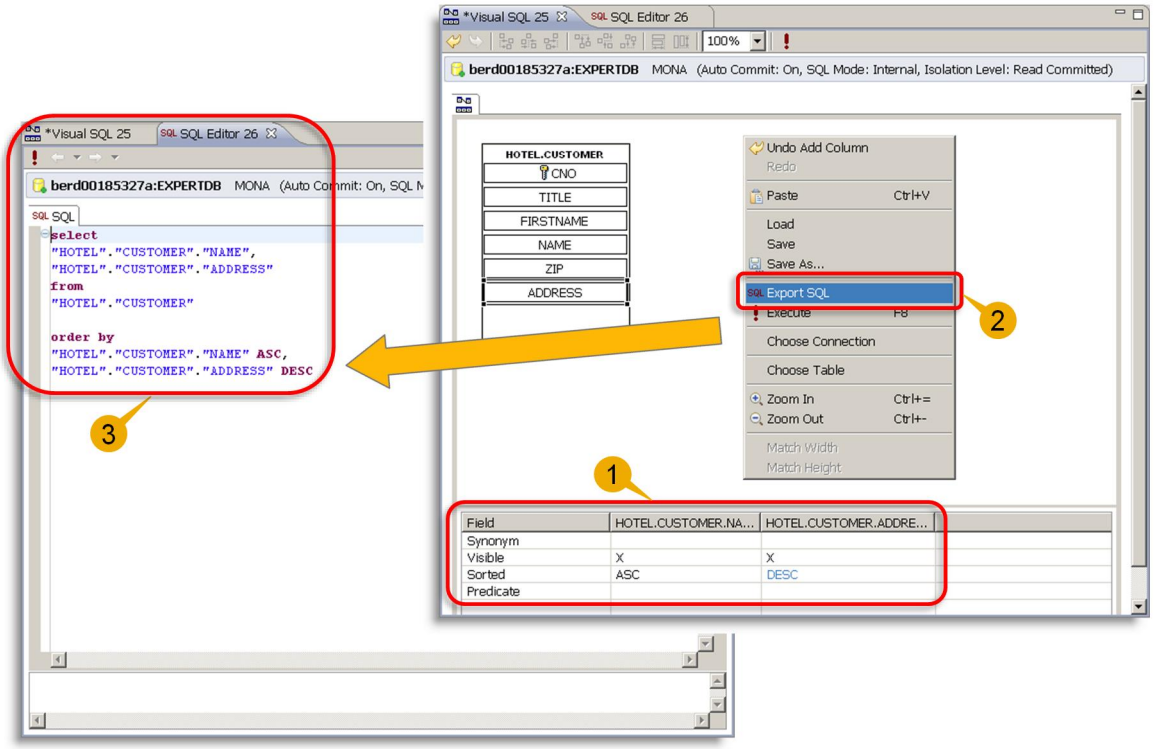
If there are foreign key references between those tables they will be shown as an arrow (4).

Now the required columns of each table can be dragged and dropped into the display below. Per default “Visible” is checked, sorting can be changed by clicking into the corresponding field (toggles between “ ”, “ASC” and “DESC”) (5).

To see the SQL command which will be generated item “Export SQL” has to be chosen from the context menu opened within the schematic table display (use right mouse button).

“When finished the exclamation mark has to be chosen (6).

3. Managing SQL objects in Database Studio
(8 - Creating a ´visual´ SELECT command)



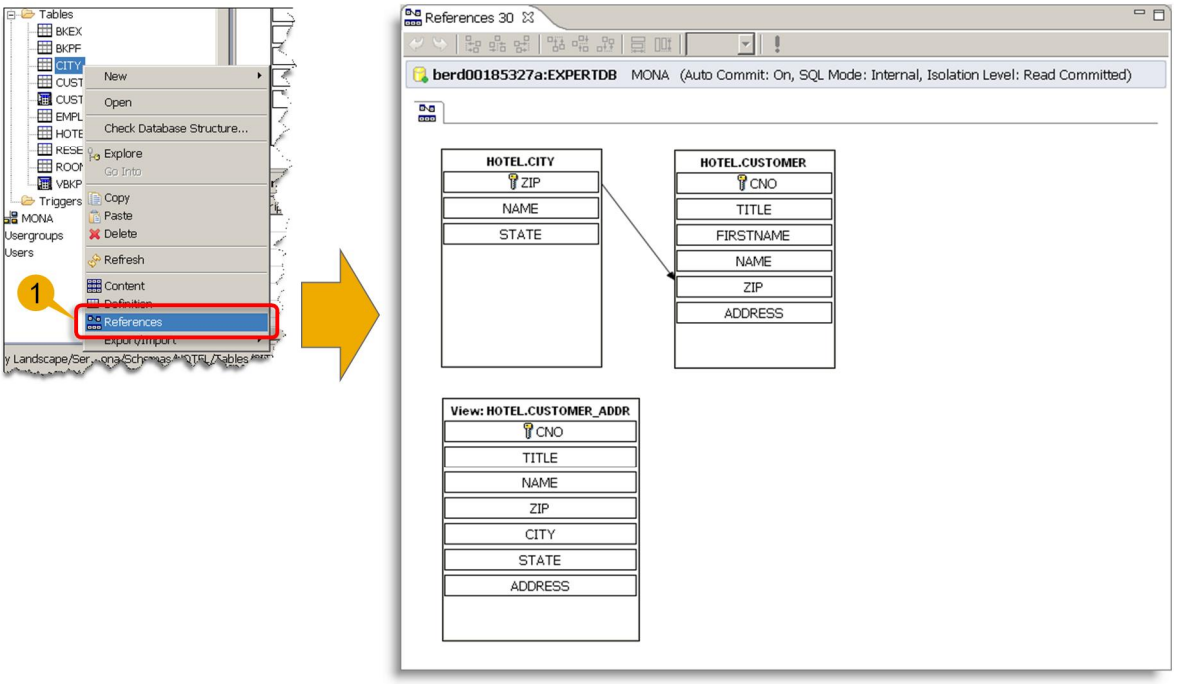
© SAP AG 2009. All rights reserved. / Page 42

Similar to creating a view it is possible to create a SELECT command. To do so within table's context menu "New" – "Visual SQL" has to be selected (use right mouse button). The required table columns are dragged and dropped from the schematic table display into the display below (1).

After choosing the sorting for each column the context menu within schematic table display has to be called and "Export SQL" has to be selected (2).

A new editor tab will be opened showing the corresponding SQL command (3).

3. Managing SQL objects in Database Studio
(9 - Showing references and dependent objects)

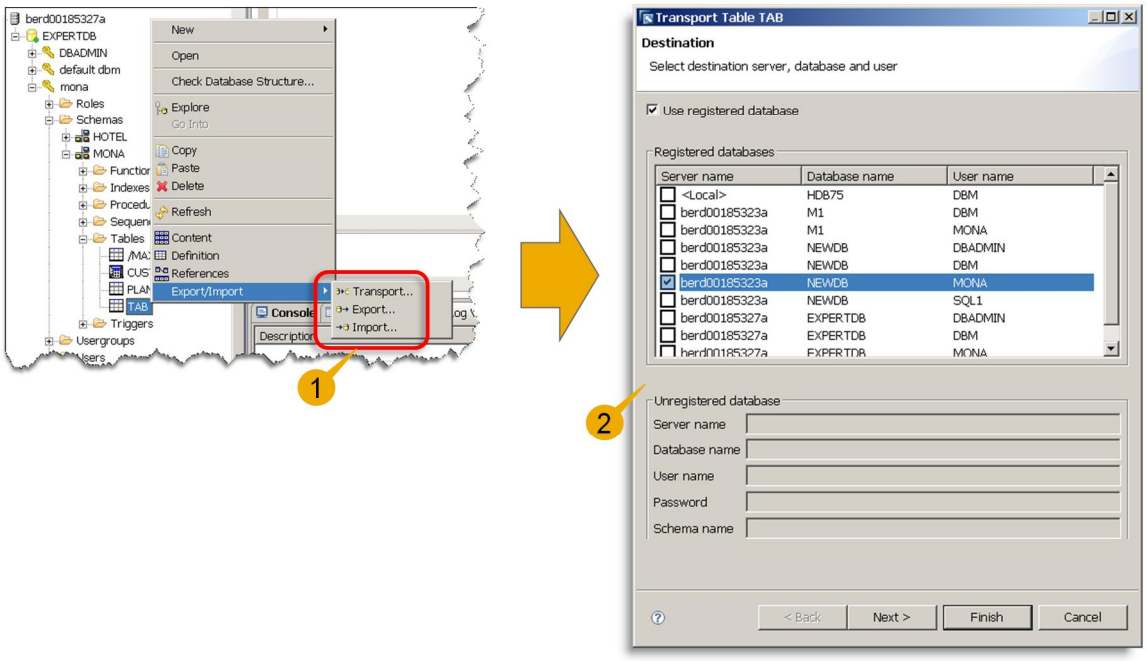


© SAP AG 2009. All rights reserved. / Page 43

Within table's context menu (use right mouse button) there is an item "References" (1).

It allows to show a schematic display presenting the table, foreign key references, indexes and views. It is an easy way of getting knowledge about dependencies of the selected table.

3. Managing SQL objects in Database Studio
(10 - Export/Import of tables [1])

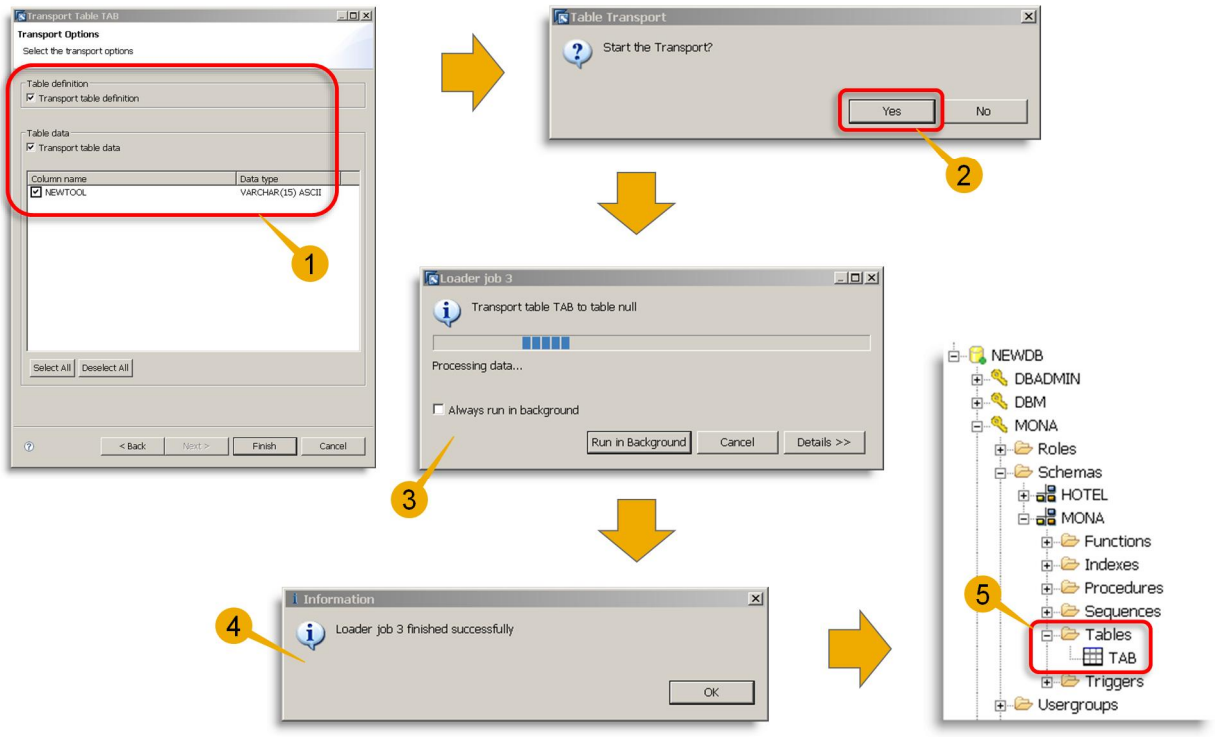


© SAP AG 2009. All rights reserved. / Page 44

Table's context menu "Export/Import" offers to transport a table to another SAP MaxDB database and to export or import tables (using package files) (1).

MaxDB tool "Loader" is used for this and integrated into Database Studio. To transport a table it is required to specify the destination database (one of the registered databases can be chosen or even an unregistered one) (2).

3. Managing SQL objects in Database Studio
(10 - Export/Import of tables [2])

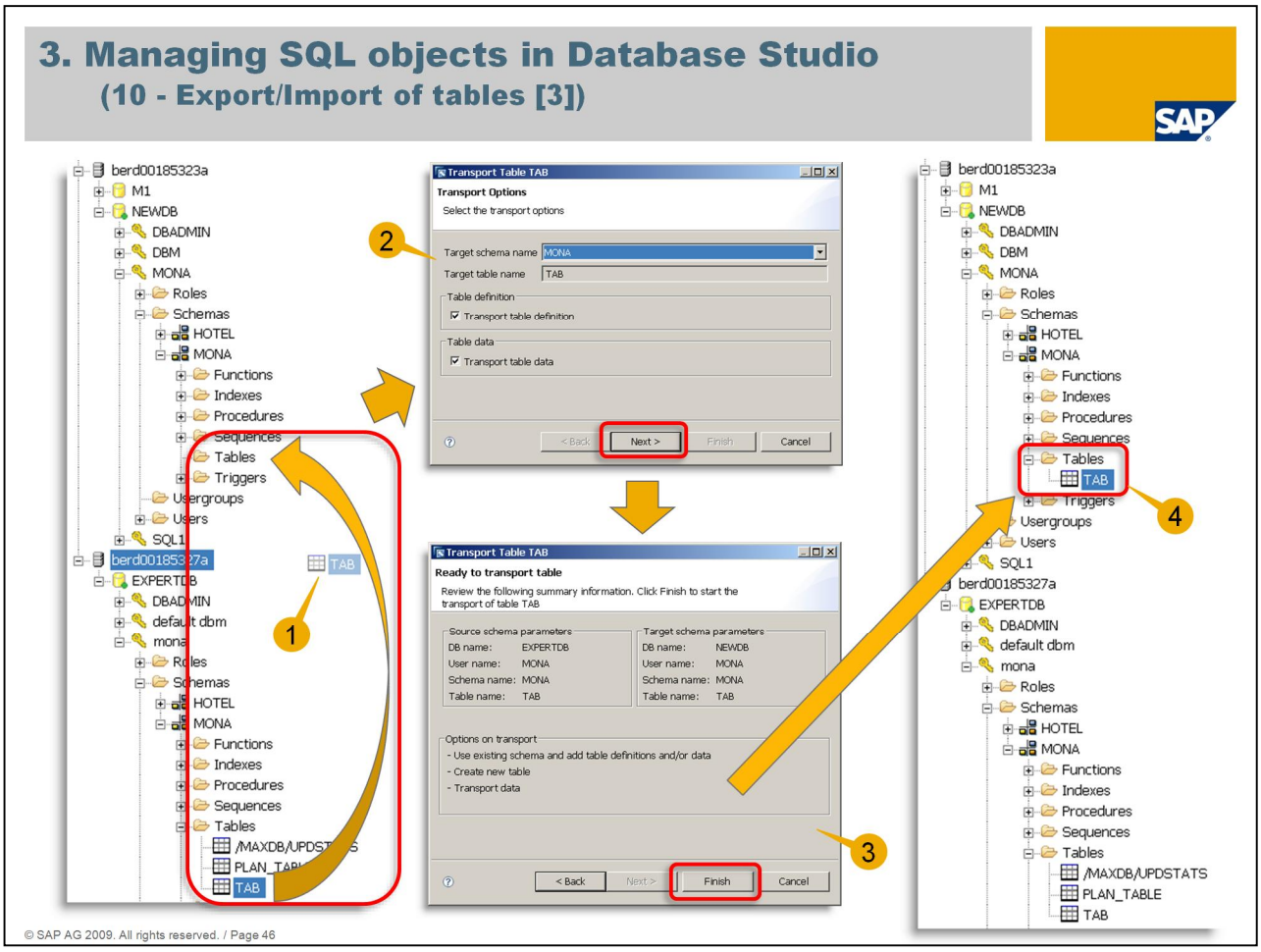


© SAP AG 2009. All rights reserved. / Page 45

When choosing “Next” transport scope can be determined (table definition and data) and the columns of the table are displayed and are checked by default (1).

After starting the transport (2) a progress bar is displayed while the transport is running (3) and a message is shown when the transport was successful (4).

The table is now listed below “Tables” within the explorer tree of the destination database (5).



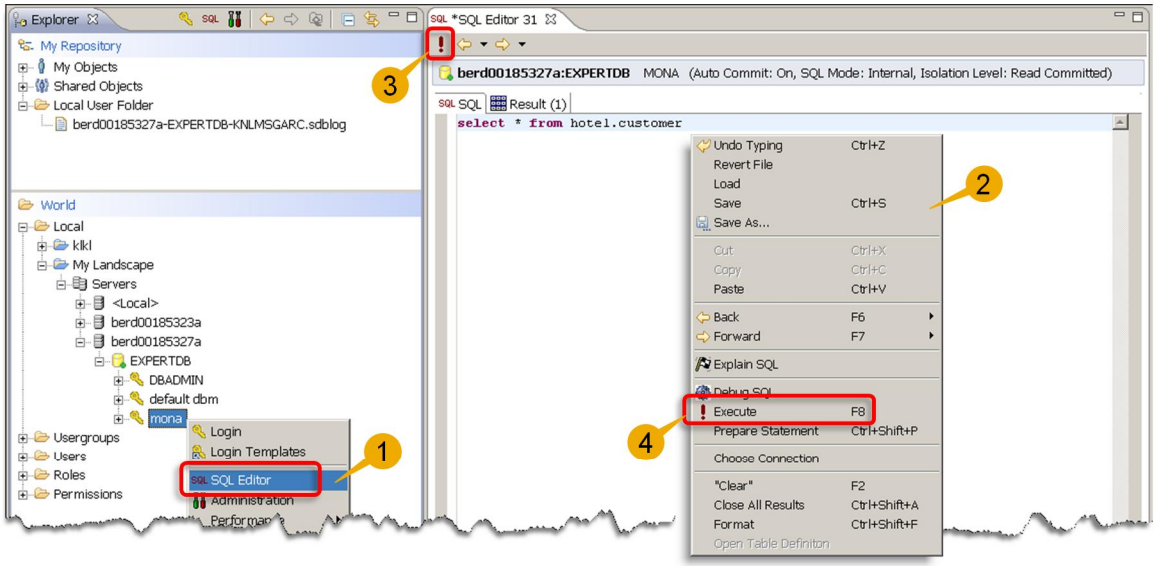
It is possible to transfer a table via drag and drop to a different database on a different database server within the network (1).

After displaying the transport options including the possibility to change them (2) a summary of the upcoming transport is shown (3).

When finished successfully the table is listed within the explorer tree of the destination database (4).

It is possible to transport a table to any schema of the destination database.

4. Running SQL commands via Database Studio
(SQL Editor [1])



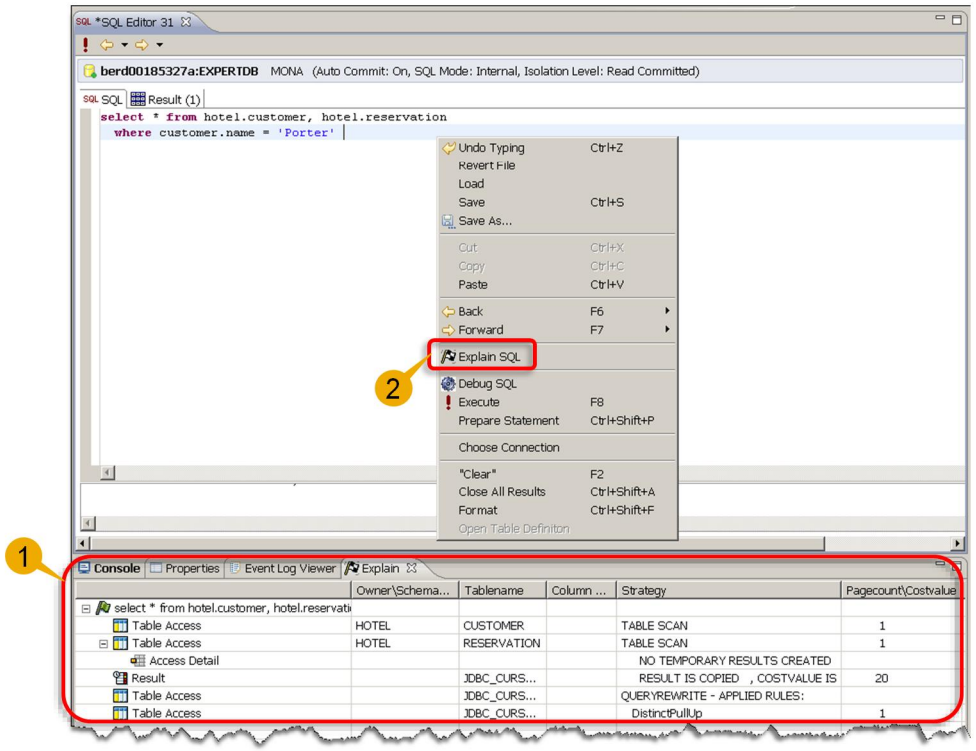
© SAP AG 2009. All rights reserved. / Page 47

To run SQL commands at first an SQL editor has to be opened via context menu of the specific SQL user (use right mouse button) (1).

Within this editor another context menu can be opened (use right mouse button) offering different options (2).

To execute an SQL command it has to be marked (only necessary if more than one command are listed within the SQL editor) and one of the following options has to be used: Firstly, pressing F8. Secondly, choosing the icon showing the exclamation mark within the toolbar (3). Thirdly, opening the context menu via right mouse button pointing to the corresponding SQL command and choose “Execute” (4).

4. Running SQL commands via Database Studio
(SQL Editor [2])



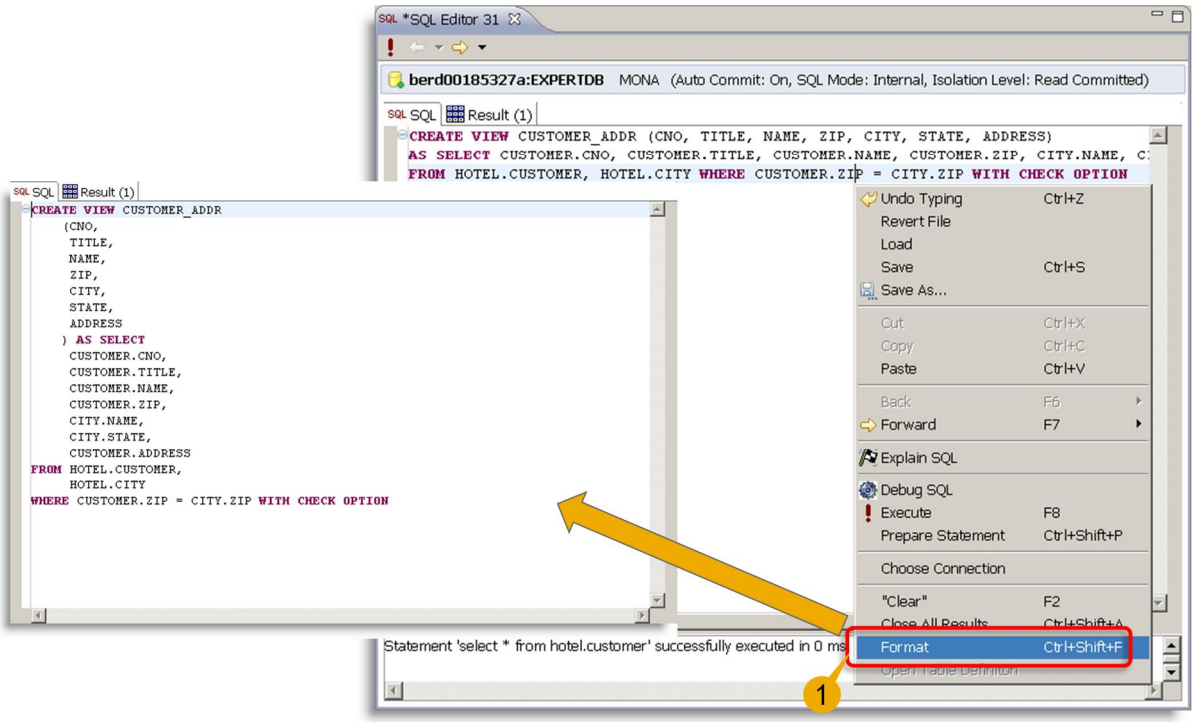
© SAP AG 2009. All rights reserved. / Page 48

Database Studio provides the possibility to display the execution plan of the corresponding SQL command as a separate tab alongside the event log viewer (1).

Within the context menu opened within the editor (use right mouse button) item “Explain SQL” has to be chosen (2).

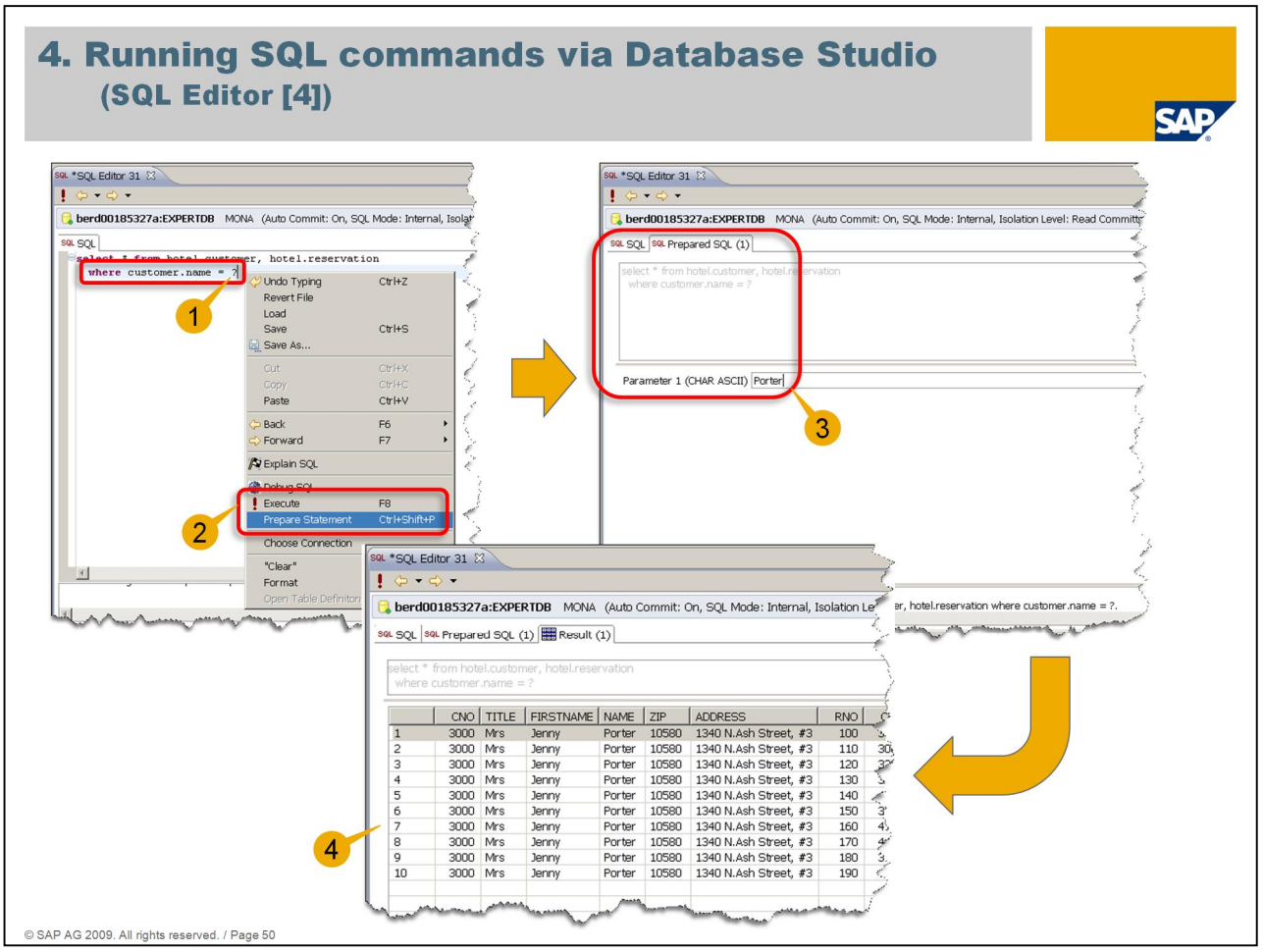
It is also possible to add the key word “explain” just before the SQL command and execute it afterwards. In this case the result is shown in a separate tab within the SQL editor.

4. Running SQL commands via Database Studio
(SQL Editor [3])



© SAP AG 2009. All rights reserved. / Page 49

Sometimes an SQL command is only available in a format which is difficult to read. To save the trouble of reformatting it manually Database Studio offers the option to do this work instantly. It is just required to open the context menu (use right mouse button), pointing to the SQL command and to choose “Format” (1).



It is possible just to prepare an SQL command before the execution using parameters instead of the specific values within the WHERE clause. The reserved character for a parameter within an SQL command is the question mark (1).

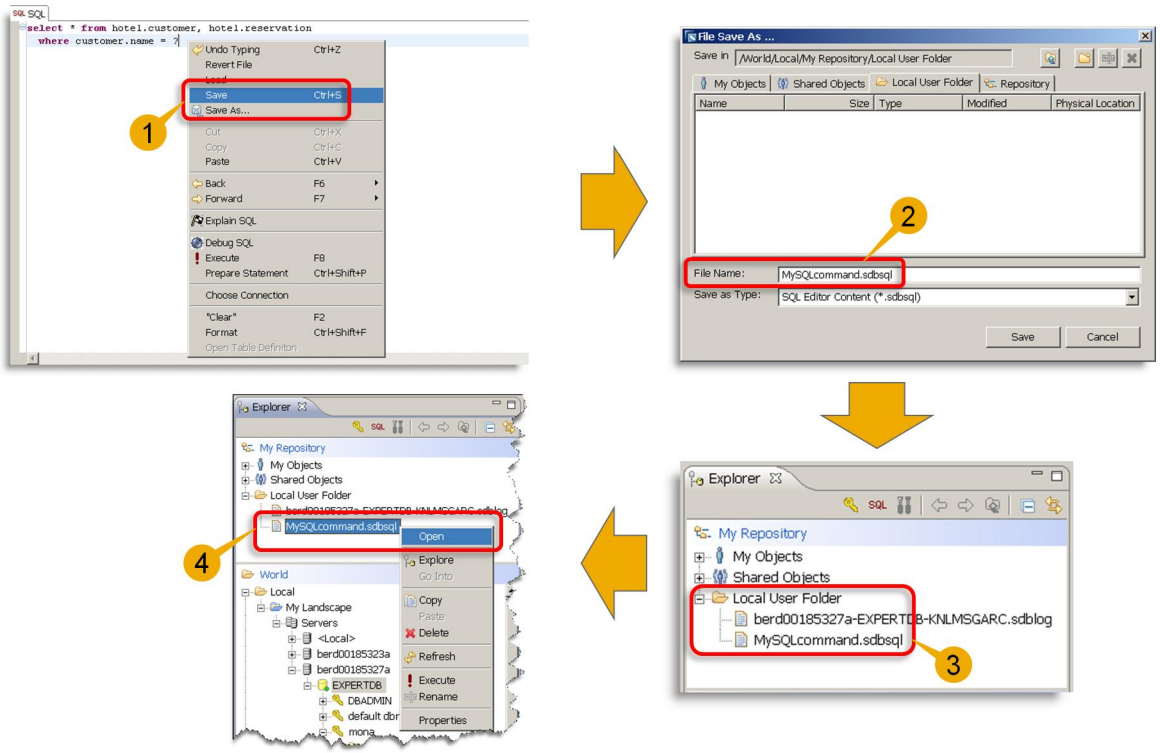
If such an SQL command was entered it is possible to choose “Execute” or “Prepare Statement” from the context menu or the exclamation mark from the toolbar (2).

A separate tab within the SQL editor is opened, called “Prepared SQL”, where the specific values can be entered (3).

Choosing “Execute” runs the SQL command with the entered values (4).

The tab “Prepared SQL” remains opened and can be used repeatedly.

4. Running SQL commands via Database Studio
(SQL Editor [5])



© SAP AG 2009. All rights reserved. / Page 51

If SQL commands are required to be saved for later reuse Database Studio provides the option to save it in files. Within the context menu (use right mouse button) ”Save” or “Save as …” has to be chosen (1).

Within the following input mask in field “File Name:” a meaningful name can be entered (2).

After choosing “Save” the file is listed within “Local User Folder” in view “My Repository” (3).

The physical location of the file within local file system is determined by the configured local folder (“Window” – “Preferences”).

To open such a file again item “Open” has to be chosen within context menu (opened via right mouse button when pointing to the file) (4). Opening is also possible by just double-clicking the file name (use left mouse button).

5. Useful information resources

- contained documentation:

  Menu bar in Database Studio:

  “Help“ – “Welcome“ – “Overview“

- SAP notes:

  1097311 (MaxDB Database Studio installation)

  1320057 (Missing or changed functions in the Database Studio)

  1315244 (Feature list for SAP MaxDB Database Studio)

- Link in SAP Community Network (SCN):

  HowTo - Installation of a 32-bit Database Studio on a 64-bit server

  (obsolet as of Database Studio version 7.8)

  http://wiki.sdn.sap.com/wiki/x/cYDxB

© SAP AG 2009. All rights reserved. / Page 52

Questions and Answers

Thank You!
Bye, Bye – And Remember Next Session

November 24, 2009	Session 3: Basic Administration with CCMS Transactions

Disclaimer

This presentation reflects current planning.

Contents may be changed without prior notice, and are in no way binding upon SAP.

Copyright 2009 SAP AG
All rights reserved

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP AG. The information contained herein may be changed without prior notice.

Some software products marketed by SAP AG and its distributors contain proprietary software components of other software vendors.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, SAP NetWeaver, Duet, Business ByDesign, ByDesign, PartnerEdge and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other product and service names mentioned and associated logos displayed are the trademarks of their respective companies. Data contained in this document serves informational purposes only. National product specifications may vary.

The information in this document is proprietary to SAP. This document is a preliminary version and not subject to your license agreement or any other agreement with SAP. This document contains only intended strategies, developments, and functionalities of the SAP® product and is not intended to be binding upon SAP to any particular course of business, product strategy, and/or development. SAP assumes no responsibility for errors or omissions in this document. SAP does not warrant the accuracy or completeness of the information, text, graphics, links, or other items contained within this material. This document is provided without a warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, or non-infringement.

SAP shall have no liability for damages of any kind including without limitation direct, special, indirect, or consequential damages that may result from the use of these materials. This limitation shall not apply in cases of intent or gross negligence.

The statutory liability for personal injury and defective products is not affected. SAP has no control over the information that you may access through the use of hot links contained in these materials and does not endorse your use of third-party Web pages nor provide any warranty whatsoever relating to third-party Web pages

Weitergabe und Vervielfältigung dieser Publikation oder von Teilen daraus sind, zu welchem Zweck und in welcher Form auch immer, ohne die ausdrückliche schriftliche Genehmigung durch SAP AG nicht gestattet. In dieser Publikation enthaltene Informationen können ohne vorherige Ankündigung geändert werden.

Einige von der SAP AG und deren Vertriebspartnern vertriebene Softwareprodukte können Softwarekomponenten umfassen, die Eigentum anderer Softwarehersteller sind.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, SAP NetWeaver, Duet, Business ByDesign, ByDesign, PartnerEdge und andere in diesem Dokument erwähnte SAP-Produkte und Services sowie die dazugehörigen Logos sind Marken oder eingetragene Marken der SAP AG in Deutschland und in mehreren anderen Ländern weltweit. Alle anderen in diesem Dokument erwähnten Namen von Produkten und Services sowie die damit verbundenen Firmenlogos sind Marken der jeweiligen Unternehmen. Die Angaben im Text sind unverbindlich und dienen lediglich zu Informationszwecken. Produkte können länderspezifische Unterschiede aufweisen.

Die in diesem Dokument enthaltenen Informationen sind Eigentum von SAP. Dieses Dokument ist eine Vorabversion und unterliegt nicht Ihrer Lizenzvereinbarung oder einer anderen Vereinbarung mit SAP. Dieses Dokument enthält nur vorgesehene Strategien, Entwicklungen und Funktionen des SAP®-Produkts und ist für SAP nicht bindend, einen bestimmten Geschäftsweg, eine Produktstrategie bzw. -entwicklung einzuschlagen. SAP übernimmt keine Verantwortung für Fehler oder Auslassungen in diesen Materialien. SAP garantiert nicht die Richtigkeit oder Vollständigkeit der Informationen, Texte, Grafiken, Links oder anderer in diesen Materialien enthaltenen Elemente. Diese Publikation wird ohne jegliche Gewähr, weder ausdrücklich noch stillschweigend, bereitgestellt. Dies gilt u. a., aber nicht ausschließlich, hinsichtlich der Gewährleistung der Marktgängigkeit und der Eignung für einen bestimmten Zweck sowie für die Gewährleistung der Nichtverletzung geltenden Rechts.

SAP übernimmt keine Haftung für Schäden jeglicher Art, einschließlich und ohne Einschränkung für direkte, spezielle, indirekte oder Folgeschäden im Zusammenhang mit der Verwendung dieser Unterlagen. Diese Einschränkung gilt nicht bei Vorsatz oder grober Fahrlässigkeit.

Die gesetzliche Haftung bei Personenschäden oder die Produkthaftung bleibt unberührt. Die Informationen, auf die Sie möglicherweise über die in diesem Material enthaltenen Hotlinks zugreifen, unterliegen nicht dem Einfluss von SAP, und SAP unterstützt nicht die Nutzung von Internetseiten Dritter durch Sie und gibt keinerlei Gewährleistungen oder Zusagen über Internetseiten Dritter ab.

Alle Rechte vorbehalten.