SAP[®] MaxDB[™] Expert Session

SAP® MaxDB™ Database Analyzer Christiane Hienger, Bettina Laidler November 12, 2013

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SAP[®] MaxDB[™] – Expert Session

SAP® MaxDB™ Database Analyzer

Christiane Hienger Bettina Laidler IMS MaxDB/liveCache Development Support November 12, 2013



Agenda

- 1. Introduction
- 2. Functional Chain
 - 2.1. Software Components
 - 2.2. How Database Analyzer Collects Statistics
 - 2.3. Log Files and Views
- 3. Ways to Manage Database Analyzer
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- 4. Parameter Check With Database Analyzer
- 5. Expert Analysis
 - 5.1. Optimize Runtime of Data Backup
 - 5.2. Aggregation Analysis
- 6. Additional Useful Information

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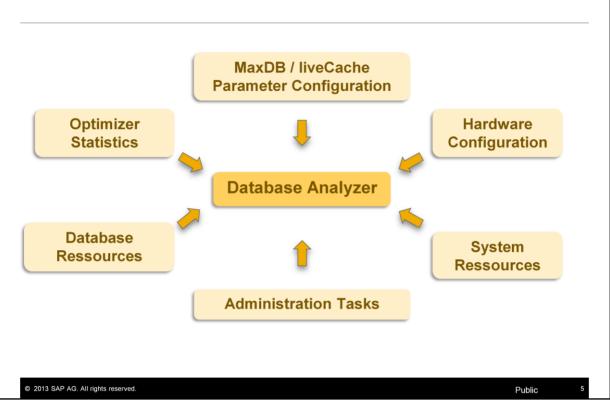
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- 4. Parameter Check With Database Analyze
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1. Introduction



The Database Analyzer is a SAP MaxDB tool for long-term performance analysis. It creates snapshots about the database status in configurable intervals and logs these in several files.

This provides statistics data, which also enables an analysis of past performance issues.

The root cause of performance issues could be different. Maybe the reason is related to:

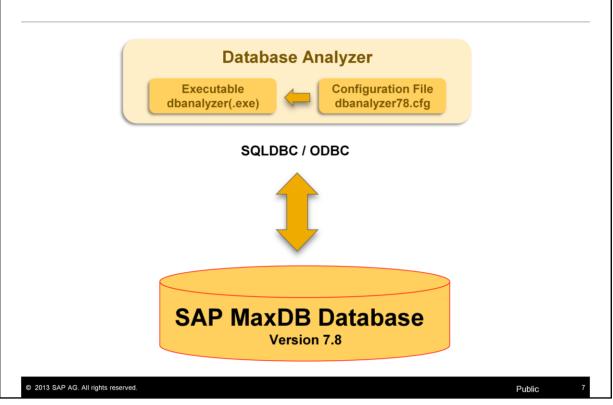
- not optimal MaxDB/liveCache parameter configuration
- lack of hardware resources (CPU, memory, swapping)
- · not optimal optimizer strategies
- high I/O response times (reading data, writing log)
- · collisions on SQL locks, critical regions, internal structures
- administration tasks running in parallel (backup, update statistics, consitency check)
- ...

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2.1. Software Components (1)



The Database Analyzer consists of two components, the executable and the configuration file. The Database Analyzer program (executable dbanalyzer(.exe)) has no knowledge about the data to be collected. It is just "infrastructure". The "heart" of the monitoring via Database Analyzer is the configuration file (dbanalyzer<version>.cfg).

2.1. Software Components (2)

| | Executable dbanalyzer(.exe) | | Configuration file dbanalyzer <version>.cfg</version> |
|------|--|---|--|
| • | independent from the MaxDB/liveCache version to monitor | • | the statistics that have to be collected and from which table they have to be selected from |
| • | able to connect to a MaxDB/liveCache instance via local (shared memory, default) or remote (TCP/IP, SAP Ni, for support purposes) communication | • | in which file which statistics have to be stored (grouped by theme) |
| • | communication is realized via SQLDBC (new) / ODBC (old) | • | how often statistics have to be collected (different intervals for different statistics possible) |
| • | able to create views, performing SELECT statements, create/write to .csv/.prt files | • | rules, when statistics indicate a performance issue and a rating how critical it is (different warning levels are supported) |
| • | to interpret a configuration file of a specified structure | | |
| | | | |
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The Database Analyzer executable is MaxDB kernel software independent. The Database Analyzer configuration file is release dependent. With each software installation only one executable related to the MaxDB kernel software version is delivered. Multi Database Analyzer configuration files are part of the software installation package for each MaxDB major Kernel version one.

Database Analyzer configuration file depends on the MaxDB/liveCache version to be monitored (dbanalyzer77.cfg, dbanalyzer78.cfg, ... located in <installtion_path>\env)

2.2. How Database Analyzer Collects Statistics

The Database Analyzer collects statistics periodically

- interval as startup parameter (default 900s)
- some statistics will be collected more often or less often; defined in configuration file; no startup option e.g. statistics about running commands

All statistics evaluated/logged by the Database Analyzer are based on MaxDB/liveCache system views (or views that are based on system views)

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- The Database Analyzer collects statistics periodically.
 - The snapshot interval is given as a startup parameter (default 900s)

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- Some statistic values are collected more often, independent from the user specified interval.
- Some statistic values which change less often or produce higher workload during collection are not collected in each interval. These user interval independent statistics values are defined in the configuration file and their interval cannot be modified (no startup option).
- Source of all statistics evaluated/logged by the Database Analyzer are MaxDB/liveCache system views (or specific Database Analyzer views that are based on system views).
- Most of the specific Database Analyzer views are created by the first start of Database Analyzer (schema <sysdba>, e.g. superdba). Additional Database Analyzer specific views are created by the Database Analyzer parameter check in schema <sysdba> too. Therefore it is important to use the correct user to start the Database Analyzer Check (note: 1423935).

2.3. Log Files and Views

| Administrative Files | <rundirectory>/analyzer</rundirectory> |
|----------------------|--|
| DBAN.err | error log file |
| DBAN.inf | information regarding an active Database Analyzer (pid, session, interval, used configuration file,) |
| DBAN.pid | contains the pid of an active Database Analyzer process |
| DBAN.run | indicates that a Database Analyzer process is already running |
| DBAN.sid | contains the session id inside the MaxDB/liveCache, to which the Database Analyzer is connected to |
| Statistics Files | <rundirectory>/analyzer/<yyyymmdd></yyyymmdd></rundirectory> |
| | |
| DBAN.prt | text file, that contains useful information, critical warnings |
| DBAN *.csv | contains raw statistics, semicolon separated values |
| | |
| DBAN_*.prt | text file, that contains information for a variable number of information (lines) per snapshot |
| - | text file, that contains information for a variable number of information (lines) per snapshot |

All administrative files of the Database Analyzer are located in subdirectory *analyzer* of the rundirectory of the MaxDB/liveCache instance to be monitored.

A bunch of statistics files are updated per interval with the collected statistics. For each day the statistics files will be stored in a separate folder.

DBAN.prt is evaluated by tools (DBACOCKPIT/LC10, Database Studio), different warning levels will be displayed in different colors.

The first three lines (header) of each file DBAN_*.csv contain information about the content of each column. This header is evaluated by the tool for display / aggregation purposes.

2.3. Log Files and Views

| Database Analyzer Views (schema <sysdba>)</sysdba> | Based on MaxDB/liveCache System Views |
|---|---|
| DBAN_ACTIVEDIAGNOSTICFUNCTIONS | SYSINFO.ACTIVEDIAGNOSTICFUNCTIONS |
| DBAN_CACHE_INFORMATION | SYSINFO.IOBUFFERCACHES, SYSINFO.DATACACHE |
| DBAN_FILLING | SYSINFO.DATASTATISTICS, SYSINFO.LOGSTATISTICS |
| DBAN_IOTHREAD_STATISTICS | SYSINFO.IOTHREADSTATISTICS |
| DBAN_LOG_IO | DOMAIN.SYSMON_TASK_DETAIL |
| DBAN_MACHINEUTILIZATION | SYSINFO.MACHINEUTILIZATION |
| DBAN_NUM_CONNECTED_USERTASKS | DOMAIN.SYSMON_US |
| DBAN_SHOW_ACTIVE_TASKS | DOMAIN.SYSMON_ACTIVE_TASK, SYSINFO.TASKGROUPSTATISTICS |
| | |
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Database Analyzer creates its own views in the MaxDB/liveCache instance to be monitored in schema <sysdba>. All these views (DBAN_*) are based on one or more MaxDB/liveCache system views. Only a subset is displayed here.

The MaxDB system views contain huge amount of information which is not necessary totally collect with each snapshot, therefore the <DBAN_views> contain only a subset of information.

The information in the Database Analyzer log files are based on the Database Analyzer views and the system views.

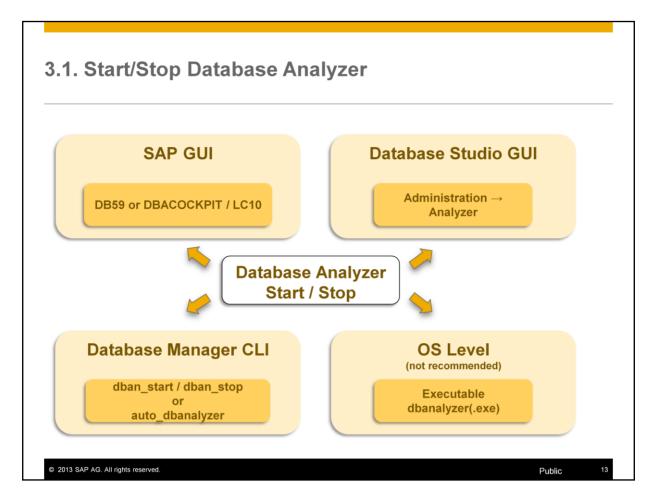
To check which Database Analyzer view is based on which system view use the following SELECT statement:

select * from viewdefs where viewname = <DBAN view>

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There are several ways to start or stop the Database Analyzer. To do this the graphical tools SAP GUI or Database Studio GUI can be used. On operating system level Database Manager CLI commands are available to start / stop the Database Analyzer manually or automatically.

For test purposes it is possible to start the Database Analyzer executable manually on OS level. It is used for support purposes, mostly in conjunction with a special configuration file (like the parameter check configuration file).

Hint: Please take care not to start a Database Analyzer on the same system twice (eg. via DBACockpit and on OS level). Both Database Analyzer would write into the same log files if the default output directory is not changed via option '-o'.

3.1.1. Start/Stop with SAP GUI: Transaction DB59

| Ø | - 4 🖳 - 4 6 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
|---|--|
| Maintain Databa | ase Integration |
| 1 DBA Cockpit | |
| | |
| Database Connection Infor | G] |
| Name of Database Connect Database name | WB9 |
| Database Server | ku252059a |
| Database Server | 102520598 |
| Description | |
| Description | |
| User Data Automat | atic Monitoring |
| , but but , theomet | |
| | |
| CCMS Monitor Sets (RZ20 | 10) |
| Activate Alert Monitor | |
| Activate Alert Monitor | |
| ✓ Activate Alert Monitor ✓ Report Critical Alerts W | r When the Database Assistant Is Called |
| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa | r When the Database Assistant Is Called base Analyzer) |
| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa Activate when starting | r When the Database Assistant Is Called base Analyzer) ig the SAP system |
| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa | r When the Database Assistant Is Called base Analyzer) |
| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa Activate when starting Collect. Interval: | r When the Database Assistant Is Called base Analyzer) ig the SAP system |
| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa Activate when starting Collect. Interval: DBA Logs | r When the Database Assistant Is Called base Analyzer) sg the SAP system 900 Seconds (Min: 60, Max: 3600) |
| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa Activate when starting Collect. Interval: DBA Logs Automatic Deletion of the | r When the Database Assistant Is Called base Analyzer) ig the SAP system 900 Seconds (Min: 60, Max: 3600) he DBA Logs |
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| Activate Alert Monitor Report Critical Alerts W Bottlenck Analysis (Databa Activate when starting Collect. Interval: DBA Logs Automatic Deletion of the | r When the Database Assistant Is Called base Analyzer) ig the SAP system 900 Seconds (Min: 60, Max: 3600) he DBA Logs |

An automatic start of the Database Analyzer can be configured with transaction DB59 \rightarrow Integration Data. Then the Database Analyzer will be started with the defined interval when the SAP system is started. This feature is only possible for the own database of the SAP system.

If a liveCache is integrated into a SAP system the implicite restart of the Database Analyzer after restart of the liveCache can be configured in the same way also via transaction DB59.

This functionality is not supported for any other remote databases.

3.1.1. Start/Stop with SAP GUI: DBACOCKPIT

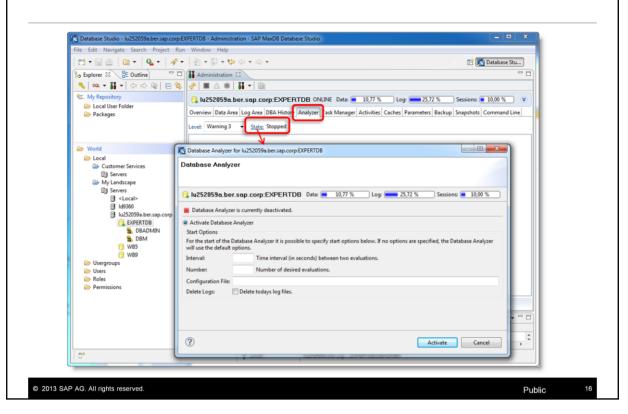
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|--|---|---|----------------|----------------|---------------------------------|-----|
| Bottlene | ck Analysis | | | | | |
| 🛐 🟭 Goto D | ate Node 🔓 Determine statu | us 🕴 Start Analysis 🍸 Stop Analysis 🖧 🕻 | | | | |
| 🗟 🔁 🖬 Sy | stem Configu > Status | | | | | |
| System EXP | FRIDE | P Database Analyzer: Composite Interval | 11:36:11 | Collect. In | terval: 900 Seconds | |
| | | | | | | |
| SAP MaxDB Da ▼ | | atabase Analyzer Composite Interval | | <u> </u> | Filter for Measurement Times | |
| Attribut | es EX B | 900 Seconds | | top the Databa | ase Analyzer | |
| System System | Information Displa | - | ipse A | | | |
| | c Ouenrieur | ∀ | 1 X - O | Do you r | eally want to stop the database | |
| Transact | | | | analyzer | ? | |
| | | | nents Messag | | | |
| | base Analyzer → ◇ 14.06. denecks → ◇ 18.06 | | | Yes | No | |
| | ert Analysis 🔰 🕨 💠 26.06. | | | 6 | | |
| | Performance | ¥ | | | | |
| 🕨 🗀 Kerr | | | | | | |
| | Database Analyzer Status | 000 | | | | |
| Space Jobs | | F | | | | |
| Alerts | Started On | 10.09.2013 11:36:11 | | | | |
| Diagnos | | 900 | - 6 - | | | |
| Administ | | /sapdb/EXPERTDB/db/env/dbanalyzer78 | | | | |
| Cools | Log Directory Working Directory | /sapdb/EXPERTDB/data/wrk/EXPERTDB/an /sapdb/EXPERTDB/data/wrk/EXPERTDB | laiyzer | | | |
| | Process ID | 6402 | | | | |
| | Session ID | 14888 | | | | 4 F |
| - 1 | 3639011 10 | 14000 | | | | |
| | | | | | | |
| | | 811 | , | | WB9 (2) 001 V lu252059a INS | |

The Database Analyzer is completely integrated into transaction DBACOCKPIT/LC10: Performance \rightarrow Database Analyzer \rightarrow Bottlenecks. If you want to check the current status of the Database Analyzer choose button *Determine status*.

Via button *Start Analysis* or *Stop Analysis* the Database Analyzer can be started or stopped manually. The default snapshot interval is 900 seconds. If you want to change the snapshot interval you have first to stop the Database Analyzer and define a new interval with next restart. In transaction DBACockpit snapshot intervals of 60, 120,300, 900 and 3600 seconds are supported.

An useful value during a performance analysis is between 60 and 120 seconds.

3.1.2. Start/Stop with Database Studio GUI



Database Studio GUI supports an intuitive way to start or stop the Database Analyzer. This functionality can be found on tab *Analyzer* of the administration editor . If no start options are specified the Database Analyzer will use the default options (e.g. interval of 900 seconds). With button *Activate* the Database Analyzer will be started.

3.1.3. Start/Stop with Database Manager CLI

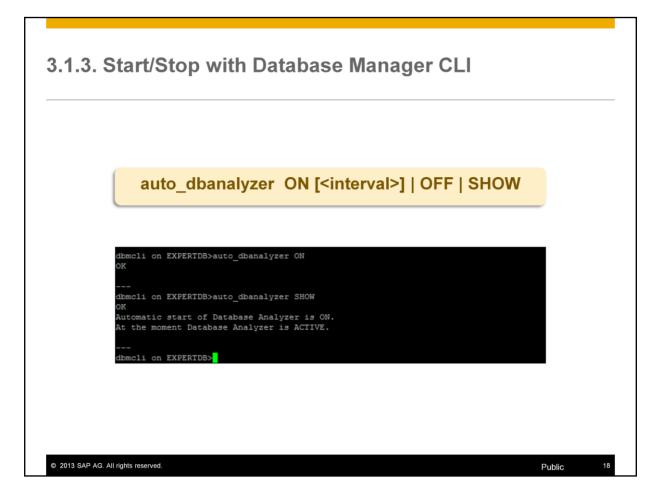


The default interval of 900 seconds will be used too if you start Database Analyzer with DBMCLI command 'dban_start' without any options. To specify another interval of collecting statistics option '-t' has to be used. Additionally the count of evaluations can be specified with option '-t'.

Further options of 'dban_start':

| -f <configuration></configuration> | Name of the configuration file |
|------------------------------------|--|
| -i | Deletes any existing log files for the current day |
| -keep <days></days> | Deletes all log files and directories that are older |
| than <days></days> | |

With DBMCLI command 'dban_stop' the Database Analyzer will be stopped. The actual state of the Database Analyzer can be displayed with DBMCLI command 'dban_state'.

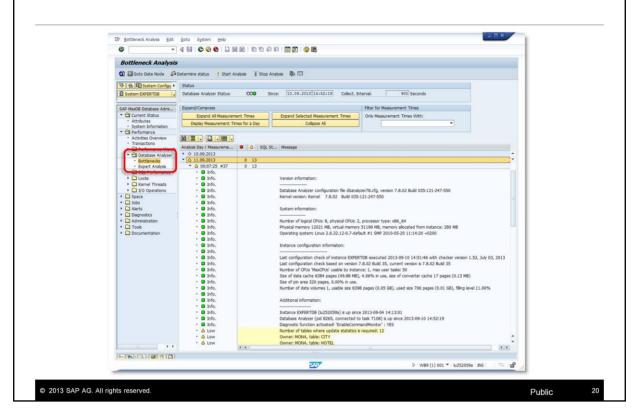


An automatic start of the Database Analyzer can be forced by using the DBMCLI command ,auto_dbanalyzer'. This command activates the function for automatically starting Database Analyzer when the MaxDB/liveCache database is started. You can switch this function on or off in any of the operational states of the MaxDB/liveCache database.

<section-header>SAP GUDatabase Studio GUDBACOCKPIT / LC10Ldministration → Analyzer f
Bacosis Files → DB Analyzer fteImage: Display Database
Bacyzer statisticsImage: Display Database
Co Level
Image: Display IMS Excel

There are several possibilities to display the collected statistic values of the Database Analyzer. In addition to the graphical tools SAP GUI and Database Studio GUI standard text editors (for all *.prt files) respectively MS Excel (for all *.csv files) can be used.

3.2.1. Display Collected Statistics with SAP GUI: Bottlenecks (1)



Each MaxDB performance analysis starts with the Bottleneck Analysis in transaction DBACockpit. The Information displayed under

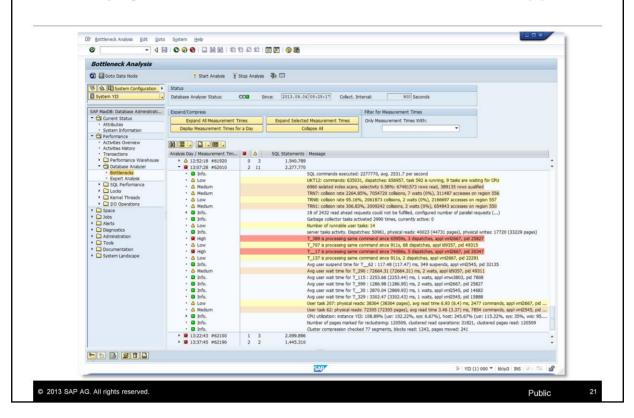
DBACOCKPIT/LC10: Performance \rightarrow Database Analyzer \rightarrow Bottlenecks are based on log file DBAN.prt which is located in subdirectory *analyzer/*<*YYYYMMDD*> of the rundirectory of the MaxDB/liveCache instance.

This log file starts with some general system information:

- Version information (Database Analyzer configuration file, Database Analyzer executable, database kernel)
- Hardware information (CPU, Memory, operating system)
- Database configuration information (including last executed parameter check)
- · Information about required statistics update
- · Missing file directory counters

This information are logged in the first interval after starting the Database Analyzer and also at the beginning of each day.

3.2.1. Display Collected Statistics with SAP GUI: Bottlenecks (2)



The other snapshots contain information about possible bottlenecks. Different warning levels will be displayed in different colors.

Note: Not each alert with priority high is pointing to a problem. The alert information should always be related to the workload of the system e.g. region collisions are not critical if there are no additional waits.

3.2.1. Display Collected Statistics with SAP GUI: Expert Analysis (1)

| DB Analyzer: Expert Ana | alysis | | | | | |
|---------------------------------------|---|--|-----------|----------------------|---------------------------|------------|
| Q & S | | | | | | |
| Image: System Configuration ▶ | | | | | | |
| System YI3 | Analysis Day/Monitoring Classes | File Name | Size | Time | | |
| | 2013.09.11 | File Name | 266 | Table | | |
| SAP MaxDB: Database Administrati | · ALERTS | DBAN.prt | 92.948 | 14:37:53 | - | |
| • 😋 Current Status | RUNNING_COMMANDS | DBAN_RUNNING_COMMANDS.prt | 3.174 | 14:37:53 | | |
| Attributes | SHOW_ACTIVE_TASKS | DBAN_SHOW_ACTIVE_TASKS.prt | | 14:47:43 | | |
| System Information | B UKT_CPU_UTILIZATION | DBAN_UKT_CPU_UTILIZATION.prt | 66.005 | 14:37:53 | | |
| Performance | USER_TASK_ACTIVITES | DBAN_USER_TASK_ACTIVITES.prt | 1.698.944 | 14:37:53 | | |
| Activities Overview | ANALYZER_TASK_STAT | DBAN_ANALYZER_TASK_STAT.csv | 4.241 | 14:37:53 | | |
| Activities History Transactions | • 🖶 BACKUP | DBAN_BACKUP.csv | 6.768 | 14:37:53 | | |
| | CACHES GACHE_OCCUPANCY | DBAN_CACHES.csv | 7.428 | 14:37:53 14:37:53 | | |
| • 🖾 Database Analyzer | CATALOG_CACHE | DBAN_CACHE_OCCUPANCY.csv DBAN_CATALOG_CACHE.csv | 4.732 | 14:37:53 | | |
| Bottlenecks | • 1 CLUSTER_IO | DBAN_CLUSTER_IO.csv | 3.685 | 14:37:53 | | |
| Expert Analysis | • TO COMMIT_STAT | DBAN_COMMIT_STAT.csv | 5.596 | 14:37:53 | | |
| SQL Performance | | DBAN_CPU_UTILIZATION.csv | 6.757 | 14:37:53 | | |
| Locks | • 🛐 FILLING | DBAN_FILLING.csv | 7.224 | 14:37:53 | | |
| Kernel Threads Diversions | • 🐴 GC | DBAN_GC.csv | 5.059 | 14:37:53 | | |
| Space | • 🔁 10 | DBAN_IO.csv | 8.501 | 14:37:53 | | |
| Space Jobs | • 🔁 IOTHREADS | DBAN_IOTHREADS.csv | 5.501 | 14:37:53 | | |
| Alerts | • 10_PREFETCH | DBAN_IO_PREFETCH.csv | 2.967 | 14:37:53 | | |
| Diagnostics | • 💾 JOIN_STAT | DBAN_JOIN_STAT.csv | 5.196 | 14:37:53 | | |
| Administration | • 🖺 LOAD | DBAN_LOAD.csv | 7.238 | 14:37:53 | | |
| • 🗀 Tools | | DBAN_LOGGING.csv | 6.299 | 14:37:53 | | |
| Documentation | OVERVIEW BREGIONS | DBAN_OVERVIEW.csv | 5.327 | 14:37:53 14:37:53 | | |
| System Landscape | REGIONS RW_LOCKS | DBAN_REGIONS.csv DBAN_RW_LOCKS.csv | 4.380 | 14:37:53 | | |
| | • B SHARED_SQL | DBAN_SHARED_SQL.csv | 4.764 | 14:37:53 | | |
| | • 1 SPINLOCKS | DBAN_SPINLOCKS.csv | 3.681 | 14:37:53 | | |
| | STRATEGY INDEX | DBAN STRATEGY INDEX.CSV | 7.713 | 14:37:53 | | |
| | • M STRATEGY_PRIMKEY | DBAN_STRATEGY_PRIMKEY.csv | 4.874 | 14:37:53 | | |
| | • B STRATEGY_SCANS | DBAN_STRATEGY_SCANS.csv | 4.888 | 14:37:53 | | |
| | • 📆 sv | DBAN_SV.csv | 6.902 | 14:37:53 | | |
| | SYS_ALLOCATION | DBAN_SYS_ALLOCATION.csv | 4.268 | 14:37:53 | | |
| | TASK_DISPATCHES | DBAN_TASK_DISPATCHES.csv | 6.330 | 14:37:53 | | |
| | • 🖶 TASK_IO | DBAN_TASK_IO.csv | 5.982 | 14:37:53 | | |
| | TASK_STATES | DBAN_TASK_STATES.csv | 6.305 | 14:37:53 | | |
| | TRANSACTIONS | DBAN_TRANSACTIONS.csv | 5.501 | 14:37:53 | | |
| | USER_TASK_STATES 2013.09.10 | DBAN_USER_TASK_STATES.csv | 4.893 | 14:37:53 | ÷ | |
| | - TOT2'0A'IO | | | | | |
| | | | | | | |
| | | SAP | | | YI3 (1) 000 V Idcivi3 INS | 191 141 14 |

Detailed information are available via DBACOCKPIT/LC10: Performance \rightarrow Database Analyzer \rightarrow Expert Analysis. All DBAN_*.prt and DBAN_*.csv files. The expert analysis is used to start a more detailed analysis. Which file have to be checked depends on the messages in the bottleneck analysis.

To work with the expert analysis detailed knowledge about the MaxDB architecture is necessary otherwise the huge amount of statistics values cannot be interpreted correctly.

3.2.1. Display Collected Statistics with SAP GUI: Expert Analysis (2)

| Display a File | | | |
|--|--|--------------------|------|
| | | | |
| Image: System Configuration Image: State No. SAP Haudit: Database Administration. - Current State - Attributes - System Information - Operation State - Attributes - Attributes - Attributes - Attributes - Operations - Operations - Operations - Disposition - Disposition | File: File: DALL USER_LAME_ACTIVITES.prt File: DALL USER_LAME_ACTIVITES.prt <th colstantintontestic="" distributitstontestic="" strestic<="" th="" ton="" transter=""><th>7804</th></th> | <th>7804</th> | 7804 |
| | → 7 The 16 0.02 0.02 0.02 0.01 0.01 0.01 0.01 0.01 | () 13092 lines | |
| | | | |
| | SAP D 1713 (1) 000 * 1 Kdy3 I II | s M S a | |

This slide shows an *.prt example for statistic values in the expert analysis - DBAN_USER_TASK_ACTIVITIES.prt

The DBAN_USER_TASK_ACTIVITIES.prt contains information about user tasks that were active between two intervals.

It does not give information about User Tasks in status connect wait.

The Database Analyzer uses the system view information (just like 'x_cons show active') to check if the region access count or the dispatch count has been changed related to the last interval. If this is true the task information will be logged in the new snapshot as well.

This shows us that the task is really working in the system. If a task is not shown anymore in the file DBAN_USER_TASK_ACTIVITIES.prt the task is doing nothing anymore on database level.

Statistics about servertasks and other special tasks are not listed here.

File DBAN_USER_TASK_ACTIVITIES.prt is available as of version 7.9. In versions < 7.9 use file DBAN_USER_TASKS_CMDS_EXECUTED.prt instead.

3.2.1. Display Collected Statistics with SAP GUI: Expert Analysis (3)

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|------------|------------|-----------------------|------------------------|------------|---------|-----------------|------------|--------|--------------|-----------|-----------------|-------------|---|---|
| DBA | analyzer: | File Dis | play | | | | | | | | | | | 1 |
| | | | | E | | atta (Ba | | | | | | | | 1 |
| | BAN_IOTH | and beautopassed . It | nonmational Sourcement | | | | | | | | | | | |
| | DATE | TIME | DURATION | | Reads | PagesRead | ReadTime | Mintos | PagesWritten | WriteTime | PendingRequests | TenantPeade | Tan | |
| 24 | 21.10.2013 | | 0 | 60 | 0 | Pagesiteau 0 | 0,00 | 0 | 0 | 0,00 | 0 | 0 | Ten A | |
| 30 | 21.10.2013 | | 0 | 61 | 177 | 3.272 | 59,39 | 0 | 0 | 0,00 | 12 | 0 | - | |
| 36 | 21.10.2013 | | 0 | 60 | 12.337 | 183.129 | 83,50 | 0 | 0 | 0,00 | 12 | 0 | | |
| 42 | 21.10.2013 | | 0 | 60 | 8.695 | 145.641 | 81,99 | 0 | 0 | 0,00 | 12 | 0 | | |
| 48 | 21.10.2013 | | 1 | 61 | 7.208 | 114.035 | 94,82 | 332 | 8.321 | 1.064,03 | 21 | 0 | | |
| 54 | 21.10.2013 | 14:20:45 | 1 | 61 | 87.617 | 1.297.361 | 80,23 | 184 | 184 | 215,16 | 11 | 0 | | |
| 60 | 21.10.2013 | 14:25:22 | 1 | 61 | 38.832 | 570.686 | 85,14 | 65 | 83 | 396,52 | 12 | 0 | | |
| 66 | 21.10.2013 | 14:26:23 | 0 | 60 | 8.231 | 137.346 | 87,89 | 0 | 0 | 0,00 | 12 | 0 | | |
| 72 | 21.10.2013 | 14:27:23 | 1 | 61 | 8.623 | 123.685 | 84,17 | 0 | 0 | 0,00 | 12 | 0 | | |
| 78 | 21.10.2013 | 14:28:24 | 1 | 61 | 8.951 | 104.844 | 80,72 | 0 | 0 | 0,00 | 12 | 0 | | |
| 84 | 21.10.2013 | 14:30:11 | 3 | 63 | 15.372 | 246.745 | 84,38 | 0 | 0 | 0,00 | 12 | 0 | | |
| 90 | 21.10.2013 | 14:31:14 | 0 | 60 | 7.826 | 135.624 | 91,33 | 0 | 0 | 0,00 | 12 | 0 | | |
| 96 | 21.10.2013 | | 0 | 60 | 28.692 | 414.762 | 82,33 | 0 | 0 | 0,00 | 12 | 0 | | |
| 102 | 21.10.2013 | | 0 | 60 | 204.941 | 1.792.361 | 70,62 | 87 | 109 | 196,87 | 12 | 0 | | |
| 108 | 21.10.2013 | | 0 | 60 | 87.239 | 338.719 | 60,85 | 0 | 0 | 0,00 | 3 | 0 | | |
| 114 | 21.10.2013 | | 66 | 126 | 51.640 | 108.575 | 28,18 | 0 | 0 | 0,00 | 12 | 0 | | |
| 120 | 21.10.2013 | | 106 | 166 | 55.470 | 122.115 | 35,84 | 43 | 53 | 298,53 | 12 | 0 | | |
| 126 | 21.10.2013 | | 2 | 62 | 93.546 | 284.970 | 37,51 | 0 | 0 | 0,00 | 16 | 0 | | |
| 132 | 21.10.2013 | | 0 | 60 | 23.814 | 54.348 | 32,87 | 0 | 0 | 0,00 | 12 | 0 | | |
| 138 | 21.10.2013 | | 67 | 127 | 25.640 | 48.062 | 30,65 | 0 | 0 | 0,00 | 12 | 0 | | |
| 144 | 21.10.2013 | | 1 | 61 | 38.002 | 113.769 | 38,54 | 43 | 55 | 288,55 | 12 | 0 | | |
| 150 | 21.10.2013 | | 1 | 61 | 22.611 | 48.634 | 32,98 | 0 | 0 | 0,00 | 12 | 0 | | |
| 156 | 21.10.2013 | | 0 | 60 | 23.201 | 46.207 | 32,39 | 0 | 0 | 0,00 | 12 | 0 | | |
| 162 | 21.10.2013 | | 1 | 61 | 23.655 | 55.113 | 30,52 | 0 | 0 | 0,00 | 12 | 0 | - | |
| 168 | 21.10.2013 | | 0 | 60 | 22.983 | 47.238 | 31,38 | 0 | 0 | 0,00 | 12 | 0 | | |
| 174 180 | 21.10.2013 | | 1 | 61 61 | 22.501 | 49.193 | 31,81 | 0 | 0 | 0,00 | 12 | 0 | - | |
| | 21.10.2013 | | | | | | 28,77 | | | 0,00 | | 0 | | |
| 186 192 | 21.10.2013 | | 0 | 60 61 | 1.464 | 16.435 | 8,80 | 0 | 0 | 0,00 | 0 | 0 | Ţ | |
| 192 | 21.10.2013 | 15:23:58 | 4 1 | 01 | | 0 | 0,00 | U | 0 | 0,00 | 0 | | ()) () () () () () () () () (| |
| | | | Contraction | | 12100 | | SAP | | | | 001 Vu252059a | 1 | | |

This slide shows an *.csv example for statistic values in the expert analysis - DBAN_IOTHREADS.csv

By default User Tasks do not execute the I/O itself, the I/O request is put in a queue and processed by the I/O thread. To analyze

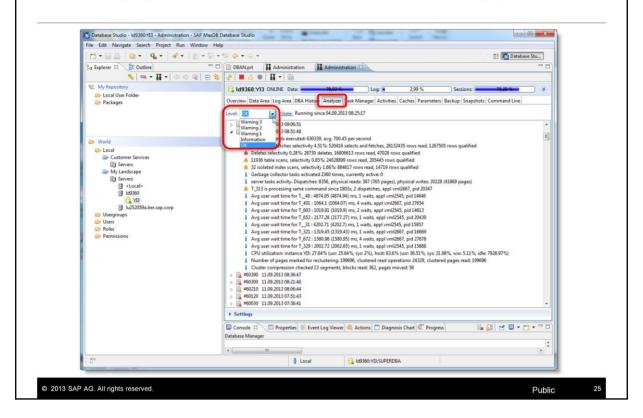
the I/O performance the DBAN_IOTHREADS.csv is used.

Scalability of asynchroneous I/O has been improved in version 7.7 significantly. In older versions the I/O threads were directly associated with the volumes. As of version 7.7 I/O threads can send their requests to different volumes. There is a configurable number of queues per volume. It is possible to assign priorities to I/O requests. Tasks don't have to wait for the result of the I/O but can send the request asynchroneously and continue their work.

In this example we see that we have

- huge number of read IO (PagesRead)
- very bad I/O times for reading (*ReadTime* in ms)
- Write I/O especially every 10 minutes (PagesWritten) could be savepoint
- Very bad I/O times for writing (*WriteTime* in ms)
- Dev threads got a bottleneck (*PendingRequests* > 0), the Dev threads could not write/read the data fast enough to avoid any wait situation in the DEV threads.
- In this example we should check the database disk configuration and the disk performance on hardware level.

3.2.2. Display Collected Statistics with DB Studio GUI (1)



On tab *Analyzer* of the administration editor the displayed warning levels can be selected and are highlighted with different icons.

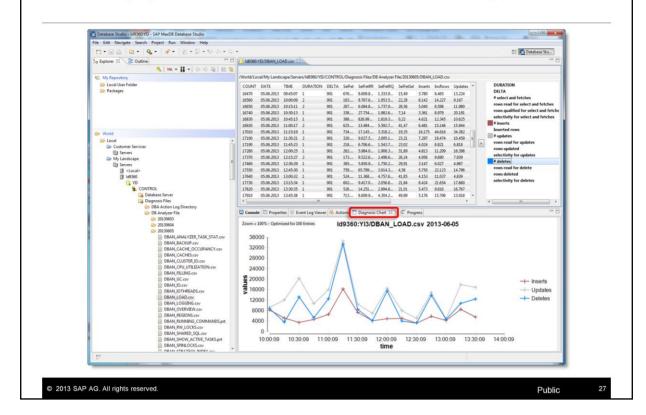
This information is based on file dban.prt and corresponds to the DBACockpit/LC10 menue *Bottlenecks*.

3.2.2. Display Collected Statistics with DB Studio GUI (2)

| 🔓 Explorer 🖾 📴 Outline | | | | | | | | | | | - [|
|--|----------|------------|------------|---------|-------------------------------------|-----------------------------|-------------|--------|-----------|----------------------|------------|
| 🌖 🔍 🕶 🚻 🕶 (소 수 | | DBAN | I_SHOW_/ | CTIVE_T | ASKS.prt 🖾 | | | | | | |
| S. My Repository | ≪ ⊟ ¥¢ | ¢ | | | | | | | | | |
| Cocal User Folder | | 🔰 Id9 | 360:YI3 | ONLINE | Data: 78,95 % | Log: | 0,70 % | | Sessions: | 73,29 % | × |
| Packages | | | #2020 | 3 | at 2013-06-05 20:08:51 | | | | | | |
| <u> </u> | | • I | Task | UKT | Appl Pid Task Type | Task State | Region | Wait4T | Wait4ROOT | UKT idle cnt | State |
| | | * I | | | | | | | | | |
| | | * I | 777 | 4 | BUPvol | Medium IO | | | | 16529107 | (S) |
| | | * W1 | 623 | 12 | 53899 User | JobWait BckRec | | | | 27876073 | (S) |
| 😂 World | | | 791 793 | 4 | BUPvol BUPvol | Vsuspend (203) Medium IO | | | | 16529107 16529107 | (S) (S) |
| | | 111 | 793 | 4 | BUPVOI | Vsuspend (203) | | | | 16529107 | (S) |
| Id9360 (1 VI3) | ^ | · • | | | 001101 | (200) | | | | 10010107 | (|
| CONTROL | | | #2020 | 4 | at 2013-06-05 20:09:01 | | | | | | |
| Database Server | | * I | Task | UKT | Appl Pid Task Type | Task State | Region | Wait4T | Wait4ROOT | UKT idle cnt | State |
| Diagnosis Files | = | * I | | | | | | | | | |
| C DRA Action Log Directory | | * W1 | 623 | 12 | 53899 User | JobWait BckRec | | | | 27876566 | (S) |
| 😂 DB Analyzer File | | * I | 780 | 4 | BUPvol | Medium IO | | | | 16543190 | (S) |
| 20130003 | | * I * T | 781 783 | 4 | BUPvol BUPvol | Vsuspend (203) Medium IO | | | | 16543190 16543190 | (S) (S) |
| iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii | | | 793 | 4 | BUPVOL | Vsuspend (203) | | | | 16543190 | (5) |
| iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii | | * I | 784 | 4 | BUPvol | Medium IO | | | | 16543190 | (5) |
| DBAN_ANALYZER_TASK | STAT.csv | * I | 775 | 4 | BUPvol | Medium IO | | | | 16543190 | (S) |
| DBAN_BACKUP.csv | | | | | | | | | | | |
| DBAN_CACHE_OCCUPA | VCY.csv | | #2020 | | at 2013-06-05 20:09:11 | | | | | | |
| DBAN_CACHES.csv | | · 1 | Task | UKT | Appl Pid Task Type | Task State | Region | Wait4T | Wait4ROOT | UKT idle cnt | State |
| DBAN_CLUSTER_IO.csv | | | 777 | 4 | BUPvol | Vsuspend (203) | | | | 16550322 | (S) |
| DBAN_CPU_UTILIZATIO | l.csv | * W1 | 623 | 12 | 53899 User | JobWait BckRec | | | | 27876757 | (S) |
| DBAN_FILLING.csv DBAN_GC.csv | | * I | 780 | 4 | BUPvol | Vsuspend (203) | | | | 16550322 | (S) |
| DBAN_GC.csv | | * I | 783 | 4 | BUPvol | Vsuspend (203) | | | | 16550322 | (S) |
| DBAN IOTHREADS.csv | | * I | 784 | 4 | BUPvol | Vsuspend (203) | | | | 16550322 | (S) |
| DBAN_LOAD.csv | | * I | 775 | 4 | BUPvol | Vsuspend (203) | | | | 16550322 | (S) |
| DBAN LOGGING.csv | | | | | | | | | | | |
| DBAN_OVERVIEW.csv | | | #2020 | | at 2013-06-05 20:09:21 | To the Owners | Provide and | | | UKT idle cnt | |
| DBAN_REGIONS.csv | | 1 | Task | UKI | Appl Pid Task Type | Task State | Region | Wait4T | Walt4ROOI | UKI idle cht | State * |
| DBAN_RUNNING_COMM | ANDS.prt | | | | |)) | | | | | |
| DBAN_RW_LOCKS.csv | | Cons | | Prop | perties 🔢 Event Log Viewer 🗟 Action | ns 🔲 Diagnosis Chart 🙋 Pro | gress | | | 🕞 🚮 📑 🗉 🖷 | |
| DBAN_SHARED_SQL.csv | | Database | Manager | | | | | | | | |
| DBAN_SHOW_ACTIVE_T | SKS.prt | | | | | | | | | | |
| DBAN_SPINLOCKS.csv | - | < | | | | | | | | | - P. |

All Database Analyzer log files DBAN_*.prt and DBAN_*.csv are available over the Explorer tree entry *DB Analyzer File* (you have to select context menu *Extended File List* of *Diagnosis Files* to see this entry). Only DBAN_*.prt files can be displayed in an usable way, this example DBAN_SHOW_ACTIVE_TASKS.prt.

3.2.2. Display Collected Statistics with DB Studio GUI (3)



A new Database Studio GUI feature will allow to display DBAN_*.csv files in a graphical way. This new Database Studio GUI feature is in progress. Via *Diagnosis Charts* one or more columns of a loaded DBAN_*.csv file will be presentable in one of the next Database Studio GUI version.

In this example we see the changes done on database level (number of Inserts, Deletes and Updates) in a specified time period.

Such statistics are used to check the system load caused by application side. With this graphical layout you can easy see when was the peak and which SQL commands (in this case deletes and updates) caused the system load.

3.3. Statistics Aggregation (1)

| DB Analyzer 1 rt Analys | is | | | | | |
|--|---|--|---|--|--|---------------|
| | | | Load History | | | |
| 2 7 2 2 | | | | | | |
| 😔 🔁 🖽 System Configuration 🔌 DI | | | [](](] | | | |
| System YI3 | Analysis Day/Monitoring Clas | File Name | System Configuration OI | | 2010.01.12 To | 2013.09.11 |
| | 2013.09.12 | | System YI3 | 중 숲 🛗 🚨 . | | |
| SAP MaxDB: Database Administration | 2013.09.11 | | | | | |
| Current Status Attributes | 2013.09.10 | | SAP MaxDB: Database Administration | Aggregation Level / Mo | | |
| System Information | • 2013.09.09 | | Current Status | Daily Aggregates | | |
| Performance | 2013.09.08 2013.09.07 | | Attributes | ANALYZER_TAS | STAT | |
| Activities Overview | 2013.09.07 | | System Information | BACKUP CACHES | | |
| Activities History | > 2013.09.05 | | Performance | | 2012 00 11 | |
| Transactions | 2013.09.04 | | Activities Overview | 2013.09.05 - 2012.10.30 - | | |
| Performance Warehouse | 2013.09.03 | | Activities History | • 2012.10.30 - | | |
| Database Analyzer | • 2013.09.02 | | Transactions | • 2012.03.22 - | | |
| Bottlenecks | 2013.09.01 2013.08.31 | | Performance Warehouse | • 2012.03.20 - | | |
| Expert Analysis SOL Performance | > 2013.08.31 | | Database Analyzer | • 2012.02.24 - | | L. |
| SQL Performance | > 2013.08.29 | | Bottlenecks | • 2012.02.22 - | | |
| | | | Expert Analysis | • 2012.02.09 - | | |
| E Load History Edit Goto S | <u>y</u> stem <u>H</u> elp | _ | SQL Performance | | | |
| 0 - 4 | | | | | 2012.02.08 | |
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| • • • | 🗏 C 😧 🚷 🗅 M M I | 2 1 A A I 📰 🔄 😵 🖪 | Locks Green Content C | | 2012.02.07 | |
| | 9 C G G I D M M I | 21223 | | • 2012.02.07 - | 2012.02.07 | |
| Load History | 8 © @ @ 1 M M | 5 T L L E E E E E | Kernel Threads I/O Operations | 2012.02.07 - 2012.02.06 - | 2012.02.07 2012.02.06 2012.02.05 | |
| | | 29.20.42 20 10 10 10 | Kernel Threads Difference of the second se | 2012.02.07 - 2012.02.06 - 2012.01.08 - | 2012.02.07 2012.02.06 2012.02.05 2012.01.07 | |
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| Load History | Aggregated Data From | 2010.01.12 To 2013.09 | Kernel Threads Jl O Operations Space Joss Alerts Dagnostics | 2012.02.07 2012.02.06 2012.01.08 2012.01.07 2011.12.05 2011.12.04 2011.11.30 2011.11.39 | 2012.02.07 2012.02.06 2012.02.05 2012.01.07 2012.01.06 2011.12.04 2011.12.03 2011.11.29 | |
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| Load History The Construction System VI3 SAP Madde: Database Administration Construction Attributes System Information | Aggregated Data From Aggregation Level / Mo Aggregation Level / Mo • @ Daly Aggregat • @ Weekly Aggregat • @ Weekly Aggregat | [010.01.12] To [2013.09] ∰ | Kernel Threads Display Compensations Space Jobs Jobs Aetts Dagnostics Admistration Tools Occumentation | 2012.02.07 2012.02.06 2012.01.08 2012.01.07 2011.12.05 2011.12.04 2011.11.29 | 2012.02.07 2012.02.06 2012.02.05 2012.01.07 2012.01.06 2011.12.03 2011.11.20 2011.11.29 2011.11.29 2011.11.24 2011.11.24 2011.11.24 2011.11.24 | |
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The statistics aggregation functionality allows to compare the statistic values of different days, weeks or months. This feature is implemented in ABAP stack only, not in Database Studio GUI.

The SAP system must be configured that the statistic values are aggregated. How to do this can be found in chapter 3.4.

Via button *Aggregated Performance Data (1)* different aggregation levels can be selected (2).

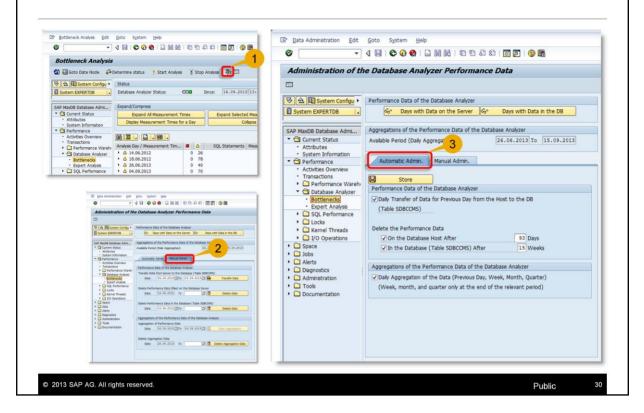
You use this functionality if the system response time has changed after some adiministrative tasks have been done e.g after a software upgrade, after a hardware change, etc.

3.3. Statistics Aggregation (2)

| Load History | | | | | | | | | | | | | | |
|---|---|---|--|--|---|--|--|---|---|--|--|---|---|------|
| | Day | View | | | | | | | | | | | | |
| 3 4 7 8 | 87. | 2.% | B0.0 | B | | | | | | | | | | |
| Daily Aggregation: DB | | | | | | | | | | | | | | |
| DATE AGGR | COUNT | SUM_DC_Acc | SUM_DC_Succ | SUM_DC_Fails | Ø DC Hit | MIN_DC_Hit | MAX_DC_Hit | SUM_SQL_Acc | SUM_SQL_Succ | SUM_SQL_Fails | Ø_SQL_HIT | MIN_SQL_Hit | MAX_SQL_Hit | SUM_ |
| 2013.09.05 | | | 2.306.595.137 | 1.436.464 | 99,921 | 98,22 | | 2.279.021.225 | | 1.436.464 | 99,919 | 98,11 | 100 | 29.0 |
| 2013.09.06 | 96 3 | .425.149.801 | 3.423.630.291 | 1.519.510 | 99,929 | 98,17 | 100 | 3.388.479.567 | 3.386.960.057 | 1.519.510 | 99,927 | 98,06 | 100 | 36.ť |
| 2013.09.07 | | | 2.278.834.527 | 239.553 | 99,992 | 99,90 | 100 | | | 239.553 | 99,992 | 99,90 | 100 | 22.8 |
| 2013.09.08 | | | 2.109.272.692 | 8.788 | 100,000 | 100,00 | 100 | | 2.094.626.706 | 8.788 | 100,000 | 100,00 | 100 | 14.ť |
| 2013.09.09 | | | 2.639.311.011 | 755.434 | 99,964 | 99,39 | 100 | | 2.617.612.726 | 755.434 | 99,964 | 99,39 | 100 | 21.6 |
| 2013.09.10 | | | 2.863.404.423 | 865.028 | 99,928 | 97,62 | 100 | | | 865.028 | 99,927 | 97,62 | 100 | 26.6 |
| 2013.09.11 | | .097.971.649 | 2.097.341.370 | 630.279 | 99,978 | 99,81 | 100 | 2.078.326.632 | 2.077.696.353 | 630.279 | 99,978 | 99,81 | 100 | 19.6 |
| | | | | 1 444 V | | | 1 | | | | | | | |
| C Overview Edit | <u>G</u> oto | | eio 62 😪 🗔 Mil | 161 20 | £3 £3 | R . Q | SAP* | | | | ▶ YB : | (1) 000 👻 ldc | yi3 i INS 🖌 | |
| 0 | _ | 400 | | 108 10 10 | រា ខា ព្រ | R P Ø | | | | | ▶ Y13 | (1) 000 👻 klc | | |
| C Load History | Mont | d ∎ © | @ & L M | | | x 2 9 | | | | | ▶ Y13 | (1) 000 👻 kic | | |
| 0 | Mont | d ∎ © | @ & L M | | | x 2 Ø | | | | | ▶ Y13 | (1) 000 👻 ldc | | |
| C Load History | Mont | Image: A marked with the second se | @ & L M | | | x 2 Ø | | | | | ▶ Y13 | (1) 000 ¥ ldc | | |
| Cad History | Mont | Image: A marked with the second se | 0012M | Acc SUM_E | DC_Succ ! | | • | IN_DC_HR MAX_ | DC_Hit SUM_ | SQL_Acc SU | | | | × |
| Load History Load History Agregation: AGGR_MONTH AC March 2013 | Mont Mont DBAN_CA GGR_COUM | CHES.csv | • • • • • • • • • • • • • | Acc SUM_1 39 91.261.8 | DC_Succ 1 115.307 1 | SUM_DC_Fails 140.257.832 | | 42,75 1 | 00,00 90.630. | 972.837 90.4 | 4_SQL_Succ 90.715.009 | SUM_SQL_Fai 140.257.828 | s Ø_SQL_Hit 99,771 | × |
| Cad History | Mont Mont DBAN_CA GGR_COUR 3 2 | Image: Control of the state of the | | Acc SUM_1 39 91.261.8 70 296.972.0 | DC_Succ ! 115.307 1 121.951 | SUM_DC_Fails 140.257.832 42.141.219 | ©_DC_Hit M 99,772 99,967 | 42,75 1 98,79 1 | 00,00 90.630. 00,00 296.423. | 972.837 90.4 745.817 296.3 | M_SQL_Succ 90.715.009 81.604.598 | SUM_SQL_Fai 140.257.828 42.141.219 | s Ø_SQL_HRt 99,771 99,967 | × |
| Cad History Load History Carl P (A) Nonthly Aggregation: AGGR_MONTH AC March 2013 April 2013 Hal 2013 | Mont DBAN_CA GGR_COUR 3 2 2 | Image: Control of the state of the | • • | Acc SUM_1 39 91.261.8 70 296.972.0 05 109.807.8 | DC_Succ 1 115.307 1 121.951 191.944 | SUM_DC_Fails 140.257.832 142.141.219 140.953.861 | DC_Hit M 99,772 99,967 99,941 | 42,75 1 98,79 1 95,70 1 | 00,00 90.630. 00,00 296.423. 00,00 109.270. | 972.837 90.4 745.817 296.3 895.408 109.2 | 4_SQL_Succ 90.715.009 81.604.598 29.941.547 | SUM_SQL_Fai 140.257.828 42.141.219 40.953.861 | s Ø_SQL_Hit 99,771 99,967 99,940 | × |
| Carl History Carl A Carl Monthly Aggregation: AGGR, MONTH March 2013 April 2013 Mai 2013 Juni 2013 | Mont DBAN_CF GGR_COUR 3 2 2 2 2 | Image: Constraint of the second sec | Image: Sum_CC_/ Image: Sum | Acc SUM_1 39 91.261.8 70 296.972.0 05 109.807.8 70 50.661.1 | DC_Succ 5 115.307 1 121.951 191.944 33.419 1 | SUM_DC_Fails 140.257.832 42.141.219 40.953.861 132.878.951 | O_DC_Hit M 99,772 99,967 99,941 99,620 | 42,75 1 98,79 1 95,70 1 34,32 1 | 00,00 90.630. 00,00 296.423. 00,00 109.270. 00,00 49.916. | 972.837 90.4 745.817 296.3 895.408 109.2 918.455 49.7 | M_SQL_Succ 90.715.009 820.941.547 84.039.505 | SUM_SQL_Fai 140.257.828 42.141.219 40.953.861 132.878.950 | Ø_SQL_Hit 99,771 99,967 99,940 99,615 | × |
| Cload History Cload History Cload History Monthly Aggregation: AGGR_MONTH AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR | Mont BBAN_CF GGR_COUI 3 2 2 2 2 3 | A B C C C C C C C C C C C C C C C C C C | © 😵 🗅 M = 000 - 000 91.402.073.13 297.014.163.18 109.48.845.05 50.794.012.33 57.281.058.66 | Acc SUM_1 39 91.261.8 70 296.972.0 05 109.807.8 70 50.661.1 64 57.194.9 | DC_Succ 5 115.307 1 121.951 191.944 33.419 1 107.998 | SUM_DC_Fails 140.257.832 42.141.219 40.953.861 132.878.951 86.150.666 | O_DC_Ht M 99,772 99,967 99,620 99,620 99,694 | 42,75 1 98,79 1 95,70 1 34,32 1 30,76 1 | 00,00 90.630. 00,00 296.423. 00,00 109.270. 00,00 49.916. 00,00 56.121. | 972.837 90.4 745.817 296.3 895.408 109.2 918.455 49.7 516.241 56.0 | 4_SQL_Succ 90.715.009 81.604.598 29.941.547 84.039.505 35.365.575 | SUM_SQL_Fai 140.257.828 42.141.219 40.953.861 132.878.950 86.150.666 | s Ø_SQL_Htt 99,771 99,967 99,645 99,652 | |
| Carl History Carl A Carl Monthly Aggregation: AGGR, MONTH March 2013 April 2013 Mai 2013 Juni 2013 | Mont BBAN_CF GGR_COUI 3 2 2 2 2 3 | Image: Constraint of the second sec | © 😵 🗅 M = 000 - 000 91.402.073.13 297.014.163.18 109.48.845.05 50.794.012.33 57.281.058.66 | Acc SUM_1 39 91.261.8 70 296.972.0 05 109.807.8 70 50.661.1 64 57.194.9 | DC_Succ 5 115.307 1 121.951 191.944 33.419 1 107.998 | SUM_DC_Fails 140.257.832 42.141.219 40.953.861 132.878.951 | O_DC_Hit M 99,772 99,967 99,941 99,620 | 42,75 1 98,79 1 95,70 1 34,32 1 30,76 1 | 00,00 90.630. 00,00 296.423. 00,00 109.270. 00,00 49.916. 00,00 56.121. | 972.837 90.4 745.817 296.3 895.408 109.2 918.455 49.7 516.241 56.0 | M_SQL_Succ 90.715.009 820.941.547 84.039.505 | SUM_SQL_Fai 140.257.828 42.141.219 40.953.861 132.878.950 | s Ø_SQL_Htt 99,771 99,967 99,645 99,652 | × |
| Cload History Cload History Cload History Monthly Aggregation: AGGR_MONTH AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR | Mont BBAN_CF GGR_COUI 3 2 2 2 2 3 | Image: Control of the contro | © 😵 🗅 M = 000 - 000 91.402.073.13 297.014.163.18 109.48.845.05 50.794.012.33 57.281.058.66 | Acc SUM_1 39 91.261.8 70 296.972.0 05 109.807.8 70 50.661.1 64 57.194.9 | DC_Succ 5 115.307 1 121.951 191.944 33.419 1 107.998 | SUM_DC_Fails 140.257.832 42.141.219 40.953.861 132.878.951 86.150.666 | O_DC_Ht M 99,772 99,967 99,620 99,620 99,694 | 42,75 1 98,79 1 95,70 1 34,32 1 30,76 1 | 00,00 90.630. 00,00 296.423. 00,00 109.270. 00,00 49.916. 00,00 56.121. | 972.837 90.4 745.817 296.3 895.408 109.2 918.455 49.7 516.241 56.0 | 4_SQL_Succ 90.715.009 81.604.598 29.941.547 84.039.505 35.365.575 | SUM_SQL_Fai 140.257.828 42.141.219 40.953.861 132.878.950 86.150.666 | s Ø_SQL_Htt 99,771 99,967 99,645 99,652 | |
| Cload History Cload History Cload History Monthly Aggregation: AGGR_MONTH AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR AGGR | Mont BBAN_CF GGR_COUI 3 2 2 2 2 3 | A B C C C C C C C C C C C C C C C C C C | © 😵 🗅 M = 000 - 000 91.402.073.13 297.014.163.18 109.48.845.05 50.794.012.33 57.281.058.66 | Acc SUM_1 39 91.261.8 70 296.972.0 05 109.807.8 70 50.661.1 64 57.194.9 | DC_Succ 5 115.307 1 121.951 191.944 33.419 1 107.998 | SUM_DC_Fails 140.257.832 42.141.219 40.953.861 132.878.951 86.150.666 | O_DC_Ht M 99,772 99,967 99,620 99,620 99,694 | 42,75 1 98,79 1 95,70 1 34,32 1 30,76 1 | 00,00 90.630. 00,00 296.423. 00,00 109.270. 00,00 49.916. 00,00 56.121. | 972.837 90.4 745.817 296.3 895.408 109.2 918.455 49.7 516.241 56.0 | 4_SQL_Succ 90.715.009 81.604.598 29.941.547 84.039.505 35.365.575 | SUM_SQL_Fai 140.257.828 42.141.219 40.953.861 132.878.950 86.150.666 | s Ø_SQL_Htt 99,771 99,967 99,645 99,652 | |

One example of statistics aggregation on the daily and monthly base (DBAN_CACHES.csv).

3.4. Statistics Administration



The administration of the Database Analyzer statistics is implemented via button *Administration of Performance Data (1)* which is available in both menues *Bottlenecks* and *Expert Analysis*. Manual (2) or automatic administration (3) can be selected via tab.

The automatic adminsitration

- defines if the performance data is additionally stored in the database (to speed up the reading time of files)
- how long these data stay in the database and on the database host
- · activates the aggregation of data

The Manual administration allows in more detailes when data will be aggregated and deleted.

SAP recommends to activate the aggregation of statistics via automatic administration.

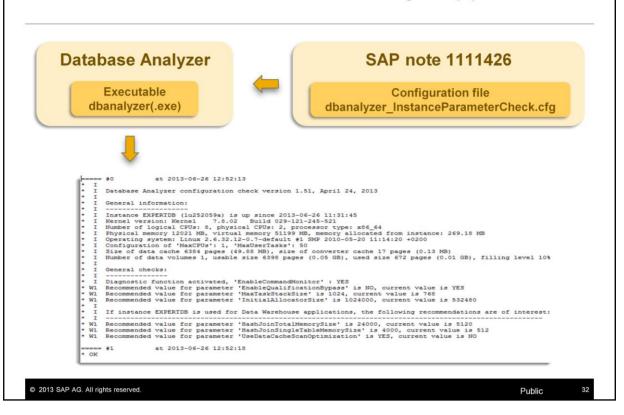
This functionality is not available in Database Studio GUI.

Agenda

- 1. Introduction
- 2. Functional Chain
- 3. Ways to Manage Database Analyzer
- 4. Parameter Check with Database Analyzer
- 5. Expert Analysis
- 6. Additional Useful Information



4. Parameter Check with Database Analyzer (1)



MaxDB/liveCache parameter check is embedded into the Database Analyzer. Use this Database Analyzer feature to check if the configuration of your MaxDB/liveCache database corresponds to the current SAP recommendations.

The parameter check should be executed after each MaxDB/liveCache software upgrade. Different recommendations may be relevant for different database versions.

The parameter check uses a **special Database Analyzer configuration file** (only one file for all MaxDB/liveCache versions). This special configuration file is attached to **SAP note 1111426**. As this file is regulary updated, you must download it always before a new check.

4. Parameter Check with Database Analyzer (2)



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The database instance must be in operational state ONLINE when you start the parameter check tool. Perform the automatic check as SYSDBA user (e.g. dbadmin)

Public

dbanalyzer -d EXPERTDB -n <server> -u dbadmin, <password> -f dbanalyzer_instanceParametercheck.cfg -o <temp_directory> -i -c 1 -t 1,1

With parameter -i the output directory will be cleaned up -c output will be send to screen as well -t 1,1 only 1 snapshot in an interval of one second

Analyze the screen output or the file <temp_directory>/<YYYYMMDD>/DBAN.prt. Important are all messages that are marked with "* W1 to * W3"

- The following checks are executed:
- general parameters
- parameters which influence the I/O performance
- optimizer parameters
- special liveCache parameters
- additional checks
 - do corrupt indexes exist?
 - is the database kernel trace activated?
 - do tables exist which do not have any file directory counters?
 - is logging activated and autooverwrite deactivated?
 - does the size of the IO Buffer Cache correspond to the SAP recommendation, which is 2% of the configured volume size for UNICODE systems and 1% for NON-UNICODE systems?

| Chock ha | is already been performed for the current version: |
|---|---|
| Info. | Instance configuration information: |
| Info. Info. Info. | Last configuration check of instance EXPERTDB executed 2013-06-26 12:52:13 with checker version 1.51, April 24, 2013 Last configuration check based on version 7.8.02 Build 29, current version is 7.8.02 Build 29 |
| Info.Info. | Is never been performed: Instance configuration information: |
| | ude Wederer Ruies Bure internet war internet beinsteldstenden. |
| Info. Info. △ Low | Instance configuration information: |

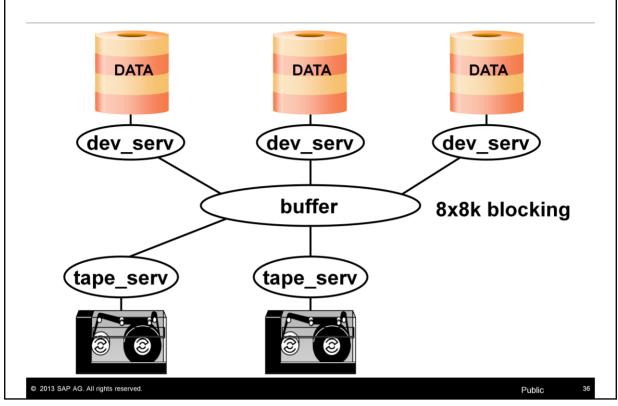
The Database Analyzer analyzes whether the configuration of your database was checked. If this is the case, the Database Analyzer also determines when the check was performed and which version was used to do this.

Agenda

- 1. Introduction
- 2. Functional chain
- 3. Ways to manage Database Analyzer
- 4. Parameter check with Database Analyzer
- 5. Expert analysis
- 6. Useful Information Resources



5.1. Optimize Runtime of Data Backup: Introduction



This illustration depicts a data transfer from the data volumes to the backup media. Each volume has a task that puts the 64 KB units into a buffer. One task per backup device reads the blocks from the buffer and stores them on the backup medium.

The limits of this process are posed either by the access speed of the data volumes, the writing performance of the backup devices or the transport layer (e.g. network) between the database server and the backup devices. As long as these limits are not reached, the process scales with any other backup device in parallel operation.

5.1. Optimize Runtime of Data Backup: Backup (1)

| Database Administration Act | ions | | | | | | | | | | |
|---|--|-----------------------|---------------|------------|-----------------------------|---------------------------|----------------|-------|--|----------------|----|
| a 🗆 | | | | | | | | | | | |
| | _ | | | | | | | | | | |
| | Backup/Restore | e (DBM Server) Backup | /Restore (Ker | nel) O | ptimizer Statist | ics Data | abase Structur | re Ch | cks Log Backup Files Arch | iving | _ |
| | | | | | | | - | | | | |
| Status Connection: WB5 Database: WB5 on U252059a Status: COO since 28.10.2013 11:17:15 WB5 WB5 WB5 WB5 WB5 WB5 WB5 WB5 Properties Akert Monitor Current Status Problem Analysis | | | | | | | | | | | |
| | Backups and Restor | res (Kernel View) | | | | | | | | | |
| Status U252059a abase: VB5 on U252059a since 28.10.2013 11:17:15 sinn: 7.8.02.36 II:17:15 WB5 II:17:15 II:17:15 ii:0 Properties II:17:15 Ii:0 Properties II:17:15 I:0 Current Status II:17:15 I:0 Deformance II:17:15 I:0 Degages II:17:15 I:0 Degaxes II:17:15 <t< td=""><td>Backup Label</td><td>Action ID Error Co</td><td>Start Date</td><td>Start Ti</td><td>End Date</td><td>End Time</td><td>Number of</td><td>Lo</td><td>Backup Template</td><td></td><td></td></t<> | Backup Label | Action ID Error Co | Start Date | Start Ti | End Date | End Time | Number of | Lo | Backup Template | | |
| • HP WR5 | WBS one 28.10.2013 11:17:15 WBS and 28.10.2013 11:17:15 WBS and 28.10.2013 11:17:16 WBS and 28.10.2013 11:17:16 WBS and 28.10.2013 11:17:17:16 WBS and 28.10.2013 11:17:17 WBS and 28.10.2013 11:17:16 | | | | | | | | | | |
| | DAT_00000069 | SAVE WARM 0 | 31.10.2013 | 13:05:31 | 31.10.2013 | 13:19:22 | | | | | Ψ. |
| | | | | | | | | | | | |
| Current Status | | | | | | | | - | | _ | |
| Problem Analysis | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | NO | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | NO | 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1. | | |
| | | | | | | | | 110 | 1000 | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Database Procedures | | | | | | | | no | | | |
| Statistics | | | | | | | | | | | |
| | Service - Andrews Control of Cont | | | | | Contractor and the second | | NO | | | |
| Tools | | | | 10.000.000 | (Charles and the second of | | | | | 1215 | - |
| | | N K I | | | | | | _ | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | SAP | | | | Þ | WB | 5 (1) 001 🔨 lu252059a 🛛 INS | (<u>14-</u>) | d, |
| | | | | _ | | | | - | | | - |

In this section the runtime of a data backup will be analyzed. It helps to recognize and remove bottlenecks.

To be able to execute a runtime analysis of a backup, the Database Analyzer must be active during the backup. It's recommended to change the default setting of the Database Analyzer interval from 900 seconds to 60 seconds.

In addition, you have to activate the time measurement explicitly. This also applies to the SAP MaxDB version 7.8 or higher.

The measurement of time is activated using the DBA Cockpit as follows: DBA Cockpit (transaction DBACOCKPIT) -> *Performance -> Kernel Threads* -> *Task Manager -> Activate* the DB measurement of time.

We check the runtime of a backup in DBACockpit -> *diagnostics* -> *Messages* -> *DBA History* -> *Backup/restore Kernel*. The Data Backup which is analyzed was executed at 31th of October from 9:37 am to 10:04 am -> duration 27 minutes.

5.1. Optimize Runtime of Data Backup: Single Medium

| [10.29.4. | 55:WB5 Data: 90,56 % Deg: 6,87 % Sessions: 14,17 % |
|---------------------------|--|
| 🖃 Name: | WB5_backup_COMP_extern |
| Backup Type: | COMPLETE DATA 🔹 |
| Device Type: | FILE |
| Backup Tool: | NONE |
| Device/File: | /backup/WB5/DATA1/save_31102013 |
| Size: | 0 КВ - |
| Compressed: | |
| OS Command | |
| Overwrite: Block Size: | |
| | |
| | |
| | |
| | |

The backup was executed on backup template *WB5_backup_COMP_extern*.

The Template definition tells us that a compressed backup is created which writes into one file.

5.1. Optimize Runtime of Data Backup: Bottlenecks

| Bottleneck Analysis | | | | | |
|--|--|--------------|------------------------------------|---|------------|
| ter en | | | | | |
| 👔 🟭 Goto Date Node 🛛 🔓 Determine | e status 👖 Start Analysis 🍵 S | top Analysis | | | |
| 3 🚖 🚺 🖽 System Configuration 🕨 | Status | | | | |
| System WB5 | Database Analyzer Status: | CCC Sinc | te: 31.10.2013 14:40:46 Collect. I | nterval: 900 Seconds | |
| AP MaxDB Database Administration | | | | | |
| Current Status | Expand/Compress | | | Filter for Measurement Time Points | |
| Performance | Expand All Measurement Tir | | Expand Selected Meas. Time Points | Only Measurement Time Points With: | |
| Activities Overview Database Activities | Display Meas. Time Points f | or a Day | Collapse All | | |
| Transactions | | | | | |
| Performance Warehouse Database Analyzer | Analysis Day / Measurement Tim. | | SQL Statements Message | | |
| Bttincks | Analysis Day / Measurement 1111. Image: Analysis Day / Measurement 1111. Image: Analysis Day / Measurement 1111. | 0 66 | size staticitients pressage | | |
| Expert Analysis GQL Performance | ▲ 09:37:40 #1 | 0 1 | 0 | | - |
| SQL Performance SQL Locks | • 🖉 09:38:40 #2 | 1 3 | 0 | | |
| Kernel Threads | • △ 09:39:40 #3 • △ Low | 0 3 | 0 | the had 26 10 ms 2 with 2 space | _ |
| Acrient Infreads Vo Operations Space Jobs Jobs Aderts Dragnostics Administration Tools Documentation | • 🛆 Low | | | riter task) 76.10 ms, 3 writes, 3 pages 0.89%, 259991 collisions, no waits, 72042 accesses on region 1422 | |
| | • 🖬 Info. | | | of pages read 192104, written 192104 | |
| | • 🛆 Low | | | state 'JobWait BckRec' since 61s, application pid 28060 | |
| | Info. Info. | | | r task 132 : 110.44 (110.43) ms, 1 suspends, application pid 30999 VB5: 100% (usr: 96.72%, sys: 3.28%), host: 114.75% (usr: 106.56%, sys: 3. | 20 |
| | ▲ 09:40:41 #4 | 0 3 | 0 | VD3: 10076 (USI: 90.7276, 595: 3.2076), HUSC: 114.7376 (USI: 100.3076, 595: 3. | 20 |
| | • 🛆 Low | | | riter task) 189.23 ms, 3 writes, 3 pages | |
| | A Medium Info. | | | 5.59%, 292342 collisions, no waits, 77835 accesses on region 1422 | |
| | • • Into. • • Low | | | of pages read 207576, written 207576 state 'JobWait BckRec' since 121s, application pid 28060 | |
| | • 🖬 Info. | | | for task 193 : 104.17 ms, 5 commands, application pid 30493 | |
| | • 🗖 Info. | | | r task 193 : 520.29 (520.29) ms, 1 suspends, application pid 30493 | |
| | Info. 09:41:41 #5 | 1 2 | CPU utilization: instance V 400 | VB5: 101.67% (usr: 100%, sys: 1.67%), host: 118.33% (usr: 106.67%, sys: : | 5% |
| | • 09:41:41 #5 • 09:42:41 #6 | 0 3 | 400 | | |
| | • △ 09:43:42 #7 | 0 3 | 0 | | |
| | • (a) 09:44:42 #8 | 0 3 | 0 | | |
| | | ., | | | , , |
| | | | | | |
| | | | SAP | WB5 (1) 001 * lu252059a INS | |
| | | | SAP | ▷ W85 (1) 001 ▼ lu252059a INS 5 | - 6 |

The analysis starts with the Database Analyzer bottleneck analysis (file DBAN.prt).

Goto transaction DBACOCKPIT/LC10: Performance \rightarrow Database Analyzer \rightarrow Bottlenecks

Choose the date (here 31.10.2013) on which the backup to be analyzed was executed and go to the period in which the backup was active. (from 9:37 am to 10:04 am)

As soon as a backup is active, you can find the following entry for the duration of the backup in the file DBAN.prt:

User task 185 blocked in state 'JobWait BckRec' since

The UserTask itself does not execute the I/O reads – asynchronus I/O is done via ServerTasks.

During the backup, you find the Database Analyzer information of how many pages were read and written by the server tasks in each interval. This gives you a first hint concerning the throughput of the backup.

In this example:

In an interval of 60 seconds - backup activity: number of pages read 192104, written 192104

5.1. Optimize Runtime of Data Backup: DBAN_BACKUP.csv

| DB | Analyzer: | File Dis | splay | | | | | | | | | |
|------|--------------|----------|--|-----------------|---|--------------|------|------------------|-----------------|-------------------|------------|---|
| 51.7 | | | 99 1 198.21 1 I | | | | | | | | | |
| | | | 28 - 78 - | | | | | | | | | |
| | e: DBAN_BACK | | | | | | | | | | | |
| | | TIME | BackUpReads | | | | | | | | | |
| | 31.10.2013 | | 25.971 | 184.024 | 7 | 1,14 | 0,56 | 22.929 | 183.432 | 2,49 | 2,44 | ÷ |
| 3 | 31.10.2013 | | 26.712 | 192.104 207.576 | | 0,18 | 0,13 | 24.013 | 192.104 | 2,50 | 2,45 | - |
| 4 | 31.10.2013 | | 28.766 | 207.576 | 7 | 0,32 | 0,27 | 25.947 25.004 | 207.576 200.032 | | 2,26 | |
| | 31.10.2013 | | 25.361 | 181.944 | 7 | 0,22 | 0,18 | 22,743 | 181.944 | 2,40 | 2,59 | |
| 7 | 31.10.2013 | | 25.623 | 185.384 | 7 | 0,18 | 0,12 | 23.173 | 185.384 | 2,64 | 2,59 | |
| 8 | 31.10.2013 | | 24.464 | 177.160 | 7 | 0,12 | 0,07 | 22.145 | 177.160 | 2,00 | 2,54 | |
| 9 | 31.10.2013 | | 27.167 | 195,344 | 7 | 0,13 | 0,08 | 24.418 | 195.344 | 2,48 | 2,42 | |
| 10 | 31.10.2013 | | 27.001 | 193.344 | 7 | 0,26 | 0,00 | 24.292 | 194.336 | 2,40 | 2,42 | |
| 11 | 31.10.2013 | | 27.660 | 198.232 | 7 | 0,16 | 0,11 | 24.779 | 198.232 | 2,43 | 2,38 | |
| | 31.10.2013 | | 26.220 | 188.136 | 7 | 0,99 | 0,95 | 23.517 | 188.136 | 2,54 | 2,49 | |
| 13 | 31.10.2013 | | 26.538 | 191.400 | 7 | 0,32 | 0,27 | 23.925 | 191.400 | 2,51 | 2,46 | |
| 14 | 31.10.2013 | | 26.701 | 190.952 | 7 | 0,14 | 0,10 | 23.869 | 190.952 | 2,52 | 2,46 | |
| | 31.10.2013 | | 25.948 | 186.616 | 7 | 0,20 | 0,15 | 23.327 | 186.616 | 2,58 | 2,52 | |
| 16 | 31.10.2013 | 09:52:45 | 25.819 | 186.056 | 7 | 0,13 | 0,08 | 23.257 | 186.056 | 2,58 | 2,53 | |
| 17 | 31.10.2013 | 09:53:46 | 27.537 | 197.600 | 7 | 0,39 | 0,33 | 24.700 | 197.600 | 2,43 | 2,37 | |
| 18 | 31.10.2013 | 09:54:46 | 28.657 | 205.728 | 7 | 0,15 | 0,11 | 25.716 | 205.728 | 2,34 | 2,28 | |
| 19 | 31.10.2013 | 09:55:46 | 30.654 | 220.872 | 7 | 0,19 | 0,14 | 27.609 | 220.872 | 2,18 | 2,12 | |
| 20 | 31.10.2013 | 09:56:47 | 27.155 | 193.152 | 7 | 0,12 | 0,08 | 24.144 | 193.152 | 2,49 | 2,44 | |
| 21 | 31.10.2013 | 09:57:47 | 27.302 | 195.032 | 7 | 0,44 | 0,39 | 24.379 | 195.032 | 2,47 | 2,41 | |
| 22 | 31.10.2013 | 09:58:47 | 27.356 | 192.824 | 7 | 0,33 | 0,29 | 24.103 | 192.824 | 2,49 | 2,43 | |
| 23 | 31.10.2013 | 09:59:48 | 27.008 | 187.712 | 7 | 0,64 | 0,60 | 23.464 | 187.712 | 2,56 | 2,50 | |
| 24 | 31.10.2013 | 10:00:48 | 29.368 | 196.912 | 7 | 1,24 | 1,19 | 24.614 | 196.912 | 2,44 | 2,39 | * |
| | | | () () () () () () () () () () () () () (| | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | SAP | | | WB5 (1) 001 - 102 | 52059a INS | 6 |
| | 51101010 | | | 1701712 | | li tele i el | SAP | 2.1102.1 | | | | Þ |

The file DBAN_BACKUP.csv contains detailed information about the backup procedure. Go to the period in which the backup was active.

Here, you will find, among others, information about how many pages were read in an interval (*BackUpReadPg*), how many read I/O accesses (*BackUpReads*) were executed in an interval, how many pages were written in an interval (*BackUpWrittenPg*), and how many write I/Os (*BackUpWrites*) were executed.

If the measurement of time has been activated, you can read the time used for reading the data in the columns *AvgAbsRTime_Backup* and *AvgRelRTime_Backup*. The columns *AvgAbsWTime_Backup* and *AvgRelWTime_Backup* display the times that were required for writing to the backup medium.

- AvgAbsRTime_Backup/AvgAbsWTime_Backup: The absolute time is the total time that a task needs for the read/write until the CPU is assigned to the task again. In other words, even if the actual I/O has already been executed, this time can still increase when the task is in the runqueue and has to wait for the CPU assignment.
- AvgRelRTime_Backup/AvgRelWTime_Backup: The relative time is the time that a task spends exclusively waiting for the execution of the I/O. As a rule, the relative time is therefore lower than the absolute time.

A big discrepancy between the relative and the absolute times points to a bottleneck in the thread (UKT). In a thread, only one task can use the CPU at any one time. In this case, you can resolve the bottleneck by distributing the server tasks to different threads (UKTs). For detailed information, see SAP note 1672994.

In this case, the I/O times measured for reading the data from volumes (*AvgRelRTime_Backup*) and the values for writing the data to the backup medium (AvgRelWTime_Backup) are very good. For good I/O times, the I/O must be lower than 10 msec.

However, poor I/O times do not necessarily mean a bottleneck for the runtime of a backup. In general, during backup you have more data volumes from which data is read in parallel by the server tasks than backup media that are written to.

5.1. Optimize Runtime of Data Backup: DBAN_SHOW_ACTIVE.prt

| V - 4 - 4 | C C C C III III III II II III III III I | |
|-----------------------------------|---|--|
| Display a File | | |
| | | |
| 경 🚖 🚹 🕼 System Configuration 🖡 | File : DBAN_SHOW_ACTIVE.prt | |
| SAP MaxDB Database Administration | | |
| | <pre>************************************</pre> | |
| | | Li 1, Co 1 Ln 207 - Ln 237 of 1362 lines |
| | | |
| | SAP | WB5 (1) 001 V u252059a INS |

In each case, you should also analyze the file DBAN_SHOW_ACTIVE.prt (> 7.8: DBAN_SHOW_ACTIVE_TASKS.prt). Go to the period in which the backup was active.

This file gives information about which tasks have been active in an interval. It only contains entries if the Database Analyzer interval is less than or equal 300 seconds.

In principle, several snapshots are used for the analysis of this file. This gives you an overview over the process of the backup.

BUPmed tasks - Activities of tasks that write to the backup medium

BUPvol tasks - Activities of tasks responsible for reading the data from the volumes

In the snapshots of 09:54:46 and 09:55:46 we can see that only one task is busy with a write I/O to the backup medium (*BUPmed*). This suggests that no parallel medium is defined here.

In the snapshot at 09:54:46, 1 server task is busy with reading from the data volumes (*BUPvol 'Medium IO'*).

The user task is waiting for the end of the backup (User JobWait BckRec).

The second snapshot at 09:55:46 is interesting if you concentrate on the server tasks that read from the data volumes. All server tasks (24) that have the read request are waiting (*Vsuspend*). The reason for the wait situation is that one write task is not fast enough to write the data from the ring buffer to the backup medium. Only once space becomes free again in the ring buffer the reading server task can continue reading the data.

The bottleneck is not due to the I/O but due to the throughput of data written to the backup medium. The I/O times for this are good (less than 3 ms). You can speed up the backup by installing a parallel backup medium.

5.1. Optimize Runtime of Data Backup: Parallel Medium

| (), 10.29.4.5 | 5:WB5 Data:90,56 % Log: | 6,89 % | | Sessions: 💻 | 13,33 % |
|----------------------|---|---------------|----------|--------------|--------------------|
| 🖨 Name: | WB5_backup_COMP_parallel | | | | |
| Backup Type: | COMPLETE DATA 👻 | | | | |
| Device Type: | FILE 🗸 | | | | |
| Backup Tool: | NONE | | | | |
| Device 1 Dev | | Device 1 Devi | ice 2 | | |
| Device/File: | /sapdb/backup/WB5/WB5_31102013_comp_parallel1 | Device/File: | /sapdb/b | ackup/WB5/WB | 5_31102013_comp_pa |
| Size: | 0 KB - | Size: | 0 | KB 💌 | |
| OS Command | : | OS Command: | | | |
| Compressed: | ī] | | | | |
| Overwrite: | 3 | | | | |
| Block Size: | 8 | | | | |
| A . I . I | 7 | | | | |

Backup template WB5_backup_COMP_parallel has been created. Backups using this template are compressed as well and write to 2 files in parallel. (Device 1 and Device 2)

5.1. Optimize Runtime of Data Backup: Backup (2)

| Status | Backup/Restore | (DBM Server) | ckup/Restore (Ker | nel) O | otimizer Statist | ics Data | base Structur | e Che | cks Log Backup Files Archiving | |
|---|---|--|--|--------------------|------------------------------------|--------------------------|---|---------------|--|----|
| Connection: WB5 | | | | | | | e) | | | |
| onnector: WB5 onnector: WB5 occ since 28.10.2013 11:17:15 II:17:15 WB5 II:17:15 WB5 II:17:15 II: | B 2 2 2 | | | | | | 1 | | | |
| | Backups and Restor | es (Kernel View) | | | | | | | | |
| | | A DESCRIPTION OF THE PARTY OF T | STREET, STREET | IL STOCKDORE SALAR | IL NOTING TO AN ADDRESS OF A STATE | LOCIOLARIB CANADE INCIDE | And the second se | Lorenza State | energy of particular and the state of the st | - |
| Image: WBS Image: WBS <td></td> <td>-</td> | | - | | | | | | | | |
| Properties | - | | | | | | | | | - |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | The second se | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | NO | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | NO | | |
| | | | | | | | | | | |
| | | | New York Control of the State | | | 1274 2274 247 | | 1.50 20 | | |
| | | | | | | | | | | |
| | | | | | | | | NO | | |
| | | | | | | | | | | - |
| Administration | LOG_00000047 | | 26.08.2013 | 03:00:19 | 26.08.2013 | 03:00:25 | 85344 | | | Ψ. |
| • 🗀 Tools | | 4 1 | | | | | | | 4 | • |
| | | | | | | | | | | |
| | | | SAP | | | | | WB5 | (2) 001 V lu252059a INS | - |

Lets check now the runtime of the backup with parallel medium executed at 31.10.2013 from 2:05 pm to 2:20 pm (runtime is now only 15 minutes instead of 27 minutes)

5.1. Optimize Runtime of Data Backup: DBAN_SHOW_ACTIVE.prt

| • • • | ◆ ④ ♥ □ | |
|---|--|--|
| | | |
| Display a File | | |
| | | |
| ろ 🚖 🚹 🖽 System Configuratior 🕨 | Fie File : DBAN_SHOW_ACTIVE.prt | |
| System WB5 | 88 | |
| | | |
| AP MaxDB Database Administration | | 74 |
| Current Status | +276 at 2013-10-31 14:16:23 | Ţ |
| Performance | * I Active BUPmed tasks found in state 'Medium IO': 2 | |
| Activities Overview | * I Active BUPvol tasks found in state 'Medium IO': 1 | |
| Database Activities Transactions | I Active User tasks found in state 'JobWait BokRec': 1 I Active Logwr tasks found in state 'Vector IO': 1 | |
| Iransaccions Performance Warehouse | * I Active Boyel tasks found in state 'Vauspend (203)': 23 | |
| Database Analyzer | * I Active User tasks found in state 'LogIOwait(234)': 1 | |
| Bttincks | | |
| Expert Analysis | <pre>#277 at 2013-10-31 14:17:33 * I Active BUPmed tasks found in state 'Medium IO': 2</pre> | |
| SQL Performance | * I Active Bornet casks found in state 'Medium IO': 5 | |
| SQL Locks | * I Active User tasks found in state 'JobWait BckRec': 1 | |
| Kernel Threads | * I Active BUPvol tasks found in state 'Vsuspend (203)': 19 | |
| I/O Operations | #278 at 2013-10-31 14:18:35 | |
| 🗋 Space | * I Active BUPvol tasks found in state 'Medium IO': 24 | |
| 🖸 🗋 Jobs | * I Active User tasks found in state 'JobWait BckRec': 1 | |
| Alerts | * I Active BUPmed tasks found in state 'Vsuspend (204)': 2 | |
| Diagnostics | ===== #279 at 2013-10-31 14:19:36 | |
| Administration | * I Active BUPvol tasks found in state 'Medium IO': 24 | |
| • 🖸 Tools | * I Active User tasks found in state 'JobWait BckRec': 1 | |
| Documentation | * I Active BUPmed tasks found in state 'Vsuspend (204)': 2 | |
| | ===== #280 at 2013-10-31 14:20:36 | |
| | + 0K | |
| | | |
| | + OK at 2013-10-31 14:21:37 | - |
| | 4 b | , ¹ |
| | | |
| | Li 1, Co 1 | Ln 1165 - Ln 1195 of 1362 lines |
| | | |
| | SAP VB5 (1) 001 | lu252059a INS lu252059a INS |

Let's have a look at snapshot 14:17:33:

Now 2 tasks in parallel are busy with a write I/O to the backup medium (BUPmed)

5 server tasks are busy with reading from the data volumes (BUPvol 'Medium IO')

Snapshot 14:18:35:

All 24 server tasks are busy with reading from the data volumes (*BUPvol 'Medium IO'*)

Both server tasks that have the write request are waiting (BUPmed Vsuspend).

The 2 servertasks which write the data to the external media are faster than only one task. So in this example the ring buffer was never

filled up completely. The server tasks which read the data from the volumes to the ring buffer have no wait (vsuspend) situations.

But we can see now wait situations on the servertasks which have to write to the external media.

Now the bottleneck is on server tasks side that have the read request. Let's check now the throughput of the I/O in DBAN_backup.csv.

5.1. Optimize Runtime of Data Backup: DBAN_BACKUP.csv

| 3 | 3 7 6 6 | 8 <mark>7</mark> . | 2. %. | 🖹 🕼 , 🕼 , 🖽 , | 🖪 🔳 | | | | | | |
|-----------|-------------|--------------------|-------------|---------------------|--------------------|----------------|------------------|--------------------|---------------|---|---|
| File Name | e: DBAN_BAC | KUP.csv TIME | PaparIOPaad | Ave AbcPTime Packup | AvaPolPTimo Packup | Packlin/Writes | PackLinWrittonDa | AvgAbsWTime_Backup | | | |
| 267 | 31.10.2013 | | 7 | 7,42 | 7,24 | 46.028 | 368.224 | 2,50 | 2,41 | | |
| 268 | 31.10.2013 | | 7 | 3,86 | 3,82 | 46.768 | 374.144 | 2,61 | 2,55 | | |
| 269 | 31.10.2013 | | 7 | 2,18 | 2,13 | 42.618 | 340.944 | 2,76 | 2,68 | | |
| 270 | 31.10.2013 | 14:10:00 | 7 | 8,08 | 7,78 | 44.616 | 356.928 | 2,59 | 2,51 | | |
| 271 | 31.10.2013 | 14:11:01 | 7 | 7,90 | 7,78 | 44.729 | 357.832 | 2,60 | 2,52 | | |
| 272 | 31.10.2013 | 14:12:01 | 7 | 5,35 | 5,13 | 57.671 | 461.368 | 2,63 | 2,53 | | |
| 273 | 31.10.2013 | 14:13:20 | 7 | 4,09 | 4,01 | 43.577 | 348.616 | 2,69 | 2,62 | | |
| 274 | 31.10.2013 | 14:14:20 | 7 | 9,17 | 8,95 | 47.385 | 379.080 | 2,50 | 2,42 | | |
| 275 | 31.10.2013 | 14:15:22 | 7 | 16,71 | 16,42 | 45.556 | 364.448 | 2,39 | 2,30 | | |
| 276 | 31.10.2013 | 14:16:23 | 7 | 6,18 | 6,12 | 50.747 | 405.976 | 2,60 | 2,52 | | |
| 277 | 31.10.2013 | 14:17:33 | 7 | 6,54 | 6,48 | 43.926 | 351.408 | 2,61 | 2,51 | | |
| 278 | 31.10.2013 | 14:18:35 | 6 | 14,54 | 14,23 | 40.801 | 326.408 | 2,53 | 2,42 | | |
| 279 | 31.10.2013 | 14:19:36 | 6 | 25,77 | 25,57 | 36.434 | 291.472 | 2,37 | 2,29 | | 1 |
| 280 | 31.10.2013 | 14:20:36 | 2 | 60,12 | 58,67 | 4.784 | 38.272 | 3,66 | 3,38 | | |
| 281 | 31.10.2013 | 14:21:37 | 0 | 0,00 | 0,00 | 0 | 0 | 0,00 | 0,00 | | |
| 282 | 31.10.2013 | 14:22:37 | 0 | 0,00 | 0,00 | 0 | 0 | 0,00 | 0,00 | | |
| | | | 4 🕨 | | | | | | | • | |
| | | | | | SA | | | | lu252059a INS | | ſ |

The runtime of the backup was less than before, but the I/O times measured for reading from volumes (*AvgRelRTime_Backup*) is increased, sometimes over 10 msec. Why?

In the configuration of this database all 24 Data Volumes are located on the same disk. This is not the configuration SAP is recommending. Because more server tasks get read requests more often and in parallel the bottleneck now is the Read IO.

To solve this bottleneck the database configuration has to be changed -> distribute the data volumes on different disks.

5.1. Optimize Runtime of Data Backup: Backup (3)

| • □ Performance • □ Space • □ Space • □ Space □ Dis □ Central Calendar □ Dis □ Central Calendar □ Dis □ Dis |
|--|
| • ① Jobs • ○ DBA Planning Calendar • ○ DBA • ○ DB |
| Summary Current Selection is Total 11 itral Calendar A Planning Calendar A Log From 28.10.2013 WM 42 43 44 45 64 74 A Log From 28.10.2013 Total 11 18 25 12 18 11 18 25 12 18 2013/11 18 25 10 26 10.2013 Total 11 18 25 12 19 26 10 2013/11 2013 |
| • DBA Log • Back End Configuration • Back End Configuration • OK • Administration • OK • Dognostics • Administration • Tools • Documentation • Documentation • End Date • Documentation • End Time • Documentation • • • • • • • • • • • • • • • • • • • |
| • BackEnd Configuration • OK 11 • Dagnostics • Ok 11 • Diagnostics • Ok 11 • Tools • Tools • Documentation • Start Date Start Time* End Date End Time Runtime Action Return Code • Ok.112013 16:45:00 02:11:2013 16:47:03 00:4235 Dicremental data backup 0K |
| Alerts Diagnostics Administration Tools Documentation Coli Sant Date Start Date |
| Image: Diagnostics Administration Tools Tools Documentation Start Date Start Time End Date End Time Runtime Action Return Code 02.11.2013 16:45:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 01.11.2013 19:00:00 |
| ▲ ▼ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ |
| > 1005 > Documentation (1) (2) (2) (2) </td |
| Image: Start Date Start Time* End Date End Time Runtime Action Return Code 02.11.2013 16:45:00 02.11.2013 16:47:35 00:02:35 Incremental data backup OK 01.11.2013 19:00:00 01.11.2013 23:57:03 04:57:03 Complete data backup OK |
| |

Now we have a backup analysis of a 4 Tbyte customer system. This customer configuration has 80 Data volumes distributed on several disks.

Let's have a closer look to this backup performance to see if we can optimize here as well.

A complete data backup was executed at 1st of November between 7:00 pm and 11:57 pm – around 5 hours runtime of backup.

5.1. Optimize Runtime of Data Backup: DBAN_SHOW_ACTIVE.prt



Let's have a look at snapshot 07:37:47 pm:

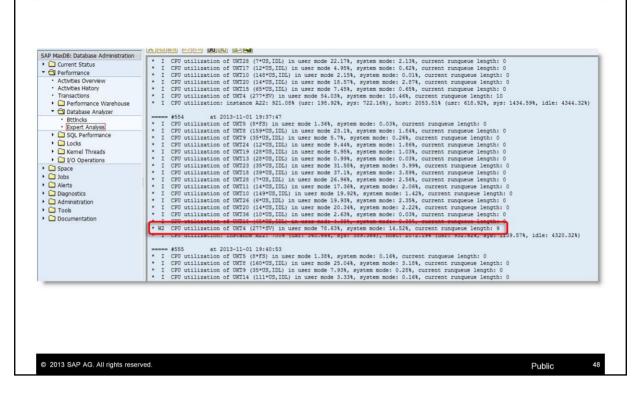
Interesting are the BUPmed and BUPvol tasks.

There are 16 tasks in parallel busy with write I/O to the backup medium (*BUPmed*) – So now we know this is a parallel backup template with 16 parallel devices.

53 server tasks are busy with reading from the data volumes (*BUPvol* '*Medium IO*')

27 server tasks that have the read request are waiting (BUPmed 'Vsuspend')

5.1. Optimize Runtime of Data Backup: DBAN_UKT_CPU_UTILIZATION.prt



File DBAN_UKT_CPU_UTILIZATION.prt contains the detailed information which UKT (user-kernel thread) is responsible for which CPU consumption.

The only thread that is of interest for the runtime analysis of a data backup is the thread in which the server tasks are configured.

-> Thread 4 – during this backup the most CPU load was in thread no 4 (~74% in User and 14,5% in System)

Note as well that the runqueue has 9 elements which are ready to use CPU but cannot get them because the CPU is used by another task in the same thread.

In this case all server tasks (read and write request) are in UKT 4. The CPU consumption of the UKT4 is high (78%) and the current runqueue length (9) points to a CPU bottleneck during the backup.

5.1. Optimize Runtime of Data Backup: DBAN_UKT_CPU_UTILIZATION.prt



We focus on the CPU Utilization of the UKT no 4. UKT no 4 includes all server tasks.

In the displayed snapshots the CPU consumption of the UKT4 is between 79% and 83% and the runqueue length increase up to 82 entries!

This pints to a CPU bottleneck which appears during the total backup time. Server task distribution to several UKTs could be the solution for such a CPU bottleneck.

With Kernel parameter configuration the server tasks can be distributed on different Threads. You can decide if the ServerTasks are in a user seperated Thread or together with the Users Tasks in the Threads. For more information, see Note 1672994.

Be careful – this configuration change should never be done directly on the productive system.

Notice that server tasks are used for backup, Check Data, create index, read ahead and during savepoints.

5.2. Aggregation Analysis (1)

| goregated Data From 02/21/2006 To 11/05/2013 Stoppequates 11/05/2013 • ANALYZER_TASK STAT • ANALYZER_TASK STAT • BACQUP • CACHE • CACHE_OCCUPANCY • CACHE_OCCUPANCY • CACHE_OCCUPANCY • CATALOG_CACHE • CAUST_CION • 00/21/2002 - 11/05/2013 • 00/21/2006 - 10/13/2007 • FULING • FRLING • 00/21/2007 • FRLING • 00/21/2006 - 10/13/2007 • STARTECO COLPANCY • 00/2007 | e.g. before and after an MaxDB software upgrade performance problems since a known date hardware configuration changes |
|---|---|
|---|---|

The aggregated Database Analyzer statistic values are used to compare a system e.g. before and after a software upgrade. If the customer detecs performance problems since a special date or hardware components on the database server have been changed.

The first example is based on a liveCache customer system which was upgraded from version 7.7.07.37 to 7.7.07.45 at 26th of October 2013.

We are using the daily aggregates to compare the system before and after the upgrade.

There are several time frames listed in the aggregation view if the structure of the file has changed – like in CPU_UTILIZATION.

5.2. Aggregation Analysis – CPU_UTILIZATION (1)

| | | _UTILIZATION.csv | | 1 | | | | |
|------------|-----|-------------------------|-----------------|-------------|--------|--------------------------|------|---|
| DATE | | SUM ProcUserTimeSec SUM | Spreadsheet | UserTimeSec | | SUM HostWaitForIOTimeSec | CLIM | |
| 10/12/2013 | 284 | 32,096 | Word processing | 41,713 | 10,921 | 4,226 | 3014 | |
| 10/13/2013 | 284 | 66,419 | Local File | 82,923 | 16,744 | 8,090 | | Ŧ |
| 10/14/2013 | 283 | 109,924 | _ | 133,448 | 24,843 | 14,043 | | |
| 10/15/2013 | 283 | 128,961 | Send | 156,043 | 25,006 | 14,529 | | |
| 10/16/2013 | 283 | 116,217 | Office | 139,893 | 24,659 | 13,232 | | |
| 10/17/2013 | 283 | 118,296 | ABC Analys. | 142,829 | 24,380 | 13,052 | | |
| 10/18/2013 | 284 | 64,091 | HTML download | 78,873 | 17,020 | 8,441 | | |
| 10/19/2013 | 283 | 32,187 | H THE download | 41,863 | 11,033 | 3,779 | | |
| 10/20/2013 | 284 | 59,897 | 1,236 | 75,024 | 15,764 | 7,072 | | |
| 10/21/2013 | 283 | 121,829 | 2,599 | 146,752 | 25,491 | 15,275 | | |
| 10/22/2013 | 282 | 128,161 | 2,621 | 154,212 | 25,567 | 13,188 | | |
| 10/23/2013 | 283 | 115,684 | 2,395 | 139,287 | 24,753 | 12,586 | | |
| 10/24/2013 | 282 | 121,793 | 2,434 | 146,927 | 25,267 | 12,899 | | |
| 10/25/2013 | 284 | 65,247 | 1,257 | 80,095 | 17,259 | 8,001 | | |
| 10/27/2013 | 86 | 33,440 | 1,355 | 42,694 | 15,119 | 8,802 | | |
| 10/28/2013 | 96 | 64,382 | 2,537 | 79,019 | 27,292 | 17,728 | | |
| 10/29/2013 | 96 | 62,752 | 2,472 | 77,686 | 24,264 | 15,462 | | |
| 10/30/2013 | 95 | 61,614 | 2,452 | 76,495 | 25,041 | 14,516 | | |
| 10/31/2013 | 96 | 62,166 | 2,372 | 77,927 | 25,492 | 14,291 | | |
| 11/01/2013 | 96 | 35,663 | 1,297 | 47,109 | 18,752 | 10,026 | | |
| 11/02/2013 | 113 | 19,693 | 699 | 28,312 | 13,343 | 6,101 | | |
| 11/03/2013 | 275 | 36,026 | 1,511 | 47,575 | 17,873 | 18,458 | | |
| 11/04/2013 | 283 | 71,609 | 2,891 | 89,560 | 28,395 | 21,685 | | |
| 11/05/2013 | 284 | 68,684 | 2,570 | 86,758 | 26,887 | 17,241 | | Ŧ |

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Public

In the CPU-Utilization we can see that the sum of CPU time in User Mode (database kernel software) decreased after the upgrade.

The are huge number of values to compare. It is much easier to have a graphical view.

Choose Spreadsheet to download the content into an excel sheet.

5.2. Aggregation Analysis – CPU_UTILIZATION (2)

| ä | Chart 4 | - | • (* <i>f</i> x | | | - | F | | 0 | | |
|----|--------------------------|-----------|--------------------------|------------|--|--|--|--|--|---------------------------|--------------|
| | A DATE | B | C SUM ProcUserTimeSec | | D | E SUM HostUserTimeSec | | mTimeSee | G SUM_HostWaitForlOTimeSec | H SLIM HeatIdleTimeSee | A DreaTatalC |
| | 09.10.2013 | 283 | 114.778 | SUM_ProcSy | 2.382 | | SUM_HostSyst | 24.204 | SUM_HostwaltFonUTImeSec 13.278 | 2.415.758 | |
| 2 | 10.10.2013 | 283 | 114.776 | | 2.382 | | | 24.204 | 13.242 | 2.415.756 | |
| , | 11.10.2013 | 283 | 65.665 | | 1.250 | | | 16,868 | 8.421 | 2.481.379 | |
| | 12.10.2013 | 284 | 32.096 | 1 | 1.2.00 | 00.014 | | 10.000 | 0.421 | 2.401.515 | 4. |
| 5 | 13.10.2013 | 284 | 66.419 | | | S | UM Proc | learTim | a Sec | | |
| , | 14.10.2013 | 283 | 109.924 | | | | | USEI IIII | iesec | | |
| ; | 15.10.2013 | 283 | 128.961 | 140.000 | | | | | | | |
| 9 | 16.10.2013 | 283 | 116.217 | 120,000 | | \wedge | \sim | | | | |
| 0 | 17.10.2013 | 283 | 118.296 | 120.000 - | 7 | 14 | 1-5 | | | | |
| 1 | 18.10.2013 | 284 | 64.091 | 100.000 - | <u> </u> | / \ | $ \longrightarrow $ | | | | |
| | 19.10.2013 | 283 | 32.187 | 80.000 - | | | | | | | |
| | 20.10.2013 | 284 | 59.897 | | | / / / | | | | | |
| | 21.10.2013 | 283 | 121.829 | 60.000 - | $\rightarrow \rightarrow /$ | | | | | | - |
| | 22.10.2013 | 282 | 128.161 | 40.000 - | \sim | \/_ | | \sim | · | SUM_ProcUserTimeSe | ec |
| | 23.10.2013 | 283 | 115.684 | | v | v | | ~ | | | |
| | 24.10.2013 25.10.2013 | 282 | 121.793 | 20.000 - | | | | | v | | |
| | 25.10.2013 | 284 86 | 65.247 33.440 | 0 - | | | | | | | _ |
| | 28.10.2013 | 96 | 64.382 | | 11 11 11 11 | | 11 11 11 11 | | 13 13 13 13 13 | | |
| | 29.10.2013 | 96 | 62.752 | - | 09.10.2013 10.10.2013 11.10.2013 12.10.2013 | 15.10.2013 15.10.2013 16.10.2013 16.10.2013 17.10.2013 18.10.2013 19.10.2013 19.10.2013 20.10.2013 | 21.10.2013 22.10.2013 23.10.2013 24.10.2013 | 26.10.2013 26.10.2013 28.10.2013 28.10.2013 | 29.10.2013 30.10.2013 31.10.2013 01.11.2013 02.11.2013 02.11.2013 03.11.2013 03.11.2013 05.11.2013 | | |
| | 30.10.2013 | 95 | 61.614 | - | | | 101.10 | | | | |
| | 31.10.2013 | 96 | 62.166 | | 01 11 12 1 | 2011201201202 | 21 23 24 24 | 5 21 28 2 | 31 31 31 31 31 31 31 31 31 31 31 31 31 3 | | |
| | 01.11.2013 | 96 | 35.663 | | 1.297 | 47,109 | | 18.752 | 10.026 | 2.529.284 | -40 |
| | 02.11.2013 | 113 | 19.693 | | 699 | | | 13.343 | 6.101 | 2.492.482 | |
| 6 | 03.11.2013 | 275 | 36.026 | | 1.511 | 47.575 | | 17.873 | 18.458 | 2.419.031 | |
| 27 | 04.11.2013 | 283 | 71.609 | | 2.891 | 89.560 | | 28.395 | 21.685 | 2.451.430 | |
| | 05.11.2013 | 284 | 68.684 | | 2.570 | 86.758 | | 26.887 | 17.241 | 2.466.414 | |
| 29 | | | | | | | | | | | |
| 0 | | | | | | | | | | | |

The aggregated values can only be transferred into graphics with Excel. The Database Studio does not support this feature.

We can easily see that the CPU_USAGE of the database in user Mode decreases since 26.10.2013.

The reason for this could be Code change in liveCache kernel, code change in LCAPPS, or other reasons.

The database Analyzer expert view allows to get more detailed information about the liveCache ressource usage.

Notice that the liveCache kernel and the LCAPPS are running in the same process.

Currently we do not have detailed information about LCAPPS statistics in the database Analyzer expert analysis.

To confirm that the CPU usage has really decreased it is important to check if the application load before and after the upgrade has been the same. Here you have several expert analysis aggregation views.

5.2. Aggregation Analysis – CACHES

| Home | insert Page | Layout Formul | as D | ata Review | View | / Pl | DF-XC | nange | 2012 | Des | iign l | Layout | F | ormat | | | | | | | | 0 | @ |
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| 1.733.142.833 | 1.733.142.246 | | | | | | | | | | | | | | 7 | | | | | | 100.00 | 1.310.43 | |
| 1.759.843.772 | 1.759.843.327 | 445 | 100,0 | 00 100,00 | | 100,0 | 0 | 334.6 | 27.326 | | 334.627 | 7.323 | | | 3 | 10 | 0,000 | | 100, | 00 | 100,00 | 1.338.00 | 68.661 |
| 1.140.721.596 | 1.140.721.267 | 329 | 100,0 | 00 100,00 | | 100,0 | 0 | 381.5 | 30.973 | | 381.530 | 0.973 | | | 0 | 10 | 0,000 | | 100. | 00 | 100,00 | 714.79 | 94.799 |
| 587.418.949 | 587.418.895 | 54 | 100,0 | 00 100,00 | | 100,0 | 0 | 117.1 | 42.514 | | 117.142 | 2.514 | | | 0 | 10 | 0,000 | | 100, | 00 | 100,00 | 451.52 | 24.594 |
| 1.049.517.672 | 1.049.517.479 | 193 | 100,0 | 00 100,00 | | 100,0 | 0 | 204.7 | 11.356 | | 204.711 | 1.356 | | | 0 | 10 | 0,000 | | 100. | 00 | 100,00 | 793.19 | 96.006 |
| 1.618.852.716 | 1.618.852.372 | 344 | 100,0 | 00 100,00 | | 100,0 | 0 | 307.8 | 14.154 | | 307.814 | 1.152 | | | 2 | 10 | 0,000 | | 100, | 00 | 100,00 | 1.228.4 | 12.179 |
| 2.056.436.993 | 2.056.436.640 | 353 | 100,0 | 00 100,00 | | 100,0 | 0 | 375.5 | 66.653 | | 375.566 | 5.651 | | | 2 | 10 | 0,000 | | 100, | 00 | 100,00 | 1.586.08 | 89.238 |
| 1.792.565.334 | 1.792.565.037 | 297 | 100.0 | | | 100.0 | 0 | 000.0 | 00.000 | | 000.000 | 0.004 | | | | 4.00 | 000 | | 400 | 0.0 | 400.00 | 4 005 04 | 208 |
| 1.786.997.145 | 1.786.996.874 | 271 | 100. | 2.500.000.000 | | | | | | | | | | | | | | | | | | | 909 |
| 1.116.162.493 | 1.116.162.372 | | 100. | | | | | | | | | | | | | | | | | | | | 426 |
| 594.462.502 | 594.462.462 | 40 | 100. | | | | | | | | | | | | | | | | | | | | 527 |
| 928.551.157 | 928.551.067 | 90 | 100, | | | | | | | | | | | | | | | | | • | | | 217 |
| 1.812.665.891 | 1.812.665.703 | 188 | 100, | 2.000.000.000 | - | | | ^ | <u> </u> | | | ~ | | | | | | | | \rightarrow | | | 120 |
| 1.991.651.996 | 1.991.651.815 | 181 | 100. | | | | | | \ | | | $^{\prime}$ | | | | ~ | | | | 1 | | | 843 |
| 1.769.561.018 | 1.769.560.853 | 165 | 100. | | - | | | | ~ | | - 1 | | \sim | | | \sim | - | | | 1 | | | 874 |
| 1.854.956.626 | 1.854.956.420 | 206 | 100, | | 1 | | | 1. | 1 | | | | | | | | 1 | | | | | | 670 |
| 1.139.156.305 | 1.139.156.123 | 182 | 100, | 1.500.000.000 | | | | \downarrow | | | | | | | | | | | | \sim | | | 998 |
| 1.040.835.390 | 1.040.785.791 | 49.599 | 99.1 | | | ۱. | | 11 | 1_ | ۱. | 1 | $^{\sim}$ | 1 | 1 | | | | 1 | - 1 | 1. | | | 661 |
| 1.857.641.550 | 1.857.636.723 | 4.827 | 100. | | 1 | 1 | | | 9 | 1 | | | ~ \ | 1 | | - | \neg | 1 | | | | | 606 |
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| 1.745.996.697 | 1.745.996.523 | | | 1 000 000 000 | | 11 | | | | 11 | | | | | \neg | | | \mathbf{U} | | | | | 001 |
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| 1.989.923.198 | 1.989.893.472 | 29.726 | 99, | | | | | | | | | | | | | | | | | | | | 210 |
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DC Hit (| Chart 1 C D E F C D E F G H J J K L M N O SUM DC Acc (SUM DC Suc (SUM DC Fails (Ø DC Hit IMN DC Hit IMN DC Hit IMN 00.01 100.00 100. |

We can check the aggregated statistic values of Cache Accesses to check if the system load related to Data Cache Accesses (blue) have been the same than before the upgrade. Because this is a liveCache application the Sum of OMS Accesses will be interesting as well.

To get closer to the reason for the lower CPU usage a detailed analysis must follow and detailed expert knowledge about liveCache application and liveCache architecture is necessary. This analysis is done at SAP with the colleagues of active global support for Max Attention customers and in team work with experts of liveCache application and liveCache kernel.

5.2. Aggregation Analysis – SQL Performance (1)

| Fi | e Hom | e Insert I | Page Layout | Formulas Data | Review View | PDF-XChar | nge 2012 | Design | Layout | Format | | | | | | |
|--------|--------------------------|-------------|----------------|--------------------------------|----------------------------|--------------------------|------------|--|--------------------------|--|--|--------------------------|-------------|------------------|-----|---|
| | Chart 1 | v (8 | f _x | | | | | | | | | | | | | |
| 4 | A | В | С | D | E | F | G | | Н | 1 | J | K | | | | |
| | | | | | SUM SelFetRQ Ø | SelFetSel MI | | tSel MAX | | SUM Inserts | SUM InsRows | | tes SUM Upd | IRR S | SUN | |
| | 18.10.2013 | 709 | | 2.594.354.803 | 1.736.884.654 | 68,295 | | 0,05 | 99,06 | 1.370.43 | | | | 22.963 | 1 | |
| | 19.10.2013 | 708 | 135.259.821 | 2.194.373.486 | 484.660.732 | 69,171 | | 0,66 | 98,41 | 472.90 | 7 465.514 | 626. | 014 1.67 | 72.578 | 1 | |
| | 20.10.2013 | 705 | | 870.991.387 | 275.557.665 | 57,062 | | 0,26 | 99,24 | 771.47 | | | | 55.359 | 1 | |
| | 21.10.2013 | 703 | | 2.466.043.522 | 1.524.353.620 | 64,325 | | 0,29 | 98,73 | 1.555.53 | | | | 19.386 | 1 | |
| | 22.10.2013 | 703 | | 2.833.396.064 | 1.769.677.108 | 65,174 | | 0,58 | 98,47 | 1.626.53 | | | | 05.919 | 1 | |
| | 23.10.2013 | 702 | | 3.314.560.824 | 1.777.359.719 | 64,645 | | 0,29 | 98,66 | 1.589.52 | | | | 59.728 | 1 | |
| | 24.10.2013 | 696 | | 2.047.448.304 | 1.066.252.353 | 56,595 | | 0,17 | 97,87 | 1.676.78 | | | | 01.303 | 1 | |
| | 25.10.2013 | 690 | | 2.411.561.054 | 1.263.236.809 | 56,887 | | 0,70 | 98,87 | 1.863.88 | | 947. | | 57.899 | 1 | |
| | 26.10.2013 27.10.2013 | 694 724 | | 1.928.424.898 1.046.285.049 | 376.654.311 102.690.114 | 62,270 29,808 | | 0,50 | 96,98 98,72 | 414.12 | | | | 41.245 12.570 | | |
| | 28.10.2013 | 697 | | 2.310.679.064 | 1.015.312.969 | 46,965 | | 0,10 | 98,72 | 2.040.70 | | | | 12.570 35.146 | | |
| | 29.10.2013 | 695 | | 19.649.519.579 | 2.237.566.629 | 46,965 | | 1,63 | 97,51 | 2.305.03 | | | | 45.640 | | |
| | 30.10.2013 | 693 | | 25.629.356.412 | 2.779.534.290 | 10,401 | | 2.70 | 35,18 | 1.561.26 | | | | 15.863 | 1 | |
| | 31.10.2013 | 693 | | 24.109.509.983 | 20000000000 | 10,102 | | 1.00 | | | | | | | A · | |
| | 01.11.2013 | 684 | | 24.464.498.213 | 30.000.000.000 | 1 | | | | | | | | | 1 | |
| | 02.11.2013 | 692 | 147.120.878 | 24.551.744.111 | 2 | | | | | | | | | | 2 | |
| В | 03.11.2013 | 685 | 71.234.879 | 21.704.067.149 | 1 | | | | | | | | | | 1 | |
| | 04.11.2013 | 688 | 66.812.789 | 23.083.035.904 | 2 25.000.000.000 | | | | | | | | | | 1 | |
| D | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | \sim | | | | |
| 2 | | | | | 20.000.000.000 | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 5 | | | | | _ | | | | | | | | | | | |
| 6 | | | | | 15.000.000.000 | | | | | | | | | | | |
| 7 | | | | | 15.000.000.000 | | | | | | | | | | | |
| B | | | | | 1 | | | | | | | | -SUM_Sel | FetRR | | |
| 9 | | | | | | | | | | | | | SUM_Sel | FetRQ | | |
| 0 | | | | | 10.000.000.000 | - | | | | | | | | - 1 | | |
| 1 | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | 5.000.000.000 | + | | | | _ | | | | | | |
| 4 | | | | | | | | \sim | | | | | | | | |
| 5 | | | | | | | | \sim | | | | | | | | |
| 6 | | | | | 0 | | · . | | | · · · · | | | | | | |
| 7 | | | | | | 2013 | 113 | 2013 | 113 | 113 113 | 2013 2013 2013 2013 | 113 | | | | |
| 8 | | | | | | 18.10.2013 19.10.2013 | 21.10.2013 | 23.10.2013 23.10.2013 24.10.2013 | 25.10.2013 26.10.2013 | 28.10.2013 28.10.2013 29.10.2013 | 30.10.2013 31.10.2013 01.11.2013 02.11.2013 | 03.11.2013 04.11.2013 | | | | |
| 9 0 | | | | | | 19.10 | 111 | 23.10. | 6.10 | 9.10 | 30.10 31.10 01.11 02.11 | 3.1 | | | | |
| 1 | | | | | | 4 4 8 | 1 10 1 | 6 6 9 | ñ ñ | йй | m m 0 0 | o õ | | | | |
| 1 | | | | | 61 · | | | | | | | | | | 7 | |
| | | | | | | | | | | | | | | | | |
| _ | | | | | | | | | | | | | | | | _ |

The next example was a customer system which had performance problems since 29th of October. Again we are using the expert analysis aggregation view to compare the statistics data before and after the 29th of October.

The customer could not tell us the transaction or the report which is slow but the information that the batch process during the night is very very slow suddenly. The customer told us that nothing has been changed from application side.

In such cases we won't use the command monitor to catch the commands in a first step.

SAP first checks with the aggregated values.

In this example we check the system load – have it really changed. You could start with DBAN_transactions to check if the sum of SQL commands has changed.

Here we check the daily aggregated values of DBAN_LOAD.csv

In DBAN_LOAD we get information about the number of Select and Fetches, the number of Insert, Updates and Deletes.

We get as well information about the Selectivity, which means how many rows have to be read and how many of these read rows have been qualified. The selectivity gives a hint if there are missing or bad indexes and therefore a high system load.

We can see that the number of Select and fetches are the same for all days. We can also see that the number of rows read (column D) to the number of rows qualified (Column E) was getting worse at 29th of October.

And this did not change until 4.11.2013

The Bad selectivity points to missing or BAD indexes.

So first we check if the are BAD indexes in the system -> DBACockpit -> Diagnostics -> database Objects -> Indexes

5.2. Aggregation Analysis – SQL Performance (2)

| 🔁 🚺 🛄 System Configuratior 🕨 | | | | | | | |
|--|------------|--------------|---------------------|-----------|--|------|--------|
| | Schema Nam | ne | SAPWB5 | | tou t Filte r | | |
| System WB5 | Table Name | | | | Filtered Output | | |
| | Index Name | | | | Only Display Bad Indexes | | |
| AP MaxDB Database Administration | T | | | | Only Display Inaccessible Indexes | | |
| Current Status | | | | | Only Display Unused Indexes | | |
| Performance | | | | | | | |
| 🗀 Space | | | | | | | |
| 🗀 Jobs | | | r r. l o . c | | | | |
| C Alerts | Indexes | (nothing yet | selected) | | | | |
| Diagnostics | Schema | Table | Index | DDIC Type | C. A U Acces. Reset Date | Time | Creati |
| Missing Tables and Indexes | | | | | | | |
| EXPLAIN SELECT-Editor | | | | | | | |
| | | | | | | | |
| Database Files | | | | | | | |
| Critical Regions | | | | | | | |
| Database Console | | | | | | | |
| Database Console | | | | | | | |
| Database Trace | | | | | | | |
| | | | | | | | |
| Database Trace | | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views | **** | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes | **** | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Database | *** | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects | _ | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms | - | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes | - | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes Database Procedures | | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes Database Procedures Table Sizes | - | | | | | | |
| Database Trace SQLD8C Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes Database Procedures Table Sizes Administration | - | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes Database Procedures Table Sizes Administration Tools | - | | | | | | |
| Database Trace SQLD8C Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes Database Procedures Table Sizes Administration | - | | | | | | |
| Database Trace SQLDBC Trace SYSINFO Views Error Codes Messages Database Objects Tables/Views/Synonyms Indexes Database Procedures Table Sizes Administration Tools | | | | | | | |

If there are bad indexes shown – those indexes cannot be used of the optimizer anymore and this could be the reason for the worse Selectivity.

Use 'Restore Index' to create those indexes again (Recreate Index) –but be careful only one create index should be active in the system. And indexes should be created when there is low system load.

Another issue could be that really an index is missing to find the best strategy. But this index was missing before the 29th of october as well. May be the customer has changed the application coding? In these cases you use Command monitor to catch the SQL statement with the worse selectivity and create a new index.

If you detect such issues and you cannot solve this issue by your own please open a CSS ticket on BC-Db-SDB. We help to find the root cause.

After the problem has been solved you can use the Database Analyzer expert analysis LOAD.csv as well to check the result.

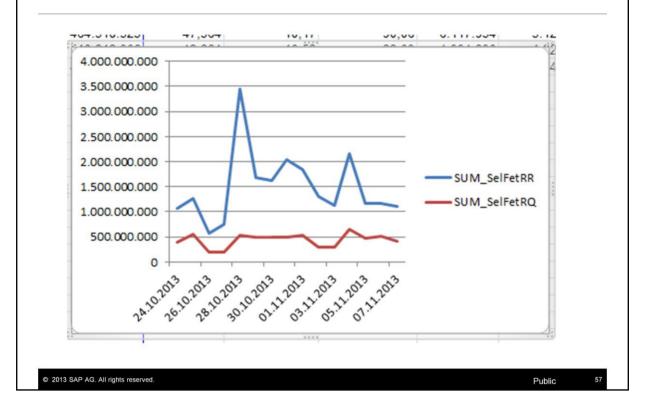
5.2. Aggregation Analysis – SQL Performance (3)

| B | С | D | E | F | G | н | 1 | J | K | L | M | N | 0 | P | Q | R | S | Т | ι |
|------------|-----------|---|------------|---------|---------------------|-----------|-------|--------|---------|------------|-----------|-----------|--------|-------|--------|-------|--------|----------|-------|
| 7.11.2013 | | 6 | 126 | 70.653 | 36.360.217 | 4.987.883 | 13,72 | 4.748 | 5.408 | 1.359 | 1.247 | 1.247 | 100,00 | 2.476 | 3.059 | 3.057 | 99,93 | | |
| 7.11.2013 | 13:22:11 | 7 | 126 | 119.015 | 35.102.457 | 4.969.914 | 14,16 | 5.142 | 6.381 | 1.815 | 1.683 | 1.677 | 99,64 | 1.952 | 2.857 | 2.856 | 99,96 | | |
| 7.11.2013 | 13:24:18 | 4 | 127 | 93.997 | 35.194.705 | 4.344.899 | 12,35 | 6.052 | 8.895 | 1.275 | 1.303 | 1.299 | 99,69 | 2.634 | 4.384 | 4.350 | 99,22 | | |
| 07.11.2013 | 13:26:22 | 6 | 124 | 64.879 | 34.904.010 | 3.426.268 | 9,82 | 2.648 | 3.291 | 816 | 917 | 915 | 99,78 | 1.470 | 2.362 | 2.361 | 99,96 | | |
| 7.11.2013 | 13:28:28 | 6 | 126 | 76.003 | 34.852.947 | 3.796.307 | 10,89 | 2.274 | 3,155 | 915 | 913 | 902 | 98,80 | 588 | 1.489 | 1.396 | 93,75 | | |
| 7.11.2013 | 13:30:34 | 6 | 126 | 63.952 | 35.272.546 | 3.379.869 | 9,58 | 1.901 | 2.542 | 820 | 987 | 971 | 98,38 | 547 | 1.052 | 1.051 | 99,90 | | |
| 7.11.2013 | 13:32:40 | 6 | 126 | 109.044 | 35.886.777 | 5.407.364 | 15,07 | 4.099 | 5,119 | 1.209 | 1.446 | 1.331 | 92,05 | 1,120 | 2.092 | 2.076 | 99.24 | | |
| 7.11.2013 | 13:34:46 | 7 | 126 | 79.642 | 35.557.851 | 5.254.641 | 14,78 | 3.496 | 5.695 | 1.099 | 1.122 | 1.119 | 99.73 | 1.203 | 6.126 | 2.630 | 42.93 | | - |
| 7.11.2013 | 13:36:53 | 6 | 127 | 88.487 | 35.182.680 | 4.855.837 | 13,80 | 45.00 | 0.000 | | | | | | | | | | 7 |
| 7.11.2013 | 13:38:59 | 8 | 126 | 99.216 | 35.017.256 | 5.115.666 | 14,61 | 45.00 | | | | | | | | | | | 11 |
| 7.11.2013 | | | | 123,188 | 33,111,462 | 4,492,506 | 13,57 | 1 | | 10 | | | | | | | | | - 11 |
| 7.11.2013 | 13:43:15 | 6 | 128 | 121.661 | 33,295,300 | 3,702,932 | 11,12 | 40.00 | 000.000 | | 1 | | | | | | | | - 11 |
| 07.11.2013 | | | | 72.198 | 35.859.160 | 4.341.491 | 12.11 | 1 | | | | | | | | | | | |
| 07.11.2013 | | | | 101,374 | 35.320.569 | 4.070.838 | 11.53 | 35.00 | 00.000 | N. LAND | - | | | | | | | | |
| 7.11.2013 | | | 127 | 76.504 | 37.655.981 | 6.576.353 | 17,46 | | | | | | | | | | | | 1 |
| 7.11.2013 | | | 127 | 95.479 | 40,114,565 | 6.004.160 | 14,97 | 30.00 | 000.000 | | - | | | | | | | | 1 |
| 07.11.2013 | | | 127 | 81.686 | 38.518.547 | 5,722,047 | 14,86 | | 100000 | | | | | | | | | | -It |
| 07.11.2013 | | | 126 | 56.381 | 37.255.956 | 4,844,692 | 13,00 | 25 0 | 0.000 | | | | | | | | | | 1 |
| 07.11.2013 | | | 126 | 60.360 | 36.257.009 | 4.835.627 | 13,34 | 23.00 | 0.000 | | | | | | | | | | |
| 07.11.2013 | | | 126 | 99.145 | 36,442,873 | 4.911.548 | 13,48 | 1 | 100000 | | | | | | | | | SelFetRR | đ |
| 07.11.2013 | | | | 138.415 | 38,191,813 | 8,161,087 | 21,37 | 20.00 | 00.000 | | - | | | | | | | | 1 and |
| 07.11.2013 | | | | 120.300 | 39.032.814 | 7.476.790 | 19,16 | 1 | | | | | | | | | | SelFetRQ | H |
| 7.11.2013 | | | | 116.594 | 37.416.400 | 6.580.626 | 17.59 | 15.00 | 00.000 | | | | | | | | | | 1 |
| 07.11.2013 | | | 126 | 96,723 | 36.638.530 | 5.965.741 | 16.28 | | | | | | | | | | | | -8 |
| 07.11.2013 | | | 125 | 58.622 | 27.861.894 | 5.625.905 | 20,19 | 10.00 | 000.000 | | | | | | | | | | |
| 7.11.2013 | | | 126 | 78.384 | 5.911.031 | 5.087.547 | 86,07 | 1 | | | | | | | | | | | - 8 |
| 07.11.2013 | | | 126 | 90.908 | 4.600.521 | 3.510.485 | 76,31 | 1 6 00 | 0.000 | 1 44 | | M | | | | | | | ÷ |
| 07.11.2013 | | | 127 | 81.636 | 4.986.470 | 3.228.012 | 64,74 | 3.00 | 0.000 | | | | | | | | | | - 8 |
| 07.11.2013 | | | 127 | 72.029 | 7.186.305 | 4.997.416 | 69,54 | 1 | | | | | | | | | | | |
| 07.11.2013 | | | | 112.290 | 7.221.989 | 5.511.907 | 76,32 | 1 | 0 | UTR-01-01 | | 241 | | | | | - | | -8 |
| 07.11.2013 | | | 125 | 91.808 | 7.274.566 | 5.904.143 | 81,16 | | 0 | HOHIO | TOHITO: | 10 | | | | | | | -8 |
| 7.11.2013 | | | 127 | 98.121 | 6.793.100 | 5.327.285 | 78.42 | | 1 | CT41000000 | | 100 | | | | | | | 1 |
| | 14:25:22 | | 126 | 85.097 | 4.687.623 | 3.001.867 | 64.04 | 1 | -++ | ******** | | *** | | | | | | | 뷺 |
| 7.11.2013 | | | 120 | 66.290 | 4.802.710 | 4.219.011 | 87,85 | 2.968 | 3.271 | 873 | 865 | 865 | 100.00 | 1,183 | 1.519 | 1 610 | 100.00 | | |
| 07.11.2013 | | | 125 | 71.044 | 2.582.112 | 1.863.283 | | 10.746 | 11.035 | 812 | 846 | 842 | 99,53 | 1.183 | 9.415 | 9.414 | 99,99 | | |
| 07.11.2013 | | | | 100.961 | 2.209.391 | 1.153.249 | 52,20 | 3.139 | 3.659 | 1.191 | 1.292 | 1.287 | 99,53 | 1.137 | 1.840 | 1.826 | 99,99 | | |
| 07.11.2013 | | | | | | 1.153.249 | | | 3.551 | | | | | | | 1.951 | 99,24 | | |
| 7.11.2013 | | | 126 126 | 78.483 | 2.157.130 3.957.812 | 1.236.350 | 57,31 | 2.631 | 3.551 | 1.363 | 1.411 935 | 1.411 929 | 100,00 | 1.156 | 20.338 | | 5.00 | | |
| | | | | | | | 38,33 | 2.530 | | | | | 99,36 | | | 2.432 | | | |
| 7.11.2013 | | | 125 | 53.834 | 1.766.082 | 1.140.866 | 64,60 | 2.345 | 2.948 | 779 | 853 | 852 | 99,88 | 383 | 45.961 | 1.165 | 2,53 | | |
| 07.11.2013 | | | | 109.352 | 2.516.107 | 1.701.086 | 67,61 | 2.647 | 3.163 | 1.143 | 1.160 | 1.155 | 99,57 | 858 | 11.962 | 1.448 | 12,10 | | |
| 17 11 2013 | 114.44.15 | 7 | 126 | 75 862 | 13 816 384 | 2 844 597 | 20 59 | 3 743 | 4 666 | 1 081 | 1 082 | 1 064 | 98 34 | 941 | 1 821 | 1 742 | 95 66 | | |

After the problem has been allocated and solved you can immediately easily check the result with the database Analyzer expert view.

For good system performance the rows read (blue) line and the rows qual (red line) should be as closely together as possible.

5.2. Aggregation Analysis – SQL Performance (4)



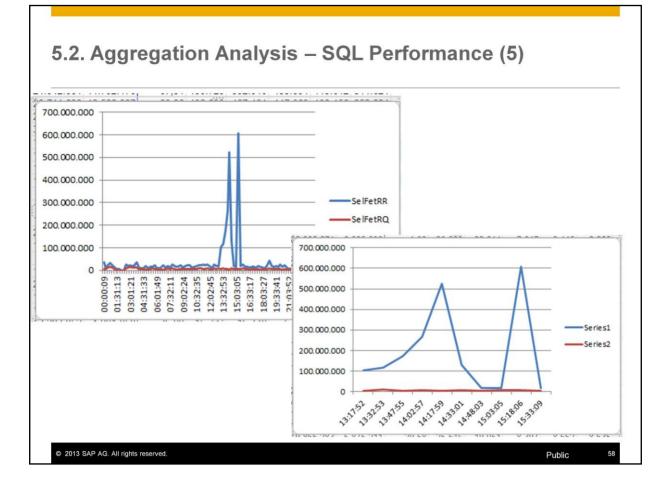
Next example is from a custoemr who told me that after the upgrade from 7.8 to 7.9 he has performance problems.

The upgrade has been done on Sunday 27.10.2013.

We use again the Database Analyzer aggregated statistics (daily) with DBAN_LOAD.csv and create a graphic view. Blue line are the rows that were read and the red line shows the rows qualified.

With the graphical view we easily can see that there are several peaks between 28.10.2013 and 6.11.2013. Much more data is read than gualified.

The next step is now zoom more detailed to the peaks. We use here the daily statistics values.



We start with the first peak of 28th of October.

We see now that the peak is between 12:02 and 4:00 pm. With the same created excel we can zoom further to the time frame.

We see that there must be an application active between 1:30 and 2:48, which has to be checked in more detail. We have to find out which SQL statement was active during this time.

We use again the Database Analyzer Bottleneck analysis to get more details.

5.2. Aggregation Analysis – SQL Performance (6)

| Analysetag / Messzeitpunkt / Typ | - | Meldung |
|----------------------------------|--------------------|--|
| | 414.668 | |
| | 446.607 | |
| ,-, | 267.034 | |
| | 620.084 | |
| | 511.254 674.494 | |
| • | | SQL commands executed: 674494, avg. 749.4 per second |
| A niedrig | | 60 memory allocations failed for command cache. Allocated 262144KB, configured 262144 KB |
| A niedrig | | 108 command cache cleanups! 0 commands reloaded, 0 execution plans and 418 commands deleted |
| ▲ niedrig | | Activities for logwriter task 2: writes 7754 (10912 pages written), suspends 2745 |
| ▲ niedrig | | Selects and fetches selectivity 4.31%: 597995 selects and fetches, 103401366 rows read, 4451432 rows |
| • △ niedrig | | 14546 table scans, selectivity 3.84%: 4813022 rows read, 184995 rows qualified |
| A niedrig | | 1149422 primary key range accesses, selectivity 2.51%: 95406594 rows read, 2391389 rows qualified |
| • Info | | Garbage collector tasks activated 1930 times, currently active: 0 |
| • 🖬 Info | | server tasks activity. Dispatches: 21105, physical reads: 94 (1685 pages), physical writes: 6245 (14357 pa |
| • 🗖 Info | | backup activity: number of pages read 0, written 9432 |
| • 🛆 niedrig | | User task 89: physical reads: 36058 (36058 pages), 190406 commands, appl S120165A, pid 2108 |
| • Info | | CPU utilization: instance BCP: 40.18% (usr: 39.29%, sys: 0.89%), host: 96.89% (usr: 88.9%, sys: 7.99%, |
| · D Info | | Number of pages marked for reclustering: 4269, clustered read operations: 1758, clustered pages read: 4 |
| • 🖬 Info | | Cluster compression checked 42 segments, blocks read: 1603, pages moved: 39 |
| | 552.541 | |
| | 513.598 | |
| | 784.390 | |
| A 14:17:59 #11070 | 838.755 | |
| A 14:33:01 #11160 | 312.377 | |
| 14:48:03 #11250 | 149.796 | |
| A 15:03:05 #11340 | 009.146 | |
| | 4 > | |

We get the information that User Task 89 did a lot of physical reads. User Task T89 was connected with application process id 2108 (Workprocess) of application server S1200165A.

To get more information which kind of SQL Statements have been executed we use again the Expert Analysis -> DBAN_RUNNING_COMMANDS.

5.2. Aggregation Analysis – SQL Performance (7)

| Dete: Dete:: | | |
|---|---|---|
| <pre>* `` Administration * `` Werkzeuge * `` Dokumentation * `` Werkzeuge * `` Dokumentation * `` Uerkzeuge * `` Dokumentation * `` I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * `` I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * `` I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * `` I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * `` I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 68: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 60: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 60: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 60: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "OBJEK" FROM "AUSP" T_00 INNER JOIN "KSSK" T_01 ON T_01 . * I task 60: SELECT /*+ FIRST_ROMS (2147483647) */ T_00 . "ATINN" = 7 AND T_00 . * I task 101 : SELECT # FROM "EDIDS" WHERE TODCHM" = 7 AND T_00 . * I task 101 : SELECT # ATINN = 7 AND T_00 . * I task 101 : SELECT # ATINN = 7 AND T_00 . * I task 101 : SELECT # ATINN = 7 AND T_00 . * I task 101 : SELECT # ATINN = 7 AND T_00 . * I task 101 : SELECT # ATINN = 7 AND T_00 . *</pre> | A B Systemkonfiguration System BCP SAP MaxDB: Datenbankadministration Aktueler Status Oberscht Aktivitäten Aktueler Status Oberscht Aktivitäten Aktivitäten-Historie Transaktionen O Performance Warehouse Obabase Analyzer Engpässe Sour-Performance Sour-Performance Sour-Performance Superen Sour-Performance Superen Kemel-Threads O VO-Operationen Olos | <pre> * 1 Task 41: SELECT * FROM * CADE* N = 7 AND * EBELN* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* * WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* * WHERE * WANDT* = 7 AND * EBELP* = 7 UNION ALL SELECT * FROM * EKBE* * WHERE * YHON * TOO *</pre> |
| | Administration Orrege | <pre>"HINNE", "ZEIMB", "ZEILM", "ZLIAX", "ZEILP", "ZLERO", "ZEINN", "ZNNOR", "ZEINM", "ZNNIN", "ZEITN", "ASVRG", ""ASVRG", """" \$10980 at 2013-10-28 14:02:57 * OK """" \$1070 at 2013-10-28 14:17:59 * I Task 68: SELECT /++ FIRSTRONS (2147483647) */ I_00 . "OBJEK" FROM "AUSP" I_00 INNER JOIN "KSSK" I_01 ON I_01. """"" \$100 at 2013-10-28 14:17:59 * I Task 68: SELECT /++ FIRSTRONS (2147483647) */ I_00 . "OBJEK" FROM "AUSP" I_00 INNER JOIN "KSSK" I_01 ON I_01. """"" \$11160 at 2013-10-28 14:13:101 * I Task 68: SELECT /++ FIRSTRONS (2147483647) */ I_00 . "OBJEK" FROM "AUSP" I_00 INNER JOIN "KSSK" I_01 ON I_01. """"" \$11160 at 2013-10-28 14:13:101 * I Task 68: SELECT /++ FIRSTRONS (2147483647) */ I_00 . "OBJEK" FROM "AUSP" I_00 INNER JOIN "KSSK" I_01 ON I_01. """""" \$1160 at 2013-10-28 14:48:03 * OK</pre> |

With the expert View of DBAN_running_commands we find out which SQL statements were active in the timeframe 1:02 pm to 2:48 pm. The information of the bottleneck analysis that task T89 was active can be confirmed. T89 executed several SQL comamnds.

To find out which ABAP programs executed those commands you can use as of SAP MaxDB 7.9 the Resource Monitor.

5.2. Aggregation Analysis – SQL Performance (8)

| Paramete | is not active | - | | | | ast Refresh | | 08.11.2013 | 11:30:42 |
|---|---|--|---|--|--|---|---|--|--|
| Itput Criter | Search Term | : SEL | ECT "MANDT | ", "AUFPL" | | | | | |
| | Search Dirct: | 7 | | | \ | | | 27.10.2013 | 06:02:12 |
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| ecorde | d SQL St | atement # Rows Re | S # Pages A | #P Cache | | Abbreviated SQL S | | Program | Offset |
| ecorde | d SQL Sta # Qualified 25,73 | atement # Rows Re 26105,84 | s | #P Cache | # Disk I/O 47.129 | Abbreviated SQL S | , "AUFPL" , "APLZL" | SAPLCOZE | 16.578 |
| ecorde | d SQL Sta # Qualified | atement # Rows Re | 5 # Pages A 24.644.95 600 | #P Cache 24.597.82 600 | # Disk I/O 47.129 0 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "N | , "AUFPL" , "APLZL" MARD" WHERE "MAN | SAPLCOZF SAPLMG26 | 16.578 1.268 |
| ecorde Qualified 94.404 | d SQL Sta # Qualified 25,73 | atement # Rows Re 26105,84 | S # Pages A 24.644.95 | #P Cache 24.597.82 | # Disk I/O 47.129 0 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "N | , "AUFPL" , "APLZL" | SAPLCOZF SAPLMG26 | 16.578 |
| Qualified 94.404 55 | d SQL Sta # Qualified 25,73 189,66 | # Rows Re 26105,84 1090,91 0,00 | 5 # Pages A 24.644.95 600 | #P Cache 24.597.82 600 12.539 | # Disk I/O 47.129 0 0 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "I DELETE FROM "DM | , "AUFPL" , "APLZL" MARD" WHERE "MAN | SAPLCOZF SAPLMG26 SAPLSDCL | 16.578 1.268 |
| Qualified 94.404 55 0 | d SQL Sta # Qualified 25,73 189,66 0,00 | # Rows Re 26105,84 1090,91 0,00 | S # Pages A 24.644.95 600 12.539 | #P Cache 24.597.82 600 12.539 | # Disk I/O 47.129 0 0 79.518 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "IN DELETE FROM "DM SELECT "MANDT" | , "AUFPL" , "APLZL" MARD" WHERE "MAN MS_PH_PROP_CD1" | SAPLCOZF SAPLMG26 SAPLSDCL SAPLCOZF | 16.578 1.268 53.203 |
| Qualified 94.404 55 0 44.620 | d SQL Sta # Qualified 25,73 189,66 0,00 22,15 | # Rows Re 26105,84 1090,91 0,00 31397,06 | s # Pages A 24.644.95 600 12.539 14.009.36 12 | #P Cache 24.597.82 600 12.539 13.929.84 | # Disk I/O 47.129 0 0 79.518 0 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "IN DELETE FROM "ON SELECT "MANDT" SELECT "KLFN1", | , "AUFPL", "APLZL" MARD" WHERE "MAN IS_PH_PROP_CD1" , "AUFPL", "APLZL" | SAPLCOZF SAPLMG26 SAPLSDCL SAPLCOZF ZVADOR01 | 16.578 1.268 53.203 16.578 |
| ecorde Qualified 94.404 55 0 44.620 0 | d SQL St. # Qualified 25,73 189,66 0,00 22,15 0,00 | # Rows Re 26105,84 1090,91 0,00 31397,06 0,00 | s # Pages A 24.644.95 600 12.539 14.009.36 12 | #P Cache 24.597.82 600 12.539 13.929.84 12 | # Disk I/O 47.129 0 0 79.518 0 32 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "IP DELETE FROM "ON SELECT "MANDT" SELECT "KLFN1", SELECT /*+ FIRS" | , "AUFPL", "APLZL" MARD" WHERE "MAN IS_PH_PROP_CD1" , "AUFPL", "APLZL" "KSTBM", "KBETR" | SAPLCOZF SAPLMG26 SAPLSDCL SAPLCOZF ZVADOR01 CL_GM_OPEN_IT | 16.578 1.268 53.203 16.578 12.144 |
| ecorde Qualified 94.404 55 0 44.620 0 192.831 | d SQL St. # Qualified 25,73 189,66 0,00 22,15 0,00 100,00 | # Rows Re 26105,84 1090,91 0,00 31397,06 0,00 412,11 | S # Pages A 24.644.95 600 12.539 14.009.36 12 794.676 | #P Cache 24.597.82 600 12.539 13.929.84 12 794.644 | # Disk I/O 47.129 0 0 79.518 0 32 2 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "D DELETE FROM "DN SELECT "MANDT" SELECT "KLFN1", SELECT /*+ FIRS' SELECT * FROM "D | , "AUFPL", "APLZL", MARD" WHERE "MAN, IS_PH_PROP_CD1", , "AUFPL", "APLZL", "KSTBM", "KBETR", T_ROWS (1) */ "BS. | SAPLCOZF SAPLMG26 SAPLSDCL SAPLCOZF ZVADOR01 CL_GM_OPEN_IT SAPLBSVA | 16.578 1.268 53.203 16.578 12.144 1.286 |
| ecorde Qualified 94.404 55 0 44.620 0 192.831 220 | d SQL St. # Qualified 25,73 189,66 0,00 22,15 0,00 100,00 2000,00 | # Rows Re. 26105,84 1090,91 0,00 31397,06 0,00 412,11 1446,82 | x Pages A 24.644.95 600 12.539 14.009.36 12 794.676 3.183 | #P Cache 24.597.82 600 12.539 13.929.84 12 794.644 3.181 | # Disk I/O 47.129 0 0 79.518 0 32 2 3 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "D SELECT * FROM "D SELECT "KLFN1", SELECT * FROM "D SELECT * FROM "D SELECT * FROM "D | , "AUFPL", "APLZL", MARD" WHERE "MAN, IS_PH_PROP_CD1", , "AUFPL", "APLZL", "KSTBM", "KBETR", T_ROWS (1) */ "BS, ISTO" WHERE "MAN, | SAPLCOZF SAPLMG26 SAPLSDCL SAPLCOZF ZVADOR01 CL_GM_OPEN_IT SAPLBSVA SAPLBSVA | 16.578 1.268 53.203 16.578 12.144 1.286 5.029 |
| ecorde Qualified 94.404 55 0 44.620 0 192.831 220 20 | d SQL St. # Qualified 25,73 189,66 0,00 22,15 0,00 100,00 2000,00 1000,00 | # Rows Re. 26105,84 1090,91 0,00 31397,06 0,00 412,11 1446,82 1600,00 | # Pages A 24.644.95 600 12.539 14.009.36 12 794.676 3.183 320 | #P Cache 24.597.82 600 12.539 13.929.84 13.929.84 12 794.644 3.181 317 | # Disk I/O 47.129 0 0 79.518 0 32 2 2 3 49 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "D SELECT "MANDT" SELECT "KLFN1", SELECT /*+ FIRS' SELECT * FROM "D SELECT * FROM "D SELECT * INTO ?, | , "AUFPL", "APLZL" MARD" WHERE "MAN. IS_PH_PROP_CO1" , "AUFPL", "APLZL" "KSTBM", "KBETR" T_ROWS (1) */ "BS ISTO" WHERE "MAN ISTO" WHERE "MAN | SAPLCOZF SAPLMG26 SAPLSOCL SAPLSOCL ZVADOR01 CL_GM_OPEN_IT, SAPLBSVA SAPLBSVA SAPLSWOR | 16.578 1.268 53.203 16.578 12.144 1.286 5.029 5.029 |
| ecorde 94.404 55 0 44.620 0 192.831 220 20 80 | d SQL St. # Qualified 25,73 189,66 0,00 22,15 0,00 100,00 2000,00 1000,00 91,95 | # Rows Re 26105,84 1090,91 0,00 31397,06 0,00 412,11 1446,82 1600,00 286,25 | # Pages A 24.644.95 600 12.539 14.009.36 12 794.676 3.183 320 229 | #P Cache 24.597.82 600 12.539 13.929.84 13.929.84 12 794.644 3.181 317 180 | # Disk I/O 47.129 0 0 79.518 0 32 2 2 3 49 | Abbreviated SQL S SELECT "MANDT" SELECT * FROM "D SELECT "ROM "D SELECT "KLFNI", SELECT * FROM "D SELECT * FROM "D SELECT * FROM "D SELECT * FROM "D SELECT * INTO ?, SELECT "LASTDAT | , "AUFPL", "APLZI" MARD" WHERE "MAN IS_PH_PROP_CD1", "KSTBM", "KBETR" T_ROWS (1) */ "BS ISTO" WHERE "MAN ISTO" WHERE "MAN ?,?,?,?,?,?,?,?,?,?, | SAPLCOZF SAPLMG26 SAPLSDCL SAPLSDCL ZVADOR01 CL_GM_OPEN_IT SAPLBSVA SAPLBSVA SAPLSVA SAPLSVA SAPLSTXBE | 16.578 1.268 53.203 16.578 12.144 1.286 5.029 5.029 10.942 |

As of SAP MaxDB version 7.9 the ressource monitor is always active. You can search for the SQL command logged in RUNNING_COMMANDS. Please notice that the DBACockpit does not display all commands Of SharedSQL. Please check first the number of commands stored in SharedSQL with

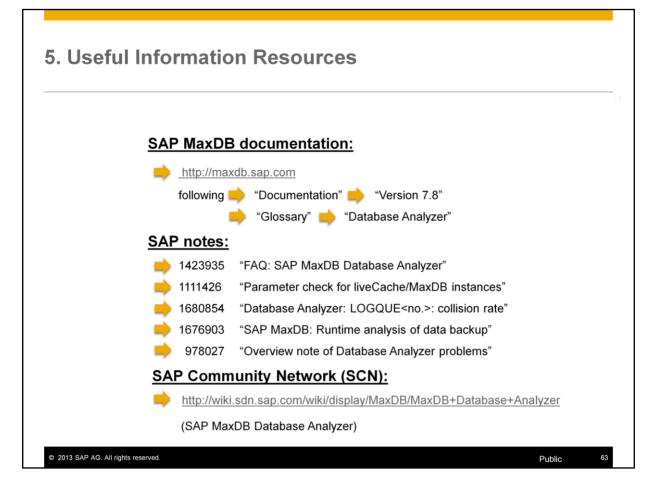
Select count (*) from commandstatistics and insert the result into the resource monitor Number of Statements and Refresh Monitor Display first before you search for the SQL command string.

When the command string can be found you 'll get the Report name where this command has been executed the first time.

Agenda

- 1. Introduction
- 2. Functional chain
- 3. Ways to manage Database Analyzer
- 4. Parameter check with Database Analyzer
- 5. Expert analysis
- 6. Useful Information Resources





Questions

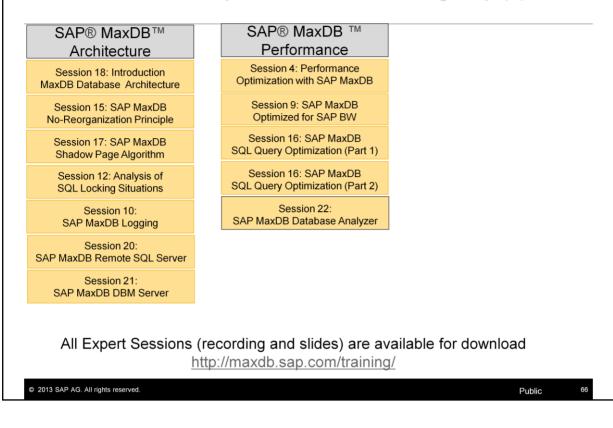
SAP® MaxDB™ Database Analyzer



SAP® MaxDB[™] – Expert Sessions Learning Map (1) SAP® MaxDB ™ SAP® MaxDB ™ SAP® MaxDB ™ Features Administration Problem Analysis Session 2: Basic Administration Session 1: Low TCO with the Session 5: with Database Studio SAP MaxDB Data Integrity SAP MaxDB Database Session 3: CCMS Integration Session 6: New Features in Session 14: SAP MaxDB Version 7.7 into the SAP System SAP MaxDB Tracing Session 8: New Features in Session 11: SAP MaxDB Session 12: Analysis of SAP MaxDB Version 7.8 **Backup and Recovery** SQL Locking Situations Session 13: Third-Party **Backup Tools** Session 19: SAP MaxDB Kernel Parameter Handling SAP® MaxDB ™ Installation/Upgrade Session 7: SAP MaxDB Software Update Basics All Expert Sessions (recording and slides) are available for download http://maxdb.sap.com/training/ © 2013 SAP AG. All rights reserved. Public 65

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SAP[®] MaxDB[™] – Expert Sessions Learning Map (2)



Thank You! Bye, Bye – And Remember Next Session

| | Feedback and further information: http://www.sdn.sap.com/irj/sdn/maxdb | |
|-----------------------------------|---|----|
| | | |
| | Next Sessions: follow in 2014 | |
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Thank you

Contact information:

Christiane Hienger Development Expert IMS Christiane.Hienger@sap.com

Bettina Laidler Senior Developer IMS Bettina.Laidler@sap.com