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Volume Testing for SAP BW

Best Practice for Solution Management

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The newest version of this Best Practice can always be obtained through the SAP Solution Manager or the SAP Service Marketplace.

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Applicability, Goals, and Requirements

To ensure that this Best Practice is the one you need, consider the following goals and requirements:

Goals of Using this Service

This Best Practice is intended to provide you with particular information for volume testing with focus on SAP BW. To get familiar with a generic best practice on volume testing, refer to the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*. There, you find a generic guideline how to plan, set up, run, and evaluate a volume test – independently of the product(s) subject to volume testing.

This Best Practice is organized in the same way as the one for the generic volume testing. If an aspect of your volume test is not product-specific, we refer to the corresponding section in the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*, which is available on the SAP Service Marketplace: <http://service.sap.com/~sapidb/011000358700006468662006E>

Alternative Offering

SAP experts deliver this Best Practice in the framework of the Solution Management Optimization (SMO) service, known as the SAP Volume Test Optimization. This service covers three stages: review of the volume test plan, monitoring of the volume test and reporting of the test results. For further details concerning this service, refer to SAP Service Marketplace (<http://service.sap.com/vto>).

Staff and Skills Requirements

Refer to the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*.

System Requirements

For generic requirements, refer to the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*

Particular note for BW: A BW landscape for testing purposes can be realized via a database copy. For details, see SAPNote 886102 and the notes referenced therein.

Duration and Timing

For generic requirements, refer to the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*

How to Use this Best Practice

Read the whole document prior to the project start. Then, use it to guide you through the different steps of the project.

Important steps in this document are illustrated with a hypothetical company performing a volume test according to SAP recommendations. The example is presented in boxes such as this one.

Best Practice Procedure and Verification

Preliminary Tasks

For a detailed description of preliminary tasks to be done prior to running the volume test, see the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*.

Procedure – Roadmap for Volume Tests

Plan Volume Test Project

For recommendations regarding the planning phase of volume test projects, see section *Plan volume test project* in the Best Practice *Volume Testing for SAP Solutions – Generic Procedure*.

Define Test Scenarios and Requirements

Establish Test Scenarios and Load Profile

Introducing our hypothetical example: HopN'Malt GmbH is a German company that analyzes its business data using SAP BW, uploading the data from R/3 or from flatfile and using Business Explorer and/or BEx Web Applications for reporting.

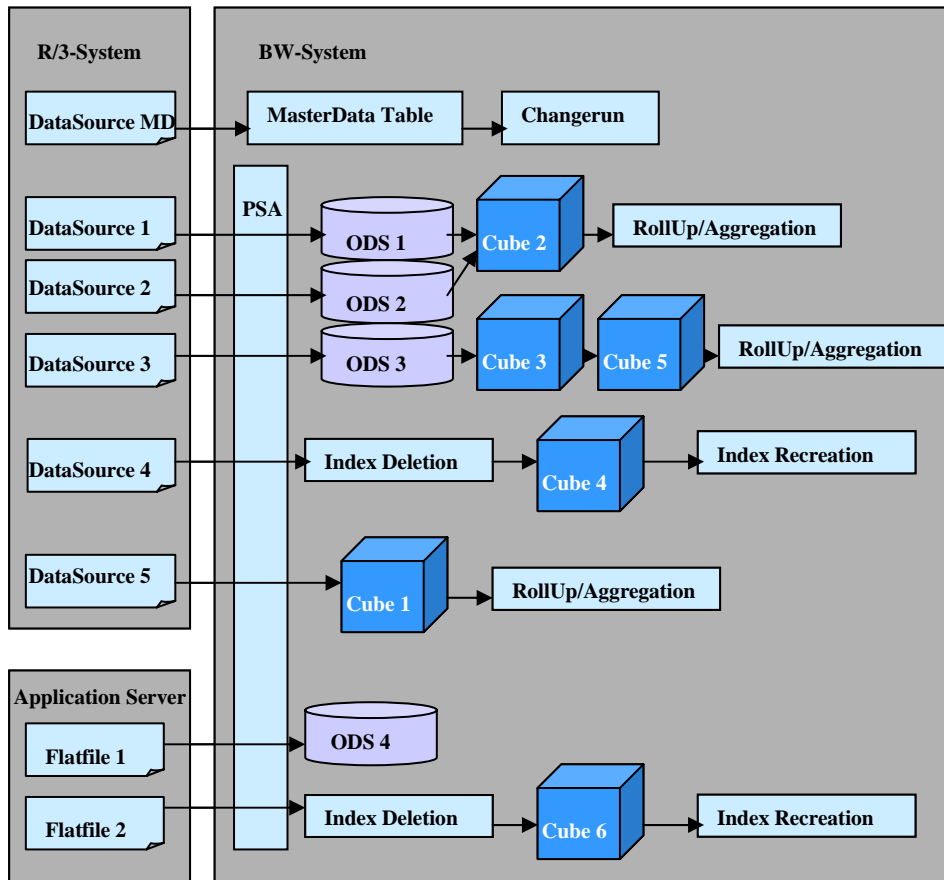
During the implementation phase, the company had a GoingLive Analysis session performed by SAP where many parameter recommendations were given, and these are now implemented into the systems. An integration test was performed to ensure that all customized business steps are consistent. As part of the GoingLive Optimization session, the business steps were tuned to show an optimum response time in single user mode.

Before the planned production start date, the responsible IT managers at HopN'Malt want to ensure that the system will work successfully within the constraints of the planned load and time schedule. Therefore, they set up a HopN'Malt Volume Test project.

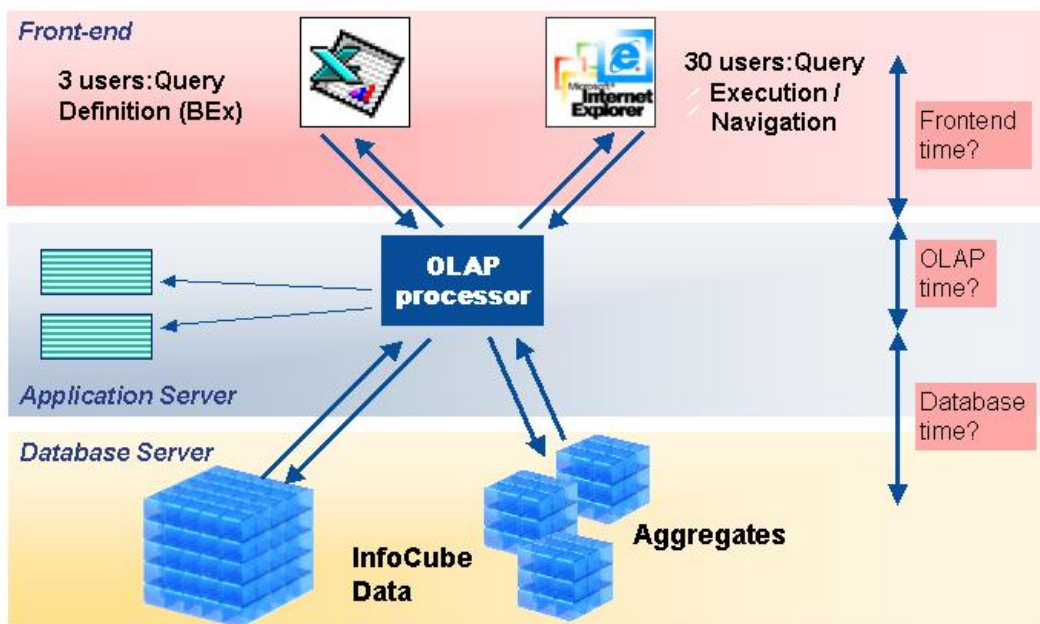
Select Business Processes for the Test

HopN'Malt GmbH orders a Solution Management Assessment service (SMA) as part of SAP's Safeguarding Program. One of the essential parts of the service is the determination and documentation of the main business processes. For HopN'Malt, two main processes are upload and reporting.

Upload Scenario



Reporting Scenario



Identify Dependencies Between Different Process Steps

Refer firstly to Best Practice *Volume Testing for SAP Solutions – Generic Procedure*.

For the **BW upload-scenario**, in particular, make sure that your processes do not interfere with each other, that is, that no aggregate roll-up locks a changerun.

Load Profile

Regarding the generic methodology to establish a load profile for the volume test, see Best Practice *Volume Testing for SAP Solutions – Generic Procedure*.

The load profile for our BW scenario may look as follows:

Upload Scenario:

<i>Business step</i>	<i>Number of data records per day</i>	<i>Processing time window</i>	<i>Frequency</i>	<i>Dialog / Batch process</i>
<i>Master DataUpload</i>	500.000	21:00 – 22:00	Daily	Dialog
<i>Changerun</i>	500.000	22:00 – 23:00	Daily	Batch/Dialog
<i>Upload DS1 – ODS1</i>	1.000.000	23:00 – 1:00	Daily	Dialog
<i>Upload DS2 – ODS2</i>	1.200.000	23:00 – 1:00	Daily	Dialog
<i>Upload DS3 – ODS3</i>	700.000	23:00 – 1:00	Daily	Dialog
<i>UploadODS1 – Cube2</i>	1.000.000	1:00 – 3:00	Daily	Dialog
<i>Upload ODS2 – Cube2</i>	800.000	1:00 – 3:00	Daily	Dialog
<i>Upload ODS3 – Cube 3</i>	900.000	1:00 – 3:00	Daily	Dialog
<i>Upload Cube3 – Cube5</i>	400.000	3:00 – 4:00	Daily	Dialog
<i>RollUp/Aggr. Cube2</i>	1.000.000	3:00 – 4:00	Daily	Batch
<i>RollUp/Aggr. Cube5</i>	400.000	4:00 – 5:00	Daily	Batch
<i>Index Deletion Cube4</i>	-	22:00 – 23:00	Daily	Batch
<i>Upload DS4 – Cube4</i>	2.500.000	23:00 – 5:00	Daily	Dialog
<i>Index Recreation Cube4</i>	-	5:00 – 6:00	Daily	Batch
<i>Upload DS5 – Cube1</i>	450.000	23:00 – 0:00	Daily	Dialog
<i>RollUp/Aggr. Cube1</i>	450.000	0:00 – 1:00	Daily	Batch
<i>Upload Flatfile1 – ODS4</i>	600.000	23:00 – 1:00	Weekly	Dialog
<i>Index Deletion Cube6</i>	-	23:00 – 00:00	Weekly	Batch
<i>Upload Flatfile2 – Cube6</i>	500.000	00:00 – 1:00	Weekly	Dialog
<i>Index Recreation Cube6</i>	-	1:00 – 2:00	Weekly	Batch

Reporting Scenario:

The sales managers would like to know the sales figures for different sales areas in their responsible areas. Additionally they would like to obtain detailed information about previous sales to a specific customer. To obtain the necessary information, a predefined query with variable selections is started for the sales figures. In the financial department, several reports for evaluations are launched all over the office hours. Many of these reports are more time consuming due to included hierarchy structures on characteristics.

<i>Business step</i>	<i>Number of selected characteristics/ keyfigures</i>	<i>Processing time window</i>	<i>Peak time window</i>	<i>Number of users for query execution</i>	<i>Max. response time</i>	<i>Online / Background</i>
<i>Query sales report</i>	20	09:00 – 18:00	09:00 – 11:00	30	20 sec	Online
<i>Query costcenters</i>	25	09:00 – 18:00	15:00- 17:00	25	15 sec	Online
<i>Account movements</i>	15	09:00 – 18:00	09:00 – 12:00	20	10 sec	Online
<i>Profit/Loss statements</i>	40	09:00 – 18:00	14:00 – 18:00	5	30 sec	Online
.....					

Work out a 24-hours time-grid showing the planned execution time-windows and associated processing volumes for each business step involved in the test. Identify all load scenarios that may differ from this model. The test scenarios that are noncritical or already included in another scenario can be neglected. Lastly, arrange the different test scenarios in a way that is most suitable for the dialog users and the system administrators who have to schedule or start the background jobs.

For the selected business steps, a timetable is created and the different load and reporting scenarios are determined. Easy situations are now separated from the complex ones. Peaks and potential bottlenecks become clearly visible.

Time from 0 to 24	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Master Data Upload																									
Changerun																									
Upload DS1 - ODS1																									
Upload DS2 - ODS 2																									
Upload DS3 - ODS3																									
Upload ODS1 - Cube2																									
Upload ODS2 - Cube2																									
Upload ODS3 - Cube3																									
Upload Cube3 - Cube5																									
RollUp/Aggr. Cube2																									
RollUp/Aggr. Cube5																									
Index Deletion Cube4																									
Upload DS4 - Cube4																									
Index Recreation Cube4																									
Upload DS5 - Cube1																									
RollUp/Aggr. Cube1																									
Upload Flatfile1 - ODS4																									
Index Deletion Cube6																									
Upload Flatfile1 - Cube6																									
Index Recreation Cube6																									
Query sales report																									
Query costcenters																									
Query Account movements																									
Profit/Loss statements																									
Printing																									
Other reports																									

At the end of the preparation phase, the “HopN'Malt Volume Test” project team has collected all information about the relevant business steps, the critical success factors and set up a test plan with two test scenarios. Before the test execution starts, the business owners for Upload and Reporting as well as the responsible managers met to approve the test plan. For each process step, the approved values were as follows:

Upload Scenario, Upload ODS1 – Cube2

	Value
Business step	Upload ODS1 – Cube2
Number of data records per day	1.000.000 data records
Processing time window	1:00 – 3:00
Frequency of execution	Daily (Monday – Friday)
Dialog / batch process	Dialog
Critical success factors	Max. processing time for this upload: 2 hours
Interference with other business steps	Not expected
Preparation of realistic test data	Done

Reporting scenario, Report ZSALES/AREAS

	Value
Business step	ZSALES/AREAS, full hierarchy drilldown
Number of data records per execution	1.000
Processing time window	9:00 – 17:00
Frequency of execution	Daily (Monday – Friday)
Dialog / batch process	Dialog
Critical success factors	Max. processing time: 25 sec with 15 users
Interference with other business steps	Not expected
Preparation of realistic test data	Done

Determine Requirements for Test Landscape (Sizing or Configuration or Test Data)

For basic recommendations, see Best Practice *Volume Testing for SAP Solutions – Generic Procedure*.

Implement Test Environment

For basic recommendations, see Best Practice *Volume Testing for SAP Solutions – Generic Procedure*. In the following, you find recommendations particular for BW volume tests.

Prepare Data Basis

If you are planning to go live with both a new SAP R/3 and SAP BW system, the R/3 system will not contain any data, which could be uploaded to BW. We recommend, splitting the volume test in two parts: a volume test for the R/3 system alone, where some transactional data will be generated; and a second testing phase for the BW integration with R/3.

Most likely several delta-DataSources are used for uploads to BW. If daily delta-uploads are to be tested (not the initial data-uploads), the initial uploads for each delta-DataSource in the test system should be already completed before you perform the volume test.

Check the load-situation on the R/3-system(s): Is there a high resource-consumption even without the BW-extraction-jobs? We recommend using additional sizing for the normal R/3 load and the additional BW load.

Implement Test Tools

Implement Load Generators

For the BW upload volume test you do not need a high number of users or a test tool. The upload processes and other processes like roll-up and changerun can be scheduled via process chains in BW. If the R/3 system does not contain any data to upload to BW yet, the upload can be performed from flat file. This scenario has the constraint that you can only monitor the BW-side of the upload process; you cannot make any estimation about the R/3 system behavior.

There are two ways for the load simulation in reporting:

- a) Manual test approach
- b) Automated test approach

During the manual test approach several power users simulate different users. Opening several sessions, for example, in transaction RSRT, the power users launch a report with a predefined selection (variant) in the system and simulate load from different users. The reports are launched in a predefined time sequence (for example, 10 seconds) and simulate an increasing load as during a peak. Alternatively query traces, which have been recorded, are restarted in transaction RSRCATTRACE. During the execution of CATT trace statistical data is recorded too. CATT trace is limited to run and repeat several reports in parallel.. An ABAP program might be added for automated start using function module RRX_TRACE_RFC_J10. Contact your SAP consultant for details.

An automated test approach uses a third party tool, for example, Mercury Load runner. The eCATT test tool, which is delivered with Web Application Server 6.20 onwards, is not yet suitable for a reporting volume test. An economical alternative to a third party tool is the use of the SAPGUI Script interface. This interface enables you to record and to run already designed scripts. Within these scripts parameters can be defined to control the execution and to simulate different load scenarios, for example, reports are launched automatically in a predefined time frequency, whereby the amount of reports is steadily increasing. SAP offers a service for volume test, starting from the project preparation to volume test execution until forward planning. Please see details under the link <http://www.sap-retail.de/services/tmc/index.asp>

The action plan defines when and how often the reports are launched to increase the load on the system gradually.

Implement or Setup Monitoring Tools

SAP Components: For monitoring the components of the SAP components of your solution, refer to the next section. There, you find details regarding performance monitoring of R/3 application servers and interfaces. The monitors base on the Computing Center Management System (CCMS, transaction RZ20), which is available on each SAP system.

To monitor the CPU and RAM utilization of servers without SAP Basis, such as stand-alone database servers, remote SAPOSCOL needs to be installed on that server. This allows monitoring from within an SAP application server (see SAP Note 436186 and 20624).

Alternatively shell or batch script in the operating system level can be programmed and applied to collect additional information from CPU, Memory and IO activities in more detail and frequently.

Non-SAP Components: In case that you require performance key figures for non-SAP components of your solution make yourself familiar with the respective monitoring applications.

Monitoring on Operation System Level: Each operation system provides you with tools for performance monitoring. Since the SAP CCMS does not have access to all possible important performance key figures on OS level, we recommend you to make yourself familiar with the OS performance monitoring tools and to employ them for detection of bottleneck situations.

Technical Preparation for Assistance from SAP

If you need assistance from SAP during the volume test (as mentioned in the ***Alternative Offering*** in sub section above), ensure that the following connections are available through SAPNet Frontend and that suitable user IDs and passwords have been created:

- R/3 Support connection to the R/3 and BW system
- BW RFC and BW GUI for reporting to the BW System
- Optional: TELNET or PCANYWHERE Connection

Additionally, the remote SAPOSCOL must be installed on each server without SAP Basis (for example, the stand-alone database server), to allow monitoring of the CPU and RAM utilization from an SAP application server (see SAP Note 20624 and 436186). Alternatively shell or batch script in the operating system level can be programmed and applied or commercial monitoring tools can be used to collect additional information of CPU, Memory and IO activities in more detail and frequently.

Make sure that the SAP Collector for Performance Monitoring is switched on. This tool collects the data, which is shown in transaction ST03.

The statistics for InfoProviders have to be switched on (Transaction RSA1 – Tools – BW statistics for InfoProviders). Set the flag WHM for the InfoProviders where data is loaded to and the flag OLAP for the InfoProviders where the reports are defined on. Only InfoProviders with active statistics are recorded and evaluated in ST03.

Make sure that you have activated database-specific tools for performance monitoring.

Run Test and Evaluate

Run Volume Test and Monitor

General Monitoring in BW

Current System Activity: The main tools for monitoring the current system activity are the Global Work Process Overview (SM66) and the Local Work Process Overview (SM50) in combination with SAP Server Overview (SM51). Continuously monitor the status of the work processes. Look for resource competing processes. Make a note of aspects such as the following:

- Are there always free work processes available (that is, work processes with status 'waiting')?
- Are there work processes in status 'stopped'? If so, see column 'Reason'.
- Are there work processes in status 'terminated'?
- For work processes in status 'running': See column 'Action/Reason for waiting' for the current activity.
- Are there work processes waiting for database locks?
- Are there work processes waiting for semaphores?
- Are there work processes in PRIV mode?

The CPU and RAM utilization of each server involved in the volume test needs to be monitored.

CPU: The hourly average CPU utilization can be obtained from the Operating System Monitor (ST06 or OS07) after the test. Additionally, the CPU utilization should be monitored periodically during the volume test to be able to identify temporary CPU bottlenecks that level out within the hourly average.

RAM: The hourly average RAM utilization (paging rates) can be obtained from the Operating System Monitor (ST06 or OS07) after the test. Additionally, the RAM utilization (paging rates) should be monitored periodically during the volume test to be able to identify temporary RAM bottlenecks that level out within the hourly average.

For each SAP application server of the OLTP-R/3 System and the BW System, the following key figures need to be monitored:

- Response times and memory utilization of the programs and transactions that implement relevant business process steps
- Utilization of SAP shared buffers and SAP memory
- Number of active users.

Continuous monitoring is required to detect lock wait situations and to keep an overview of the current system activity while the volume test is in progress.

SAP Shared Buffers: Snapshot data about the utilization of SAP shared buffers can be obtained from the SAP Memory Configuration Monitor (ST02) after the test. Immediately after each test scenario, make a note of all buffers that have swapped.

SAP Memory: Snapshot data and high water marks of SAP memory utilization (extended or roll or paging or heap memory) can be obtained from the SAP Memory Configuration Monitor (ST02). Make a note of the high water marks after each test scenario.

Number of Active Users: The number of active users can be obtained from the Global User Monitor (AL08). Make a note of the number of interactive users and RFC users during each test scenario.

Database Locks: Snapshot data about exclusive wait situations for database locks can be obtained from the Database Lock Monitor (DB01). If exclusive database lock waits occur, document the locked object, lock holder (program/transaction) and lock waiter (program/transaction).

Database Performance: Snapshot of data buffer/cache quality, SQL cache catalog/pin ratio (ST04). For further detailed analysis, click button *Detail Analysis Menu* on ST04. Prerequisite: to get exact snapshot information from ST04, reset the counter by clicking button *Reset Counter* once before volume test start.

To deepen the analysis, use the appropriate detail monitor, for example, the Database Monitor (ST04), Database Lock Monitor (DB01), Operating System Monitor (ST06), and SAP Memory Configuration Monitor (ST02).

Errors: After the volume test, investigate the System Log (SM21) for error messages and warnings that indicate potential functional or stability problems. Additionally, check for ABAP dumps (ST22) that occurred during the volume test.

Load: For each test scenario, measure the actual system load (for example, the number of active users, and number of data records processed). Compare this data with the load planned for the volume test.

During the volume test, if you encounter single processes, which are too slow, analyze them in more detail when the volume test is over using performance or ABAP traces. Pay attention to own-defined routines in transfer- and update-rules. **In general, single process tuning should already be completed before the volume testing.**

Performance Trace: Transaction ST05 (SQL Trace, Enqueue Trace, RFC Trace) can be used to detect long database accesses, long RFC times or long waiting times for enqueue. The performance trace has to be switched on in BW and in the relevant sourcesystem. Make sure that you specify the correct user: The data-extraction in the sourcesystem is not done by the user-ID who starts the upload, but by a specific extraction-user-ID (mostly user ALEREMOTE). Make sure that no other extraction is running on the sourcesystem during the trace.

ABAP Trace: If time elapses, an ABAP trace (SE30) helps to narrow down performance problems mainly in ABAP.

Analysis and Repair of BW Objects: The Analysis and Repair of BW Objects (RSRV) helps to analyze DB parameters, Indices and Statistics of Aggregates. This may be of use if the data-activation in the InfoProviders takes a long time.

Monitoring SAP Upload Scenario

For the BW Upload scenario it is important that the above mentioned general monitors are checked not only in the BW-system, but also in all sourcesystems where the data is loaded from.

Additionally, the following monitors and tools are important for the BW Upload scenario:

Process Chain Overview: For the application-sided analysis of the processes executed via process chain you can use the Process Chain Overview (RSPC). Here you have an overview about the progress of your test scenario and which processes are taking place at the moment. You see an overview about the process-steps completed so far for each process. From here, you can jump to more detailed monitors of single processes or to the job-log of the processes.

Open Hub Monitor: For problems with Open Hub Service and InfoSpokes you can use the Open Hub Monitor. Similar to the Upload Monitor the Open Hub Monitor shows the progress of each request and the single process steps.

Extractor Checker: The Extractor Checker (RSA3) in the sourcesystem helps to analyze extraction problems in the SourceSystem.

Simulation within the Upload Monitor: The Simulation within the Upload Monitor is a simple tool for the debugging of transfer- or update-rules.

Upload Monitor: To have an overview about all upload-processes running on your BW-system, you should use the Upload Monitor (RSMO). In the detail-monitor of each request (upload-process) the progress of this upload and the single process-steps are shown. Look for the time that is spend for

- Extraction
- Transfer to PSA
- Processing of the transfer-rules
- Processing of the update-rules
- Data-Activation in the InfoProviders

Changerun Monitor: For problems with changeruns you can use the Monitor for changeruns (transaction CHANGERUNMONI).

Monitoring the SAP Reporting Scenario (Statistical Data)

The average response time is not a highly representative value for performance measurement in BW, because the structure of a query and design of the corresponding InfoProvider strongly influences the runtime and therefore the response time. For each query the OLAP processor collects statistical data from several levels that have to be analyzed:

- Statistical data for the activities on database level (for example, database time, number of rows selected, number of rows transferred, ...)
- Statistical data for activities on the application server (for example, OLAP init time, OLAP time, number of cells...)
- Statistical data for activities on the frontend (for example, frontend time, ...)

Negative influences on the OLAP/WHM performance are not noticed yet.

If BW statistics switched on for InfoCubes, tables RSDDSTAT* are filled. If you use RSRT in *Debug-Mode* and you set the flag *Display Statistics Data*, the tables RSDDSTAT* are filled for ODS objects too.

OLAP Cache Monitor: If the performance of database should be part of the volume test, the OLAP Cache has to be deactivated. User transaction RSCUSTV14 and set flag for deactivation.

Workload Monitor: In this transaction you get an overview of current data, but summarized (not on detailed level anymore). Start the workload monitor with transaction ST03(N) and choose the Expert Mode. Select BIW system load and choose a time frame (for example, ST03n >> change to *Expert mode >> Detailed Analysis >> BW System Load >> Last Minute's Load*). In the analyze view you can evaluate reporting data according to the runtime or to a hit list. For more detailed statistics of each transaction/report, highlight the transaction/report you want to drilldown and click button *Single Records*; double-click the transaction/job name for single records detail.

Table RSDDSTAT: In this table all statistical data regarding the OLAP is stored (if statistics for the relevant InfoProviders are switched on). This table allows a thorough performance monitoring up to each navigational step of a query.

Use the number given in table RSDDSTAT to calculate specific quotes, for example:

- DB proportion : QTIMEDB / QRUNTIMECATEGORY
- OLAP proportion : QTIMEOLAP / QRUNTIMECATEGORY
- Client proportion : QTIMECLIENT / QRUNTIMECATEGORY

If a proportion is significantly higher than the others, check specific settings. Details can be found in OSS note 130696.

Evaluate Test Results

The result of the volume test is the determination whether the hardware is sufficient to handle the expected system load and – at the same time – the comparison of measured and required performance according to the critical success criteria. Keep in mind that the memory consumption in a BW-system is generally higher than in a normal OLTP-system. The following section describes some rules of thumb you can use to evaluate the results of the volume test from the monitored values.

R/3 and BW Application Servers

Maximum CPU utilization: For each measurement of the hourly CPU utilization sum up the CPU utilization by user and system and enter the maximum value as 'Max. CPU utilization [%]'.
CPU rating: If the average CPU load increases to more than 70%, some CPU wait situations may occur. An average CPU load of more than 90% clearly indicates a CPU bottleneck situation.

Memory used:

1. Calculate an upper limit for the maximum memory usage MaxMemUsage1 as the sum of memory used by SAP shared buffers, SAP work processes and users contexts. An upper limited for the memory used by user contexts is calculated by adding up the maximum usage of main memory for SAP Roll Memory, SAP Paging Memory, SAP Extended Memory and SAP Heap Memory.
2. Calculate an upper limit for the maximum memory usage MaxMemUsage2 as the sum of RAM [MB] and the maximum paging rate measured within the hourly average. Note that you have to take the page-out rates for UNIX servers and the page-in rates for Windows servers.
3. Enter the minimum of MaxMemUsage1 and MaxMemUsage2 as 'Memory used [MB]'.

Maximum paging: Based on the measured hourly paging rates, enter the value for 'Max. Paging [% of RAM]'.

Memory rating: The memory usage should be less than 125-150% of the RAM size. The hourly paging rates should be less than 25% of the RAM size. A memory usage of more than 150% of the RAM size or paging rates of more than 50% of the RAM size indicate a memory bottleneck.

SAP Memory usage:

Roll area: The maximum usage ('Max. used [KB]) of the roll area, configured as shared memory ('in memory [KB]'), should be less than 80%.







Paging area: The maximum usage ('Max. used [KB]) of the paging area ('In memory [KB]' + 'On disk [KB]') should be less than 80%

Extended Memory: The maximum usage ('Max. used [KB]) of the Extended Memory ('in memory [KB]') should be less than 80%.

Lock situations: Lock situations may occur in every system. The duration of the lock, the frequency of occurrence and the locked object type are of importance to judge whether and what actions should be taken.




HopN'Malt GmbH has performed all tests and monitored the parameters as defined. Lastly, the final report has to be written and the hardware and business process steps must be evaluated.

Maximum CPU and Memory Utilization

Server	Max. CPU utilization [%]	CPU Rating	RAM [MB]	Memory used [MB]	Memory used [% of RAM]	Max. Paging [% of RAM]	Memory Rating
Sapaix01	87		2048	2850	139	45	
Sapaix02	66		2048	1856	91	12	
Sapdb1	77		4096	3200	78	10	

From the monitored values, the hardware capacity was evaluated and has shown a possible bottleneck on server SAPAIX01, which could be avoided by redistributing load onto the other application server. The database server also shows a somewhat too high CPU utilization. Especially if the untested processes are taken into account, the hardware might not be sufficient.

Sales Order Reporting, Evaluation of sales areas

InfoProvider/Query	Critical success factor	Value required	Value observed	Rating
ZSALES/AREAS	Average response time initial screen	5 sec	4 sec	
ZSALES/AREAS	Reading entire sales area hierarchy	15 sec	22 sec	
ZSALES/MATERIAL1	Total frontend time	3 sec	25 sec	

For the InfoProvider ZSALES three critical performance criteria have been defined. The average response time of query ZSALES/AREAS for the initial screen should have an average value less than five seconds. When the hierarchy is expanded up to the lowest level, the time for reading all values should not exceed 15 seconds which is not met yet but not considered as critical. Regarding Query MATERIAL1, the time to prepare the result on the frontend fairly exceeds the internal benchmark.

Further Information

- Strategic motivation and project guidelines for volume testing are discussed in detail in *Project Handbook Load Testing and Performance Tuning* by George W. Anderson and Michael Mißbach, published by SAP Press (English edition 2003; revised German edition 2005).
- For performance tuning of SAP solutions, refer to *SAP Performance Optimization Guide* by Thomas Schneider, published by SAP Press (4th edition 2006).

Feedback and Questions

Send any feedback by formulating an SAP customer message (short description “Best Practice Volume Testing – Feedback”) to component SV-SMG-SER at <http://service.sap.com/message> in the SAP Service Marketplace.

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