FUJITSU

White Paper
FUJITSU Server PRIMERGY & PRIMEQUEST Benchmark Overview SAP SD Standard Application Benchmark

This document presents the SAP SD (Sales & Distribution) benchmark which is part of the SAP Standard Application Benchmark suite. The suite was developed and published by SAP in 1993 and maintained since to provide basic information for configuring and sizing of SAP systems and for platform comparisons.

This benchmark has become a de-facto standard and measures the maximum number of supported users satisfying a certain average dialog response time in a SAP Sales & Distribution scenario. It comes in a 2- or 3-tier flavour and a parallel version using multiple database nodes. The resulting data from benchmark runs are audited, certified and published by SAP and allow realistic comparisons between manufacturers and hardware architectures.

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2.1
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Contents

Document history

Version 1.0 (October 2003)

- First report version

Version 1.1 (April 2009)

- New layout

Version 2.0 (May 2009)

- Update of the benchmark with "SAP ERP 6.0 with Enhancement Pack 4"
- Minor corrections

Version 2.1 (February 2015)

- New layout
- Minor corrections

SAP Benchmarks – An overview

Since 1993 the SAP Standard Application Benchmarks have been developed by SAP to provide basic information for configuring, sizing and for platform comparison. The first benchmarks available (for SAP R/3 Release 1.1H) were targeted for FI (Financial Accounting), SD (Sales and Distribution), and MM (Materials Management) followed by ATO (Assemble-To-Order), PP (Production Planning), WM (Warehouse Management), BW (Business Information Warehouse) and now many more.

The SAP Benchmark Council (established in April 1995 and consisting of representatives of SAP as well as hardware, logo and technology partners involved in benchmarking) define and control the content of the benchmarks and establish rules that encompass the testing procedures. The procedures involve the hardware companies running most of the benchmarks and sending the results to SAP. On request SAP certifies the results.

A SAP Standard Application Benchmark consists of script files that simulate the most typical transactions and workflow of a user scenario. It has a predefined SAP client database that contains sample company data against which the benchmark is run. The benchmark transactions of each component usually reflect the data throughput of an installation (for example orders, number of goods movements, etc.). However benchmark transactions do not reflect reporting because the resource consumption of a customer-defined report depends on the volume of data sought and is therefore not comparable. An exception is the BW benchmark which is mainly (but well defined) reporting activity.

Application components are customized for a benchmark run in such way that the system resource requirements are minimized while still representing an economic reality. Comparable customizing settings (buffer sizes, number of work processes etc.) can be found in live customer installations that need high data throughput.

In general each benchmark user has his own master data such as material, vendor or customer master data to avoid data locking situations. For most benchmarks a maximum of 100 parallel benchmark users can be simulated per client. The multi-tier client/server architecture consists of a database, application and presentation layer. The presentation layer – in real life the PC's of the logged-in users – is handled by one (or occasionally more) machines dubbed 'benchmark driver(s)'. There is no way for the application layer to tell whether it is driven by real users or a simulation environment.
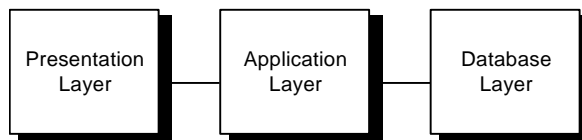

Figure 1: Multi-tier client/server architecture

Possible configurations for a benchmark simulation are:

a) 2-tier configuration architecture

Database and application layer reside on a single system – the simulation is driven by the presentation server (aka benchmark driver).
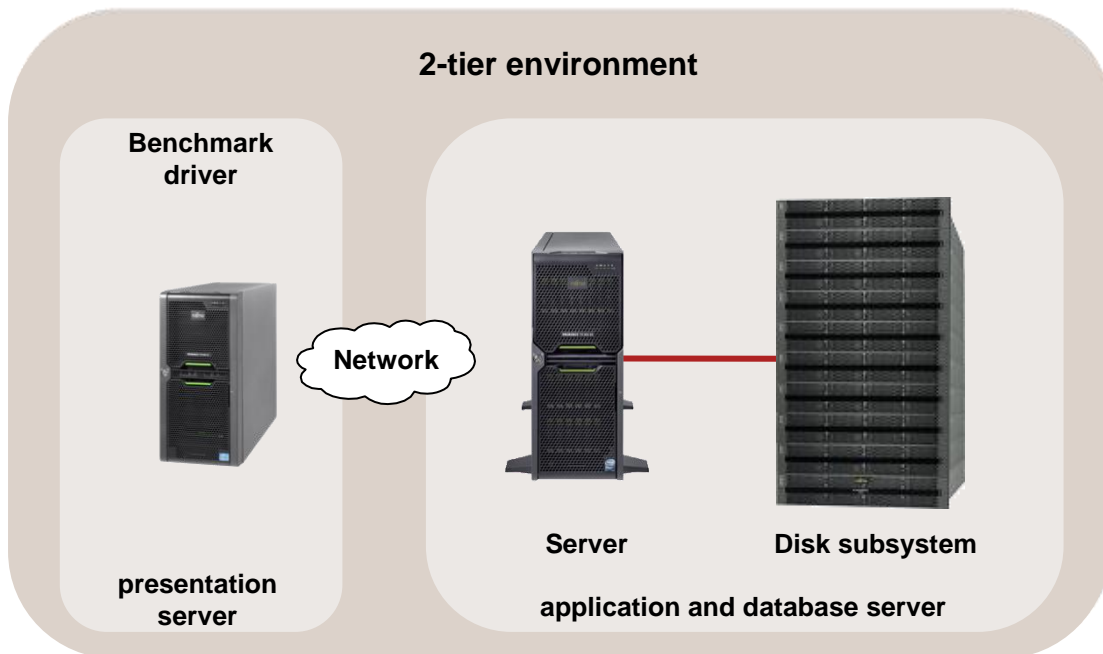

Figure 2: 2-tier configuration

b) 3-tier configuration architecture

Database and application layer reside on separate systems – the simulation is driven by a presentation server (aka benchmark driver).

Based on the architecture possible configurations are:

- 1 database server (or more - using parallel database techniques)
- n application servers with dedicated enqueue, update, message and dialog server
- n presentation servers (benchmark driver)

With such a configuration an impressive degree of scalability can be achieved.
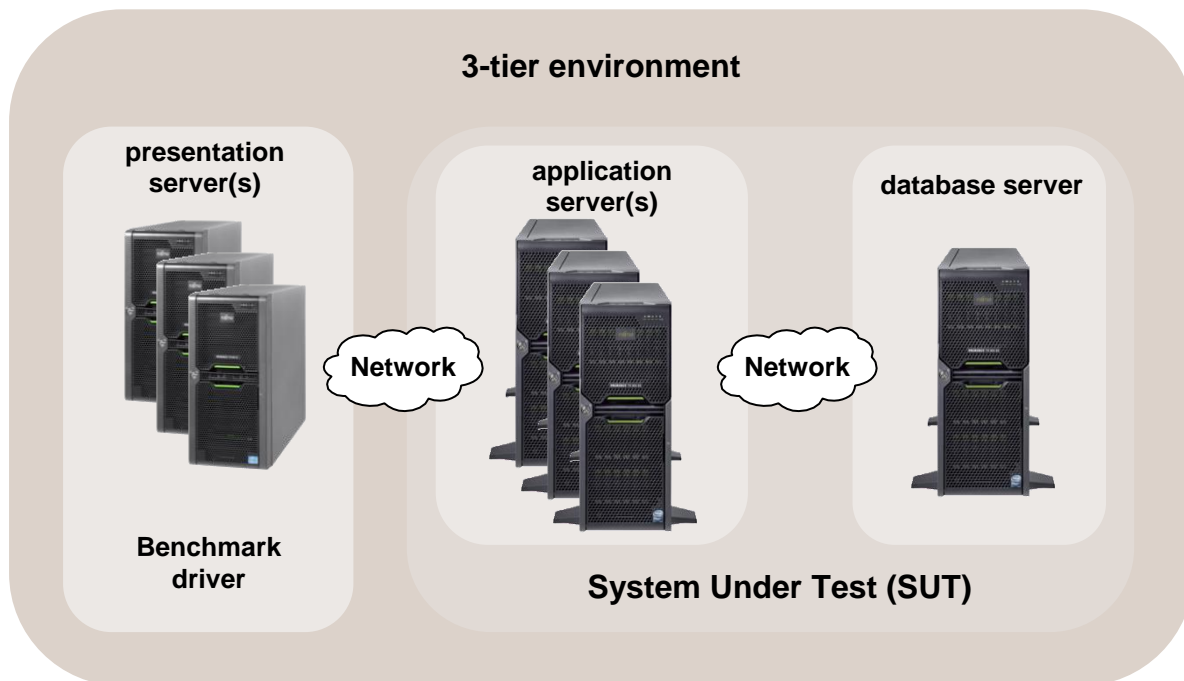

Figure 3: 3-tier configuration

The SAP Standard Application Benchmarks measure all performance relevant metrics such as database request times, wait times, CPU utilization, average dialog response times by a given number of benchmark users (with a fixed think time of 10 seconds between each dialog step) and the achieved throughput. The most significant parameters have to be part of every publication about SAP benchmarks initiated by the platform partners.

The following information must be part of a benchmark press release:

- The SAP® Business Suite component (e.g. "SAP ERP 6.0 with Enhancement Pack 4")
- RDBMS and Operating System release
- Tested standard SAP® Business Suite components (FI, PP, SD or a combination of these)
- Number of tested benchmark users (if applicable)
- Average dialog response time in 'n.nn sec' (if applicable)
- Achieved throughput in dialog steps / hour or business numbers such as "accounts balanced"
- Type of client/server configuration
- A detailed description of hardware configuration (type, size of main memory, average CPU utilization and function for all servers involved in the benchmark)
- Confirmation that the benchmark is certified by SAP (e.g. "This benchmark fully complies with SAP's issued benchmark regulations and has been audited and certified by SAP.")
- Reference where readers can get more information (e.g. "Details regarding this benchmark are available upon request from hardware partner or SAP AG").

SAP Benchmarks – Terminology

Benchmark Users and Average Dialog Response Time

A benchmark can only be certified if the average dialog response time is less than a fixed amount of time (think about it as system reaction time). More and more benchmark users are 'switched' to the system under test until the mean response time is outside the granted time frame.

Only SAP audited and certified benchmarks may be published by partners to ensure results that can be fairly compared with each other. A typical result would read like '2550 SD benchmark users with an average dialog response time of 0.96 seconds'.

Throughput Measurement in SAPS

SAP has defined a unit for measuring throughput in a SAP® Business Suite environment: **SAPS** (SAP Application Benchmark Performance Standard).

100 SAPS are defined as 2,000 fully processed business line items per hour in the standard SD application benchmark. This throughput is achieved by processing 6,000 dialog steps (screen changes) and 2,000 postings per hour in the SD benchmark or processing 2,400 SAP transactions.

In the SD standard benchmark 'fully business processed' means the full business workflow of an order line item (creating the order, creating a delivery note for this order, displaying the order, changing the delivery, posting a goods issue, listing orders and creating an invoice) has completed.

Benchmark Toolkit

In order to have a benchmark environment which enables fairly easy usage and reproducible results, a continuously maintained and updated toolkit is publicly available. It makes heavily use of perl scripts plus some standard C source code which is either precompiled by SAP or by the user for the specific target platform.

The Sales and Distribution (SD) benchmark

The Sales and Distribution benchmark is one of the most CPU consuming and memory demanding benchmarks available and has become a de-facto standard for SAP's platform partners and in the ERP (Enterprise Resource Planning) environment.

During the benchmark a defined sequence of business transactions are run through as shown in the table below. The Sales and Distribution (SD) benchmark covers a sell-from-stock scenario (including a customer order creation, the corresponding delivery with subsequent goods movement and creation of the invoice) and consists of the following SAP transactions:

Create an order with five line items (SAP transaction VA01)
Create a delivery for this order (SAP transaction VL01N)
Display the customer order (SAP transaction VA03)
Change the delivery (SAP transaction VL02N) and post goods issue
List 40 orders for one sold-to party (SAP transaction VA05)
Create an invoice (SAP transaction VF01)

Table 1: Dialog steps of the standard Sales & Distribution (SD) benchmark

Each of the simulated users repeats this series of transactions from the start to the end of a benchmark run. During the so-called ramp-up phase the number of concurrently working users is increased until the expected limit (e.g. 2550) is reached. When all users are active the test interval starts. This performance level must be maintained for at least 15 minutes (benchmark rule). After at least 5 minutes of the high load phase one or more database checkpoints must be enforced (i.e. all log file data is flushed back to the database within the high load phase) to stress the I/O subsystem in a realistic way (benchmark rule). At the end of the high load phase users are gradually taken off the system until none is active. When the test concludes all relevant data (some are gathered with a SAP developed Operating System monitor) are then transferred to the presentation server for further evaluation.
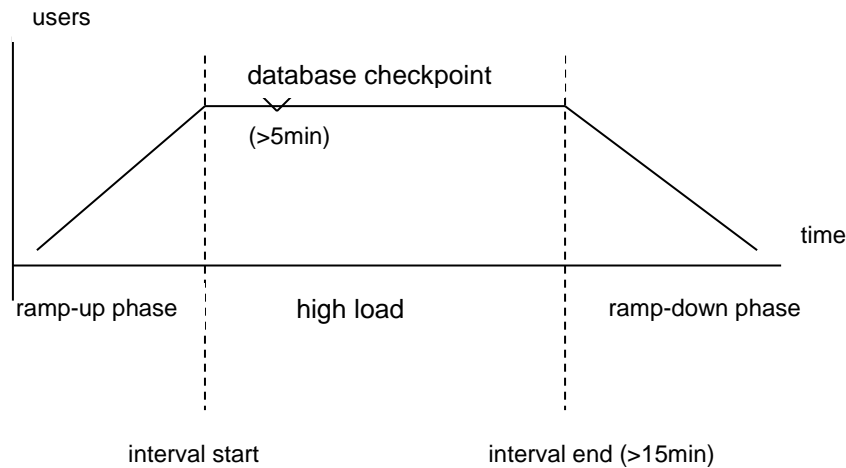
Figure 4: Benchmark run

Concluding remarks

Available now for over 20 years the CPU and memory demanding SAP SD benchmark has served well to demonstrate the strength or weakness of a hardware platform. SAP certified results will be published on SAP's web site (see Literature) and comprise information on machines (running the major SAP releases since Version 2), platform partner, SAP® Business Suite component and the number of benchmark users. Each of the tables contains basic information about the certified results. In line with SAP's full disclosure policy more detailed information about each result can be obtained from the respective hardware partner or SAP.

Literature

PRIMERGY & PRIMEQUEST Servers

http://www.fujitsu.com/fts/products/computing/servers/

PRIMERGY & PRIMEQUEST Performance

http://www.fujitsu.com/fts/x86-server-benchmarks

Benchmark descriptions

http://www.fujitsu.com/fts/products/computing/servers/primergy/benchmarks/benchmark-descriptions.html

This White Paper:

http://docs.ts.fujitsu.com/dl.aspx?id=0a1e69a6-e366-4fd1-a1a6-0dd93148ea10

http://docs.ts.fujitsu.com/dl.aspx?id=ae039b1d-73d8-4946-ae60-08dcef54cfa8

http://docs.ts.fujitsu.com/dl.aspx?id=ab13a8c0-44d8-40ee-9415-695d372e2e7b

SAP SD

http://www.sap.com/benchmark

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