

**IBM Information**  
On Demand

2008

>>> Comes To You



# DB2 Optimised for SAP Solutions

## Why customers choose/migrate to DB2 for SAP?

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### DATA MANAGEMENT

*DATA SERVERS, DATA WAREHOUSE  
AND DATA ARCHIVING (PRINCETON)*



### ENTERPRISE CONTENT MANAGEMENT

*INCLUDING FILENET PRODUCT PORTFOLIO*



### INFORMATION INTEGRATION & MASTER DATA MANAGEMENT

*PREVIOUSLY KNOWN AS ASCENTIAL,  
DWL, SRD & TRIGO.*



### BUSINESS INTELLIGENCE & PERFORMANCE MANAGEMENT

*COGNOS*

## Agenda

- **DB2/SAP Partnership**
- **Unique DB2 Features for SAP**
- **DB2/SAP Performance**
- **DB2/SAP Customer Experience**
- **Migration & Retraining Consideration**



# SAP runs DB2, IBM runs SAP



## The facts:

- IBM runs its business on SAP on DB2
- SAP is a very satisfied DB2 customer and runs more than 1200 systems on DB2
- SAP IT has strategically decided to use DB2 as its platform for business systems
- SAP develops applications on DB2

## Customer benefits:

- Massive DB2 deployment at SAP ensures best quality for both DB2 and SAP software
- SAP applications run best on DB2 from the very beginning
- Long term commitment from both SAP and IBM



# SAP is a DB2 Reference Customer

- **DB2 one of the main development platform for SAP**
  - Development & test systems for new & future releases:
    - SAP ERP 2005 / ECC 6
    - SAP CRM 5.0, SAP SCM 5.0
    - SAP NetWeaver BI, SAP NetWeaver MDM
  - Widely used across development and QA systems:
    - SAP ECC 5.0
    - SAP NetWeaver BI, Web Application Server (J2EE)
    - SAP Bank Analyzer
    - mySAP SCM
    - SAP R/3 Enterprise
- **Currently over 1,200 systems running on DB2**
- **SAP IT runs its business systems on DB2**
  - SAP IT is **an Oracle-Free zone**
    - HR@SAP runs on DB2/HP-UX with Unicode (migrated from Oracle)
    - CRM@SAP runs on DB2/Solaris platform (migrated from Oracle)
    - Upgraded R/3 to mySAP ERP 2005 on DB2/HP-UX with Unicode (migrated from Oracle)
    - Upgraded to BI 7.0 / NetWeaver 2007 on DB2 (migrated from Oracle)

*Top to Bottom*  
*we know they know*  
*End to End*

**SAP IT selects IBM DB2 as strategic database platform for internal business systems**

**Overview**

- **The Challenge**  
SAP IT (the IT department of SAP AG) wanted to be able to take advantage of new SAP software functionalities while reducing the complexity and operational costs of its IT landscape. The company also wanted to move to a new database platform to deliver optimal performance.
- **The Benefits**  
Simultaneous upgrade/conversion/migration helps reduce business disruption with no significantly increasing project complexity. Response times in the HCM environment have improved by around 40 per cent. Archiving and database reorganization have reduced the size of the ERP database by 22 per cent – and DB2 9 Deep Compression could provide further reductions. Conversion to Unicode has helped SAP IT introduce multiple-language applications, facilitating international operations. SAP's Business Intelligence system is now positioned for nearly unlimited scalability and massive growth with DB2.
- **The Solution**  
In three separate projects, SAP IT upgraded its Human Capital Management (HCM), ERP and Business Intelligence applications, simultaneously performing Unicode conversion and migrating databases from Oracle to IBM DB2.
- **Key Solution Components**  
Industry: Software  
Applications: SAP® ERP 6.0, SAP ERP Human Capital Management 6.0, SAP NetWeaver® Business Intelligence 7.0  
Software: IBM DB2®

SAP AG in Walldorf, Germany, is one of the world's leading business software providers. With more than 45,000 employees serving international enterprises of every conceivable type, SAP AG has people and offices on every continent, operating in multiple languages.

SAP uses its own software products to manage its internal business processes. SAP IT, the company's IT department, wanted to upgrade its existing software environment to take advantage of numerous functional enhancements in the latest versions of the SAP ERP and SAP ERP Human Capital Management (HCM) applications, as well as the SAP NetWeaver Business Intelligence component. The applications would help drive business efficiencies through advanced integration and enhanced information delivery.

"We decided to split this technology refresh into three separate projects," says Peter Boegler, Solution Architect at SAP IT. "We started with the upgrade from SAP ERP HCM 5.0 to version 6.0 in Autumn 2006, followed by the move of the main ERP systems

**IBM | SAP**

**Feedback from SAP IT:**  
**Consistently extremely good experiences with DB2 quality and performance**



## SAP IT: Better Performance; Lower TCO; Better ROI

“We wanted to demonstrate the power and flexibility of SAP software for high-workload, mission-critical systems, and **selected IBM DB2 as the strategic database platform**. Moving the in-house human resources (HR) management solution to mySAP ERP 2005, which requires Unicode support, presented itself as **the ideal opportunity to migrate from Oracle to DB2.**”

“...the actual export and import of the data taking **just 18 hours**. The **Unicode conversion and the database migration were performed in a single step**, from the existing Oracle database to .... IBM DB2 Optimized for SAP software...”

“Our planned system response improvement was around 20 per cent, whereas in reality we have observed a **40 per cent cut in response times with DB2**”  
“..the **DB2 database ... is even more efficient** than we had anticipated. This means that the **investments in new server and storage hardware will actually last longer than planned, contributing to a better-than-forecast return on investment.**”

**Peter Boegler, Solution Architect, SAP IT**



IBM DB2 and SAP solutions - the next wave

# A Collaborative Database

Teamwork between SAP and IBM has led to the close integration of IBM's DB2 database with SAP solutions. The latest version, DB2 V9, makes that integration tighter than ever and brings reduced total cost of ownership (TCO).



The SAP-IBM alliance reflects more than 30 years of leadership based on continuous collaboration, innovation, and service. The DB2 part of the picture shows that those same three pillars are making the difference.

Last year saw key executives from both SAP and IBM endorsing a DB2 version (the DB2 UDB version running on Unix, Windows, and Linux) specifically designed for SAP environments, labeled "Optimized for SAP Solutions." Now we are on the verge of the successor version, V9, which again is built in close collaboration during development, with innovative features customers can benefit from immediately and synchronized one-stop service and support.

#### Close collaboration driving

#### innovation

One of the key difference is how teams work together in the development of DB2, SAP fine the SAP-related release. Then, a planned general release, SAP and integration of the software. This is out by the IBM at the Toronto 100. It is staff developers.

Along with the timing of the dates. Each new release is close to the date with its product. The new version would bring a set of customer most recent SAP but SAP strives for compatibility.

DB2 V8.2.2 became available for all SAP releases that were still in standard maintenance at the time it was launched. Thus, all customers could benefit

# Together in the Fast Lane

SAP and IBM DB2 UDB for Unix and Windows

SAP solutions based on IBM DB2 UDB for Unix and Windows (DB2) have been available since 1994 and have enjoyed great success. The new DB2 version V8.2.2 - the first release labeled "Optimized for SAP" - represents a milestone along the route to a new, even more intensive partnership.

"DB2 V8.2.2 is visible proof that the partnership between SAP and IBM generates immediate benefit for our joint customers," says Karl-Heinz Hess, senior vice president for product support at SAP. "What's new is that SAP and IBM have designed a DB2 release together and specifically for SAP customers. This means that the new DB2 release is optimized for integration with SAP products. We'll continue

this form of collaboration in the future; planning for the next release has already begun."

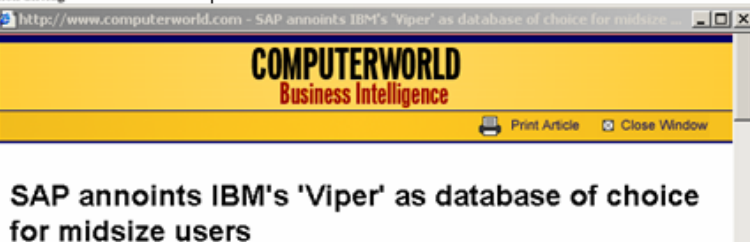
#### Joint product planning

In the past, the requirements of SAP customers were already incorporated to a large extent into new DB2 releases. But now, the joint product planning specifically oriented toward SAP makes the difference.

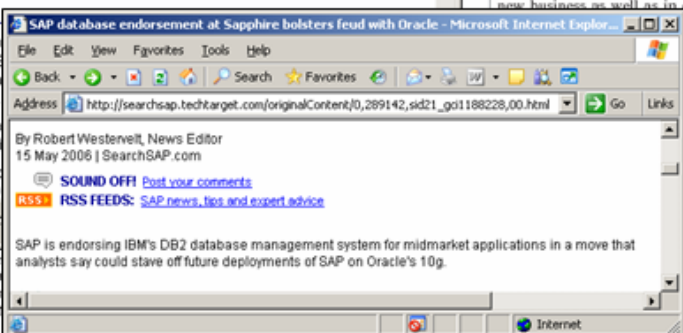
And not just future products are set to benefit from DB2 V8.2.2. "One of the most important design goals for V8.2.2 was to ensure that all our customers benefit directly from the innovations of the new DB2 version," says Torsten Wittkugel, vice president for DB/OS platforms at SAP. "Of course, this includes ensuring that DB2 innovations are delivered to customers as quickly as possible. The timely launch of a new DB2 release for all SAP products is therefore at the top of our list of priorities."

This offers considerable advantages for DB2 customers. While the latest product versions of some other database providers can take up to a year or more before they are certified for SAP, new DB2 versions are usually approved within just a few weeks. "This is partly because we begin and continue testing in our joint Integration Center during the DB2 product development phase. When the product is finished, SAP and IBM can be sure that they have achieved the highest possible quality," explains Wittkugel.

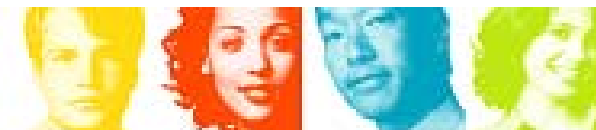
Customers are also noticing the new qualitative dimension in SAP's collaboration with IBM, and so it is no surprise that DB2 plays a major role in attracting new business as well as in database mi-



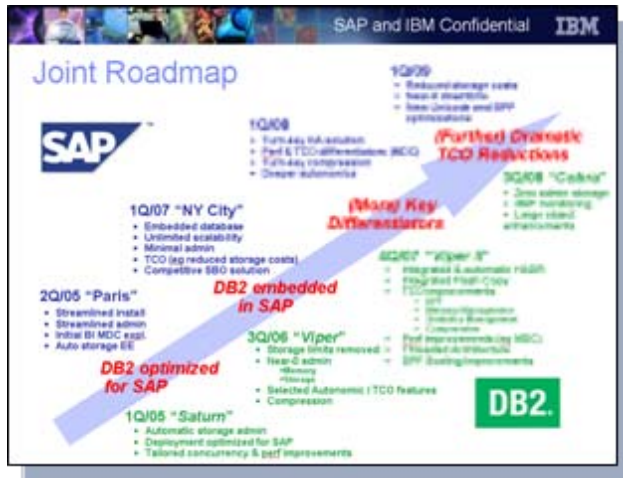
**May 11, 2006** (Computerworld) Ratcheting SAP AG said today that the next version of IBM for midsize users of SAP's business software. Customers buying the All-in-One version of will be able to get the "Viper" edition of DB2 -- excellent performance, according to Bernie Spang, director. After IBM and SAP last year released a special edition of SAP users either switched from Oracle Database to IBM DB2 or vice versa.



**SAP database endorsement at Sapphire bolsters feud with Oracle** - Microsoft Internet Explorer...  
By Robert Westervelt, News Editor  
15 May 2006 | SearchSAP.com  
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SAP is endorsing IBM's DB2 database management system for midmarket applications in a move that analysts say could stave off future deployments of SAP on Oracle's 10g.



# IBM DB2 and SAP share a partnership unparalleled in the industry



## The facts:

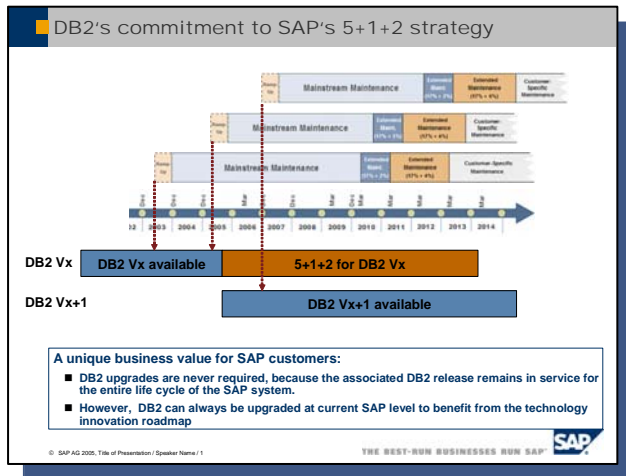
- DB2 release cycle synchronized with SAP
- Very significant part of DB2 development plan reserved for SAP
- Joint product planning for DB2
- Mandatory SAP design approval for all SAP relevant DB2 development items
- SAP platform team develops code for DB2

## Customer benefits:

- All new DB2 features designed 100% compatible and best exploitable with SAP software from the beginning
- Shortest possible feedback cycle from SAP customers to DB2 development



# One-stop integrated Maintenance for your SAP on DB2 system



## The facts:

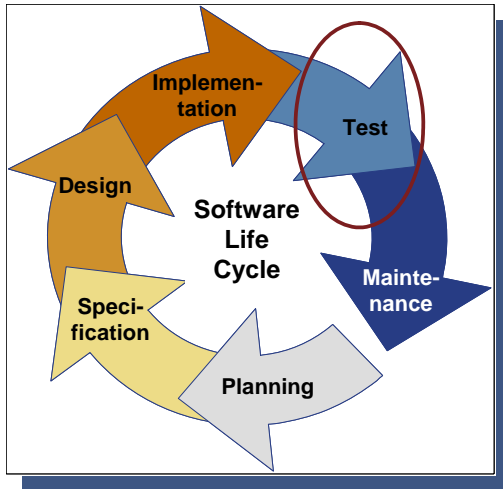
- All SAP on DB2 customers receive one-stop service through SAP
- SAP's and IBM's service teams have regular technical exchanges to ensure best integration of our joint service work
- DB2 follows SAP's 5+1+2 maintenance

## Customer benefits:

- Only one partner to deal with - SAP takes care of the complete problem resolution, regardless where the problem comes from
- Elimination of undesired database upgrades - upgrade to the next level of DB2 is a plain technology decision. A DB2 upgrade is **never dictated by DB2's maintenance cycle** during SAP's 5+1+2 maintenance



## DB2 pre-GA testing and certification with SAP software



### The facts:

- SAP IBM Integration Center validates compatibility and stability during DB2 development cycle
- SAP certification of a DB2 major release within 4-8 weeks after GA
- DB2 code is **stable and ready to use by SAP customers at IBM GA**

### Customer benefits:

- Stability – every DB2 fix pack and release is certified by SAP
- Riskless early adoption of new technologies
- SAP customers benefit from joint technology innovations as soon as they become available



## Vendor Database GA vs SAP Database Certification

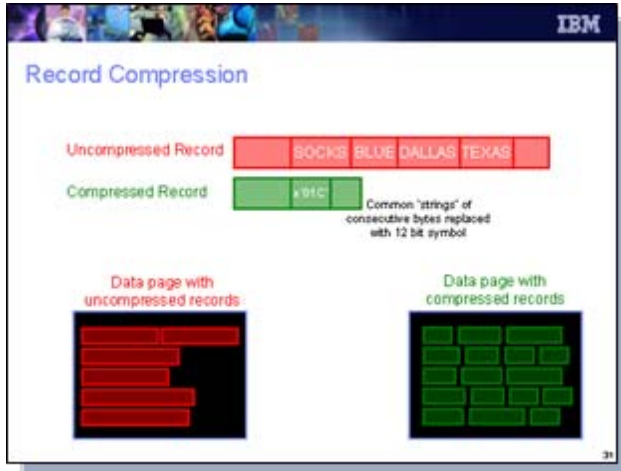
Database (DB)	Database GA	SAP DB GA	GA Delta	Comments
Oracle 9i	June 2001	During Q1 2003	<b>78-91 weeks</b>	Different dates for different SAP releases
Oracle 10g	Jan 2004	~ Q2 2006	<b>~125 weeks</b>	Backward comp. → 4.6D
DB2 v8.2.2	April 29, 2005	June 3, 2005	<b>4 weeks</b>	1st DB2 optimized for SAP Software release
DB2 9	July 28, 2006	Aug 31, 2006	<b>4 weeks</b>	2nd DB2 optimized for SAP Software release Backward comp. → 3.11

- Oracle 9i – more than 1.5 years delay
- Oracle 10G – more than 2 years delay
- 1st Oracle RAC SAP pilot in March 2003 – so far not GA
- **DB2 optimized for SAP Software is available within 4 weeks**

Note: GA = General Availability of software ready for general public consumption.



## DB2 9 Deep Compression reduces storage cost



### The facts:

- DB2's unique Compression technology cuts down sizes of database tables by 70-85% transparently to the application
- Deep Compression is fully supported for all SAP Releases and applications, from R/3 3.1I up to the newest releases.
- Improve overall SAP system performance

### Customer benefits:

- Reduced storage cost by 35%-55%
  - **Cost per TB of managing SAP data = €70,000 per year in Europe**
- Reduced I/O requirements, better CPU, memory, cache utilization
- Better Performance, Faster Backup/Restore time



## Unicode - DB2 9 Resource-Advantage

Database	Storage-need without Unicode	Storage-need with Unicode	Storage-Need Unicode with Compression
DB2 for Linux, Unix, Windows	100%	90...110%	45...55% ( DB2 Compressionfactor ~50%)
MAXDB	100%	140...160%	No Compression
MS SQL	100%	140...160%	No Compression
Oracle	100%	90...110%	Only for selected SAP BW, only for few Objects, low compression factor



# Unicode requires more Hardware

For specific details see: [service.sap.com/unicode](http://service.sap.com/unicode)

## Hardware Requirements – Overview



Based on parallel benchmarking of Unicode / non-Unicode test systems

### CPU

- +30%
- depending on existing scenario (MDMP, double byte)

### RAM

- +50%
- Application Servers are based on UTF-16 internally

### Database size

- UTF-8\* : up to +35%
- UTF-8\*\* : up to +10%
- UTF-16 : +60..70%

\*35% is the observed maximum in growth for small systems (db size < 200 GB).  
\*\* 10% is the observed maximum for bigger systems (db size > 200 GB).

### Network Load

- UTF-8
- almost no change due to efficient compression

\*\*First customer conversions indicate: DB size *increase* due to Unicode conversion is outweighed by size *decrease* due to DB reorganization ... so actually DB *shrinks!*



# Unique DPF scale out technology makes you do more with less

IBM Software Group

## DB2 DPF – Multiple Database Partitions

- One database can reside on several separate computers
- Each partition has its own Buffer Pools, Sort Areas and Logging.
- Hash function is used to distribute records on database partitions
- Shared nothing (function shipping)
  - ◆ Each Partition accesses only its local Data
- Several logical partitions can be on the same machine
  - ◆ Physical or Logical Partitioning is transparent to the database.
- Database Catalog on partition 0, DB catalog cache on the other partitions
- Fast communication needed (e.g. Gigabit Ethernet Switch)

4 SAP W00N 042 L00 0 P P W14000 ON DEMAND BUSINESS

## The facts:

- DB2's DPF (Database Partitioning Feature) offers a unique and proven linear scale out technology for SAP BI
- DPF is a mature technology and fully supported since SAP BW 2.0
- Almost all larger SAP BI installations use DPF

## Customer benefits:

- Best exploitation of available SMP hardware through logical partitioning with proven performance benefit compared to other databases.
- Ability to run a high-end SAP BI on lower cost hardware:
- Deployment on multiple smaller boxes instead of one big SMP machine.

Siemens [Video](#)

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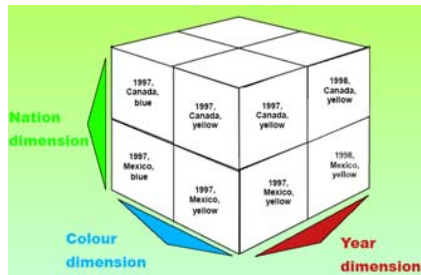
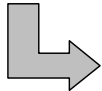


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13 MAY - SYD, 15 MAY - MEL

# Multi Dimensional Clustering (MDC) makes you do more with less

```
CREATE TABLE MDCTABLE (  
  Year INT,  
  Nation CHAR(25),  
  Colour VARCHAR(10),  
  ... )  
ORGANIZE BY( Year, Nation, Colour )
```



## The facts:

- MDC is a unique DB2 technology to cluster along multiple partitions
- MDC is fully supported for SAP BW 3.x
- MDC is reorg-free and self managing, no ongoing DBA intervention required
- MDC supports fast roll in and roll out

## Customer benefits:

- Significantly less DBA activity compared to range partitioning
- SAP BI query performance boost –up to factor 8 or more
- Can be applied to as many dimensions as desired (whereas range partitioning works only on one dimension).



# DB2 comes with built-in and ready to use HA and DR

**HADR: High Availability Disaster Recovery**

- High Availability Disaster Recovery for
  - Ultra-fast failovers (no instance restart)
  - Rolling upgrades
- Two active machines
  - Primary
    - Processes transactions
    - Ships log entries (not logfiles) to the other machine
  - Secondary
    - Cloned from the primary
    - Receives and stores log entries from the primary
    - Re-applies the transactions
- If the primary fails, the secondary can take over the transactional workload
- If the failed machine becomes available again, it can be resynchronized
- Various Operation modes:
  - Asynchronous
  - Near-synchronous
  - Synchronous

Failover in 11 seconds demonstrated in test of SAP environment with 600 users!

© 2008 IBM Corporation

## The facts:

- HADR is an easy to set up, integrated High Availability and Disaster Recovery solution with ultra-fast failover.
- Complemented by a free 2-node license for Tivoli System Automation (AIX/Linux)
- Fully supported and tested by SAP

## Customer benefits:

- Out of the box HA and DR solution at no additional charge
- One-stop support through SAP for your HA+DR solution

Note: HA = High Availability; DR = Disaster Recovery



## Austrian Railways (OEBB)

- ensures high availability for mission critical SAP solutions with DB2 HADR

OBB



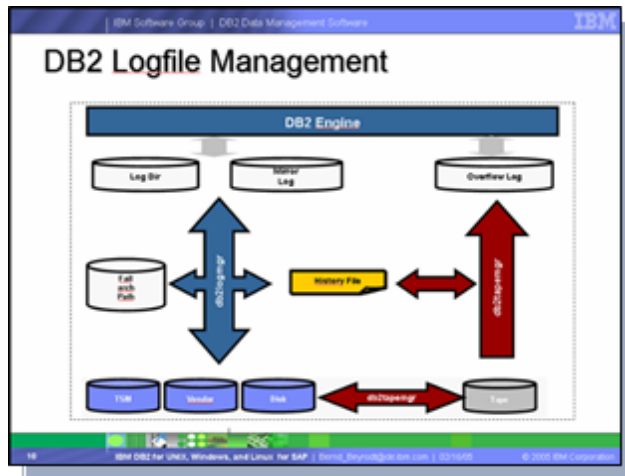
**“And failover time with Oracle had been one hour. With DB2, it’s now one to two minutes, or as much as 97 percent less.** This frees up all the productivity that was trapped by slow performance and drives further gains in the data center by enabling us to reassign employee hours to more valuable work.”

“In addition to price, we chose DB2 over Oracle because the high availability and disaster recovery capability of DB2 is supported for SAP solutions whereas the Oracle RAC high availability functionality is not. **One of the major advantages of DB2 is that we get a disaster recovery solution for our SAP system with HADR at no extra cost.**”

– *Gustav Elias, Database Administrator and System Programmer for DB2, Austrian Railways*



## Backup, restore and recovery are built into the DB2 core engine



### The facts:

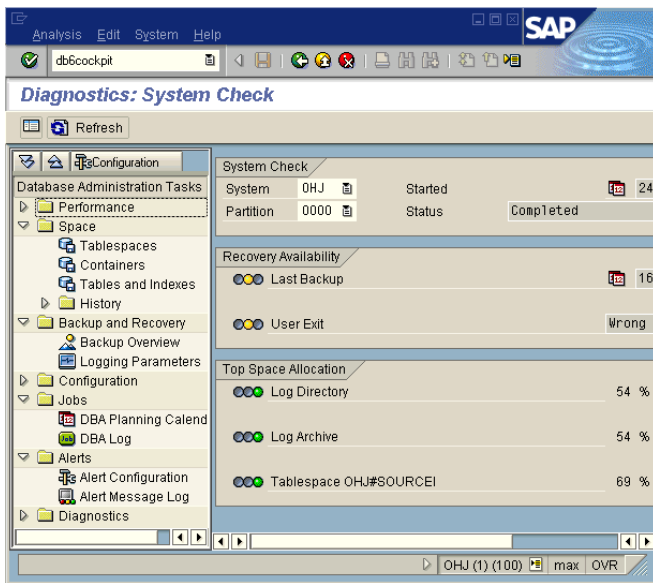
- With DB2 all backup, recovery and logfile management activities are performed by the DB2 engine
- No dependency on any external tool,
- Backup and logfile management are fully automated, no DBA intervention

### Customer benefits:

- Stability - backup, recovery and logfile management are tested as part of the DB2 certification
- Ease of use – once configured DB2 manages everything by itself



# DB2 autonomics – designed to make DB2 ultimately „invisible“



## The facts:

- DB2 automates most DBA activities:
  - Configuration and memory tuning
  - Backup, logfile management
  - Online Reorganizations, Collection of statistics
  - ....
- All automations are fully supported by SAP and integrated into SAP's DBACOCKPIT

## Customer benefits:

- Ease of use
- Reduction of DBA workload
- Operational stability - DB2 constantly adjusts itself to the workload and is never „mistuned“



# „State of the art“ Database Administration with DB2 - integrated in the SAP DBA Cockpit for DB2 (DB6Cockpit)

- Automation of DBA activities
  - Table and index reorganization
  - Memory tuning, storage increase
  - Configuration, ...
- DB2 will ultimately become “invisible”
- 25%-30% less DBA effort than Oracle
  - DuPont, rku.it
- Fully certified & integrated into SAP
- Storage optimization (compression)
- Built-in Recovery
  - Backup, Restore, Recovery and Logfile-Mgmt
  - No dependencies on external tools
  - Significantly higher stability and reliability

The screenshot displays the SAP DB6Cockpit interface for DB2. The main window is titled "Diagnostics: System Check" and shows a tree view of database administration tasks on the left and a detailed view of system check results on the right. The tree view includes categories like Performance, Space, Backup and Recovery, Configuration, Jobs, Alerts, and Diagnostics. The detailed view shows system check results for System OHJ and Partition 0000, with a status of "Completed". Other sections include Recovery Availability, Top Space Allocation, and DB & Instance Configuration. Several callout boxes highlight specific features: "Performance Monitoring" points to the Performance section in the tree; "Access to multiple systems / partitions" points to the System and Partition fields; "Space Management" points to the Recovery Availability section; "Backup & Logging" points to the User Exit field; "DB & Instance Configuration" points to the Log Active field; "Job Scheduling" points to the Alerts section; and "DB Monitoring & Diagnostics" points to the Diagnostics section.

HP Pelzer [Video](#)



# DB2 Performance

DB2's record leading performance is proven in **SAP Standard Benchmarks**:

- **SAP 3-tier SD** benchmark: (certificate 2005021) – DB2 v8.2.2 [better performance @ half the number of CPUs]
- **SAP 3-tier BI** benchmark (certificate 2005043) – DB2 v8.2.2 [the only 3-tier BI benchmark]
- **SAP 2-tier SD** benchmark: (certificate 2008019) – DB2 9.5 [better performance @ half the CPU core]
- **SAP Banking TRBK** benchmark: (certificate 2007050) – DB2 9 [50% better performance @ 4x less database server CPUs, 3x less apps server CPUs, 2x less storage]

**CERTIFICATION**  
SAP Standard Application Benchmarks

The SAP SD standard R3 Enterprise 4.70 application benchmark performed on May 11, 2005 by IBM in Beaverton, OR, USA was certified on May 13, 2005 with the following data:

Number of benchmark users & comp:	168,300 SD (Sales & Distribution)
Average dialog response time:	1.95 seconds
Throughput:	
Fully Processed Order Line Items/hour:	16,896,670
Dialog steps/hour:	844,820
SAPS:	0.026 sec / 0.028 sec
Average DB request time (dialog):	96%
CPU utilization of database server:	85% (db), 85% (app), 85% (msgmgnt) 44%
CPU utilization of application servers:	ASX 3
Operating System all servers:	DB2 UDB 8.2.2
RDMS:	ASX 3
SAP R3 Release:	4.70
Total database disk space:	2,240 GB

Configuration:  
Database server: IBM eServer p5 Model 595, 32-way SMP, POWER5, 1.9 GHz, 32 KB(D) + 64 KB(I) L1 cache per processor, 1.92 MB L2 cache and 36 MB L3 cache per 2 processors, 256 GB main memory

12 Application servers: IBM eServer p5 Model 595, 64-way SMP, POWER5, 1.9 GHz, 32 KB(D) + 64 KB(I) L1 cache per processor, 1.92 MB L2 cache and 36 MB L3 cache per 2 processors, 256 GB main memory

11 Dialog/Update servers: IBM eServer p5 Model 595, 64-way SMP, POWER5, 1.9 GHz, 32 KB(D) + 64 KB(I) L1 cache per processor, 1.92 MB L2 cache and 36 MB L3 cache per 2 processors, 256 GB main memory

1 MessageEnq server: IBM eServer p5 Model 595, 6-way SMP, POWER5, 1.9 GHz, 32 KB(D) + 64 KB(I) L1 cache per processor, 1.92 MB L2 cache and 36 MB L3 cache per 2 processors, 64 GB main memory

Certification Number: 2005021

**CERTIFICATION**  
SAP Standard Application Benchmarks

The SAP SD standard SAP ERP 6.0 (2000) application benchmark performed on March 24, 2008 by IBM in Beaverton, OR, USA was certified on April 08, 2008 with the following data:

Number of benchmark users & comp:	35,400 SD (Sales & Distribution)
Average dialog response time:	1.94 seconds
Throughput:	
Fully Processed Order Line Items/hour:	3,599,000
Dialog steps/hour:	19,777,000
SAPS:	177,950
Average DB request time (dialog):	0.313 sec / 0.017 sec
CPU utilization of central server:	99%
CPU utilization of central server:	ASX Version 6.1
Operating System central server:	DB2 9.5
RDMS:	ASX
SAP ECC Release:	6.0

Configuration:  
Central server: IBM Power 595, 32 processors / 64 cores / 128 threads, POWER5 5.0 GHz, 128 KB L1 cache and 4 MB L2 cache per core, 32 MB L3 cache per processor, 512 GB main memory

Certification Number: 2005043

**CERTIFICATION**  
SAP Standard Application Benchmarks

The SAP Business Information Warehouse 3.5 Standard Application Benchmark suite performed on September 22, 2005 by IBM in Toronto, On, Canada was certified on October 19, 2005 with the following data:

The scenario for 64 GB main memory, which corresponds to 934,400,000 records in fact table, was used:

Step 1: Load Phase - Part 1	
Average throughput (rows/hour):	168,360,360
In detail:	
Load from PSA into InfoCube (rows/hour):	218,317,757
Repar secondary indexes on fact table (rows/hour):	2,712,774,184
Change statistics on fact table:	7,760,003,923
Rollup of aggregates (rows/hour):	1,160,344,940
Step 2: Load Phase - Part 2	
Average throughput (rows/hour):	6,511,120
In detail:	
Load from PSA into ODS (rows/hour):	157,262,272
Activate ODS (rows/hour):	6,762,343
Average throughput total step 1+2 (rows/hour):	6,269,687
Step 3: Query Phase	
Throughput/hour:	311,004 query navigation steps
Average CPU utilization of servers:	30%

The software configuration for all steps of the SAP BIW benchmark:  
Operating System: SuSE Linux Enterprise Server 9 (64-bit)  
RDMS: DB2 UDB 8.2.3 (64-bit)  
Platform Release: SAP NetWeaver 04 (64-bit)

Configuration:  
Cluster of 32 servers, each server: IBM i386 Model SagerTU, 1 processor / 1 core / 2 threads, Intel XEON 3.6 GHz, L1 Execution Trace Cache, 2 MB L2 cache, 2 GB main memory

Certification Number: 2008019

**CERTIFICATION**  
SAP Standard Application Benchmarks

The SAP TRBK (Transaction Banking) standard SAP for banking application benchmark performed on July 26, 2007 by IBM in Beaverton, OR, USA was certified on August 20, 2007 with the following data:

The scenario contained 30,000,000 accounts and 600,000,000 postings.

Part 1: Day Processing	
No. of postings to bank accounts/hour:	15,519,000
CPU utilization database server:	99%
CPU utilization application servers:	60%
Part 2: Night Processing	
No. of balanced accounts/hour:	7,429,000
CPU utilization database server:	96%
CPU utilization application servers:	74%

The software configuration for all steps of the SAP TRBK benchmark:  
Operating System all servers: AIX 5L Version 5.3  
RDMS database server: DB2 9  
SAP Release: Deposits Management 4.0

Configuration:  
Database server: IBM System p 570, 2 processors / 4 cores / 8 threads, POWER6, 4.7 GHz, 128 KB L1 cache and 4 MB L2 cache per core, 32 MB L3 cache per processor, 64 GB main memory

3 Application servers:  
1 Dialog/Update server: IBM System p 570, 16 processors / 16 cores / 32 threads, POWER5+, 2.2 GHz, 32 KB(D) + 64 KB(I) L1 cache per processor, 1.92 MB L2 cache and 36 MB L3 cache per 2 processors, 128 GB main memory  
2 Dialog/Update server: IBM System p 570, 16 processors / 16 cores / 32 threads, POWER5+, 2.2 GHz, 32 KB(D) + 64 KB(I) L1 cache per processor, 1.92 MB L2 cache and 36 MB L3 cache per 2 processors, 128 GB main memory

Certification Number: 2007050

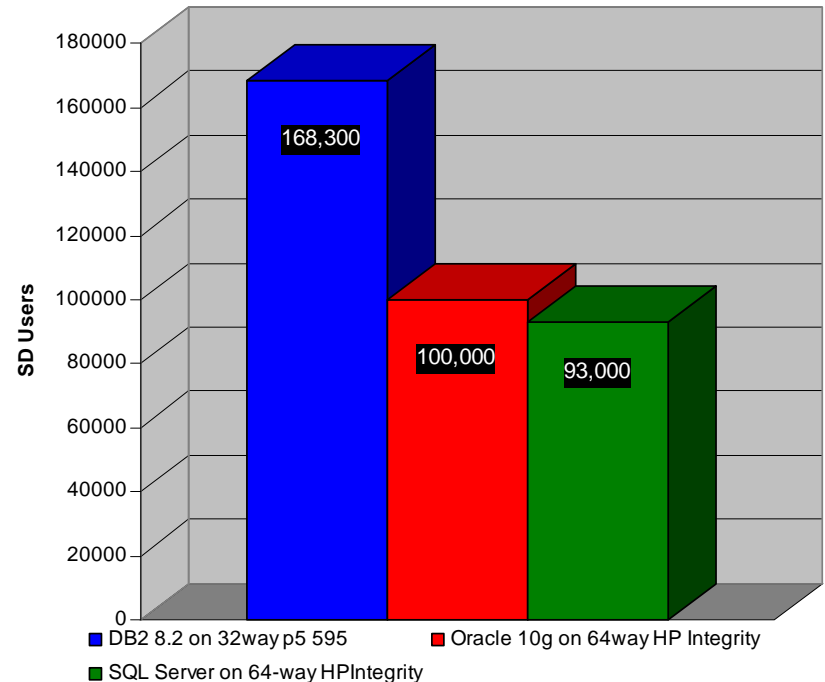
<http://www.sap.com/benchmark/>



# Leading Performance 3-Tier SAP SD Benchmark\*

- This benchmark represents a 3-Tier SAP R/3 environment in which the database resides on it's own server
  - Shows DB2's ability to scale up to 168,300 SAP SD users – ready for large customer environments
- Used RDBMS Versions:
  - DB2 V8.2.2 – optimized for SAP solutions at DB2 availability
  - Oracle 10g – **certified 24 month after product availability**
  - SQL Server 2005
- Result: **68% better performance for DB2 (vs Oracle) & 80% better (vs SQL Server) using 50% less CPUs**
  - DB2 v8.2.2 running on 32-way p5 595
  - Oracle 10g running on 64-way HP
  - SQL Server 2005 running on 64-way HP

Top SAP SD 3-tier Results by DBMS Vendor



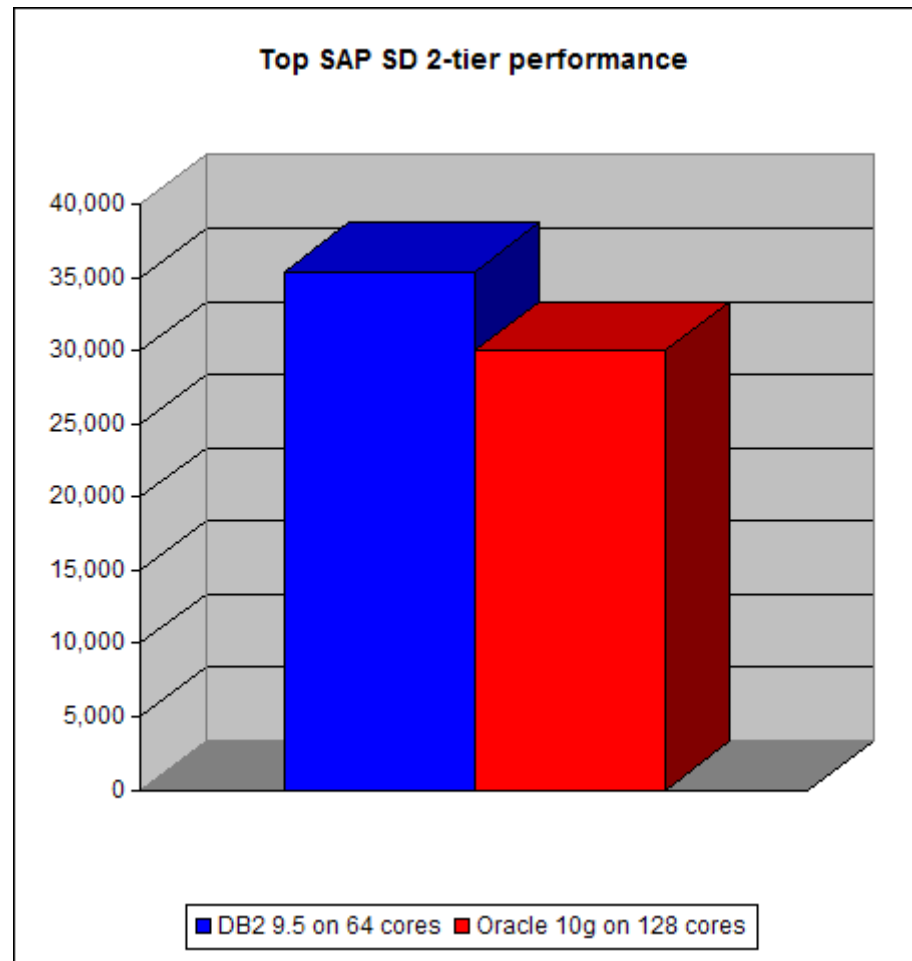
\*Results referenced are current as of May 1, 2008.

For the latest SAP results, visit <http://www.sap.com/benchmark>



## DB2 Leads in 2-tier SAP SD Benchmarks

- DB2 leads Oracle by 18% on ½ the number of cores



Results as of April 8, 2008

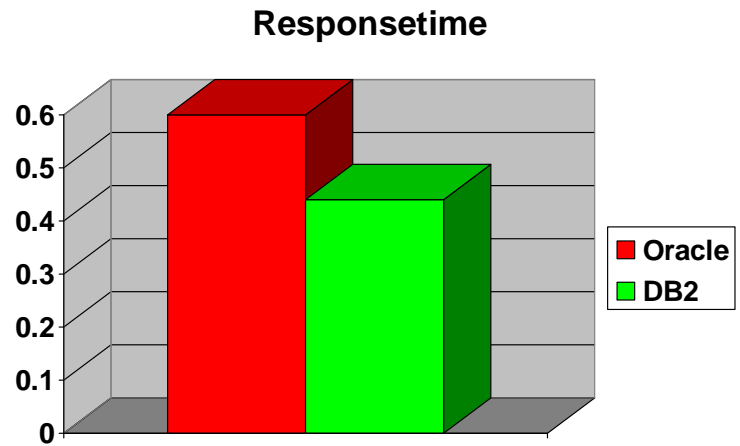


# SAP Performance - DB2 vs. Oracle

## Customer rku.it

Performance measurement before and after migration from Oracle to DB2 on same pSeries hardware:

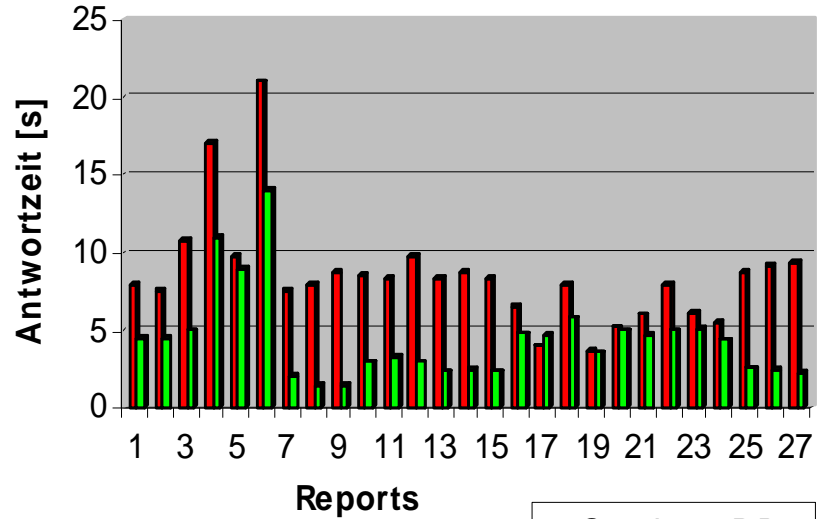
- DB2 40% faster Dialog
- DB2 40% faster Batch processing



## DB2 at Siemens Germany

Testcase: Runtime measurement of different BW transactions with SAP BW Queries

- DB2 up to 9 times faster
- DB2 in average over 40% faster



# SAP Performance DB2 vs. SQL Server

## Customer TFX

Significant performance improvements after migration

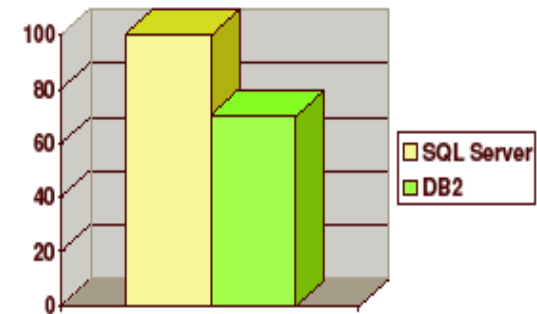
- Database response time up to 10 times faster
- Total performance 30% better

## Customer CMU

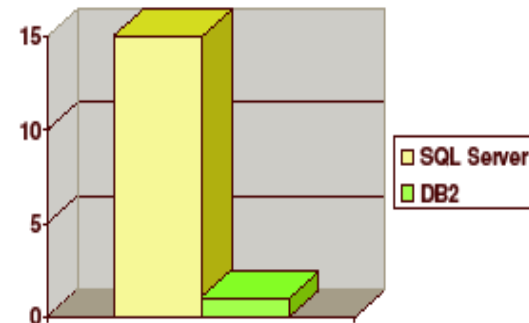
Extreme performance improvements after migration

- Batch jobs previously taking 15-20 minutes now only take 1 minute with DB2
- Faster response time, despite more data and increased number of users

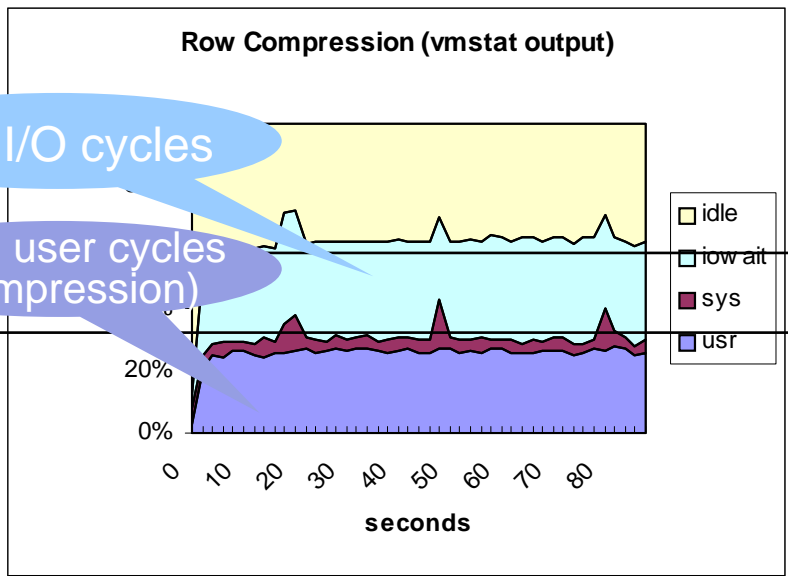
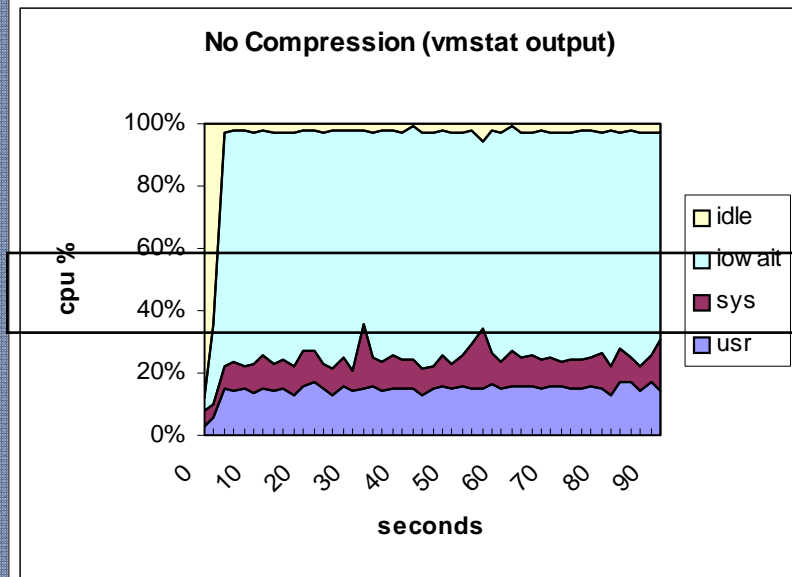
Overall System Performance



Batch: Response Time



# DB2 Compression Value : Not limited to Storage Savings !



Less I/O cycles

More user cycles (compression)

Tablescan	No Compression	Row Compression
# of Rows	59,986,052	59,986,052
# of Pages	1023162	426292
MB	7993	3330
Run time (secs)	<b>90.993</b>	<b>43.268</b>
MB/sec	87.847	76.972
Total user cpu time (sec.ms)	48.910	94.490
Time waited for prefetch	302878	67950
user cpu time/row	0.00000082	0.00000158
user cpu time/page	0.000048	0.000222
rows/page	59	141

Overall Performance Significantly Improved



## DB2 V9 - Data Compression Functionality, POC done by Nestle

### DB2 V9 Deep Compression - Shrinkage

#### Compression candidates and rates

Type	Number tables	Compression Rate Achieved
ODS	26	79%
PSA	517	64%
Fact	100	86%

#### Benefits seen in Performance

- ✓ Aggregate Throughput: **+ 15%**
- ✓ Query execution: **+ 3.5%**
- ✓ Query resp time: **- 23%**

#### Infrastructure Benefits

- ✓ Disk Storage Requirements: **-48%**

- Less Disk Space Required
- Less IO for more data – each page contains more data content
- Increase data in memory – improved buffer pool quality



## DB2 Performance Assessment – Swiss Customer

- Run selected SAP BW reports on both the Oracle and DB2 installation
- Compare runtime
- Test environment:
  - Hardware: POWER6 p570 (9117-MMA), 8 way
  - 5 GB memory used for database cache both on Oracle and DB2

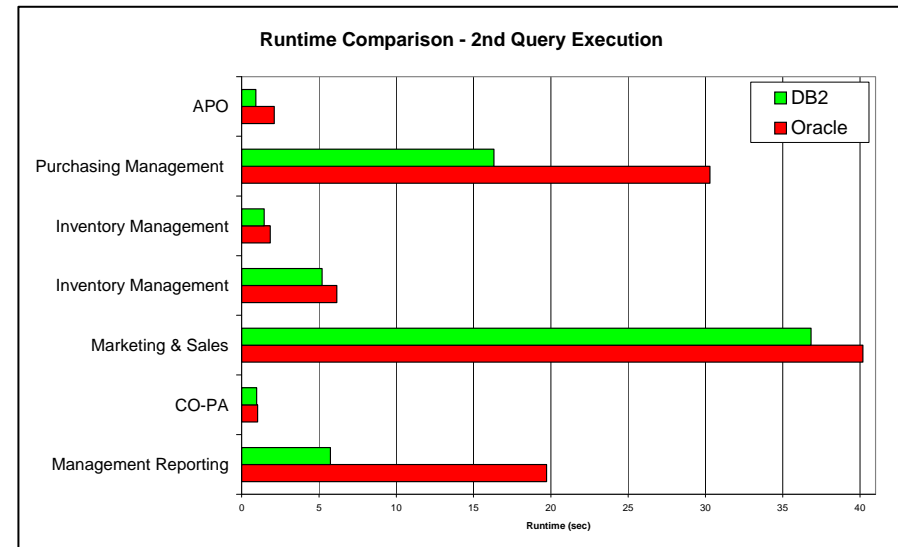
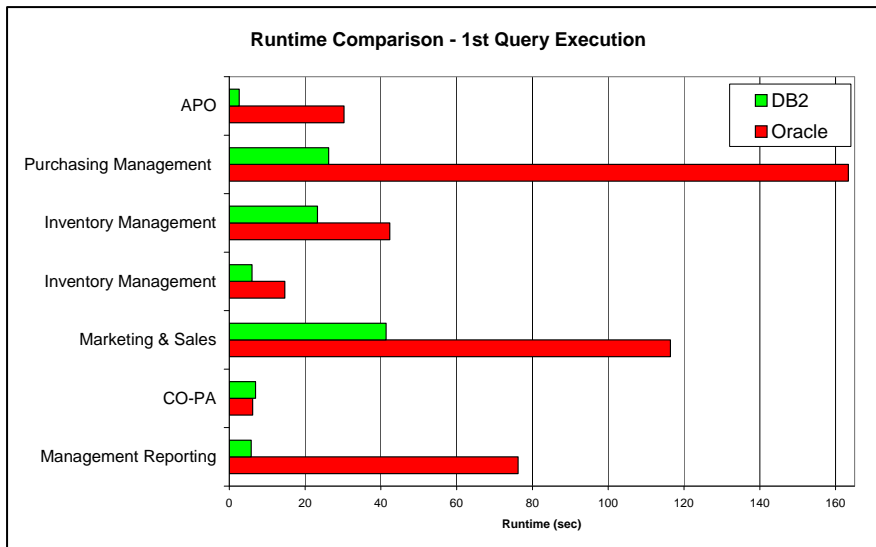


## DB2 Performance Assessment – Swiss Customer

Performance Comparison DB2 and Oracle:

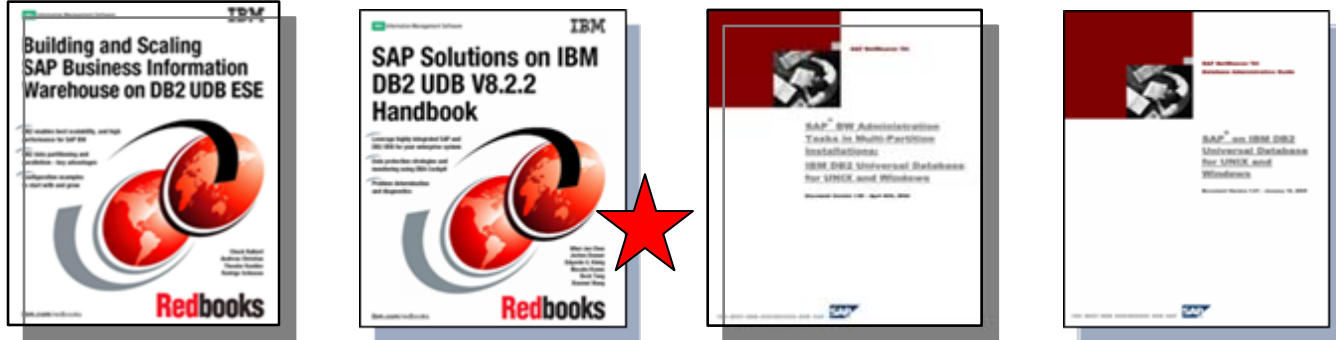
DB2 factor **4.0 faster** with empty database cache (first query execution)

DB2 factor **1.5 faster** with filled database cache (second query execution)

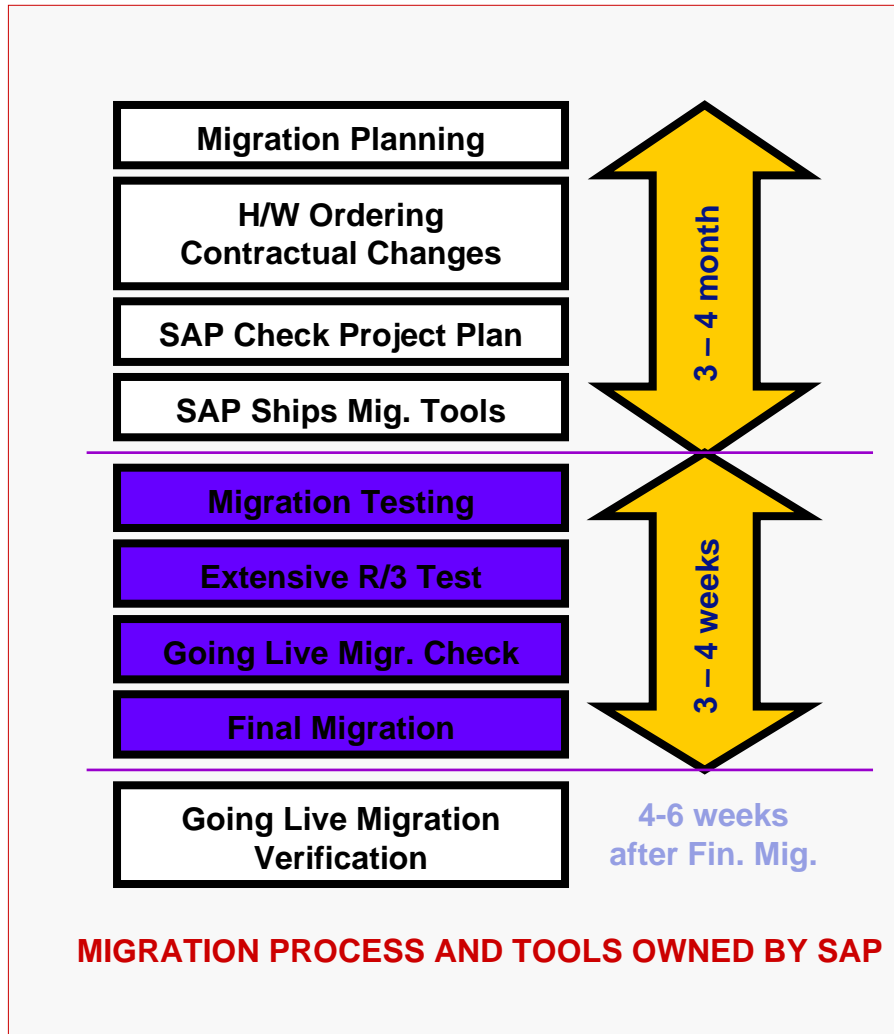


# Migration and Retraining

- Migration to DB2 is SAFE and EASY !!!
  - Using standard SAP owned/certified tools/processes
  - Fix price offering from IM Services based on customer input
    - Final Price quote requires migration completed questionnaire
- Less than 2 weeks to retrain SAP/Oracle DBA
  - SAP training classes, Redbooks, white papers ...



# SAP OS/DB Migration Overview



- Use of SAP migration tools and migration service mandatory
- Done customer with assistance from consultant (migration partner)
  - Customers must submit Migration Plan
  - Customers requires SAP approval
- Test migration is required
- Second system needed
- Effort depends on: Amount of Data, Customizations (Data Dictionary), SAP Release, Hardware
- Open an OSS message in application area XX-SER-OSDBMIG
- SAP migration note: OSS 82478



## DB2 SAP Education

### *Selection of SAP Education Classes*

- **TADM56** - Partner Academy, SAP Installation & Deltas on DB2 (Certification as SAP Technical Consultant DB2), 5 days, for experienced Informix, Oracle, SQL Server consultants
- **ADM100** - Technical Core Competence R/3
- **ADM535** - SAP Database Administration on DB2
- **PDEXXL Technical Consultant Enhanced Training** - SAP BW on DB2 UDB Enterprise - Extended Edition



# SAP and IBM - Partnership that makes a difference !

ORACLE

DB2

<b>SAP Platform team setup and tasks</b>	Joint platform team at SAP	Yes	Yes
	Joint platform team at database vendor	No	Yes
	SAP platform team develops code for database code base	No	Yes
<b>Development Cooperation</b>	Regular interlock meetings between SAP and database vendor	Yes	Yes
	Database vendor reserves very significant portion of development plan exclusively for SAP requirements	No	Yes
	SAP design review and mandatory sign off for SAP relevant developments in the database code base	No	Yes
	Database vendor aligns database release schedule with SAP release schedule	No	Yes
	New database releases tested and validated by SAP prior to database vendor's GA date	No	Yes
	New database releases certified for use with SAP within 4-8 weeks of database vendor's GA	No	Yes
	All database patch sets and releases tested and validated by SAP prior to database vendor's GA date	No	Yes
<b>Maintenance Offering</b>	One-stop defect support offering	Yes	Yes
	SAP Active Global support available 24x7	Yes	Yes
	SAP Development support available in multiple time zones	Yes	Yes
	Database vendor's support strategy follows SAP's support strategy: Underlying database release remains in service for complete 5+1+2 maintenance of SAP system	No	Yes
	Database is development platform for new SAP NetWeaver releases	Yes	Yes
<b>Database use at SAP</b>	Database is development platform for future SAP applications and new releases of existing SAP applications	No	Yes
	Database is used to run SAP's Business Systems	No	Yes



# ITG Reports on TCO for SAP (DB2 vs Oracle & DB2 vs SQL Server): Cost/Benefit Business case for SAP Enterprise Migration

## 2 separate ITG Reports:

- Value Proposition for IBM DB2 9: Cost/Benefit Case for SAP Enterprise Migration – released Oct 2007 (DB2 vs Oracle)
- Business Case for IBM DB2 9 for SAP Enterprise Deployments: Comparison with Microsoft SQL Server – released Apr 2008 (DB2 vs SQL Server)

## Reports examined:

- Cost implication of employing Oracle 10g or SQL Server 2005 vs IBM DB2 9 to support SAP ERP 6.0 solutions
- Based on input from numerous SAP users
- Cost comparisons based on 3 composite profiles of large-scale SAP ERP installations in 3 companies:
  - For the DB2 vs Oracle Report: (\$8 billion manufacturer of industrial machinery, tools & parts / \$5 billion manufacturer of electronic systems, components & sub-assemblies / \$3 billion manufacturer of automotive parts)
  - For the DB2 vs SQL Server Report: (\$8 billion manufacturer of consumer packaged goods / \$6 billion aerospace manufacturer / \$3 billion diversified electronics manufacturer)
- Scenarios for 3 sets of costs:
  - Initial investment in databases, database servers & storage infrastructures
  - 5-year operating costs for the above investment
  - Cost of migration to DB2 9 from Oracle/SQL Server (including data conversion, system set-up & staff re-training)

## Findings:

- "Organizations also cited **SAP's commitment to DB2 9, and the close relationship between IBM and SAP in database development and optimization as equally if not more important** than cost savings. DB2 9, it was noted, is **SAP's "preferred and recommended" database for its ERP 6.0 generation of solutions.**"*
- "Over a five-year period, ... combined costs of databases, storage, servers, and personnel **required to support SQL Server 2005-based ERP 6.0 environment are almost double those for DB2 9.** Organisations that **migrate from SQL Server 2005 to DB2 9 may reduce these costs by 46 percent.**"*

## Note:

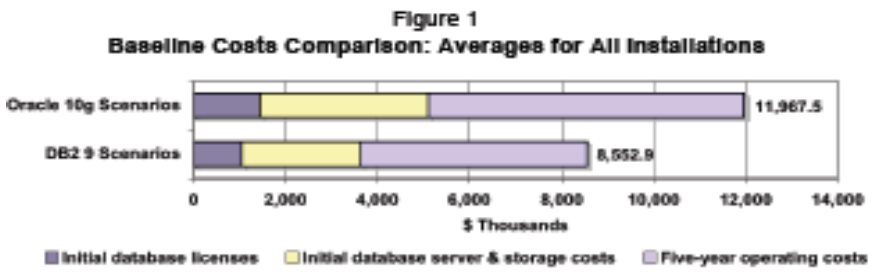
- SAP Database Licensing costs
  - Initial Licensing cost for DB2 is less than Oracle (8% vs 11% of SAV)
  - Annual Maintenance Fee for DB2 is also less than Oracle (SAP currently charges 17% of Initial License Fee but this will increase to 22%)
  - DB2 includes a number of Free-of-charge components (HADR, Compression, Autonomic features, etc); whereas there are additional licensing and annual maintenance fees for Oracle's equivalent components. (Eg. RAC = additional 3% of SAV)
- DB2 performance, compression and automation capabilities: deliver distinct advantages
- Cost reductions occur not only in database software; but also:
  - Database servers, disk and tape storage systems
  - Database- and storage-related administrative processes
- These savings more than offset large scale cost of migration from Oracle/SQL Server to DB2.



# ITG Reports on TCO for SAP (DB2 vs Oracle & DB2 vs SQL Server): Cost/Benefit Business case for SAP Enterprise Migration

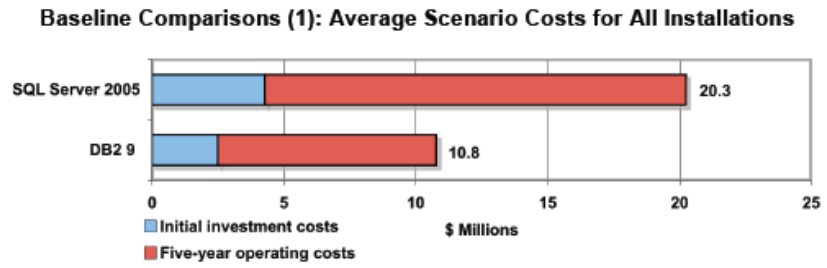
## New Installation:

DB2 is 28.5% less than Oracle



## New Installation:

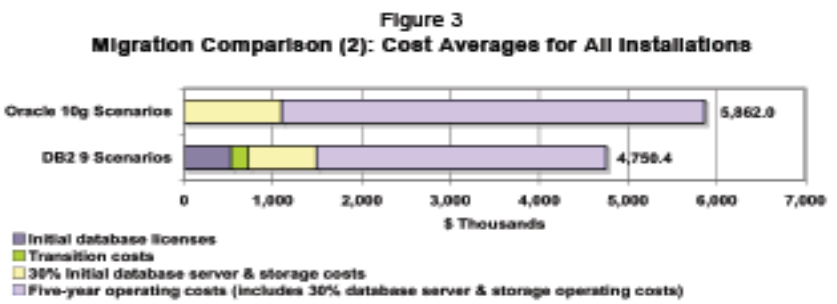
DB2 is 47% less than SQL Server



## Migration from Oracle to DB2:

DB2 is 23.5% less than Oracle

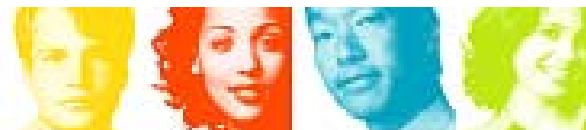
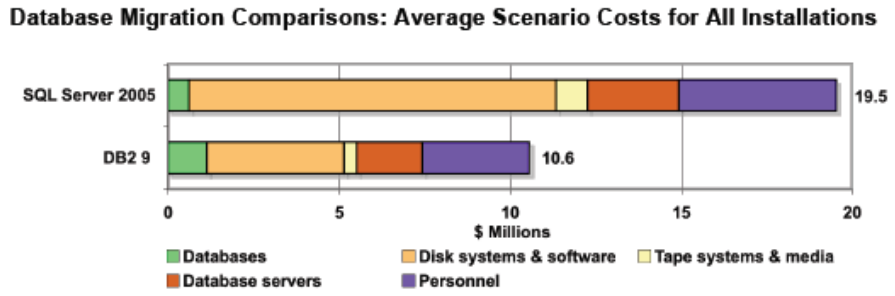
(Include database license, transition costs ~ data conversion/migration, retraining)



## Migration from SQL Server to DB2:

DB2 is 46% less than SQL Server

(Include database license, transition costs ~ data conversion/migration, retraining)



# SAP DB2 Customers on Linux, Unix & Windows



## Why SAP customers use DB2 for their SAP Infrastructure?

- DB2 is the **Only** database that SAP has **jointly Optimised for SAP Solutions**.
  - DB2 is pre-tuned and pre-configured for SAP workload (DB2\_WORKLOAD=SAP)
  - Self-tuning and self-managing (autonomic capabilities) for SAP workload
- DB2 is a **NO RISK** technology for SAP solutions with **Proven lower Total Cost of Ownership**:
  - **Best Performance, Best Data Administration/Management, Best Compression technology, Best (Free) High Availability solution** certified and GA by SAP.
- **SAP uses DB2** as its Primary R&D platform and also for internal business systems; **IBM uses DB2** for all our SAP installations.
- Simplify and ease of administration & management of the SAP database via **SAP DBA Cockpit for DB2**.
- DB2 skills needed for SAP is **minimised/simplified** and is easy to **master**.
- Quoting SAP IT: „**40% Better Performance, Lower TCO & Better-than-forecast ROI**“.

Customer value: **TCO reduction** (initial acquisition and subsequent cost)

- Reaps the benefits from the joint investment of IBM & SAP
- Exploit the hardware & software technology
- Lower the running & management cost of the SAP system



## DB2/SAP Value Proposition Summary

### “DB2: Only Optimized Database for SAP“

Joint Development & Support & Service, Lowest TCO

### Best Performing Database for SAP

DB2 leads key SAP benchmarks

20+% faster than Oracle for R/3

40+% faster than Oracle for SAP BW

### Only Scalable Database for SAP BW

Lowest cost - unlimited scale out for SAP BI

### 38% - 74% Price Advantage over Oracle

License & Maintenance via SAP OEM

### Disc Space Savings with Compression

40+% savings vs. Oracle, 60+% savings vs. MS SQL



# Thank YOU

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