SAP DB
A review on 2 years of Open Source

Jörg Hoffmeister

SAP AG

Teaming up with MySQL

Cross licensing and joint development agreement with MySQL

MySQL is the most popular Open Source DBMS

Combining the enterprise-ready SAP DB technology with the community and eco-system of MySQL

SAP DB will be rebranded to a MySQL brand (Roadmap will follow by August 2003)

Ongoing SAP DB development, maintenance and support by SAP

Joint development of a next-generation DBMS

www.mysql.com

Content

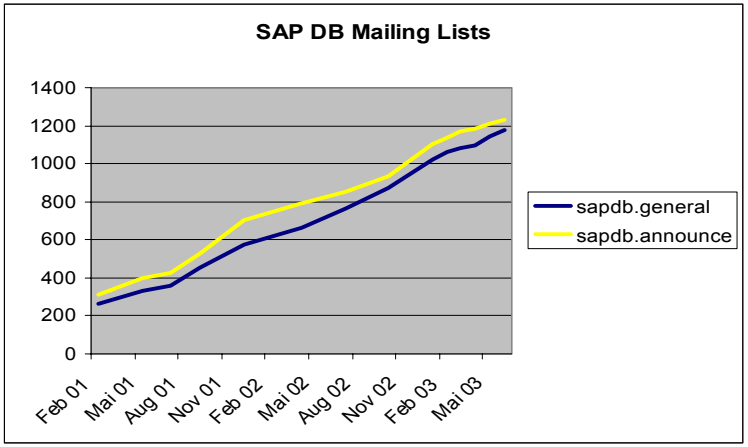
- Project History
- SAP DB Open Source Project Evolution
- SAP DB Case Examples
- Benchmarks
- Benefits of Version 7.4

Project History

- SAP DB and predecissors since 1978
- October 2000: SAP DB Open Source Project starts
  - Binaries, Documentation, News and Spotlights
  - Mailing Lists
- April 2001: Sources and Development Environment
  - Available as Recurring Packages
  - Proprietary Development Environment
- October 2002: Sources available through CVS
- Part of SuSE distribution since SuSE 7.2
  - since 8.x the make is done by SuSE themselves

Evolution

- Mailing Lists
  - steadily increasing community
- Releases
  - 2 major releases (7.3, 7.4)
  - many minors



- Documentation
  - updated through 1 complete development cycle
  - HTML vs PDF
- Spotlights
  - on availability of topics
- Installations
  - 3rd party applications: no statistics available
  - SAP applications: #installations more than doubled

Evolution

- CD-Roms
  - 4 CD Roms in irregular intervals
- Benchmarks
  - 3 new Benchmark results available
- Public Sector
  - increasing interest
- Linux Distributors
  - continous part of SuSE editions
- Support
  - Idea of a Support Network to avoid expensive SAP contract
  - Mailing List works fine

Project vs Product

- **SAP DB is an Open Source Project**
  - Sources available
  - Development environment available
  - GPL/LGPL licensing
  - CVS source control
  - All patch proposals are checked and implemented if accepted

- **SAP DB is an Open Source Product**
  - Ready-to-run binaries
  - SAP quality assured
  - Identical sources – single source approach
  - SAP drives development

Case Examples

Case: SAP DB on Linux with SAP solutions

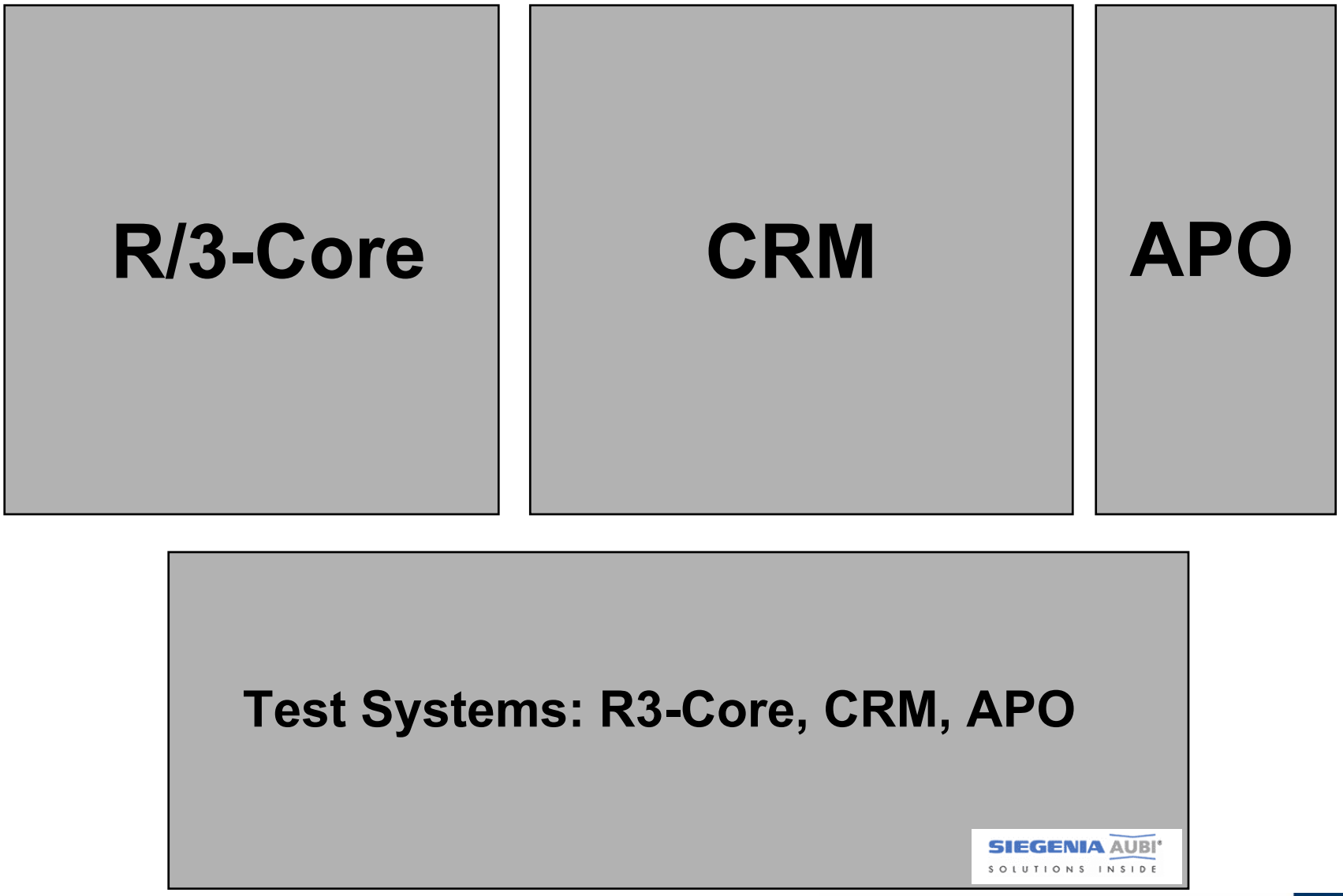
Ventilation technology

Safety systems (Window security etc.)

Case: SAP DB on Linux with SAP solutions

- SAP DB since R/3 2.2D (1995/96)
- Started with Windows/NT 3.1
- Migration to Linux with 4.5B
- 1 ½ year test phase w/o problems
- Now Linux everywhere where it is possible
- Backupserver on Linux
  - Legato Networker (to DLT, LTO)

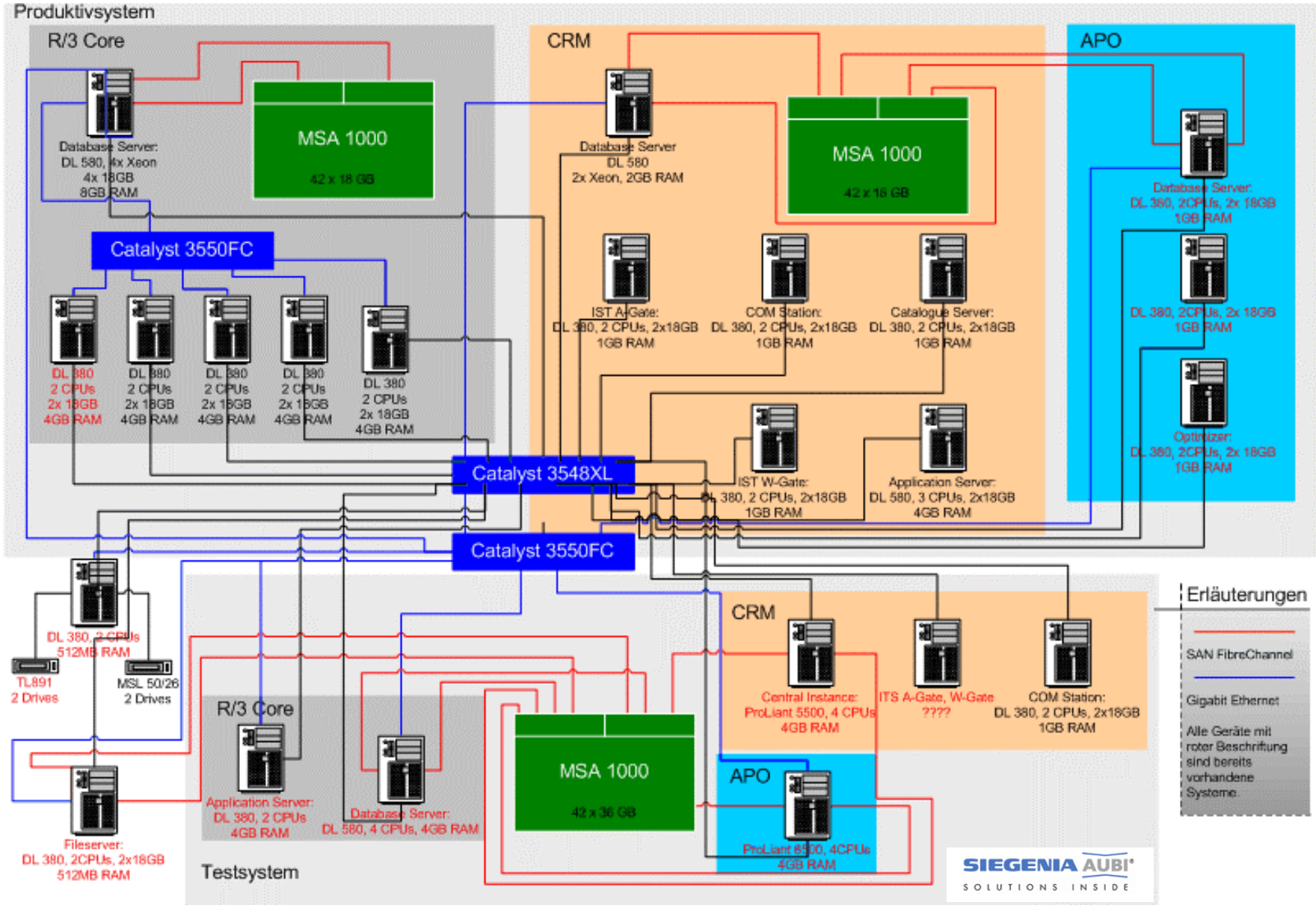
Siegenia Aubi Landscape



Case: SAP DB on Linux with SAP solutions

- R/3
  - 800 users, 550 concurrent
  - Database Size 200 GB
  - 3 languages
- CRM
  - 70 Laptops
  - 170 workgroup server
  - Database size 30 GB today (just started)
  - ITS Linux internet sales planned to start in 2003
- APO
  - DB-Server Linux/SAP DB
  - liveCache Windows (not yet available on Linux)

Siegenia Aubi Landscape (precise)



Beumer

- Equipment and Technology
  - Conveying
  - Packaging
  - Palletizing
  - Loading
  - Sortation & Distribution

Beumer

- Non-SAP enterprise application migrated to SAP DB 7.3
  - formerly Adabas D
  - Beumer has used Adabas D and predicissors since 1988 !
  - Migration via vbs-scripts
  - Significant performance improvement
- 2 Systems, each around 35 GB
- 400- 450 Users
- SUN-Solaris and Win2000 on DELL, HP-Compaq, SUN
- ARCServe as backup software for Win2000

Beumer

- SAP Solution with SAP DB
  - R/3 for FI, CO, HR,
  - Sun Solaris
  - since 1995 (production)
- Database Size
  - 30 GB
- 50 Users

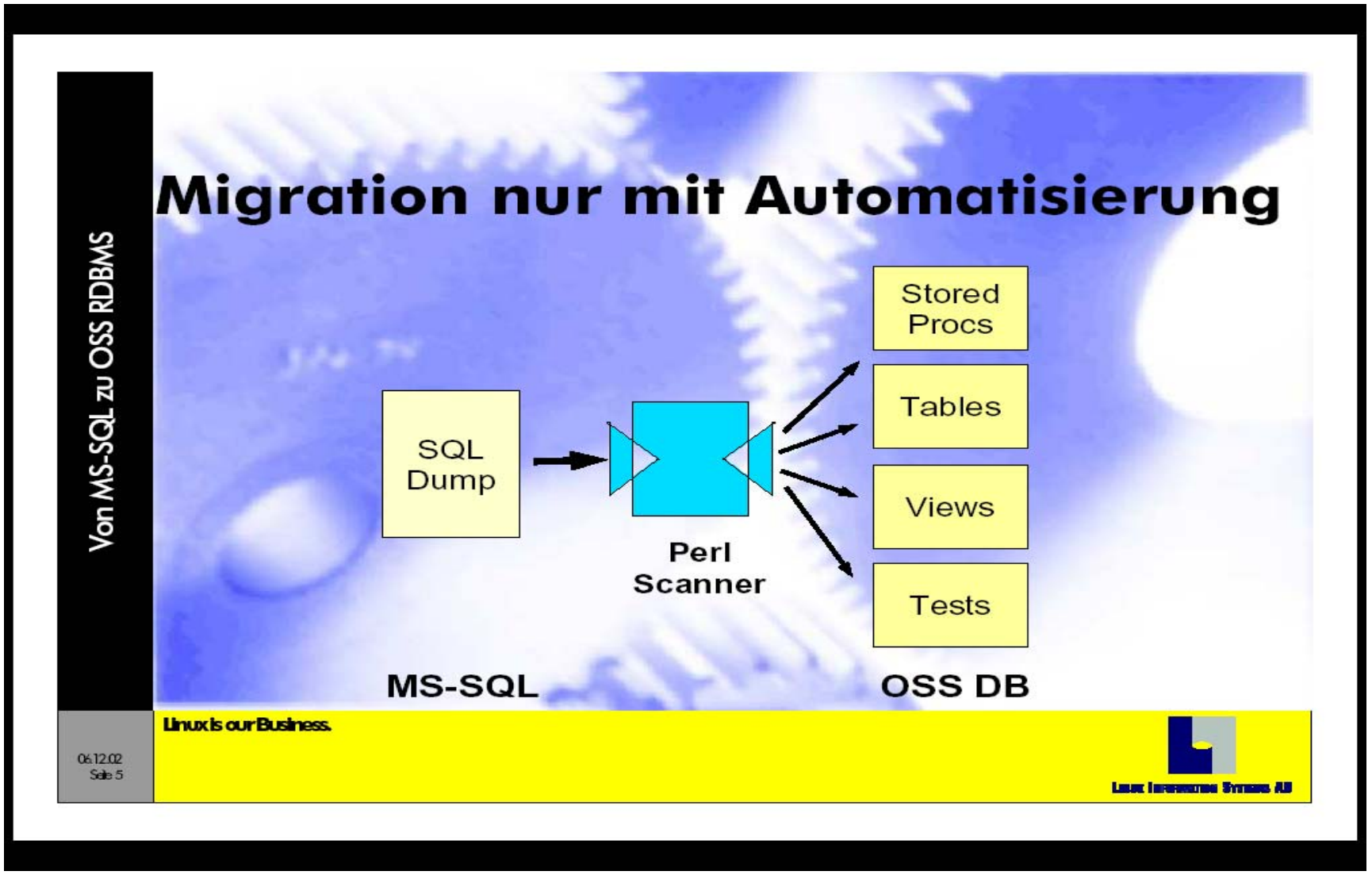
Bundeskartellamt

- Migration Project BKart
  - Migrate all servers from Windows to Linux
  - Migrate an MS-SQL application to an OS-DB
    - migrate from MS-SQL 6.5 to an Open Source Database
    - finally SAP DB was selected
    - 42 Tables, 150 Stored Procedures, 6 Trigger, 12 Views
    - 300 Users
  - Open Source software at BKart
    - Debian GNU/Linux
    - Open LDAP
    - Samba
    - Postnuke

Bundeskartellamt

- Client in Visual Basic 6.0 SP5
- Connection via OLE-DB
- Conditions
  - Minimize client changes
  - Chance to rollback

Bundeskartellamt: Automatic Migration



Bundeskartellamt: Why SAP DB ?

- Proven quality through multi-year use with SAP Solutions
- Fast and reliable
- Easy administration
- System Characteristics: Enterprise, even for terabyte database

DBMS Experiences of SAP Hosting

System A:

- Needs lots of hard disk space
- Needs DB reorg every 3 to 6 months
- Inefficient backup
- Needs higher I/O rate (factor 2) in comparison to SAP DB (same workload)

System B:

- Can not backup logs and DB in parallel
- Needs higher I/O rate (factor 2) in comparison to SAP DB (same workload)
- High CPU consumption

System C:

- Needs lots of hard disk space
- Needs DB reorg every 3 to 6 months

SAP DB:

- More or less no administration needed once the database is set up
- Does not need a DB reorganization
- Less disk and CPU resources needed

Disk Space Comparisons Made by SAP Hosting

Migrations from System A → SAP DB:

- Database size shrinks to 30 - 40% of its previous size

Migration from System C → SAP DB

- Database size shrinks to 30 - 40% of its previous size

DBA Resources As Planned by SAP Hosting

DB Size / Instance	SAP DB	System B	System A	System C
0 - 30 GB	0,1	0,2	0,2	0,2
30 - 100 GB	0,1	0,2	0,5	0,5
100 - 500 GB	0,2	0,4	0,5	0,5
500 GB - 1 TB	0,2	0,5	1,0	1,0
> 1 TB	0,3	1,0	1,5	1,5

Benchmarks

SAP DB Benchmark – Small Configuration

1 Central Server

- 2-way SMP, Intel Xeon 3.06 GHz
- 512 KB L2 Cache, 3 GB main memory

292 concurrent users in SAP‘s SD Benchmark Profile

Average Dialog Response Time	1,96 sec
CPU utilization on DB server	98 %
SAP DB Version	7.3
Operating System	SuSE SLES 8
Total Disk Space	108 GB
Throughput	1.470 Benchmark Items (SAPS)

SAP R/3 4.6C, 2-tier, Certification No. 2003021

www.sap.com/benchmark

SAP DB Benchmark – Small Configuration II

1 Central Server

- 4-way SMP, Intel Itanium II, 1 GHz
- Caches: 32 KB L1, 256 KB L2, 3 MB L3
- 7 GB main memory

470 concurrent users in SAP's SD Benchmark Profile

Average Dialog Response Time	1,74 sec
CPU utilization on DB server	99%
SAP DB Version	7.3
Operating System	SuSE SLES 8
Total Disk Space	51 GB
Throughput	2.400 Benchmark Items (SAPS)

SAP R/3 4.6C, 2-tier, Certification No. 2003031

www.sap.com/benchmark

SAP DB Benchmark – Medium Large Configuration

1 Database Server

- 8-way SMP, Intel Xeon 2.0 GHz
- 2 MB L3 Cache, 8 GB main memory

61 Application Servers

- 48 Dialog Servers, 2-way SMP
- 12 Update Servers, 2-way SMP
- 1 Message/Enqueue Server , 1-way

5500 concurrent users in SAP‘s SD Benchmark Profile

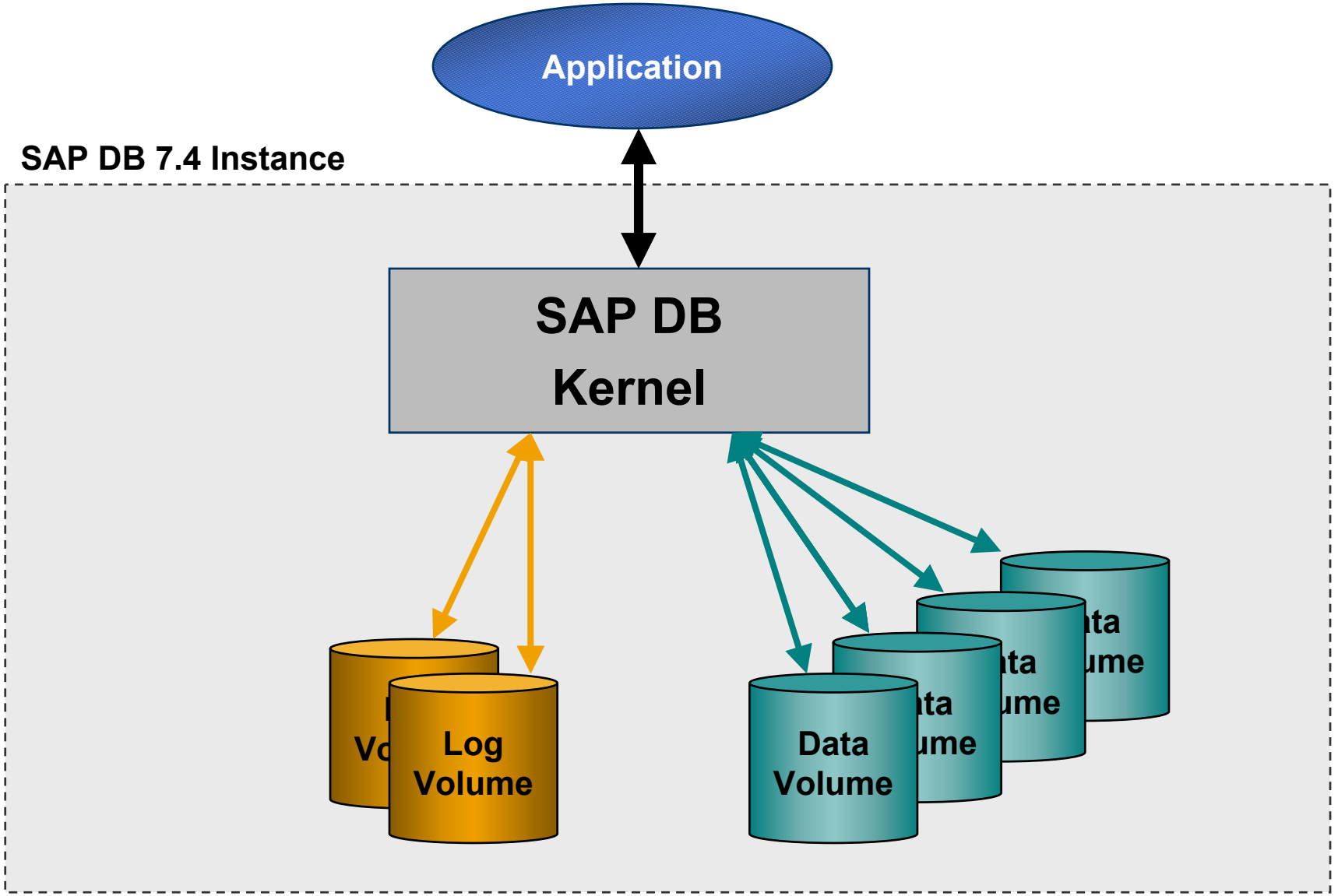
Average Dialog Response Time	1,96 sec
CPU utilization on DB server	98 %
SAP DB Version	7.3
Operating System Database Server	SuSE SLES 8
Operation System Applic. Servers	SuSE SLES 7
Total Disk Space	2.500 GB
Throughput	27.770 Benchmark Items (SAPS)

SAP R/3 4.6C, 3-tier, Certification No. 2003014

www.sap.com/benchmark

Spotlight on SAP DB 7.4

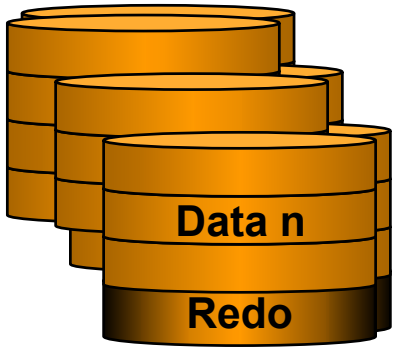
Inside SAP DB 7.4



Version 7.4

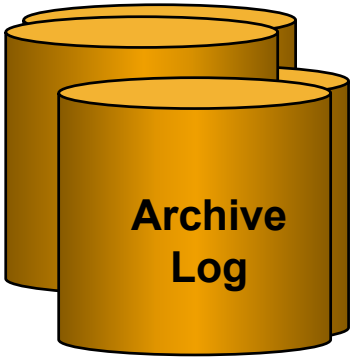
Version 7.3

Data-Devspaces



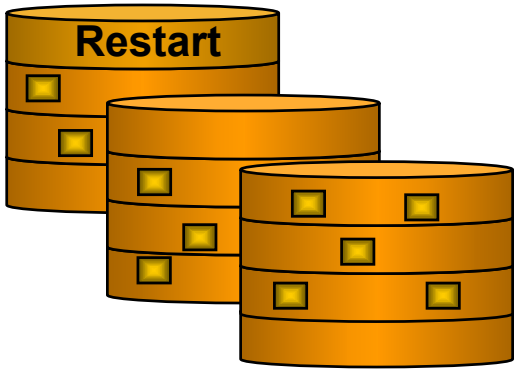
System-Devspace

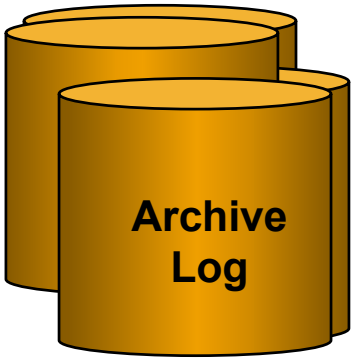
Log-Devspaces



NOW:

Data-Volumes





Log-Volumes

A new Converter

- System devspace is removed. No hotspot when writing the Converter during Savepoint
- Increased concurrency on the converter
  - Converter is divided into several independent parts synchronized by latches
- No customizing of the Converter Cache
  => Single Configuration Parameter
- Converter can dynamically grow or shrink
  - Online Add Volume without limits (MAXDATAPAGES, MAXDEVSPACES)
  - Drop Data Volume (not yet implemented)
- Highest ever used data page number is independent from the number of converter pages
  - Oversized databases can easily be decreased by restoring the data into a smaller amount of data volumes

A new Logging

- Separate Before and After Images
  - Before images are stored in transaction bound ‘Undo-Containers’
  - After images are stored in the archive log
- Concurrent writing of Before Images
  - Because of the transaction bound Undo-Containers
- Checkpoints are Obsolete
  - Database can be restarted when archive log is missing
  - Any database backup can be used for database copy

Document Repository and XML Indexing

WebDAV server

- Document repository with files and folders
- Accessible via HTTP (web folders)
- Checkout / checkin support
- The Internet file system

Indexing of XML data

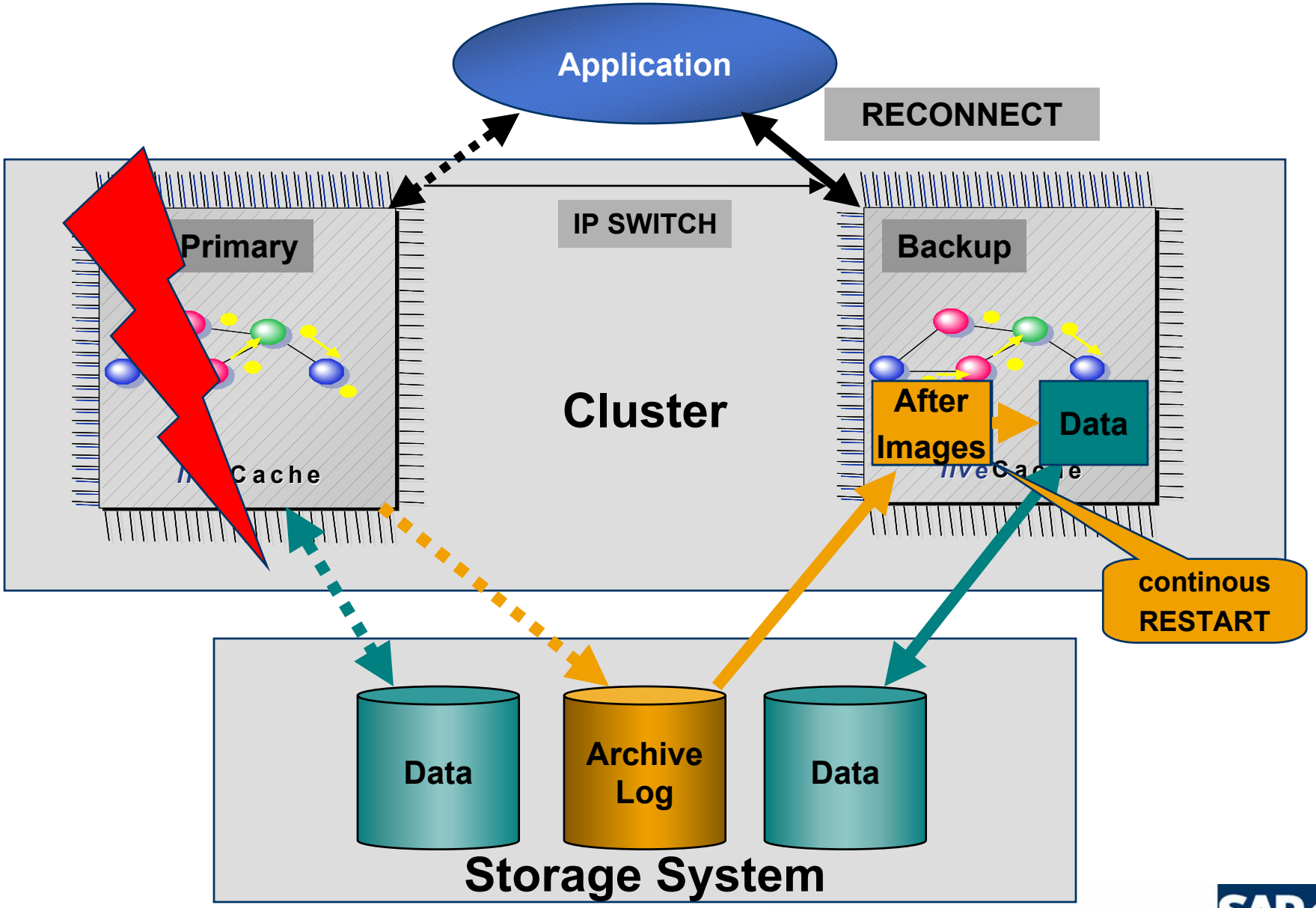
- XML data are stored as LOB
- XML indexes are defined by XPath expressions
- Synchronous or asynchronous index maintenance
- XML indexes are implemented by SQL tables
- Retrieval support for pre-defined XML indexes

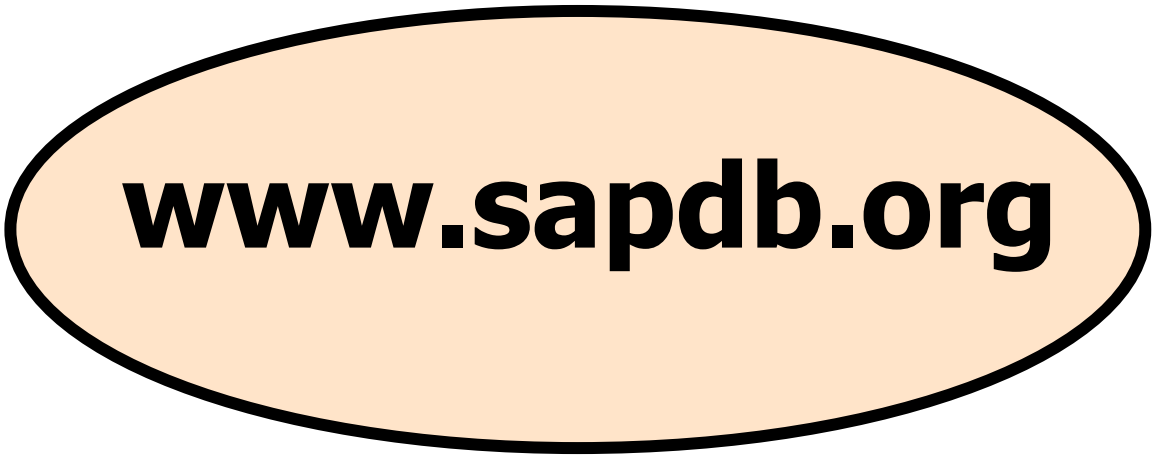
Internet connectivity to (XML) documents

DBAnalyzer

- Rule-based expert system to watch SAP DB instances
- Collects statistical and monitoring data
- Collects system messages
- Supports remote access
- Detects and reports
  - Low cache hit rates
  - High I/O load
  - Low hit rates of DML commands (Select, Update, Delete)
  - Log queue overflows
  - User lock collisions
  - Command timings
  - Timings and frequencies of system locks

Hot-stand-by Configuration (Q3/2003)





The Enterprise Open Source DBMS