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SAP with DB2 HADR and Deep Compression – A Customer Case Study

Helmut K. C. Tessarek, DB2 Performance, IBM Toronto Lab
Gustav Elias, Manager for Storage and Backup, OEBB

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IBM INFORMATION ON DEMAND 2008
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Agenda

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- Overview of ÖBB (Austrian Federal Railways)
- How did it start?
- SAP and HADR
- SAP and Deep Compression
- Questions

Overview of OEBB (Austrian Federal Railways)

Overview of ÖBB

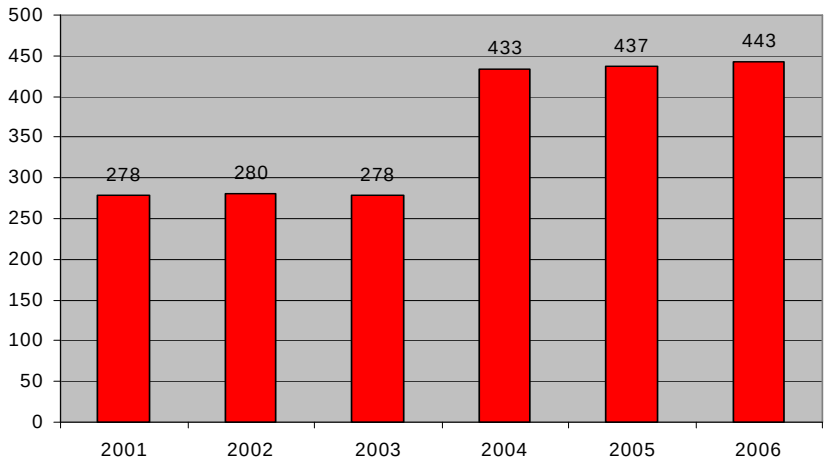
- The biggest mobility supplier of Austria
- Transportation of human beings and carriage of goods on rail and road
- Railway system of 5,690 km
- > 1,200 Railway engines
- > 300 Trains
- > 46,000 Employees

ÖBB

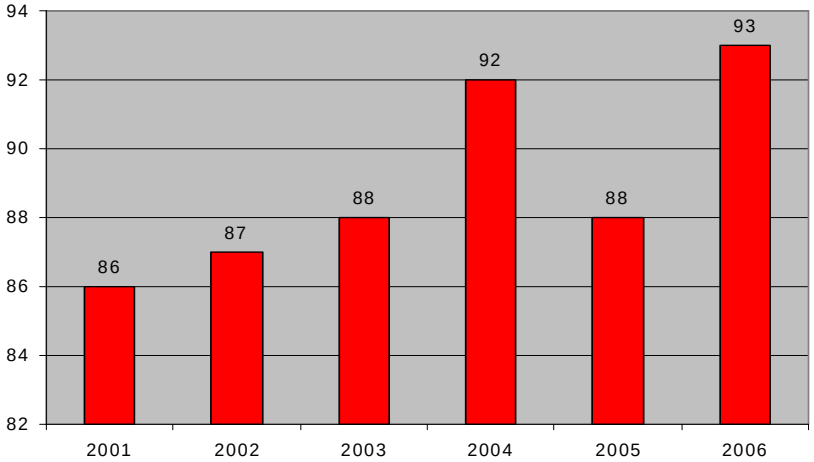
Zukunft am Zug

Transportation Numbers

Beförderte Fahrgäste (in Mio.)



Beförderte Tonnen (in Mio.)



Information Services – Infrastructure Operations

- 2 data center locations in Vienna
- other servers and computer rooms across Austria
- > 500 Server and Clustered Systems (AIX, Linux, Windows, VM)
- > 180 TB Storage (IBM DS8300, HDS 9585, Netapp FC3020C), HP
- 78 Employees

How did it start?

Original Environment

- 2 SAP System landscapes – SAP HR and SAP CORE
- No technical problems
- No massive response time problems; however, bordering on of the SLA's
- Technical requirements for SAP systems increasing constantly
- Hardware S80 Cluster Systems with HACMP – end of lifecycle
- Operating system AIX 4.3.3
- Database on DB2 v7.2 and Oracle 8.1.7 end of maintenance
- Oracle license cost rises !!!

Why DB2….

- Lower license costs and maintenance costs than other competitive databases
- DB2 Administrations-Tools inclusive (eg. HADR)
- Efficient database administration / configuration
- Reduction of the administration tasks (reduction in support staffing) thereby increases the system availability
- Joint „Competence Centre “ in Walldorf (SAP and IBM Partnership)
- High availability = DB2 HADR
  - Very quick failover times / improved Restore process
  - Automatic Client-Reroute
  - Support for Upgrades without interruption (Rolling Upgrades)
  - Lower network traffic - (HADR replicates only transactions!)
- DB2 HADR Proof-of-Concept

SAP HR Overview

(Feb. 2005)

- SAP 4.6C
- DB-Server S80 with 12 CPU‘s (Power3) and 12GB Memory
- 4 Applications Server with 4 CPU‘s (Power3) and 6GB Memory
- 8895 SAPs
- AIX 4.3.3 and Oracle 8.1.7
- Active-Passive Cluster using HACMP
- 600 Users
- 620 GB Data volume
- Largest Table: 120GB (PCL2)
- High Batch load on Salary Account
- Other 4 Systems (Development, Test, Quality Assurance, Training) on Power3 Basis with a total of 4620 SAPs

SAP CORE Overview (Feb. 2005)

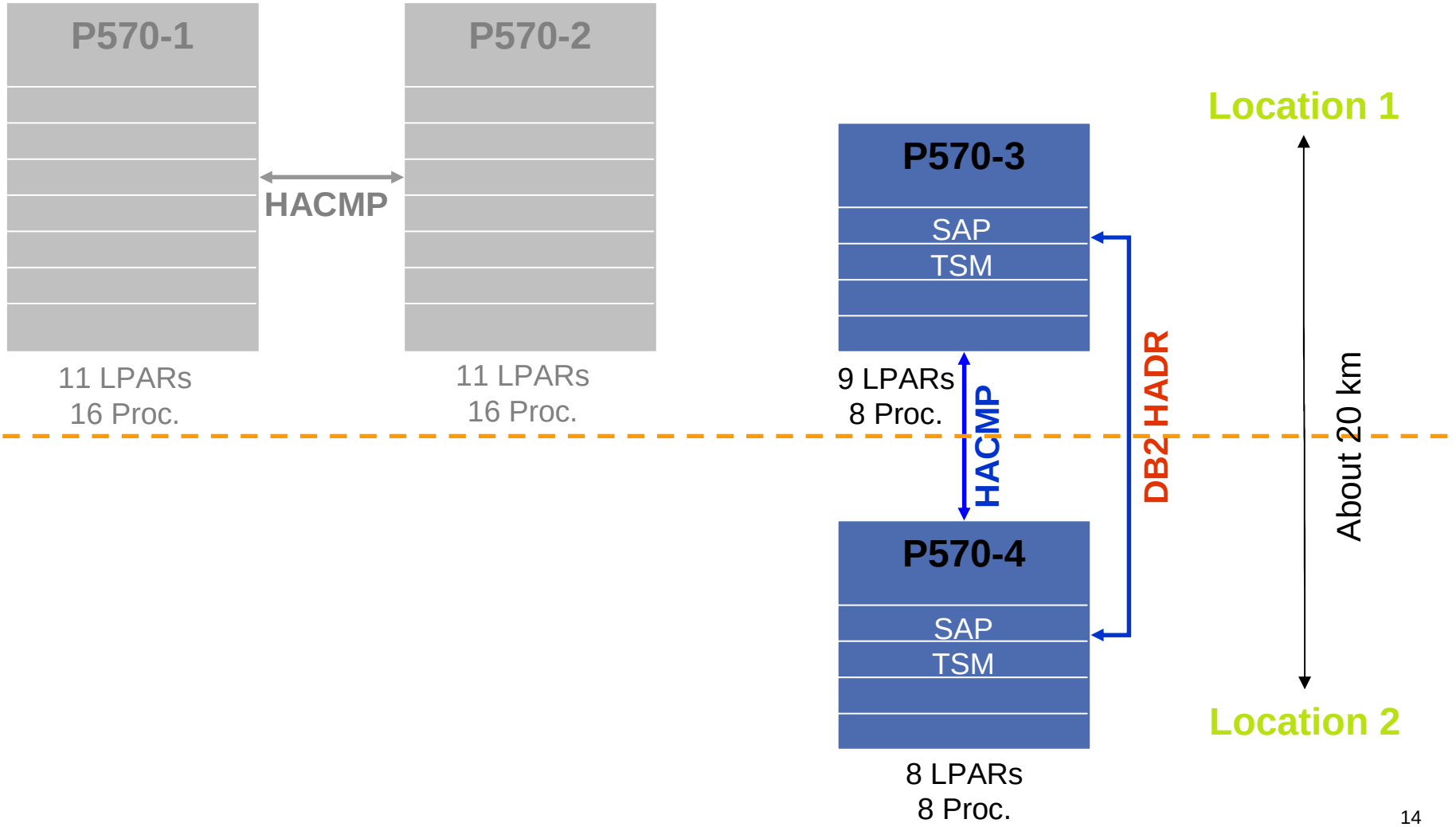
- SAP 4.6C
- DB-Server S80 with 6 CPU‘s (Power3) and 12GB Memory
- 6 Applications Server with 4 CPU‘s (Power3) and 4GB Memory
- 10875 SAPs
- AIX 4.3.3 and DB2 7.2
- Active-Passive Cluster using HACMP
- 1500 User
- 720 GB Data volume
- Largest Table: 76GB (GLPCA)
- High Transaction online workload
- Other 3 Systems (Development, Test, Quality Assurance) on Power3 base with a total of 3960 SAPs

Project Expectation

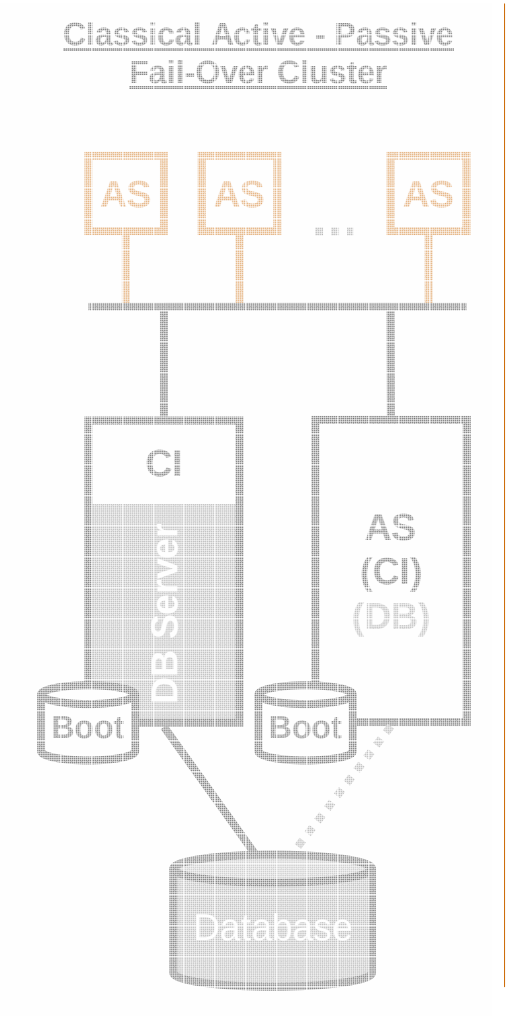
- Modern and for future protected-optimized hardware
- Extended Scalability
- Platform consolidation for both SAP system landscapes uniform operating system and database system
- Minimize the costs for SAP Systems

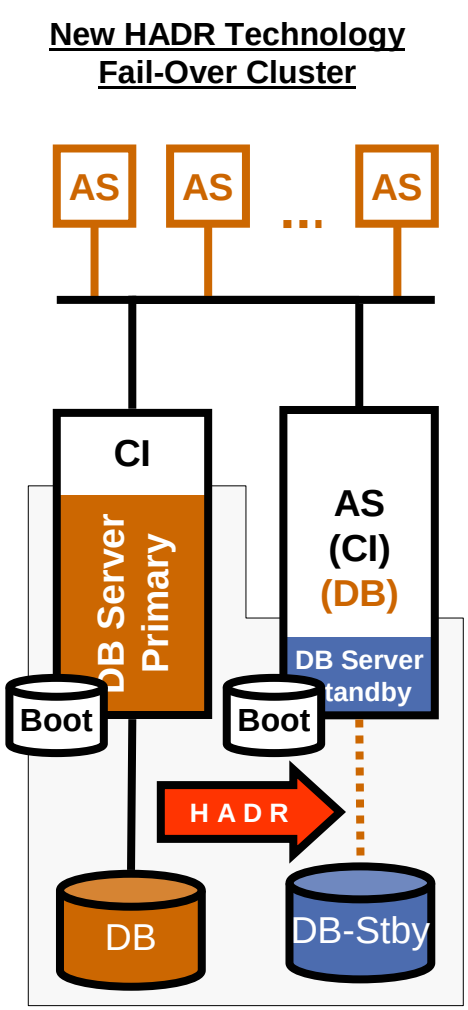
SAP and HADR

High Level Architecture



High Availability Disaster Recovery





Scenarios:

- Onsite Standby
- Offsite Disaster Recovery

Approach:

- Primary & Standby systems
- permanent update of the changes
- Works at level of the database
- Ultra-fast fail-over (no instance restart)
- If the Primary Database fails, the Standby Database will take over the Workload (HADR-Takeover)
- If the primary server becomes available, switch back over from the secondary server to primary server
- Applications become automatic re-routed (Automatic client Reroute)
- Various HADR modes of operations (SYNC, NEARSYNC, ASYNC)

HADR Performance Tests

SGEN software component SAP_BASIS

Description	Runtime in seconds
Initial Run	881
Without HADR	579
HADR nearsync	685
HADR syncronous	775

Result of Migration

- instead of 19 single servers to only 2 p570 with 15 LPARs
- dynamic resource allocation between the systems
- Increased availability and minimized failover time by HADR
- average online response time approx. 0.4 sec.
- Significantly reduced diminished backup times (>12 hrs to approx. 2.5 hrs)
- Significant response time and performance improvement
  - Salary Account processing time reduced by half
  - On-line response time up to 5x faster than in the old system
  - Other Batch tests 6 to 10 times improvement
- Cost reduction by savings in the license area

SAP and Deep Compression

18 months later…

- **SAP ECC 6.0**
- **1.1 TB database SAP CORE (+ 50%)**
- **730 GB database SAP HR (+ 65%)**
- **average response time approx. 0.7 seconds**

Deep Compression Procedure

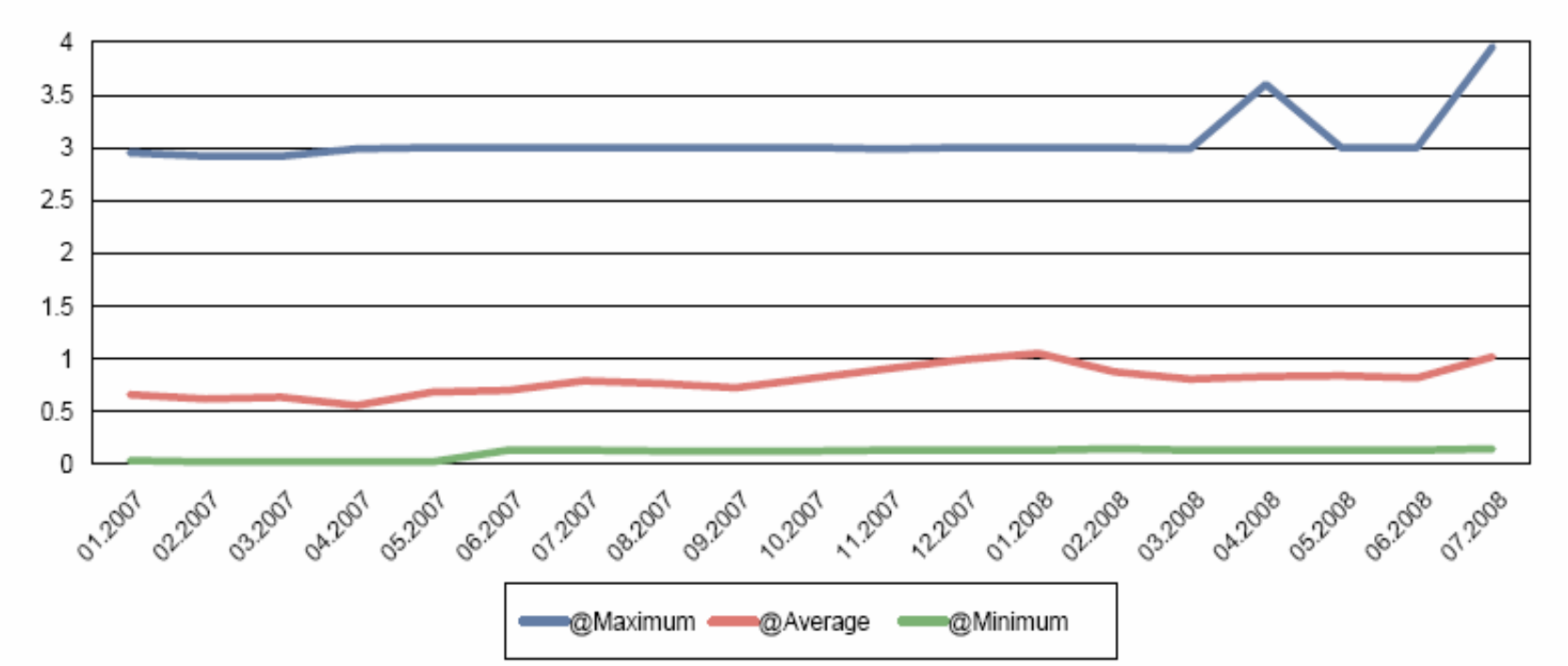
- **DB2 Migration DB2 8.1 to DB2 9.1**
- **Compression of 100 largest tables**
- **SAP Transaction COMP**
- **over a long weekend (3 days)**

15 largest tables (SAP CORE)

Table	Size in KB without Compression	Size in KB with Compression	Spacesaving %
GLPCA	90,255,515	29,784,320	67
COEP	62,749,131	18,197,248	71
BSIS	62,601,600	17,528,448	72
ACCTIT	30,575,669	8,866,944	71
COSS	41,768,960	6,265,344	85
SWWLOGHIST	18,673,231	4,855,040	74
BSAD	17,877,169	4,648,064	74
SWPSTEPLOG	14,336,985	3,727,616	74
COBK	11,732,907	3,519,872	70
SWWWIHEAD	13,456,738	3,498,752	74
BSAS	12,855,941	3,471,104	73
BSAK	13,614,080	3,403,520	75
COSP	18,903,200	3,024,512	84
VIBEPP	11,990,933	2,877,824	76

CPU Usage in Processors

SAP CORE (Primary) Database LPAR



Benefits of Deep Compression

- **Decrease of Storage Usage by up to 50%**
  - ✓ **SAP CORE 1.2 TB to 625 GB**
  - ✓ **SAP HR 750GB to 490 GB**
- **Decrease of Backup Times by 30%**
- **No increase of response or batch time (CPU)**

Questions

Backup Slides

Migration

Phase 1: Planning and Preparation

- Planning of the required migration times with the help of the results from the test runs (72 hours "downtime" incl. all system works, tests, approval by the User) for the production system
- Definition of the migration schedules together with the User depending on their requirements (salary account, accounting periods and accounting periods, …)
- Scheduling of the personnel resources for the migration plans on the part of IBM and ÖBB
- Construction of the project plans (A – Z: Installation of the LPAR's up to the dismantling of the old systems)
- Construction of a detailed "timetable" for the productive conversion (To-Do list of the migration steps)

Migration

Phase 2: Migration of SAP HR on p570

- Migration schedule: September 2005 (Week 37)
- Trial rehearsal: 2 weeks before, Migration Test System
- Actual Migration:
  - Thursday: Migration Development System
  - Friday 07:00 hr: Start of Migration Production System
  - Saturday 15:00 hr: End of Export/Import
  - 22:00 hr: End of system work on SAP
  - Sunday 02:00 hr: End of building HADR db regarding Backup/Restore
  - 08:00 hr: Final work migration
  - 12:00 hr: Handing over to User for final tests
  - 16:00 hr: Release of the new system, Backup

- Wk38: Construction of quality assurance system and test system using "redirected restore" from the Backups of production system and developing system as well as migration of the training system

Migration

Phase 3: Migration of SAP CORE on p570

- Migration schedule: November 2005 (Week 46)
- Trial rehearsal: 3 weeks before, Migration Test System
- Actual Migration:
  - Thursday: Migration Development system
  - Friday 07:00 hr: Start of Migration Production System
  - Saturday 18:00 hr: End of Export/Import
  - 22:00 hr: End of system work on SAP
  - Sunday 02:00 hr: End of building HADR db regarding Backup/Restore
  - 08:00 hr: Final work migration
  - 10:00 hr: Handing over to User for final tests
  - 18:00 hr: Release of the new system, Backup
- Wk47: Construction of quality assurance system and test system using "redirected restore" from the Backup of the production system.

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