

SAP Business Suite
Unicode Hardware Requirements



Solution Management Globalization Services
SAP AG
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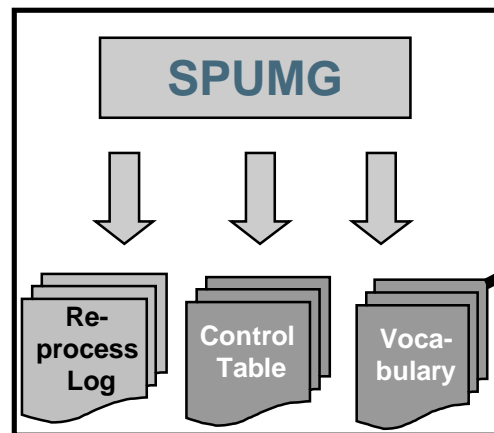
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Database Export, Conversion and Import: Overview



- **System Copy procedure** used for Unicode Conversion
- Import and export during **downtime**
- Unicode Conversion during Export
- Usually **downtime optimization** necessary

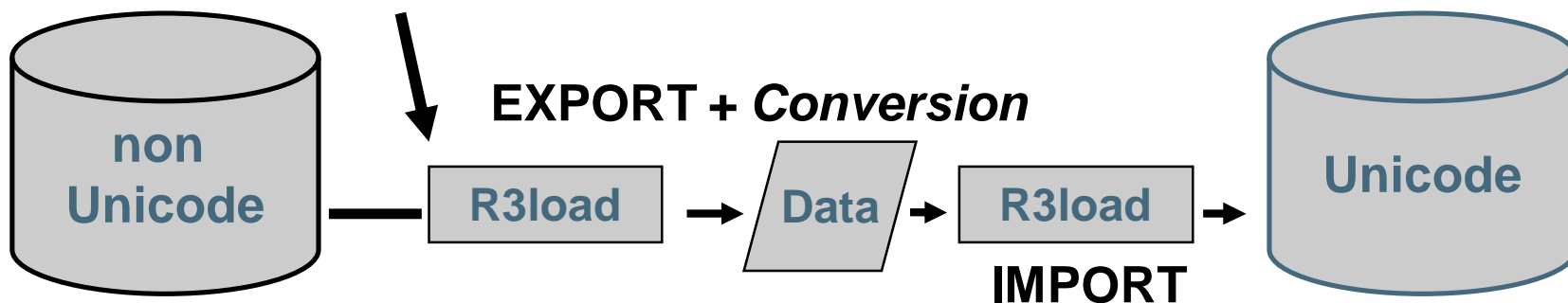


System Vocabulary:

Word	Language	Collision	Filled by	Name	Current Date	Time
grün	DE	3	SEEM	13.09.2004	11:06:40	
꺆꺆꺆꺆꺆	KO	3	SEEM	13.09.2004	11:06:40	
꺆꺆꺆꺆꺆	KO	3	SEEM	13.09.2004	11:06:40	
꺆꺆꺆꺆꺆	KO	3	SEEM	13.09.2004	11:06:40	
꺆꺆꺆꺆꺆	DE	3	SEEM	13.09.2004	11:06:40	
꺆꺆꺆꺆꺆	KO	3	SEEM	13.09.2004	11:06:40	
꺆꺆꺆꺆꺆	RU	M	SEEM	13.09.2004	11:07:35	
꺆꺆꺆꺆꺆	JA	M	SEEM	13.09.2004	11:07:46	
꺆꺆꺆꺆꺆		A	SEEM	13.09.2004	11:04:20	
꺆꺆꺆꺆꺆		A	SEEM	13.09.2004	11:04:20	

Unicode View:

COLOR	SPRAS	NAME
B	DE	blau
G	DE	grün
R	DE	rot
Y	DE	gelb
B	EN	blue
G	EN	green
R	EN	red
Y	EN	yellow
B	JA	青
G	JA	緑
R	JA	赤
Y	JA	黄
B	KO	파란색
G	KO	초록색
R	KO	빨간색
Y	KO	노란색



Factors That Impact the Resource Consumption



Additional resource consumption of unicode depends on various factors

- Processing time: Type of processor, clock speed, and so on
- Memory consumption:
 - OLAP or OLTP
 - Java has always been on Unicode
- Database space: See next slide

Results of SAP measurements based on standard application benchmarks

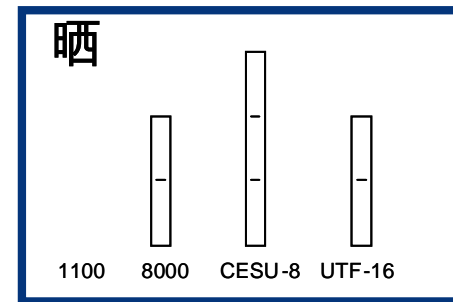
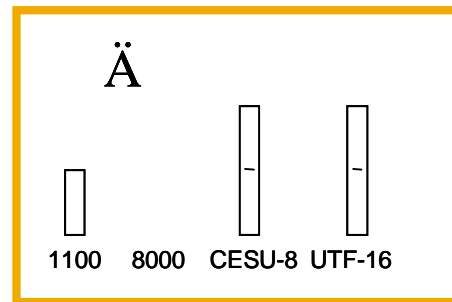
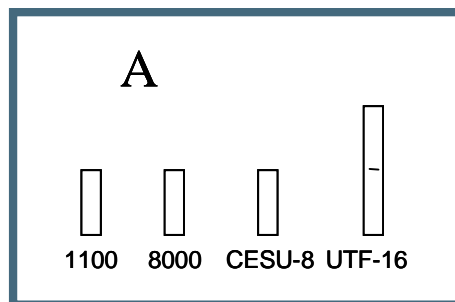
- Measurements were done on the same server, same software, unicode enabled vs. non-unicode
- Note: all of these figures are platform and application dependent
 - Processing time: +5-10%
 - Example: a process that took 1 CPU second now may take 1.1 CPU seconds
 - Memory consumption:
 - +40-50% in OLTP applications (except liveCache)
 - Database space: +10-60%, depending on database type

However

- Experience from conversion projects shows that additional factors play a role so that the measured values form only the **basis** for the project

Database growth depends

- Database Unicode encoding scheme (e.g. CESU-8 vs. UTF-16)
- Database settings (page size, extent size)
- Application modules in use (ratios: tables/indices, text/binary data)
- Reorganization frequency
 - Unicode conversion includes a DB reorganization
 - DB growth is often compensated in UTF-8 case by the shrinking due to reorganization (especially the indexes)
- z/OS: Hardware compression (reduces size by approx. 40%)
- Languages in use (e.g. English vs. Japanese):



Overview of Likely Unicode Hardware Requirements



Note

- The table below includes the additional resource consumptions as measured in the benchmark tests as well as headroom to accommodate a mixture of different transactions
- DB vendors must additional CPU/RAM Hardware resource requirements on standalone DB servers

KPI	Range of Additional Resource Consumption**	Comments
CPU	+10-30%*	<ul style="list-style-type: none">■ Depends on transaction mix■ (MDMP, double byte)
RAM	+40-50%	<ul style="list-style-type: none">■ OLTP■ Internally, application servers are based on UTF-16
Database	UTF-8: +10% UTF-16: +30-60%	<ul style="list-style-type: none">■ 10% is the observed maximum for larger systems (DB size > 200 GB).■ 35% is the observed maximum in growth for small systems (DB size < 200 GB).
Network	0%	Nearly no change due to efficient compression

*** We observed dependencies in the processor type. Modern processors showed 10% increase, older processors up to 30%. So if you update your hardware you'll have to expect less increase than when you continue to use your old hardware**

**** All values (CPU / RAM / Database) refer to *allocated* resources.**

Details on Expected Hardware Requirements - Database



Average database growth at customers (sum of all sizes):

- UTF-8 and CESU-8: -13% (for more than 90% of the installations the database size **actually decreased**)
- UTF-16: +30 ..+40%

Database	Encoding	Add. Storage Req's
DB2 (Universal Database for Unix / NT)	UTF-8	~10% (see slide 2)
Oracle	CESU-8	~10% (see slide 2)
MaxDB	UCS-2	40 ... 60%
MS SQL	UCS-2	40 ... 60%
DB2 for AS/400	UTF-16	10 ... 20%*
DB2 for z/OS**	UTF-16	20 ... 50 %**

•* small growth as biggest part of the ASCII based database is already UC

•** SAP Unicode installations on z/OS always use hardware compression, which reduces the growth of data files due to Unicode conversion. On the other hand side a significant growth of indices was observed (50% and more).

Biggest Tables – Optimize parallelization of Export / Import processes

Processing of Cluster tables

- Sizes of Cluster tables (compared to transparent tables)

Hardware

- Number and Speed of CPUs
- Performance of disks
- Separate Server available for Unicode System – SAP Best Business Practice

Time spent on trouble shooting

- Problems (other than long runtimes) influencing the length of downtime

MDMP or Single Code Page Conversion ?

A Test conversion will give you the best downtime estimation

As many factors influence the runtimes it is very difficult to predict these for specific customers ! Note 857081 gives a ROUGH estimation.

Downtime Optimization: System Downtime Estimation



Highly depends on the hardware used (like CPU, disk, ...) but also on performance optimization.

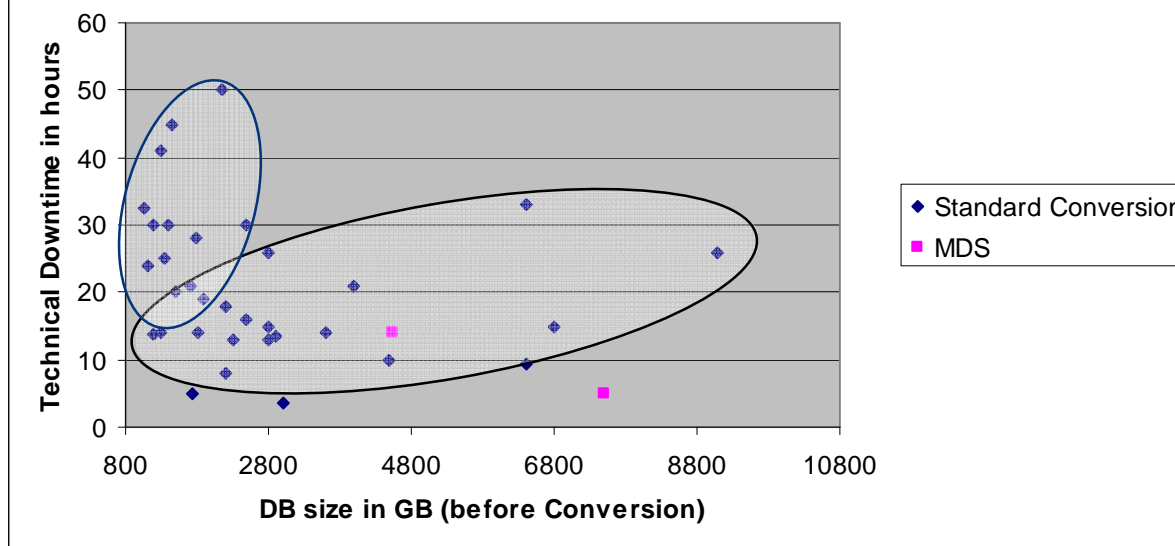
Use SAP Note 857081 „Unicode conversion: downtime ”estimate” to get an early orientation about:

- Expected downtime
- Potential bottlenecks
- Possible measures for improvement
- How to analyze test results
- How to compare results of different migration projects

Runtimes - Customer Experiences



Examples for Technical Unicode Conversion Downtime
(Database Size > 1000GB)



○ Customers with “smaller” systems, lower downtime requirements and/or smaller Hardware capability
→ Smaller Investment in Downtime Opt.

○ Customers with “larger” systems, higher downtime requirements and/or higher Hardware capability
→ Higher Investment in Downtime Opt.

Note: These numbers do not include upgrade downtime

- Net Runtimes on PRD systems: Time needed from **begin of Export until end of Import** (w/o e.g. Upgrade, Prepare Jobs, Back-up, Tests after the conversion ... etc)
- Most of the shown examples used two Servers (Export on Server 1 and Import on Server 2 in parallel).
 - Experiences show that the reduction can be significantly high when using the **Two Servers Scenario** (e.g. from 50 h → 28 h for the runtimes).

Available Methods for Performance Optimization:

- Hardware tuning (e.g. Additional CPUs, I/O Tuning,...)
- Use additional (new) server for the Unicode system
- Database tuning (see note 936441)
- R3Load package split (see System Copy Guide)
- Table split (see note 952514)
- Migration Monitor (See note 784118)
- Distribution Monitor (See note 855772)
- Export: *Unsorted* export of transparent tables (see note 954268)
- Import: R3load option “Fastload” (See note 864861)
- Minimized Downtime Service (MDS) (See Note 693168)

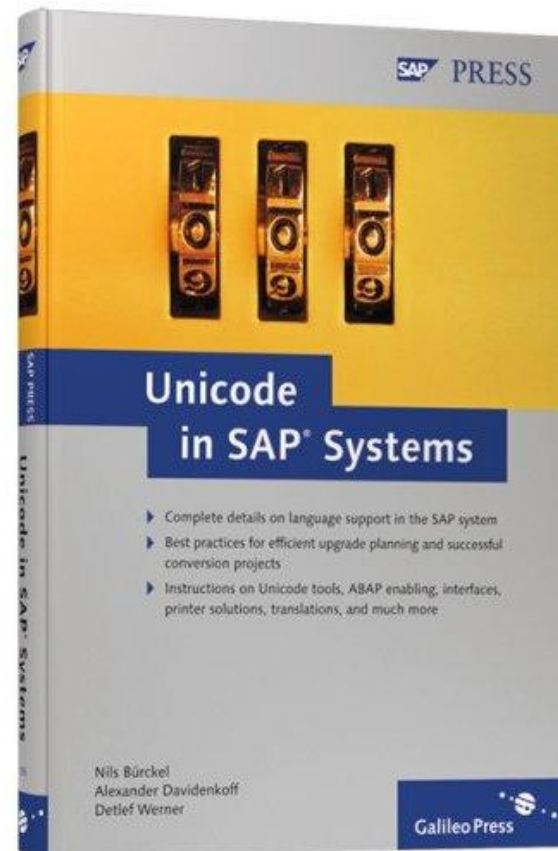
Analyzing Export and Import Times

- Time Analyzer

Appendix - Book: "Unicode in SAP Systems"



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