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Unicode Conversion Overview

Combination of Upgrade with the Unicode Conversion

Interfaces in mixed Environments

Unicode Conversion Project in a 3 Tier Landscape

Unicode Conversion of Complex Landscapes
Learning Objectives

As a result of this workshop, you will be able to:

- Understand how to create a high level Unicode Conversion Roadmap for the Systems in your Landscape
- Consider additional requirements in case of combining a Unicode Conversion with an Upgrade
- Include SAP Best Practices of converting complex system landscapes to Unicode in your Unicode planning
- Determine the conversion sequence in a landscape with several SAP systems involved
Unicode Conversion Overview

Preparation-Tasks

Technical Conversion

Post-Conversion

Non-Unicode System

MDMP preparation – SPUMG (all Systems)

Enabling of Customer Developments - UCCHECK (DEV / SBX)

Interface – Evaluation / Adaptation (DEV / QAS)

Unicode System

Downtime (all Systems)

Unload / reload process (all Systems)

Test Downtime Optimization (SBX / QAS)

Redo n times (SBX)

Check and Repair problematic Data – Transaction SUMG (all systems)

Integration Testing with focus on
Adapted customer ABAP programs
- Interfaces (SBX / QAS)

All Systems =

DEV = Development System
SBX = Sandbox System
QAS = Quality Assurance System
PRD = Production System

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Unicode Enabling of Customer Developments

- ABAP enabling is a preparation task
- Clear **distinction between character and byte processing** in Unicode
- **Single** ABAP source for Unicode and non-Unicode systems
- Unicode enabling is done before the Unicode conversion on the Non-Unicode system via transaction UCCHECK (available as of SAP WAS 6.20)
- **Unicode flag** ("Unicode checks active") is used as a program attribute to control the Unicode enabling procedure
- For details see lesson LCM262
MDMP Preparation – SPUMG (SPUM4 in 4.6C)

- Unicode Conversion converts binary code of character like data from Non-Unicode to Unicode
- Prerequisite for a proper Conversion: *Source Code Page is unique.*
- In Case of an MDMP (Multiple Display Multiple Processing) database, tables contain textual data from several code pages.
  - Source code page is NOT unique
- Preparation task: code page assignment of data in MDMP systems

  - **Full DB scan** via transaction SPUMG
    - Scan times need to be taken into account during planning
  - Scan builds up a **vocabulary**, which needs language assignment
    - Automatical and manual assignment necessary
  - **Vocabulary assignment** is used during Unicode Conversion
  - Repair data after conversion on the Unicode System in transaction SUMG
  - For details see lesson LCM 211
MDMP Preparation – SPUMG / SUMG

**SPUMG Requirements**

- Available as of SAP NetWeaver AS 6.20 (4.6C: SPUM4 is available)
- Full SPUMG scans necessary for MDMP / Ambiguous Blended Codepages before the conversion (export / import)
- Manual maintenance necessary by **native speakers**

**Best Practices**

- Create sandbox as copy of PRD system and run SPUMG/SPUM4 and conversion on this Sandbox
- Maintain SPUMG (**Vocabulary and Reprocessing logs**) properly during this conversion and transfer results to other systems in landscape
- Repair data in SUMG
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
- For details see lesson LCM 211

System Vocabulary:

<table>
<thead>
<tr>
<th>Word</th>
<th>Language</th>
<th>Collision/Filled by Name</th>
<th>Current Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>grün</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>blau</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>blau</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>rot</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>gelb</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>blau</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>grün</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>grün</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>grün</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
<tr>
<td>grün</td>
<td>DE</td>
<td>3</td>
<td>12.06.2004</td>
<td>11:06:40</td>
</tr>
</tbody>
</table>

Unicode View:
Unicode Conversion Overview

Combination of Upgrade with the Unicode Conversion

Interfaces in mixed Environments

Unicode Conversion Project in a 3 Tier Landscape

Unicode Conversion of Complex Landscapes
End of Support for Mixed Code Pages: MDMP

West European View

Japanese View

Korean View

No support as of SAP ERP 6.0 / NW 7.0
Ways to Your Unicode SAP System for MDMP Cases

Supported Unicode Conversion Paths

Unicode Conversion without Upgrade

- releases: R/3 Enterprise 4.7 Ext. 110 & 200 (Web AS 6.20)
  ECC 5.0 (ERP 2004) (Web AS 6.40)

Combined Upgrade & Unicode Conversion (CU & UC)

- source releases: R/3 4.6C
  R/3 Enterprise 4.7 (Web AS 6.20)
  ECC 5.0 (ERP 2004) (Web AS 6.40)
- target release: ECC 6.0 (ERP 6.0) (NW AS 7.00)

Twin Upgrade & Unicode Conversion (TU & UC)

- release independent, target release Unicode enabled
Combined Upgrade & Unicode Conversion R/3 4.6C \textrightarrow ECC 6.0

*ECC = Enterprise Central Component of release ERP 6.0*
**Detailed View: R/3 4.6C MDMP → SAP ECC 6.0 Unicode (UC)**

<table>
<thead>
<tr>
<th>UPTIME</th>
<th>DOWNTIME</th>
<th>DOWNTIME</th>
<th>DOWNTIME</th>
<th>DOWNTIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP Basis 4.6C MDMP</td>
<td>SPUM4 activities</td>
<td>Update Add. Prep.</td>
<td>DB and Unicode conversion</td>
<td>SAP Basis 7.00 Unicode</td>
</tr>
<tr>
<td>Import SPUM4</td>
<td>Module Ext.</td>
<td></td>
<td>Export</td>
<td>Import</td>
</tr>
<tr>
<td>PREPARE</td>
<td>SAPup</td>
<td></td>
<td>R3load</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The ABAP Unicode enabling can only be done in the target release ECC 6.0 (or Unicode enabled SAP release) Therefore a sandbox or (copy of) development system shall be upgraded first.
Combined Unicode Conversion and Upgrade TU & UC

PRODUCTION RUN

Production System R/3 4.5B MDMP → Upgrade → Production System ECC 6.0 MDMP → System Copy + Conversion → Production System ECC 6.0 Unicode

SUMG

Example:
R/3 4.5B MDMP → ECC 6.0

System Copy → Copy Prod. System R/3 4.5B MDMP

TWIN RUN

Copy Prod. System R/3 4.5B MDMP → Upgrade → Copy Prod. System ECC 6.0 MDMP

UCCHECK

SPUMG

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### Downtime Optimization: Average Downtime Upgrade to SAP ERP 6.0

<table>
<thead>
<tr>
<th>Evaluation type:</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preselected:</td>
<td>All New Upgrades</td>
</tr>
<tr>
<td>Internal Upgrades:</td>
<td>Excluded</td>
</tr>
<tr>
<td>Customer Upgrades:</td>
<td>Included</td>
</tr>
<tr>
<td>Upgrade Title:</td>
<td>SAP ECC 6.0 SR2</td>
</tr>
<tr>
<td>Upgrade Strategy:</td>
<td>Downtime-minimized, Resource-minimized</td>
</tr>
</tbody>
</table>

For most projects the potential upgrade downtime is under 8 hours.

Average 7.5h

Number of Systems analysed: 166

Note: All values which occur less often than 5% of the peak value have been cut off and cumulated in the last bar.
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
Depending on hardware and parallelization effort, the R3load runtimes throughput is 100 – 200 GB/h. Test measurements up to 300GB/h.
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)

Analyzing Export and Import Times

- Time Analyzer
Unicode Conversion Overview
Combination of Upgrade with the Unicode Conversion
Interfaces in mixed Environments
Unicode Conversion Project in a 3 Tier Landscape
Unicode Conversion of Complex Landscapes
Conversions between incompatible code pages possible

Only a common subset of language characters exchangeable

Special rules have to be obeyed to make communication possible

...
In case of an Unicode ↔ non-Unicode single code page combination RFC passes all character data with code page conversion between Unicode and the single code page.

As Unicode is a true superset of any old standard codepage not all Unicode characters can be transferred to the non-Unicode system. If the partner is an external single code page system the same conversion rules between Unicode and single code page apply.

Invalid characters in ISO-8859-1 / MS 1252 system

<table>
<thead>
<tr>
<th>Unicode to Single Codepage</th>
<th>only allows valid characters for target codepage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ä</td>
<td>Ä</td>
</tr>
<tr>
<td>ß</td>
<td>ß</td>
</tr>
<tr>
<td>あ</td>
<td>#</td>
</tr>
<tr>
<td>東</td>
<td>#</td>
</tr>
<tr>
<td>한</td>
<td>#</td>
</tr>
<tr>
<td>ᡁ</td>
<td>#</td>
</tr>
</tbody>
</table>
In case of an Unicode ↔ non-Unicode MDMP combination RFC passes all character data with code page conversion between Unicode and the different old code pages if RFC transfer structure contains a language key.

Which of the MDMP code pages is chosen depends on the language. The language is defined either by the logon language or (for flat tables) by the language key within the data:

- Unicode to MDMP only allows valid characters of configured codepages

<table>
<thead>
<tr>
<th>Character</th>
<th>Codepage</th>
<th>Character</th>
<th>Codepage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ä</td>
<td>DE</td>
<td>Æ</td>
<td>DE</td>
</tr>
<tr>
<td>ß</td>
<td>DE</td>
<td>ß</td>
<td>DE</td>
</tr>
<tr>
<td>あ</td>
<td>JA</td>
<td>あ</td>
<td>JA</td>
</tr>
<tr>
<td>東</td>
<td>JA</td>
<td>東</td>
<td>JA</td>
</tr>
<tr>
<td>한</td>
<td></td>
<td>#</td>
<td></td>
</tr>
<tr>
<td>ハ</td>
<td></td>
<td>#</td>
<td></td>
</tr>
</tbody>
</table>

Invalid in ISO-8859-1 and SJIS
Interface Challenges in Large System Landscapes (1)

- Mixed Landscape: Many SAP systems in Unicode, non-Unicode Single Codepage and MDMP
- Many Interfaces to Non-SAP systems
- No or incomplete list of all main interfaces is available
- No or incomplete information which interfaces exchange Business text data in which languages
- Old partner systems or old partner system interfaces to SAP
  - When re-connecting such an interface to a SAP system converted to Unicode, often even technical connections are no more possible
Even if it is planned to convert all SAP systems to Unicode, it is mostly only possible to convert one SAP system only at one time (weekend)
  - Some Customers manage to convert two systems on one weekend, but a “Big Bang” for all Systems is usually not realistic

During a Unicode conversion the effort for interface testing and adjustment is often underestimated

If Add-on software or non-SAP interface is not Unicode enabled, an early discussion with and solution from vendor is required
Choice for Data Transfer: Non-Unicode or Unicode

- Changeable in RFC Connections (Transaction SM59) on the Unicode system

- Can be specified in File Down- and Upload
  
  OPEN DATASET dsn IN TEXT MODE ENCODING (DEFAULT | UTF-8 | NON-UNICODE).
Unicode – Non-Unicode Communication

- Rule of Thumb: **Logon Language / Batch Job Language** controls in most cases the Unicode – Non-Unicode conversion
  - SAP MDMP ↔ SAP Unicode (Exception: TABLES parameter and language key in table)
  - File Up- and Download (OPEN data set in TEXT MODE)
  - Communication between SAP Unicode ↔ Non-SAP Non-Unicode System

- **Logon Language** is changeable in programs via SET LOCALE LANGUAGE <lang>

- With Asian Languages the **Container-Problem** (Conversion - Misalignment) can cause additional effort

- Non-SAP Partner Systems:
  - Additional effort for **adjustments of correct dictionary metadata** (data types, lengths, structures, etc.) often required since length in SAP Unicode (UC) different than in non-UC
Unicode Conversion Overview
Combination of Upgrade with the Unicode Conversion
Interfaces in mixed Environments
Unicode Conversion Project in a 3 Tier Landscape
Unicode Conversion of Complex Landscapes
Building Blocks of Unicode Conversion Projects

ABAP Unicode Enabling

Interface Adaptation

Project Management

Technical Conversion

MDMP Handling

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Which Factors influence the UC Conversion Project

**Used Language Support technology**
- easy: Single Code Page; Asian Code Page
- medium: Multiple Code Pages (MDMP)
- difficult: Multiple Code Pages (MDMP)

**Type of System**
- SAP NetWeaver AS standalone
- SAP ERP
- SAP CRM with Mobile Sales

**System properties:**
- Database Size
- Downtime
- Hardware performance
- Small database size
- Long Downtime window
- Good performing Hardware
- Large database size
- Small Downtime window
- Bad performing Hardware

**ABAP Enabling (UCCHECK)**
- Small Amount of Objects
  - easy: Small Amount of Objects
  - medium: Large Amount of Objects
  - difficult: Large Amount of Objects
- Easy objects (CS, …)
  - medium: Difficult Objects (Offset)
  - difficult: Difficult Objects (Offset)

**Conversion Methods**
- Standard Table Splitting
- Combined Upgrade & Conversion

**Interfaces to SAP systems**
- SAP Unicode Systems
- SAP Single code page
- SAP MDMP + TABLES
- SAP MDMP + ALE (Container)

**Interfaces to Non-SAP systems**
- Unicode based Systems
- Single Code Page Latin
- Single Code Page Asian
Typical 3 System Landscape Conversion: Planning

Assumption:
Release: ECC 5.0
MDMP Customer
DB Size: ~ 1TB
Downtime Window: 48 h

<table>
<thead>
<tr>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Production</td>
</tr>
<tr>
<td>Sandbox Environment*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
</tr>
</tbody>
</table>

- Kickoff Unicode Conversion Project
- Development Freeze recommended
- All ABAP Objects are Unicode enabled
- Unicode GO-Live

* Ideally this Sandbox Environment consists of two systems – one Non-Unicode and one Unicode system with the Hardware comparable to the PRD conversion

Assumption:
Release: ECC 5.0
MDMP Customer
DB Size: ~ 1TB
Downtime Window: 48 h

- ABAP Enabling / Testing
- SPUMG + Conversion
- Testing (Unicode)
- Performance Optimization

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Typical 3 System Landscape Conversion: Sequence

1) Create Sandbox (SBN) as Copy of Productive System (PRD)
2) Unicode Conversion of SBN → SBU (n times)
3) Unicode Conversion of Development (DEV)
4) Unicode Conversion of Quality Assurance (QAS)
5) Unicode Conversion of PRD
Example for Combined Upgrade + Unicode Conversion CU&UC

1) Create Sandbox (SBX) as Copy of Production System (PRD)
   - SPUM4 / Language Scans / Vocabulary

2) a) Upgrade of SBX (2 times recommended)
   - ABAP Reconciliation / SPAU between 4.6C / ECC 6.0
   - ABAP Unicode Enabling
   - Combine ABAP Unicode Enabling with SPAU (synergy !)
   b) Unicode Conversion of SBX (n times >= 2-3 recommended)

**Dual Landscape is needed to support CU & UC Projects**

3) Upgrade + Unicode Conversion of Development System DEV
4) Upgrade + Unicode Conversion of Quality System QAS
5) Optimization of Conversion of SBX – PRD Dress Rehearsal (n times, depends)
6) Upgrade + Unicode Conversion of Production (PRD)
Important Points to be considered before a Unicode Conversion Project I

- A Unicode Conversion is a combined approach between SAP NetWeaver and Application Specialists
  - Identify Language specialists for all used languages in case of MDMP
  - Establish a proper project team with all parties included

- In case of large systems, Downtime Optimization will be time consuming
  - Several runtime tests might be necessary

- One important and effective downtime optimization method is to make use of new hardware (additional server) in order to export and import in parallel
  - Acquire new Hardware as early as possible

- Archiving and data reduction can significantly reduce the Unicode Conversion effort
  - Analyze Archiving options as early as possible
Important Points to be considered before a Unicode Conversion Project II

- **Sandbox Conversion** is (highly) recommended
- An SAP certified **Third Party Solution** does not mean, that it is automatically Unicode enabled
  - Ask the vendor for Unicode compliance as early as possible
- **Interfaces to MDMP** systems need to be analyzed in detail
- MDMP systems: Plan **sufficient time** for SPUM* Scans
- Especially for MDMP systems: Use the **latest Basis Support Package** Level for the conversion
Combination of Upgrade with the Unicode Conversion
Unicode Conversion Overview
Interfaces in mixed Environments
Unicode Conversion Project in a 3 Tier Landscape
Unicode Conversion of Complex Landscapes
What is Best Conversion Sequence for a Complex Landscape? (1)

**Main Rules for Deciding the Conversion Sequence in a given Landscape**

- **Convert MDMP Systems first**
- **Do not extend or implement MDMP in existing Systems** – Convert these systems to Unicode
  - The more code pages you implement in an MDMP system, the more complicated the conversion gets
- **Unicode compatible Release and Support Package Level** need to be met
  - Combined Approach (CU&UC or TU&UC) might be necessary
- **Minimize Unicode – MDMP Interfaces**
  - Unicode – MDMP Interfaces cause most effort
- **Convert the Fast Growing Systems in the first place**
  - The bigger the system, the more effort needs to be spent on downtime optimization
What is Best Conversion Sequence for a Complex Landscape? (2)

Additional Rules

- Minimize Unicode → Single Codepage Interfaces
  - Risk of Transfer of Non-supported characters from Unicode to Single Code Page

- Transfer from Single Code Page System to Unicode System without data loss
  - Example: Conversion of SCM or BW systems before Backend (Single Code Page) has no “data loss risk”

- Conversion of multiple Systems during one Weekend only in case of very complicated interface problems

- Get Conversion Experiences before Converting complicated Systems

- In case of multiple PRD systems with one DEV system, all PRD systems should be converted to Unicode

- Check Multi Language Requirements in different systems
  - Example: SCM System is often operated in EN only – low Unicode priority

- Longterm: Go for Unicode for all Systems in your Landscape
Golden Rules for Combined Upgrade and Unicode Conversions

- Use as many synergies as possible for Upgrade and Unicode conversion, in particular
  - Upgrade SPAU / SPDD adjustments
  - functional adjustments of customer programs for ECC 6.0 release
  - Unicode ABAP enabling
  - User Acceptance Test & Integration test in ECC 6.0 Unicode

- Ensure Availability of Experiences on Upgrade and Unicode conversion, in case of lacking experience consider to get Unicode experts on board
  - In particular for overall optimization and Downtime minimization

- Good housekeeping, esp. archiving, cleansing, etc. drives efficiency of upgrade and Unicode conversion (vocabulary effort, upgrade and Unicode downtime)

- Many Unicode Conversion activities can run in parallel to upgrade activities and are therefore not impacting the upgrade project timeline

- Test for Key business processes and organization of involved User Community needs to be organized centrally
Example for Landscape Conversion:

1. CU & UC Upgrade SAP R/3 4.6C MDMP to SAP ERP 6.0 (2005) (Unicode)
2. Unicode Conversion SAP CRM 4.0
3. Unicode Conversion SAP NetWeaver BI 3.5
4. Unicode Conversion SAP SCM 5.0
Complex System Landscapes: Example for Sequence

Non-Unicode

SAP CRM 4.0

SAP NetWeaver BI 3.5

SAP R/3 4.6C

MDMP

SAP SCM 5.0

Mixed

SAP CRM 4.0

SAP NetWeaver BI 3.5

SAP ERP 6.0 (2005)

Mixed

SAP CRM 4.0

SAP NetWeaver BI 3.5

SAP ERP 6.0 (2005)

Mixed

SAP SCM 5.0

Unicode only

SAP CRM 4.0

SAP NetWeaver BI 3.5

SAP ERP 6.0 (2005)

SAP SCM 5.0

Unicode

Non-Unicode

Data Transfer

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Customer Case SAP: Unicode Conversion of four large SAP Systems

- R/3 FI 4.6C MDMP system with 22 languages and 11 code pages
- Combined upgrade to SAP ECC 6.0 and conversion to Unicode
- Parallel database migration from ORACLE to IBM DB2 for Unix
- Decision for TU & UC for several reasons
- Production downtime shall be a prolonged weekend with a „worst case“ of 4 days
- Dependent SAP systems also to upgrade and convert to Unicode in parallel:
  - R/3 HCM MDMP: Target ERP 6.0 Unicode connected via ALE to FI
  - CRM: Target SAP CRM 5.0 Unicode
  - BI: Target SAP BI 7.0 Unicode
Customer Case SAP: System Data of Largest R/3 FI System

Hardware (production):
- 13 Windows application servers (4 double-core CPU’s INTEL, 32 GB RAM each)
- HA Clustering of Message Server and Standalone Enqueue Server
- UNIX database server (11 double-core CPU’s IA, 128 GB RAM)
- HA Clustering between two data centers

System Data (production):
- Active users: ~5,000
- Database size: ~4.4 TeraByte
- Languages: 28 languages within 11 code pages
- Modifications: several thousands in dictionary (SPDD) and coding (SPAU)
Customer Case SAP: R/3 FI Upgrade Landscape (simplified)

Upgrade landscape for:
- upgrade adjustments
- ABAP enabling
- Unicode conversion

Upgrade Project Landscape ECC 6.0

Productive Landscape 4.6C

Changes in DE4 MUST be maintained manually in DEV with Unicode enabled ABAP

Support / Emergency / Bug Fix
Timeline for R/3 FI upgrade and Unicode project system in a nut shell (2006 / 2007)

- August: Setup of project landscape; process/scope definition
- September: Test Upgrade to ERP2005 and Unicode Conversion
- October: Business test I
- November: Quality cycle and final business test II
- December / January: Project rest due to year end closing
- February: Productive Upgrade and Unicode Migration

Dependent and parallel upgrades and Unicode conversions:
- R/3 HCM: Live upgrade and Unicode conversion September 2006
- CRM: Live upgrade and Unicode conversion October 2006
- BI: Live upgrade and Unicode conversion August 2007
Summary

- Unicode is SAP’s Strategic Technical Solution for all Applications
- Combination of Upgrade and Unicode Conversion can lead to synergies
- Unicode Conversion of complicated Landscapes is possible
SAP Unicode Info Center:

- Homepage: [www.service.sap.com/unicode@sap](www.service.sap.com/unicode@sap)
  - Unicode Overview Library
  - Unicode Conversion Guides
  - Combined Upgrade & Unicode Conversion
  - ABAP and Unicode Library

- Solution Management: [www.service.sap.com/unicode](www.service.sap.com/unicode)

SAP Notes:

- 551344 „Unicode Conversion“
- 548016 „Conversion to Unicode“
- 79991 „Multi-Language and Unicode support of mySAP solutions“
- 928729 „Combined Upgrade & Unicode Conversion FAQ“
- 959698 „Twin Upgrade & Unicode Conversion FAQ“
More Upgrade Information

SAP Upgrade Info Center:
- Homepage: [http://service.sap.com/upgrade](http://service.sap.com/upgrade)
- mySAP ERP specifics:
  - SAP upgrade roadmap: [HTML version](http://service.sap.com/upgrade-erp)

SAP Upgrade Tools:
- System Switch Technology: [http://service.sap.com/upgradetech](http://service.sap.com/upgradetech)
- SAP Solution Manager: [http://service.sap.com/solutionmanager](http://service.sap.com/solutionmanager)

SAP Upgrade Services:
- Overview and order infos: [http://service.sap.com/upgradesservices](http://service.sap.com/upgradesservices)
Further Information (1)

SAP Public Web:
SAP Developer Network (SDN): [www.sdn.sap.com/unicode@sap](http://www.sdn.sap.com/unicode@sap)

SAP Service Marketplace:
[www.service.sap.com/unicode@sap](http://www.service.sap.com/unicode@sap)
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