Performance Techniques for Unicode Conversion of Single Code Page Systems
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Learning Objectives

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

- Select an appropriate environment strategy for your project
- Understand the Unicode conversion process
- Use SAP tools and techniques for high performance conversion to reduce downtime
- Use Oracle features to enable continuous processing due to space consumption
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<thead>
<tr>
<th>Agenda</th>
<th>Chevron Corporation</th>
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<td>SAP Landscape</td>
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One of the world’s largest global energy companies
Active in more than 180 countries
47,000 employees worldwide
$150 billion in revenue for 2004
Agenda

Chevron Corporation
SAP Landscape
Conversion
Planning
Environment Strategy
Process
Tips and Tricks
Q & A
HPUX PA-RISC & IA64
Hitachi
7 Production environments
500 GB - 4TB
40+ Environments
Oracle 9.2.0.5+
H.R. Landscape Prior to The Conversion

- HPUX 11.11 PA-RISC
- SAP Enterprise 4.71
- 5 App. servers
- 2 ITS servers
- 500 GB DB
- Timesheet access via ESS and Portal
- 24,000 users
H.R. Landscape After The Conversion

- **HPUX 11.23 IA64**
- **SAP R/3 Enterprise 4.71 Unicode**
- **3 Application servers**
- **2 ITS servers**
- **450 GB DB**
- Timesheet access via ESS and Portal
- **24,000 users**
Agenda

Chevron Corporation
SAP Landscape
Conversion
Planning
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Tips and Tricks
Q & A
Conversion Planning - Documentation

- Unicode Conversion Guide
- SAP Installation Guide
- System Copy Guide
- Migration Monitor Guide
- Read OSS Notes
Conversion Planning - Hardware

- Change platform to Itanium
- Need OS skills to patch and certify new platform
- Making existing scripts work on new platform
- While HR is relatively small, need to make sure to have enough disk space for export
- Given a 24 hour window for data movement downtime
Conversion Planning - Downtime

- Understand what customers are willing to endure for outage duration
- Downtime started on Friday Evening
- Go/No-Go decision on Sunday Morning
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Conversion Environment Strategy

- All prior experience based on upgrade strategy
- Identified that Unicode Conversion does **NOT** need to use the same strategy as an upgrade
- Dual support stack not needed, although may be preferred (it’s up to you)
- Key learning – development environment does not need to be unicoded immediately
- Fix ABAP code prior to converting an environment.
Chose to apply ABAP unicode changes via transport bundles after conversion

Needed a separate environment to transport and test ABAP Unicode (can not use existing Staging / QA)

Sand box for initial learning
  Even though this was for technical learning, users wanted to see it.
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Conversion Process

- Have a rock solid detailed plan
- Understand the environment architecture
- Create sand box for learning
- Apply OSS notes
- Far fewer OSS notes to apply than SAP R/3 Enterprise Upgrade
## Conversion Process - Know Your Files

<table>
<thead>
<tr>
<th>Type of file (Extension)</th>
<th>Purpose</th>
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<tbody>
<tr>
<td>EXT</td>
<td>Initial extent for tables</td>
</tr>
<tr>
<td>STR</td>
<td>Structure/Table Definition</td>
</tr>
<tr>
<td>TOC</td>
<td>Table of Content</td>
</tr>
<tr>
<td>CMD</td>
<td>Command</td>
</tr>
<tr>
<td>LOG</td>
<td>Import/Export package logs</td>
</tr>
<tr>
<td>TSK</td>
<td>Task</td>
</tr>
<tr>
<td>DBSIZE.xml</td>
<td>DB Size Definition</td>
</tr>
<tr>
<td>DDLORA.TPL</td>
<td>DDL Statement Template for Object Creation</td>
</tr>
<tr>
<td>SGN</td>
<td>Communication Between Export and Import Processes</td>
</tr>
<tr>
<td>import/export_state.properties</td>
<td>Migration Monitor Status</td>
</tr>
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</table>
■ Create a skeleton DB with locally managed tablespace (LMTS) and automatic segment space management (ASSM)
  ■ Improve performance
  ■ Easier to manage disk space

■ Run SAPINST to create central instance
  ■ Since the DB was created earlier (to fit our standards), chose MCOD to bypass DB creation
  ■ Extract R/3 Kernel, but not Oracle Client
  ■ Client already installed in our Shared Oracle_Home
    ◆ May need to run CROCLLNK script from OSS Note #’s 521230, 539922
Run INSTALL executable non-Unicode version for export

After initial media extract, run sapinst version if you need to restart

Run INSTALL executable UNICODE version for import

Get familiar with keydb.xml file

- Change ORACLE_HOME references

- Acknowledge steps that have been performed
  - Change status from ERROR to OK (ie: after Migration Monitor)

Terminate the export/import when R3load is running
Conversion Process

- Setup Migration Monitor
- Move your split table files into place.
- Wait for scheduled downtime
- Bring down SAP R/3
- Take the last backup
- Start Migration Monitor
- Have plenty of snacks available
Agenda

- Chevron Corporation
- SAP Landscape Conversion
- Planning
- Environment Strategy
- Process
- Tips and Tricks
- Q & A
Create a logon trigger to set resumable when SAP WP’s start or connections are made to SAPR3 (R3load)

```
CREATE OR REPLACE TRIGGER logon_set_resumable
AFTER LOGON
ON sapr3.schema
BEGIN
    execute immediate 'alter session enable resumable timeout &&TIMEOUT_VAL';
END;
```

The TIMEOUT_VAL is one of your choosing. We choose 7200 (seconds) in PRD and 1800 in all others.
Set all your datafiles to autoextend

```
SELECT   'ALTER DATABASE DATAFILE '||file_id||' AUTOEXTEND
ON NEXT ${EXTNDSIZE}M MAXSIZE ${MAXDFSIZE}M;' AUTOEXTEND
FROM     dba_data_files a, dba_tablespaces b
WHERE    a.tablespace_name = b.tablespace_name
AND      b.contents NOT IN ('UNDO','TEMPORARY')
AND      a.tablespace_name NOT IN ('PSAPTEMP','PSAPROLL','SYS_AUDIT');
```

This was used in conjunction with a script that periodically checks to add disk space from a pool and extends file systems.

Manage PSAPTEMP separately. With Resumable query, you have time to analyze usage and extend if needed.
who_is_sorting.sql

column tablespace format a10;
column osuser format a10;
column machine format a10;
column bytes format 999,999,999,990
break on tablespace skip 1
compute sum of bytes on tablespace
set linesize 180

SELECT   b.tablespace, b.segfile#, b.segblk#,
         b.blocks, b.blocks*8192 as bytes, a.sid, a.serial#,
         a.process, a.machine, a.username, a.osuser,
         a.status
FROM     v$session a,v$sort_usage b
WHERE    a.saddr = b.session_addr
ORDER BY b.tablespace, b.segfile#, b.segblk#,
         b.blocks;
Favorite monitoring queries – sqlactive.sql

sqlactive.sql
    set pagesize 60
    set linesize 130
    set long 1000
    column sql_text format A50 wordWrapped

    select b.hash_value, a.status, b.executions NumExec,
          b.buffer_gets BuffGets,
          (b.buffer_gets/b.executions) GetsPer, a.sid,
          rpad(a.username,8) usernm, b.sql_text
    from v$session a, v$sqlarea b
    where a.sql_address = b.address
    and a.sql_hash_value = b.hash_value
    and a.username <> 'SYS'
    and b.users_executing > 0
    and b.executions > 0
    and a.status != 'INACTIVE'
    order by buffer_gets;
Tips and Tricks - Continued

- Export/import_monitor_cmd.properties (Migration Monitor)
  - Use mounted file system - nfs vs. ftp
    - Saves on space and no need to enable ftp (security risk)
  - Use explicit export order to force large packages earlier and get them importing (and indexing) (OrderBy=<filename>)
  - ExportNumJobs=16 (on an 8-CPU system)

- Restarting export/import process
  - Know your tools R3load and status (import/export_state.properties)
  - Know how to reset an export/import package (LOG, TSK, SAPxxx.00x files)
Splitting large tables into multiple packages

- Very worthwhile, need to know your tables & indexes to determine where/how to split (‘where clause’ generation).

- Query to define boundaries for split table “where clause”
  ```
  select min(DOCNUM), max(DOCNUM), pcntile from (select DOCNUM, ntile(10) over (order by DOCNUM) pcntile from sapr3.EDIDS where mandt='002')group by pcntile;
  ```

- “Where clause” bypasses export sort!!!

- “Where clause” for export/import MUST be identical (including white space)

Custom indexes need to be rebuilt (if not in SAP DD)

Great opportunity to upgrade & reduce hardware

- The move to IA64 and faster CPU’s yielded a reduction in app servers from 5 to 3.
Summary

- Unicode is not to be feared… don’t believe all the myth/horror!
- Outage can be reduced using parallel/concurrent processing techniques
- Oracle “resumable query” is a key to a successful migration
- It’s vital to have in-depth knowledge of your files and status for restarting specific packages/phases
- Practice… practice… practice makes perfect!
  - Technical downtime for data movement (R3load/MigMon)
  - 450GB instance
  - Export time: 4h:40m, Import time: 7h:45m
    - Last hour of import was just one package
    - Concurrent Export and Import using MigMon
Further Information

Public Web:
www.sap.com
www.sdn.sap.com

Americas’ SAP Users’ Group (ASUG)
www.asug.com

Related Workshops/Lectures at SAP TechEd ’05
SPC204 Performance Techniques for Unicode Conversion of Single Code Page Systems
Tue, 4:00 p.m. – 5:00 p.m., 253B, Thu, 5:15 p.m. – 6:15 p.m., 258B

SPC202, Conversion of SAP Systems to Unicode
Wed, 1:45 p.m. – 3:45 p.m., 258C, Fri, 8:00 a.m. – 10:00 a.m., 258A

SPC250 Making Programs Unicode Enabled
Wed, 10:30 a.m. – 12:30 p.m., 103, Thu, 1:45 p.m. – 3:45 p.m., 103

SPC251 Unicode Interfaces – Data Exchange Between Unicode and non-Unicode Systems
Wed, 4:15 p.m. – 6:15 p.m., 103, Thu, 4:15 p.m. – 6:15 p.m., 103
Questions?

Q&A
Please complete your session evaluation.

Be courteous — deposit your trash, and do not take the handouts for the following session.

Be kind to others.

Thank You!