Oracle 10*g* Database with Itanium Servers

Bernd Menth
HP/Oracle CTC EMEA

Agenda

- Oracle 10*g* availability
- Oracle split configuration on Itanium
- Installation
- Oracle 10*g* data management
- Data transition to Itanium

Oracle Product Certification

Oracle product	Tru64 Alpha	OpenVMS Alpha
Oracle DB 10g	certified	projected Q3/2004
Oracle 9i DB (9.2.0.2-4)	certified	certified
Oracle 9iAS (9.0.3)	certified	not available

Oracle Product Certification on Itanium^2

Oracle product	HP-UX 11iv2	RH ES/AS 2.1	SUSE SLES8
Oracle DB 10g	certified	certified also RH3.0	Q2/2004
Oracle 9i DB (9.2.0.2-4)	certified	certified	certified
Oracle AS 10g (9.0.4) J2EE only!	certified	certified	tbd
Oracle 9iAS (9.0.3) J2EE only!	certified	certified	tbd
Oracle Application Server (full certification)	next major release beyond AS 10g (9.0.4)* Q4/2004		

Oracle Product Certification on Itanium²

Oracle product	HP-UX 11iv2	RH ES/AS 2.1	SUSE SLES8
Oracle E-Business Suite 11i (11.5.9), split config**	certified	certified	tbd
E-Business Suite, full certification	tbd*		
Oracle Collaboration Suite 9.0.4.1, split config**	projected	projected	projected

*Note: Oracle Application Server, E-Business Suite and Collaboration Suite have
building dependencies with older Oracle releases which haven‘t been released on Itanium. Oracle will release these products as soon as their tech stack is beyond 9.2.0.1.

**Split config: db tier is on Itanium, apps tier on any other certified platform

Oracle Application Server SoD

statement of direction for Oracle AS on Itanium at http://otn.oracle.com/products/ias/htdocs/9iasitaniumsod.html

Oracle currently provides Oracle9*i*AS Containers for J2EE (OC4J), on HP-UX and Linux (production) and Windows (developer release) on Itanium2.

All other services (including Portal, Business Intelligent, Reports and more) will be supported with its next major release beyond Oracle9*i*AS Release 2 version 9.0.4. These will be made available on all Itanium 2-based operating systems including HP-UX, Linux, and Windows.

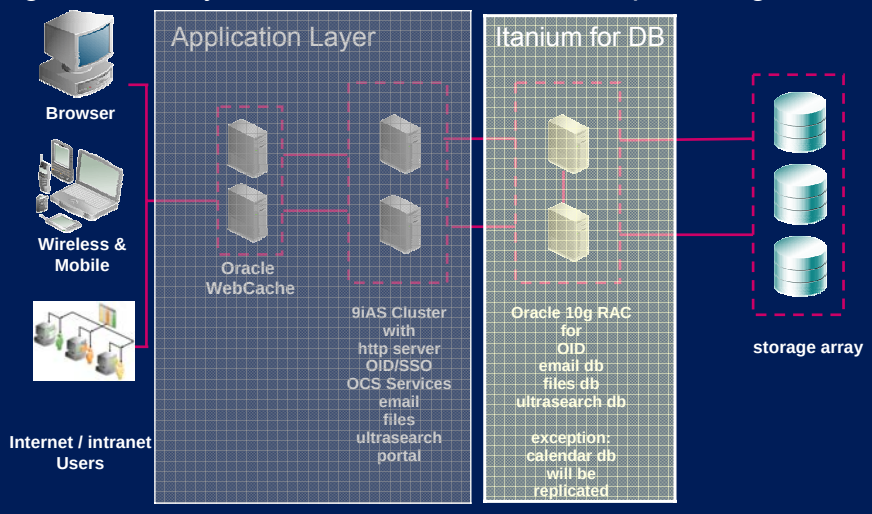
SoD Oracle on OpenVMS Alpha

- Oracle is committed to providing continued ports of its core database to OpenVMS. In fact, Oracle Database 10gR1 is currently being ported to OpenVMS Alpha; which is expected in the Q3CY04 timeframe.
- Support for Oracle Database 10*g*R1 OpenVMS Alpha will be provided in accordance with Oracle Standard and Extended Support policies – at least until 2009.

Oracle Collaboration Suite(OCS)

- split config projected

High Availability Architecture Overview with split configuration



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Software Installation

- Fast lightweight install
  - Major redesign of installation process
  - Single CD, 20 Minutes
  - CPU, memory, disk space consumption greatly reduced
  - Extremely lightweight client install (3 files) using Oracle Instant Client
- Automation of All Pre and Post Install Steps
  - Validate OS Configuration, patches, resource availability etc.
  - Configure all components (listeners, database, agent, OMS, etc.) for automatic startup and shutdown
- Enhanced silent install

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Simplified DB Creation & Configuration

- Greatly reduced database creation time using pre-configured, ready-to-use database (from 20 minutes with Oracle9i to 8 minutes for example database with Oracle10g)
- 90% reduction of initialization parameters: < 30 Basic parameters
- Automatically setup common tasks, e.g. backups

Basic Parameters

- compatible
- processes
- sessions
- pga_aggregate_target
- nls_language
- nls_territory
- db_domain
- shared_servers
- instance_number
- cluster_database
- db_block_size
- sga_target
- control_files
- db_name
- db_recovery_file_dest
- remote_listener
- db_recovery_file_dest_size
- db_create_online_log_dest_n
- db_create_file_dest
- log_archive_dest_n
- log_archive_dest_state_n
- remote_login_passwordfile
- db_unique_name

Data Management

- Data Pump
- Transportable Tablespaces

Oracle10*g* Data Pump

- High performance import and export
  - 60% faster than 9i export (single thread)
  - 15x-20x faster than 9i import (single thread)
- Scales with parallel threads
- Network transfer data between databases with no intermediate representation
- Data written in Direct Path stream format. Metadata written as XML
- New clients expdp and impdp: Supersets of original exp / imp.

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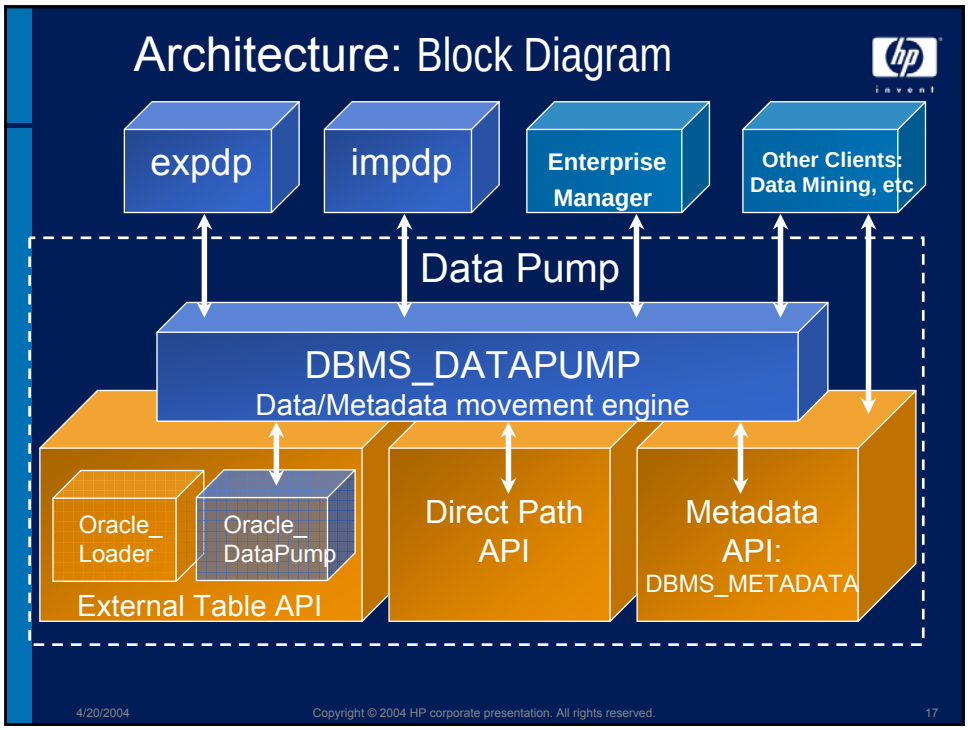
Oracle10*g* Data Pump

- Allows system-to-system import over network
- DBMS_DATAPUMP
- Direct path load and external tables access mechanisms
- Master – worker processes
- Schedule, restart job
- Self-tuning
- Job status reports

Oracle10*g* Data Pump

- Simple: parallel=<number of active threads>
- Dynamic: Workers can be added and removed from a running job in Enterprise Edition
- Index builds automatically “parallelized” up to degree of job


Architecture: Block Diagram
expdp
impdp
Enterprise Manager
Other Clients: Data Mining, etc
Data Pump
DBMS_DATAPUMP
Data/Metadata movement engine
Oracle_ Loader
Oracle_ DataPump
External Table API
Direct Path API
Metadata API:
DBMS_METADATA
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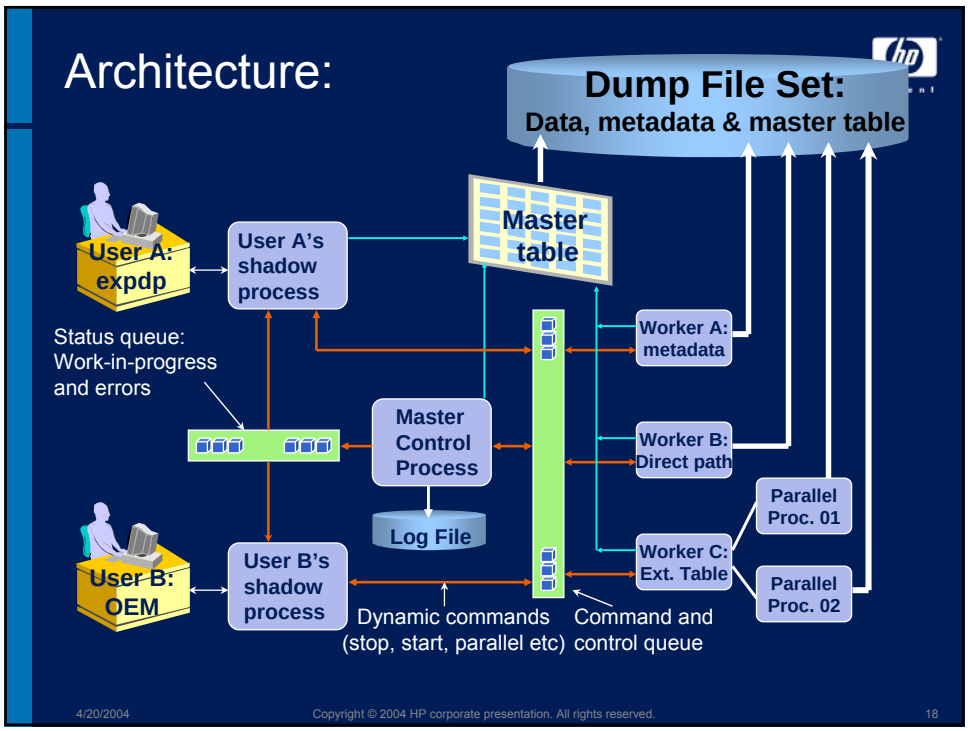
Architecture:
Dump File Set:
Data, metadata & master table
Master table
User A: expdp
User A's shadow process
Status queue:
Work-in-progress
and errors
Worker A: metadata
Master Control Process
Worker B: Direct path
Log File
Parallel Proc. 01
Worker C: Ext. Table
Parallel Proc. 02
User B: OEM
User B's shadow process
Dynamic commands
(stop, start, parallel etc)
Command and
control queue
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Data Pump: Performance Tuning

- Spread the I/O!
- Parallel= no more than 2X number of CPUs:
  Do not exceed disk spindle capacity.
  - Corollary: SPREAD THE I/O !!!
- Sufficient SGA for AQ messaging and metadata API queries
- Sufficient rollback for long running queries

That's it!

Internet Company
2 Fact Tables: 16.2M rows, 2 Gb

Program	Elapsed
exp out of the box: direct=y	0 hr 10 min 40 sec
exp tuned: direct=y buffer=2M recordlength=64K	0 hr 04 min 08 sec
expdp out of the box: Parallel=1	*0 hr 03 min 12 sec*
imp out of the box	2 hr 26 min 10 sec
imp tuned: buffer=2M recordlength=64K	2 hr 18 min 37 sec
impdp out of the box: Parallel=1	*0 hr 03 min 05 sec*
With one index per table	
imp tuned: buffer=2M recordlength=64K	2 hr 40 min 17 sec
impdp: Parallel=1	*0 hr 25 min 10 sec*

Oracle Applications Seed Database

- Metadata intensive:
  - 392.000 objects, 200 schemas, 10.000 tables, 2.1 Gb of data total
- Original exp / imp total: 32 hrs 50 min
  - exp: 2 hr 13 min imp: 30 hrs 37 min.
- Data Pump expdp / impdp total: 15 hrs 40 min
  - expdp: 1 hr 55 min impdp: 13 hrs 45 min.
  - Parallel=2 for both expdp and impdp

Example

->normal export:

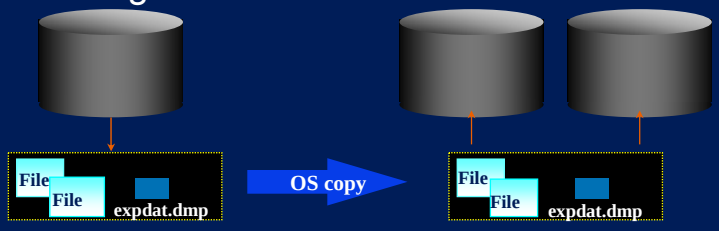
- $expdp system/system directory=dpump_dir dumpfile=sh%u.dmp schemas=sh logfile=sh.log job_name=sh_expdp parallel=2
- ->full export:
- $expdp system/manager FULL=y DUMPFILE=datadir1:full1%U.dat,datadir2:full2%U.dat,datadir3:full3%U.dat,datadir4:full4%U.dat FILESIZE=2G,PARALLEL=4 NOLOGFILE=Y

Keep in Mind:

- Designed for *big* jobs with lots of data.
  - Metadata performance is about the same
  - More complex infrastructure, longer startup
- XML is bigger than DDL, but much more flexible
- Data format in dump files is ~15% more compact than exp
- Import subsetting is accomplished by pruning the Master Table

Transportable Tablespaces

- Since Oracle8*i*
- Improvements in Oracle9*i*: Support of heterogeneous data block sizes
- Oracle Database 10*g*: Support of heterogeneous OSs

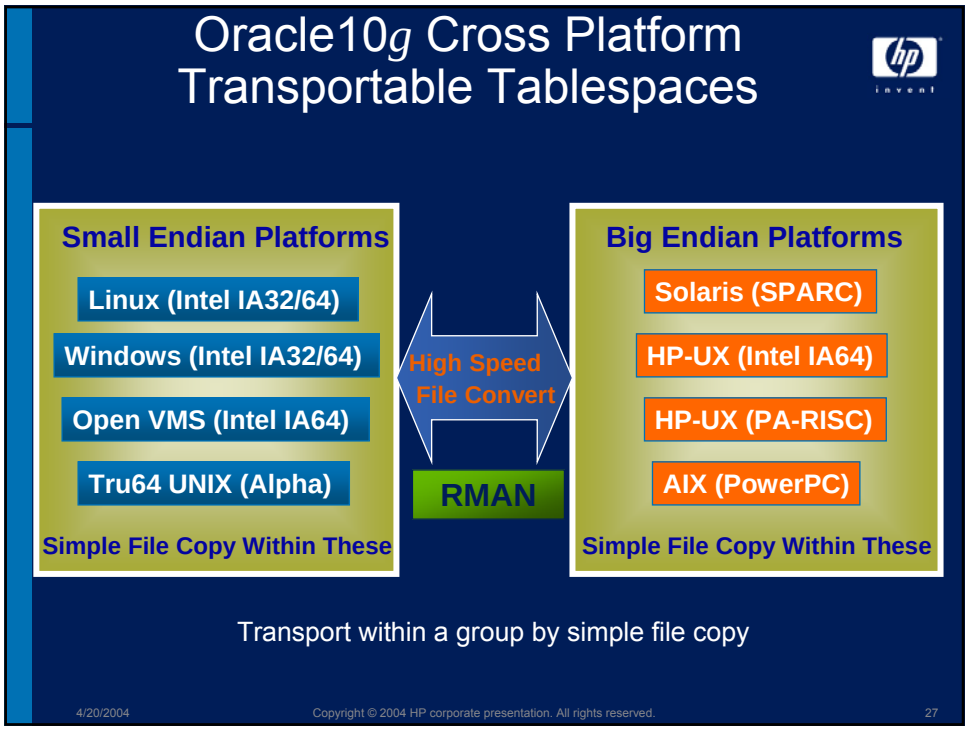


Uses of Cross Platform Transportable Tablespaces

- Move data from one DB to another
  - No export / import, no loading
  - Largely independent of data volume
- Migrate DBs onto different OS
- Access read-only tablespaces from different DBs in parallel

Supported platforms

- V$TRANSPORTABLE_PLATFORM
  - HP-UX PA-Risc and HP-UX Itanium (64-Bit)
  - HP Tru64 UNIX (64-Bit)
  - IBM AIX (64-Bit)
  - Linux IA (32- and 64-Bit)
  - MS Windows NT
  - SUN Solaris (32- and 64-Bit)


Oracle10g Cross Platform Transportable Tablespaces
Small Endian Platforms
Linux (Intel IA32/64)
Windows (Intel IA32/64)
Open VMS (Intel IA64)
Tru64 UNIX (Alpha)
Simple File Copy Within These
High Speed File Convert
RMAN
Big Endian Platforms
Solaris (SPARC)
HP-UX (Intel IA64)
HP-UX (PA-RISC)
AIX (PowerPC)
Simple File Copy Within These
Transport within a group by simple file copy
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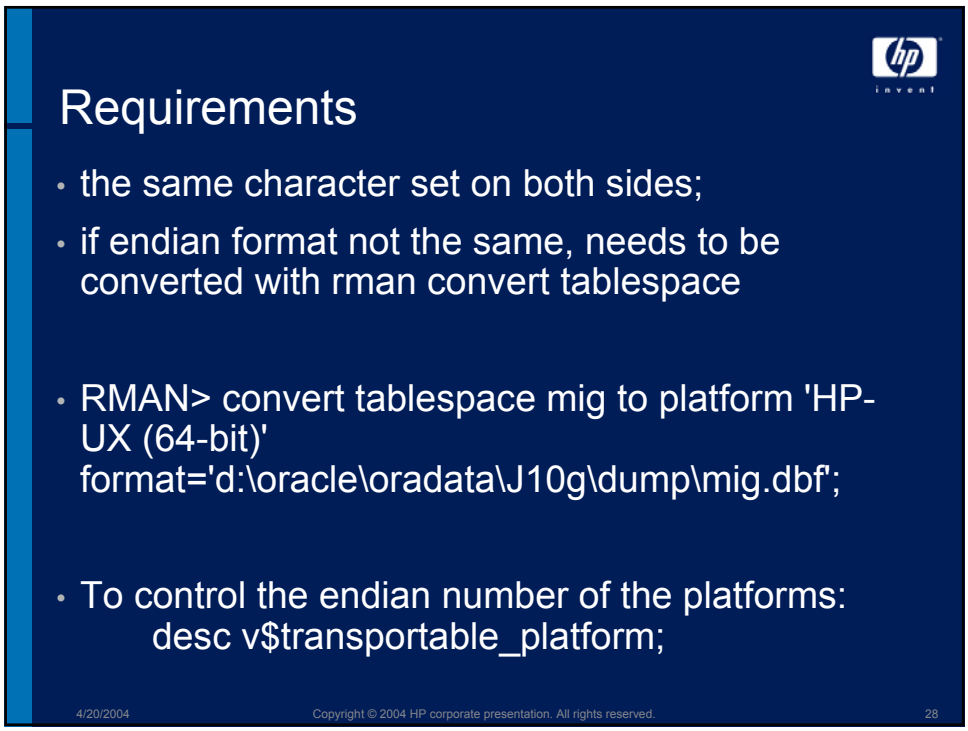
Requirements
• the same character set on both sides;
• if endian format not the same, needs to be converted with rman convert tablespace
• RMAN> convert tablespace mig to platform 'HP-UX (64-bit)' format='d:\oracle\oradata\J10g\dump\mig.dbf';
• To control the endian number of the platforms: desc v$transportable_platform;
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Conversion

- Use RMAN
  - Creates a copy in the required format
  - Time required identical to backup of data with RMAN
  - Perform on source or target platform
  - Exception: CLOBs from pre Oracle Database 10*g* little endian platforms
    - Convert manually when convenient or
    - Have Oracle do the conversion when accessing the data for the first time

Example

- set tablespace read only first:
- expdp 'system/system' transport_tablespaces=example dumpfile=example.dmp
- impdp system/system dumpfile=EXAMPLE.DMP transport_datafiles=/oradata/J10g/dump/EXAMPLE01.DBF

But what if ...

- Tablespace with identical name does already exist in target database?
  - Rename one tablespace if necessary


```
ALTER TABLESPACE users
RENAME TO users01;
```


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Transition to Oracle DB on Itanium®2 Processor

- Transition
  - Just “replace” the PA-Risc / IA-32 server with Itanium server
  - Stay on the same operating system
- Transition from HP PA-RISC
  - no export and import required
- Transition from a 32-Bit System Linux
  - no export and import required
- Transition from a 32-Bit System Windows
  - no export and import required
- Migrating from a Proprietary RISC Based System
  - export and import necessary -> more efforts, more downtime

Transition from PA-Risc to Itanium®2 on HP-UX

- **Upgrade to Oracle 9i R2 if necessary**
- **Install new binaries on Itanium server**
- **Shutdown database on HP PA-RISC server**
- **Copy your existing config files to the new ORACLE_HOME**
- **Copy database files from HP PA-RISC to the Itanium2 server or plug your external storage on the new Itanium server**
- **Re-create control file (a single SQL statement)**
  `SQL> ALTER DATABASE BACKUP CONTROLFILE TO TRACE;`
- **Startup database on the Itanium2 server**
- **Re-compile Java (a single SQL script)**
  `SQL >create or replace java system;`
- **Done!**

Migration white paper on http://otn.oracle.com/tech/hp/content.html

Transition from IA-32 Windows to Itanium®2 on Windows 2003

- Install new binaries on Itanium server
- Shutdown database
- Create the new Oracle Database service
- Copy the 32-bit configuration files to the 64-bit Oracle home
- Copy database files from IA-32 server to the Itanium2 server or plug your external storage on the new Itanium server
- Re-create control file (a single SQL statement)
  `SQL> ALTER DATABASE BACKUP CONTROLFILE TO TRACE;`
- Startup database on the Itanium2 server
- Re-compile existing PL/SQL and change word size
  `SQL> @utlirp.sql;`
- Re-compile Java (a single SQL script)
  `SQL >create or replace java system;`
- Done!

Transition from IA-32 Linux to Itanium®2 on Linux

- Install new binaries on Itanium server
- Shutdown database
- Copy your existing configuration files to the new ORACLE_HOME
- Copy database files from IA-32 server to the Itanium2 server or plug your external storage on the new Itanium server
- Re-create control file (a single SQL statement)
  `SQL> ALTER DATABASE BACKUP CONTROLFILE TO TRACE;`
- Startup database on the Itanium2 server
- Re-compile existing PL/SQL and change the word size
  `SQL> @utlirp.sql;`
- Re-compile Java (a single SQL script)
  `SQL >create or replace java system;`
- Done!


invent