Using Oracle12c Pluggable Databases to Archive / Log Data

2014 Great Lakes Oracle Conference
#gloc14

Michael J. Gangler – Oracle Database DBA – Database Specialist
Tuesday - May 13, 2014 - Session 2 – 11:45am – 12:45pm
About Michael J. Gangler

Oracle Technology since 1987

Started with Oracle Version 5.1c

Database Specialist – Jstor / Ithaka

Database experience with FOCUS, IMS DB/DC, DB2, Sybase, and MSSQL, and MySQL databases as well as Oracle experience.

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Upcoming Events

Southeast Michigan Oracle Professionals

- 2nd Tuesday – Every Month – 6:00pm – 8:00pm
- Secure-24 office’s - 26955 Northwestern Hwy, Suite 200, Sourthfield, MI.

November 12 – Wed– Michigan Oracle Users Summit

- Schoolcraft Co. Community College
- Full day -Includes database, Oracle applications, PeopleSoft and Hyperion user groups
- [www.mous.us](http://www.mous.us)
Audience Background

What is your Oracle background?
• 1 – 3 years
• 4 – 8 years
• 8+ years?

How many are working with Oracle 12c now?

How many are using the Multi-Tenet (CDB) Option?

Any Microsoft SqlServer Experience?
Goals / Non-Goals

• Goals
  – Present new ways / reasons to use Oracle 12c Multi-Tenet databases
  – Present ways to reduce memory and storage (disk) usage
  – Focus on process of consolidating databases

• Non-Goals
  – Learn ALL aspects of Oracle12c Multi-Tenet DB’s
  – Learn Tips that will make you an expert
Agenda

• Pre-Oracle 12c Configuration and database setup
• Oracle 12c Pluggable database – Brief Explanation
• Oracle 12c Pluggable database – Setup
• Getting Data from Old DB’s to New DB’s
• Compression
• Results - Non-pluggable DB versus Oracle 12c Pluggable database setup
• Lessons learned
Pre-12c Configuration

- Electronic Journals for College Students
- All web usage is recorded for Publishers and Librarians
- Raw Data stored in Archive database(s) for Reports and Warehouse
- Non-existent planning for Old Raw log data
- Many reports / warehouse use all Archive databases(s) at the same time.
Pre-12c Configuration
Database Information

• Machine – Solaris x86, 65gb Memory, 16 CPU’s, 16TB – SAS Storage
• 7 archive databases (2008 – 2014)
• 3 - Oracle – Version 10g
• 4 – Oracle – Version 11g
• Each Database – 1.5tb – 2.0tb (14tb total)
• SGA / Memory – 10G – 2gb (6 gb Total)
• SGA / Memory – 11G – 8gb (32gb Total)
Server Archive Database Server
Solaris x86
16 Cpu’s
65gb Memory
12T – SAS Storage

2008 Logs
Oracle Version 10
1.4Tb
2gb SGA

2009 Logs
Oracle Version 10
1.4Tb
2gb SGA

2010 Logs
Oracle Version 10
2.0Gb
8gb SGA

2014 Logs
Oracle Version 11
700gb
8gb SGA

2011 Logs
Oracle Version 11
1.9Tb
8gb SGA

2012 Logs
Oracle Version 11
1.9Tb
8gb SGA

2013 Logs
Oracle Version 11
2.0Tb
8gb SGA

Current Log Database Setup
44 Gb Memory Used
13 Tb Storage Used

301x468
13 Tb Storage Used

2014 Logs
Oracle Version 11
700gb
8gb SGA

2011 Logs
Oracle Version 11
1.9Tb
8gb SGA

2012 Logs
Oracle Version 11
1.9Tb
8gb SGA

2013 Logs
Oracle Version 11
2.0Tb
8gb SGA

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Pre-12c Configuration – Log Processing

• Logs from 3 datacenters are copied to current Archive database (Nightly).
• ETL / Warehouse process runs daily
• Usage Reports are generated out of ETL/Warehouse process.
Pre-12c Configuration – Log Processing

Nightly Log Transfer and ETL Processing

Application Usage Logs Ann Arbor Site
Application Usage Logs Princeton Site
Application Usage Logs UK Site

2014 Logs
Oracle Version 11
700gb
8gb SGA

ETL / Warehousing Process

Laptop

Usage / Counter Reports
Pre-12c Configuration – Issues

• Oracle databases using 10g not supported (3 databases).
• Only 65gb of total Memory on Solaris x86 machine.
• Can only run 4 database’s at 1 time (Due to Memory limitations).
• Solaris x86 machine near end of life / Support.
• Non-existent plan for older archive DB’s.
Oracle 12c Pluggable database – Brief Explanation

• Similar to a SqlServer
  – 1 Instance
  – Multiple Databases within Instance
• CDB – Container Database – Instance Level
• PDB – Pluggable Database – Many applications/databases within Container
• PDB’s Share SGA with other PDB’s
Non-CDB Architecture

Single database **User database cannot be easily copied separately from system data**

SGA is dedicated to a single database
Multitenant Architecture

Many-to-one database consolidation using one container database (CDB) to many pluggable databases (PDBs) Enables the DBA to easily create, clone, and move databases

All of the PDBs share the same SGA
Non-CDB Data Dictionary

- Data Dictionary stores both system data and user data
- Not easy to copy just user data
Multitenant Partitioned Data Dictionary

- User metadata for each PDB stored separately
- Enables plug/unplug operation
- User data separate from system data
Archive Log Consolidation – Multitenant

- Multiple Archive Log DB’s in a single instance
  - Shared SGA
  - Single patch level
  - Backup / restore (fairly) simple
  - Resource management works across PDBs
  - Each PDB represents a different Year Archive
Why Multi-Tenet 12C Database?

- All Archive DB’s have same user names, table space names and Partitions.
- Limited Machine Memory
- Machine is at end of life for support
- Many Oracle Databases – end of life support (Oracle v10)
- Utilize Oracle 12C Compression to reduce disk storage.
Why Not use Multiple Users / Schemas in Oracle 12c?

- Code / Application changes required due to Archive Database have same user names
- Lots of manual intervention due to tables using same tablespace and user names.
  - Manual steps required to recreate all the tables with new Tablespaces and partitions
  - Partition names would need to be changed for each user.
  - Import – required many tablespace name changes
Oracle 12c – Create Container DB Options

• **DBCA**

• Cloud Control (12.1.0.3) – 12c
  – Provisioning
  – Procedure Library

• Manual – i.e. Create Database....
Create 12.1.0.1 Container Database
1. Launch DBCA
   $cd $ORACLE_HOME/bin
   $./dbca

2. Select create database click next
Oracle 12c Multi-Tenant Setup

Here you can select to create database with default options or choose advance mode to have more control over how the database is created. Click next!

In my case I choose advance mode.
Oracle 12c Multi-Tenant Setup

Select the template that you want to use and click next.

In my case I like to choose custom database. Note: the template called testdbs is one I created not one of Oracle's templates.
Oracle 12c Multi-Tenant Setup

Set the global database and SID name. Select create as container database you can choose to have the CDB empty or include creating a PDB or PDBs. Click next.

In my case I choose to create CDB empty.
Oracle 12c – Create Container DB Options

• DBCA

• **Cloud Control (12.1.0.3) – 12c**
  – Provisioning
  – Procedure Library

• Manual – i.e. Create Database....
Oracle 12c – Cloud 12c – Procedure / Template Setup

Enterprise/Provisioning – Create Database Template

Select Create Oracle Database
Oracle 12c – Cloud 12c – Provisioning

Provision Pluggable Database console - Cloud Control 12C – 12.1.0.3 or Greater
Oracle 12c – Create Container DB Options

• DBCA

• Cloud Control (12.1.0.3) – 12c
  – Provisioning
  – Procedure Library

• Manual – i.e. Create Database...
CREATE DATABASE newcdb

  USER SYS IDENTIFIED BY sys_password
  USER SYSTEM IDENTIFIED BY system_password

  LOGFILE GROUP 1 ('/u01/logs/my/red001a.log', '/u02/logs/my/red001b.log')
  SIZE 100M BLOCKSIZE 512,
  GROUP 2 ('/u01/logs/my/red002a.log', '/u02/logs/my/red002b.log')
  SIZE 100M BLOCKSIZE 512,
  GROUP 3 ('/u01/logs/my/red003a.log', '/u02/logs/my/red003b.log')
  SIZE 100M BLOCKSIZE 512

  MAXLOGHISTORY 1
  MAXLOGFILES 16
  MAXLOGMEMBERS 3
  MAXDATAFILES 1024
  CHARACTER SET AL32UTF8
  NATIONAL CHARACTER SET AL16UTF16
  EXTENT MANAGEMENT LOCAL
  DATAFILE '/u01/app/oracle/oradata/newcdb/system01.dbf'
  SIZE 700M REUSE AUTOEXTEND ON NEXT 10240K MAXSIZE UNLIMITED
  SYSAUX DATAFILE '/u01/app/oracle/oradata/newcdb/sysaux01.dbf'
  SIZE 550M REUSE AUTOEXTEND ON NEXT 10240K MAXSIZE UNLIMITED
  DEFAULT TABLESPACE deftbs
  DATAFILE '/u01/app/oracle/oradata/newcdb/deftbs01.dbf'
  SIZE 500M REUSE AUTOEXTEND ON MAXSIZE UNLIMITED
  DEFAULT TEMPORARY TABLESPACE temps1
  TEMPFILE '/u01/app/oracle/oradata/newcdb/temp01.dbf'
  SIZE 20M REUSE AUTOEXTEND ON NEXT 640K MAXSIZE UNLIMITED
  UNDO TABLESPACE undotbs1
  DATAFILE '/u01/app/oracle/oradata/newcdb/undotbs01.dbf'
  SIZE 200M REUSE AUTOEXTEND ON NEXT 5120K MAXSIZE UNLIMITED

  ENABLE PLUGGABLE DATABASE

  SEED
  FILE_NAME_CONVERT = ('/u01/app/oracle/oradata/newcdb/',
                       '/u01/app/oracle/oradata/pdbseed/')

  SYSTEM DATAFILES SIZE 125M AUTOEXTEND ON NEXT 10M MAXSIZE UNLIMITED
  SYSAUX DATAFILES SIZE 100M
  USER_DATA TABLESPACE user/ts
  DATAFILE '/u01/app/oracle/oradata/pdbseed/user/ts01.dbf'
  SIZE 200M REUSE AUTOEXTEND ON MAXSIZE UNLIMITED;
Create database 12cplugdb

......

ENABLE PLUGGABLE DATABASE

SEED FILE_NAME_CONVERT = ('/u01/app/oracle/oradata/newcdb/', '/u01/app/oracle/oradata/pdbseed/')

SYSTEM DATAFILES SIZE 125M AUTOEXTEND ON NEXT 10M MAXSIZE UNLIMITED

SYSAUX DATAFILES SIZE 100M USER_DATA TABLESPACE usertbs

DATAFILE '/u01/app/oracle/oradata/pdbseed/usertbs01.dbf'

SIZE 200M

REUSE AUTOEXTEND ON MAXSIZE UNLIMITED;
Oracle 12c – Pluggable Create Options

• **DBCA – During Create container DB**

• Cloud Control (12.1.0.3) – 12c
  – Provisioning
  – Procedure Library

• Manual – i.e. Create Database....
Oracle 12c – DBCA – Pluggable DB

Set the global database and SID name. Select create as container database you can choose to have the CDB empty or include creating a PDB or PDBs. Click next.

Create the pluggable db (PDB) with this DBCA Screen
Oracle 12c – Pluggable Create Options

• DBCA – During Create container DB

• **Cloud Control (12.1.0.3) – 12c**
  – Provisioning
  – Procedure Library

• Manual – i.e. Create Database....
Oracle 12c – Cloud 12c – Provisioning

Provision Pluggable Database console - Cloud Control 12C – 12.1.0.3 or Greater

Create Pluggable Databases
Oracle 12c – Pluggable Create Options

• DBCA – During Create container DB

• Cloud Control (12.1.0.3) – 12c
  – Provisioning
  – Procedure Library

• Manual – i.e. Create Database....
SYS_hist2010.jstor.org>connect sys/PW@hist2010.jstor.org as sysdba

Connected.

create pluggable database hist2010 admin user hist2010_admin identified by PW
storage (maxsize 2g max_shared_temp_size 100m)
default tablespace hist2010_default_data
datafile '/u01/app/oracle/historical_db/histdb08/ajpa2010.hist2010_default_data.01.dbf' size 1g autoextend on
path_prefix = ('/u01/app/oracle/historical_db/histdb08/pdbseed/','/u01/app/oracle/historical_db/histdb08/ajpa2010/ajpa2010pdb/')
SYS_hist2010.jstor.org>connect sys/PW@hist2010.jstor.org as sysdba

*From Root / Container DB*

SYS_histdb08>show con_name

<table>
<thead>
<tr>
<th>CON_NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDB$ROOT</td>
</tr>
</tbody>
</table>

SYS_histdb08>show pdbs

<table>
<thead>
<tr>
<th>CON_ID</th>
<th>CON_NAME</th>
<th>OPEN MODE</th>
<th>RESTRICTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PDB$SEED</td>
<td>READ ONLY</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>HIST201R</td>
<td>MOUNTED</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HIST2010</td>
<td>MOUNTED</td>
<td></td>
</tr>
</tbody>
</table>
SYS_hist2010.jstor.org>connect sys/PW@hist2010.jstor.org as sysdba

SYS_hist2010.jstor.org>startup
Pluggable Database opened.
SYS_hist2010.jstor.org>show pdbs

<table>
<thead>
<tr>
<th>CON_ID</th>
<th>CON_NAME</th>
<th>OPEN MODE</th>
<th>RESTRICTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HIST2010</td>
<td>READ WRITE</td>
<td>NO</td>
</tr>
</tbody>
</table>
Oracle 12c Listener setup

```
SID_LIST_LISTENER12C =
  (SID_LIST =
    (SID_DESC =
      (SID_NAME=CLRExtProc)
      (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
      (PROGRAM = extproc)
    )
    (SID_DESC =
      (SID_NAME = hist2012)
      (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
    )
    (SID_DESC =
      (SID_NAME = hist201r)
      (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
    )
    (SID_DESC =
      (SID_NAME = hist2010)
      (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
    )
  )
LISTENER12C =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = machine_archive.jstor.org)(PORT = 2521))
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC2512))
    )
  )
ADR_BASE_LISTENER = /u01/app/oracle
```
Oracle 12c Listener setup

SID_LIST_LISTENER12C =
(SID_LIST =
(SID_DESC =
   (SID_NAME=CLRExtProc)
   (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
   (PROGRAM = extproc)
 )
(SID_DESC =
   (SID_NAME = ajpa2014)
   (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
 )
(SID_DESC =
   (SID_NAME = hist201r)
   (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
 )
(SID_DESC =
   (SID_NAME = hist2010)
   (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
 )
)
LISTENER12C =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = machine_archive.jstor.org)(PORT = 2521))
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC2512))
    )
  )

ADR_BASE_LISTENER = /u01/app/oracle
Agenda

• Pre-Oracle 12c Configuration and database setup

• Oracle 12c Pluggable database – Brief Explanation

• Oracle 12c Pluggable database – Setup

• Getting Data from Old DB’s to New DB’s

• Compression

• Results - Non-pluggable DB versus Oracle 12c Pluggable database setup

• Lessons learned
Getting Old Data into Oracle 12c PDB

• **Cloud Control (12.1.0.3) – 12c**
  – Provisioning console – 11.2.0.3 databases or Higher

• “dbms_pdb” – Oracle 12c non-cdb databases only!

• Manual – Datapump - Oracle 10g and above
Getting Old Data into Oracle 12c PDB

Cloud Control (12.1.0.3) – 12c
Getting Old Data into Oracle 12c PDB
Cloud Control (12.1.0.3) – 12c
Data Pump Option – 11.2.0.3 or Greater
Getting Old Data into Oracle 12c PDB
Cloud Control (12.1.0.3) – 12c
dbms_pdb– 12.1.0.3 or Greater
Getting Old Data into Oracle 12c PDB

- Cloud Control (12.1.0.3) – 12c
  - Provisioning console – 11.2.0.3 databases or Higher

- “dbms_pdb” – Oracle 12c non-cdb databases only!

- **Manual – Datapump** - Oracle 10g and above
Getting Old Data into Oracle 12c PDB
Manual – Datapump
Options

1. Convert to later version
   1. Convert to 11g/12c
   2. Export/Import (Datapump)

2. Oracle 10g/11g → to 12c
   1. Export / Import (Datapump)
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Exp/Imp Only

Datapump – Options

- Export to file and then import
  - Disadvantage – Large file to move around/create

- Using Network option on Export/Import (Datapump)
  - No export file created – done over db link.
    - Disadvantage – Slower than creating file
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2010 Archive – Oracle 10g – 2.0Tb -- Move

Precreated 2010 PDB in New Oracle 12c CDB
Precreated tables, tablespaces, users
Emptied recycle bin (2010 Archive DB)
Added Oracle 12c db in tnsnames.ora file (Archive 2010 Database)
Created Database link (oracle 12c)
- Pointing to 2010 Archive DB
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2010 Archive – Oracle 10g – 2.0Tb -- Move

impdp hist2010_admin/PW@hist2010.jstor.org
network_link="ajpa2010.jstor.org"
directory=hist2010_data_pump_dir
schemas=\'LITERATUM_ARCHIVE\'
logfile=import_2010_20130905.log
metrics=Y status=0 parallel=3
TRANSFORM=DISABLE_ARCHIVE_LOGGING:Y
exclude=TABLE:"="\'LOG_SESSION\'
TRANSFORM=SEGMENT_ATTRIBUTES:N TRACE=400300
TABLE_EXISTS_ACTION=APPEND
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2010 Archive – Oracle 10g – 2.0Tb – Move

Options explained

- `impdp` `ora12c/PW@hist2010.jstor.org` (use 12c tnsname)
- `network_link` – Database link – source database link
- `directory=hist2010_data_pump_dir` – Directory Object
- `schemas=(\'LITERATUM_ARCHIVE\')` - Only 1 Schema desired
- `logfile=import_2010_20130905.log` – Log file
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2010 Archive – Oracle 10g – 2.0Tb – Move

• metrics=Y – Display # of objects and elapsed Time
• status=0 – frequency in Seconds job status should be displayed
• parallel=3 – Degree of parallelism
• TRANSFORM=DISABLE_ARCHIVE_LOGGING:Y – Disables Redo Logs
  – ** Note ** ignores if in forced logging mode
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2010 Archive – Oracle 10g – 2.0Tb – Move

- exclude=TABLE:"='LOG_SESSION'" - Ignores table “Log Session
- TRANSFORM=SEGMENT_ATTRIBUTES:N – Ignore Segment attributes
- TRACE=400300 – Sets trace level for debugging
- TABLE_EXISTS_ACTION=APPEND – Append data if data already exists
- Version=10.2.0.4 – Can only be used with network_link
Issues with 10.2.0.4 import

- Slow without Parallel option
- Memory issues
- Issues with Log_session table LOB and Oracle 10g.
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2011 Archive – Oracle 11g – 1.8Tb – Move (Same as 2010 Archive).

- Precreated 2011 PDB in New Oracle 12c CDB
- Precreated tables, tablespaces, users
- Emptied recycle bin (2011 Archive DB)
- Added Oracle 12c db in tnsnames.ora file (Archive 2011 Database)
- Created Database link (oracle 12c)
  - Pointing to 2011 Archive DB
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2011 Archive – Oracle 11g – 1.8Tb -- Move

impdp hist2011_admin/PW@hist2011.jstor.org
network_link="ajpa2011.jstor.org"
directory=hist2011_data_pump_dir
schemas=(\'LITERATUM_ARCHIVE\')
logfile=import_2011_20130905.log
metrics=Y status=0 parallel=3
Version=11.2.0.3
TRANSFORM=DISABLE_ARCHIVE_LOGGING:Y
TABLE_EXISTS_ACTION=APPEND
Getting Old Data into Oracle 12c PDB Manual - Option #2 – Data Pump Only

2011 Archive – Oracle 11g – 1.8Tb -- Move

Same as 2010 datapump, but without:

- `exclude=TABLE:"="\'LOG_SESSION\'"

- `TRANSFORM=SEGMENT_ATTRIBUTES:N`

- `TRACE=400300`
Issues with 11.2.0.3 import

- Slow without Parallel option
- No Memory issues
- No Issues with Log_session table LOB and Oracle 10g.
- Worked better with 11g database.
Agenda

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• Lessons learned
Compression with Data pump

- Use impdp command line option (or use DBMS_DATAPUMP)
- Use the TABLE_COMPRESSION_CLAUSE:

The allowable values for the TABLE_COMPRESSION_CLAUSE include the following:

- NONE: The table compression clause is omitted, so the table takes on the compression characteristics of the tablespace.
- NOCOMPRESS: Disables table compression.
- COMPRESS: Enables basic table compression.
- ROW STORE COMPRESS BASIC: Same as COMPRESS.
- ROW STORE COMPRESS ADVANCED: Enables advanced compression, also known as OLTP compression.
- COLUMDN STORE COMPRESS FOR QUERY: Hybrid Columnar Compression (HCC) available in Exadata and ZFS storage appliances.
- COLUMDN STORE COMPRESS FOR ARCHIVE: Hybrid Columnar Compression (HCC) available in Exadata and ZFS storage appliances.
Compression with Data pump

• Use impdp command line option (or use DBMS_DATAPUMP)

• Use the `TABLE_COMPRESSION_CLAUSE`:

```
TABLE_COMPRESSION_CLAUSE=None
TABLE_COMPRESSION_CLAUSE=NOCOMPRESS
TABLE_COMPRESSION_CLAUSE=COMPRESS BASIC
TABLE_COMPRESSION_CLAUSE=COMPRESS ROW STORE
COMPRESS ADVANCED  (used for OLTP)
```
Compression with Data pump

Warehouse compression (low is faster load):

*** HCC – Only for exadata and ZFS ***

TABLE_COMPRESSION_CLAUSE=COMPRESS COLUMN
STORE COMPRESS FOR QUERY LOW

TABLE_COMPRESSION_CLAUSE=COMPRESS COLUMN
STORE COMPRESS FOR QUERY HIGH
Compression with Data pump

Archive compression (low is faster load):

*** HCC – Only for exadata and ZFS ***

TABLE_COMPRESSION_CLAUSE=COMPRESS COLUMN STORE COMPRESS FOR ARCHIVE LOW

TABLE_COMPRESSION_CLAUSE=COMPRESS COLUMN STORE COMPRESS FOR ARCHIVE HIGH
Compression with Data pump

Turned off compression during data pump (impdp) to improve performance.

Compressed Partitions after import:

```sql
select 'alter table '||table_name||' move partition '||partition_name||' compress for all_operations;' from user_tab_partitions order by table_name
/```
Compression Results

2010

- 2010 Old way – Space used – 2.0 Tb
- 2010 Oracle 12c – Space Used – 1.2Tb (30%)

2011

- 2011 Old Way – Space Used – 1.8 Tb
- 2011 Oracle 12c – Space Used – 1.4 Tb (25%)
Storage Comparison – Old / New

- 2010 Oracle 10G DB: 2 TB
- 2010 Oracle 12C DB (30%): 1.4 TB
- 2011 Oracle 11G DB: 1.8 TB
- 2011 Oracle 12C DB (22%): 1.4 TB
- 2012 Oracle 11G DB: 2 TB
- 2012 Oracle 12C DB (20%): 1.6 TB
Lessons Learned

• Pluggable database basics
• Data pump basics – (impdp)
• Compression with data pump
• Database consolidation options
• Oracle 12c results
References Used

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Collaborate 14 Presentations:
2014_704_Browning_ppt.pptx
2014_725_niemiec_ppt.pptx
2014_150_Hotka_ppt.pdf
Thank You for Attending

• Please complete session evaluation – guidebook
• Twitter – #gloc14

• Questions ??????

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  – Twitter: @mjgangler
  – Blog: mjgangler.wordpress.com
  – Aim: mgangler