

BACKUP & RECOVERY



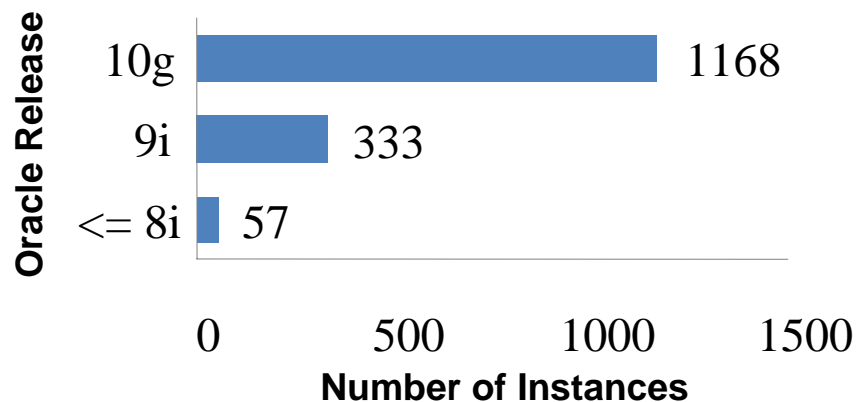
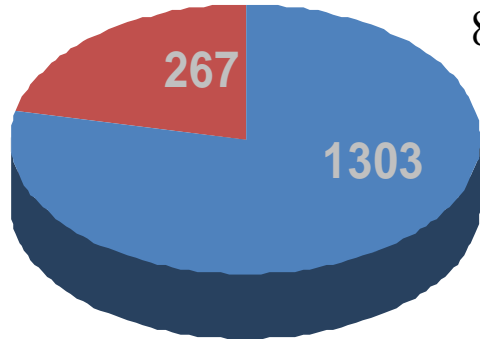
SREEKANTH CHINTALA
DATABASE ENGINEER
GLOBAL DATABASE ENGINEERING

GLANCE AT DELL IT



DELL IT PRODUCTION ORACLE ENVIRONMENT

Windows 17%
Platforms
Linux 83%



Applications Supported

- Manufacturing
 - Highly transactional
 - Performance is key
- Financials
 - Security is key
- Sales & Support
 - Shopping Cart, Quotes
 - Availability is key
- HR
- Proprietary internal applications



MONITORED METRICS

DELL ORACLE <http://gridcontrol.us.dell.com> *****PRODUCTION***** [Setup](#) [Preferences](#) [Help](#) [Logout](#)

Home Targets Deployments Alerts Compliance Jobs Reports

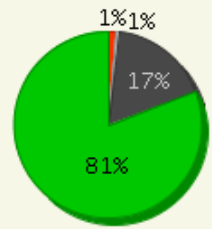
Page Refreshed Oct 2, 2007 12:11:57 PM CDT

View: All Targets

Overview

Total Monitored Targets **7969**

All Targets Status



Down(93)
Unknown(61)
Under Blackout(1,240)
Up(5,847)

Some rollup information is not shown because you have a large enterprise.

- Targets: 7805
- Cluster Databases: 307
- Database Instances: 1207
- Hosts: 1510
- ASM Targets; 778

Target Search

Search: All

Deployments Summary

View: Database Installations

Software Targets Without Inventory: **97 of 1228** Collection Problems: **109**

Database Installations	Targets	Installations	Interim Patches Applied
Oracle Database 10g 10.1.0.4.0	25	29	Yes
Oracle Database 10g 10.1.0.5.0	605	773	Yes
Oracle Database 10g 10.2.0.2.0	26	59	Yes
Oracle Database 10g 10.2.0.3.0	175	283	Yes
oracle.rdbms 8.1.7.4.1	0	1	No
Oracle8i Server 8.1.6.3.0	0	1	No
Oracle8i Server 8.1.7.0.0	3	6	No
Oracle8i Server 8.1.7.2.1	0	3	No
Oracle8i Server 8.1.7.3.0	0	2	No
Oracle8i Server 8.1.7.4.0	0	17	No
Oracle8i Server 8.1.7.4.1	33	39	No
Oracle9i 9.0.1.1.1	0	1	No
Oracle9i 9.0.1.3.0	0	2	No
Oracle9i 9.2.0.6.0	8	20	Yes
Oracle9i 9.2.0.7.0	23	24	Yes
Oracle9i 9.2.0.8.0	233	294	Yes



ORACLE DATABASE 11g NEW FEATURES USED BY DELL IT



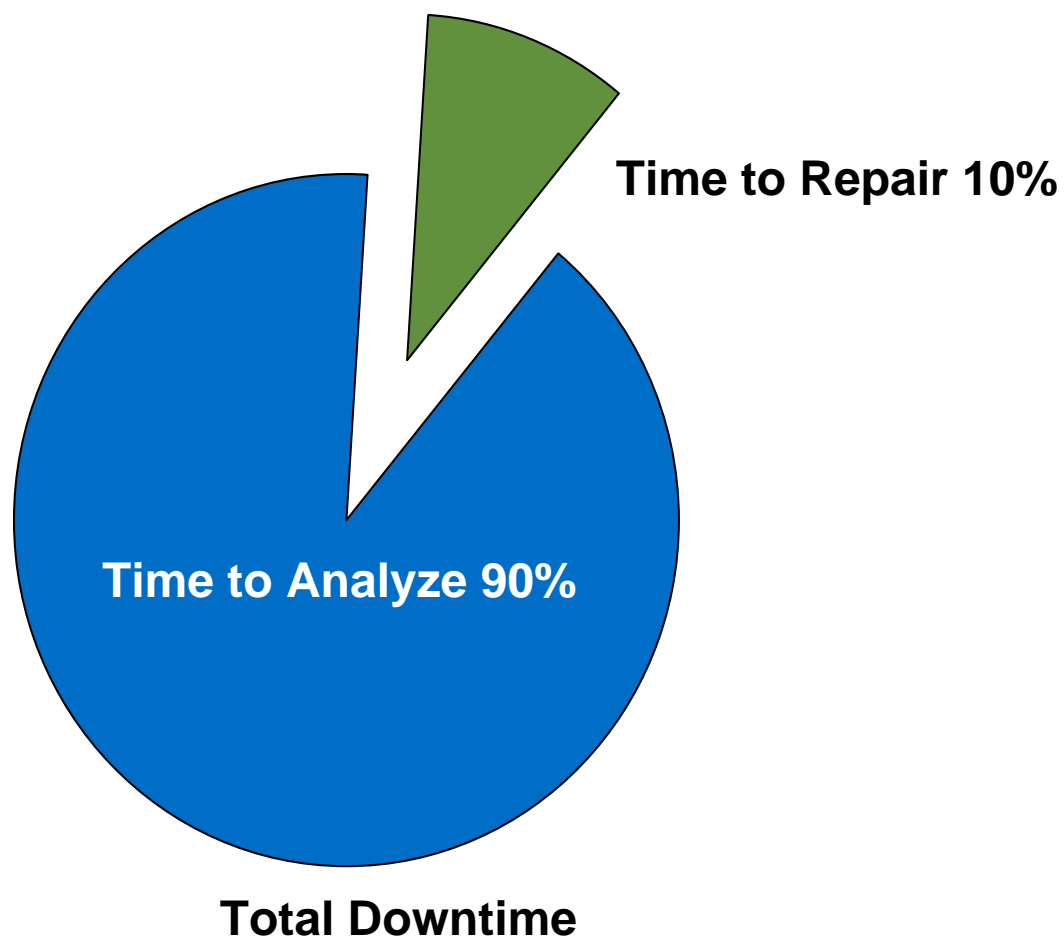
REALITY CHECK..

- Imagine you are monitoring 1500 production databases
- Imagine you get about 10 trouble tickets per minute
- Imagine every minute of downtime costs thousands of \$\$
- Imagine you have only one on-call DBA available

HOW FAST CAN YOU IDENTIFY THE REAL ISSUE?



DATA RECOVERY ADVISOR (DRA)



DATA RECOVERY ADVISOR

- Automatically diagnoses known failures
 - Failures are physical issues, e.g. missing files, block corruption, etc.
- Provides advice on how to correct failures
 - Automatically generates repair script, if possible
- Optionally executes repair script
- Revalidates failures



DRA SCENARIO

- A few datafiles are missing on a production database
- There is corruption in one of the datafiles
- Access is limited, requires authorization through a trouble ticket
- A lot of research is done before identifying the issue
 - Are the listeners up?
 - Are CRS and node applications up? (RAC)
 - Check cluster related logs (RAC)
 - Is ASM up?
 - Check ASM related logs
 - Check alert logs



MULTIPLE FAILURES

The screenshot displays two overlapping Oracle Enterprise Manager 11g Database Control windows. The top window shows an error message: "Error Message: The operation for starting up the database has failed. Click 'View Details' to see the error. You may have to perform a recovery." A blue oval highlights a redacted area below the message. The bottom window shows a SQL session titled "Change Status Details" with the following content:

```

SQL> Connected to an idle instance.
SQL> SQL> ORACLE instance started.

Total System Global Area 640286720 bytes
Fixed Size 1301812 bytes
Variable Size 226493132 bytes
Database Buffers 406847488 bytes
Redo Buffers 5644288 bytes
Database mounted.
ORA-01157: cannot identify/lock data file 1 - see DBWR trace file
ORA-01110: data file 1: '+DATA_1/dell/datafile/system.266.636037941'

Disconnected from Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, Real Application Clusters and Real Application Testing options
    
```

An "OK" button is visible at the bottom right of the SQL session window.



MULTIPLE FAILURES

ORACLE Enterprise Manager 11g Help

ORACLE Enterprise Manager 11g Help
 Database Control Database

Database Instance: dell.prd.amer.dell.com >

View and Manage Failures

Last Refresh **October 15, 2007 2:39:13 PM CDT**

Select dropdown values and optionally enter failure description and impact strings to filter the data that is displayed in your results set.

Failure Description Impact Priority Status Time Detected

CRITICAL or HIGH OPEN All

Select failures and ...

[Select All](#) | [Select None](#) | [Expand All](#) | [Collapse All](#)

Select	Failure Description	Impact	Priority	Status	Time Detected
<input type="checkbox"/>	Data Failures				
<input checked="" type="checkbox"/>	System datafile 1: '+DATA_1/dell/datafile/system.262.636032501' needs media recovery	Database cannot be opened	CRITICAL	OPEN	2007-10-15 12:52:09.0
<input checked="" type="checkbox"/>	System datafile 1: '+DATA_1/dell/datafile/system.266.636037941' needs media recovery	Database cannot be opened	CRITICAL	OPEN	2007-10-15 13:16:02.0
<input checked="" type="checkbox"/>	System datafile 1: '+DATA_1/dell/datafile/system.266.636037941' is missing	Database cannot be opened	CRITICAL	OPEN	2007-10-15 14:36:09.0
<input checked="" type="checkbox"/>	▶ One or more non-system datafiles are missing	See impact for individual child failures	HIGH	OPEN	2007-10-15 12:52:09.0
<input checked="" type="checkbox"/>	▶ Datafile 4: '+DATA_1/dell/datafile/users.265.636028237' contains one or more corrupt blocks	Some objects in tablespace USERS might be unavailable	HIGH	OPEN	2007-10-15 13:03:07.0

TIP All CRITICAL failures must be selected before "Advise". All CRITICAL failures must be unselected before "Set Priority High" or "Set Priority Low".

Use a Recovery Catalog
 Recovery Catalog Database **not specified**



MULTIPLE FAILURES

ORACLE Enterprise Manager 11g Database Control Help Database

Database Instance: dell.prd.amer.dell.com >

Manual Actions

The following user actions may provide a faster recovery path for certain simple failures. Click "Re-assess Failures" button when user actions are performed.

Manual Action Details

- If you restored the wrong version of data file correct one
- If you restored the wrong version of data file correct one
- Contact Oracle Support Services if the procedure selected for repair
- If file +DATA_1/dell/datafile/system.266.63
- If file +DATA_1/dell/datafile/example.256.63
- If file +DATA_1/dell/datafile/example.264.63

Re-assess Failures (circled in blue)

ORACLE Enterprise Manager 11g Database Control Help Database

Database Instance: dell.prd.amer.dell.com >

Recovery Advice

Cancel (circled in blue)

The repair includes complete media recovery with no data loss

RMAN Script

```
# restore and recover datafile
restore datafile 1, 5;
recover datafile 1, 5;
# block media recovery
recover datafile 4 block 12;
```



MULTIPLE FAILURES

ORACLE Enterprise Manager 11g Database Control Help Database

Database Instance: dell.prd.amer.dell.com >

Recovery Succeeded
Recovery succeeded. See Recovery Results below.

Recovery Results

Recovery Results

Recovery Manager: Release 11.1.0.6.0 - Production on M
Copyright (c) 1982, 2007, Oracle. All rights reserved.

RMAN>
connected to target database: DELL (DBID=360677887;
using target database control file instead of recovery cata

RMAN>
echo set on

RMAN> REPAIR FAILURE USING REPAIRID 650 NO O
Strategy: The repair includes complete media recovery w
Repair script: /u01/app/oracle/diag/rdbms/dell/dell/hm/rec

contents of repair script:
restore and recover datafile
restore datafile 1, 5;
recover datafile 1, 5;
block media recovery
recover datafile 4 block 12;
executing repair script

Starting restore at 10/15/2007 14:47:08
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=143 device type=DISK

Starting recover at 10/15/2007 14:49:05
using channel ORA_DISK_1

starting media recovery
media recovery complete, elapsed time: 00:00:00

Finished recover at 10/15/2007 14:49:07

Starting recover at 10/15/2007 14:49:07
using channel ORA_DISK_1

channel ORA_DISK_1: restoring block(s)
channel ORA_DISK_1: specifying block(s) to restore from backup set
restoring blocks of datafile 00004
channel ORA_DISK_1: reading from backup piece
+DATA_1/dell/backupset/2007_10_15/nndf0_tag20071015t142214_0.262.636042137
channel ORA_DISK_1: piece
handle=+DATA_1/dell/backupset/2007_10_15/nndf0_tag20071015t142214_0.262.636
tag=TAG20071015T142214
channel ORA_DISK_1: restored block(s) from backup piece 1
channel ORA_DISK_1: block restore complete, elapsed time: 00:00:01

starting media recovery
media recovery complete, elapsed time: 00:00:01

Finished recover at 10/15/2007 14:49:10
repair failure complete

RMAN> exit;

Recovery Manager complete.

Open Database OK



DATA RECOVERY ADVISOR

- Issues can be identified right away
- Reliable issue identification
- Intelligent in identifying the order of resolution
- Provides scripts for resolving the issues
- Engaging right resource enables quick resolution



FLASHBACK TRANSACTION



FLASHBACK TRANSACTION

- Backout a target transaction and its dependent transactions
 - Tracks row-level dependencies using redo logs, i.e. write-after-write or insert/delete primary key
- Based on LogMiner
 - ALTER DATABASE ADD SUPPLEMENTAL LOG DATA;
 - ALTER DATABASE ADD SUPPLEMENTAL LOG DATA (PRIMARY KEY) COLUMNS;
 - grant execute on dbms_flashback to <USER>;
 - grant select any transaction to <USER>;
- Available from Enterprise Manager or SQL*Plus



SCENARIO

- A table is updated erroneously
- The modified rows were then changed again
- Flashback options
 - Flashback transaction standalone & do not consider dependent transactions
 - Flashback transaction standalone & do not backout rows affected by dependent transactions
 - **Flashback transaction & backout dependent transactions in order**



SCENARIO

```

SQL> update sales set promo_id=444 where promo_id=777 ;
876 rows updated.
SQL> commit;
SQL> delete from sales where promo_id=444 and rownum < 77 ;
76 rows deleted.
SQL> commit ;
SQL> update sales set promo_id=222 where promo_id=444 and
rownum < 401;
400 rows updated.
SQL> commit;
. . .

```

BEFORE CHANGES:

PROMO_ID	COUNT(1)
999	887837
777	876
333	799

AFTER CHANGES:

PROMO_ID	COUNT(1)
999	887837
222	400
444	400
333	799



Flashback Transaction

SCENARIO

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Perform Query Select Transaction Show Dependencies Review

Flashback Transaction: Perform Query

Database **dell** Cancel Step 1 of 4

Operation Type **Flashback Transaction** es Help Logout

Specify the time range (on-disk) archived log time range) to further

Cancel Stop

Query Time Range

Time Range

* Start Time

* End Time

TIP The oldest

Query Filter

Table Example

DB User Example

Advanced Query

TIP Click the Cancel button to cancel processing or the Stop button to stop mining and show the current results

Processing: Mining Transactions

Enterprise Manager is mining transactions during the specified range using the following query filter:
where seg_owner = 'SH' and table_name = 'SALES'

Start Time **Oct 22, 2007 7:05:36 PM**
 End Time **Oct 22, 2007 7:13:35 PM**

Transactions Found **0**
 Approximate Time Remaining (secs) **0**
 Redo Processed **0**
 Total Redo **0**

Cancel Step 1 of 4 Next

Oct 15, 2007 1:18:06 PM CDT

Recycle Bin



SCENARIO

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Perform Query Select Transaction **Show Dependencies** Review

Flashback Transaction: Show Dependencies

Database **dell** Cancel Back Step 3 of 4 Next

Operation Type **Flashback Transaction**

Flashback to target transaction and change the recovery option

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Perform Query Select Transaction **Show Dependencies** Review

Show Dependencies: Change Recovery Option

OK

Nonconflict Only
 Only non-conflicting changes of the target transaction will be be

Nocascade Force
 All changes of the target transaction will be be

Cascade
 All changes of the target transaction, as well as

Flashback Transaction Result

Your flashback transaction has been executed successfully.

The compensating transaction ID is 03000D00F3050000



FINAL RESULTS

BEFORE CHANGES:

PROMO_ID	COUNT(1)
999	887837
777	876
333	799

AFTER CHANGES:

PROMO_ID	COUNT(1)
999	887837
222	400
444	400
333	799

AFTER FLASHBACK TRANSACTION :

PROMO_ID	COUNT(1)
999	887837
777	876
333	799

FLASHBACK TRANSACTION

- Provides a way to:
 - Look at transactions by owner or object level
 - Back-out transactions in the order they were applied
 - Save transaction data for future reference

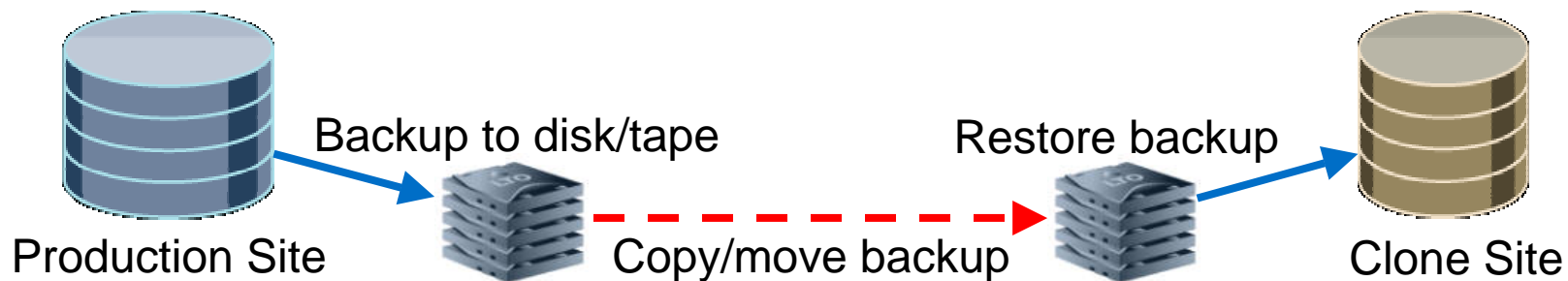


RMAN NETWORK- ENABLED DATABASE DUPLICATION



DATABASE CLONE PROCESS

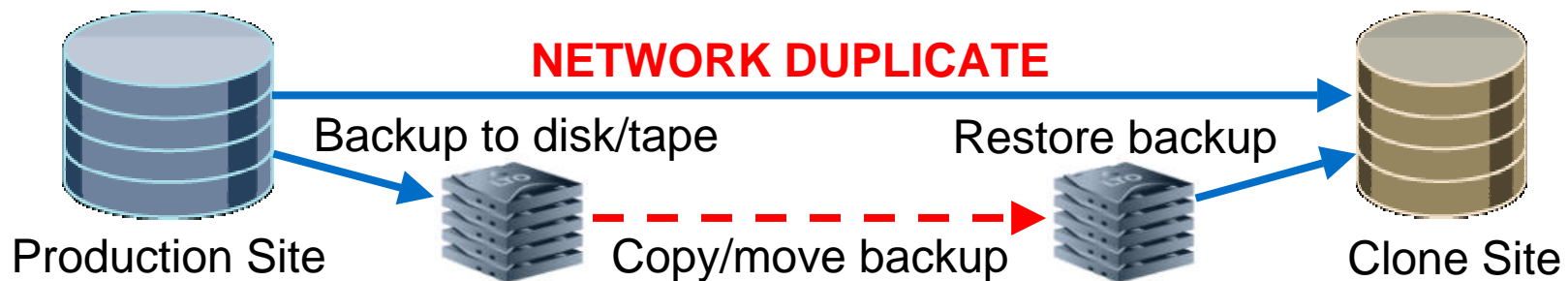
- Imagine 40 clone requests per week
- Imagine 120+ hrs/month just engaging cloning resources
- Imagine having to clone 100GB in 6-10hrs
- Imaging starting all over when clone servers go down
- Imagine backups being impacted by cloning



IMAGINE CLONING WITHOUT GOING TO TAPE BACKUP

NETWORK DUPLICATE BENEFITS

- Clone production database without intermediate staging area (no need for pre-existing backups)
- Benefits:
 - Quicker turn-around time
 - Cloning can be embedded into scripts
 - Time, resource, storage, and cost savings



“Dell will save \$100k/year+ using Network Duplicate”



DELL 11g ADOPTION

