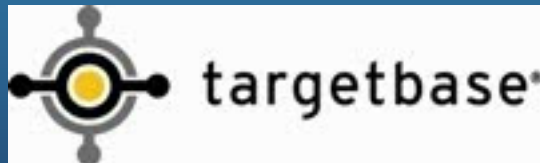


Oracle Exadata and Oracle Enterprise Manager 12c: A Match Made in Heaven

Presented by: Brad Peek & Andy Colvin

October 3, 2012



About Enkitech

- Oracle-Centric Consulting Firm
 - US
 - UK
- Extensive Exadata Practice
 - Education
 - Migration
 - Performance Review
 - On Call Support



About Targetbase



- Marketing Services Provider
 - Pharmaceutical
 - Automotive
 - Utilities
 - Consumer Goods
- Broad Range of Applications
 - Informatica
 - Unica
 - SAS
 - Business Objects



enkitec

Targetbase and Exadata

- 3 Exadata Systems
 - (2) V2 ¼ Racks
 - Purchased Q1 2010
 - (1) X2-2 ½ Rack
 - Purchased December 2011
- Installed OEM 11g with V2 deployment
- Migrated to new X2-2 in 2012



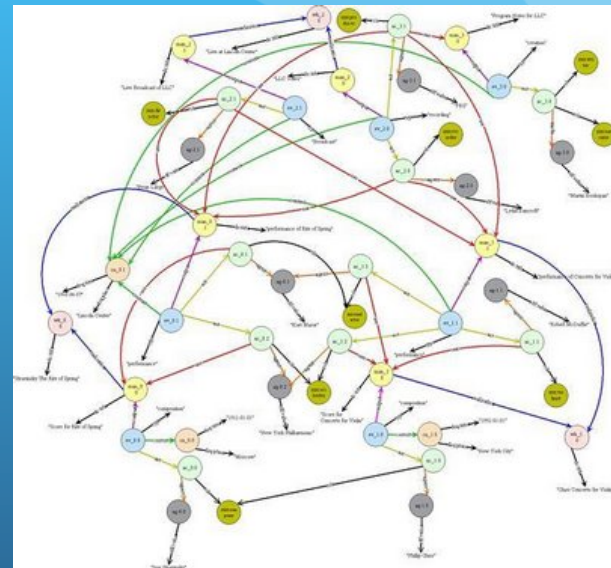
“Old School” - Exadata and OEM 11g

- Enhanced database management
- OEM 11g introduced Exadata plugins
 - Separate plugins for each target type
 - Storage Server
 - ILOM
 - KVM
 - Infiniband Switch
 - Cisco Switch
 - Power Distribution Unit



Installing Exadata Plugins - OEM 11g

- Death by 1,000 clicks
- Manual Deployment
 - Deploy each plugin individually
 - Create each target individually
 - Manually configure SSH keys
 - Manually configure SNMP alerts
 - Create non-privileged user on ILOMs



*not a true diagram for 11g

enkitec

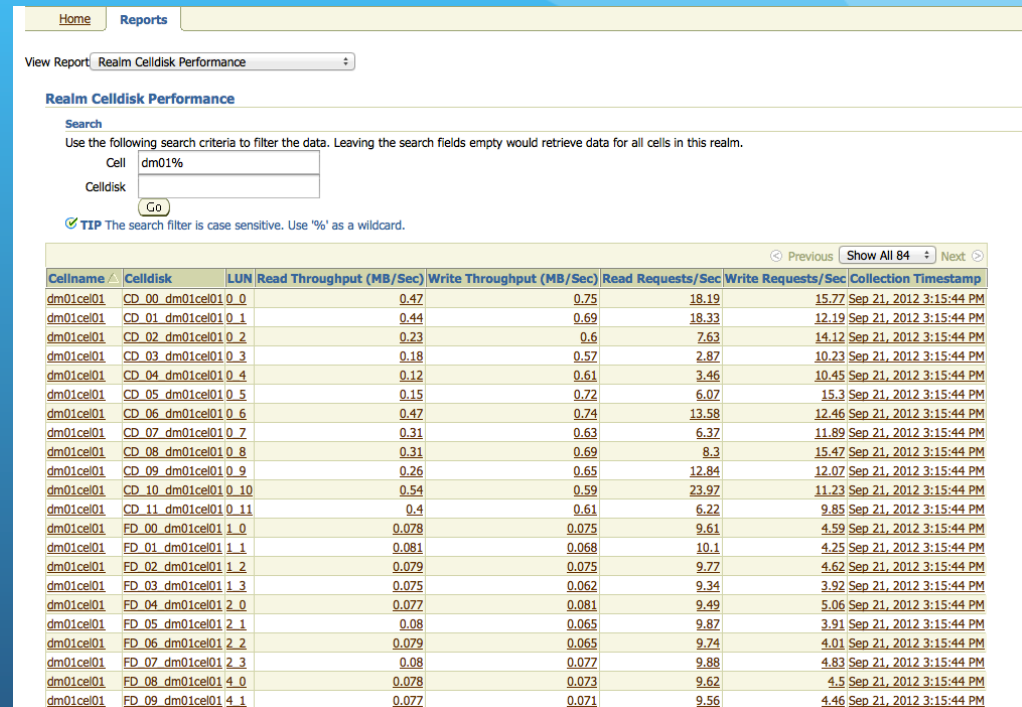
OEM 11g Exadata Plugins

- Static Graphs
 - 24 Hours
 - 7 Days
 - 31 Days
- Few Metrics



OEM 11g Exadata Plugins

- Lots of Text!
- Realm Performance
- Cell Performance



Home Reports

View Report: Realm Celldisk Performance

Realm Celldisk Performance

Search

Use the following search criteria to filter the data. Leaving the search fields empty would retrieve data for all cells in this realm.

Cell: dm01%

Celldisk:

Go

TIP The search filter is case sensitive. Use '%' as a wildcard.

Cellname	Celldisk	LUN	Read Throughput (MB/Sec)	Write Throughput (MB/Sec)	Read Requests/Sec	Write Requests/Sec	Collection Timestamp
dm01cel01	CD 00 dm01cel01 0 0		0.47	0.75	18.19	15.77	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 01 dm01cel01 0 1		0.44	0.69	18.33	12.19	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 02 dm01cel01 0 2		0.23	0.6	7.63	14.12	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 03 dm01cel01 0 3		0.18	0.57	2.87	10.23	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 04 dm01cel01 0 4		0.12	0.61	3.46	10.45	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 05 dm01cel01 0 5		0.15	0.72	6.07	15.3	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 06 dm01cel01 0 6		0.47	0.74	13.58	12.46	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 07 dm01cel01 0 7		0.31	0.63	6.37	11.89	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 08 dm01cel01 0 8		0.31	0.69	8.3	15.47	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 09 dm01cel01 0 9		0.26	0.65	12.84	12.07	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 10 dm01cel01 0 10		0.54	0.59	23.97	11.23	Sep 21, 2012 3:15:44 PM
dm01cel01	CD 11 dm01cel01 0 11		0.4	0.61	6.22	9.85	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 00 dm01cel01 1 0		0.078	0.075	9.61	4.59	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 01 dm01cel01 1 1		0.081	0.068	10.1	4.25	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 02 dm01cel01 1 2		0.079	0.075	9.77	4.62	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 03 dm01cel01 1 3		0.075	0.062	9.34	3.92	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 04 dm01cel01 2 0		0.077	0.081	9.49	5.06	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 05 dm01cel01 2 1		0.08	0.065	9.87	3.91	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 06 dm01cel01 2 2		0.079	0.065	9.74	4.01	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 07 dm01cel01 2 3		0.08	0.077	9.88	4.83	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 08 dm01cel01 4 0		0.078	0.073	9.62	4.5	Sep 21, 2012 3:15:44 PM
dm01cel01	FD 09 dm01cel01 4 1		0.077	0.071	9.56	4.46	Sep 21, 2012 3:15:44 PM

Enter OEM 12c!

- What can we do?
- OEM 12c released October 2012
- Major upgrade from 11g



enkitec

Installing OEM 12c

- 2 ways to get the software
 - Download from OTN
 - Requires separate database download
 - Includes weblogic, OMS, and agent software
 - OEM Setup Automation Kit for Exadata (MOS Note #1440951.1)
 - Includes everything you need to install OEM (database, weblogic, OMS, agents)
- Install on single host, or separate database and management servers



















OEM 12c Architecture Changes

- OMS is central source of truth
- Agents are minimal installation
 - Deploying from OEM console actually works!
- Everything is a plugin - only deploy what you need
 - Database
 - Exadata
 - Oracle VM
 - Exalogic



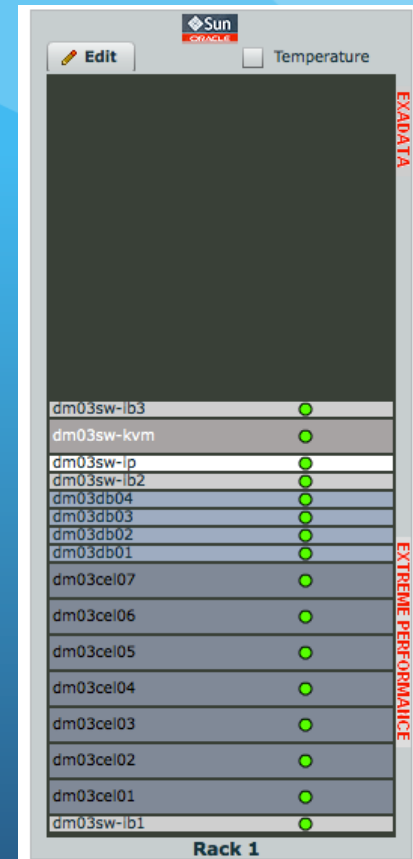
OEM 12c Self-Update Console

- Download agents and plugins from OEM console
- Apply to OMS/agents

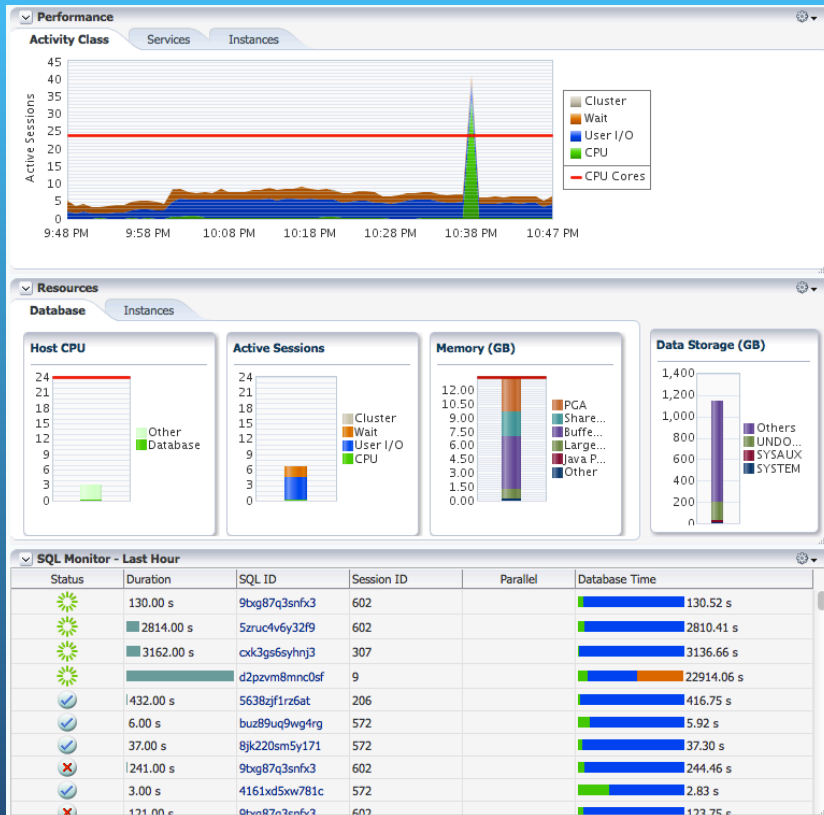
Status			
Connection Mode Online		Last Download Time	
Most Recent Refresh Time  Sep 26, 2012 4:28:38 PM EDT		Last Download Type	
Actions ▾	 Open	 Check Updates	 Agent Software
Type	Available Updates	Downloaded Updates	Applied Updates
 Agent Software	19	0	1
 Compliance Content	0	0	0
 Diagnostic Checks	0	0	0
 EM Deployment Prerequisite Resources	0	0	0
 Exadata Configuration Template	0	0	0
 Extensibility Development Kit	0	0	1
 Management Connector	10	0	1
 Middleware Profiles and Gold Images	0	0	0
 Monitoring Templates	0	0	0
 Oracle Database Provisioning Profiles and	0	0	0
 Plug-in	10	17	10
 Provisioning Bundle	0	0	1

Benefits of OEM 12c

- Pictures!
- Easy to configure
- Exadata as a target







Benefits of OEM 12c



- Better graphs
- Customizable home pages per user
- Drag & drop interface for page customization

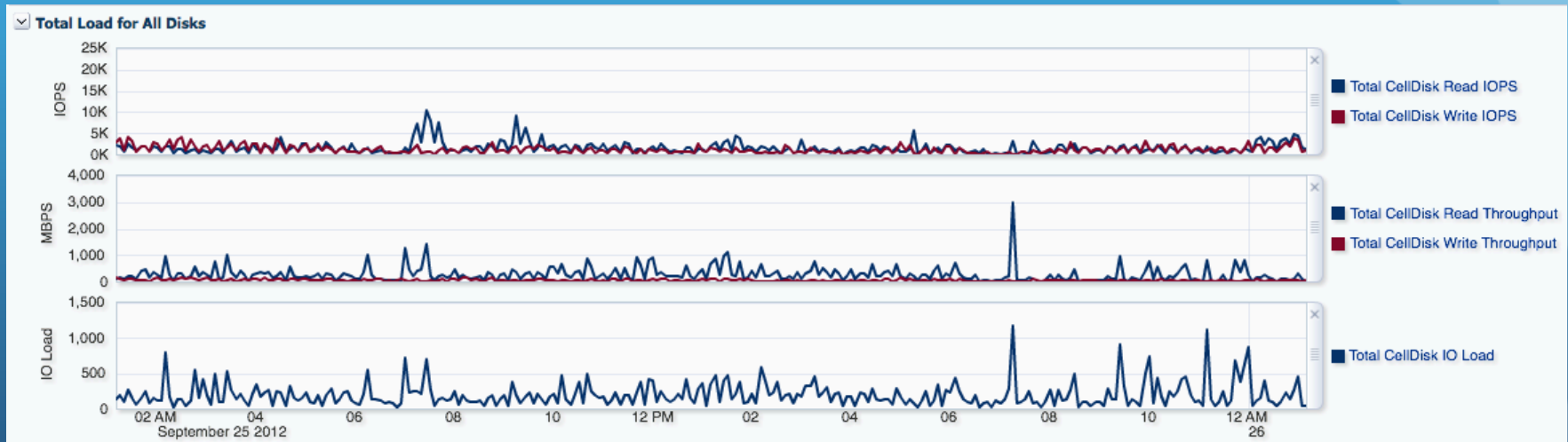
Exadata Plugin for OEM 12c

- Simple installation
- Single plugin
- 10 step discovery
- Updated via self-update console

Actions ▾ View ▾  Deploy On ▾  Undeploy From ▾			
Name	Version		
	Latest Available	Latest Downloaded	On Management Server
 Oracle Exadata	12.1.0.2.0 [u120704]	12.1.0.2.0 [u120704]	12.1.0.2.0 [u120704]
 Oracle Exadata Healthchecks	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0

Performance Graphs

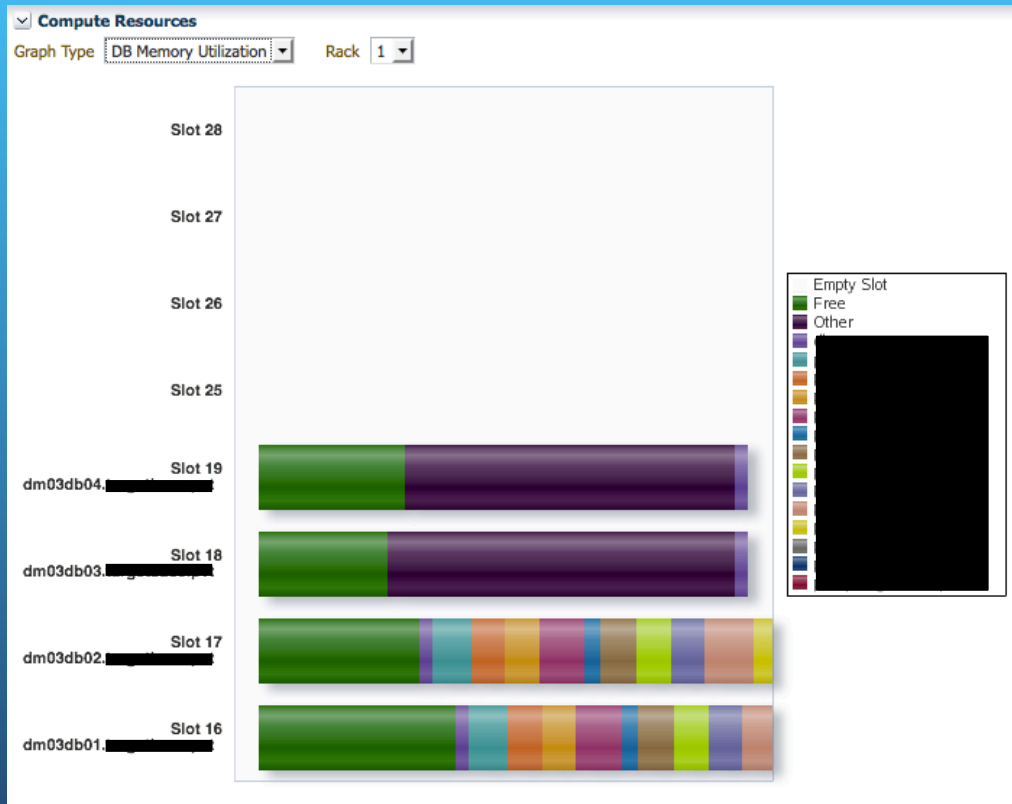
- Text reports become graphs!



- Easily see resource consumption
- Dynamic graphs

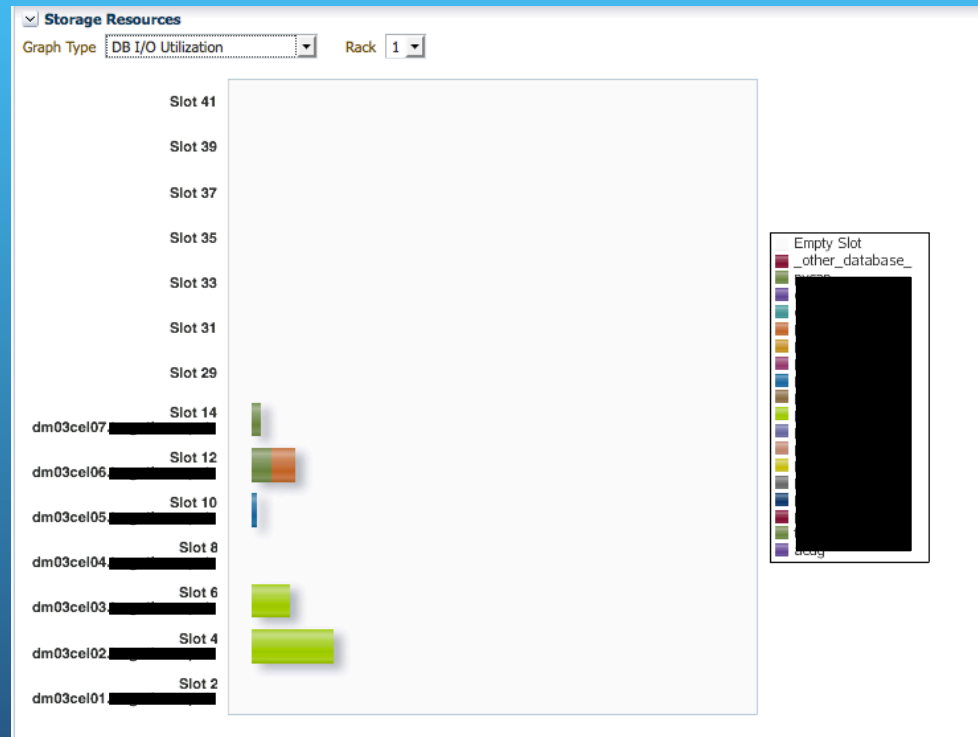


Compute Node Memory Allocation



- See memory allocation across compute nodes in the cluster

Storage I/O Allocation



- See I/O utilization across storage servers in the cluster

Infiniband Switch Metrics

- View switch health
- Healthy and degraded ports are color-coded

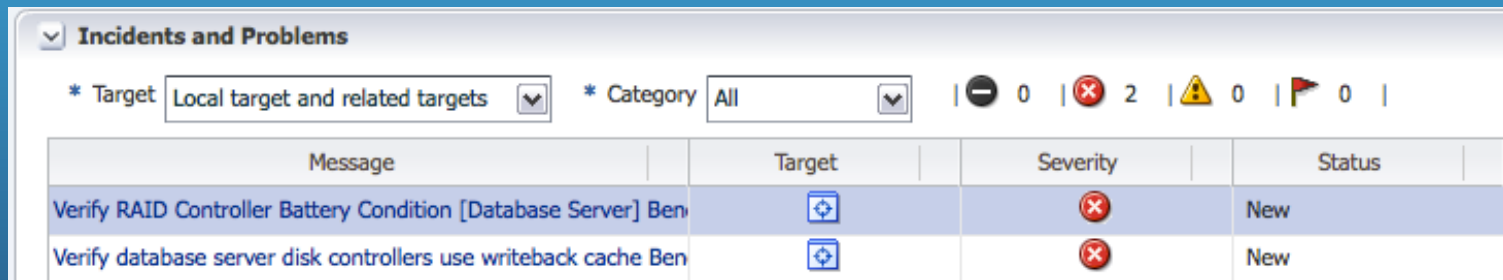
Throughput			
Link Type	Average (Mbps)	Lowest (Mbps)	Highest (Mbps)
Switch to Node Link	19.84	0.32	55.48
Switch to Switch Link	0.03	0.01	0.07

Switches

Name	Status	Type	Port Details																																				
dm03sw-ib3.t...	↑	Normal	<table><tr><td>20</td><td>22</td><td>24</td><td>26</td><td>28</td><td>30</td><td>35</td><td>33</td><td>31</td><td>14</td><td>16</td><td>18</td><td>11</td><td>9</td><td>7</td><td>5</td><td>3</td><td>1</td></tr><tr><td>19</td><td>21</td><td>23</td><td>25</td><td>27</td><td>29</td><td>36</td><td>34</td><td>32</td><td>13</td><td>15</td><td>17</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>2</td></tr></table>	20	22	24	26	28	30	35	33	31	14	16	18	11	9	7	5	3	1	19	21	23	25	27	29	36	34	32	13	15	17	12	10	8	6	4	2
20	22	24	26	28	30	35	33	31	14	16	18	11	9	7	5	3	1																						
19	21	23	25	27	29	36	34	32	13	15	17	12	10	8	6	4	2																						
dm03sw-ib2.t...	↑	Normal	<table><tr><td>20</td><td>22</td><td>24</td><td>26</td><td>28</td><td>30</td><td>35</td><td>33</td><td>31</td><td>14</td><td>16</td><td>18</td><td>11</td><td>9</td><td>7</td><td>5</td><td>3</td><td>1</td></tr><tr><td>19</td><td>21</td><td>23</td><td>25</td><td>27</td><td>29</td><td>36</td><td>34</td><td>32</td><td>13</td><td>15</td><td>17</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>2</td></tr></table>	20	22	24	26	28	30	35	33	31	14	16	18	11	9	7	5	3	1	19	21	23	25	27	29	36	34	32	13	15	17	12	10	8	6	4	2
20	22	24	26	28	30	35	33	31	14	16	18	11	9	7	5	3	1																						
19	21	23	25	27	29	36	34	32	13	15	17	12	10	8	6	4	2																						
dm03sw-ib1.t...	↑	Spine	<table><tr><td>20</td><td>22</td><td>24</td><td>26</td><td>28</td><td>30</td><td>35</td><td>33</td><td>31</td><td>14</td><td>16</td><td>18</td><td>11</td><td>9</td><td>7</td><td>5</td><td>3</td><td>1</td></tr><tr><td>19</td><td>21</td><td>23</td><td>25</td><td>27</td><td>29</td><td>36</td><td>34</td><td>32</td><td>13</td><td>15</td><td>17</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>2</td></tr></table>	20	22	24	26	28	30	35	33	31	14	16	18	11	9	7	5	3	1	19	21	23	25	27	29	36	34	32	13	15	17	12	10	8	6	4	2
20	22	24	26	28	30	35	33	31	14	16	18	11	9	7	5	3	1																						
19	21	23	25	27	29	36	34	32	13	15	17	12	10	8	6	4	2																						

Exadata Healthchecks Plugin

- Reads exachk results and creates OEM incidents
- Schedule exachk via cron or run manually



The screenshot shows a software interface titled "Incidents and Problems". It includes filter controls for "Target" (set to "Local target and related targets") and "Category" (set to "All"). To the right of these filters are status counts: 0 incidents with a minus sign, 2 incidents with a red X, 0 incidents with a yellow warning triangle, and 0 incidents with a red flag. Below the filters is a table with four columns: "Message", "Target", "Severity", and "Status". Two incidents are listed in the table, both with a "New" status and a "Critical" severity (indicated by a red X icon).

Message	Target	Severity	Status
Verify RAID Controller Battery Condition [Database Server] Ben			New
Verify database server disk controllers use writeback cache Ben			New

Exadata Healthchecks Plugin

- Click to get incident details

Incident Details

ID 182

Metric [STATUS](#)

Metric Group ExadataResults

CHECK_ID AEAAA40DB83E0226E040E50A1EC06725

INTERNAL_KEY 174575850

Target [V2 Exadata \(Oracle Exadata Healthchecks\)](#) ⓘ

Incident Created Sep 26, 2012 2:56:08 PM CDT

Last Updated Sep 26, 2012 2:56:08 PM CDT

Summary

Verify RAID Controller Battery Condition [Database Server] Benefit: The RAID controller battery loses its ability to support cache over time. Verifying the battery charge and condition allows proactive battery replacement. The impact of verifying the RAID controller battery condition is minimal. Risk: A failed RAID controller battery will put the RAID controller into WriteThrough mode which significantly impacts write I/O performance. Recommendation: Execute the following command on all servers: /opt/MegaRAID/MegaCli/MegaCli64 -AdpBbuCmd -a0 | grep 'Full Charge' -A5 | sort | grep Full -A1 The output will be similar to: Full Charge Capacity: 1357 mAh Max Error: 2 % Immediately replace any batteries that meet either of the following criteria: 1) 'Max Error' is 10% or greater (battery deemed unreliable regardless of 'Full Charge Capacity' reading) 2) 'Full Charge Capacity' less than 674 mAh regardless of 'Max Error' reading.

Internal Event

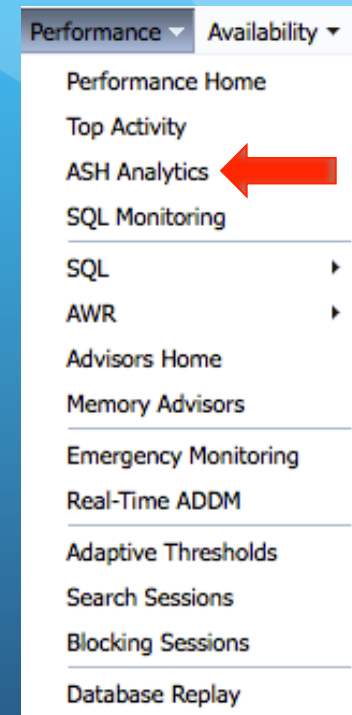
Name ExadataResults:STATUS

Event Type Metric Alert

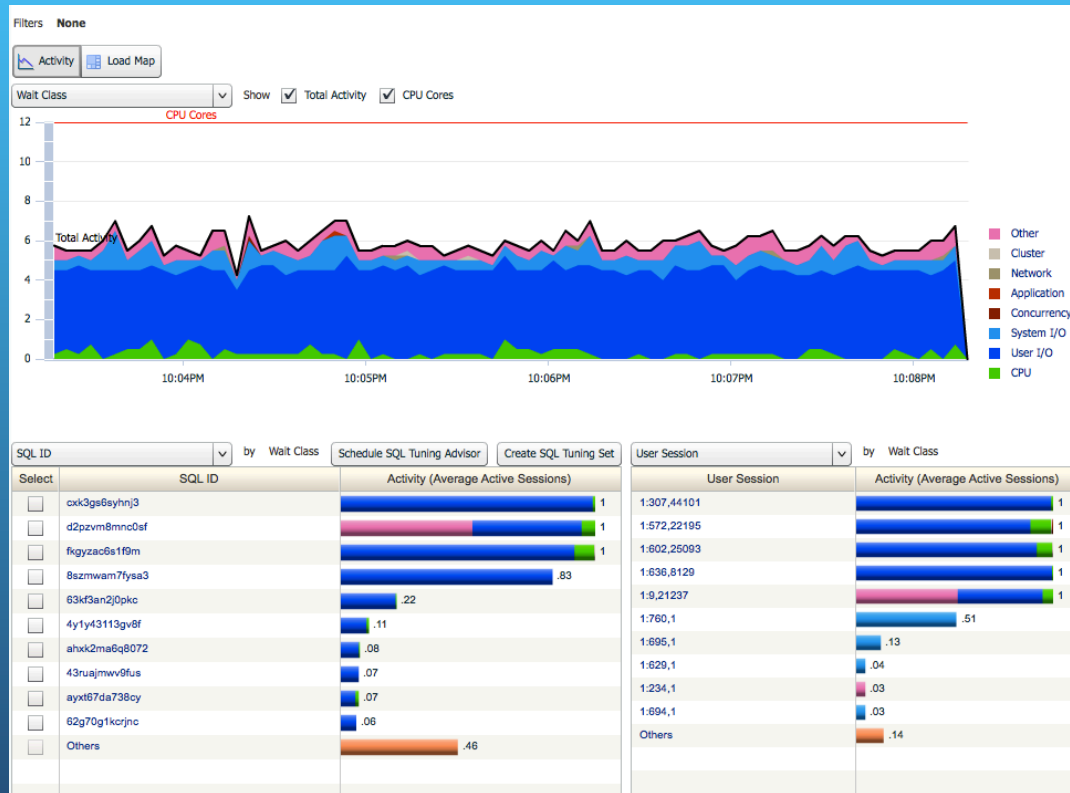
Category Unclassified

Active Session History Analytics

- Allows DBAs to drill down into performance pages
- Dynamically changing views based on user-defined filters
- Requires installation in each database
- Hard to find at first - look at the instance target, not the “cluster database” target

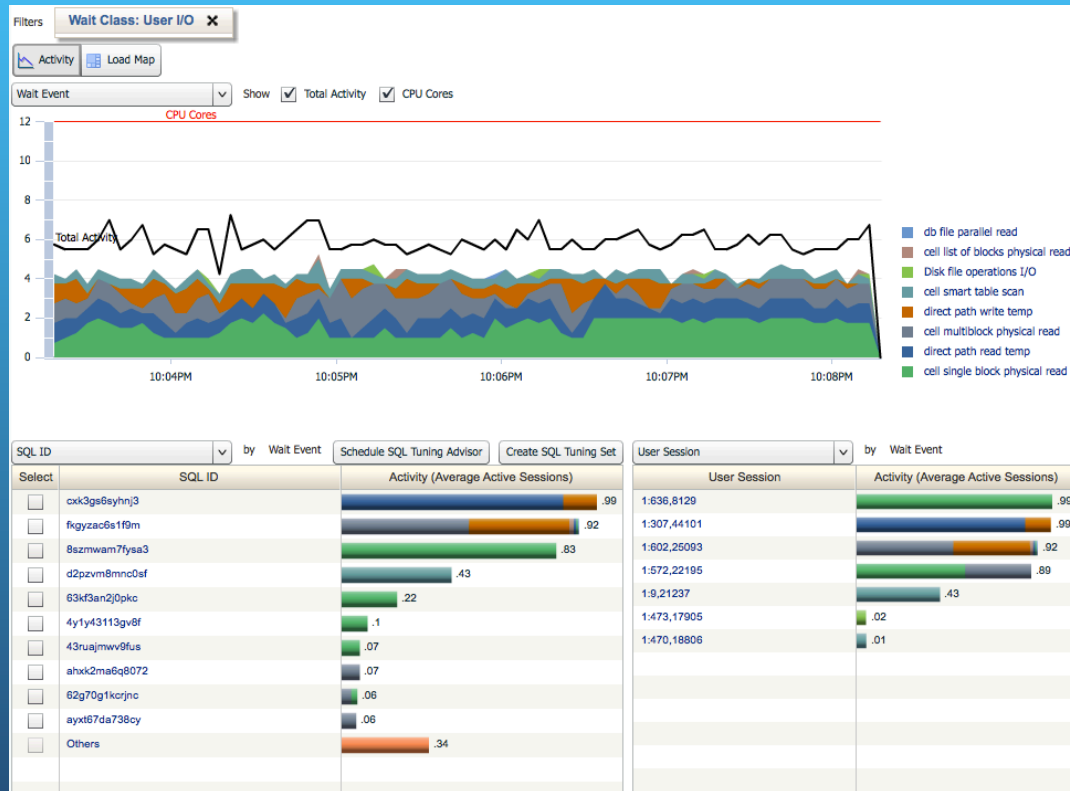


Active Session History Analytics



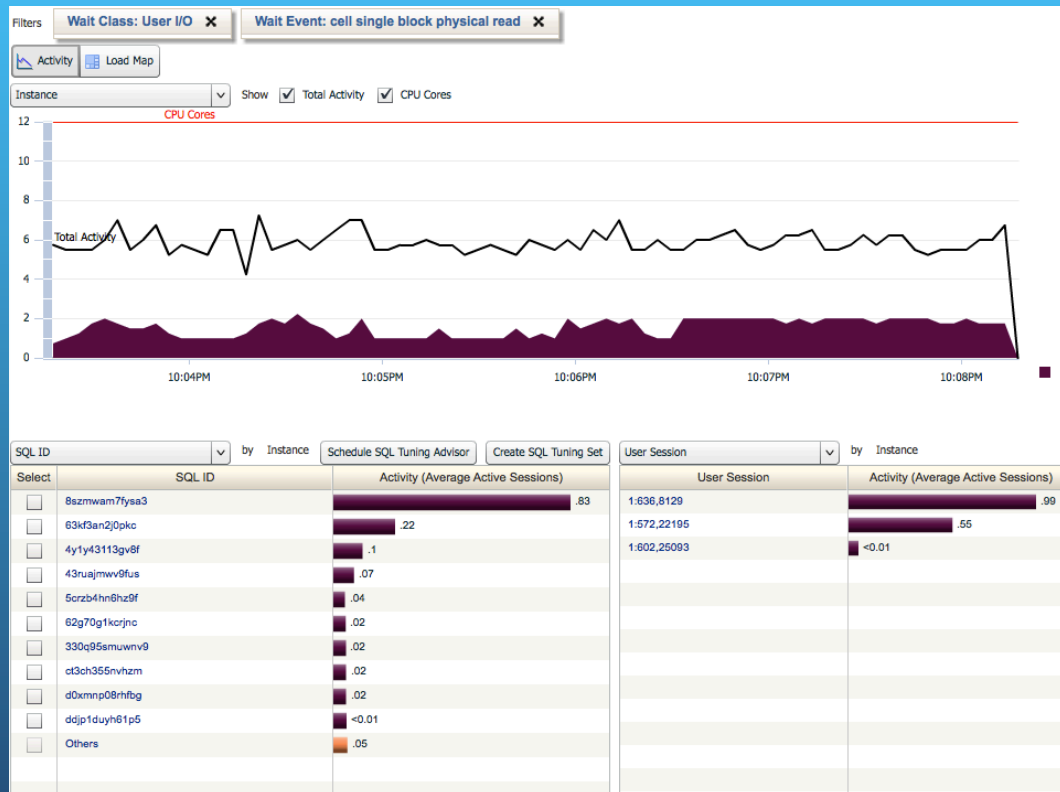
- Displaying all wait events

Active Session History Analytics



- Filtered by User I/O

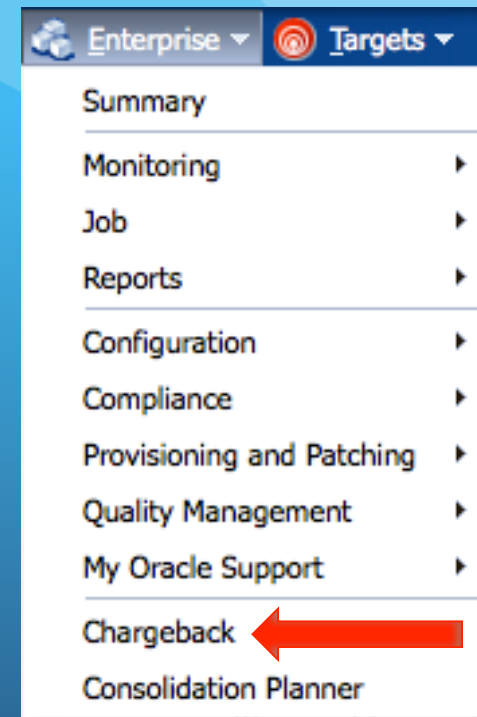
Active Session History Analytics



- Filtered by “Cell Single Block Physical Read”

Chargeback

- Many Exadata environments are consolidation
- Allows for better reporting based on actual resources consumed
- *Requires Cloud Management Pack for Oracle Database or Fusion Middleware



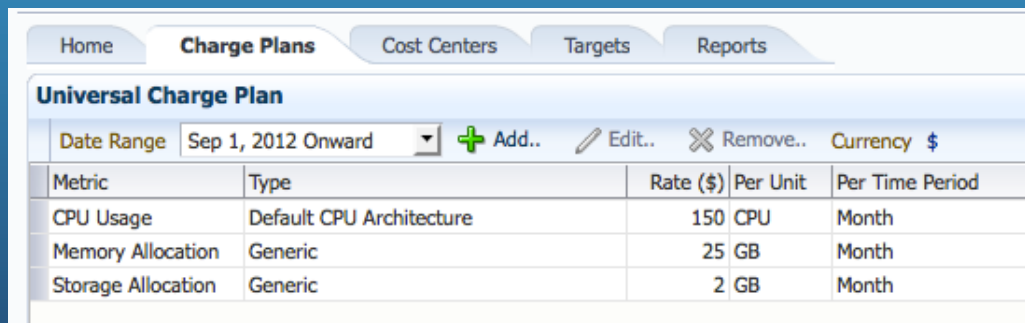
Configuring Chargeback

- Deploy the chargeback plugin to OMS
- Define a charge plan
- Add targets to charge plans
- Assign cost centers to targets
- Profit!!!



Configuring Charge Plans

- Define a universal charge plan
 - CPU
 - Memory
 - Storage



Home Charge Plans Cost Centers Targets Reports				
Universal Charge Plan				
Date Range	Sep 1, 2012 Onward	+ Add..	Edit..	Remove.. Currency \$
Metric	Type	Rate (\$)	Per Unit	Per Time Period
CPU Usage	Default CPU Architecture	150	CPU	Month
Memory Allocation	Generic	25	GB	Month
Storage Allocation	Generic	2	GB	Month

enkitem

Configuring Charge Plans

- Configure extended charges
 - Database Options
 - Number of RAC nodes
 - Database version
 - Network I/O

Add Item

Item Name: Option

Charge Type: Flat

* Rate (\$): 1,500

Unit: Target Instance

Time Unit: Month

☐ Default (Applies when no Condition is matched)

☒ Use Condition

Condition Operator: Equals



Condition Value:

- Active Data Guard
- Automatic Storage Management
- Data Guard
- Data Mining
- OLAP
- Partitioning
- Real Application Testing
- Specify Value

OK Cancel

Configuring Chargeback Targets

- Select a target, assign your charge plan
 - Multiple types of targets can share cost plans

Cost Center and Charge Plan Assignment for Targets			
Action ▾	View ▾	 Add Targets	 Remove Targets
		Assign Plan	Assign Cost Center
Target Name	Target Type	Charge Plan	Cost Center
▽ Databases			
▷ dbm	Cluster Database	Test Extended Plan	

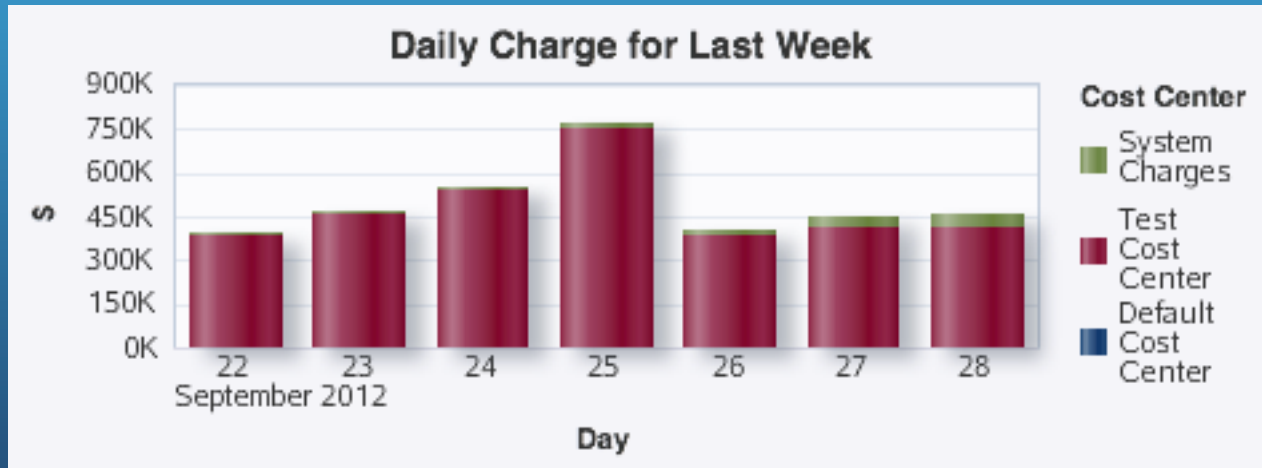
Configuring Cost Centers

- Cost centers decide where charges are assigned to
 - Different customers in DBaaS environments
 - Different departments in enterprise consolidation environments



Chargeback Reporting

- Reports can be delivered monthly
 - Uses BI Publisher to send reports in PDF or HTML format
 - View by resource, cost center, target type

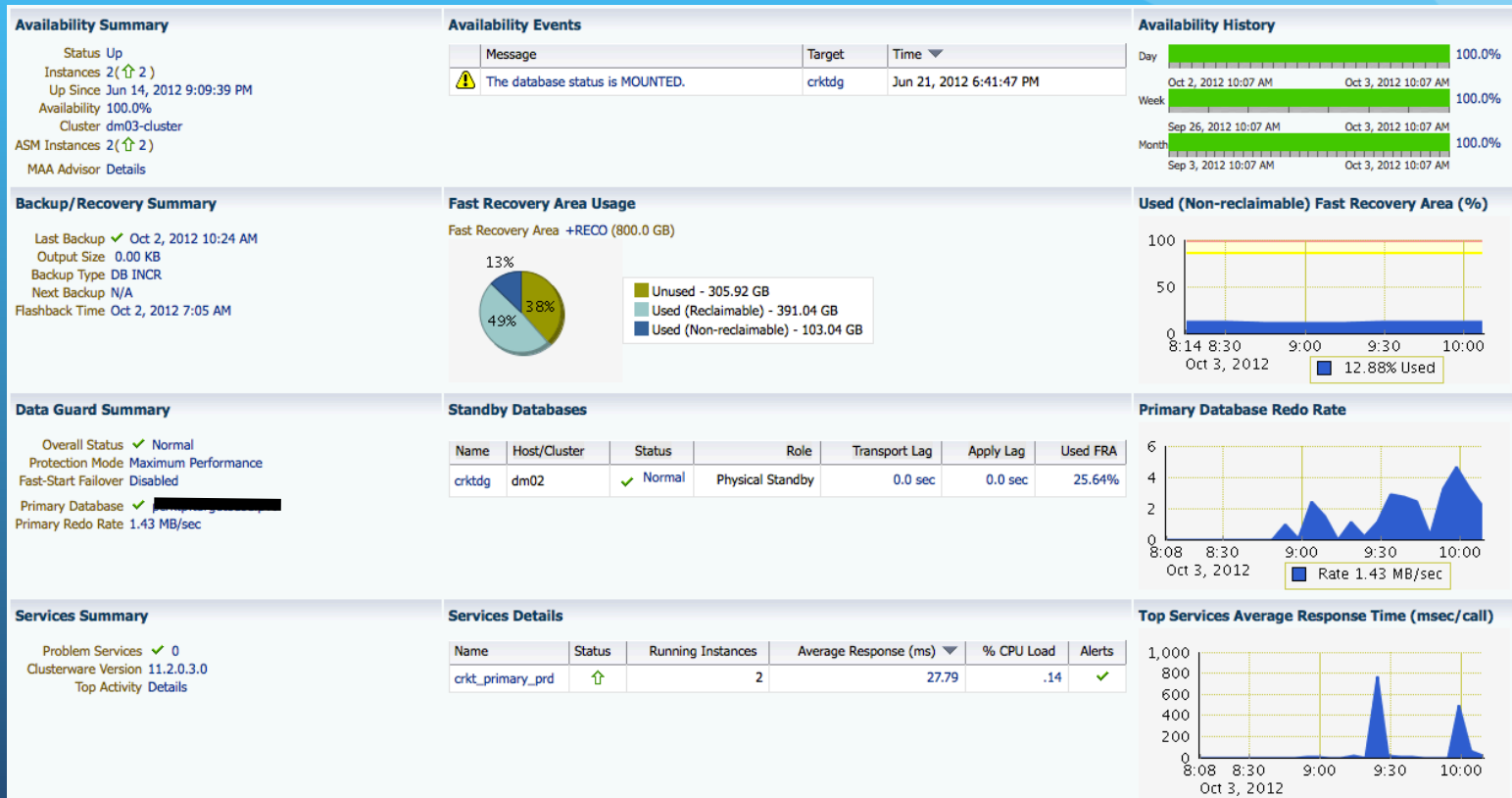


OEM Dashboards

ORACLE Enterprise Manager Cloud Control 12c								
DB Machine System Service Dashboard: DB Machine slcb06.us.oracle.com								
Refresh								
Service	Status	Performance	Usage and Business Indicators	Components	Service Level			
					Last 24 Hours	Last 7 Days	Last 31 Days	
DB Machine slcb06.us.oracle.com-Exadata Storage Servers Service	↑	0.20 Average Read Respons... 0.20 Average Write Respons...	0.79 Average I/O Load	Up 3 Up	100.00%	100.00%	100.00%	
DB Machine slcb06.us.oracle.com-Exadata Infiniband Service	↑	No Metrics Available	196.76 Average Link Through...	Up 2 Up	100.00%	100.00%	100.00%	
DB Machine slcb06.us.oracle.com-Exadata Host Service	↑	2.82 CPU Utilization(%)	22.67 Memory Utilization(%...	Up 2 Up	100.00%	100.00%	100.00%	
DB Machine slcb06.us.oracle.com-Exadata Cisco Switch Service	↑	No Metrics Available	No Metrics Available	Up 1 Up	100.00%	100.00%	100.00%	
DB Machine slcb06.us.oracle.com-Exadata ILOM Service	↑	No Metrics Available	No Metrics Available	Up 2 Up	100.00%	100.00%	100.00%	
DB Machine slcb06.us.oracle.com-Exadata PDU Service	↑	No Metrics Available	No Metrics Available	Up 2 Up	100.00%	100.00%	100.00%	
DB Machine slcb06.us.oracle.com-Exadata KVM Service	↑	No Metrics Available	No Metrics Available	Up 1 Up	100.00%	100.00%	100.00%	
Database System Service Dashboard: dbm_sys								
Refresh								
Service	Status	Performance	Usage and Business Indicators	Components	Service Level			
					Last 24 Hours	Last 7 Days	Last 31 Days	
DB Machine slcb06.us.oracle.com-Exadata ASM Service_dbm_sys_asm1	↑	No Metrics Available	1.20 Disk Usage	Up 3 Up	100.00%	100.00%	100.00%	

ec

High Availability Console



OEM 12c Release 2 (12.1.0.2)

- Released recently
- Handles “Split Racks” much better
- Faster than Release 1

Target Name
▼ DB Machine V2
Exadata Grid V2
IB Network X2
▼ DB Machine X2
Exadata Grid X2
IB Network X2



Questions?

Contact Information: Andy Colvin

email - andy.colvin@enkitec.com

web - <http://www.enkitec.com>

twitter - @acolvin

