
ORACLE

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Managing Oracle Grid Computing: Oracle Real Application Clusters, Oracle Automatic Storage Management, Oracle Data Guard

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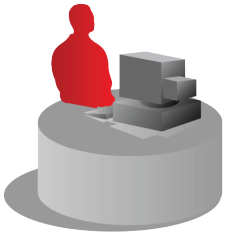
ORACLE

Oracle's Complete Enterprise Software Stack

Built-in & Integrated Manageability



Business User

BUSINESS SERVICES

ENTERPRISE APPLICATIONS	Oracle E-Business Suite, PeopleSoft, Siebel, JD Edwards, Oracle Fusion
MIDDLEWARE	Oracle WebLogic, Oracle SOA Suite, OracleAS
DATABASE	Oracle Database, Oracle TimesTen
OPERATING SYSTEM	Enterprise Linux
VIRTUALIZATION	Oracle VM

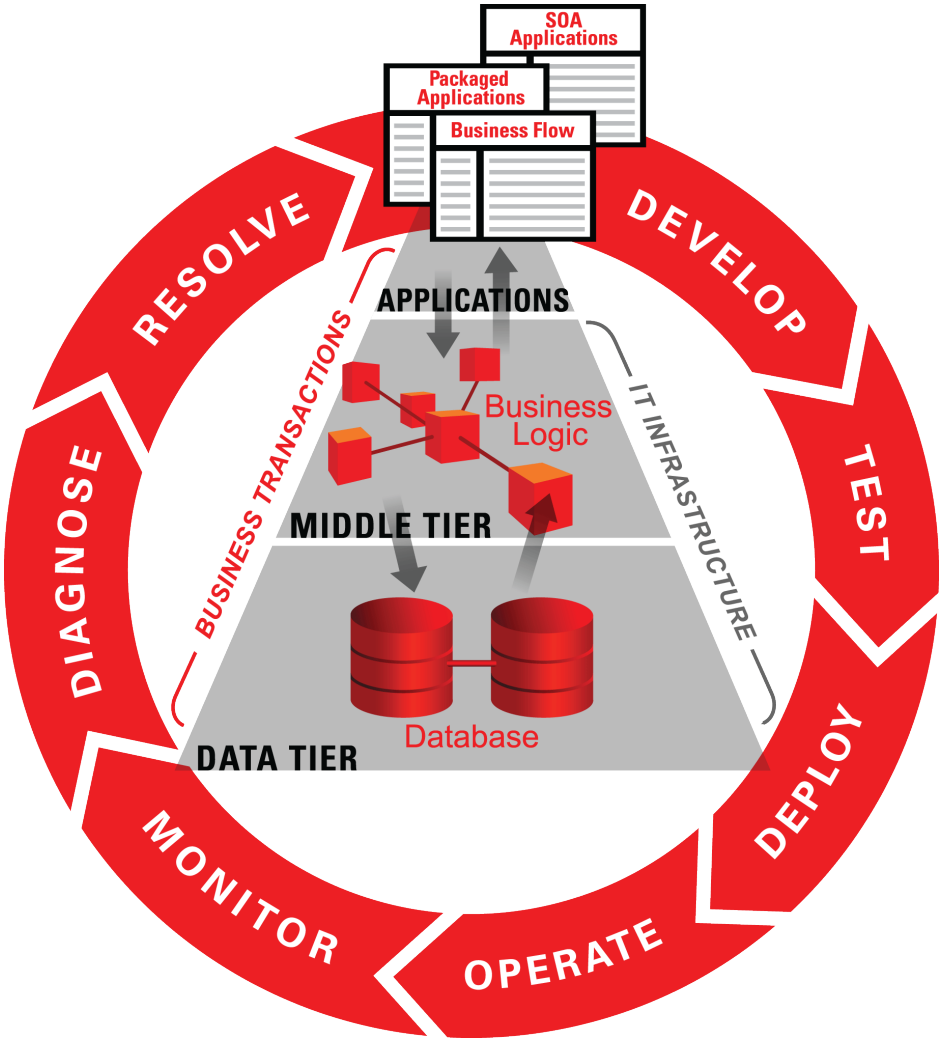
ORACLE

- Leader in the complete enterprise application stack
- Built-in manageability into every tier
- Integrated manageability across the entire stack

Oracle Enterprise Manager

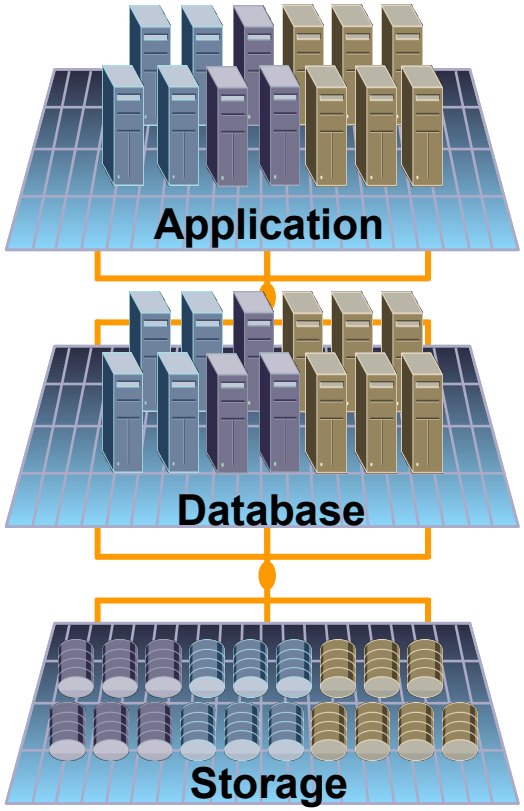
Increases Business Efficiency

- **Manage applications top-down, from the business perspective** by understanding user experiences and business impact of IT issues
- **Manage entire application lifecycle to increase business agility** with comprehensive application quality management and compliance solutions
- **Reduce operational costs** through intelligent diagnostics and automated IT processes



Oracle Highly Available Grid strategy

- Scale-Out architecture
  - Commodity hardware building blocks
  - Inherently highly scalable & redundant
- Scalability & Availability responsibility moves out of hardware/OS to scale-out savvy software
  - First Web & Application server tiers
    - Application servers
  - Then DB tier
    - Real Application Clusters
    - Data Guard for disaster recovery
  - Then storage tier
    - Scale-out storage software



Agenda

Managing Oracle's Highly Available Grid

Setup
Setup RAC, ASM and Standby configurations
Automate Oracle recommended Best practices
Avoid maintaining custom scripts or time consuming and error prone manual procedures

Manage
Manage as One, Diagnose as Many
Manage RAC, ASM and Standby configurations
Reduce Total Cost of Ownership

Agenda

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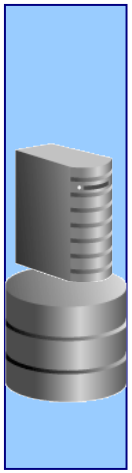
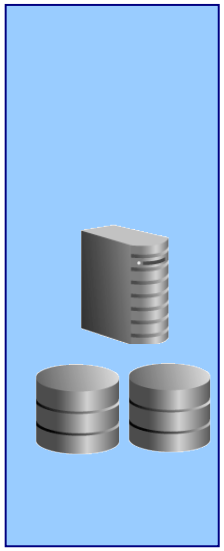
Oracle's Highly Available Grid - Setup

- Setup RAC, ASM and Data Guard configurations to implement Highly Available Grid
  - Migrate Database to ASM Storage
  - Convert Single Instance Database to RAC
  - Create Standby Database for your RAC Primary
  - Convert Standby Database to RAC
- Automate Oracle recommended best practices
- Avoid maintaining custom scripts or time consuming and error prone manual procedures

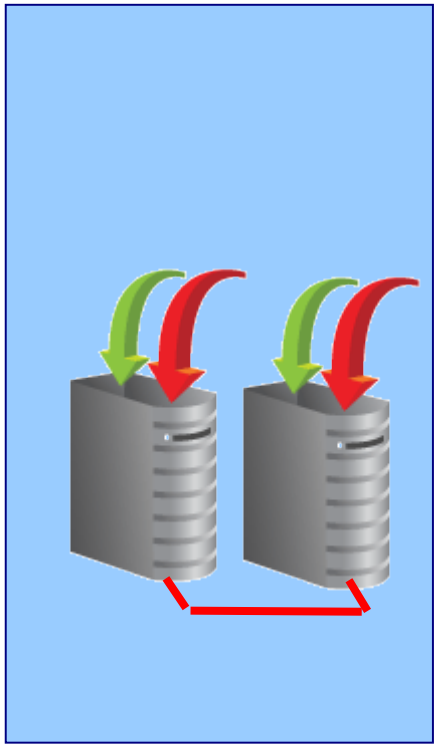
Getting on to Oracle's HA Grid



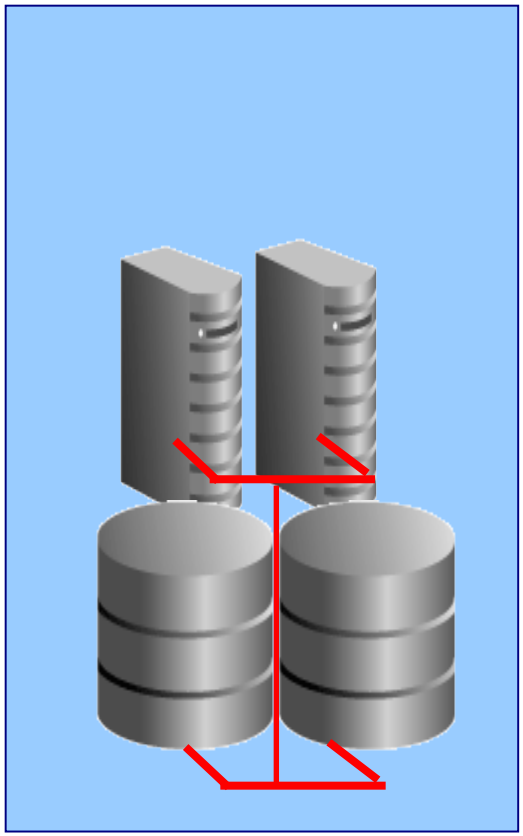
Single Instance Database



Migrate Database to ASM Storage

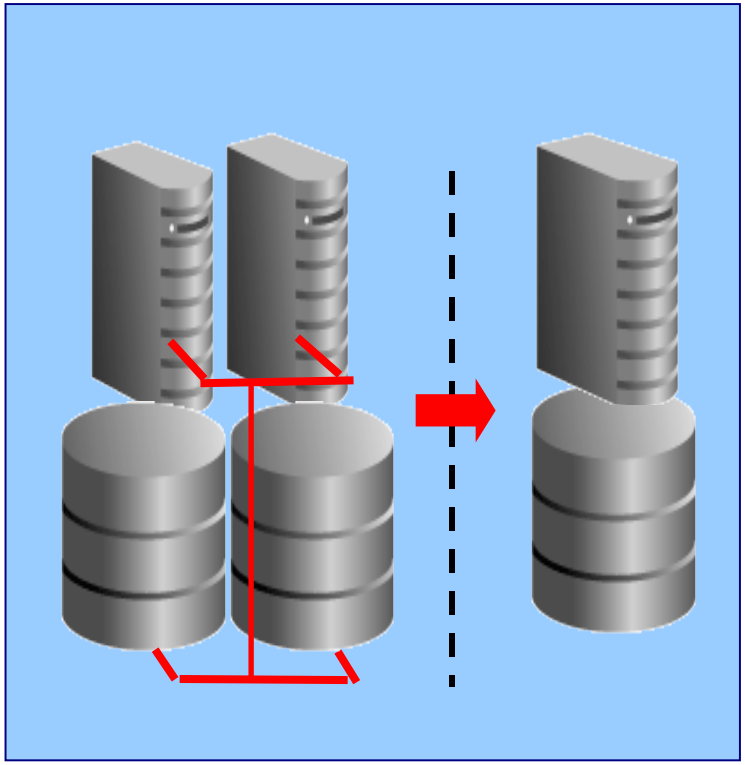


Provision Clusterware

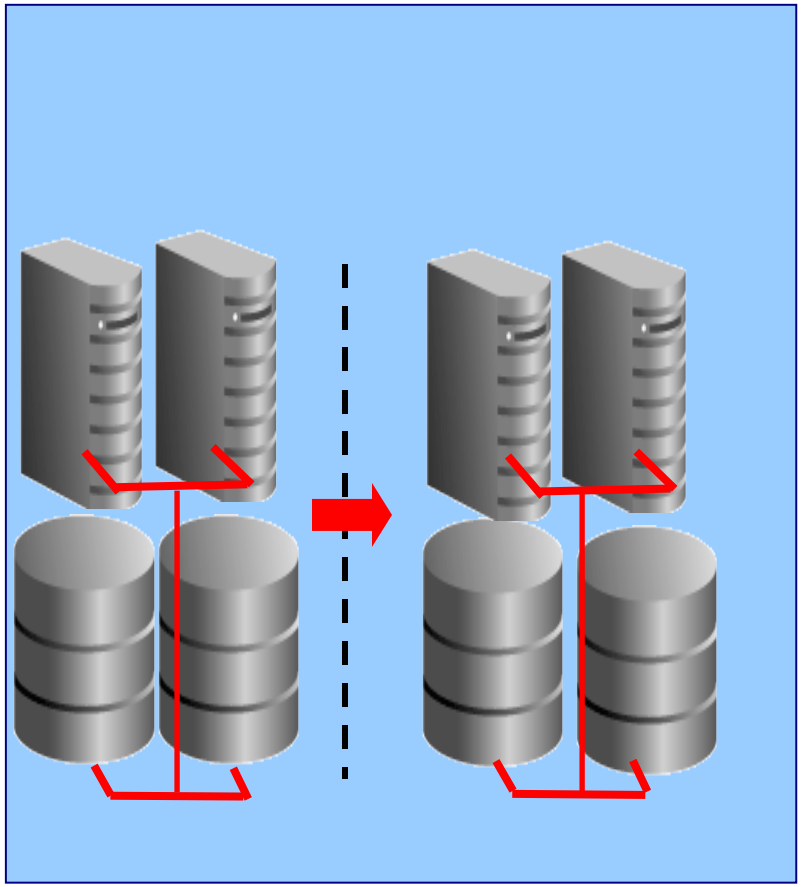


Convert Single Instance Database to RAC

Getting on to Oracle's HA Grid



Create Standby database



Convert Standby to RAC

Oracle's Highly Available Grid - Setup

- Setup RAC, ASM and Data Guard configurations to implement Highly Available Grid
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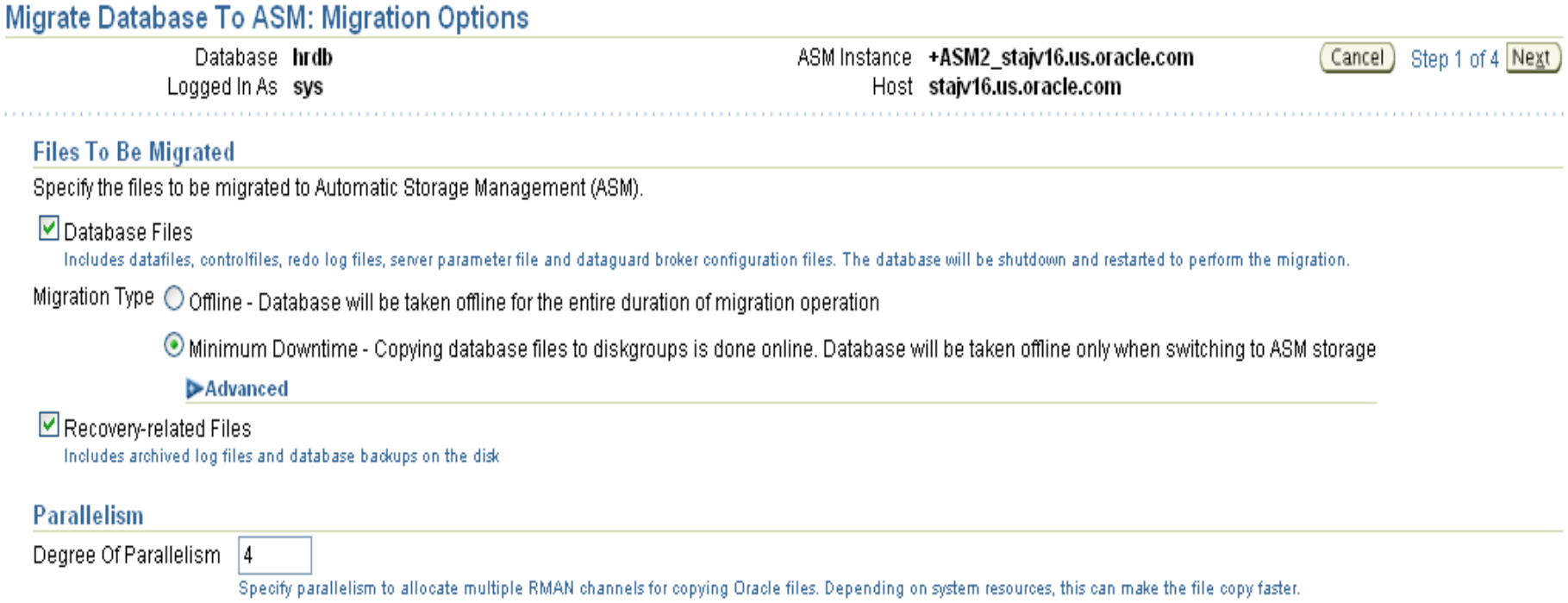
  - Convert Standby Database to RAC
- Automate Oracle recommended best practices
- Avoid maintaining custom scripts or time consuming and error prone manual procedures

Migrate Database to ASM Storage



- Configure ASM if needed NEW!
- Supports migration from Raw or File system to ASM storage
- Migrate database and recovery files
- Minimal Downtime Migration NEW!

- Migrate to different host NEW!
- Automated as EM job

Migrate Database to ASM Storage

- Configuration
  - Performs pre-requisite checks prior to initiating the operation
  - Configure Single Instance or Clustered ASM
  - Can migrate single instance or RAC
- Migrate using Backups
  - Migrate database files and recovery files while database is online
  - Option to suspend the job and notify prior to taking database offline for switching to ASM storage.
  - If opted to be notified, can resume at planned downtime window
  - Can use existing backup to avoid load on production server
  - Can be migrated to different host
- Minimal Downtime Migration (using Data Guard)
  - Create Physical standby, and Switchover

Oracle's Highly Available Grid - Setup

- Setup RAC, ASM and Data Guard configurations to implement Highly Available Grid
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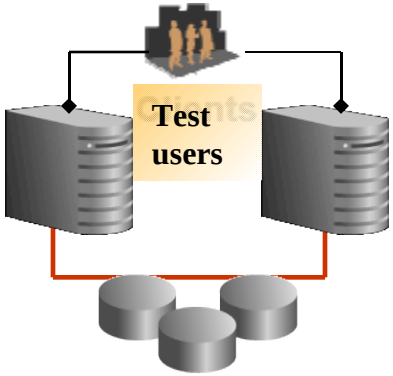
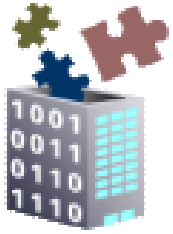
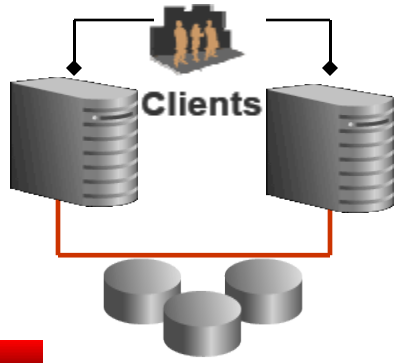
EM driven RAC Provisioning



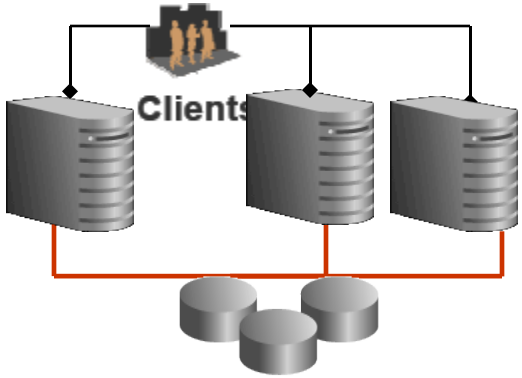
1 Create reference RAC



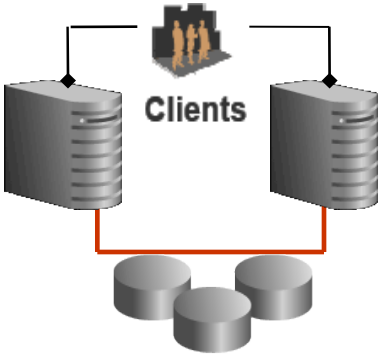
2 Stage gold images



3 Create Production clusters



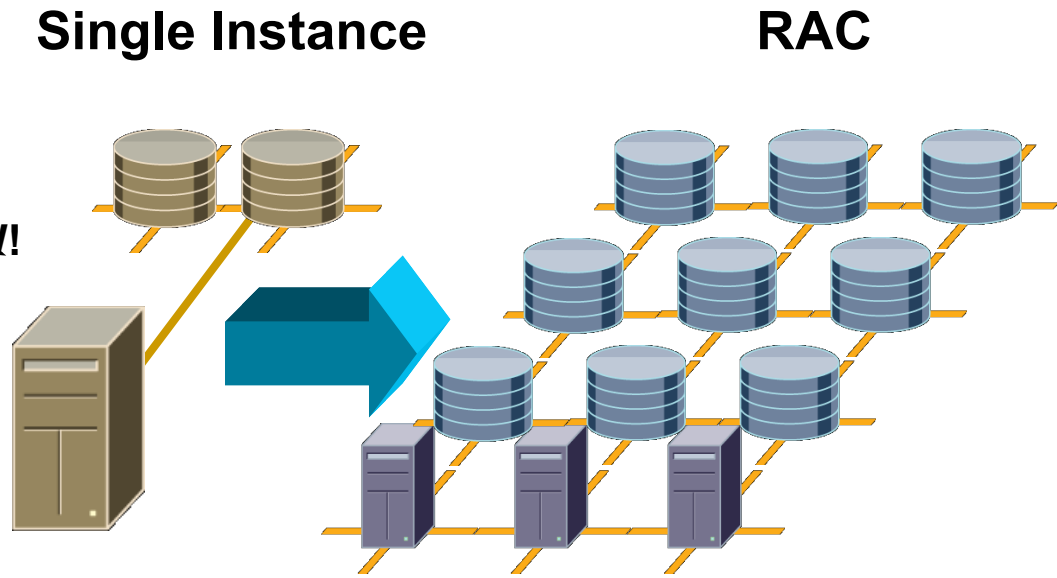
4 Scale up RAC cluster



5 Scale down

Convert Single Instance Database to RAC

- Wizard-driven interface to convert single instance into multi-instance RAC database
- Convert ASM to Clustered ASM (if necessary)
- Automated as EM jobs



Convert Single Instance Database to RAC

- Pre-reqs prior to performing cluster-wide operations
  - Cluster verification
  - Node accessibility
  - Oracle Database Software on all selected nodes
  - If converting ASM to Clustered ASM, ensures that ASM is not in use by any open database
- Automates
  - Mounting of shared diskgroups on all nodes
  - Setup parameter files across cluster hosts
  - Migrate files to shared file system or ASM storage (if necessary)
  - Create additional undo TS, redo logs, password files, oratab/registry entries etc.
  - Listener configuration across all cluster hosts
  - Register with Cluster-ware
- Restore SI ASM or SI DB back if something were to fail, so retry can be attempted after fixing the root cause

Oracle's Highly Available Grid - Setup

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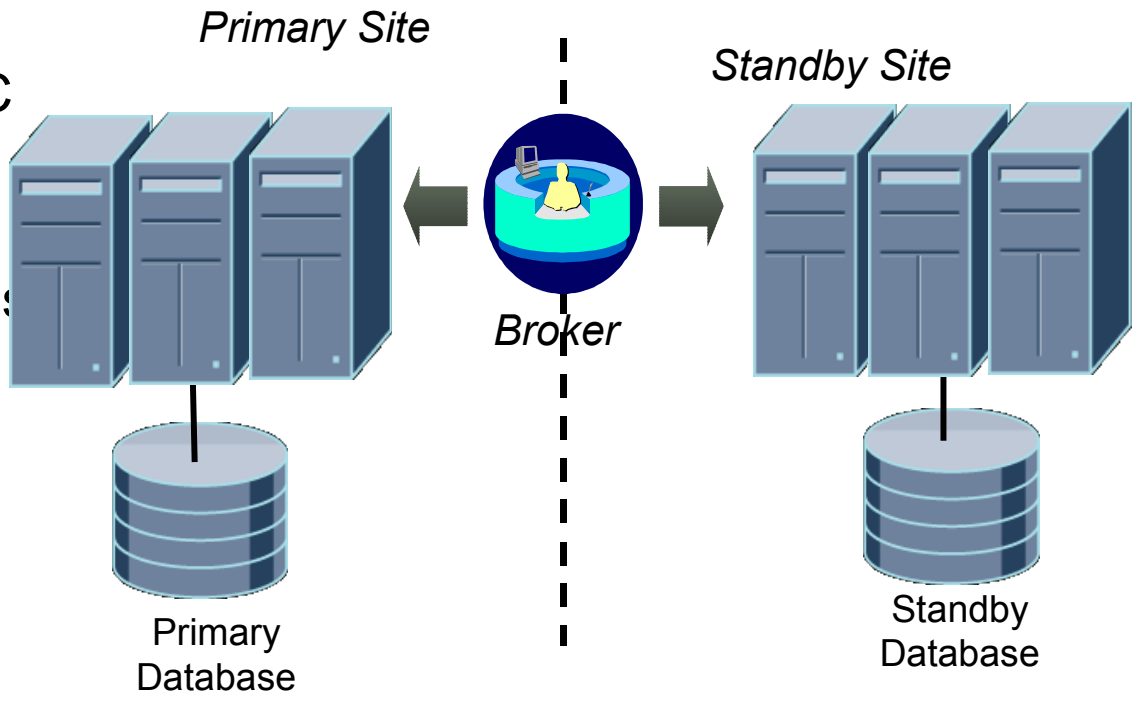
Setup Standby Database Grid

- Create Physical, Logical standby databases
- Create Standby for your RAC database
- Create standby on ASM storage for primary database on FS/Raw storage NEW!
- Create standby from existing RMAN backups NEW!
- Convert Physical standby to Snapshot Standby and vice-versa NEW!



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- Automate Oracle recommended best practices
- Avoid maintaining custom scripts or time consuming and error prone manual procedures

Oracle's Highly Available Grid - Setup

Enterprise Manager helps setup Highly Available Grid

Setup
Setup RAC, ASM and Standby configurations
Automate Oracle recommended Best practices
Avoid maintaining custom scripts or time consuming and error prone manual procedures

Agenda

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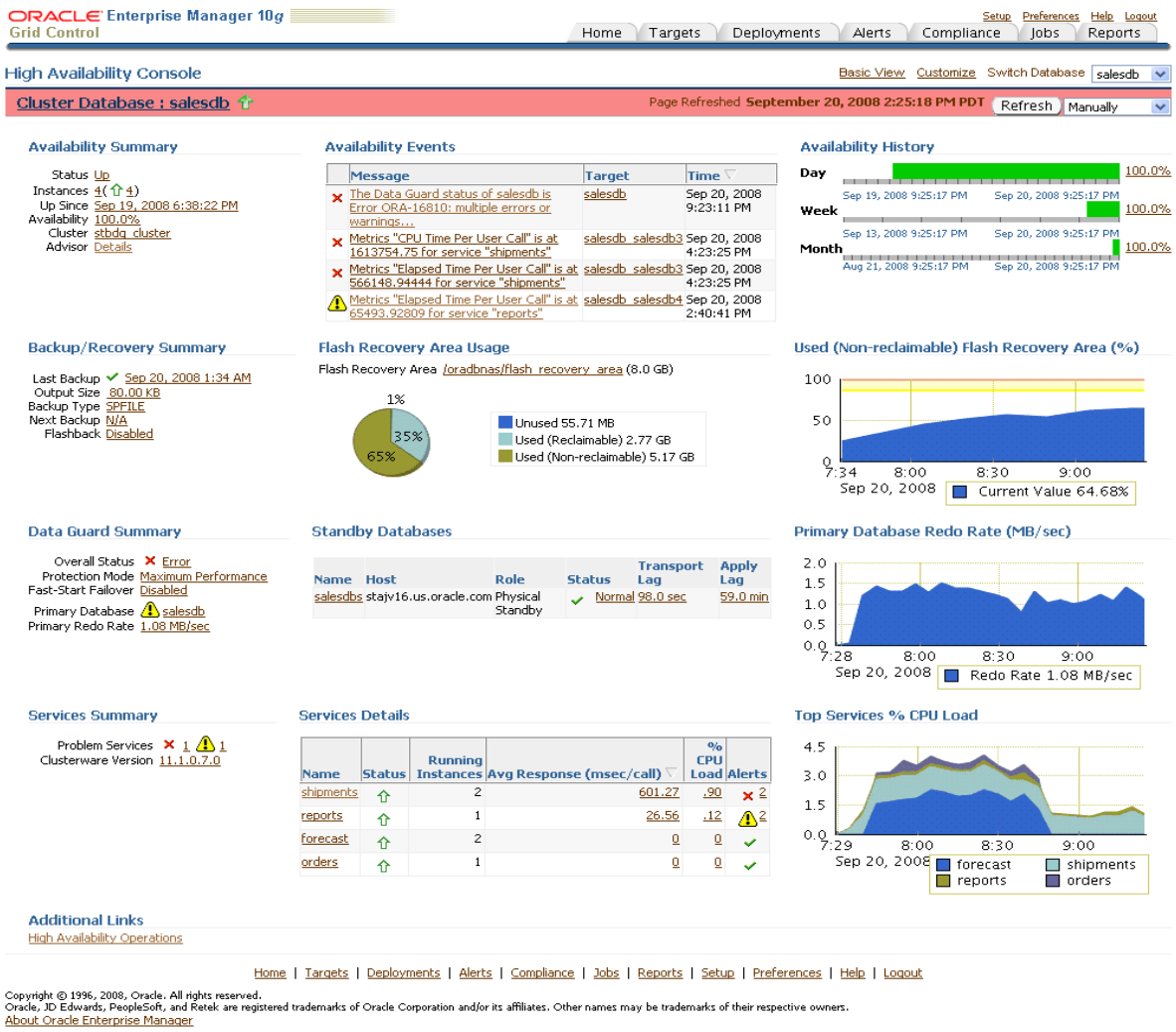
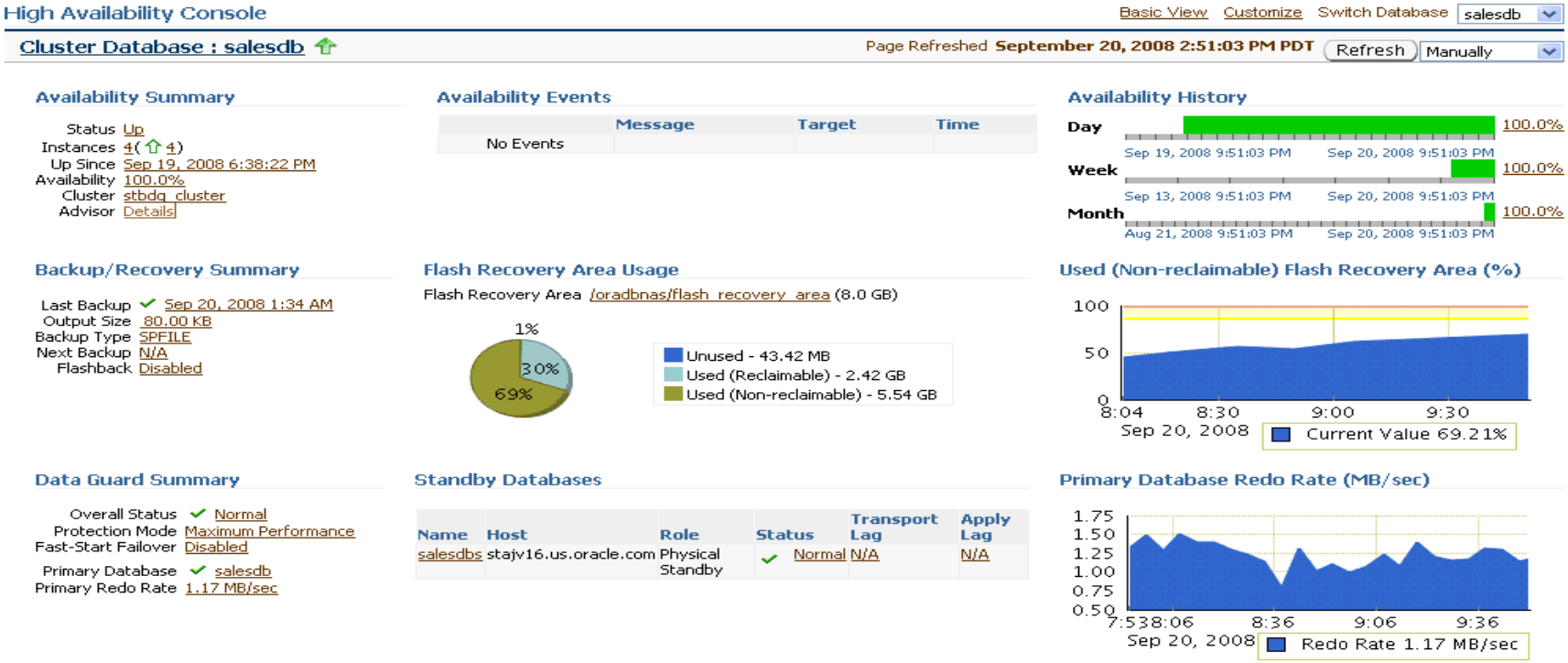
Manage
Manage as One, Diagnose as Many
Manage RAC, ASM and Standby configurations
Reduce Total Cost of Ownership

Oracle's Highly Available Grid – Manage

- Manage as one
- HA Console – Dashboard to Manage HA Grid NEW!
- Manage RAC
- Manage ASM
- Manage Data Guard



HA Console



- Configuration-wide view for RAC/HA setup instead of individual databases
- Show MAA configuration advice
- Show Availability related events across the configuration

- Summary and Chart views for key Backup/Recovery, Data Guard and HA Service metrics
- Customizable views
- Drilldowns
- Launch HA Operations

HA Console – Configuration Advice

High Availability Configuration Advisor

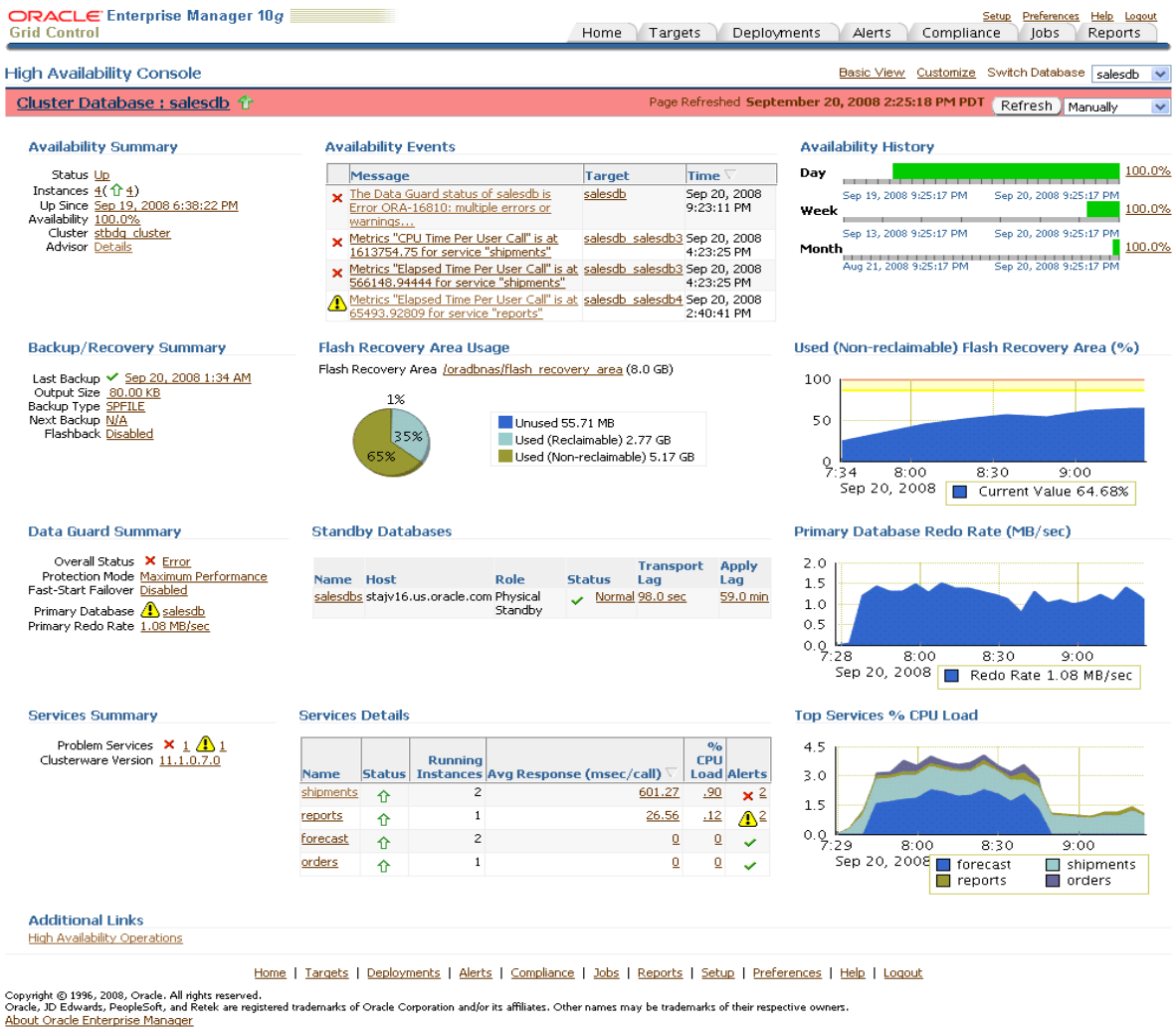
Outage Type	Oracle Solution	Benefits
Computer Failures	Configure Oracle Real Application Clusters and Oracle Clusterware	Automatic recovery of failed nodes and instances. Fast application notification wi failover.
Computer Failures	Configure Oracle Data Guard	Fast-start failover and fast application notification with integrated Oracle clients.
Computer Failures	Configure Oracle Streams	Online replica database resumes processing.
Storage Failures	Migrate Storage to Automatic Storage Management	Mirroring and online automatic rebalance places redundant copies of the data in s
Storage Failures	Setup Oracle Data Guard	Fast-start failover and fast application notification with integrated Oracle clients.
Storage Failures	Schedule Backups Using Flash Recovery Area	Fully managed database recovery and disk-based backups.
Storage Failures	Configure Oracle Streams	Online replica database resumes processing.
Human Errors	Enable supplemental logging.	Provides ability to browse transactions by time or SCN range.
Human Errors	Configure Flash Recovery Area and Enable Flashback Database	Fine-grained and database-wide rewind capability.
Data Corruptions	Use storage compliant with Hardware Assisted Resilient Data (HARD) Initiative.	Corruption prevention within a storage array.
Data Corruptions	Configure DB_BLOCK_CHECKING and DB_BLOCK_CHECKSUM Initialization Parameters	Different levels of block corruption prevention and detection at the database level.

- Provide launch pad to perform configuration changes for better Availability
- Based on Oracle Suggested Best practice recommendations
- Provide automation workflow to implement recommendation

Demo

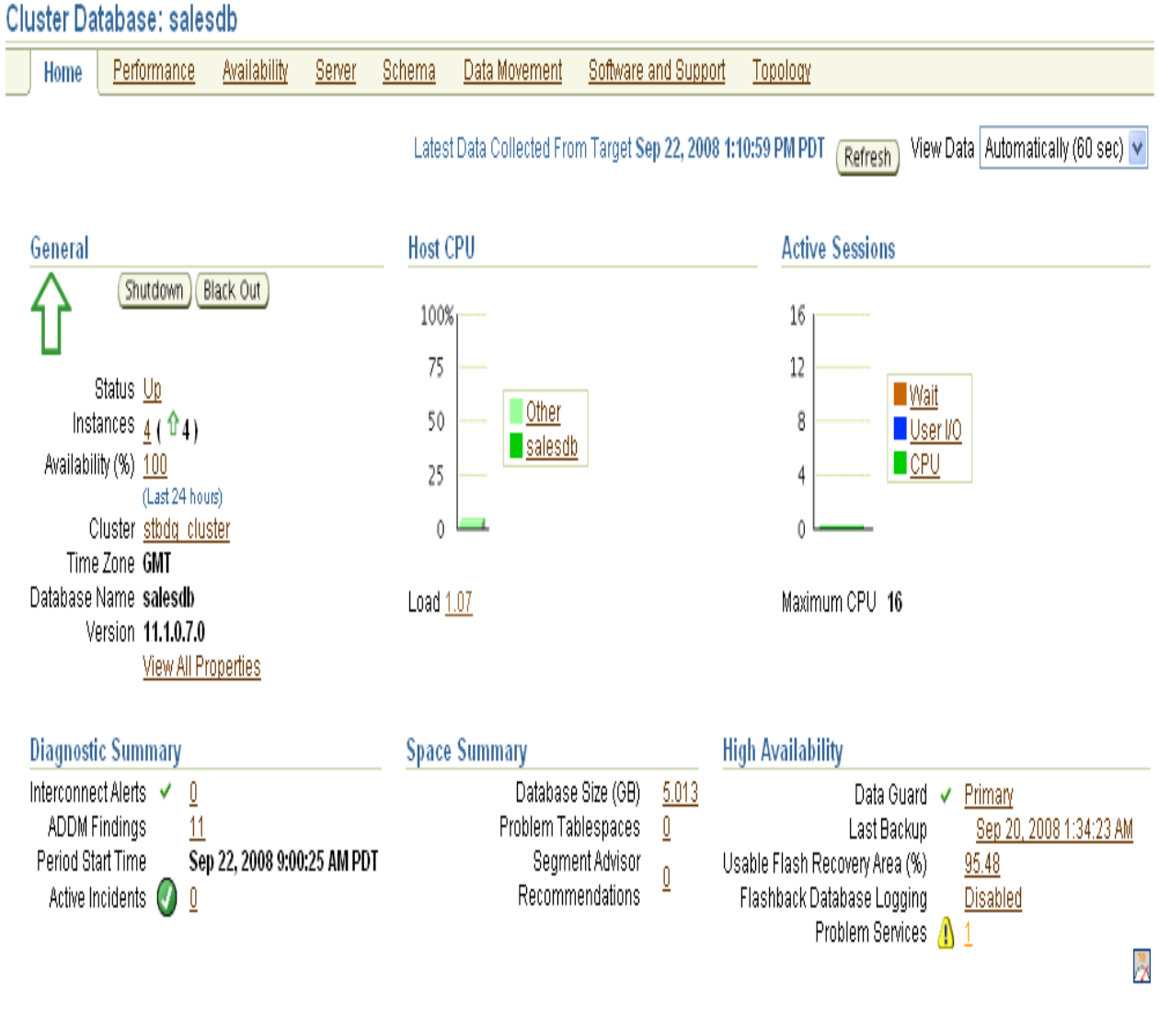
Oracle's Highly Available Grid – Manage

- Manage as one
- HA Console – Dashboard to Manage Highly Available Grid
- Manage RAC
- Manage ASM
- Manage Data Guard



RAC Management

- Manage as one
- Monitor RAC and Cluster targets
- Cluster-aware monitoring
- Cluster-aware jobs
- ADDM for RAC NEW!
- Service Centric Management NEW!
- Diagnose as many NEW!

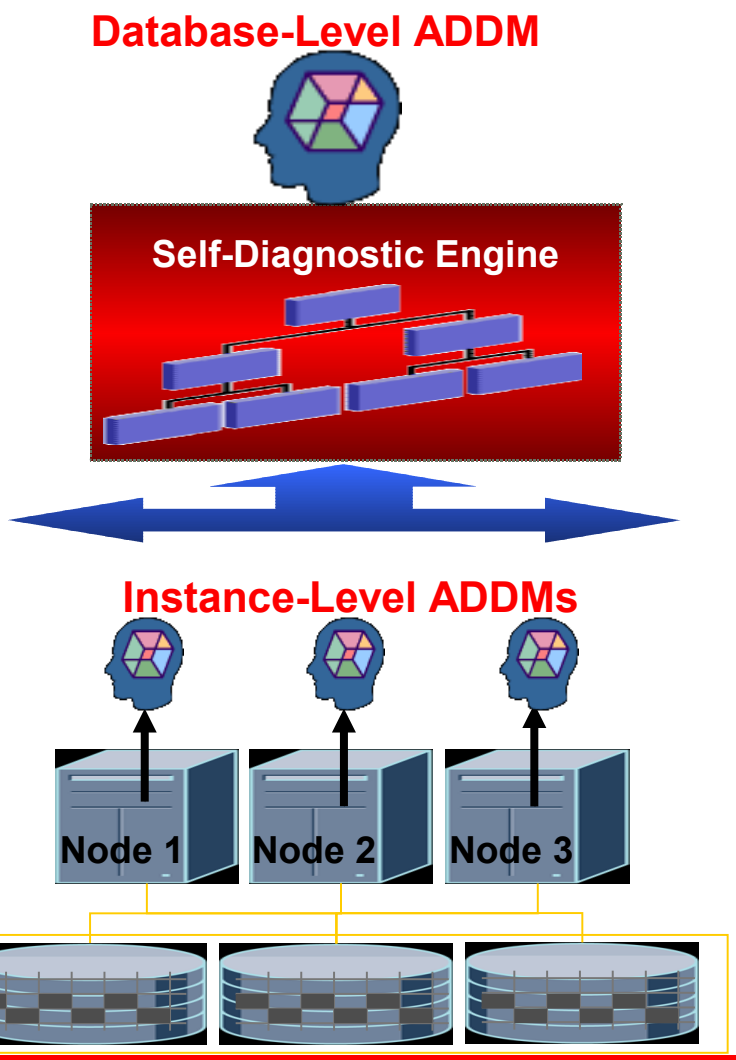


RAC Management

- Cluster Monitoring
  - Interconnects
  - Status, VIP relocations, nodeapp availability
  - Alert log monitoring
- RAC Monitoring
  - Summary views, drilldowns to individual components
  - Load average across the cluster
  - RAC level Active Sessions
    - Identify Top SQL, Sessions
  - Global Cache Coherency
    - Identify top node(s)/ instance(s) involved in block transfers
    - Identify top segments with extreme concurrency profile across some nodes
- Topology views
  - RAC and Cluster level topology views
  - Launch Operations

ADDM for RAC

ORACLE DATABASE 11g



- A Performance Expert, now a RAC Specialist too!
- Identifies the most “Globally Significant” performance issues
- Automatically runs every hour
- Cluster-wide analysis of:
  - Global cache interconnect issues
  - Lock manager congestion issues
  - Global resource contention, e.g. IO bandwidth, hot blocks
  - Globally high-load SQL
  - Skew in instance response times

Service Centric Management

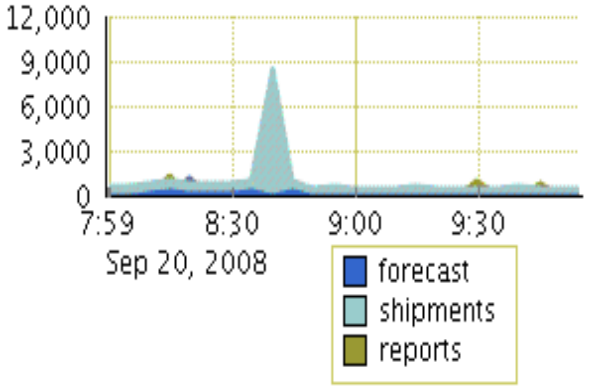
Services Summary

Problem Services ✘ 1 ⚠ 1
Clusterware Version 11.1.0.7.0

Services Details

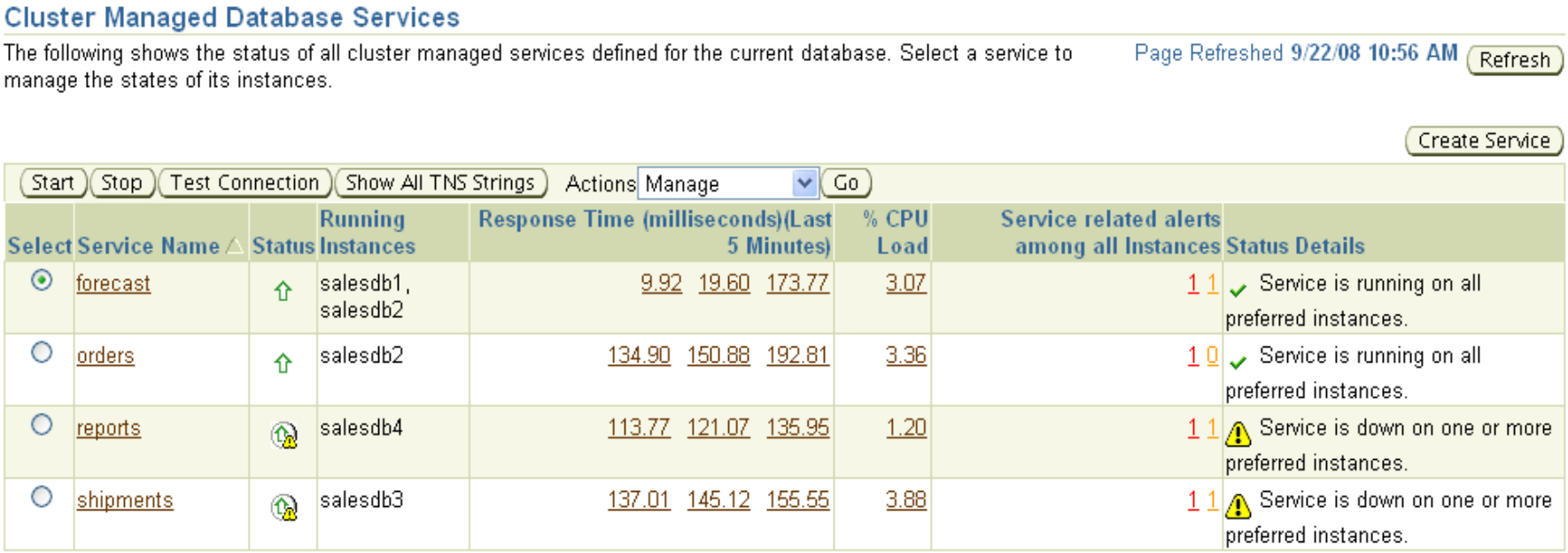
Name	Status	Running Instances	Avg Response (msec/call)	% CPU Load	Alerts
shipments	⇧	2	579.86	.91	✘ 2
reports	⇧	1	38.44	.13	⚠ 1
forecast	⇧	2	0	0	✓
orders	⇧	1	0	0	✓

Top Services Average Response Time (msec/call)



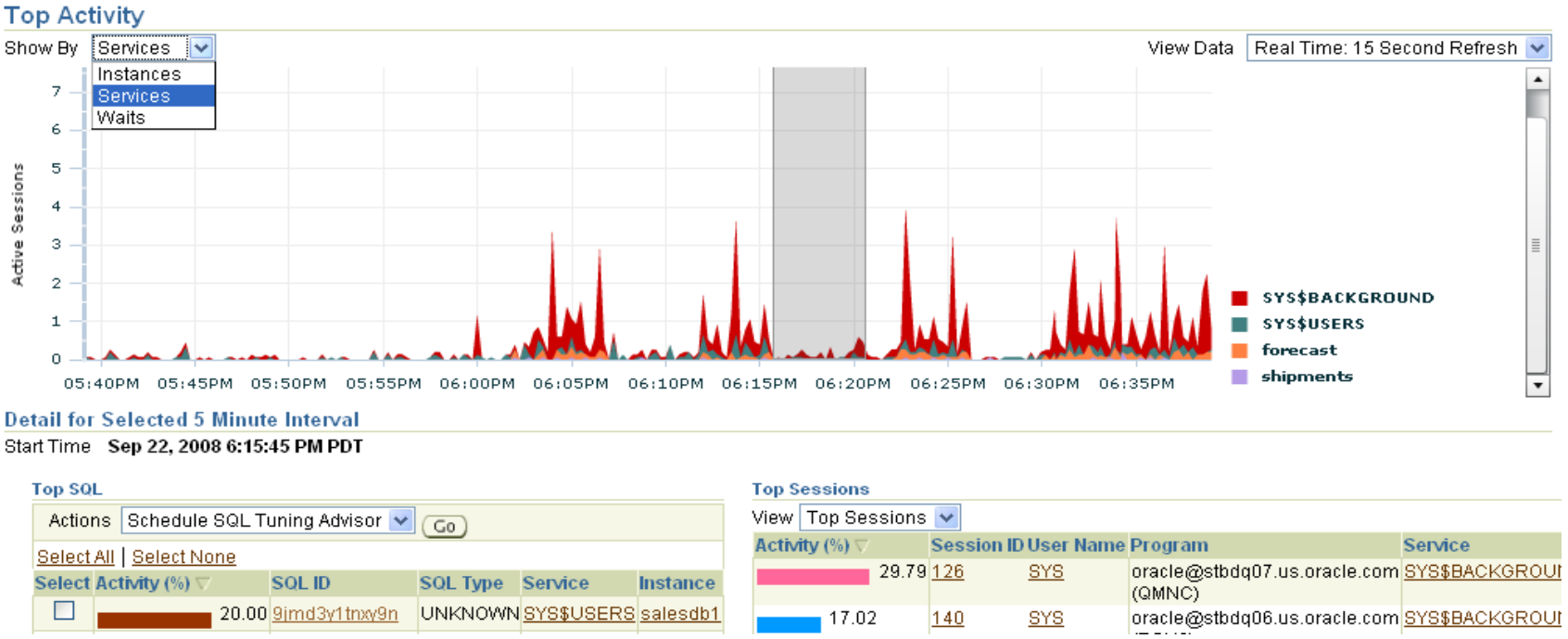
- Create and Administer Cluster Managed Databases Services for work load management
- Monitor Services for Status, Performance and Configuration issues via HA console
  - View Top services based on Avg. Response time across the cluster
  - View Top services based on %CPU utilization across the cluster
  - Drilldowns to analyze the session waits, identify SQL or root cause

Service Centric Administration



- Setup HA Services with Preferred/Available instances
- Test connectivity to service
- Create TNS alias files for services as well as ability to export this to client machines.
- Manage Services for start/stop/relocate, enable/disable operations
- Drilldown to individual services

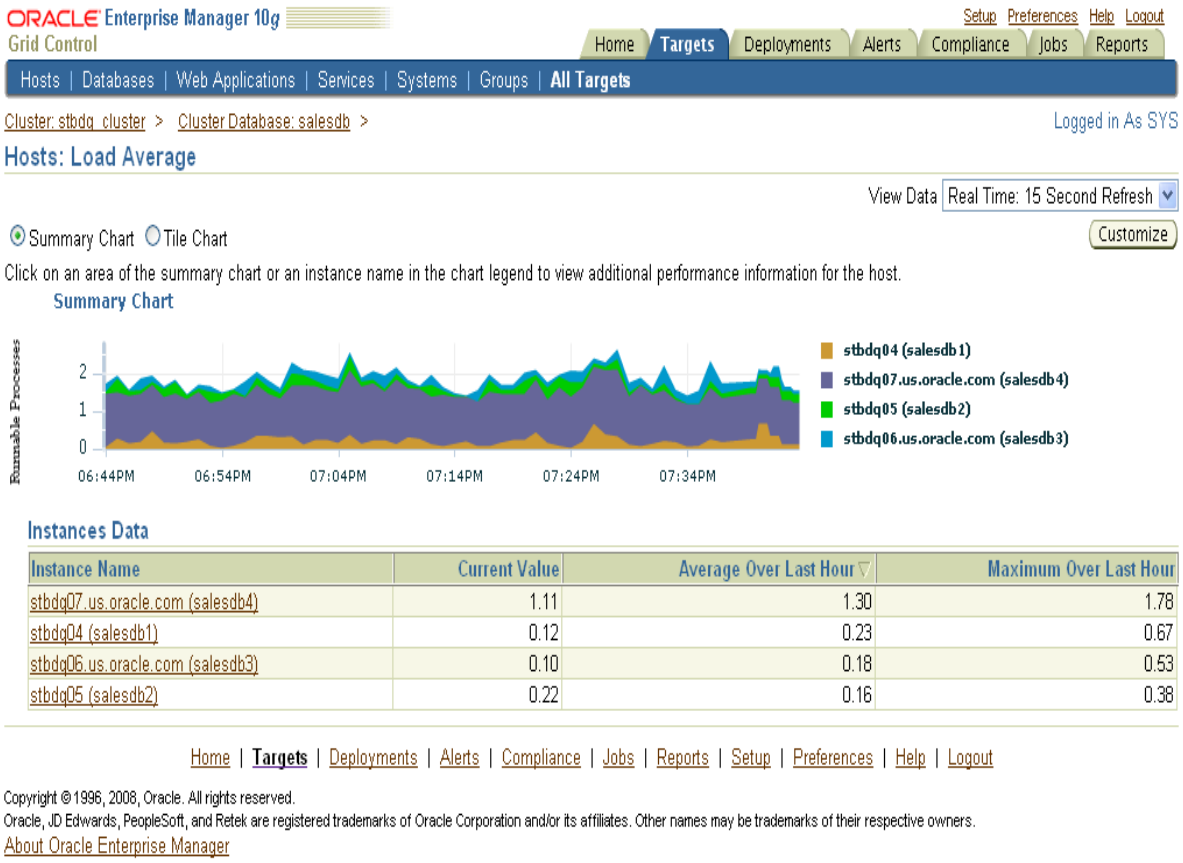
Service Centric Monitoring



- Identify Top services from Avg. Response time and %CPU utilization across the cluster
- Drilldown to identify Top Activity breakdown by Service, Wait and Instances
- Identify SQL and session(s) causing waits

Diagnose as many

- Manage as one works but one would need to diagnose problems at one or many nodes/instances
- Monitor any metric across the Database instances or cluster nodes in a single tile based view
- Customizable views for selective monitoring
- Fits in to existing workflows



Diagnose as many

Cluster: stbdq_cluster > Cluster Database: salesdb >

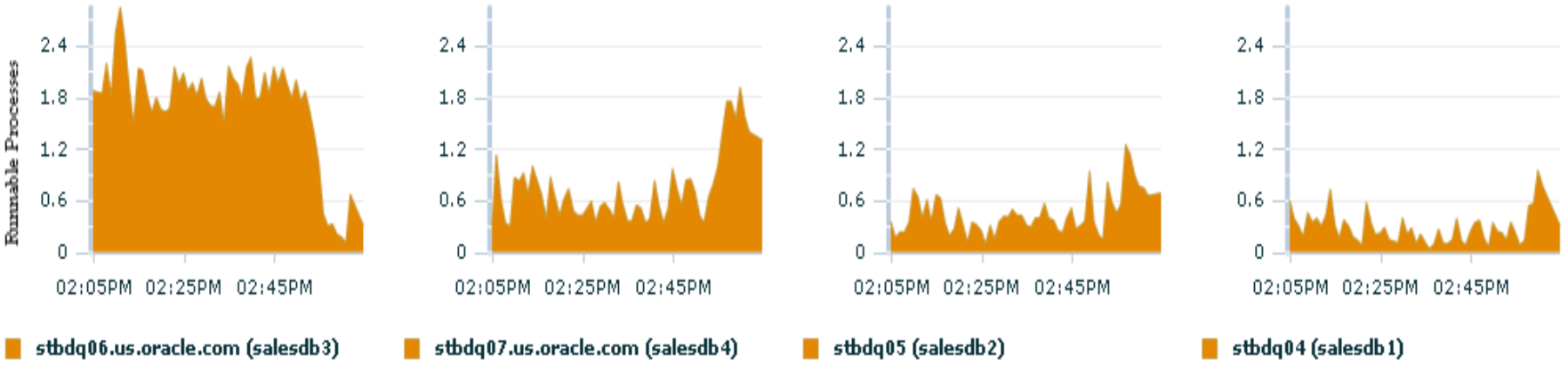
Logged in As SYS

Hosts: Load Average

View Data: Real Time: 15 Second Refresh

Summary Chart / Tile Chart

Customize



Instances Data

Instance Name	Current Value	Average Over Last Hour	Maximum Over Last Hour
stbdq06.us.oracle.com (salesdb3)	0.31	1.69	2.85
stbdq07.us.oracle.com (salesdb4)	1.30	0.74	1.92
stbdq05 (salesdb2)	0.69	0.45	1.25
stbdq04 (salesdb1)	0.31	0.29	0.95

Diagnose as many

Cluster: stbdg_cluster > Cluster Database: salesdb >

Logged in As SYS

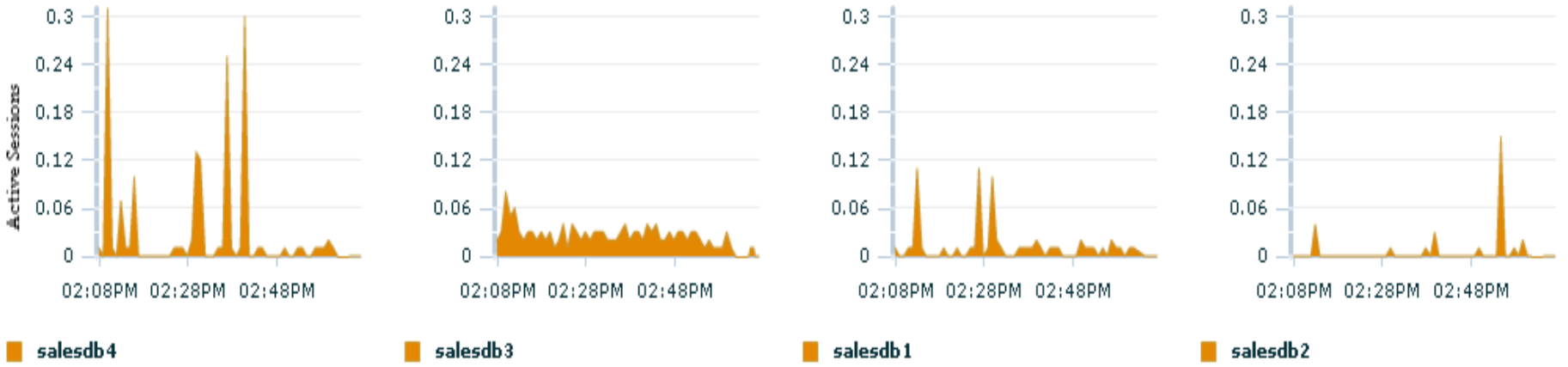
Active Sessions By Instance: Cluster

Wait Class: Cluster

View Data: Real Time: 15 Second Refresh

Summary Chart / Tile Chart

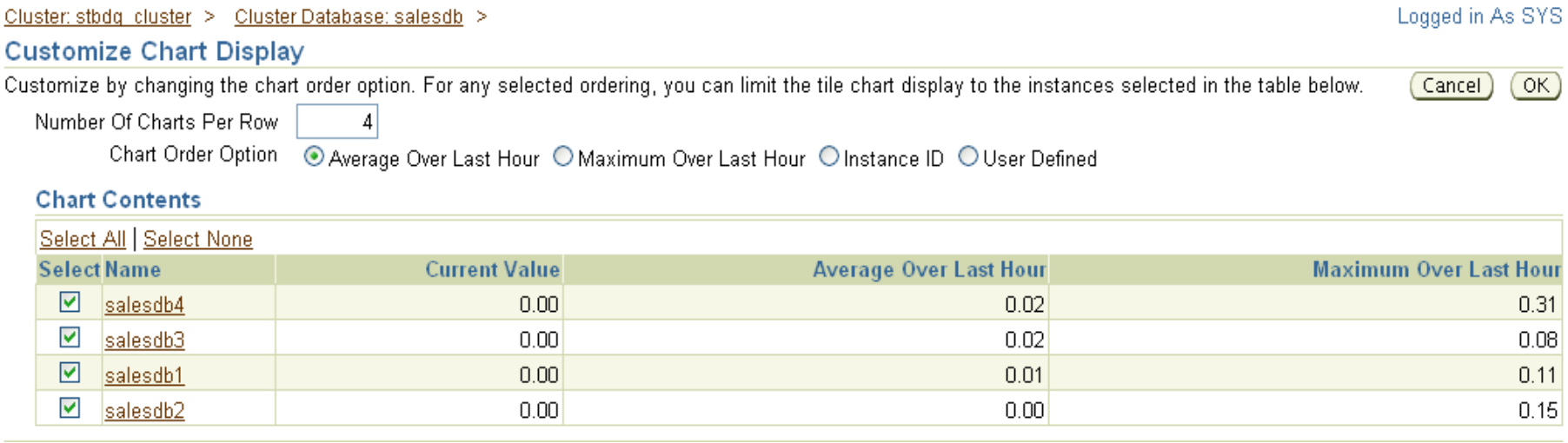
Customize



Instances Data

Instance Name	Current Value	Average Over Last Hour	Maximum Over Last Hour
salesdb4	0.00	0.02	0.31
salesdb3	0.00	0.02	0.08
salesdb1	0.00	0.01	0.11
salesdb2	0.00	0.01	0.15

Diagnose as many



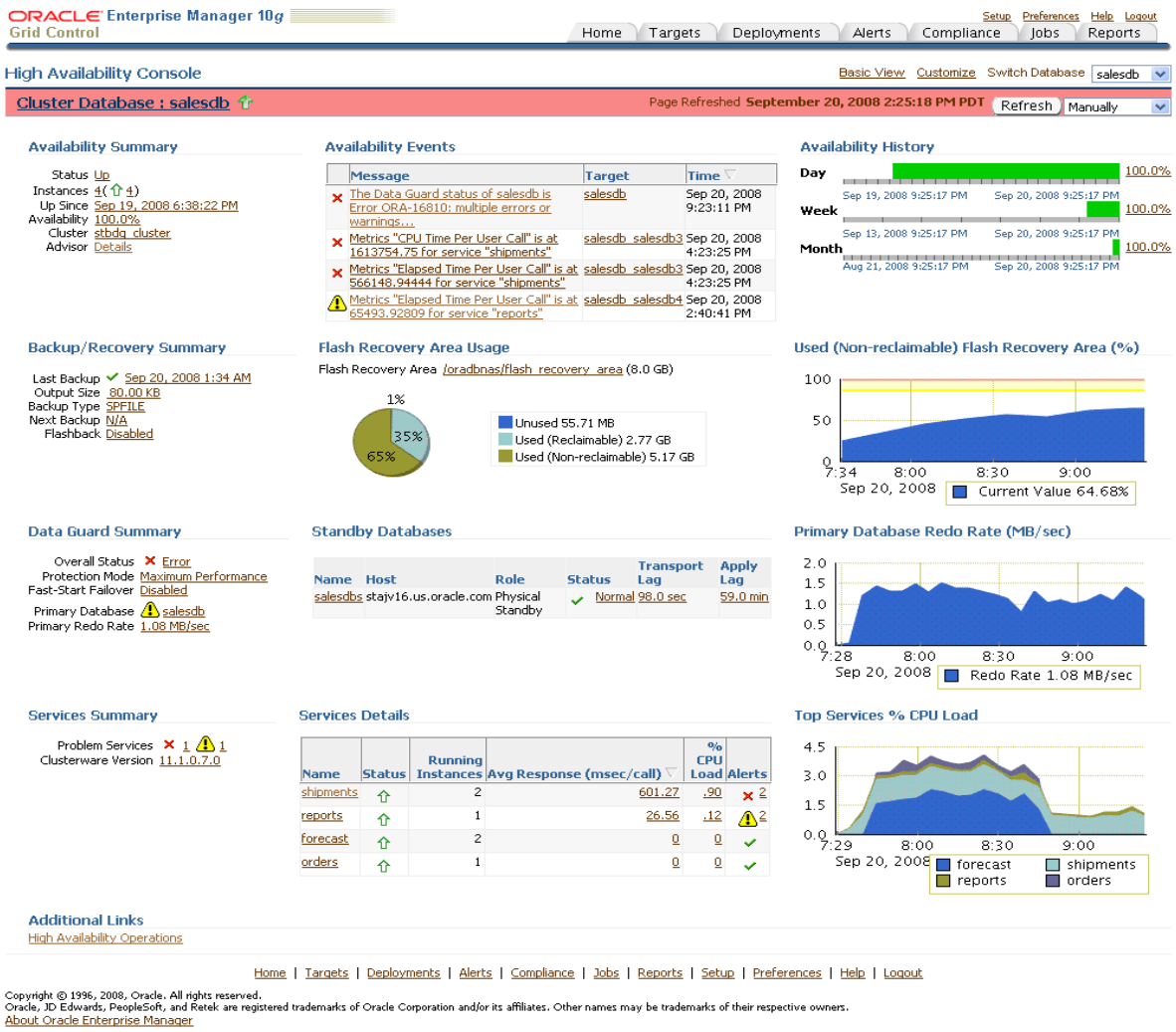
Select	Name	Current Value	Average Over Last Hour	Maximum Over Last Hour
☑	salesdb4	0.00	0.02	0.31
☑	salesdb3	0.00	0.02	0.08
☑	salesdb1	0.00	0.01	0.11
☑	salesdb2	0.00	0.00	0.15

- Customizable tile charts
  - Number of charts per row
  - Order by Metric
    - Average value over 1 hr
    - Maximum over 1 hr
    - Instance ID
    - User defined

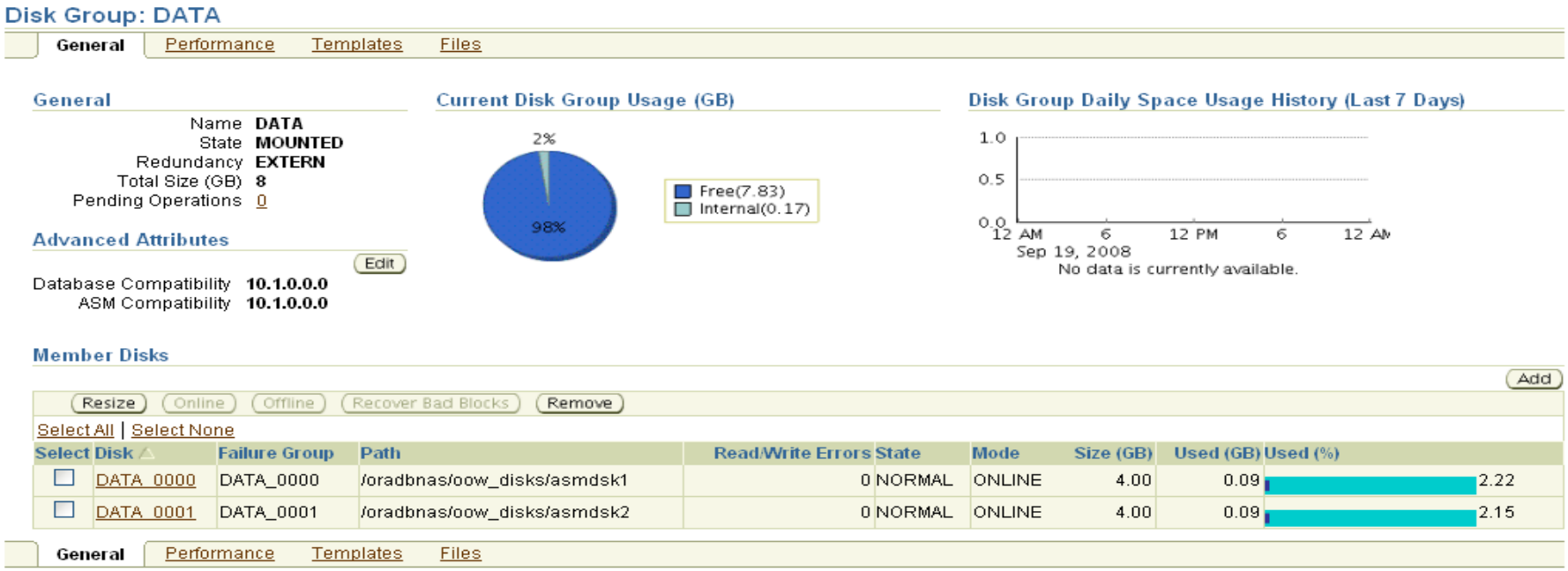
Demo

Oracle's Highly Available Grid – Manage

- Manage as one
- HA Console – Dashboard to Manage Highly Available Grid
- Manage RAC
- Manage ASM
- Manage Data Guard



Manage ASM



- Monitor ASM Instance
- Monitor Diskgroups (Size, rebalance, etc.)
- Real-time performance monitoring
  - Response time, Throughput and Operations/sec

- Administration
  - Startup/shutdown
  - Diskgroups
    - Create/Delete
    - Mount/Un-mount
    - Rebalance
    - Add, Resize Disks

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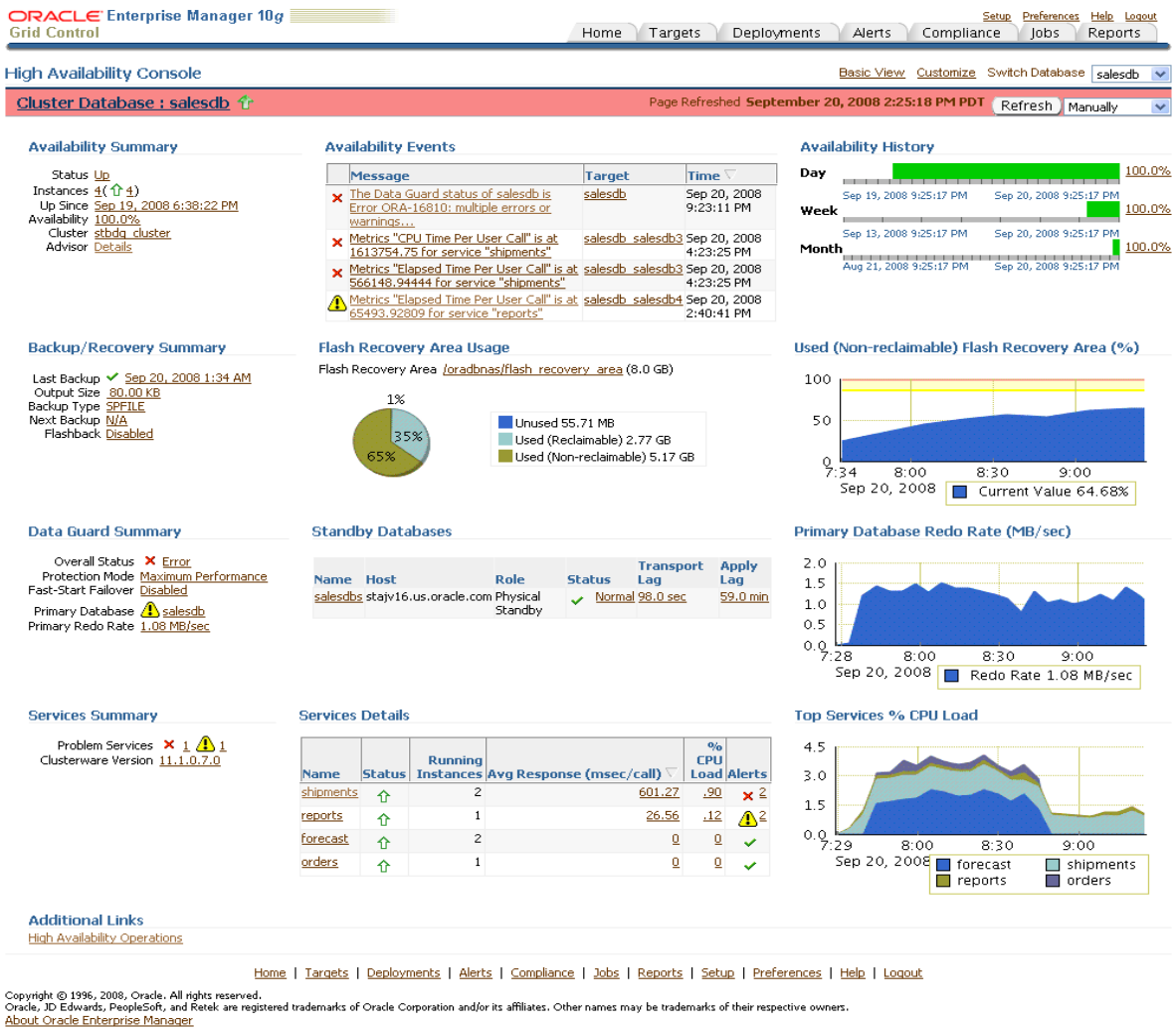
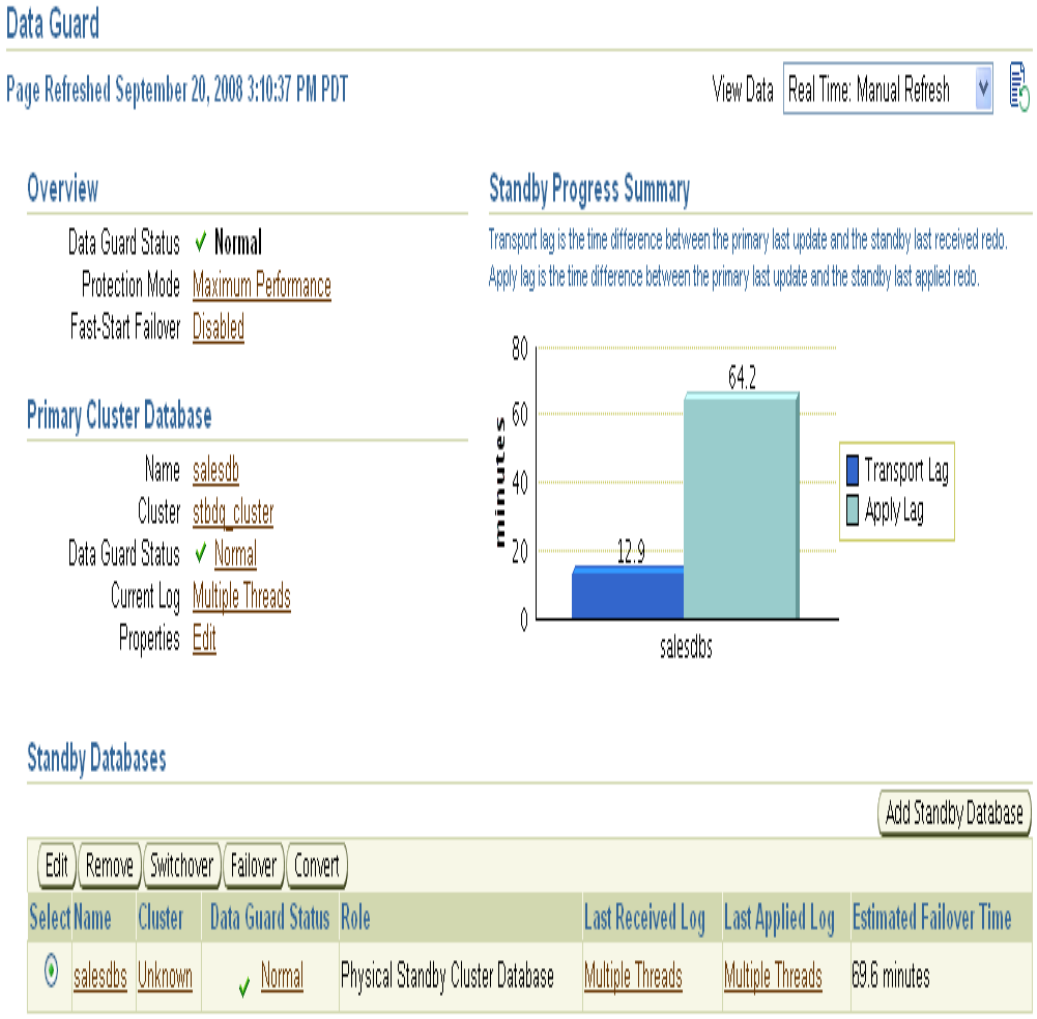


Manage Standby Database

- Monitor Physical, Logical Standbys
- Real-time and Agent based monitoring for Data Guard Status, Transport, and Apply lags
- Fast-start failover
- Edit Configuration
- Single click Switchover and Failover
- Verify Configuration
- Support new 11g features NEW!



Manage Standby Database

- Snapshot Standby support
  - Read-write copy of primary database
  - Preserves zero data loss with continuous redo transport while standby is open for read-write
  - Can be used for in Real Application Testing
  - Data Guard Management extended to manage Snapshot standbys
- Active Data Guard
  - Enable Read-only access to Physical standby databases for optimal resource utilization
  - Changes from primary database are continually applied on the standby
  - Disaster Recovery protection while standby is used to offload queries, reports, backups, etc.
  - Monitored as any physical standby database

Manage Standby Database

- Automatic Migration of EM Jobs and monitoring settings upon role changes 

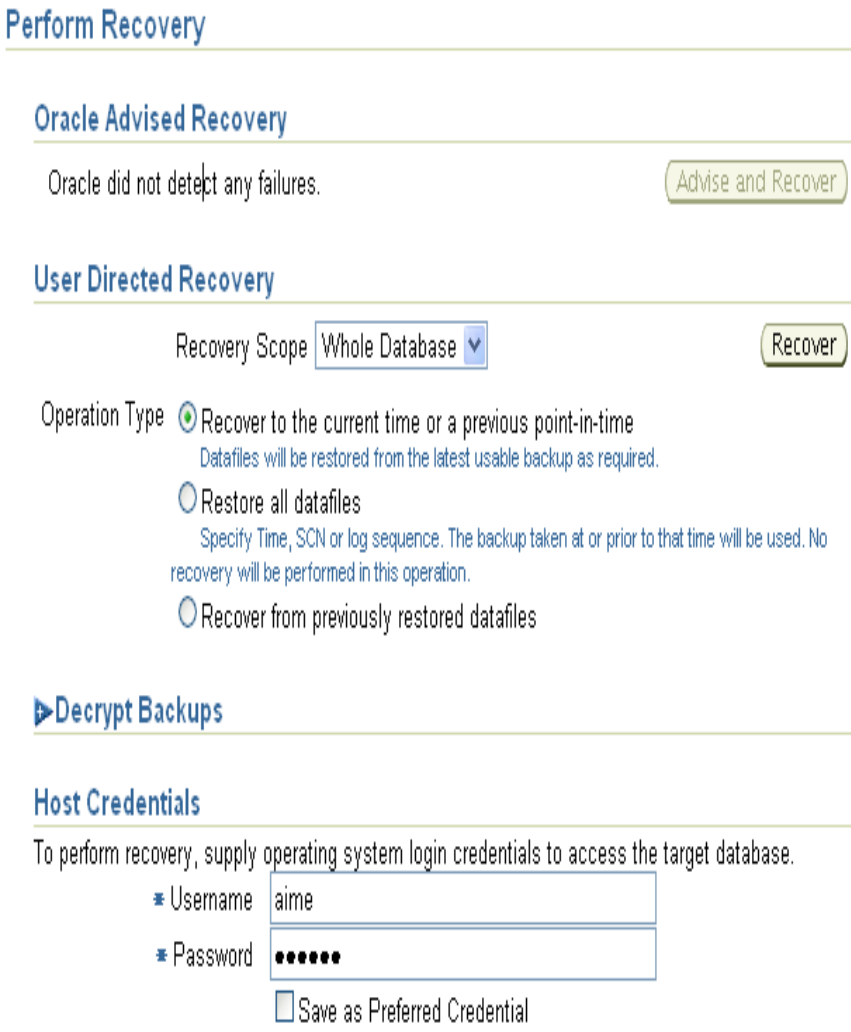
  - User created jobs such as backups can be setup to be migrated between primary/standby databases as part of the switchover
  - Customized thresholds for metrics are swapped between the databases upon switchover

- Fast-start Failover enhancements
  - Enterprise Manager monitors to ensure observer is Highly Available
  - Helps setup alternative observer hosts to ensure Fast-start Failover is not disabled in event of failure with observer host
  - Configure Fast-start Failover in Maximum Performance and Maximum Availability modes (11g DB)
  - Setup user configurable Fast-start Failover conditions (11g DB)
    - Archiver stuck, named ORA- errors, corrupted control file, inaccessible log files, etc.

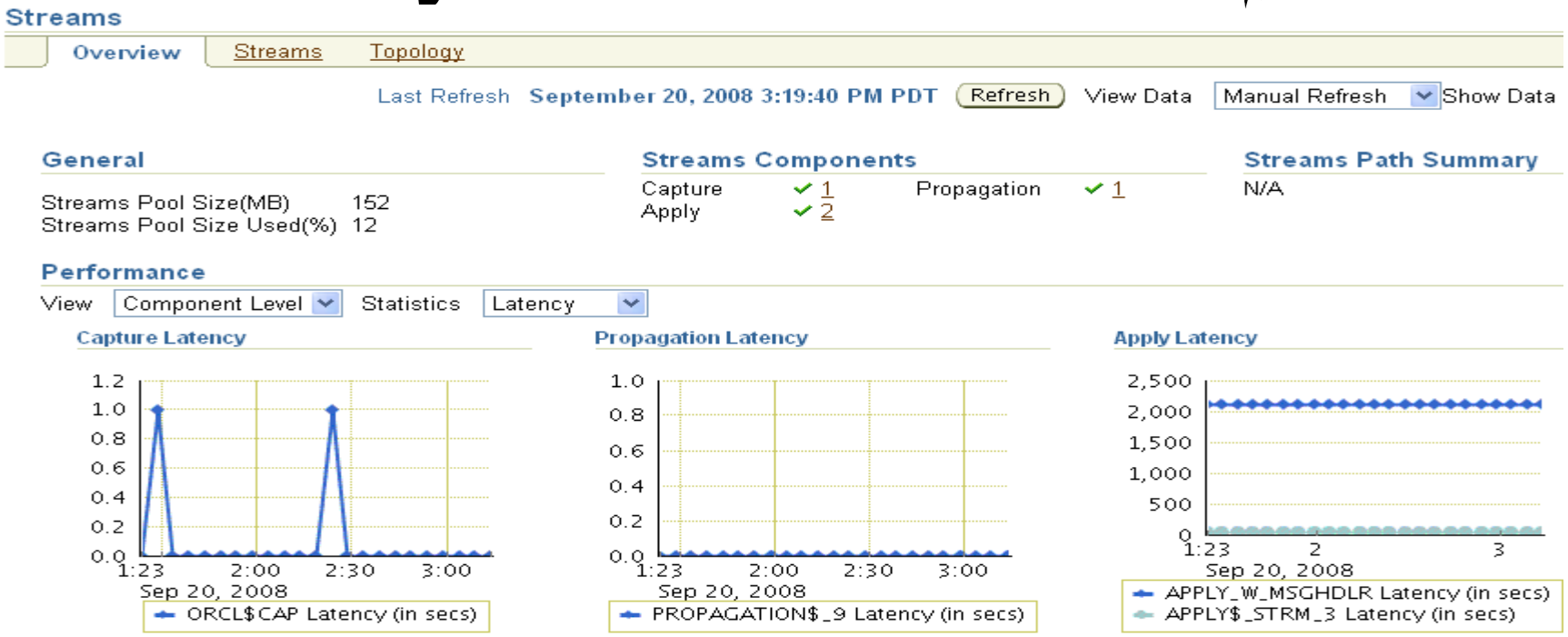
Other key HA enhancements

NEW!

- LogMiner and Flashback Transaction integration workflows to
  - Search/Browse transactions by user/time range/SCN range
  - View transaction details and dependent transactions
  - To recover from human errors, Undo using Flashback Transaction
- Wizard driven Data Recovery Advisor workflows



Other key HA enhancements



- Oracle Secure Backup
  - Monitor Oracle Secure Backup Administrative Server as a new EM target
  - Support File system Backup/Restore jobs from Enterprise Manager
- Improved Streams management to setup and monitor
  - Simplified workflows to setup Streams based replication
  - Monitor Streams at component and path level
  - Monitor Latency and Throughput

Summary

Enterprise Manager helps Setup and Manage Highly Available Grid

Setup
Setup RAC, ASM and Standby configurations
Automate Oracle recommended Best practices
Avoid maintaining custom scripts or time consuming and error prone manual procedures

Manage
Manage as One, Diagnose as Many
Manage RAC, ASM and Standby configurations
Reduce Total Cost of Ownership

Q&A

HA Sessions, Labs, Demos From Oracle Development

Mon, Sep 22

- 2:30 pm - Database 11*g*: Next-Gen HA, Moscone South 103

Tue, Sep 23

- 9:00 am - Active-Active Data Centers, Moscone South 103
- 11:30 am - Sharding with Oracle, Moscone South 302
- 11:30 am - HA with Oracle VM, Moscone West 3024
- 1:00 pm - Active Data Guard, Moscone South 104

Wed, Sep 24

- 9:00 am - Fusion Middleware Grid HA, Marriott Nob Hill AB
- 11:30 am - RMAN Best Practices, Moscone South 103
- 1:00 pm - Database in the Cloud, Moscone South 305
- 5:00 pm - Data Guard & Real Application Testing, Moscone 102

Wed, Sep 24 (contd.)

- 5:00 pm - EM in Secure MAA, Moscone West 2001
- 5:00 pm - E-Business Suite HA, Moscone West 2002/04

Thu, Sep 25

- 9:00 am - Oracle Secure Backup, Moscone South 102
- 10:30 am - Streams Replication, Moscone South 102
- 12:00 pm - Rolling Database Upgrades, Moscone South 103
- 1:30 pm - Streams Performance, Moscone South 102
- 3:00 pm - Oracle Grid Computing, Moscone South 303
- 3:00 pm - E-Business Suite R12 MAA, Moscone West 2007
- 3:00 pm - Siebel MAA, Moscone South 308
- 3:00 pm - Fusion SOA HA & Scalability, Marriott Salon 14/15

Hands On Labs - Thu, Sep 25

- 10:30 - 11:30 am, 12:00 - 1:00 pm - Active Data Guard, Marriott Golden Gate A3

DEMOgrounds, Mon-Thu

- Active Data Guard, Streams, Oracle Secure Backup, RMAN/Flashback, MAA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