ORACLE®

Not Your Father's Enterprise Manager

Enterprise Manager 12c, Cool and New Features

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Consulting Member of Enterprise Manager Technical Team
Strategic Customer Program

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Program Agenda

1. A Little History Lesson
2. Framework
3. Middleware
4. Database
5. Just Plain Cool

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Program Agenda with Highlight

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Enterprise Manager History

EM

- Web Browser Option
- Intelligent Agent
- Configuration to use with Dial-up

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Enterprise Manager History

EM10g

- Introduction of SYSMAN
- All about Grid Control
- Management Agent
- OPMNCTL and EMCTL

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Enterprise Manager History

EM11g

- SQL Monitor, nuff said!
- Extended Metrics
- Provisioning and Lifecycle
- VM Management

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Enterprise Manager History

EM12c

- Cloud Control
- Everything as a Service
- Real Application Testing
- ....

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Enterprise Manager History

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Enterprise Manager 12c

- Enterprise level monitoring and management.
- Full Cloud Control with chargeback capabilities.
- Provisioning and life cycle management.
- Self Service portal to support XaaS.
- Middleware and Application management
- Command Line Power

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Requirements for Enterprise Manager 9.2.0.2

- Available Hard Disk Space 135 MB
- Pentium 166 MHz
- 128 MB RAM

- Available Hard Disk Space 135 MB
- SPARC 20 166 MHz or SPARC Ultra 1 266 MHz
- 128 MB RAM

- Available Hard Disk Space 135 MB
- Pentium 266 MHz
- 256 MB RAM

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Requirements for Enterprise Manager 12c

	SMALL	MEDIUM	LARGE
Environment	<1000 Targets <100 Agents <10 Concurrent Users	<10,000 Targets <1000 Agents <25 Concurrent Users	>10,000 Targets >1000 Agents >25 Concurrent Users
Repository	DB or RAC 2 Dual Core CPU, 8Gb memory	RAC 4 Dual Core CPU, 8Gb memory	2+ Nodes RAC 8 Dual Core CPU, 16Gb memory
OMS Machine(s)	2 OMS 2 CPU, 8GB memory	2 OMS 4 CPU, 8Gb memory	2+ OMS 8 CPU, 16 GB memory

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Security Console

- Ability to review Enterprise Manager Security
- Not a traditional “Console”
- Information about best practices
- Violation to best practices
- Links to corrective steps

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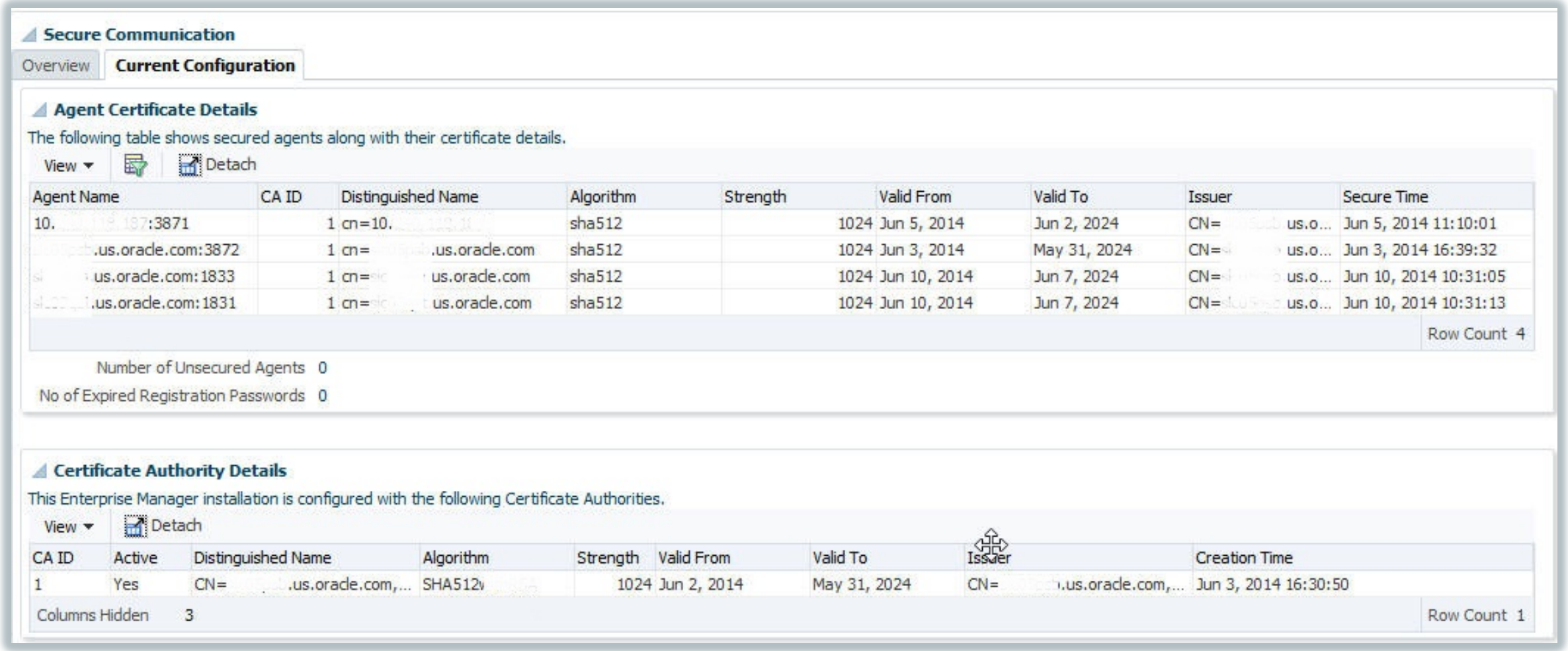
Secure Communication Page



Secure Communication

Overview | Current Configuration

Agent Certificate Details

The following table shows secured agents along with their certificate details.

View ▾ | Detach

Agent Name	CA ID	Distinguished Name	Algorithm	Strength	Valid From	Valid To	Issuer	Secure Time
10. :3871	1	cn=10.	sha512	1024	Jun 5, 2014	Jun 2, 2024	CN= us.o...	Jun 5, 2014 11:10:01
.us.oracle.com:3872	1	cn= .us.oracle.com	sha512	1024	Jun 3, 2014	May 31, 2024	CN= us.o...	Jun 3, 2014 16:39:32
us.oracle.com:1833	1	cn= us.oracle.com	sha512	1024	Jun 10, 2014	Jun 7, 2024	CN= us.o...	Jun 10, 2014 10:31:05
.us.oracle.com:1831	1	cn= us.oracle.com	sha512	1024	Jun 10, 2014	Jun 7, 2024	CN= us.o...	Jun 10, 2014 10:31:13

Row Count 4

Number of Unsecured Agents 0

No of Expired Registration Passwords 0

Certificate Authority Details

This Enterprise Manager installation is configured with the following Certificate Authorities.

View ▾ | Detach

CA ID	Active	Distinguished Name	Algorithm	Strength	Valid From	Valid To	Issuer	Creation Time
1	Yes	CN= .us.oracle.com,...	SHA512	1024	Jun 2, 2014	May 31, 2024	CN= .us.oracle.com,...	Jun 3, 2014 16:30:50

Columns Hidden 3

Row Count 1

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Securing EM12c

- Do NOT log in at SYSMAN, create individual accounts.
- Use the MGMT_ADMIN_USER_PROFILE in 12c .
- Create privileges and roles for accessing EM12c.
- Create Global Named Credentials to hinder risks.
- Aggregate target privileges offer granule control of access.

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Private Roles

- Roles that can be granted by one EM User to another EM User to manage
  - Jobs
  - Templates
  - Targets tasks
- Allows Named Credential to be granted to a Role
- Creation can be done via the Console or the EM CLI, but only "WITH_ADMIN" option required to create a private role can be done through EM CLI GRANT_PRIVS verb call.

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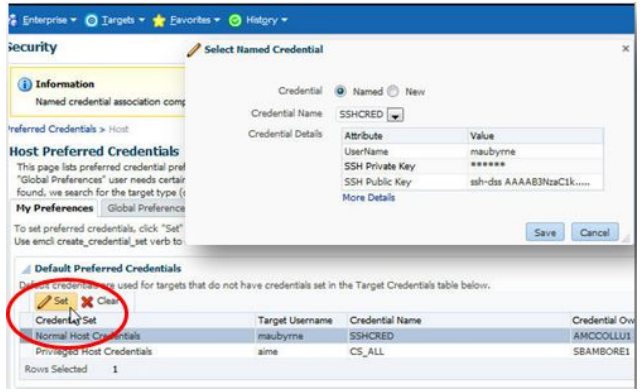
Credential Enhancements

- Assign credentials by default to a target, (no more logging in by user and creating new credentials or unsecure credentials.)
- Targets credentials that are default for a specific target that will be used by users granted access to the target.
- SSH credentials as Preferred Credentials
  - Supported in earlier versions, but required manual edits to emd.properties and sudoers file
  - Now one just needs to update sudoers file



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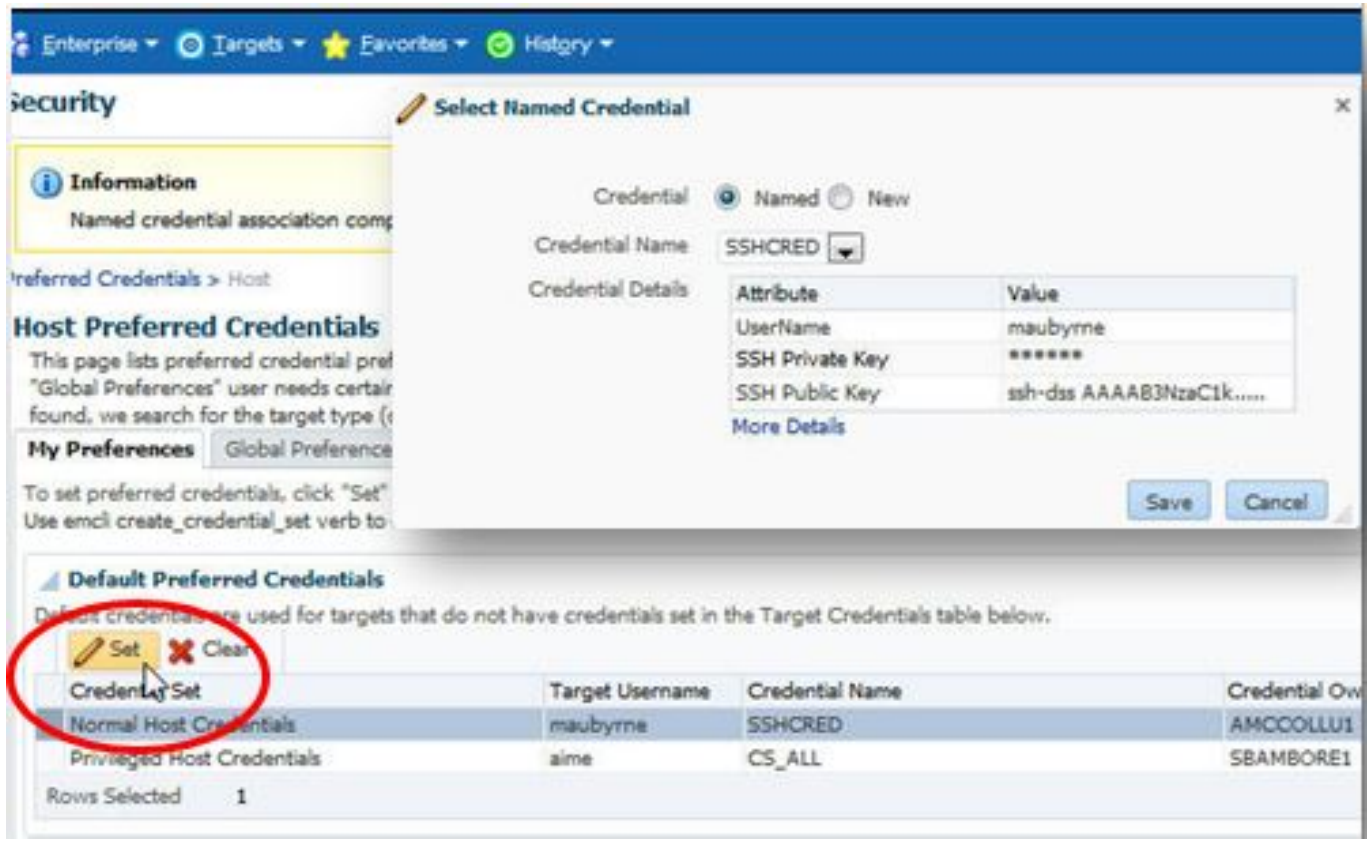
UI Enhancement



- Simple management via the console.
- EM CLI verb if global allocation desired.

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Global Preferred Credentials

- Convenient System Wide Credentials
- Privileged Administrator can set Preferred Credentials for **ALL** users
  - For a specific Target
  - For a Target Type
- Efficient allocation of common Accounts
  - Aid in new hire on-boarding
  - User Scope Preferred Credentials
  - System Scope Preferred Credentials

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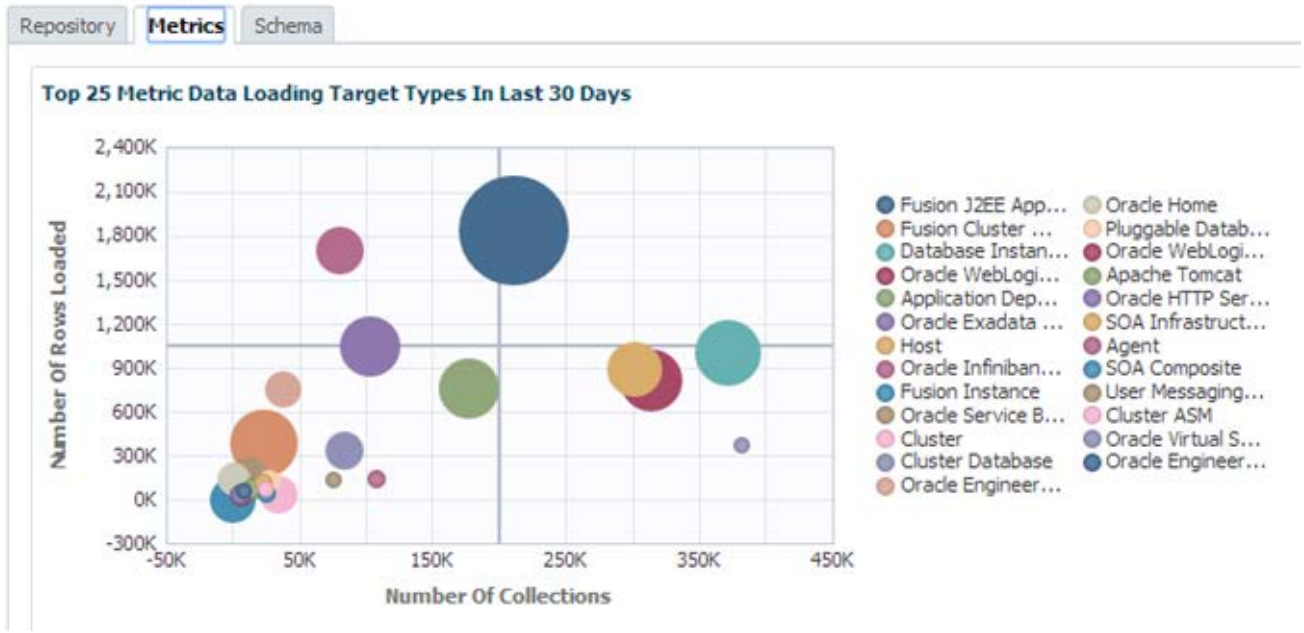
The Repository Page



- Configuration Validation
- Monitor and configure EM housekeeping tasks
- Deep Insight and visualization of collected metrics
- Identify space hogs and control schema retention policies

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Enterprise Manager Page Performance

- Load and processing metrics shown for overall page performance and individual page performance
- Breakdown by time spent in Repository, OMS and Browser/Network
- Diagnostics report for pages taking >30 seconds to load

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Improved Target Deployment

- Windows customers- PSEXEC built in!
  - No more CYGWIN installations! ☺
  - Simpler deployment
    - Still recommend silent deploys or EM CLI scripts.

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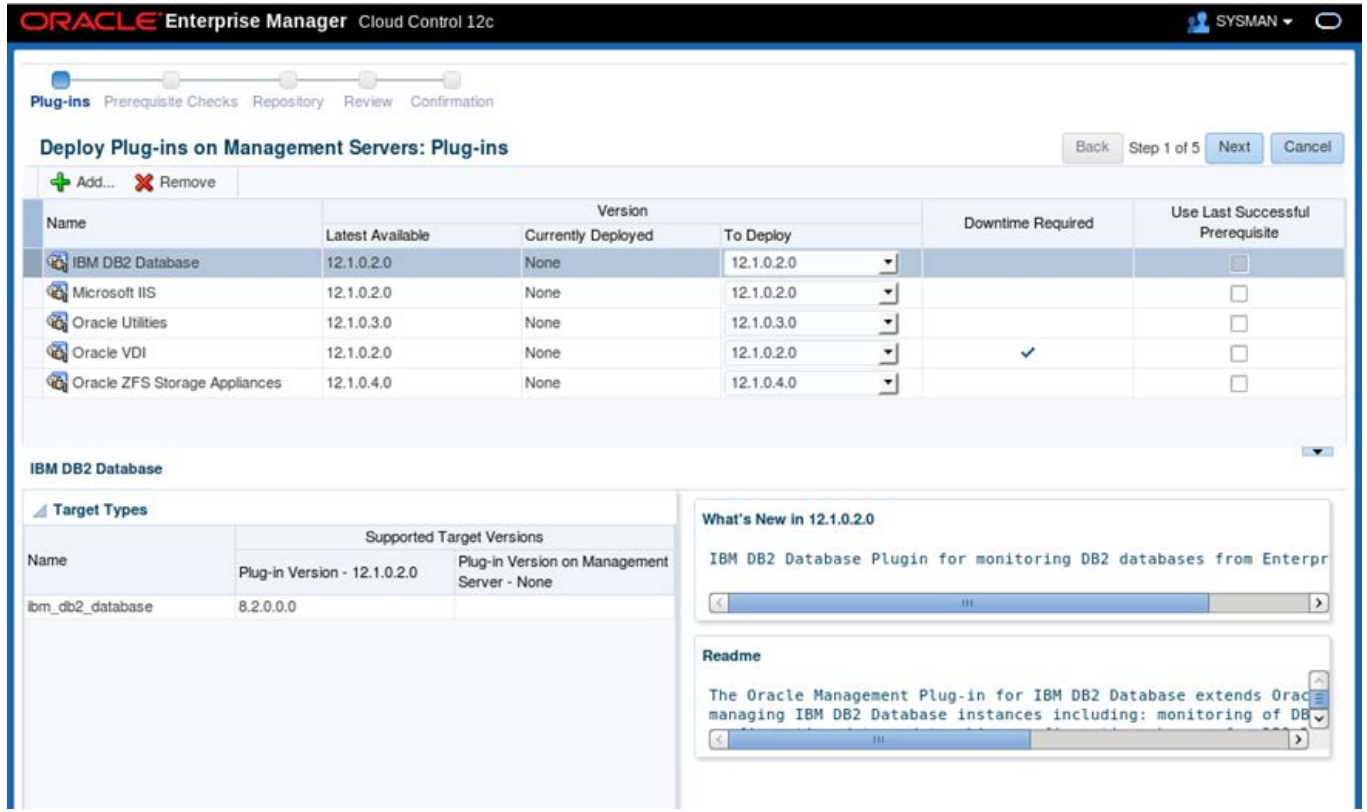
Enhanced Plug-in Deployment



- New Plug-in Deployment Wizard allows multiple Plug-ins to be deployed to the OMS in a single deployment session
- Identifies Plug-ins that require an OMS restart

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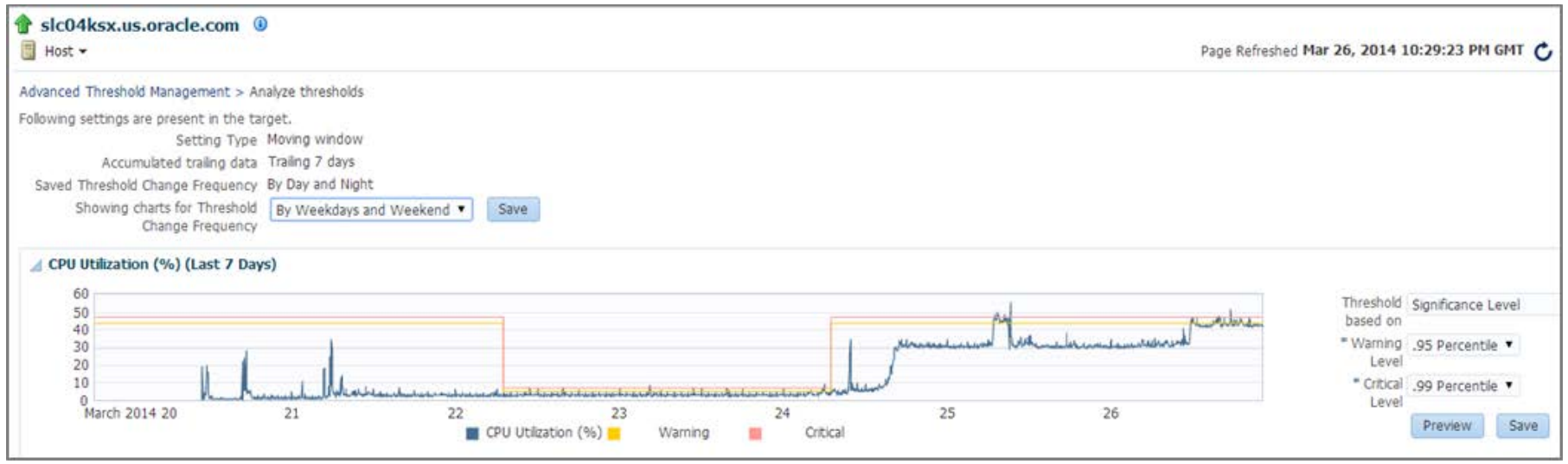
Enhanced Threshold Management



- Flexible, adaptive thresholds for more accurate alerting
  - **Time-based Static Thresholds:** Auto adjust static thresholds based on workload changes
  - **Adaptive Thresholds:** Auto calculate thresholds to alert when target deviates from expected baseline behavior

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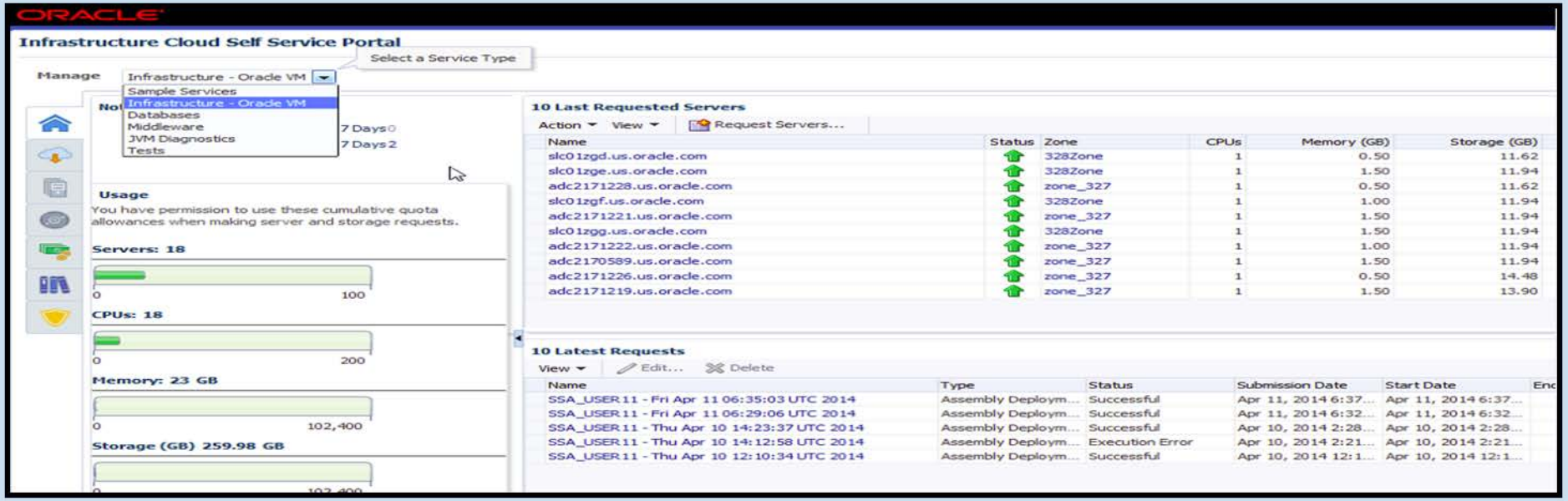
Impressive New Self-Service Portal



- SSA Portal UI Look & Feel Changes
- Streamlined command line (emcli) support
- Adopted by SSA FW integrated services (MWaaS, DBaaS and ~~Nimbula~~)
- New framework for streamlined XaaS development in future

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Database as a Service Enhancements

- No longer hindered by storage platform!
- All are supported by either a hardware or software plug-in.
- Rapid Start deployment option with response file offers simpler deployment solution.

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Cloning with DNFS

- Ability to create thin databases from RMAN image copies
- Supported configurations
  - Single instance databases
  - ASM is not supported for this type of thin clone provisioning, ~~(yet~~)
- Supported database versions
  - 11.2.0.3-> DB12c
- Benefits
  - Easy to setup without pre-requisites
  - No special storage software needed
  - Works on all platforms
  - Instantaneous cloning with DNFS snap clone
  - Create multiple clones based on one backup and consume very little space

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More Cloning Enhancements! ☺

- Ability to create active thin clones of databases on ASM using EMC (currently VMAX Enginuity Version: 5773 and above with Time Finder.)
- Use of Active DataGuard (ADG) standby as a master for creating snap clones
  - Solves the problem of continuous replication
- Change profile attached to a service template
  - Allowing an update of data without changing configuration
- 'Live' Full clones using RMAN duplicate
  - Clones created from a live instance of database

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JVMD as a Service

- JDaaS is designed to enable IT orgs to allow their users to consume JVMD functionality in a self-service manner & manage all their JVMs within a web based portal
- SSA users can enable JVMD on their JVMs regardless of JVMs being targets in EMCC
- To enable the cloud, all that is required is to set the Quotas.
- Quotas are set to Roles and are in terms of number of monitored JVM
- Users use this functionality by downloading an agent from the SSA an deploying it on the desired JVM.

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Database

Comparing Performance Periods

Comprehensive System Monitoring

Incident Rules and Management

Groups

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How Often Do We Ask, “What Changed?”

- It ran fine last week, now it no longer does!
- ETL loads have changed, but no one has released any new code!
- The DBA says there hasn’t been any parameter changes to this database, but I’m sure there have been.

- Compare ADDM Resolution

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What is Compare ADDM?

- Uses Two AWR snapshots
- Creates Report that-
  - Compares SQL that is common and different.
  - SGA changes
  - IO/CPU bound issues
  - Parameter Changes

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What is in an ADDM Compare?

- Report Includes Following:
  - Clear Demonstration of impact of change.
  - Recommendations to address issue.
  - Identifies causes behind change, (with limitations.)
  - Lists Regressed SQL, too!

  - *Tip: If Installing to database for first time, (simple installation, nothing to concern about, just pkg to fulfill views) you must have preferred credentials SET of install will fail!*

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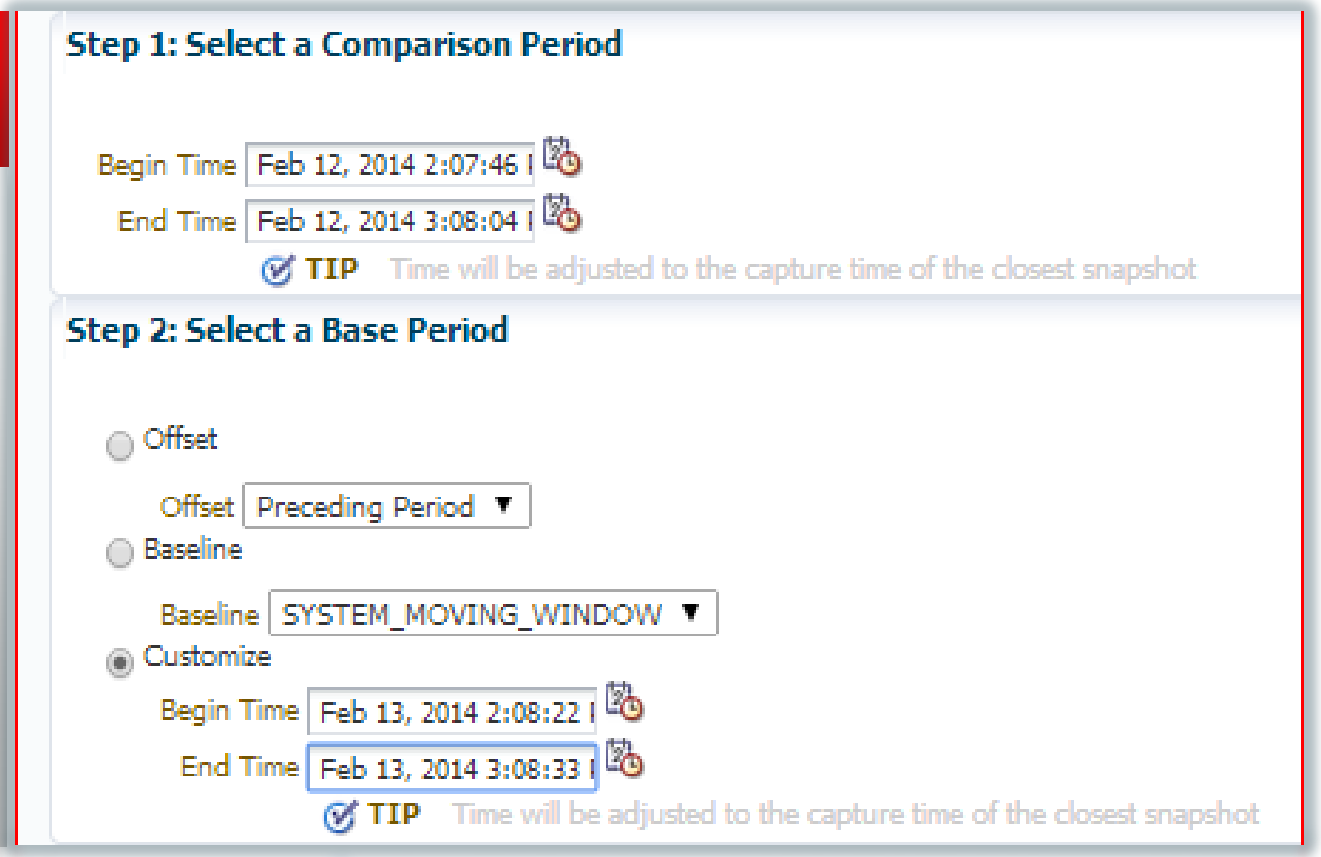
Executing a Report from EM12c

Comparison

- Choose focus period
- Choose to compare to an Offset, Baseline or Custom



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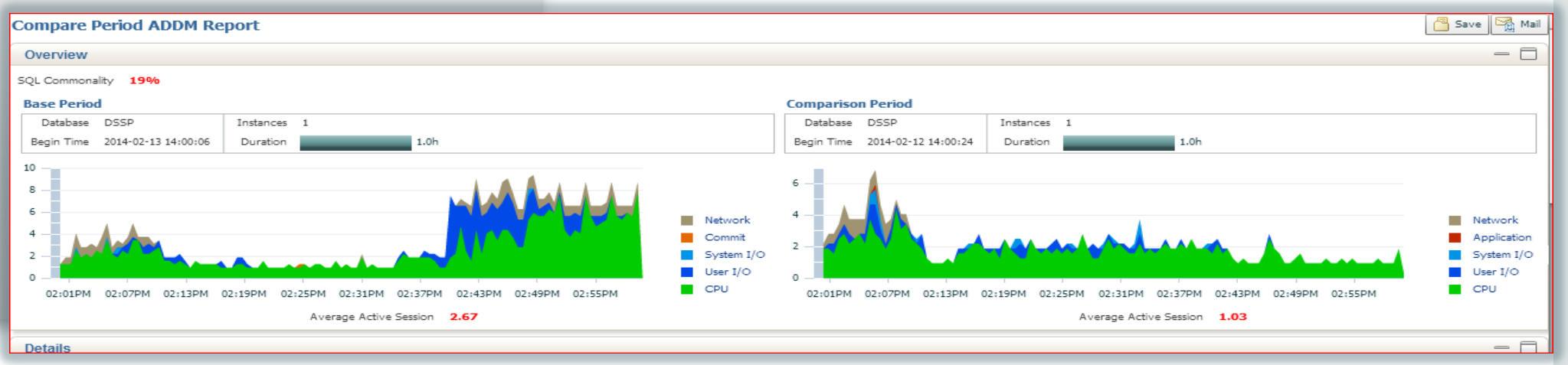
Main Screen of Comparison

2-3PM, 12th Vs. 13th

- Familiar interface with visual wait event comparisons.
- Average # of sessions during each period are displayed.



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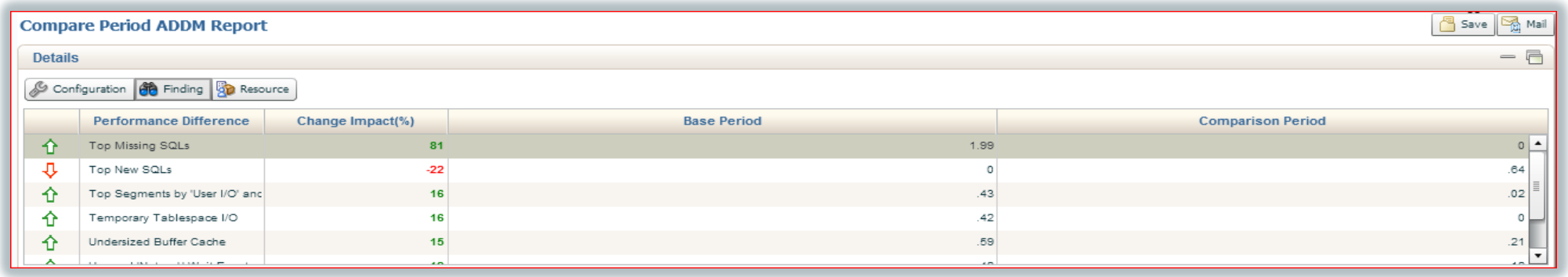
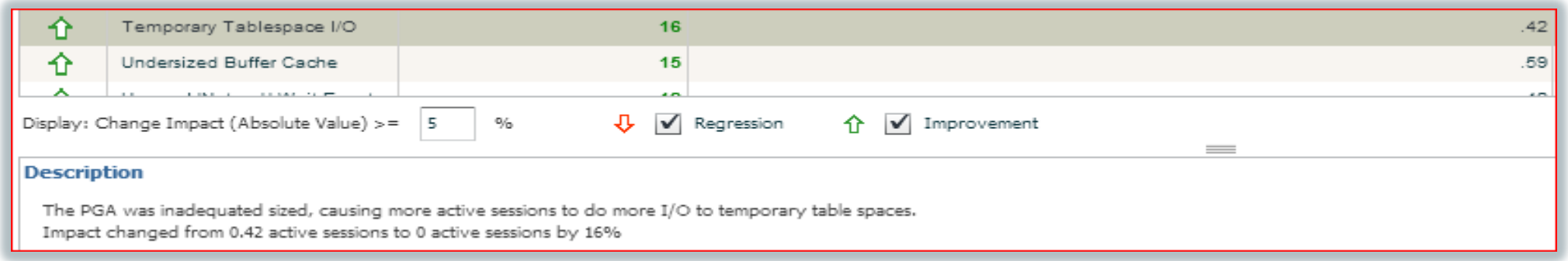
Detail Report

- High level data, highlight for analysis and recommendations.





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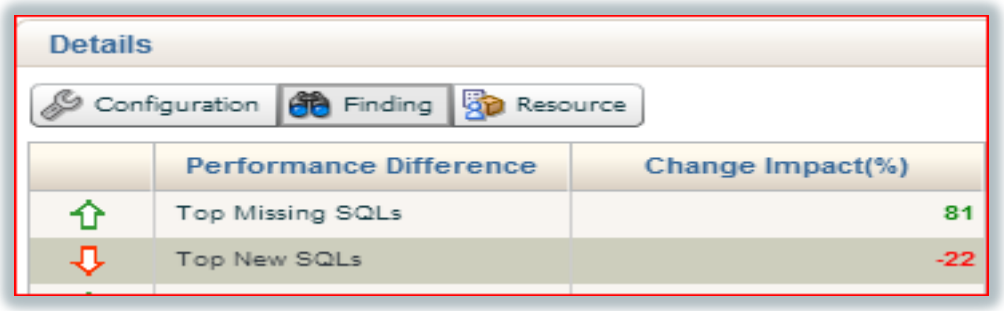
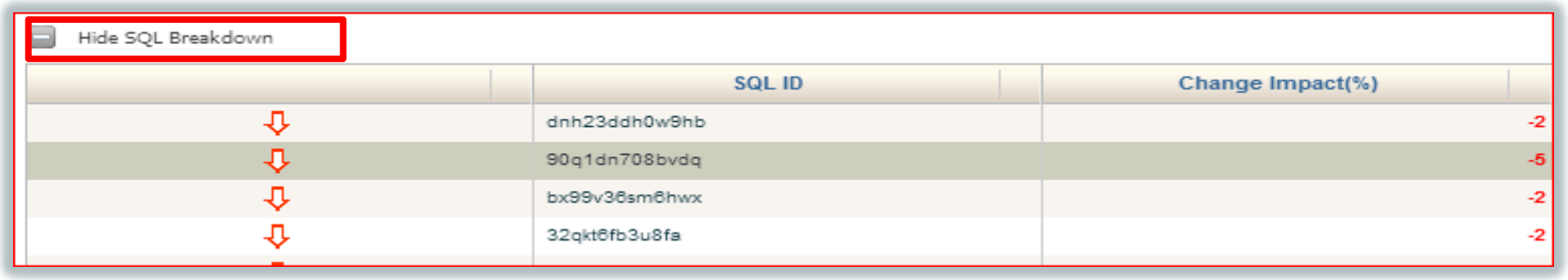
Regression SQL

- Any performance degradation is noted with the down arrow icon:





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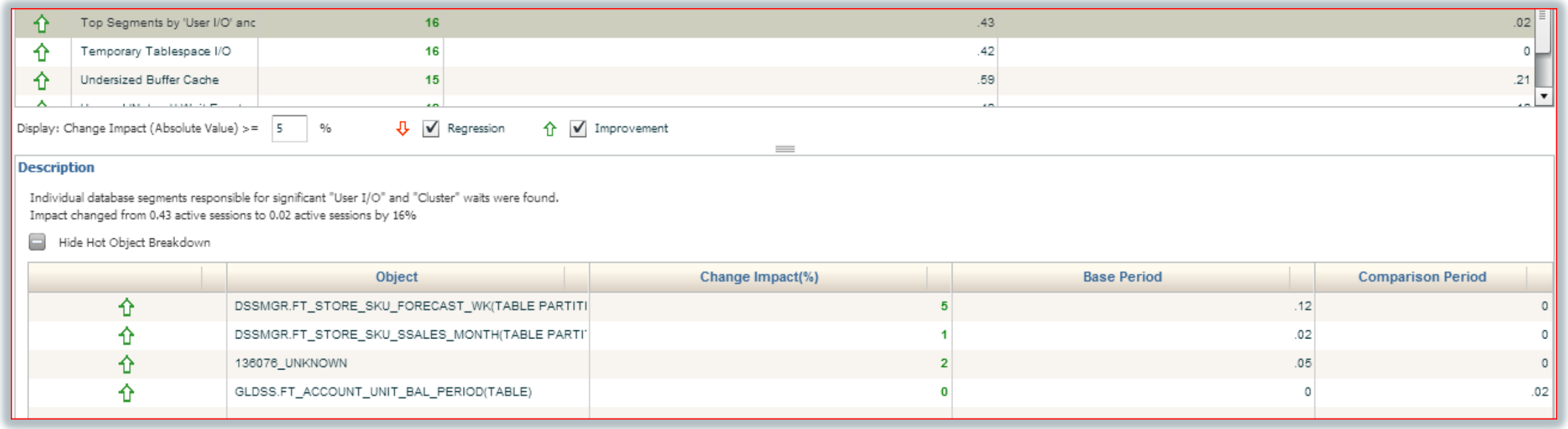
Top Segments Causing IO Waits

- High Level data
- Click on “Show Hot Object Breakdown” to see more detail.



⇧	Top Segments by 'User I/O' anc	16	.43	.02
⇧	Temporary Tablespace I/O	16	.42	0
⇧	Undersized Buffer Cache	15	.59	.21

Display: Change Impact (Absolute Value) >= 5 % ⇩ Regression ⇧ Improvement

Description

Individual database segments responsible for significant "User I/O" and "Cluster" waits were found.
Impact changed from 0.43 active sessions to 0.02 active sessions by 16%

Hide Hot Object Breakdown

	Object	Change Impact(%)	Base Period	Comparison Period
⇧	DSSMGR.FT_STORE_SKU_FORECAST_WK(TABLE PARTITI	5	.12	0
⇧	DSSMGR.FT_STORE_SKU_SSALES_MONTH(TABLE PARTI	1	.02	0
⇧	136076_UNKNOWN	2	.05	0
⇧	GLDSS.FT_ACCOUNT_UNIT_BAL_PERIOD(TABLE)	0	0	.02

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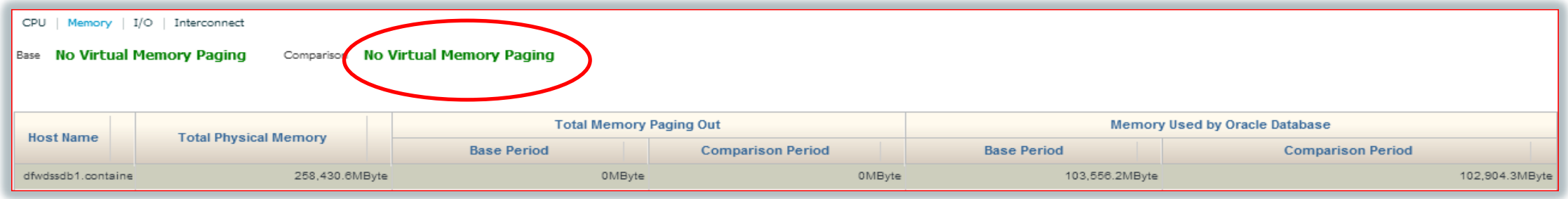
Resource Comparisons

- Comparisons of Memory, CPU, IO and Interconnect.
- Memory Is there Virtual paging?
- Memory Base Period
- Memory Comparison Period


CPU | Memory | I/O | Interconnect

Base No Virtual Memory Paging Comparison No Virtual Memory Paging

Host Name	Total Physical Memory	Total Memory Paging Out		Memory Used by Oracle Database	
		Base Period	Comparison Period	Base Period	Comparison Period
dfwdssdb1.containe	258,430.6MByte	0MByte	0MByte	103,556.2MByte	102,904.3MByte

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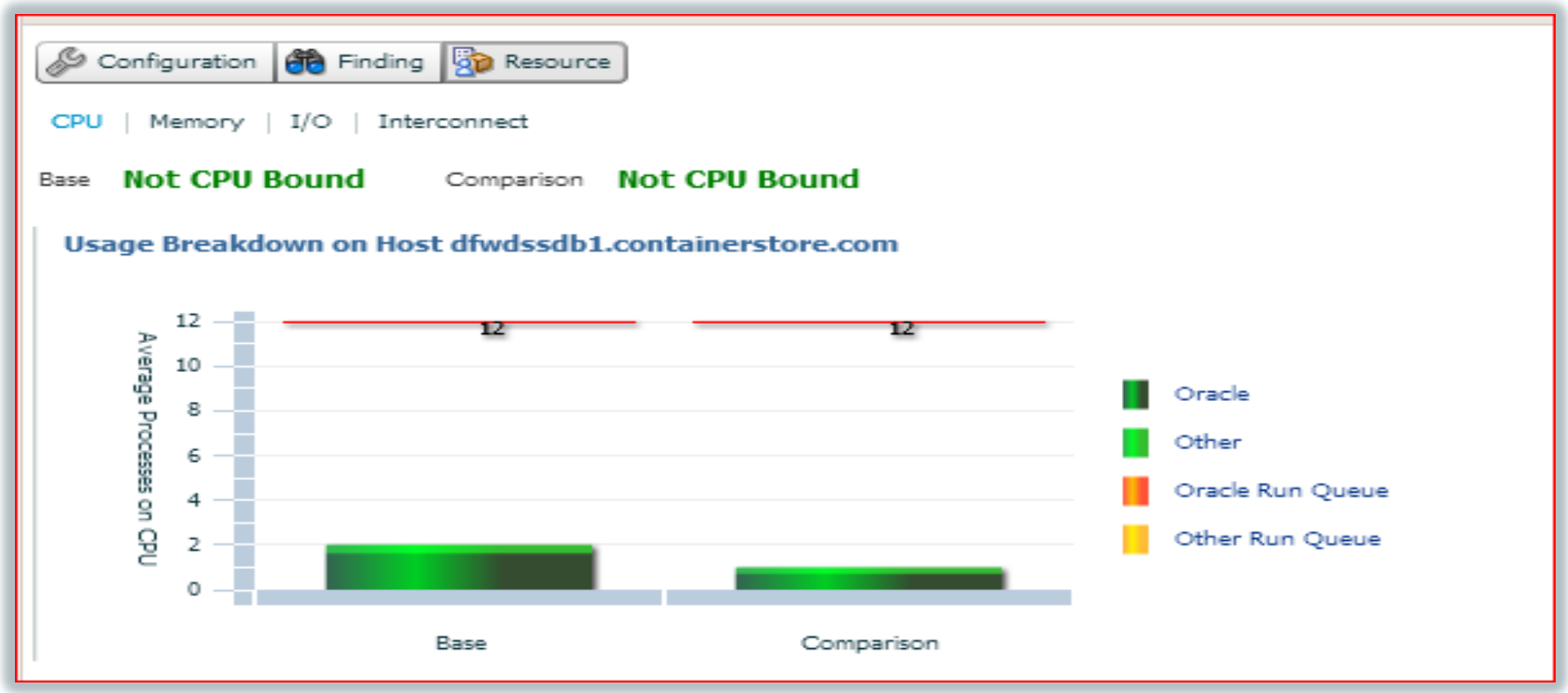
Dashboard Provided for CPU, Memory, IO and Interconnect

- Is something OTHER than Oracle the cause?



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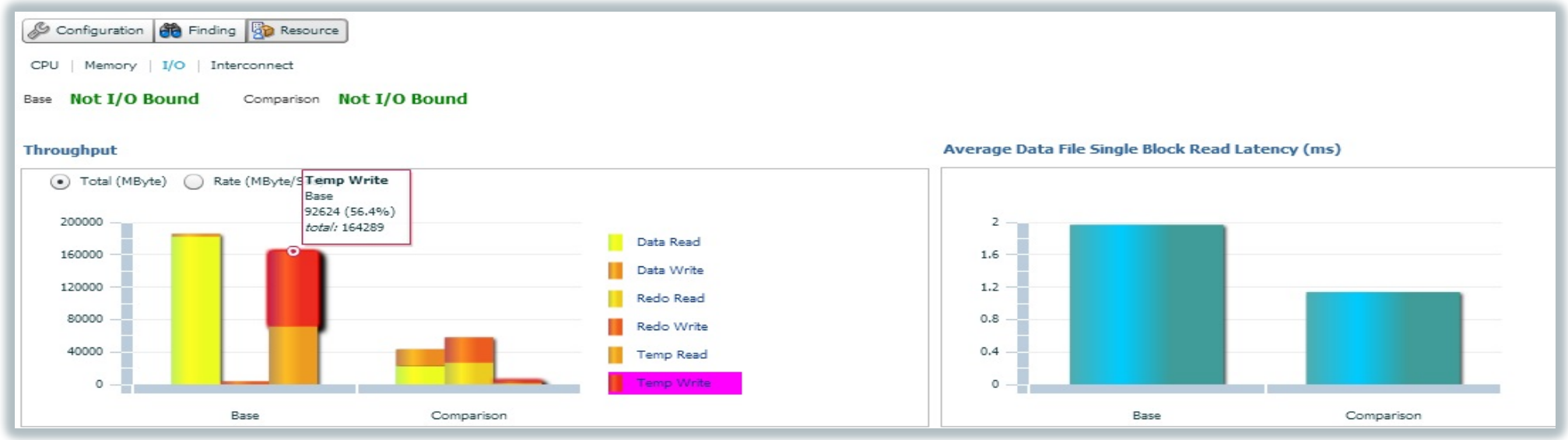
IO Bound Dashboard

- Base vs. comparison period
- Temp reads/writes specified
- Single block read latency



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Monitoring Templates

- Sets distinct, consistent monitoring for individual targets or groups.
- Still allows for individual metric policies and thresholds to be set and not overridden by templates.
- Easy to maintain and can be automated to be set as “default” template for targets/groups.

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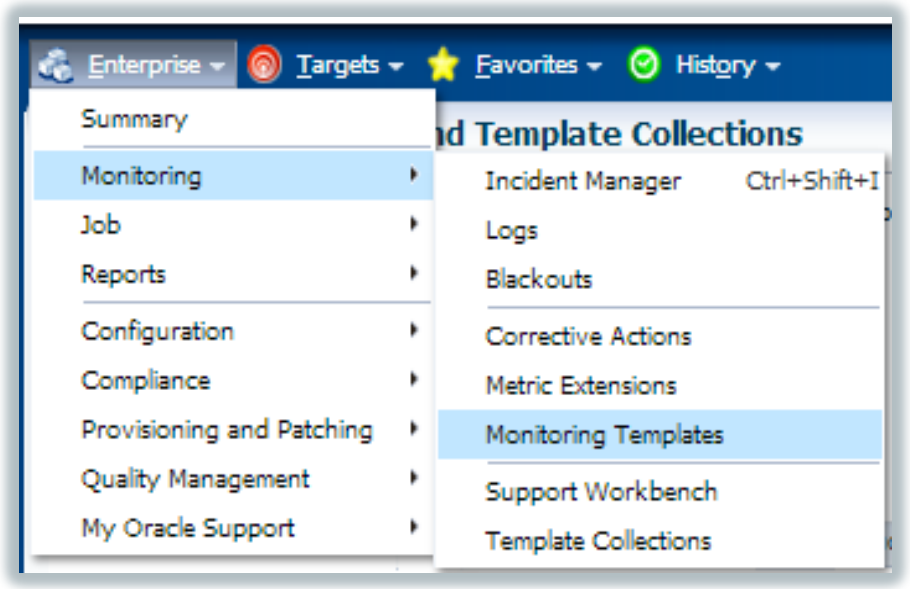
Creating a Monitoring Template



- Or part of administration group creation step.

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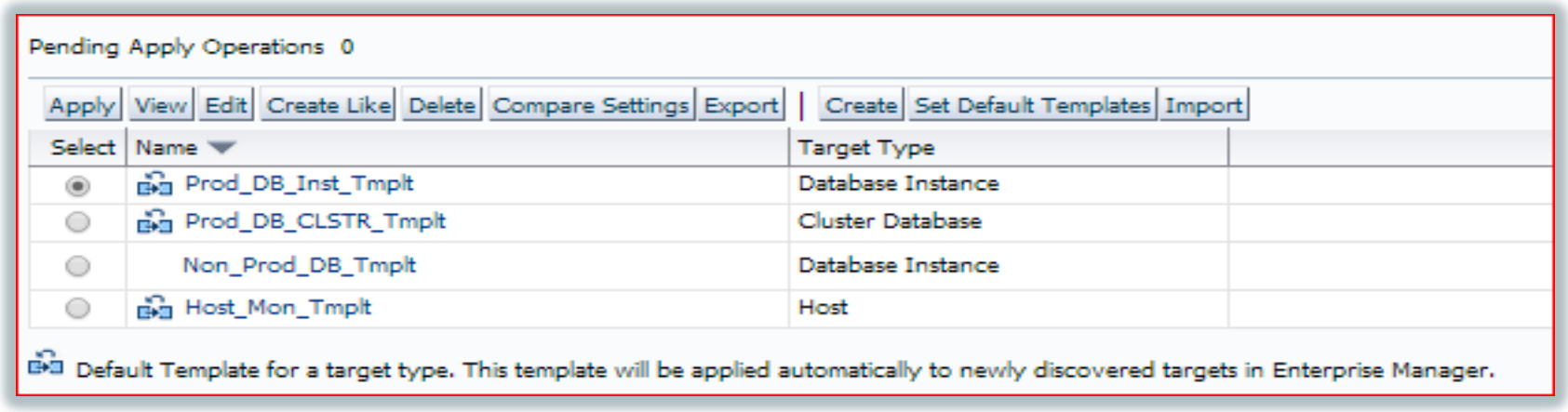
Monitoring Template Design

- Base Templates off Existing Targets
- Build by Target Type
- Make Templates DEFAULT for Crucial Target Types.



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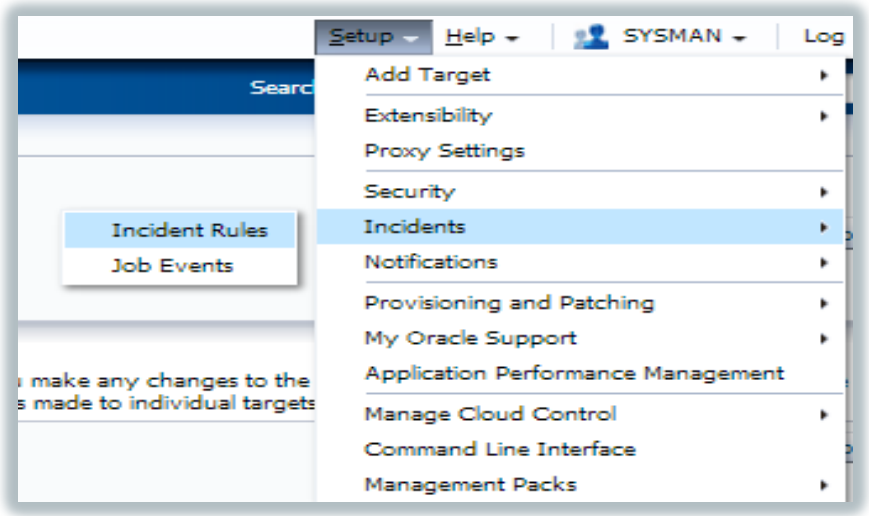
Incident Rule Sets



- Two Default Rule Sets
- "Create Like" for the Default Rules Sets
- Build out New Ones
- Disable the Defaults

Name	Description	Ord	Enterprise Rule Set	Owner	Enabled
Incident management Ruleset for all targets	System-generated Ruleset to create and manage incidents.	1	✓	System Generated	No
Event management Ruleset for Self Update	System-generated Ruleset for Self Update Events	2	✓	System Generated	No
Incident Management Ruleset	System-generated Ruleset to create and manage incidents.	3	✓	SYSMAN	Yes
Event Management Ruleset	System-generated Ruleset for Self Update Events	4	✓	SYSMAN	Yes
Non-Prod Incident Management Rule Set	System-generated Ruleset to create and manage incidents for Non-Production Group. This has just bee...	5	✓	SYSMAN	Yes

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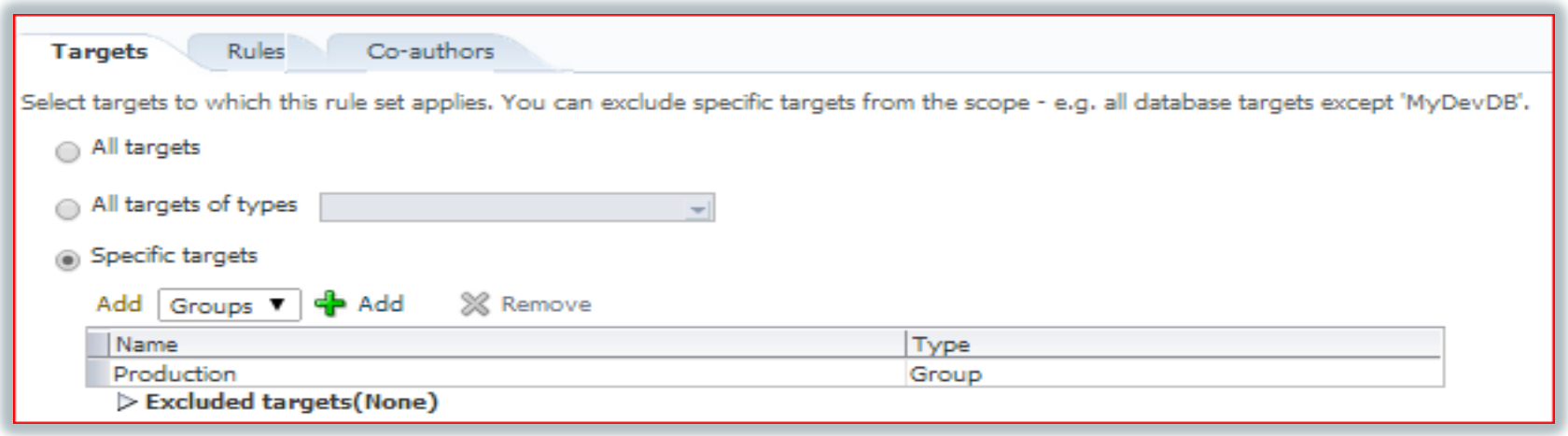
A Rule Set Can…..

- Be assigned to a Target, Target Type or a GROUP.
- Build out rule sets as complete as you need.



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Rules

- Think about…
  - What is important to be ACTUALLY notified for?
  - What is TRULY mission critical?
  - What should be managed during the business day?
  - More notifications are NOT better notifications
  - No, NO WHITE NOISE- make every notification count.

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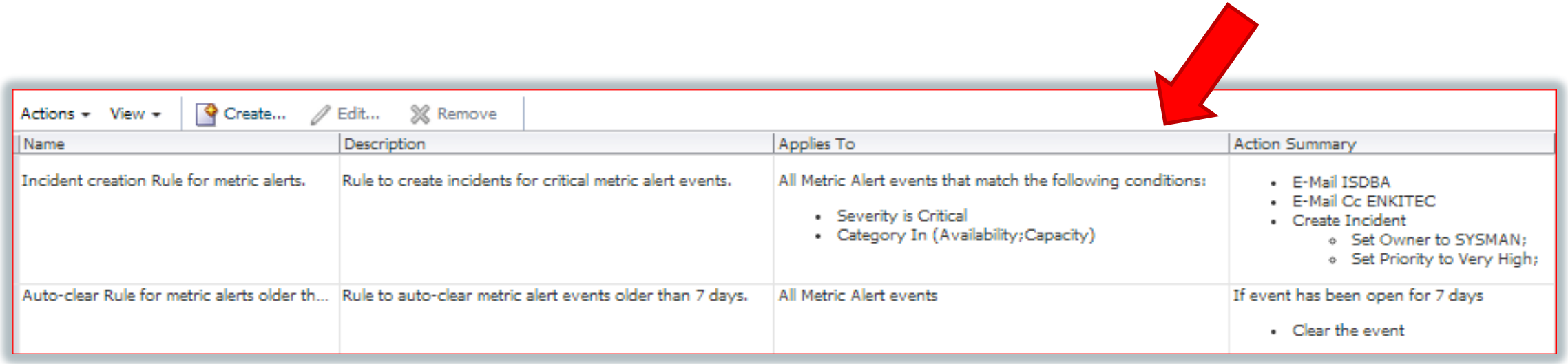
Defining Rules for Efficiency

- From default rule, but have eliminated all categories but Availability and Capacity that are Critical.
- Email who is required to be notified AND
- Set the owner and the priority in the incident.



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The Rest of the Categories

- Created a second rule
  - Still severity has to be critical
  - Covers all categories removed from original rule.
  - No email notification- I want these to just create an incident.
  - Sets the owner and the priority automatically.

Metric Alert Rule Categories NoEmail	This rule is Critical Metric Alerts that no emails should be ...	All Metric Alert events that match the following conditions: • Severity is Critical • Category In (Business;Configuration;Diagnostics;Err	• Create Incident ◦ Set Owner to SYSMAN; ◦ Set Priority to Urgent; • Clear the event

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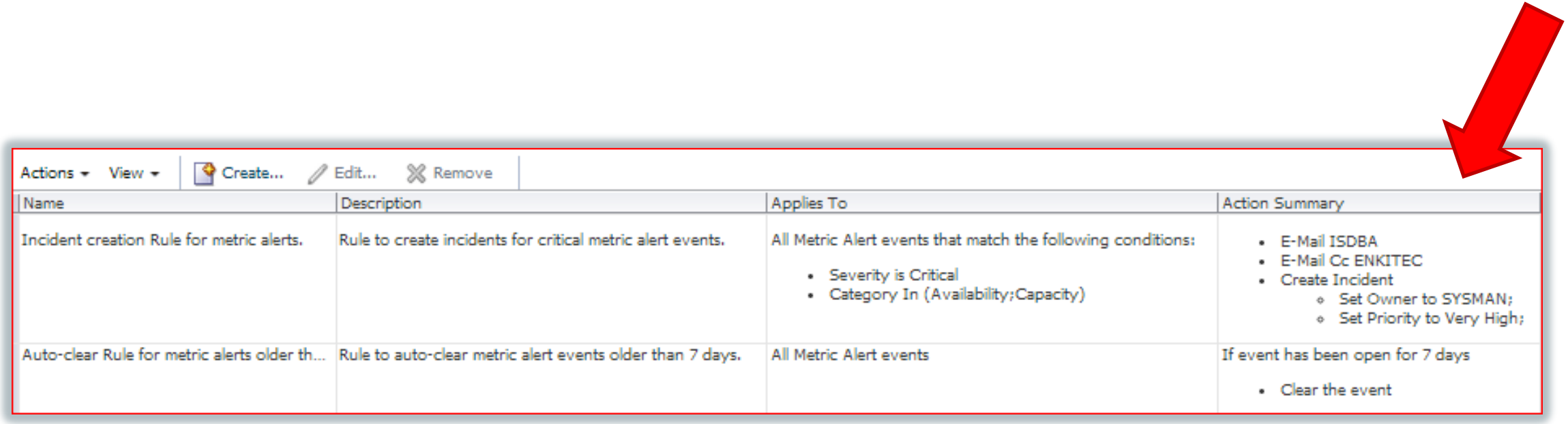
Auto-Clear of Metric Rules

- Update how long till auto-clear
- Remove notification- no, I don't want an email!



Actions ▾ View ▾ | Create... | Edit... | Remove

Name	Description	Applies To	Action Summary
Incident creation Rule for metric alerts.	Rule to create incidents for critical metric alert events.	All Metric Alert events that match the following conditions: • Severity is Critical • Category In (Availability;Capacity)	• E-Mail ISDBA • E-Mail Cc ENKITEC • Create Incident ◦ Set Owner to SYSMAN; ◦ Set Priority to Very High;
Auto-clear Rule for metric alerts older th...	Rule to auto-clear metric alert events older than 7 days.	All Metric Alert events	If event has been open for 7 days • Clear the event

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What about Warnings??

- No, there aren't any rules set for warnings.
- I choose to use the incident manager to track warnings and pro-actively manage from it.
- Severity Warning, creates and incident, sets the owner to SYSMAN and priority to LOW.
- This is a PROFESSIONAL PREFERENCE.

Incident Creation Rule for Warnings	Additional rule to maintain incidents for Warnings and gi...	All Metric Alert events that match the following conditions: • Severity is Warning	• Create Incident ◦ Set Owner to SYSMAN; ◦ Set Priority to Low;

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When to Know to Change a Rule

- Notification does not provide value.
- Notification is triggered by a bug, isn't critical or can't be resolved by the one notified.
- Always retain the email notification to ensure you are editing the correct notification.
- Break down the rule to ensure that metrics grouped in one category are not mistakenly set to not notify.

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Everything You Need….

Target type=**Host**
Target name=**host.orcl.com**
Categories=**Capacity**
Message=**Disk Device sdd is 97.371% busy.**
Severity=**Critical**
Event reported time=**Feb 8, 2014 8:19:26 PM CST**
Operating System=**Linux**
Platform=**x86_64**
Associated Incident Id=**8193**
Event Type=**Metric Alert**
Event name=**DiskActivityiskActivitybusy**
Metric Group=**Disk Activity**
Metric=**Disk Device Busy (%)**
Metric value=**97.371**
Key Value=**sdd**
Key Column 1=**Disk Device**
Rule Name=**New Ruleset - Incident Management,Incident creation Rule for metric alerts.**
Update Details:
Disk Device sdd is 97.371% busy.
Incident created by rule (Name = New Ruleset - Incident Management, Incident creation Rule for metric alerts.; Owner = SYSMAN).

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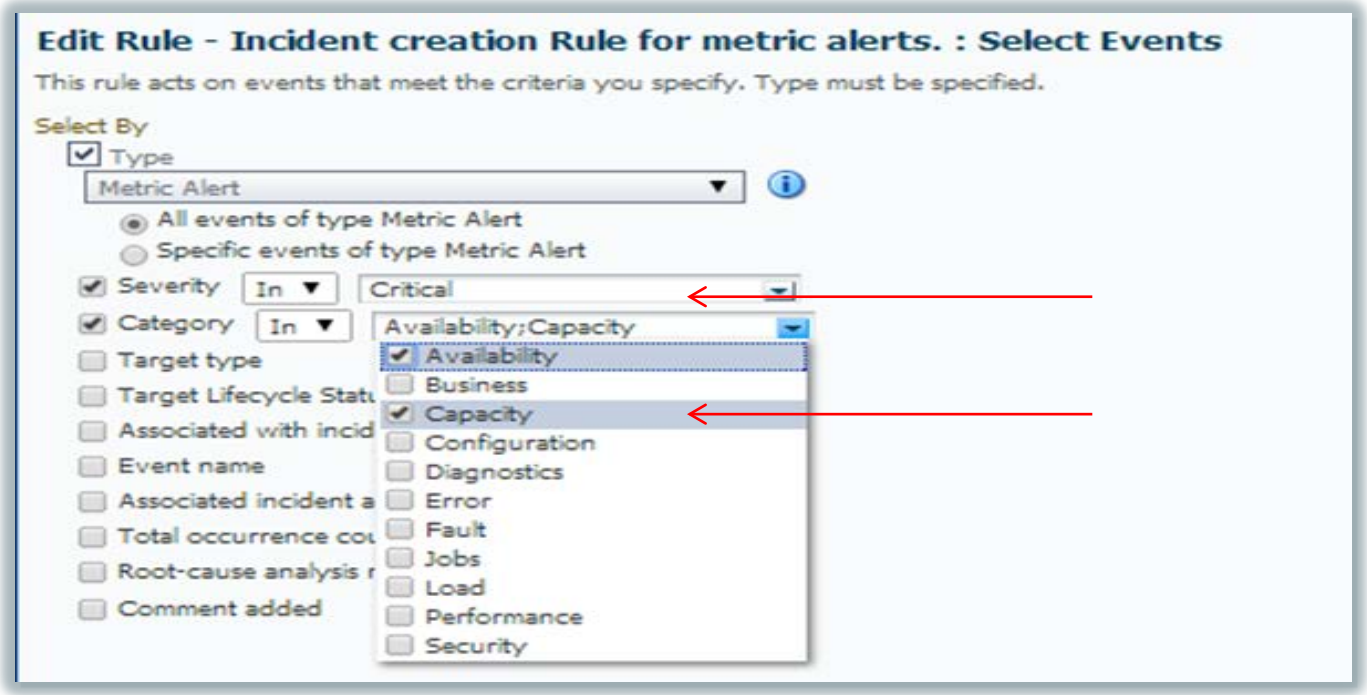
Edit the Rule from the Rule Set..

Incident created by rule (Name = New Ruleset - Incident Management, Incident creation Rule for metric alerts.;

Categories=**Capacity**
Message=**Disk Device sdd is 97.371% busy.**
Severity=**Critical**



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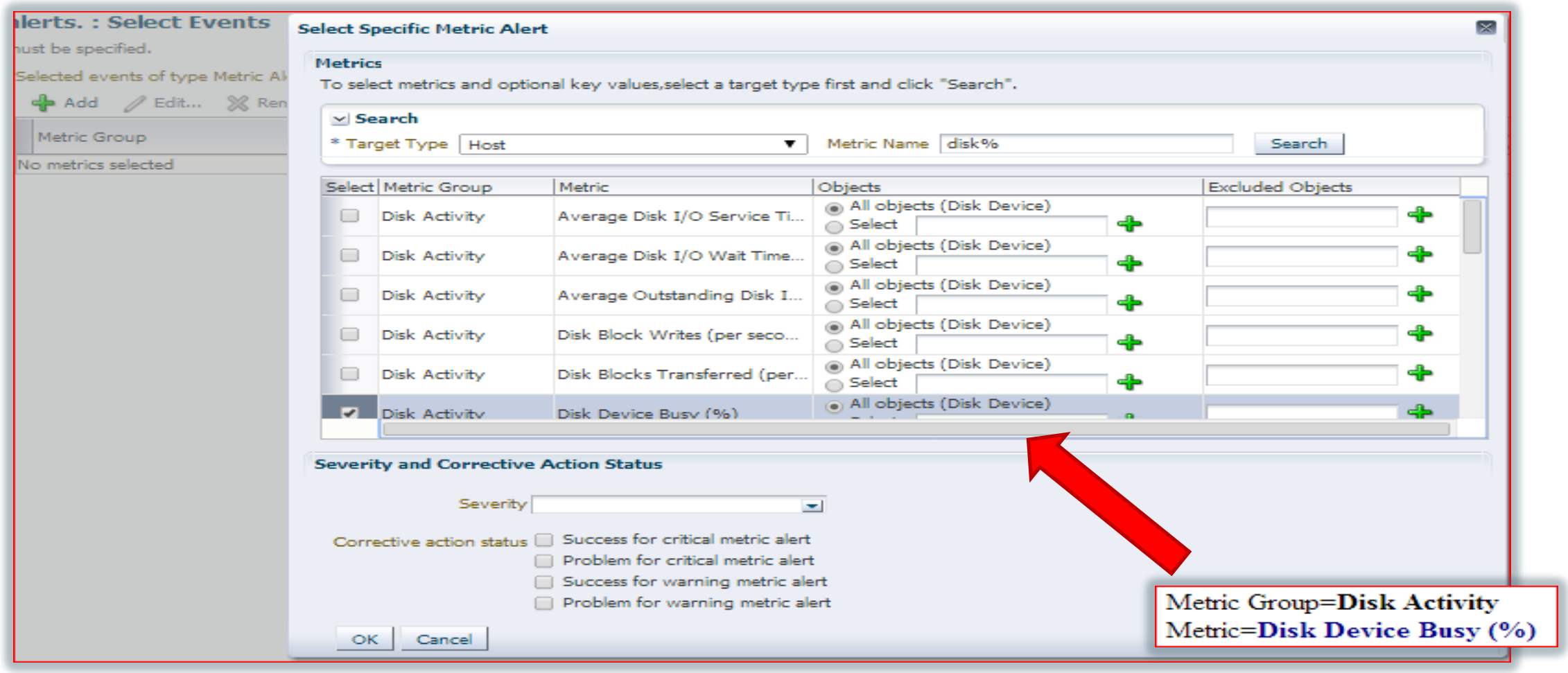
Search the Target Type and Metric



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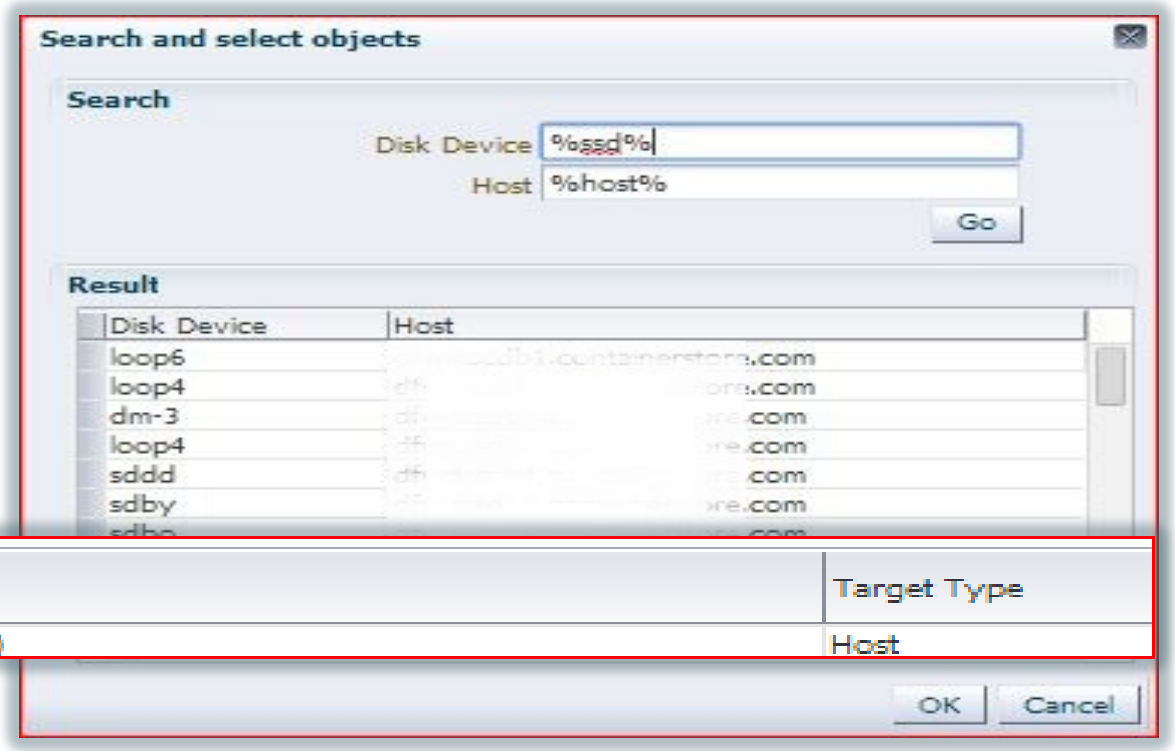
Add the Device to Exclusion List

Target type=**Host**
Target name=**host.orcl.com**
Categories=**Capacity**
Message=**Disk Device sdd is 97.371% busy.**



Metric Group	Metric	Target Type
Disk Activity	Disk Device Busy (%)	Host

Target Type	Severity	Objects		Corrective Action Status	
		Selected	Excluded	On Critical	On Warning
Host	Critical	All objects	ssd	Problem	

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Tips on Event Building

- Create New Rules and Break Down Categories
- Inspect Each Notification the Impacts Effective Alerting.

- Recognize when a metric threshold vs. a rule set is the “culprit”.

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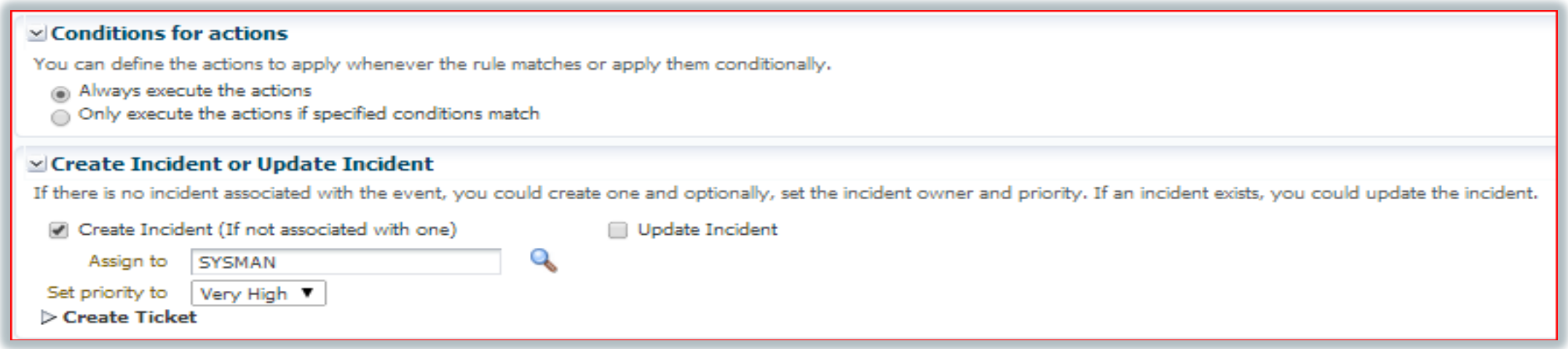
Edit Actions

- Choose if this should be done for all actions.
- Create Incident, automatically assign.
- Set a priority and even update information automatically in the incident.



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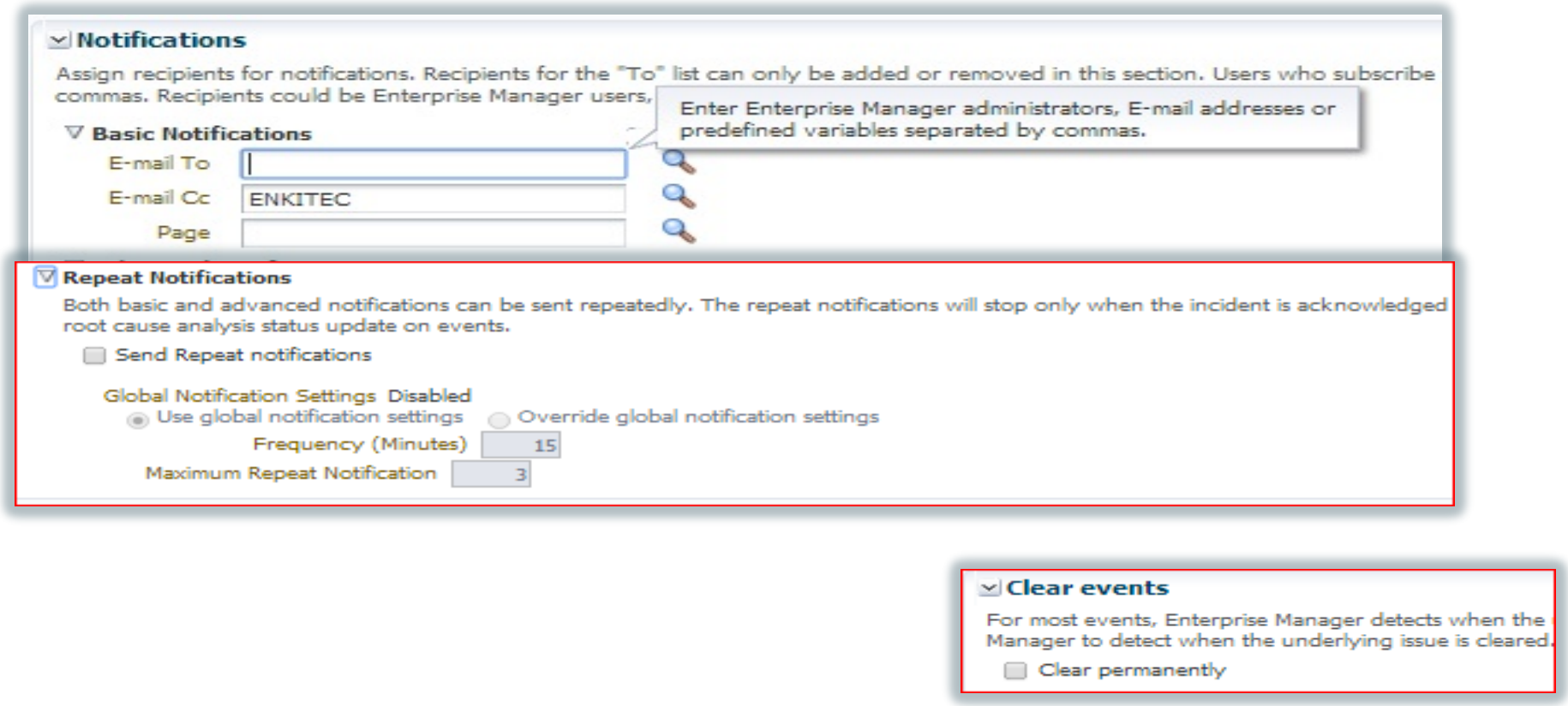
Editing Actions, Cont.



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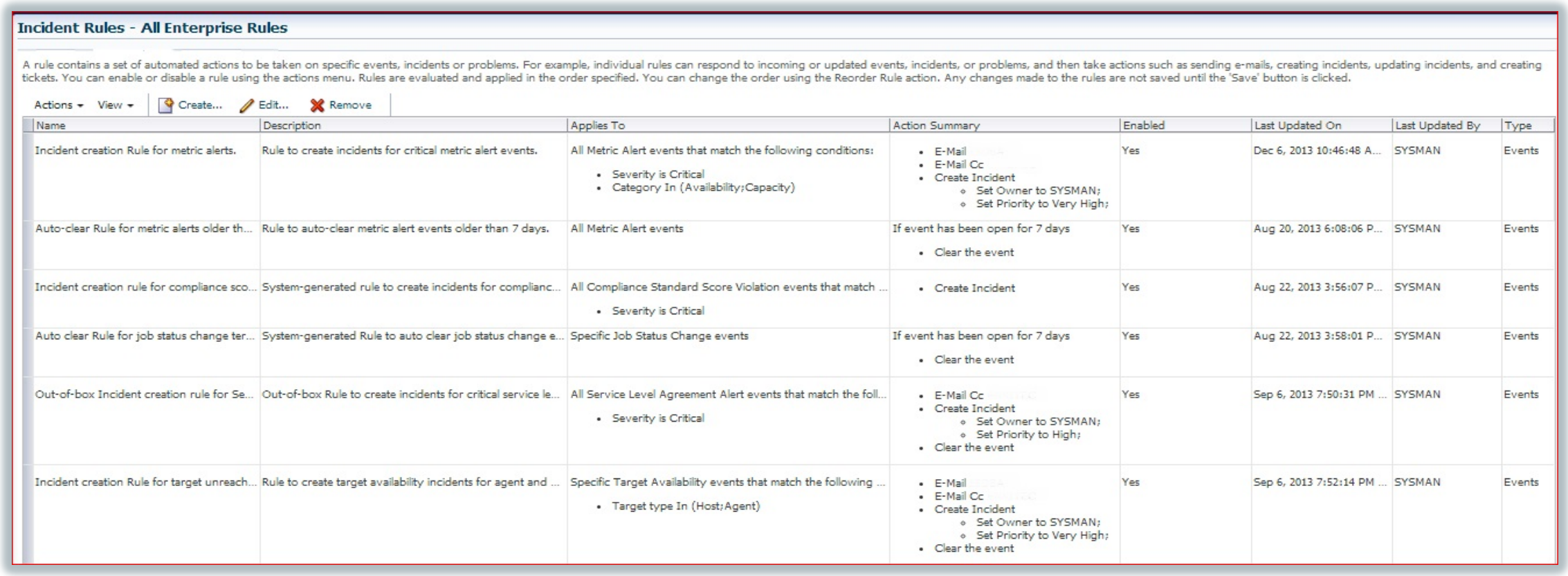
Review Rule and Rule Sets



Incident Rules - All Enterprise Rules

A rule contains a set of automated actions to be taken on specific events, incidents or problems. For example, individual rules can respond to incoming or updated events, incidents, or problems, and then take actions such as sending e-mails, creating incidents, updating incidents, and creating tickets. You can enable or disable a rule using the actions menu. Rules are evaluated and applied in the order specified. You can change the order using the Reorder Rule action. Any changes made to the rules are not saved until the 'Save' button is clicked.

Actions ▾ View ▾ | Create... Edit... Remove

Name	Description	Applies To	Action Summary	Enabled	Last Updated On	Last Updated By	Type
Incident creation Rule for metric alerts.	Rule to create incidents for critical metric alert events.	All Metric Alert events that match the following conditions: • Severity is Critical • Category In (Availability;Capacity)	• E-Mail • E-Mail Cc • Create Incident ◦ Set Owner to SYSMAN; ◦ Set Priority to Very High;	Yes	Dec 6, 2013 10:46:48 A...	SYSMAN	Events
Auto-clear Rule for metric alerts older th...	Rule to auto-clear metric alert events older than 7 days.	All Metric Alert events	If event has been open for 7 days • Clear the event	Yes	Aug 20, 2013 6:08:06 P...	SYSMAN	Events
Incident creation rule for compliance sco...	System-generated rule to create incidents for complianc...	All Compliance Standard Score Violation events that match ... • Severity is Critical	• Create Incident	Yes	Aug 22, 2013 3:56:07 P...	SYSMAN	Events
Auto clear Rule for job status change ter...	System-generated Rule to auto clear job status change e...	Specific Job Status Change events	If event has been open for 7 days • Clear the event	Yes	Aug 22, 2013 3:58:01 P...	SYSMAN	Events
Out-of-box Incident creation rule for Se...	Out-of-box Rule to create incidents for critical service le...	All Service Level Agreement Alert events that match the foll... • Severity is Critical	• E-Mail Cc • Create Incident ◦ Set Owner to SYSMAN; ◦ Set Priority to High; • Clear the event	Yes	Sep 6, 2013 7:50:31 PM ...	SYSMAN	Events
Incident creation Rule for target unreach...	Rule to create target availability incidents for agent and ...	Specific Target Availability events that match the following ... • Target type In (Host;Agent)	• E-Mail • E-Mail Cc • Create Incident ◦ Set Owner to SYSMAN; ◦ Set Priority to Very High; • Clear the event	Yes	Sep 6, 2013 7:52:14 PM ...	SYSMAN	Events

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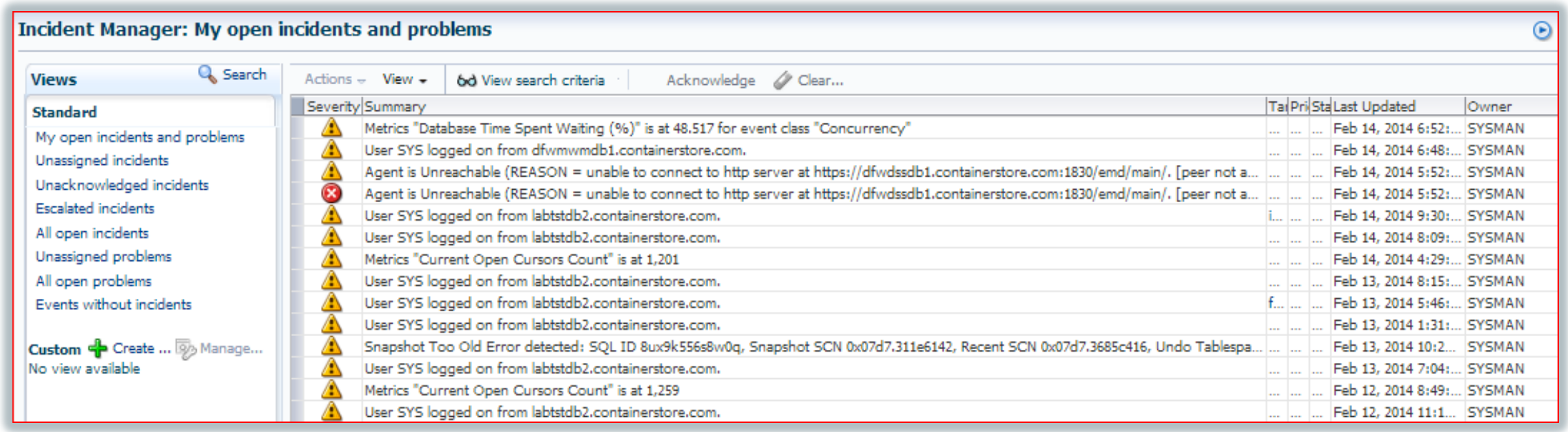
Incident Management

- Critical Notifications are now ONLY for Mission Critical and Production Down
- The Incident Manager interface now can be utilized for review and management.



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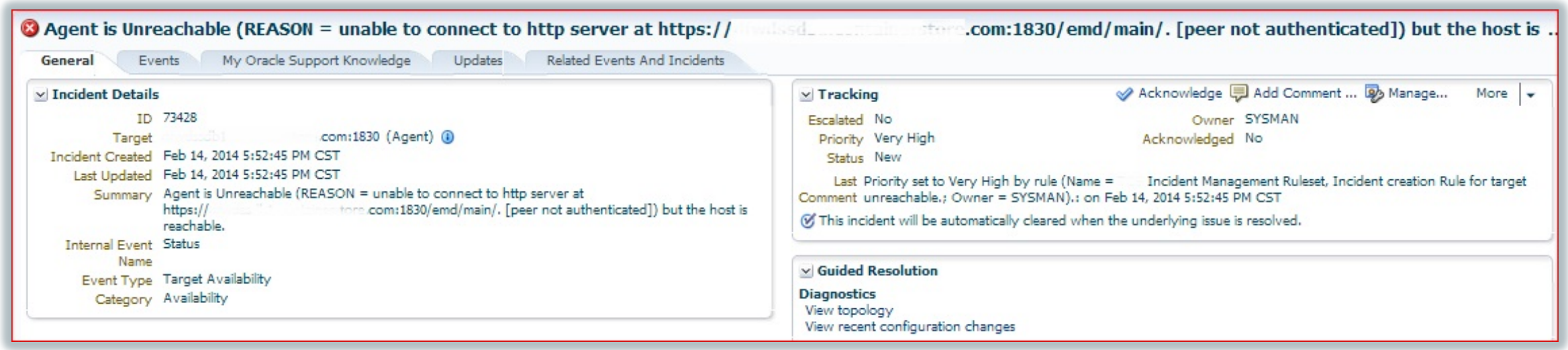
An Incident



High Level Information regarding incident and links to details.

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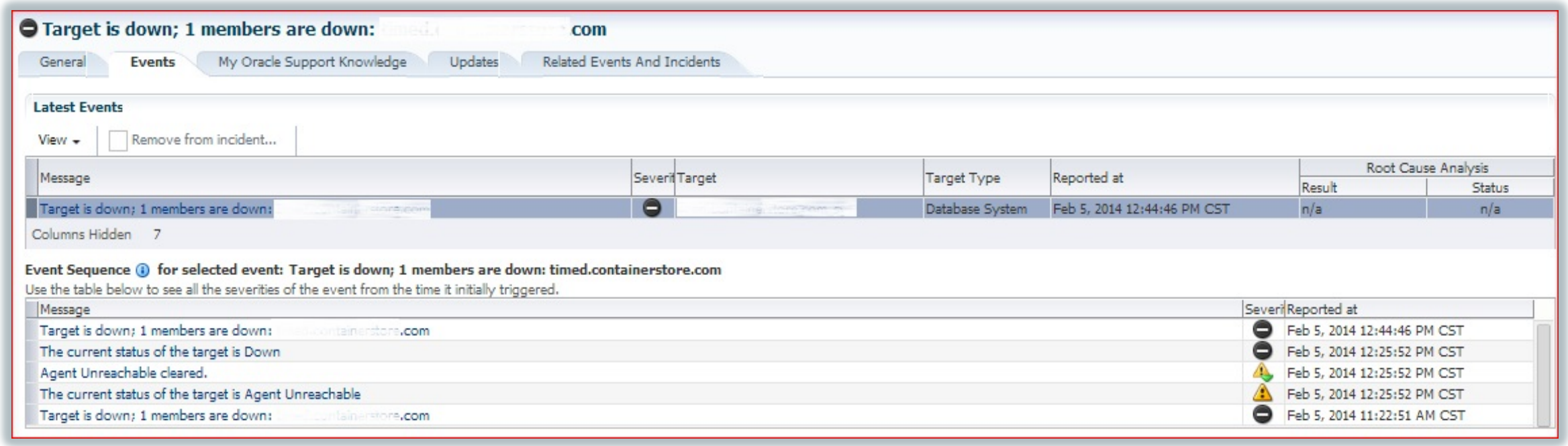
Incident Events

Steps covered in incident and escalation.



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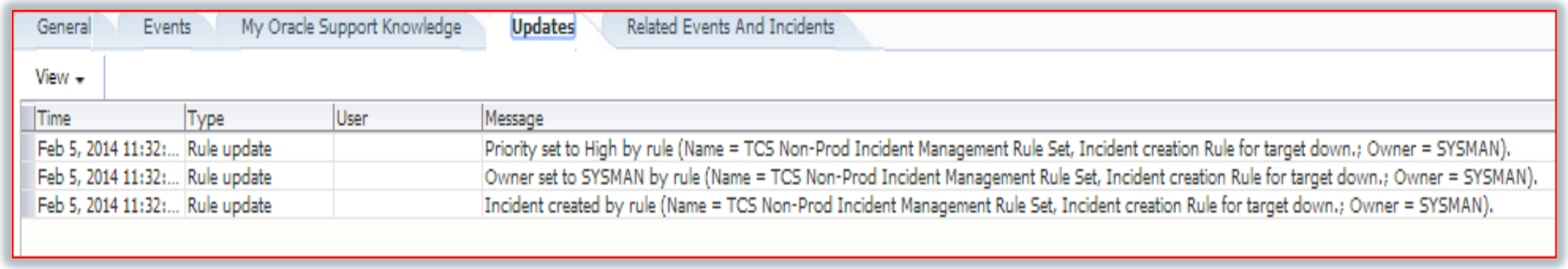
Incident Updates

- Steps through the updates to the incident.
- If any notifications have been sent, this is where you look!



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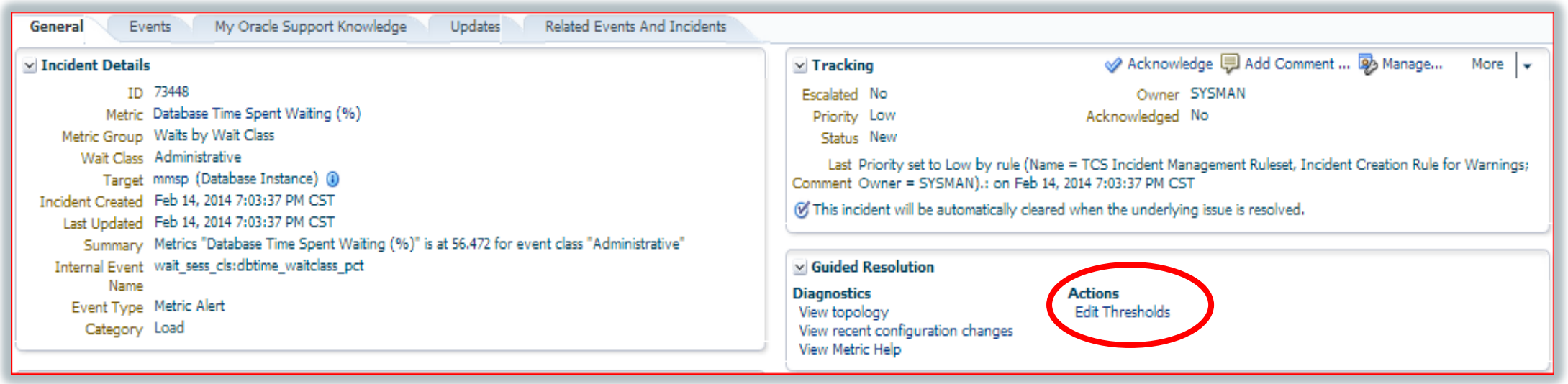
Editing Thresholds for Incidents

- If Metrics Involved, Edit from Incident:



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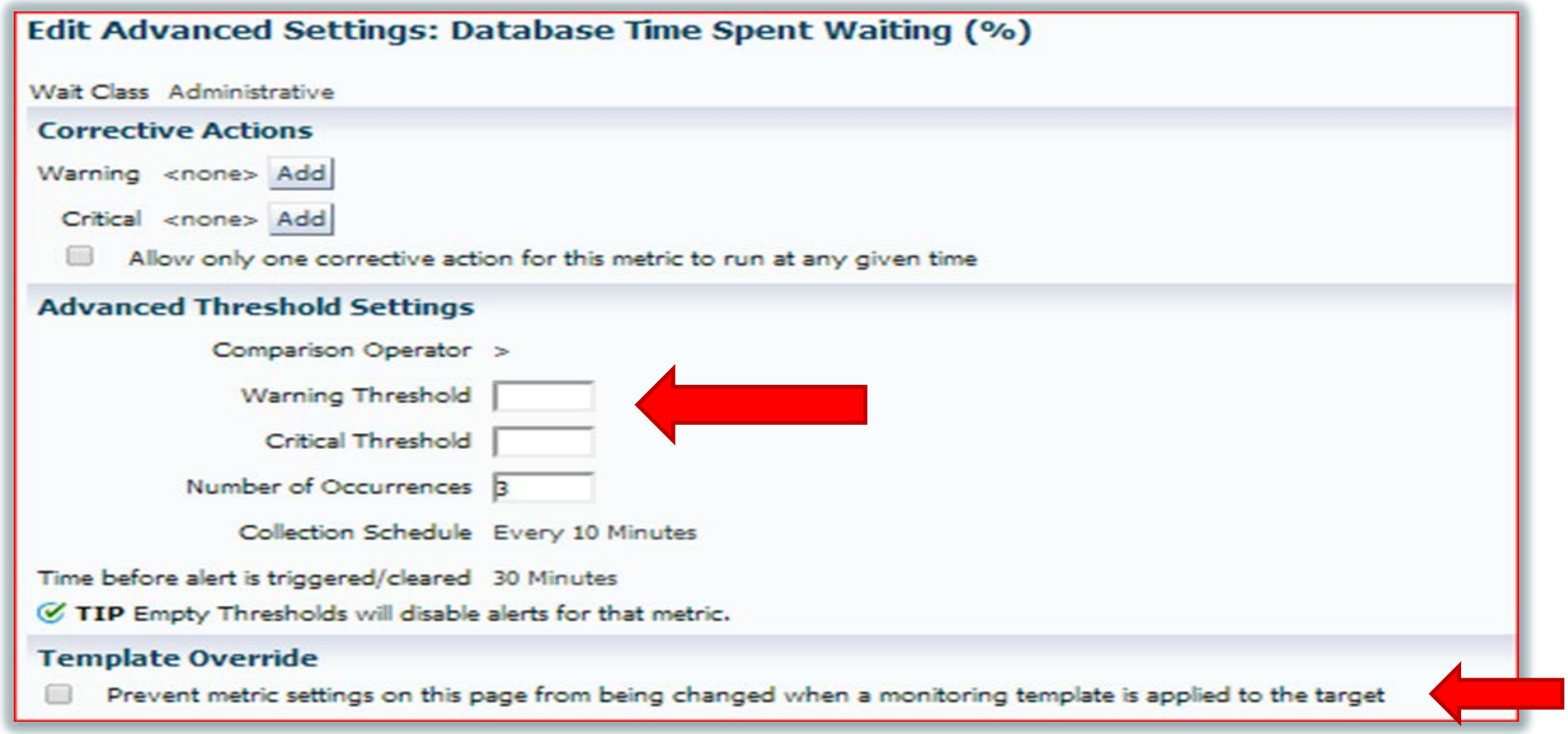
Set New Thresholds



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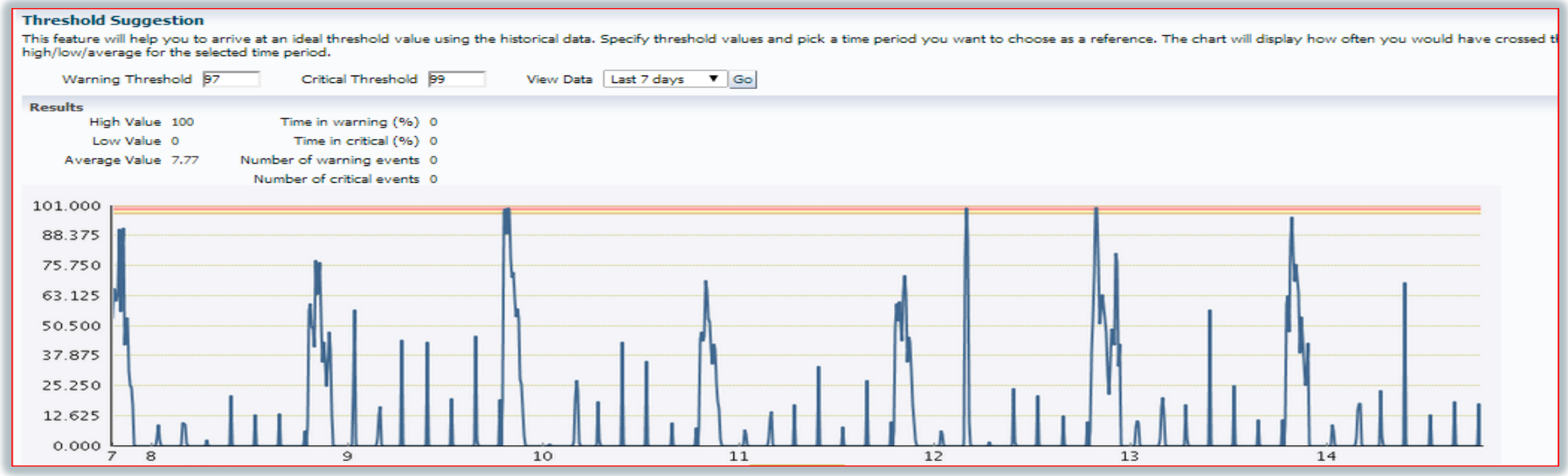
Threshold Suggestions

Threshold Suggestion

This feature will help you to arrive at an ideal threshold value using the historical data. Specify threshold values high/low/average for the selected time period.

Warning Threshold | Critical Threshold | View Data: Last 7 days | Go



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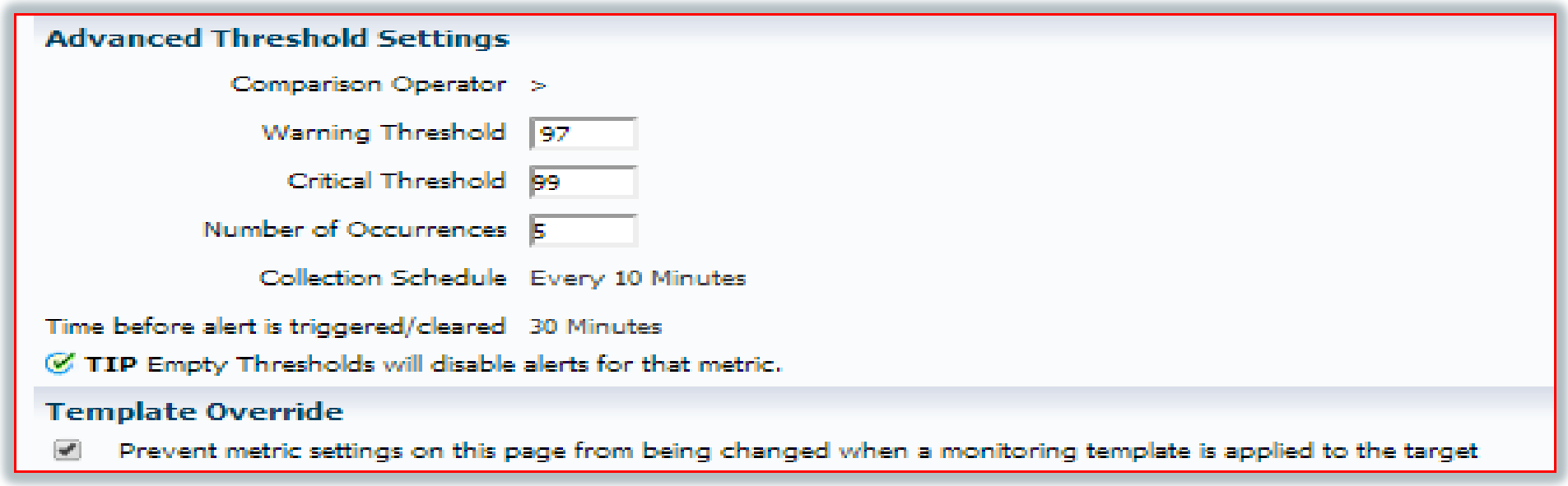
Set the New Metric Thresholds

- Suggestions Have Verified- no Guessing.
- Upped Number of Occurrences to Eliminate False Alerts
- Choose if Monitoring Templates Can Override.



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Groups and Admin Groups

- Groups ease management of targets, allowing assignment of tasks, monitoring and other features through a single alias for multiple targets.
- Groups are still supported, but limited vs. what Administration groups offer you. The one advantage is multiple group assignment of a single target.
- Administration groups set hierarchy and automate management by assigning monitoring templates, compliance standards, and cloud policies.

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Groups- Simple

- Creating Groups are like Creating Roles…☺
- Add targets to a group or more than one group at any time.
- Edit standard groups down the road.
- Groups can be used with rule sets to assign alerts to multi-level escalation in actions.

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Administration Groups- Complex

- Plan out first, including “Line of Business”, “Lifecycle Status” and what types of databases exist in environment, (production, mission critical, staging, development, QA, etc.)
- Once created, most design elements of the Administration group are not open to edits.
- All hierarchy for each target is available in the “target properties”.

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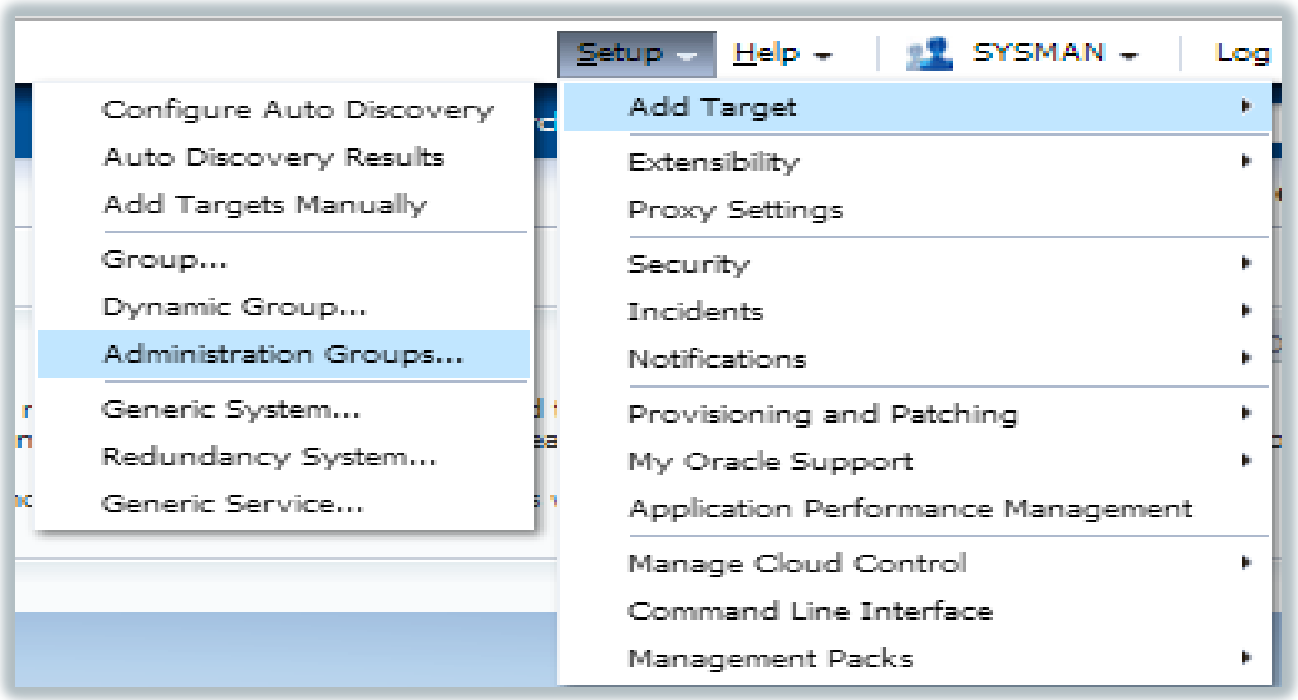
Setting up Admin Groups

- Click on Targets, Groups OR Setup, Add Target, Administration Groups
- Create, Choose Administration Group

Have your design ready…



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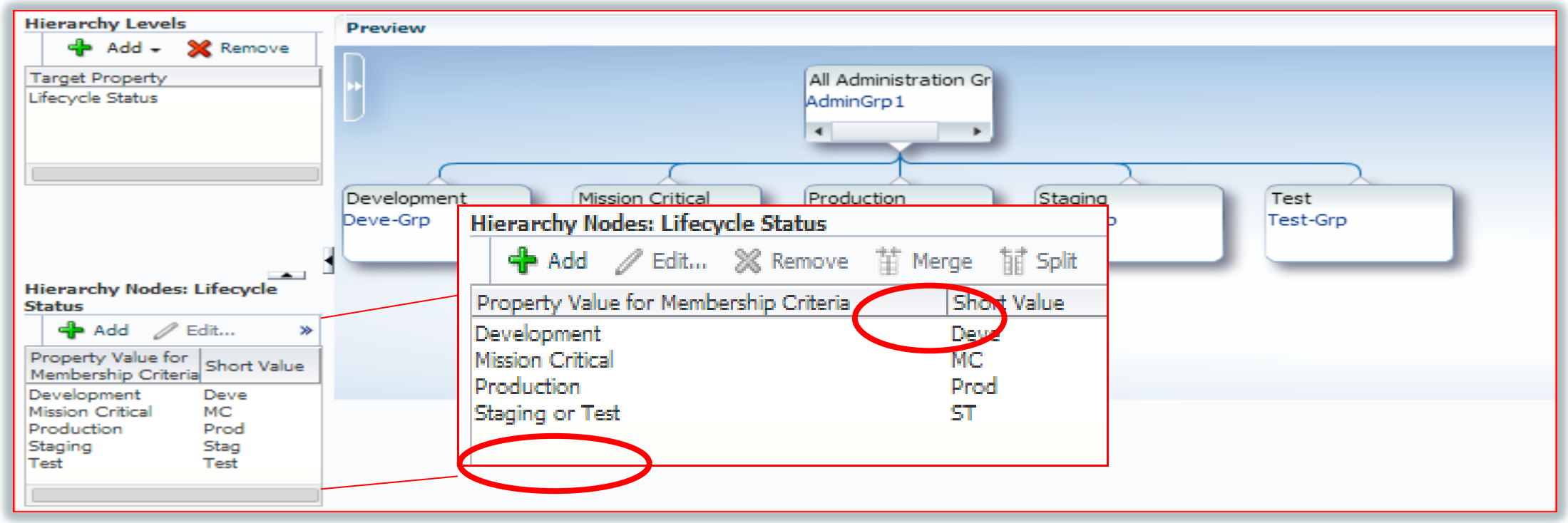
Creation a Hierarchy

- Start with Lifecycle Status
- Decide which to keep, edit, add, remove or merge.



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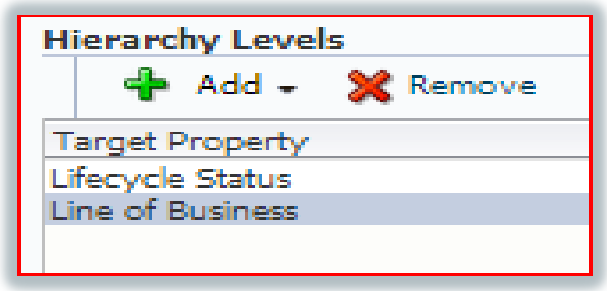
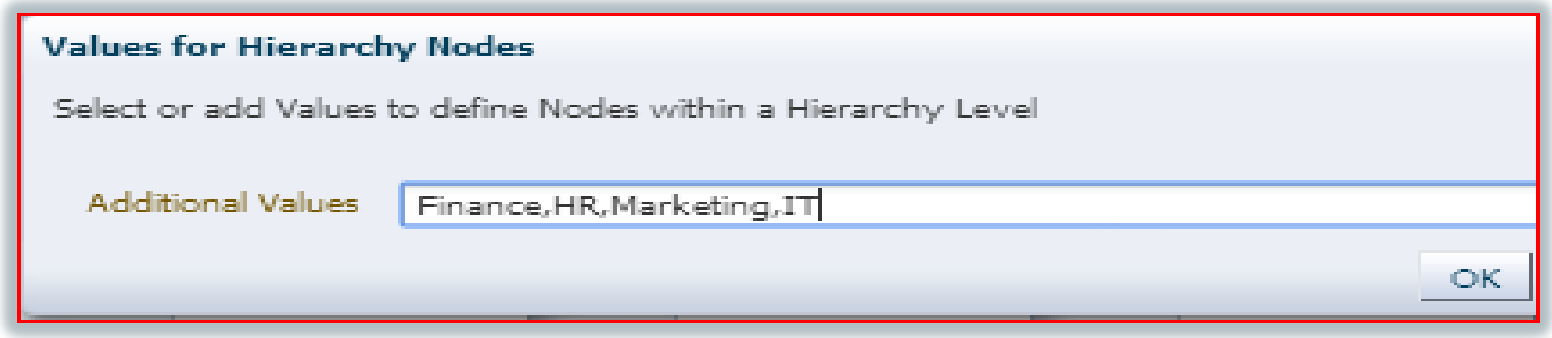
Create Your Line of Business

- Click on “Add” in Hierarchy Levels, (again)



- Choose Line of Business, click on Add, separate by a comma all lines of business desired.



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Simple Hierarchy is now built

- Development Hierarchy, (same for each Lifecycle status)

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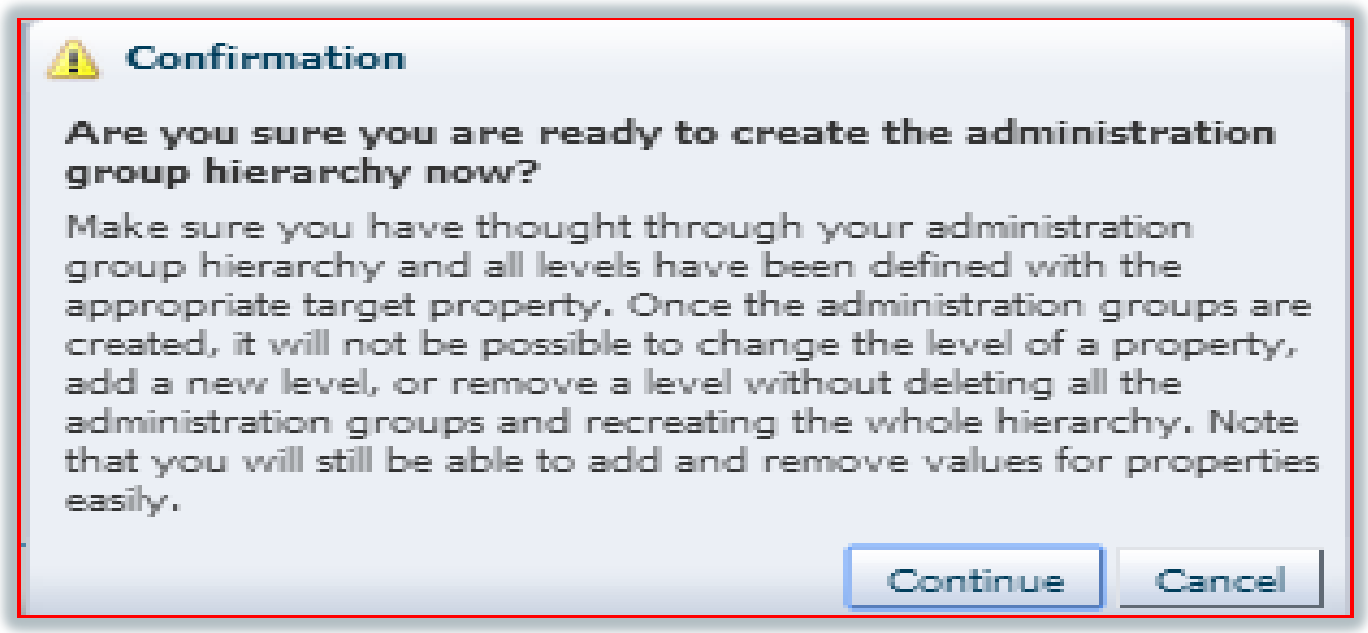
Create Hierarchy

- Click on Create, warning will appear-



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- Monitoring Templates, (covered earlier), can be created as part of this step.
- Compliance and Cloud standards must be created in the appropriate framework in EM12c before being added to the Administration Group.

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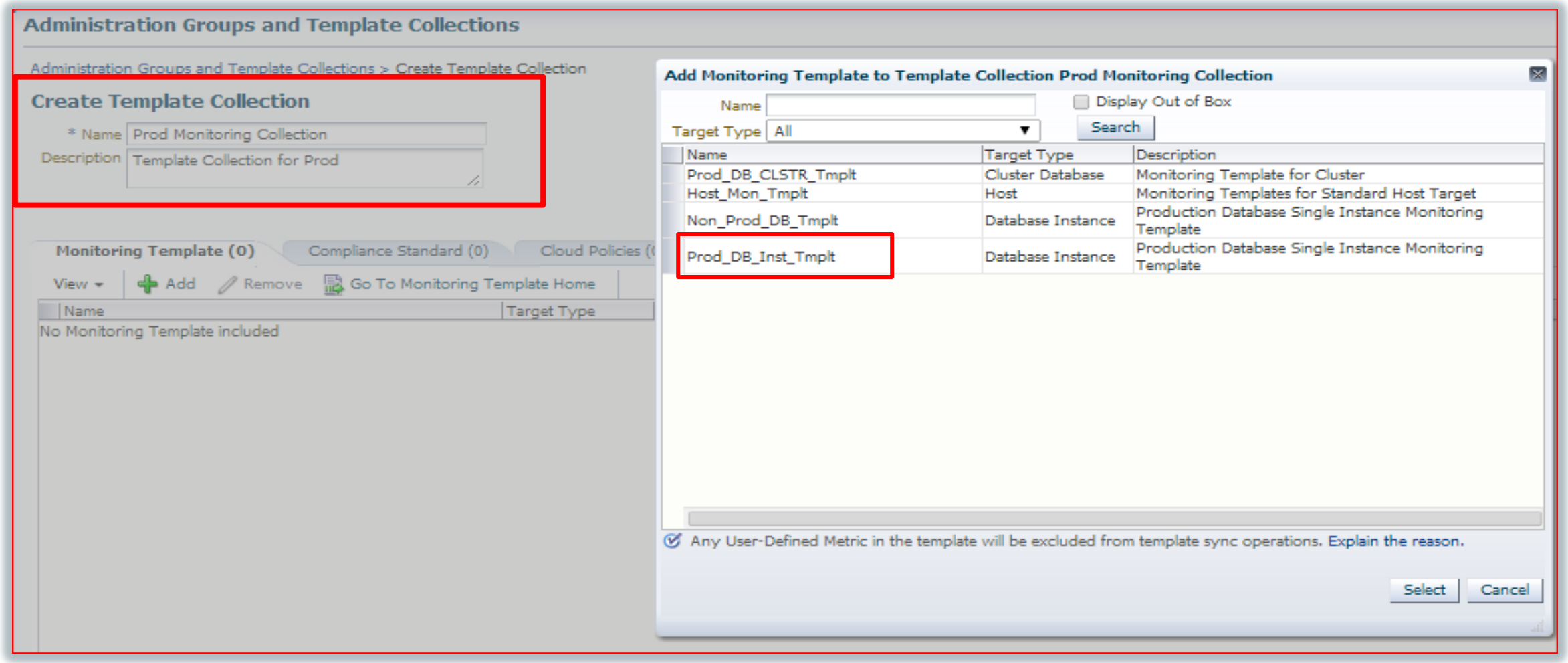
Create and Choose Existing



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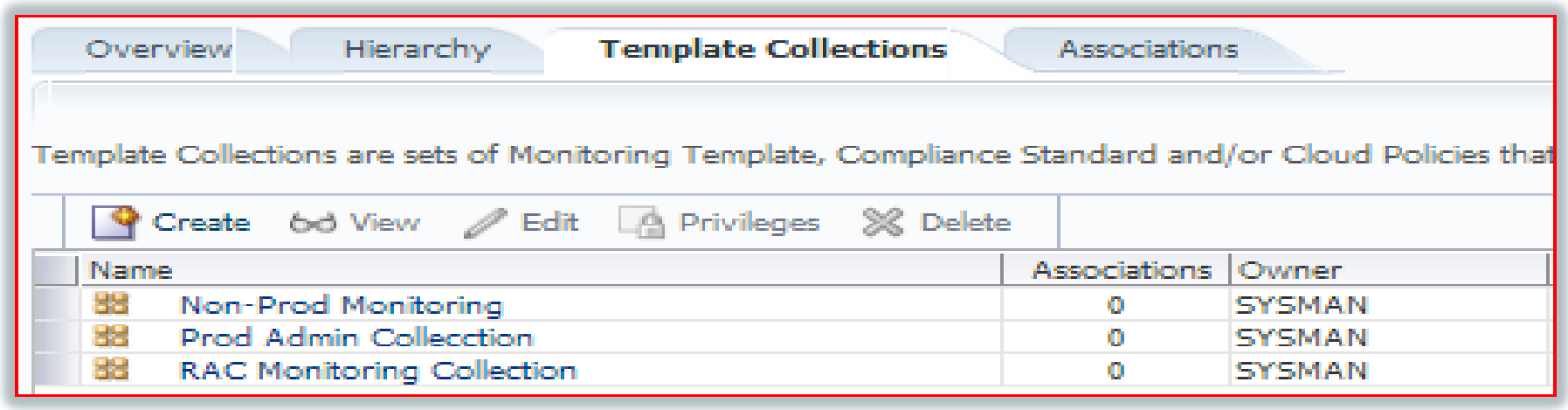
Create the Template Collections

- Add all monitoring templates required of any life cycle.



- Note- No associations exist yet!

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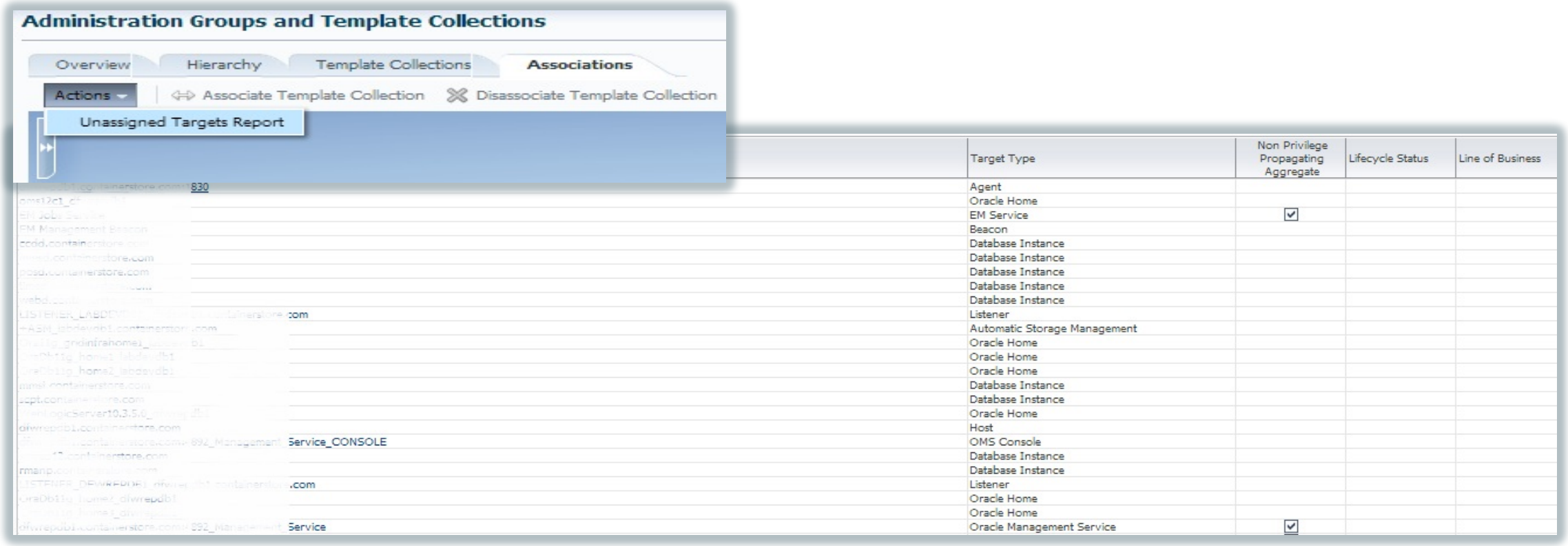
Run Unassociated Target Report

- Run Report to see what targets aren't associated with Admin Groups.



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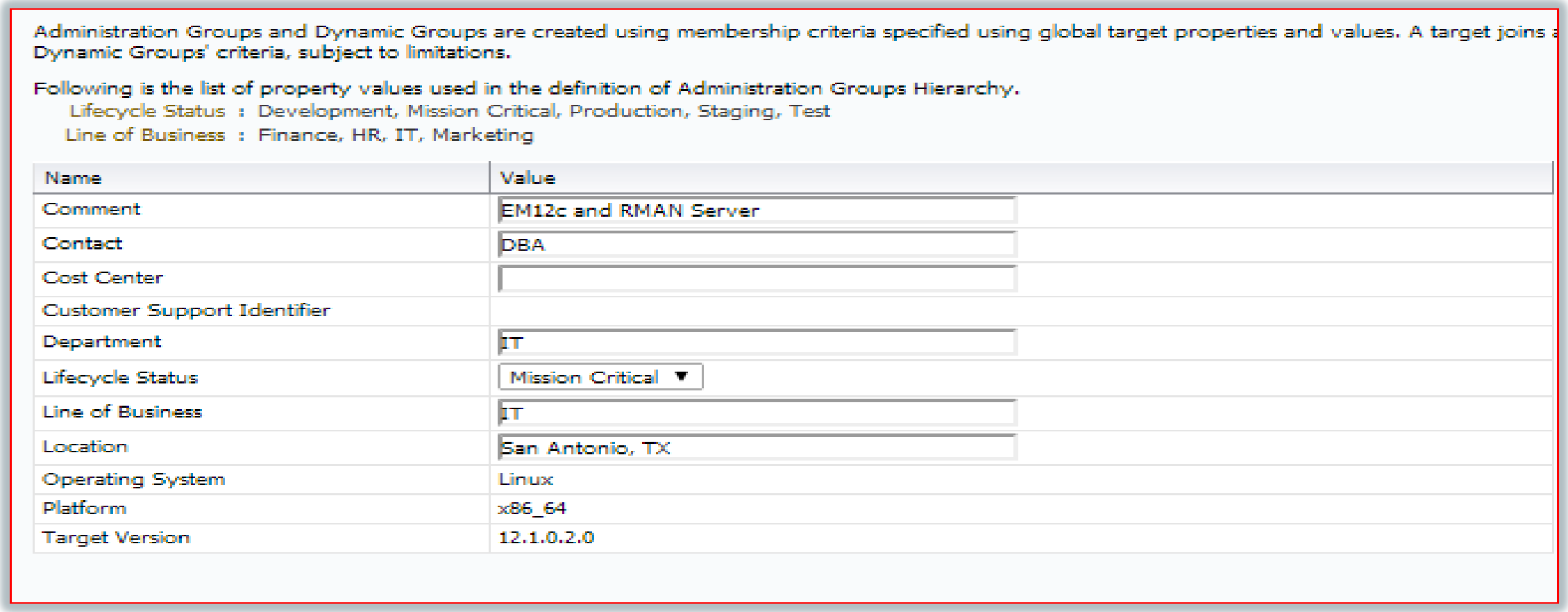
Editing a Target

- Fill in all Pertinent Information



Administration Groups and Dynamic Groups are created using membership criteria specified using global target properties and values. A target joins a Dynamic Groups' criteria, subject to limitations.

Following is the list of property values used in the definition of Administration Groups Hierarchy.

Lifecycle Status : Development, Mission Critical, Production, Staging, Test

Line of Business : Finance, HR, IT, Marketing

Name	Value
Comment	EM12c and RMAN Server
Contact	DBA
Cost Center	
Customer Support Identifier	
Department	IT
Lifecycle Status	Mission Critical
Line of Business	IT
Location	San Antonio, TX
Operating System	Linux
Platform	x86_64
Target Version	12.1.0.2.0

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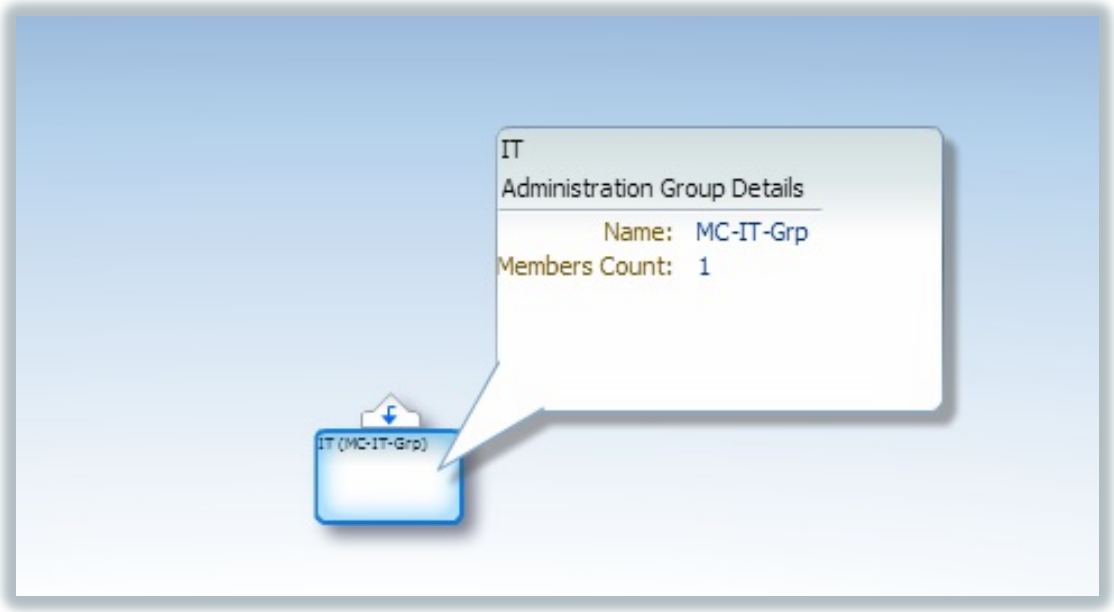
Post Association

- Associate Template Collection
- Continue with all Targets Till Complete.



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Dynamic Groups

- High Level Review

- A dynamic group allows administrators to create a group of targets by specifying its membership criteria instead of adding targets directly into the group. Membership criteria are based on target properties such as Lifecycle Status, Line of Business, Target Type, etc. When multiple criteria are defined for a dynamic group, a target must match all criteria before it is automatically added to the dynamic group. An example of dynamic group criteria can be (Target Type = Database or Listener) AND (Lifecycle Status = Production).

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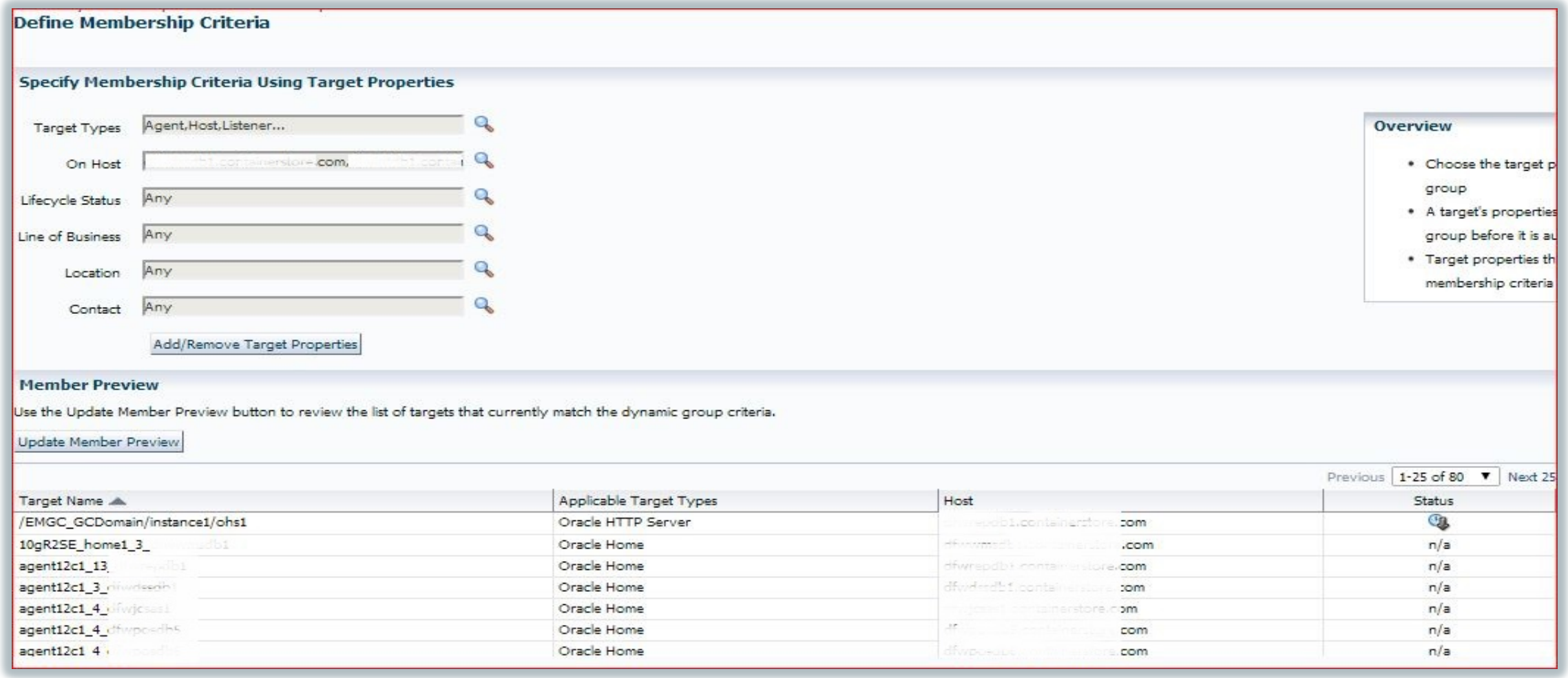
Define the Membership Criteria



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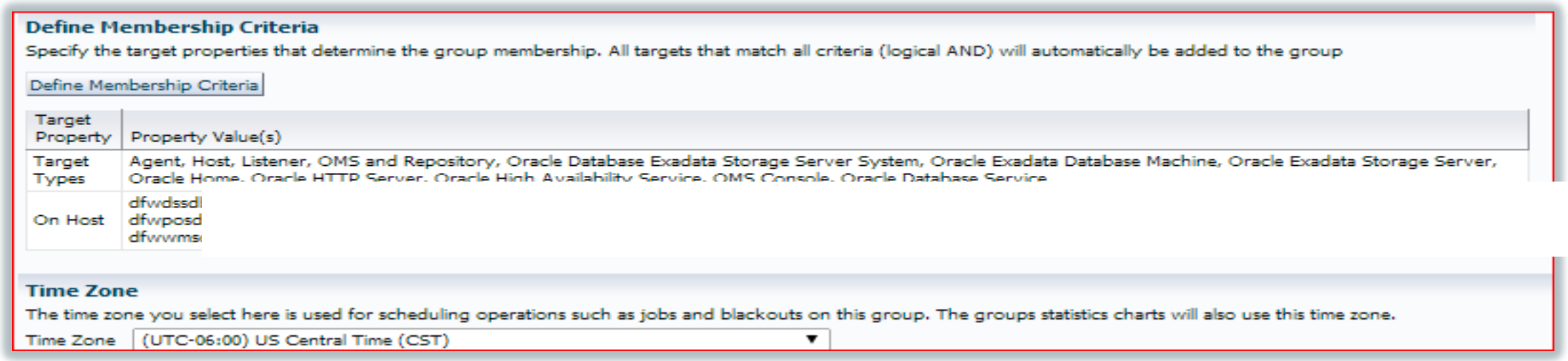
Reviewing the Build

- The Membership can now easily build out from the criteria entered.
- Saves from having to build Admin Groups.



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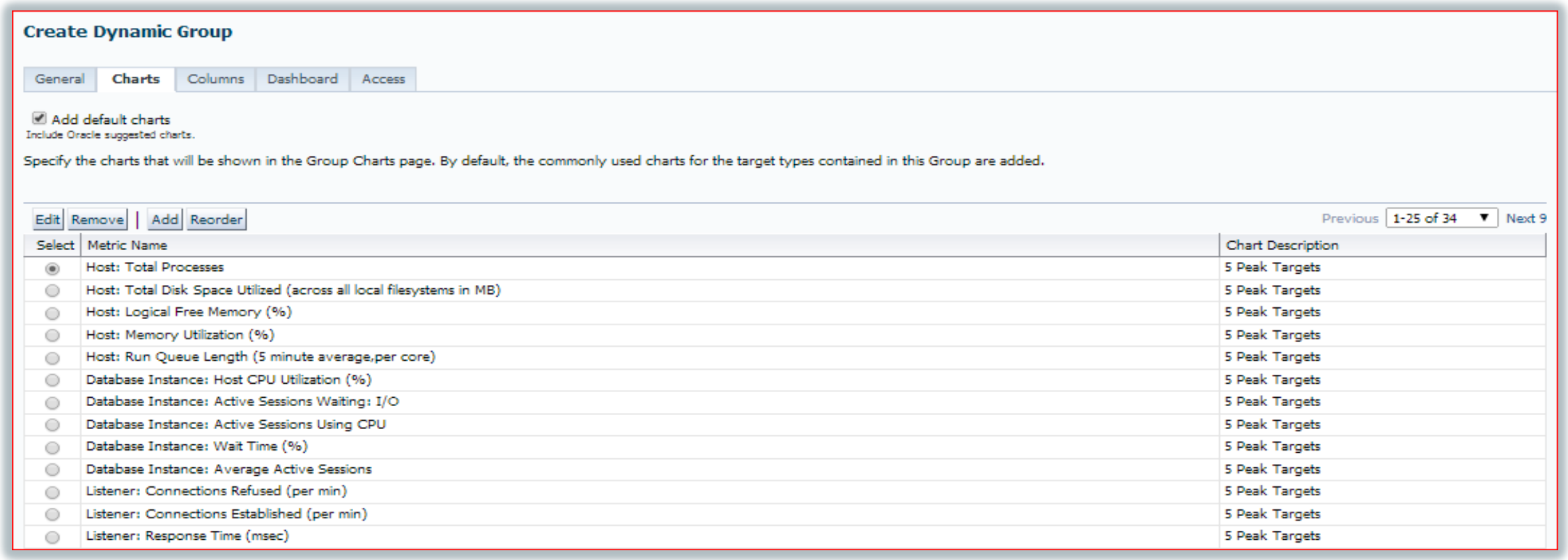
Charts

- Use Default Charts to Begin



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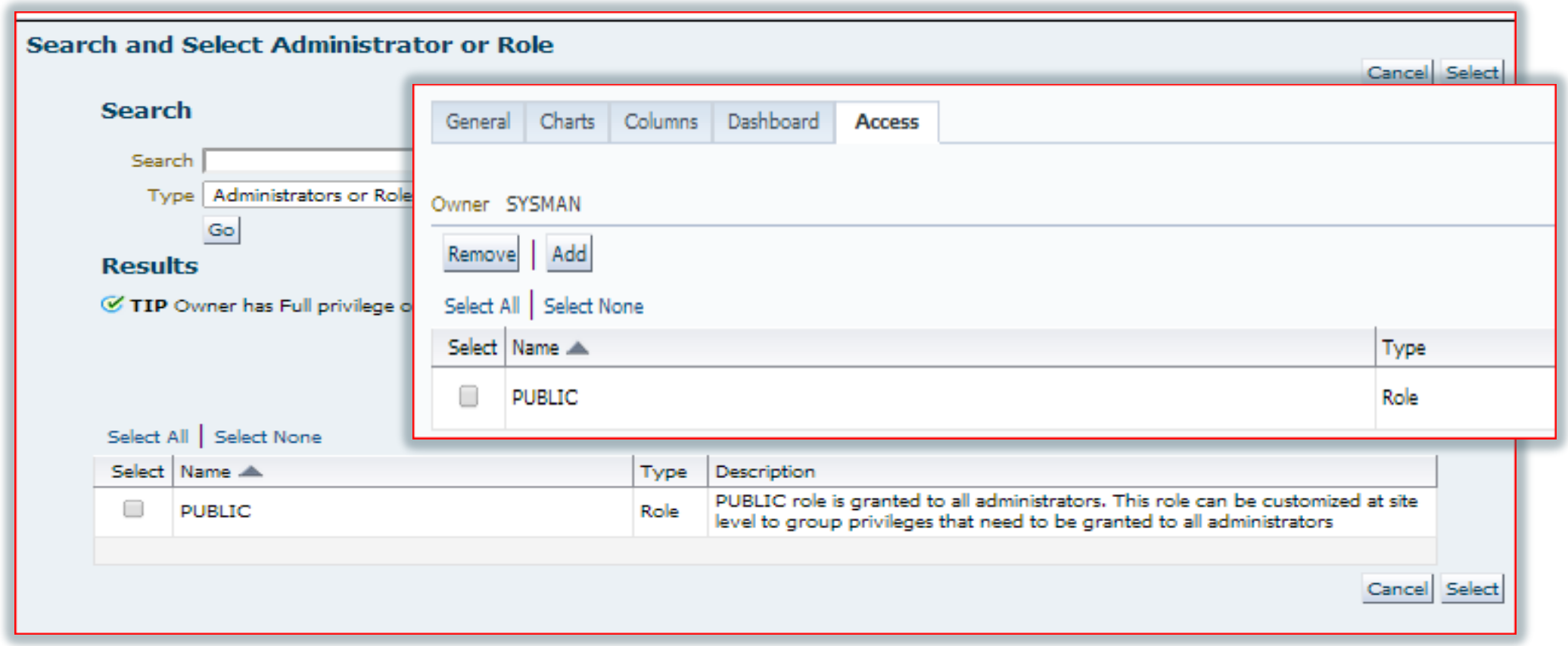
Keep it Simple

- Use Default for Charts, Columns, Dashboard



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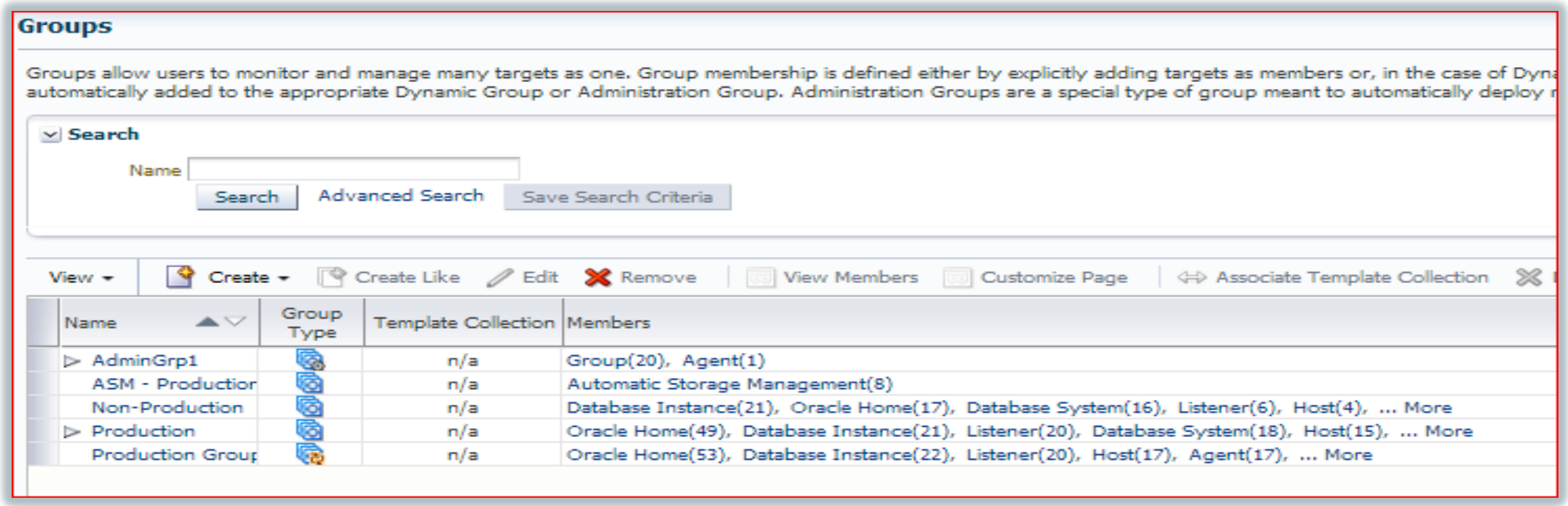
Group Review

- Dynamic Easier, Fluid
- Administration- more complex, but open to more errors.



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Summary-How This Works Together

- Automate-
  - Monitoring Templates
  - Rule Sets
  - Dynamic Groups if you are not using Advanced Features
  - Administration Groups if you want automation, auto-discovery/monitoring

- Efficiency
  - Remove notifications that create “white noise”.
  - Update metric thresholds.
  - Silence metrics that offer no value.

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Program Agenda with Highlight

1. A Little History Lesson
2. Framework
3. Everything as a Service
4. Database
5. Just Plain Cool

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Just Plain Cool

AWR Warehouse

The Future

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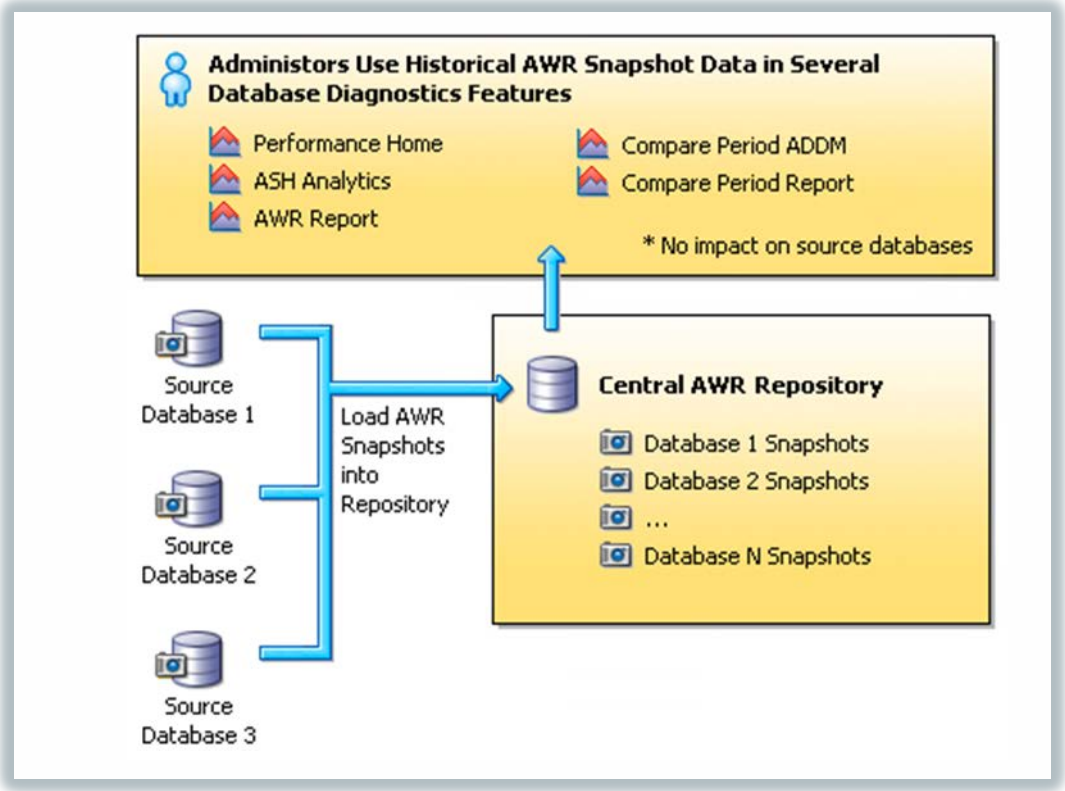
AWR Warehouse



- Central warehouse configured for long term AWR data retention
- Historical and ongoing AWR snapshots collected from databases enabled for AWR warehouse
- ETL jobs moves snapshots from source databases into AWR warehouse
- Retention period configurable for weeks, months, years or forever (default)

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AWR ETL Jobs

Source Target

DBMS Job on Source Database to directory

All data identified by DBID and with the EM, the Target_GUID

Enterprise Manager

Job in EM Job Service that pulls file from Source Target and then pushes to AWR Warehouse Target Directory

AWR Warehouse

Final DBMS Job Inserts data into AWR Warehouse

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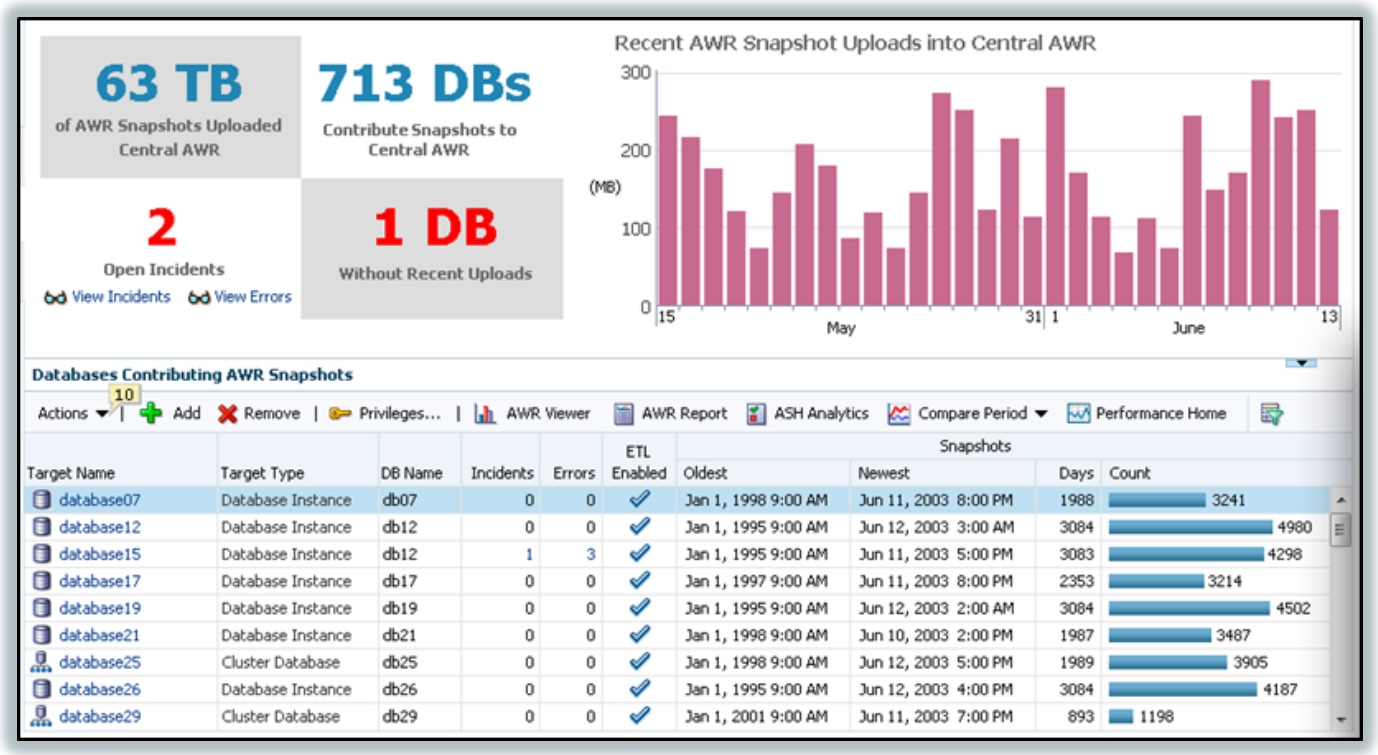
Warehouse Interface



- Warehouse dashboard tracking ETL jobs
- All AWR features available on long term AWR data
  - Performance page
  - AWR report
  - ASH analytics
  - Compare Period ADDM
  - Compare Period Report
- Integrated seamlessly into EM UI
- Zero runtime overhead on source Production databases

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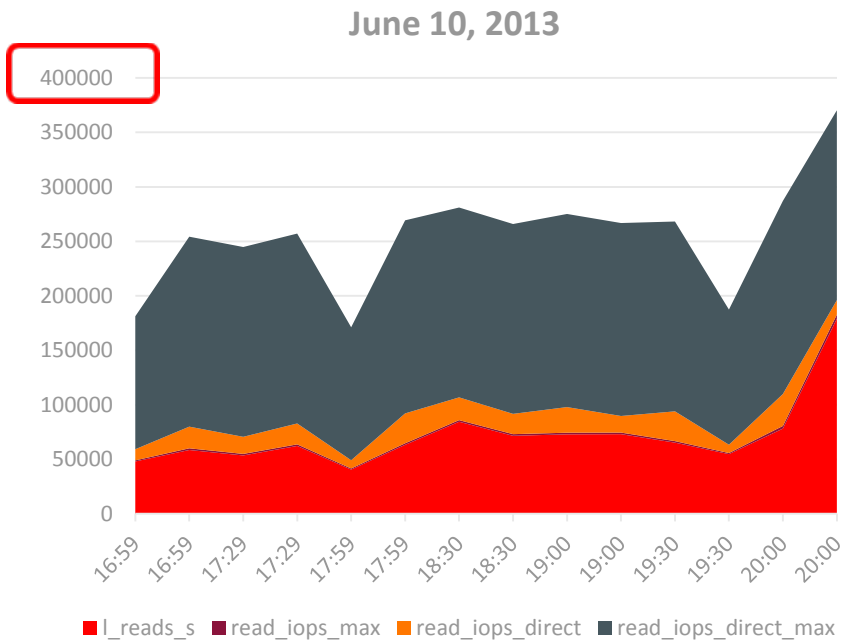
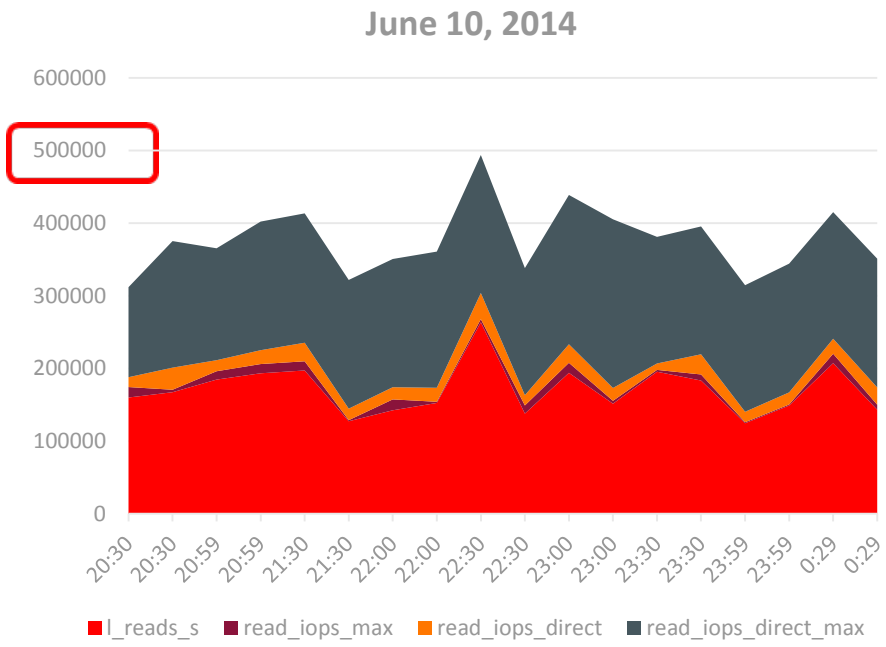
What Can I do with the AWR Warehouse?





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The Future

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