Introducing Exadata & ZDLRA Management Packs: New Advanced Features for Exadata & ZDLRA Practitioners

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Product Management
Observability and Management, Oracle

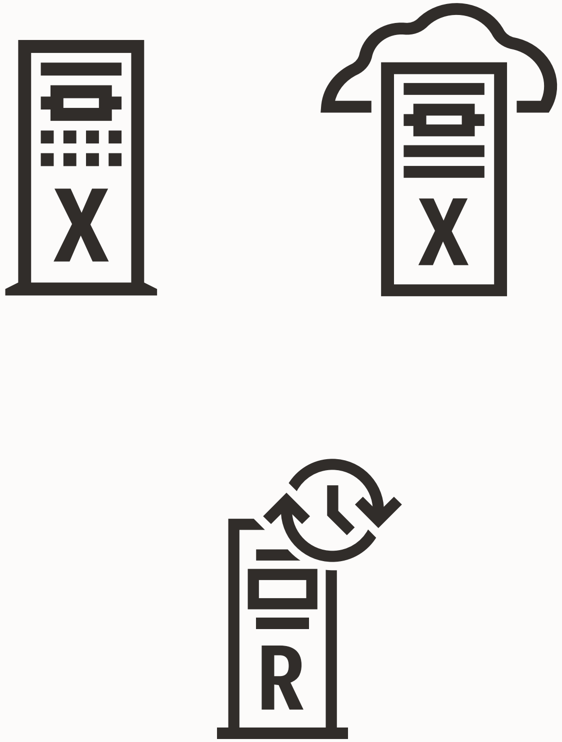
Agenda

Exadata Management: Challenges

Exadata Management Pack: Solution

Zero Data Loss Recovery Appliance (ZDLRA) Management: Challenges

ZDLRA Management Pack: Solution



Exadata Management

Challenges

Customer Challenges for Managing Exadata Systems

Optimizing Cost, Operations, Performance and Resource Management

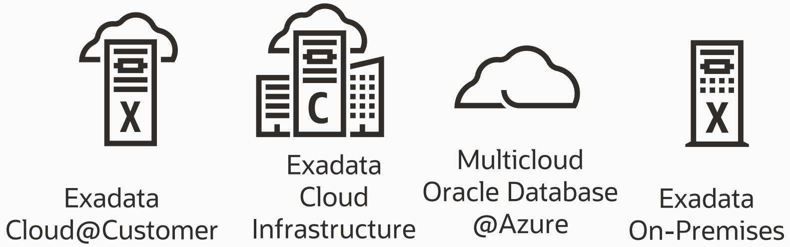
- Customers are running mission critical databases on a single or multiple Exadata racks
- Deployment type: Exadata on-premises, Cloud@Customer, OCI and Multicloud

Optimize Cost

- **Optimize consolidation density and performance** with shared infrastructure

Improve Productivity

- **Automate** at scale with service context to **minimize human errors**



Maximize Resource Management

- Get level visibility across the estate of Engineered systems **to increase Utilization and performance** at single resource level and aggregated targets

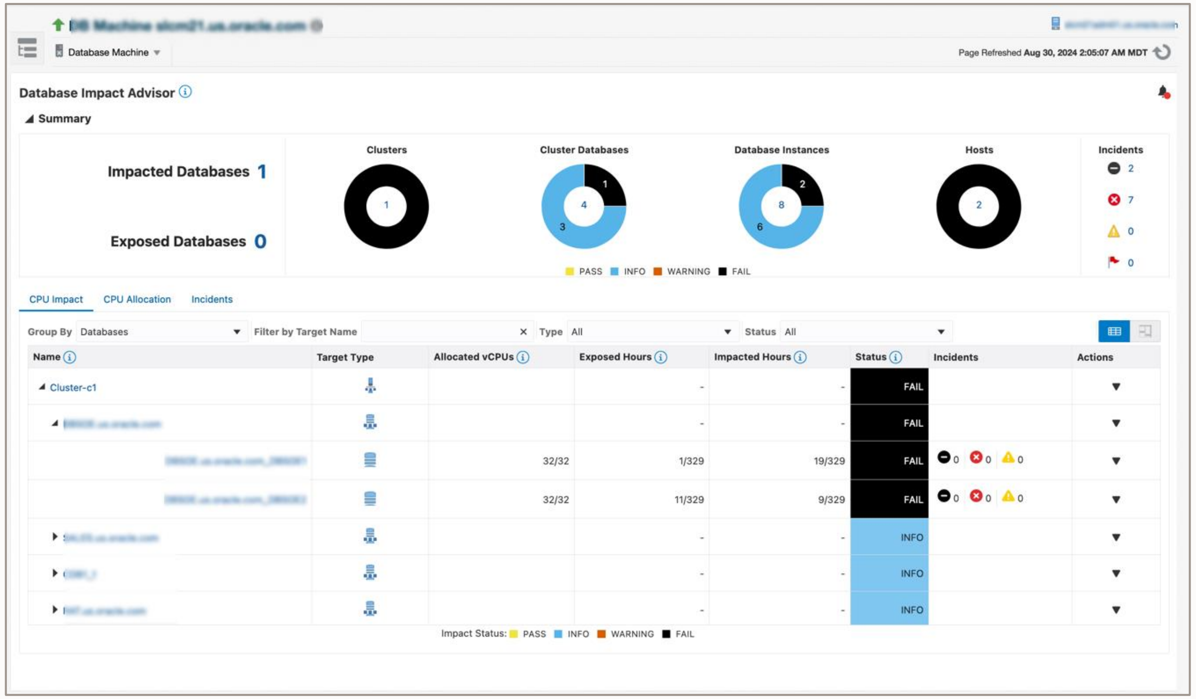
Ensure Reliable Performance

- **Identify noisy neighbor** or resource hogs impacting other consumers
- **Detect outliers** at various levels– databases, VM clusters, racks

Exadata Management Pack: Solution

New capabilities to monitor and manage a single or hybrid Exadata fleet consistently and at scale

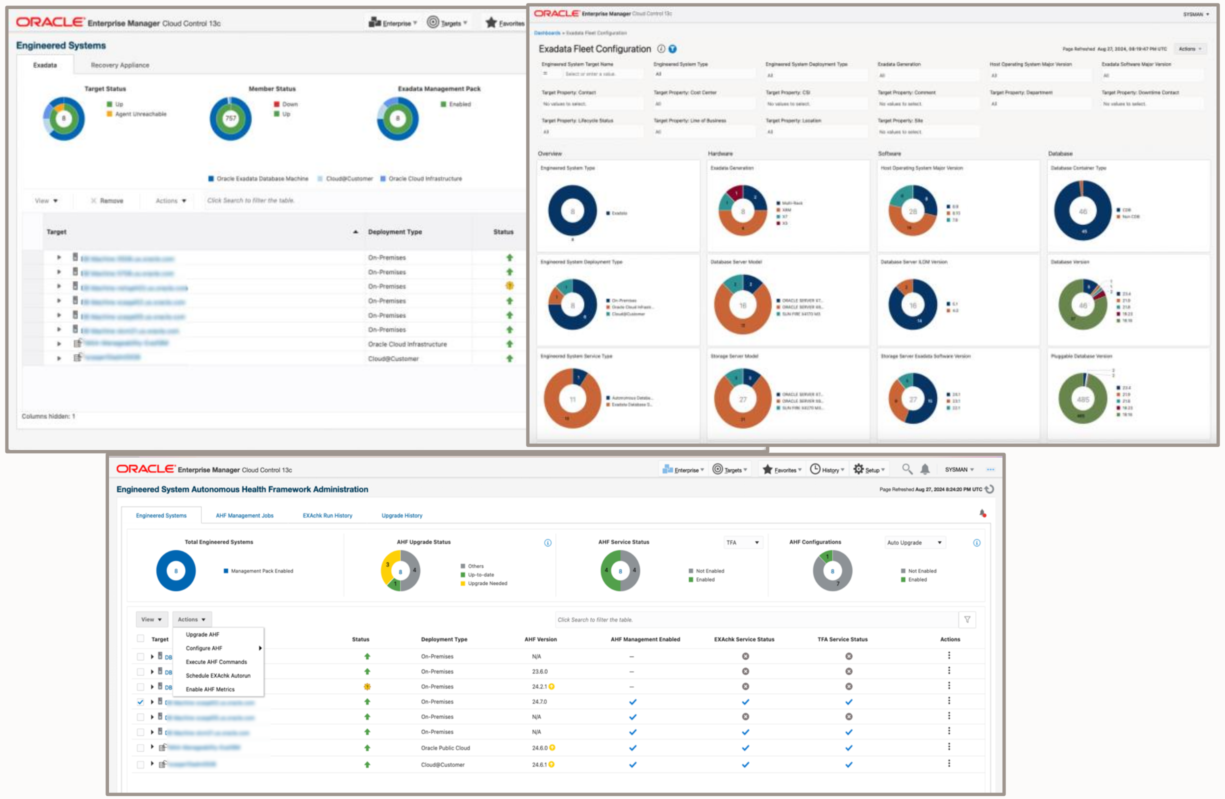
- **Analysis** of Exadata fleet and visualization thru dashboards provide comparative inventory and capacity visibility across the estate
- **Advisors** facilitate resolution of system-wide resources - CPU and I/O issues and optimization of settings
- **Automation** at fleet-scale of Exadata infrastructure patching and AHF management improves security and compliance
- Support for hybrid deployments
  - On-premises
  - Cloud@Customer
  - Oracle Cloud Infrastructure
  - Multicloud (Azure, Google, AWS)



Exadata Management Pack

Key Features

- Exadata Fleet Dashboards
- Autonomous Health Framework (AHF) Administration
- Exadata Infrastructure Patching
- Database Impact Advisor
- IORM Advisor
- Exascale Interactive IOPS Visualization
- Exadata Cloud Database Inventory Visualization



Benefits

- Ensures configuration consistency across the fleet, and hardens security and compliance
- Improved DevOps efficiency by 70% resulting from advisors and automation as well as reduced human errors
- Optimized resource utilization of shared infrastructure to obtain best consolidation density and performance

Analysis and visualization

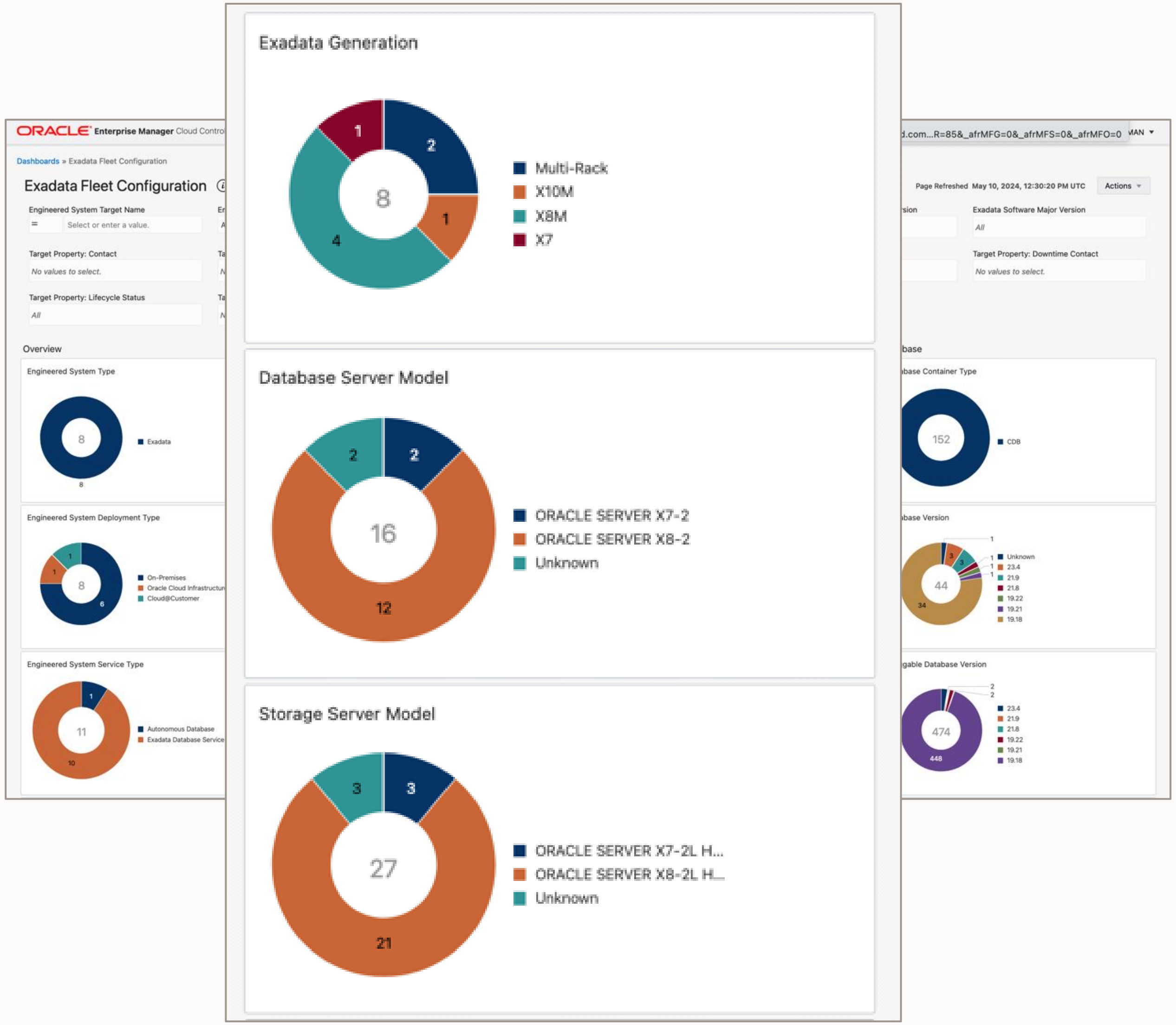
Fleet Dashboards – Configuration and Capacity

Analysis of configuration and capacity

Fleet Dashboards

Overview of Exadata configuration and capacity across the fleet

- **Fleet Configuration:** Current Exadata hardware and software configuration
- **Fleet Aggregated Capacity:** Summary of CPU, memory, and storage capacity and performance across fleet
- **Fleet Capacity:** Individual Exadata compute & storage capacity in fleet context, allowing comparison by system
- **Fleet Component Capacity**: Individual Exadata compute & storage capacity by component (host), allowing identification of component over/under-utilization



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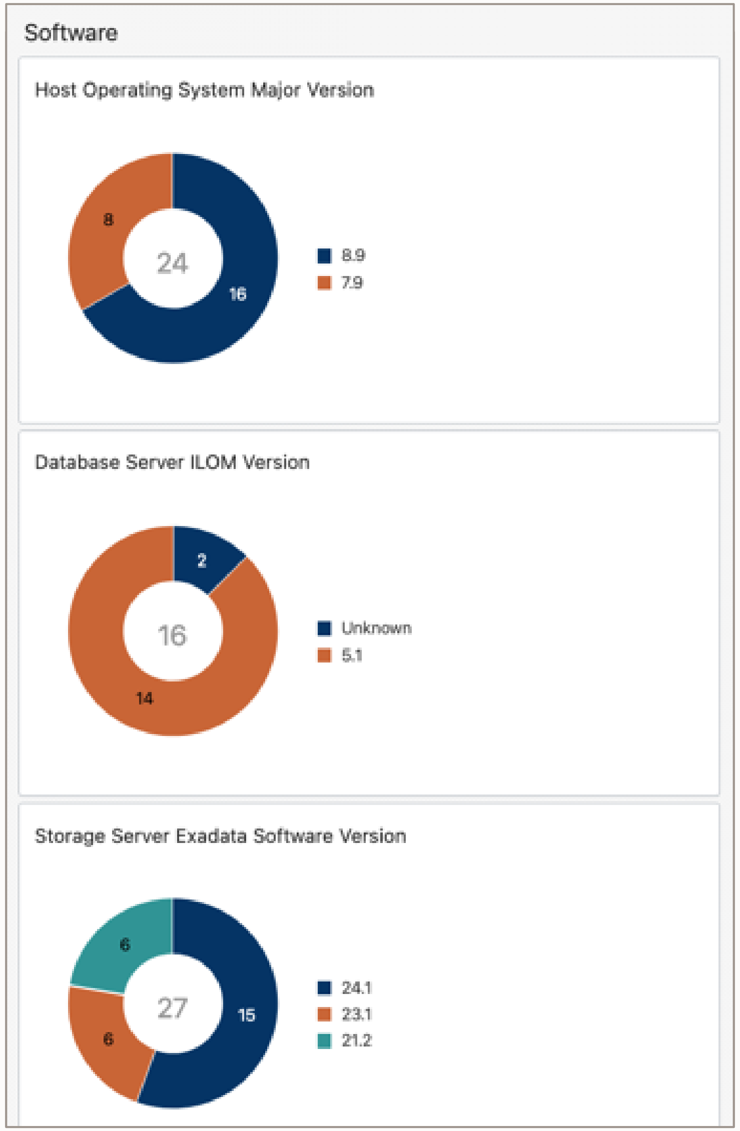

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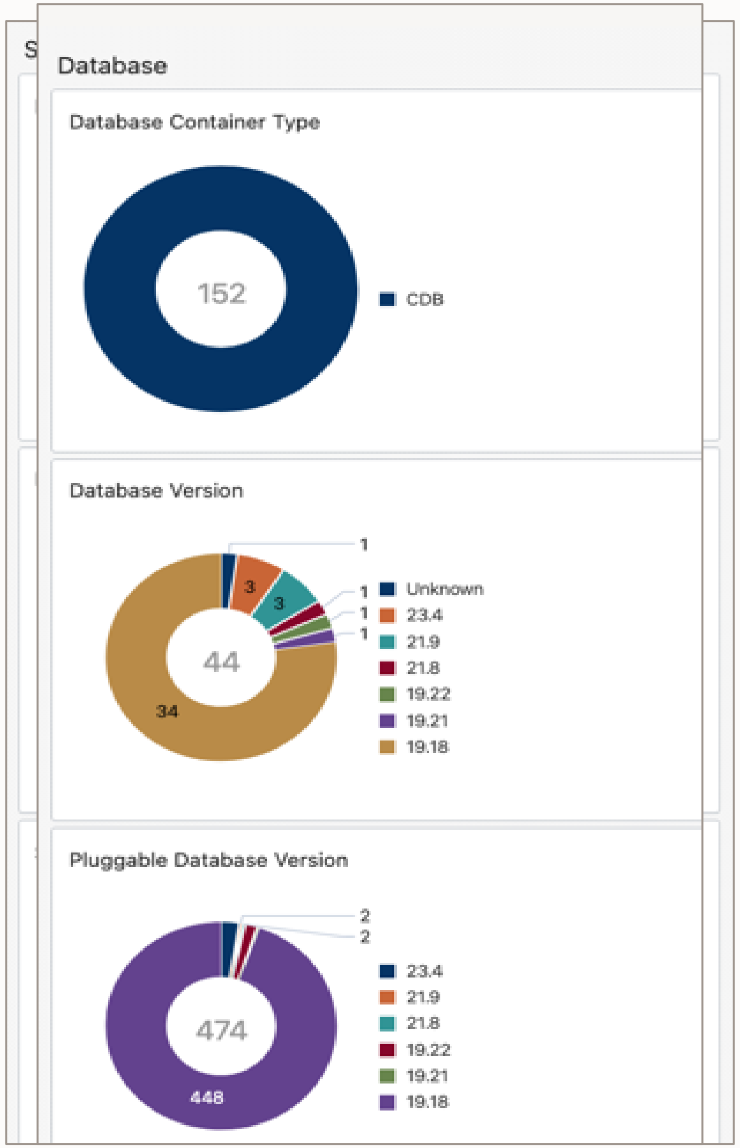

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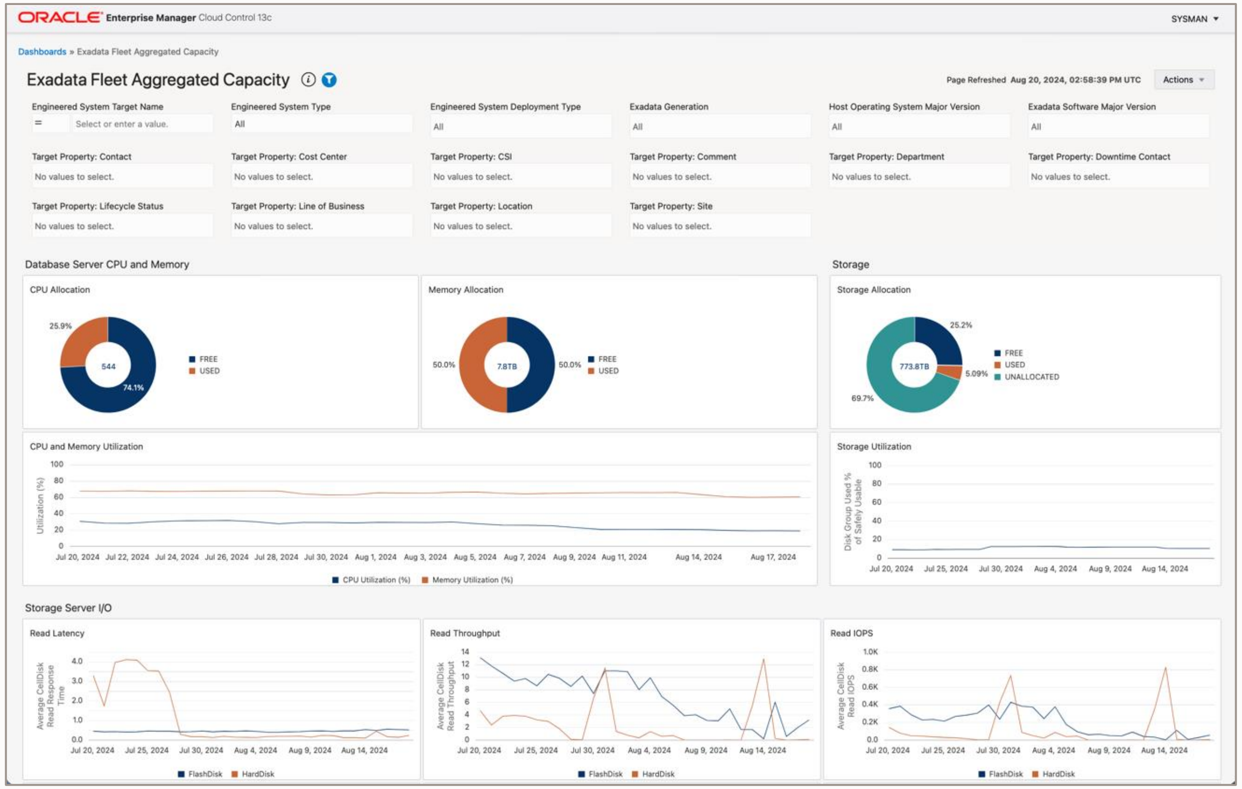

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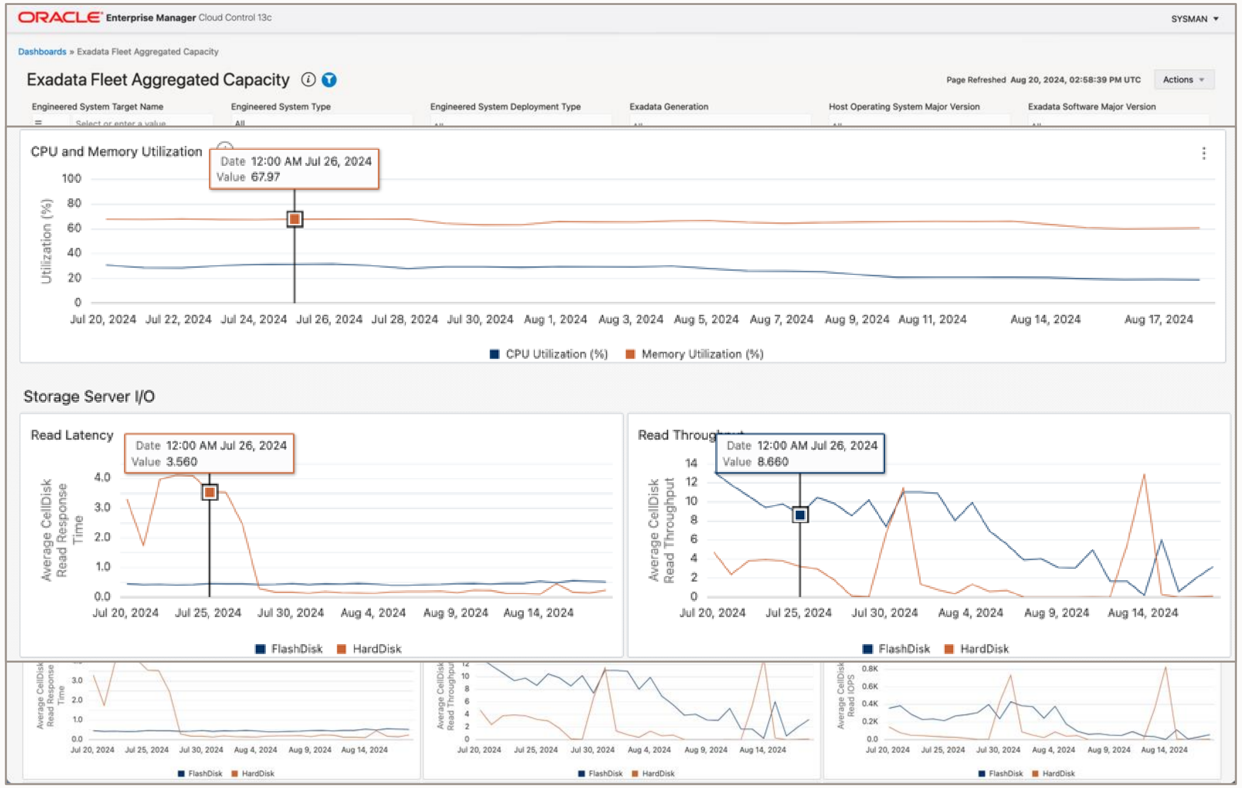

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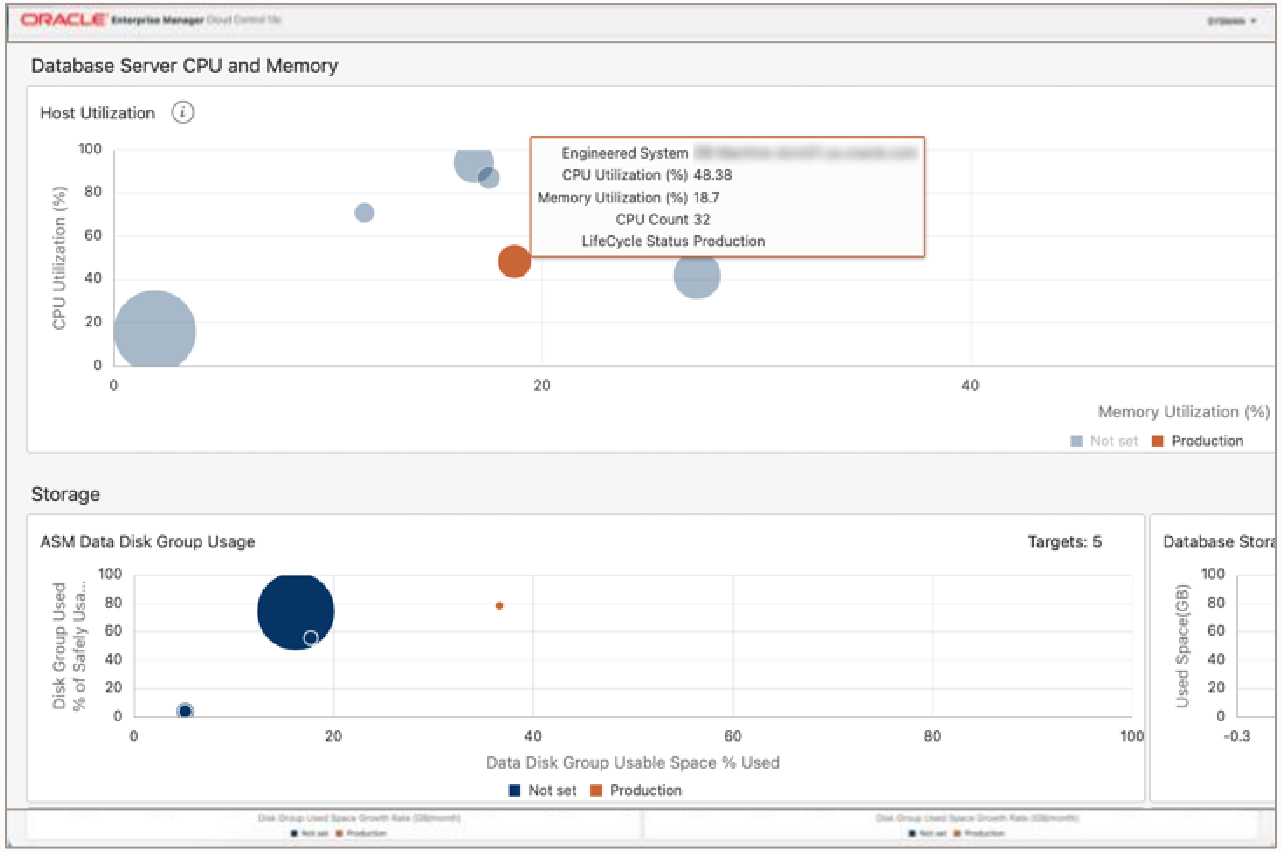

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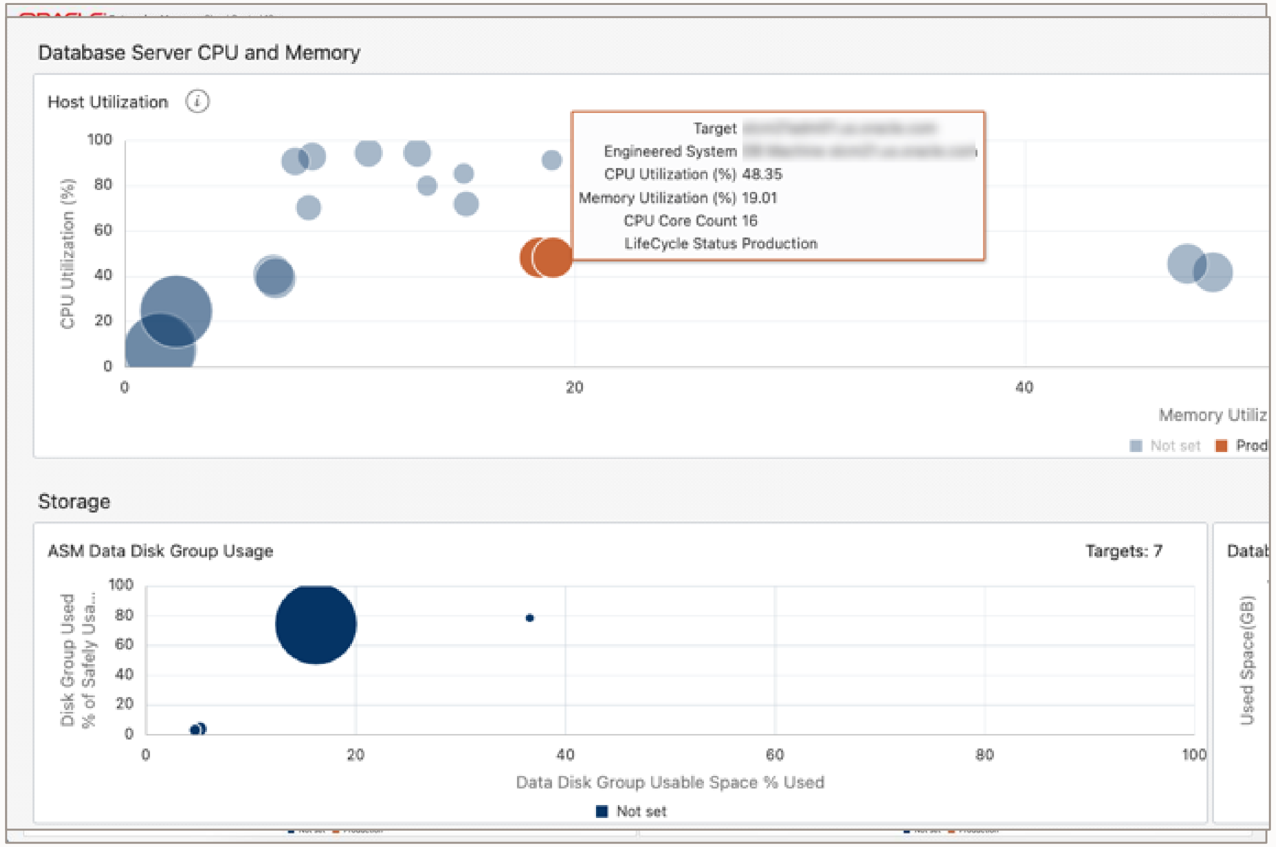


Resource Advisors

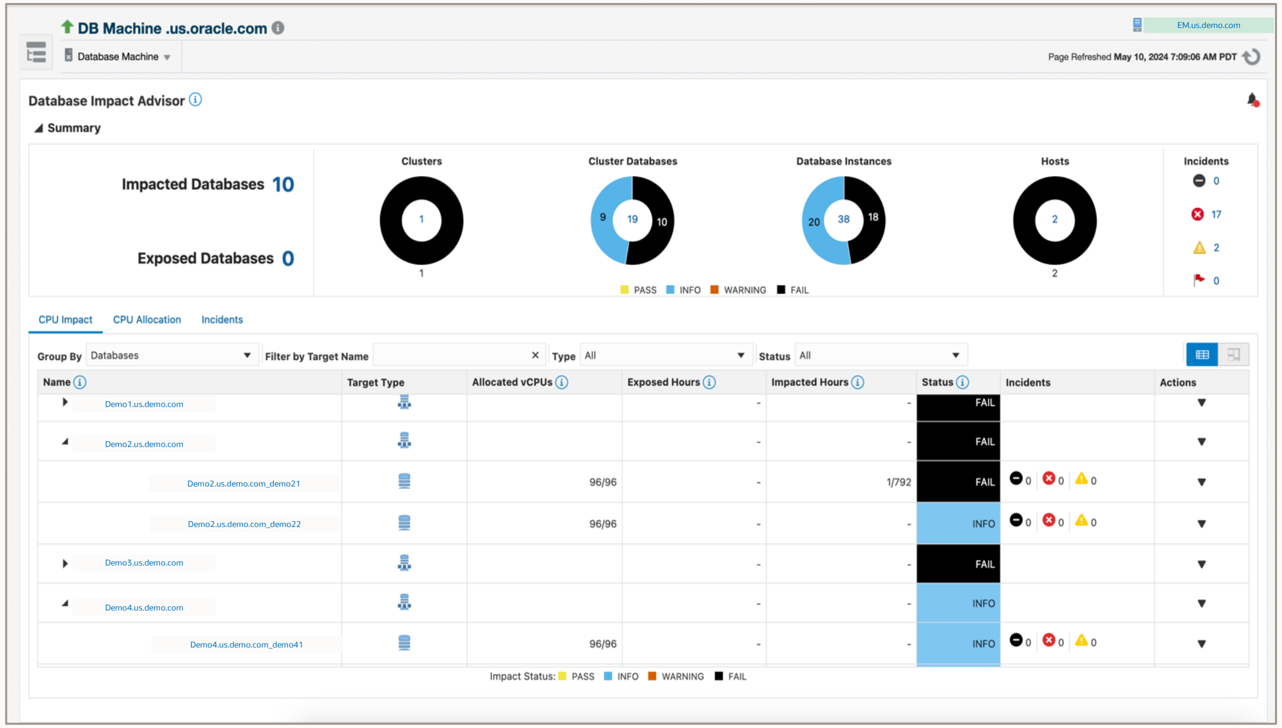
Database Impact Advisor
IORM Advisor

Resource Advisors

Database Impact Advisor

Integrates with AHF Balance to perform system-wide Exadata CPU usage analysis to identify databases impacted by “noisy neighbor” issues

Summary of impacted and exposed databases



Resource Advisors

Database Impact Advisor

Integrates with AHF Balance to perform system-wide Exadata CPU usage analysis to identify databases impacted by “noisy neighbor” issues

Correlates instance-level impacted periods with

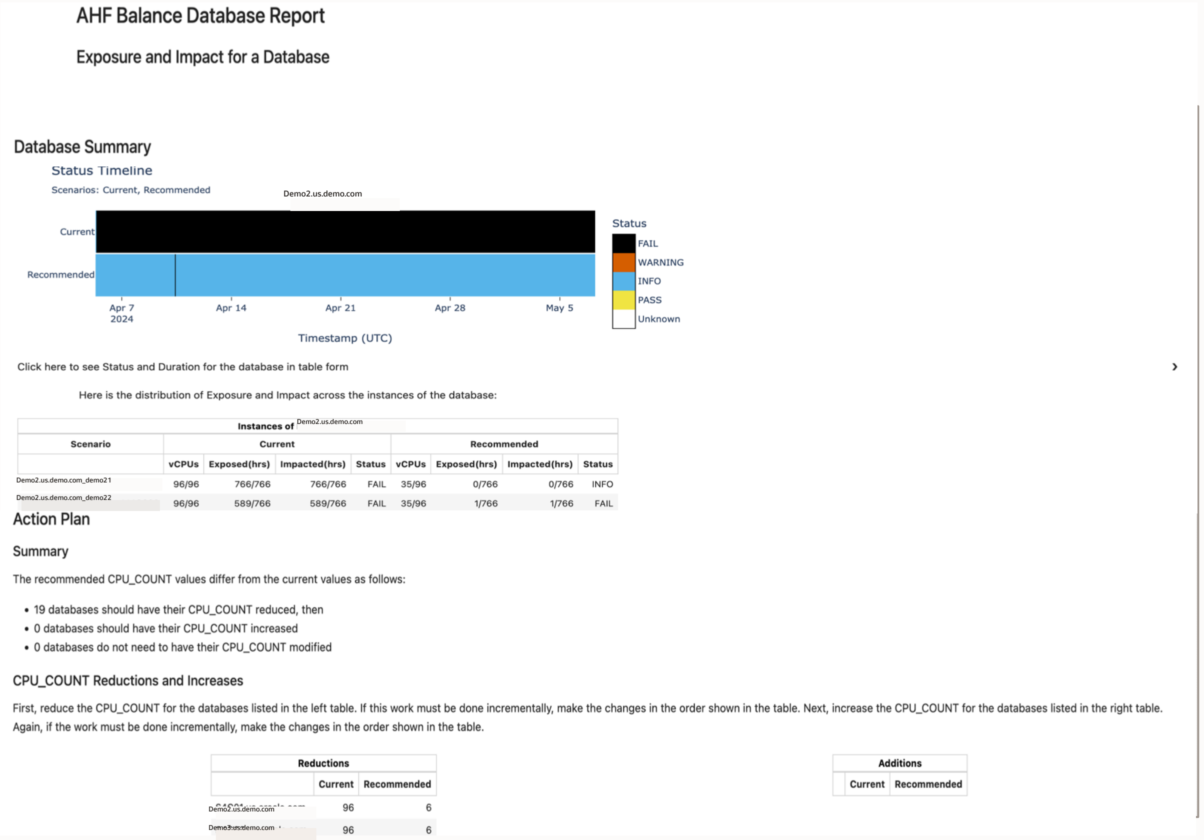
- Events on related hardware and software targets
- CPU usage of other instances and non-DB processes

Per-instance historical charts showing:

- CPU usage compared to DBRM guarantee/limit
- Impacted and exposed time ranges

Leverages AHF Balance reports for deep analysis and problem resolution

- Cluster and database-level CPU impact
- Recommendations for optimized DB Resource Manager settings within a cluster



AHF Balance Database Report

Exposure and Impact for a Database

Database Summary

Click here to see Status and Duration for the database in table form

Here is the distribution of Exposure and Impact across the instances of the database:

Instances of Demo2.us.demo.com								
Scenario	Current				Recommended			
	vCPUs	Exposed(hrs)	Impacted(hrs)	Status	vCPUs	Exposed(hrs)	Impacted(hrs)	Status
Demo2.us.demo.com_demo21	96/96	766/766	766/766	FAIL	35/96	0/766	0/766	INFO
Demo2.us.demo.com_demo22	96/96	589/766	589/766	FAIL	35/96	1/766	1/766	FAIL

Action Plan

Summary

The recommended CPU_COUNT values differ from the current values as follows:

- 19 databases should have their CPU_COUNT reduced, then
- 0 databases should have their CPU_COUNT increased
- 0 databases do not need to have their CPU_COUNT modified

CPU_COUNT Reductions and Increases

First, reduce the CPU_COUNT for the databases listed in the left table. If this work must be done incrementally, make the changes in the order shown in the table. Next, increase the CPU_COUNT for the databases listed in the right table. Again, if the work must be done incrementally, make the changes in the order shown in the table.

Reductions		
	Current	Recommended
Demo2.us.demo.com	96	6
Demo3.us.demo.com	96	6

Additions		
	Current	Recommended

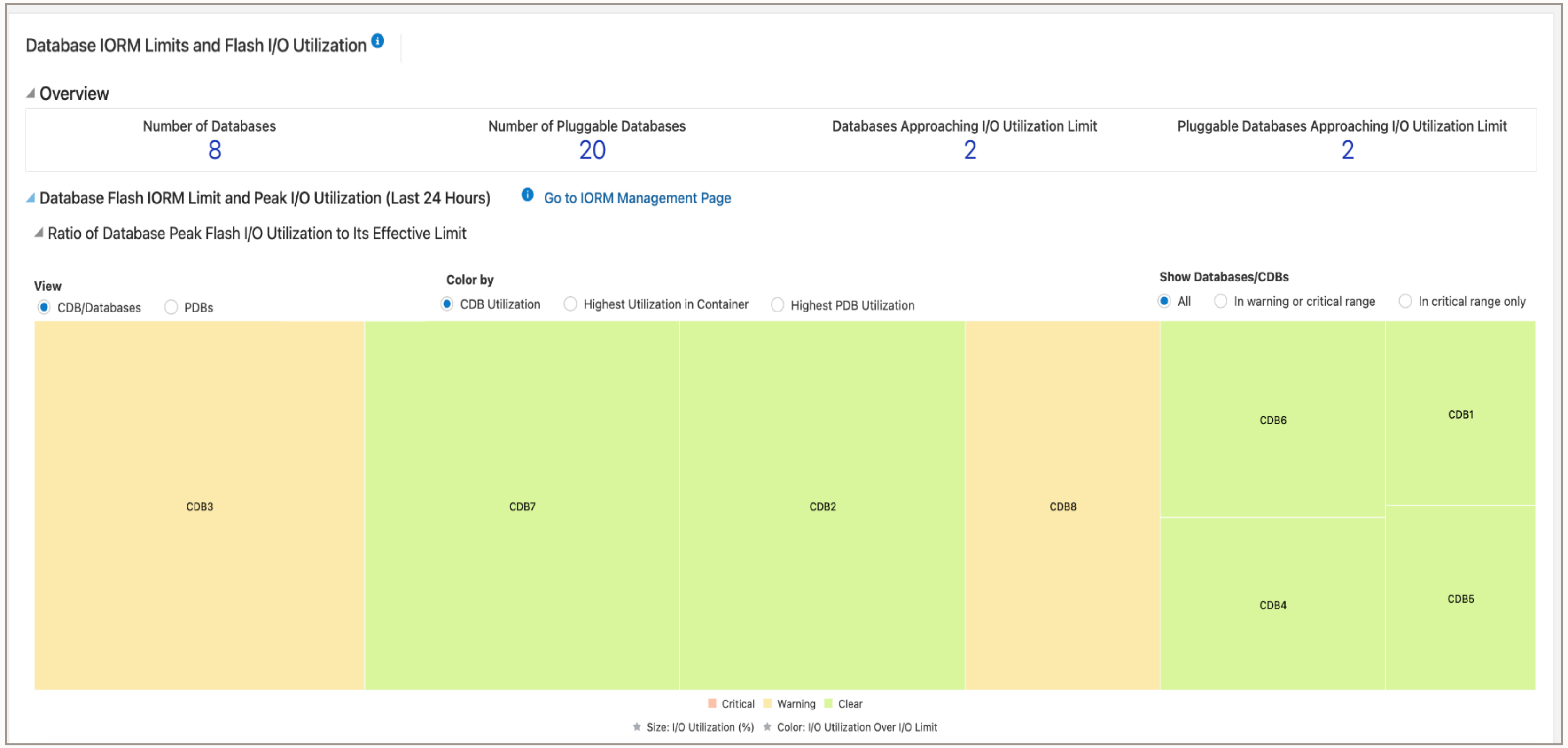
Resource Advisors

IORM Advisor

Provides interactive visualization tool for analysis of Exadata flash I/O resource utilization across all databases in order to determine if the system has capacity for additional I/O load

Heat map view of peak I/O utilization compared to limit

Filters allow identification of heavy I/O consumers at CDB and PDB levels



Resource Advisors

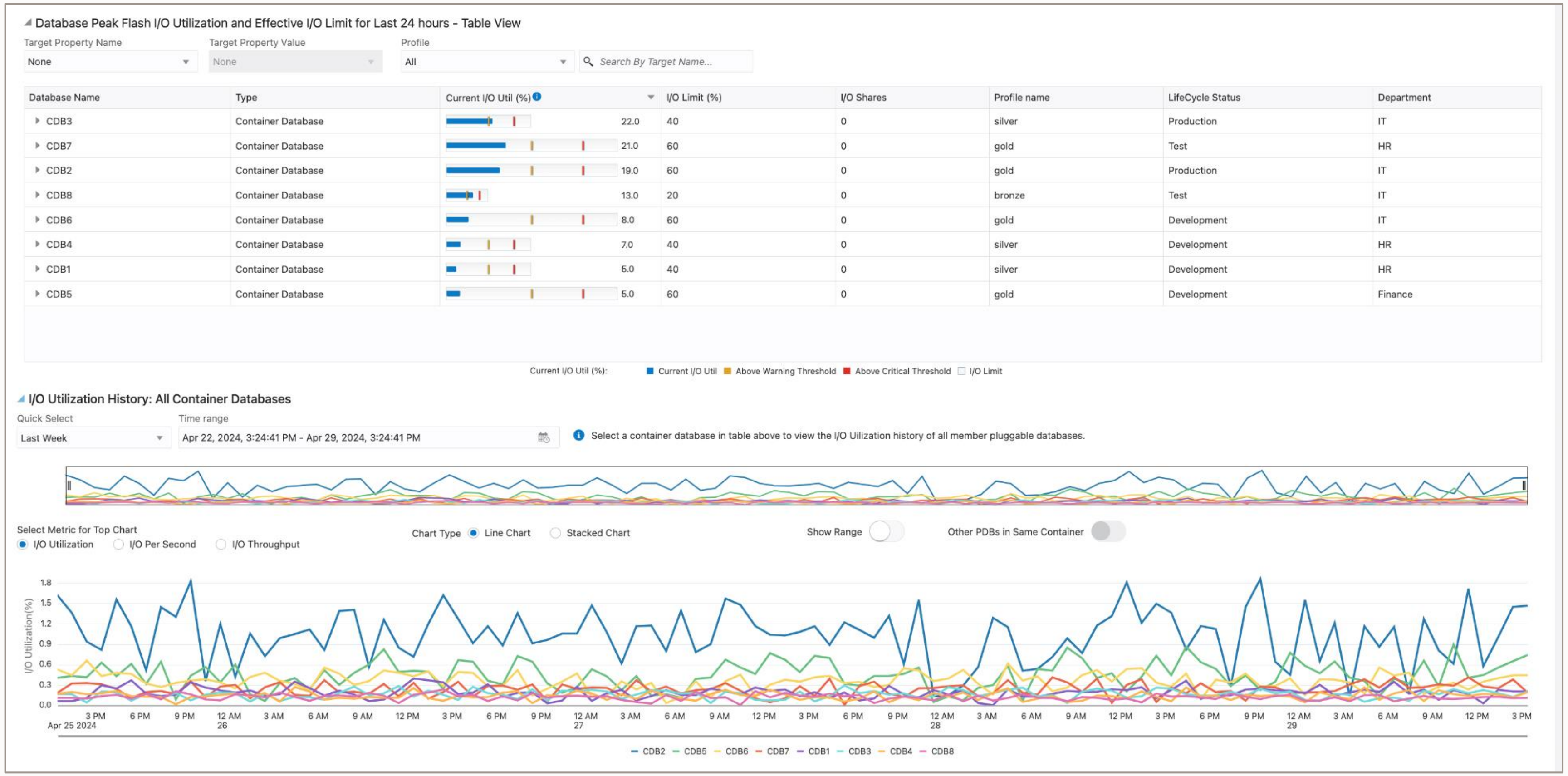
IORM Advisor

Provides interactive visualization tool for analysis of Exadata flash I/O resource utilization across all databases in order to determine if the system has capacity for additional I/O load

Tabular view allows assessment of how close databases are to their I/O limits

Visualizations can be organized according to IORM Profiles

Customizable historical charts allow comparison of different I/O statistics across all PDBs within a CDB



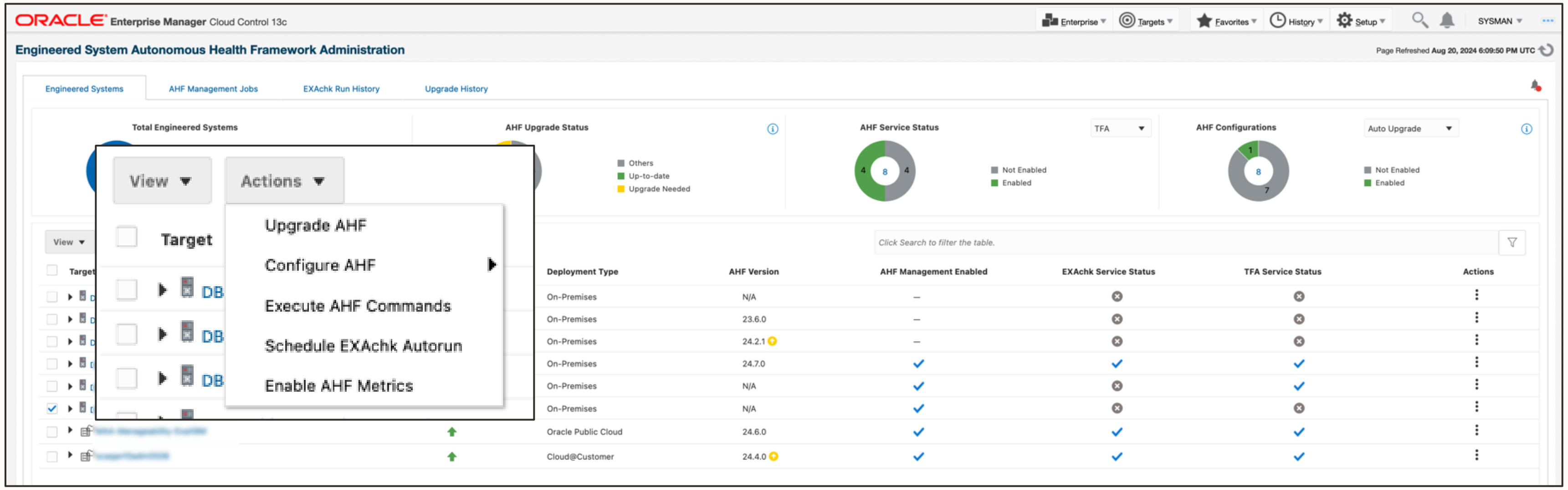
Automation

AHF Management
Fleet-level infrastructure patching

Automation

Engineered System Autonomous Health Framework Administration

Manage and Monitor AHF and EXAchk across Exadata, Exadata Cloud and ZDLRA fleet



Monitor

- AHF upgrade status and history
- AHF service status
- AHF autorun and AutoUpgrade configuration
- EXAchk run status and history

Manage

- **Deploy** latest AHF release on all Exadata database servers
- **Configure** AHF Auto Upgrade
- **Schedule & configure** EXAchk compliance checks
- **Schedule** EXAchk Autoruns
- **Execute** on-demand compliance checks
- **Execute** ahfctl and exachk commands

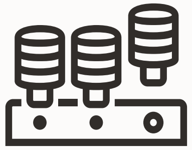
Automation

Secure Exadata Infrastructure stack using Fleet Maintenance (On-premises Exadata)

Patch Exadata components along with Database and Grid

- Monitor, manage and secure complete Exadata stack including database, grid and Exadata components
- In addition to database and grid, Fleet Maintenance now also supports patching of
  - Database server
  - KVM guest, Xen DomU
  - Storage server
  - InfiniBand switch
- Schedule patching windows and customize deployments to fit organizational needs.
- Patching support through UI, EMCLI and REST API

Patch to secure



Oracle Databases

- Database
- Grid Infrastructure
- SI and Multitenant

Exadata Systems

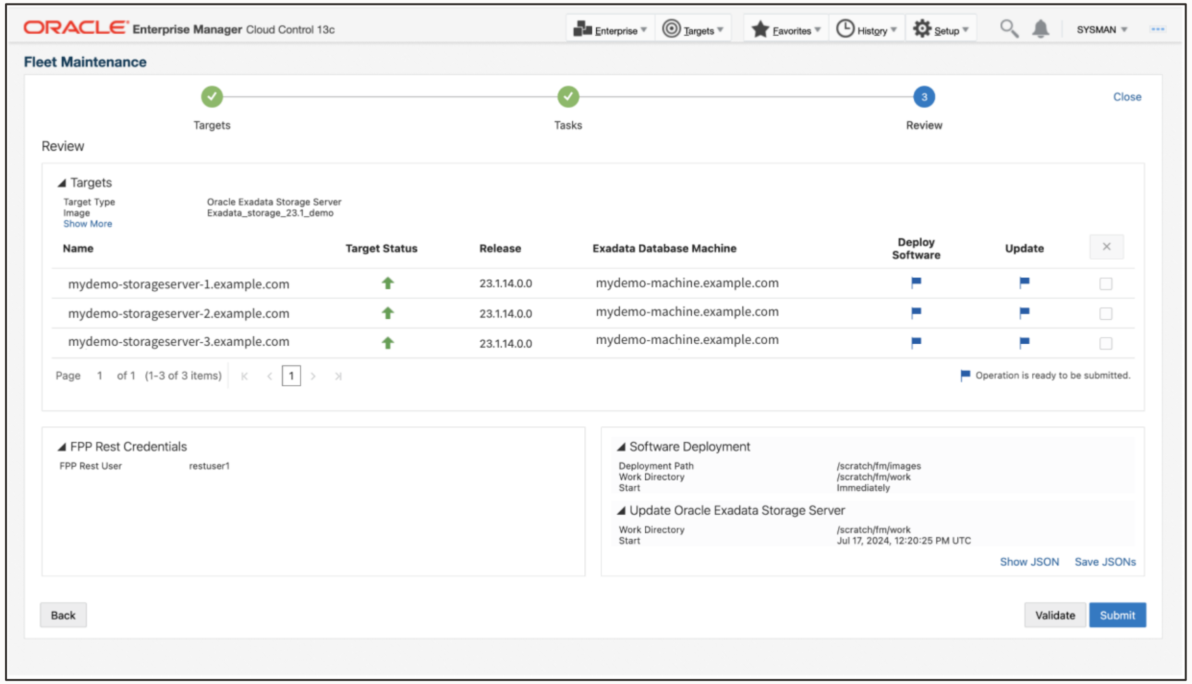
- Compute node
- Storage server
- IB Switch

Automation

Exadata Infrastructure patching

Using Fleet Maintenance

- Gold image based in-place patching solution
- Deploy and update components at scale for a faster patching cycle
- Optional Rollback to last known good state if necessary
- Validate update and rollback to minimize failures
- Pre-check mode to minimize potential failures
- Customize patching with optional parameters
- Integrate with automation tools like Ansible, Chef, Terraform using RESTAPIs



Advanced Monitoring

Exascale
Cloud

Exascale monitoring

Feature included in Exadata Management Pack

Interactive visualization

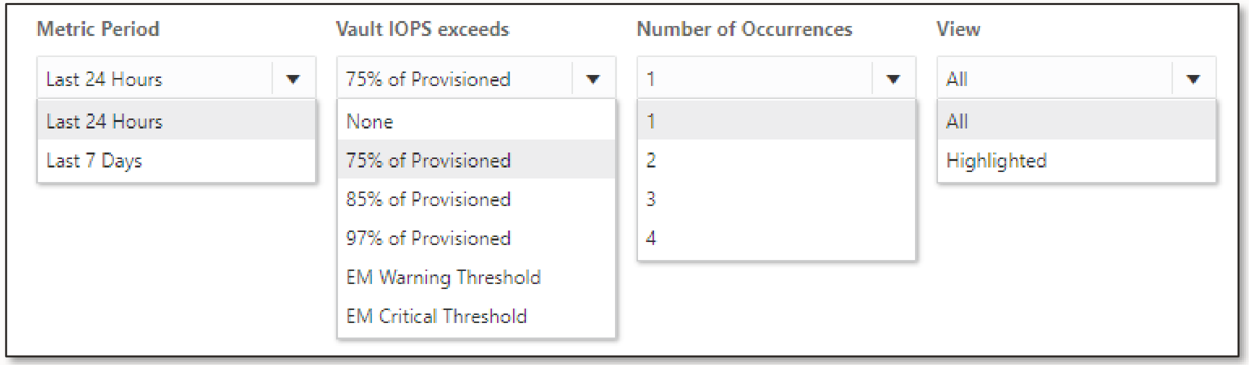
IOPS allocations across vaults, storage pools and databases

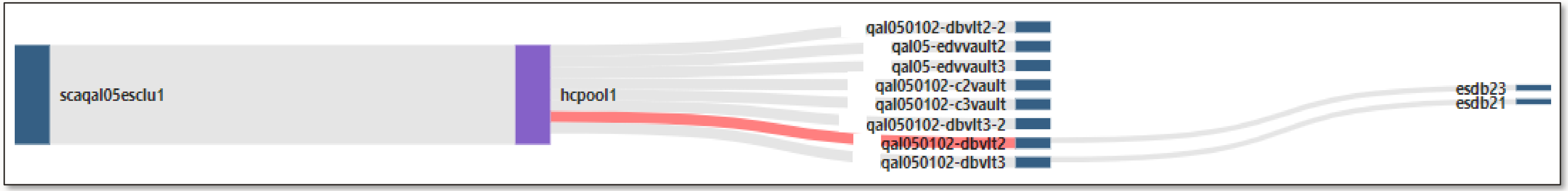
Advanced filtering options

To identify high IOPS utilization

Triage performance resource allocation issues

View IOPS data in context with historical Exascale IOPS utilization





Business Benefits - Exadata Management Pack

Better Management, Performance, Security and Resilience

Simplified Management	• Automates and streamlines management tasks to reduce time and effort for important tasks such as capacity monitoring, scheduling and monitoring health checks, resource allocation, patching, I/O configuration, software administration, ..etc.
Cost-Effective Resource Management	• Enables better optimization of CPU and I/O resource allocation, reducing waste and improving ROI.
Improved Performance	• Delivers insight that helps optimize the configuration to minimize competition for resources, improving the overall performance of the databases in the cluster
Better Security	• Automates infrastructure patching which helps ensure all components are patched and up-to-date , and provides a centralized view of Exadata configurations, enabling users to assess and mitigate risks, and quickly identify affected system; reducing the likelihood of security breaches and improving overall system security.
Enhanced Resilience	• Automation of health checks helps to identify potential issues before they become incidents, reducing the likelihood of system downtime and improving overall system reliability • Streamlined infrastructure patching minimizes maintenance downtime

Zero Data Loss Recovery Appliance (ZDLRA) Management

Challenges

Challenges with ZDLRA Management

- Customers are running 100s/1000s of mission critical databases
- Deployment type: Commodity, Exadata on-premises, Cloud@Customer, OCI and Multicloud

Improve Productivity

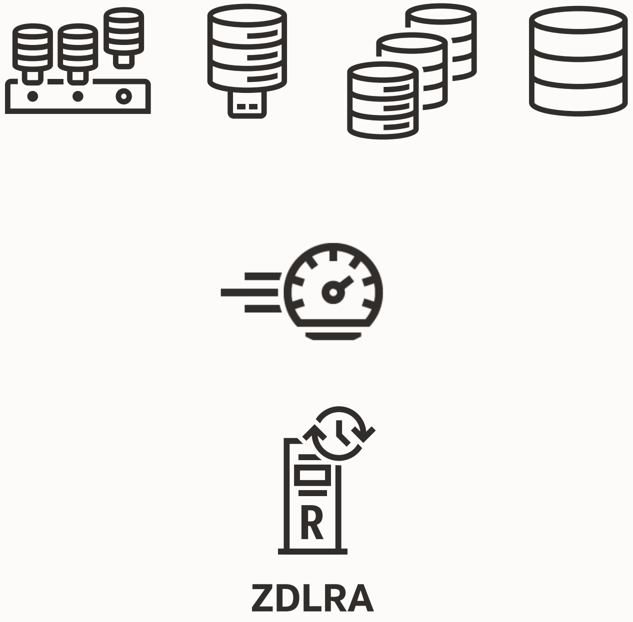
- **Automate** at scale with service context to **minimize human errors**

Maximize Resource Management

- Get level visibility across the estate of Engineered systems **to increase Utilization and performance**

Streamline Backup Operations

- **Configure advanced backup** setting without in-depth knowledge



Zero Data Loss Recovery Appliance Management Pack

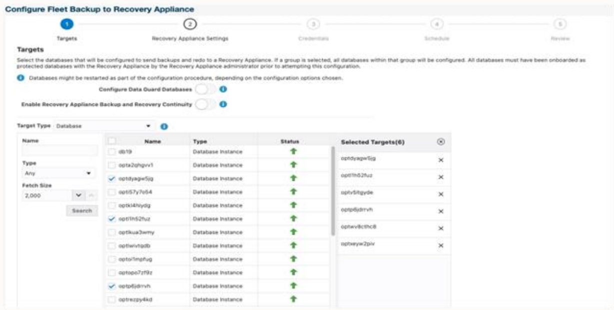
Advanced end-to-end configuration, scheduling and monitoring of database fleet backups

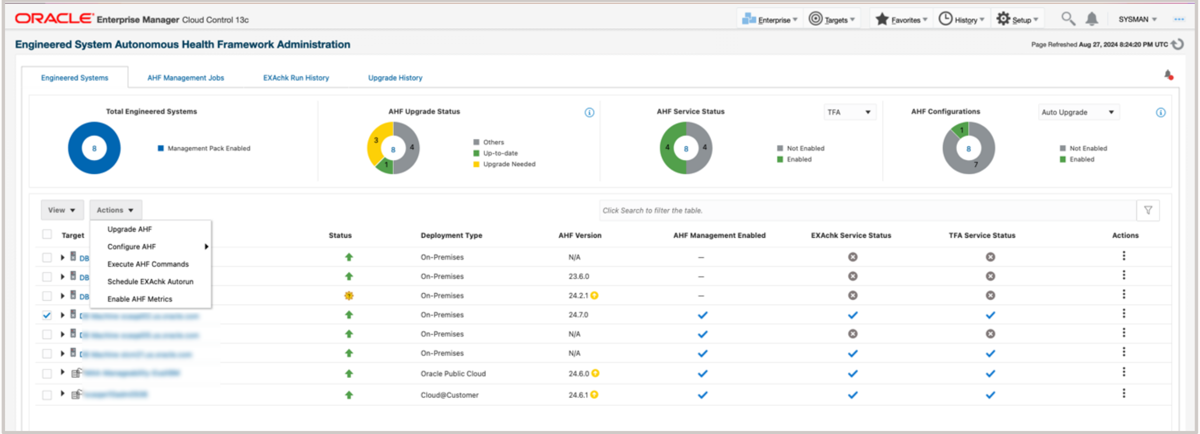
Key features

- Automatic onboarding configures and schedules backups for new databases as soon as they are discovered in Enterprise Manager
- Fleet-scale backup and archival management as per MAA best practices
- Support for configuring advanced backup topologies involving Data Guard and multiple ZDLRAs

Benefits

- End-to-end automation reduces number of steps by 80% resulting increased administrator productivity
- Oracle-recommended best practices for backup management reduce human errors and improve SLAs





Database Fleet Backup Management for Recovery Appliance

Enterprise Manager Automatic End-to-End Backup Management

Recovery Appliance Administrator

On-board new database: Add Database to Recovery Appliance

Database Administrator

Discover Database

Automated by Enterprise Manager

Database Fleet Backup Configuration

- For all hosts
  - Download/install RA module
  - Create/update backup wallet
  - Update SQLNET.ora
- For all databases
  - Register with RA recovery catalog
  - Configure RMAN settings
  - Configure initialization parameters
  - Create redo transport user
  - Configure redo transport settings
  - Configure SRVCTL settings
  - Configure TLS settings if needed
  - Perform test backup
  - Restart DB if needed
- Data Guard integration (all DG databases):
  - Configure DG broker settings
  - Add RA to broker config
  - Register/configure all standby databases
- Refresh EM metrics

Automated by Enterprise Manager

Database Fleet Backup Scheduling

- Schedule Oracle-suggested incremental-forever backup for all databases
- Execute recurring backup job for each database
  - Validate database configuration
  - Validate encryption settings (for encrypted backups)
  - Perform backup

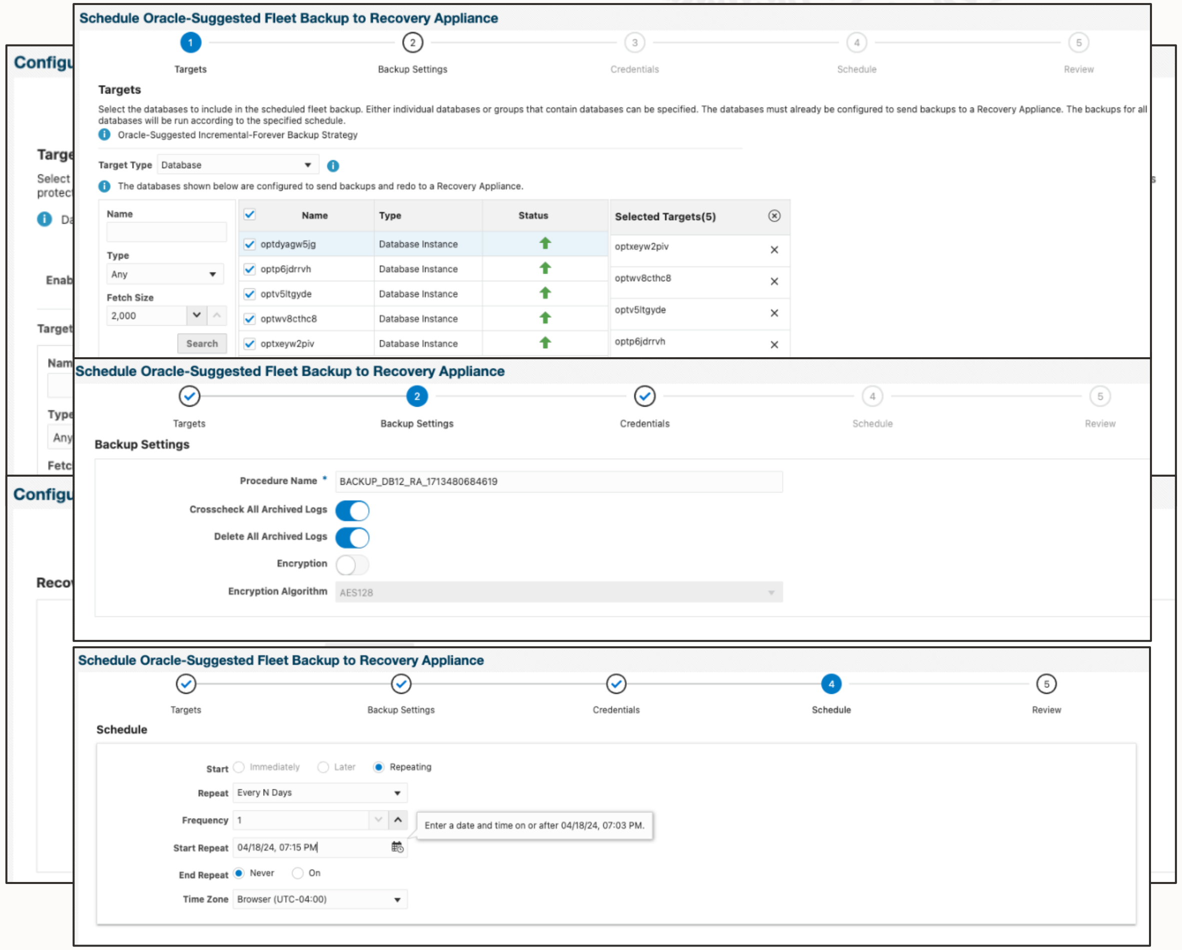
Database Fleet Backup for Recovery Appliance

Configuration

- Workflow to configure multiple databases to send backups and redo to a Recovery Appliance.
- Deployment procedure fully automates all aspects of database configuration.

Scheduling

- Workflow to schedule standardized Oracle-suggested Recovery Appliance backup strategy for multiple databases.
- Recurring deployment procedure invokes individual database backups in parallel.



Database Fleet Advanced Backup Configuration for ZDLRA Using EMCLI

MAA-certified configuration of Data Guard databases to send backups and redo to one or more ZDLRAs

Gold

- Backup primary and standby databases to different Recovery Appliances

Gold + Backup & Recovery Continuity

- Backup primary and standby databases to different Recovery Appliances
- Configure an alternate Recovery Appliance for each preferred Recovery Appliance

Gold with Backup Anywhere Replication

- Recovery Appliances in two-way replication
- Backups from either the primary or the standby database to the respective Recovery Appliance

Gold with Backup Anywhere Replication + Backup and Recovery Continuity

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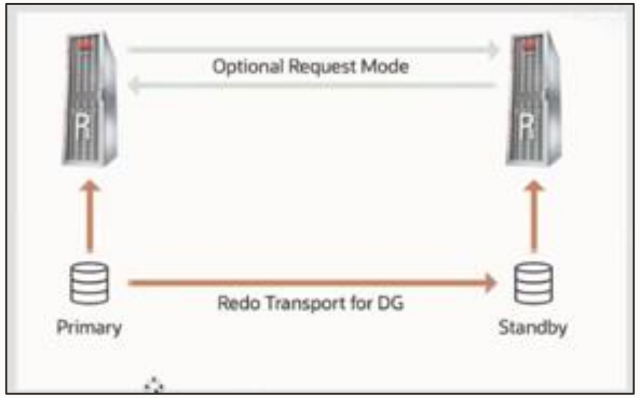
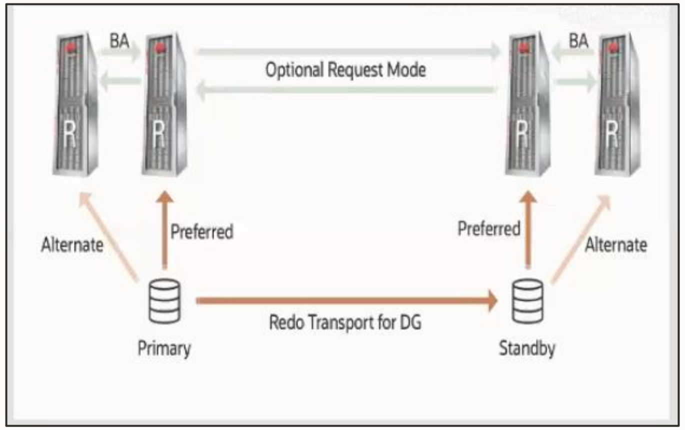


MAA Gold

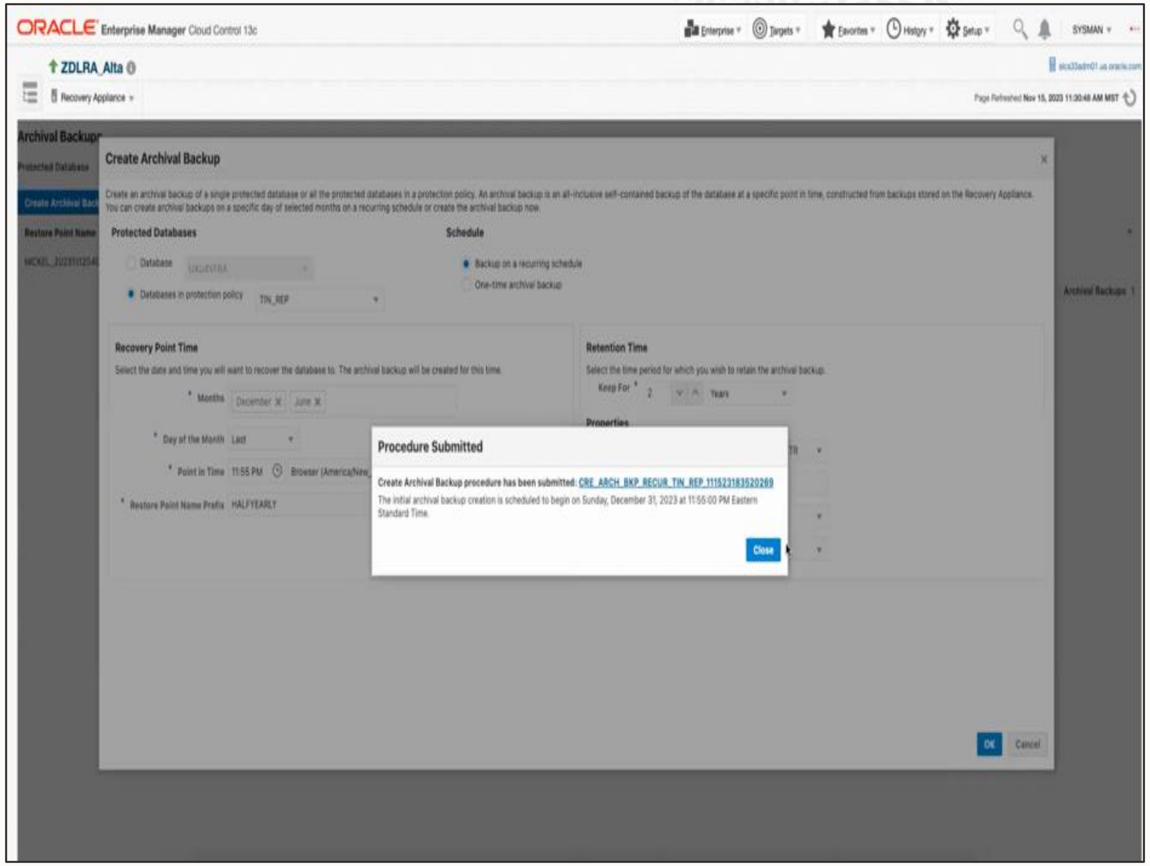
MAA Gold
+
Backup & Recovery Continuity



Recovery Appliance Protected Database Fleet Archival Backup Scheduling

Perform and manage archival backups to Cloud or tape for all databases

- Standard with ZDRLA Plug-in: Archival Backup Management for single database
  - Schedule one-time or recurring archival backup based on point-in-time, SCN, or restore point
- ZDLRA Management Pack: Fleet Archival Backup Management
  - Schedule recurring archival backups for multiple databases within a ZDLRA protection policy
  - Archival backup based on specified point-in-time
- Optimized backup implementation maximizes recovery time objective
- Specification of compression/encryption options



Business Benefits - Zero Data Loss Recovery Appliance Management Pack

Summary

New capabilities for advanced end-to-end configuration, scheduling and monitoring of database fleet backups to multiple Recovery Appliances

Simplified Management

- Automatic onboarding configures and schedules backups for new databases as soon as they are discovered in Enterprise Manager
- Fleet-scale backup and archival management as per MAA best practices

Cost-Effective Management

- End-to-end automation reduces number of steps by 80% resulting increased administrator productivity

Enhanced Resilience

- Oracle-recommended best practices for backup management reduce human errors and improve SLAs
- Support for advanced backup topologies configuration involving Data Guard and multiple ZDLRAs

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