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Database Impact Advisor

Introduction

Database Impact Advisor can be run against an individual Exadata system to perform system-wide database CPU usage noisy-neighbor analysis in order to identify databases whose performance is potentially impacted by other databases or other operating system processes. With the increased number of cores available on Exadata, it becomes possible to place more databases on a single machine. However, this ability comes with a tradeoff of packing databases too tightly into a cluster can lead to erratic or poor performance, while packing them too loosely results in unnecessary hardware and Oracle license costs.

Objectives

- Learn how to use the Database Impact Advisor for effective cluster sizing
- Understand best practices for database placement within clusters
- Configure CPU allocation to optimize performance
- Identify and resolve noisy neighbor issues when databases interfere with each other
- Determine the optimal level of oversubscription on clusters to minimize performance impact across databases

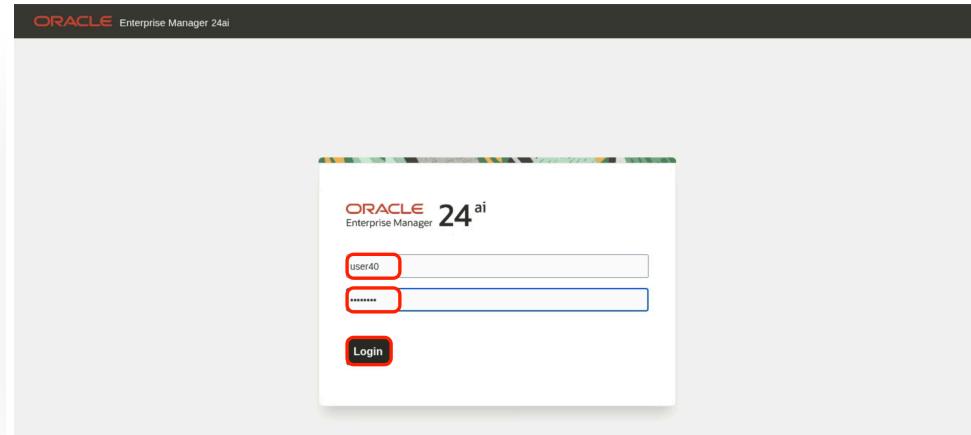
Estimated Time: 25 minutes

[Collapse All Tasks](#)

Task 1: Explore Database Impact Advisor

Note: This is a live environment, so the charts and data shown in the screenshots may vary from what you see in Enterprise Manager when you perform the workshop.

1. Log into Enterprise Manager





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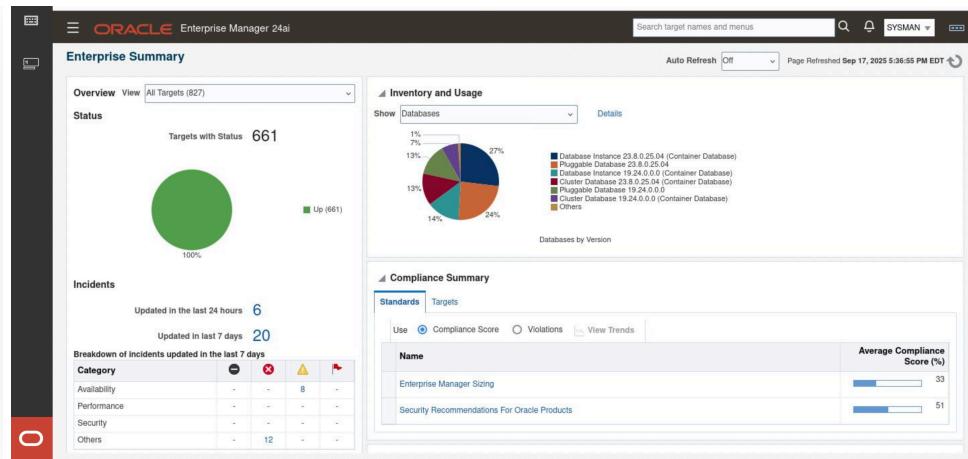
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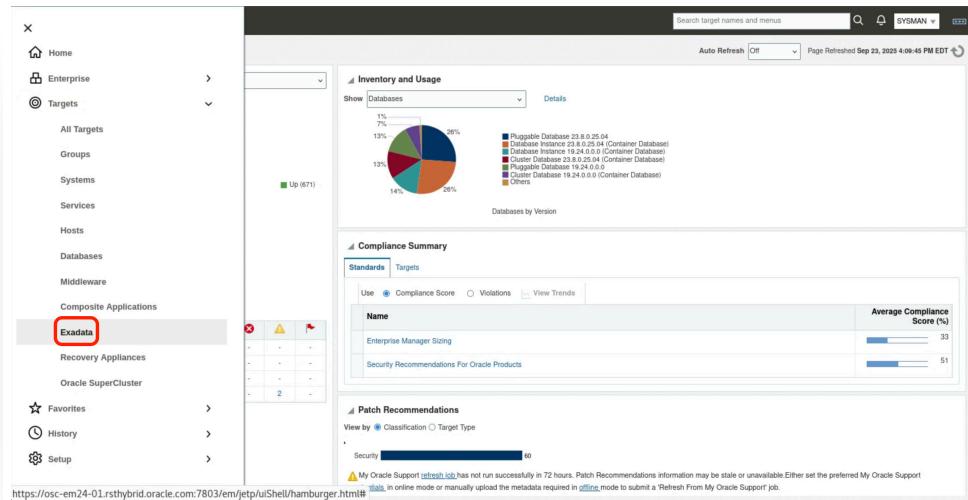
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2. Navigate to Targets > Exadata.



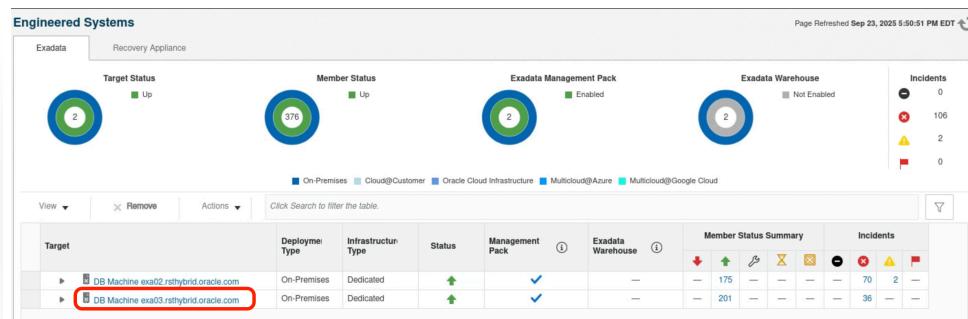
3. Click on the DB Machine **DB Machine exa03.rsthybrid.oracle.com**.

DB Machine exa03.rsthybrid.oracle.com is a half-rack Exadata system consisting of 12 clusters of various sizes, where some clusters run a single database and others have multiple databases.

Goal:

In this lab, you will analyze cluster performance and identify databases experiencing noisy neighbor conditions. You will review CPU allocation across the cluster, compare CPU usage among databases, and determine the impacted time periods.

The lab also shows how to use the DB Impact Advisor to detect noisy neighbor issues and how to generate CPU allocation recommendations using the AHF balance report.





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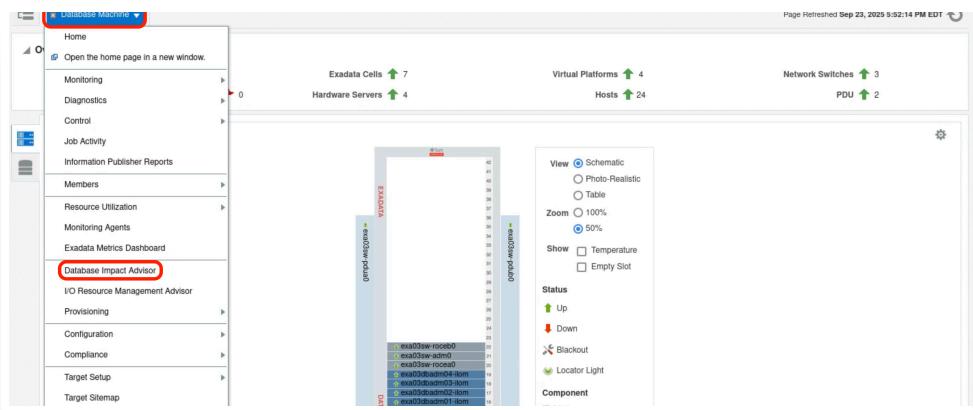
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5. Explore Database Impact Advisor summary

Database Impact Advisor is divided into 3 parts as shown below

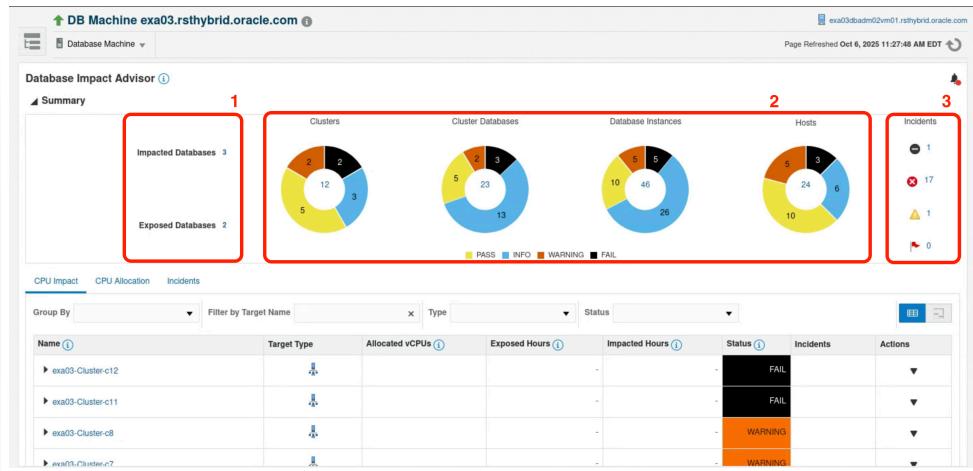
1. Shows the count of impacted and exposed databases

- **Exposed Status:** A database is exposed when it tries to use more CPU than what is guaranteed to it. This means it might face noisy neighbor issues if other databases are also demanding CPU at the same time.
- **Impacted Status:** A database is impacted when it is exposed and the machine's overall CPU usage is very high (above 70%). In this case, it is very likely experiencing noisy neighbor issues.

2. Pie charts show the summary of the number of clusters, cluster databases, database instances, and hosts

We can see that there are 12 clusters, 23 cluster databases and 46 databases instances running on 24 hosts showing statuses **PASS, INFO, WARNING & FAIL**

- **PASS:** The cluster is not over-provisioned. No exposed or impacted hours are possible.
- **INFO:** Database is running normally. No exposed or impacted hours were found.
- **WARNING:** Database had exposed hours (it tried to use more CPU than guaranteed). It might face noisy neighbor issues.
- **FAIL:** Database had impacted hours (exposed and host CPU >70%). It is very likely experiencing noisy neighbor issues.

3. Incident summary displays the number of incidents grouped by status: **fatal, warning, critical, and escalated**.



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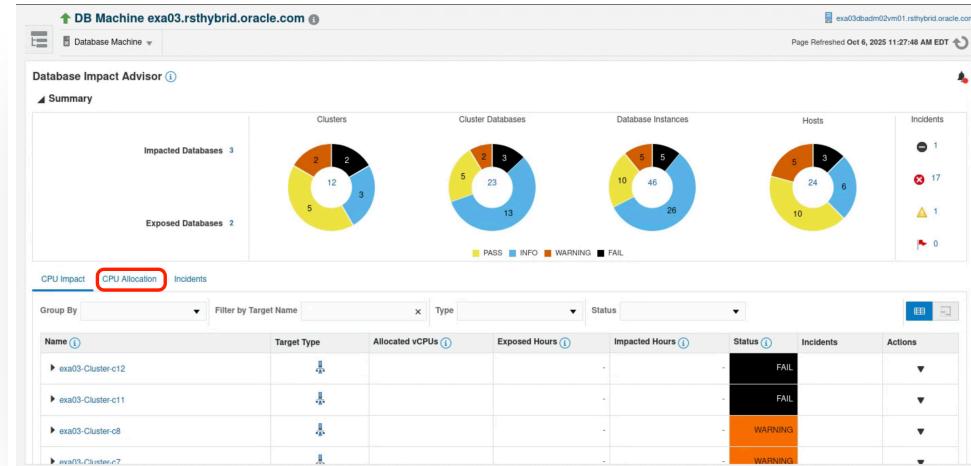
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1. Click on the **CPU Allocation** tab

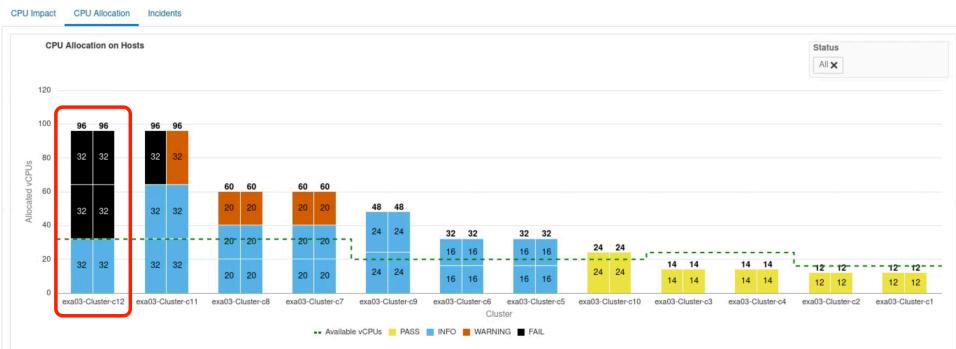
Here we can see that there are 12 clusters: the largest cluster has 32 cores per node, while the smallest has 12 cores per node.

In this lab, we will be analyzing the cluster **exa03-Cluster-c12** and current status of this cluster shows as **FAIL & INFO**.

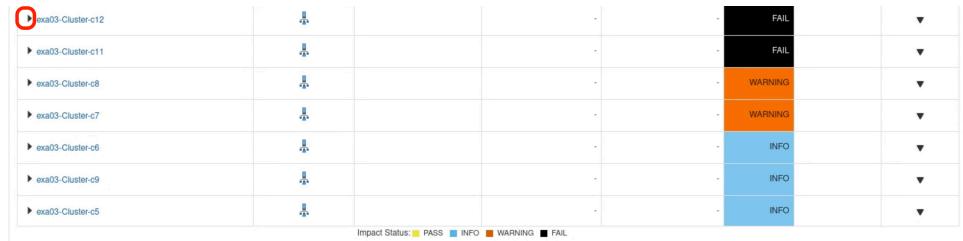
The **green dashed line** indicates how many cores are allocated to the cluster. For the largest cluster, **exa03-Cluster-c12**, it is 32 cores per instance. Each block of 32 represents a database and its corresponding CPU_COUNT per instance.

In this case, the CPU_COUNT is also 32, which means it is either set to the same value as the total number of cores in the cluster or not set at all. Here, it is not set. With three databases having CPU_COUNT not set, overallocation occurs because the total allocated cores amount to 96, while only 32 cores are available.

This results in a **3x overallocation**.

2. Now click on **CPU Impact** & Expand the cluster **exa03-Cluster-c12**

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3. Select the database cluster **exa03cdb1db12** by clicking on its row (*Clicking on the cluster name opens the cluster home page*), then scroll down to view the CPU usage.

Group By	Filter by Target Name	Type	Status	Actions			
Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	
exa03-Cluster-c12			-	-	FAIL		
exa03cdb2db12			-	-	FAIL		
exa03cdb1db12			-	-	FAIL		
exa03cdb3db12			-	-	INFO		
exa03-Cluster-c11			-	-	FAIL		
exa03-Cluster-c8			-	-	WARNING		
exa03-Cluster-c7			-	-	WARNING		

Chart now shows CPU utilization in cores for this database. Since no CPU_COUNT is set, the database can use all available CPUs when needed. However, the **guaranteed limit is 10.67 cores** because there are two other databases on the cluster.

The **orange area** indicates when the **database exceeds its guaranteed limit**.

If this happens, the database may be impacted by other databases and might need to wait for CPU resources.



4. Now, expand the database cluster **exa03cdb1db12**, select the instance **exa03cdb1db12_cdb1db122** by clicking on its row (*Clicking on the instance name opens the instance home page*) and scroll down on selection to view the CPU Usage for the instance



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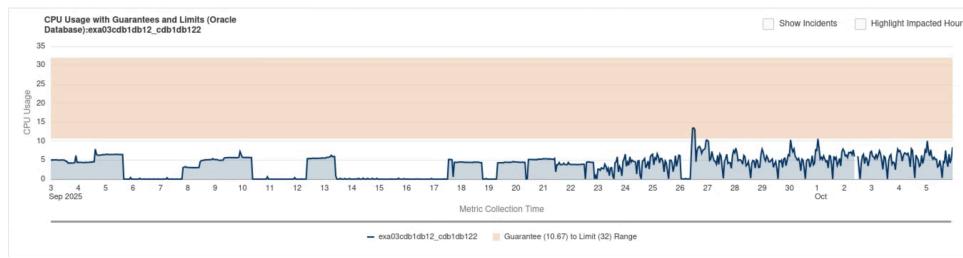
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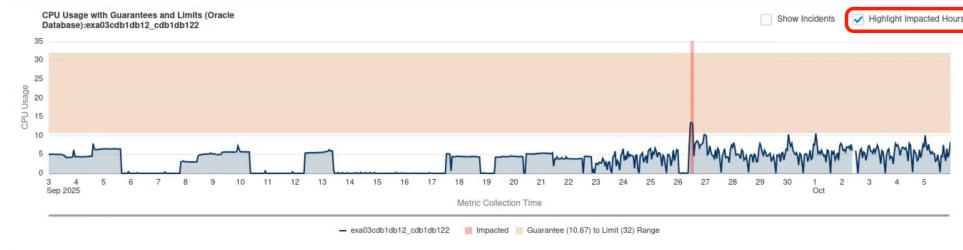
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exa03cdb1db12		32/32	-	3/766	FAIL	
exa03cdb1db12_cdb1db122		32/32	-	2/766	FAIL	
exa03cdb3db12		-	-	-	INFO	
exa03-Cluster-c11		-	-	-	FAIL	

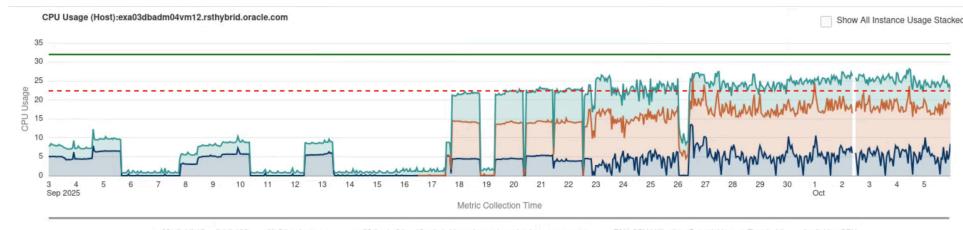
Checkout the CPU usage for the instance instance **exa03cdb1db12_cdb1db122** is utilizing CPU resources beyond the guaranteed limit of 10.67 cores.



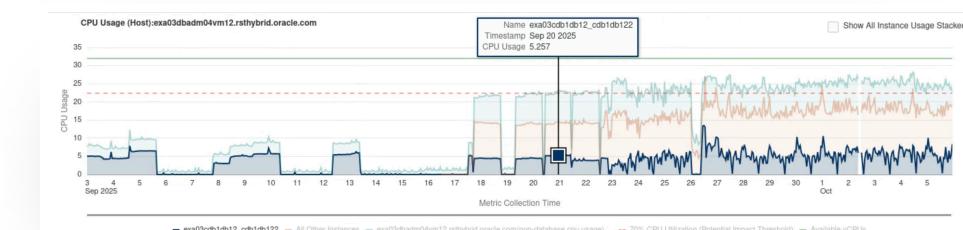
To identify exactly the impacted hours check **Highlight Impacted Hours** and analyze graph



In the lower graph, you can observe details about other instances running on the same cluster node, along with non-database CPU consumption. This view helps to understand how your database may be impacted by other databases and processes running on the same host.



- Blue line indicates the cpu usage of the instance **exa03cdb1db12_cdb1db122**



- Brown line indicates the cpu usage of other instances running on the same node



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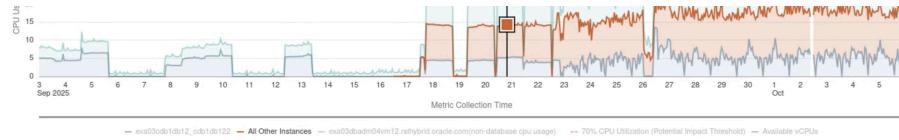
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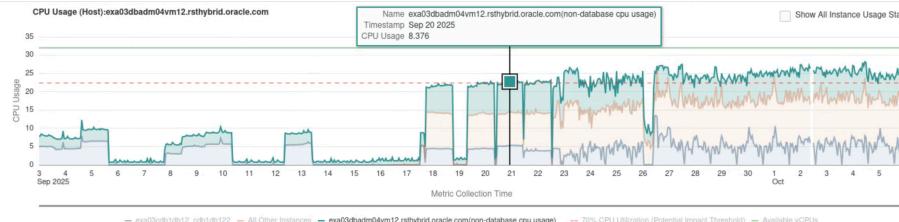
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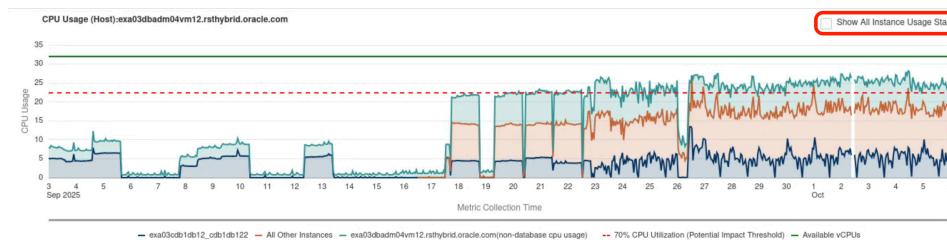
+ Need Help?



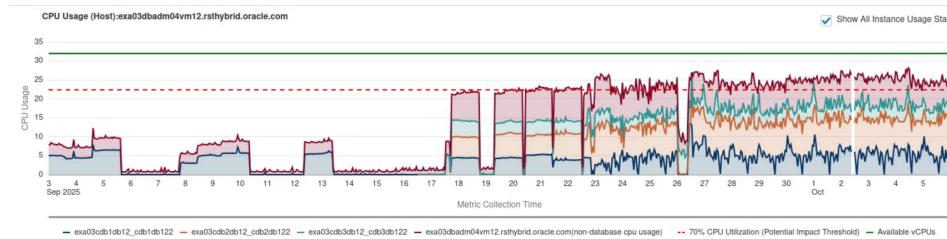
- Teal line indicates the non-database processes running on the same node



- Now, check the box **Show All Instance Usage Stacked**



We can now see the total CPU consumption in the graph and how much each instance is using. The dashed red line represents the 70% utilization level. When the total utilization goes above this threshold, it indicates that one or more databases are impacted. If a database's CPU usage is above its guaranteed allocation, but other databases are consuming more, the database is experiencing performance impact.



- Now, select **exa03cdb2db12_cdb2db122** and then select **exa03cdb3db12_cdb3db122** to review their CPU consumption

Review the CPU consumption for each of these databases to compare their usage and understand how they are affected relative to the total consumption on the node.

Select database instance **exa03cdb2db12_cdb2db122** by clicking on its row (*Clicking on the instance name opens the instance home page*) as shown below



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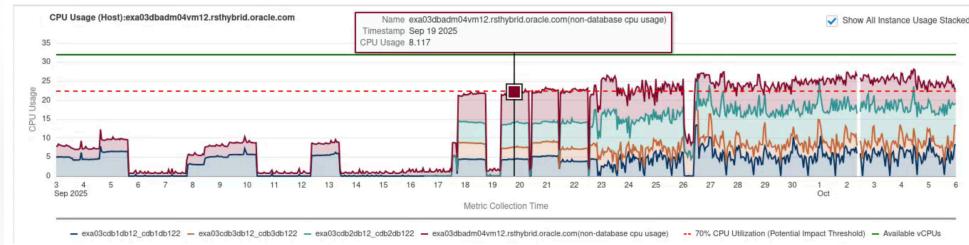
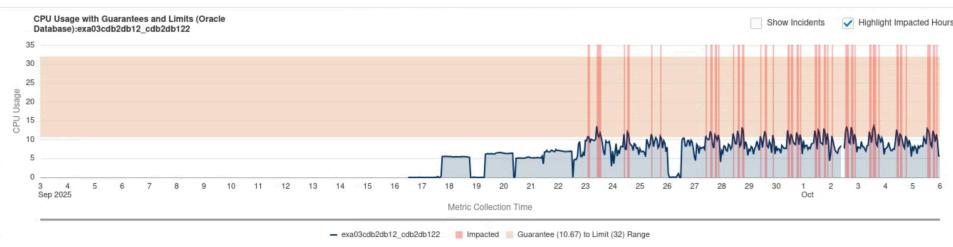
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exa03-Cluster-c12						FAIL	
exa03cdb2db12_cdb2db12						FAIL	
exa03cdb2db12_cdb2db121		32/32		7/442	80/442	FAIL	
exa03cdb2db12_cdb2db122		32/32		4/442	54/442	FAIL	
exa03cdb1db12						FAIL	
exa03cdb1db12_cdb1db12		32/32			3/766	FAIL	
exa03cdb1db12_cdb1db121		32/32			2/766	FAIL	

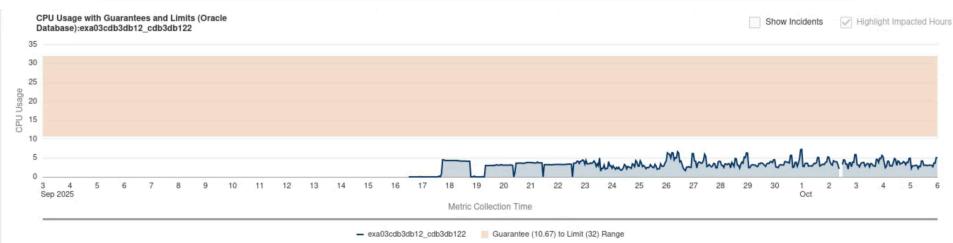
CPU Usage of the instance exa03cdb2db12_cdb2db122



Select database instance **exa03cdb3db12_cdb3db122** by clicking on its row (*Clicking on the instance name opens the instance home page*) as shown below

CPU Impact							
Group By	Filter by Target Name	Type	Status	Actions			
▲ exa03-Cluster-c12				-	-	FAIL	
► exa03cdb2db12				-	-	FAIL	
► exa03cdb1db12				-	-	FAIL	
► exa03cdb3db12				-	-	INFO	
exa03cdb3db12_cdb3db121		32/32		-	-	INFO	
exa03cdb3db12_cdb3db122		32/32		-	-	INFO	
► exa03-Cluster-c11				-	-	FAIL	

CPU Usage of the instance exa03cdb3db12_cdb3db122





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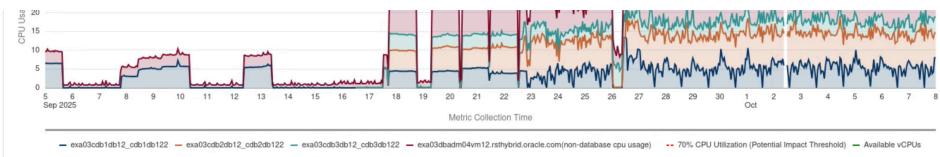
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As shown, the databases **exa03cdb1db12_cdb1db12** and **exa03cdb2db12_cdb2db12** are operating above their guaranteed CPU limits, while **exa03cdb3db12_cdb3db12** is within its limit. All three databases run on the same cluster, which also has non-database CPU usage.

As a result, **exa03cdb1db12_cdb1db12** and **exa03cdb2db12_cdb2db12** are impacted and experiencing noisy neighbor conditions. **Database Impact Advisor** detects these issues and marks such databases status as **FAIL**, indicating that these databases need attention and require CPU adjustment.

There are two ways to address the issue of **Noisy Neighbor**:

- o Increase the number of CPUs on the node (virtual machine)
- o Adjust the CPU_COUNT on the database instance using recommendations from the AHF Balance Report

Since increasing CPUs can lead to wasted resources, adjusting CPU_COUNT based on AHF Balance report will be our preferred approach.

7. Generate AHF Balance Report

Database Impact Advisor provides the ability to generate AHF Balance reports for clusters, cluster databases and database instances. AHF Balance Report uses CPU statistics from all databases in the cluster over the last 30 days. It analyzes both peak and low workloads to recommend an optimal CPU_COUNT setting.

On the cluster **exa03-Cluster-c12**, click on the arrow under **Actions** column as shown below.

Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c12					FAIL		▼
exa03cdb2db12					FAIL		▼
exa03cdb1db12					FAIL		▼
exa03cdb3db12					INFO		▼
exa03-Cluster-c11					FAIL		▼
exa03-Cluster-c5					FAIL		▼
exa03-Cluster-c7					WARNING		▼

Impact Status: ■ PASS ■ INFO ■ WARNING ■ FAIL.

Click on the **Generate AHF Balance Report**

Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c12					FAIL		▼
exa03cdb2db12					FAIL		▼
exa03cdb1db12					INFO		▼
exa03cdb3db12					FAIL		▼
exa03-Cluster-c11					FAIL		▼
exa03-Cluster-c5					FAIL		▼
exa03-Cluster-c7					WARNING		▼

Impact Status: ■ PASS ■ INFO ■ WARNING ■ FAIL.

When generating for the first time, you will be prompted to enter the Enterprise Manager password. Enter password **welcome1** and then click **Yes**



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Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c12					FAIL		
exa03-Cluster-c11					FAIL		
exa03-Cluster-c8					WARNING		
exa03-Cluster-c7					WARNING		
exa03-Cluster-c6					INFO		
exa03-Cluster-c9					INFO		
exa03-Cluster-c5					INFO		

Impact Status: PASS (Yellow) INFO (Blue) WARNING (Orange) FAIL (Black)

A job will be submitted and it takes sometime for the job to be completed.

Once completed, you can choose to either download or open the AHF balance report.

CPU Impact		CPU Allocation		Incidents			
Group By		Filter by Target Name		Type	Status		
Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c12					FAIL		
exa03cdb2db12							
exa03cdb1db12							
exa03cdb3db12					INFO		
exa03-Cluster-c11					FAIL		
exa03-Cluster-c5					FAIL		
exa03-Cluster-c7					WARNING		

Impact Status: PASS (Yellow) INFO (Blue) WARNING (Orange) FAIL (Black)

Note: The AHF Balance Report has been pre-generated for this lab.

- o Launch new tab in Google Chrome.
- o Open the following URL to view the AHF Balance Report:

Copy

tinyurl.com/ahfreport

Details of the report is explained below.

The report contains two parts: **Summary and Actions**.

Cluster Summary for **exa03-Cluster-c12** shows that, after reducing the CPUs based on the recommended values, the impacted hours have been reduced.

However, the database workloads are still running above their guaranteed limits, meaning they may continue to compete for additional CPU resources. As a result, the status under recommendation shows as **FAIL**.

First, a summary for the cluster as a whole:

exa03-Cluster-c12								
Scenario	Current				Recommended			
	vCPUs	Exposed(hrs)	Impacted(hrs)	Status	vCPUs	Exposed(hrs)	Impacted(hrs)	Status
exa03-Cluster-c12	96/32	246/791	114/791	FAIL	65/32	253/791	76/791	FAIL

Status Timeline: showing statuses over last 30 days.



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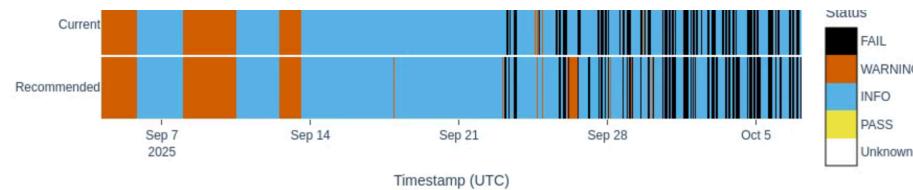
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Action plan shows that the CPU to be reduced for the databases **exa03cdb3db12 & exa03cdb2db12** and no recommendations are shown for additions.

Action Plan

Summary

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

- 2 databases should have their CPU_COUNT reduced, then
- 0 databases should have their CPU_COUNT increased
- 1 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
exa03cdb3db12	32
exa03cdb2db12	32

Additions	
Current	Recommended
exa03cdb2db12	24

The recommendation suggests reducing the CPU allocation for the databases. With the reduced CPU on the databases, the report indicates that the impacted hours for all three databases will decrease. However, the workload for **exa03cdb2db12** may still exceed its guaranteed limits, potentially causing it to continue competing for additional CPU resources. So, the status of **exa03cdb2db12** is shown as **FAIL** under the recommended section.

Ideally, the cluster should be allocated additional CPUs, or the databases should be moved to a cluster with available capacity.

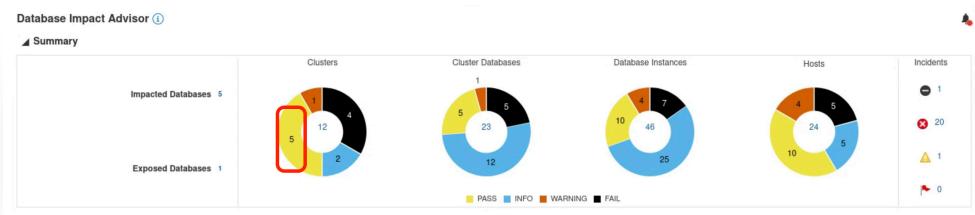
Database Details

Databases in exa03-Cluster-c12								
Scenario	Current				Recommended			
	vCPUs	Exposed(hrs)	Impacted(hrs)	Status	vCPUs	Exposed(hrs)	Impacted(hrs)	Status
exa03cdb2db12	32/32	117/491	111/491	FAIL	24/32	79/491	76/491	FAIL
exa03cdb1db12	32/32	131/791	5/791	FAIL	32/32	126/791	0/791	WARNING
exa03cdb3db12	32/32	0/491	0/491	INFO	9/32	20/491	0/491	WARNING

Task 3: Increasing the Amount of CPUs

If there is a need to increase the number of CPUs, start by examining clusters marked as **Pass**. If these clusters have workloads below 70% of their capacity, you can adjust their CPU allocation based on the AHF Balance Report. This helps ensure that the right amount of CPU is allocated to database workloads. Free up CPUs from underutilized clusters and allocate them to clusters that need additional resources.

1. Select the yellow section of the pie diagram for clusters.





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Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c10	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c3	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c4	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c1	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c2	Cluster	8	N/A	N/A	PASS	0	▼

3. Expand cluster **exa03-Cluster-C10**.

CPU Impact							
Group By		Filter by Target Name		Type	Status		
Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c1	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c4	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c10	Cluster	8	N/A	N/A	PASS	0	▼
exa03cdb1db10	Database	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c3	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c2	Cluster	8	N/A	N/A	PASS	0	▼

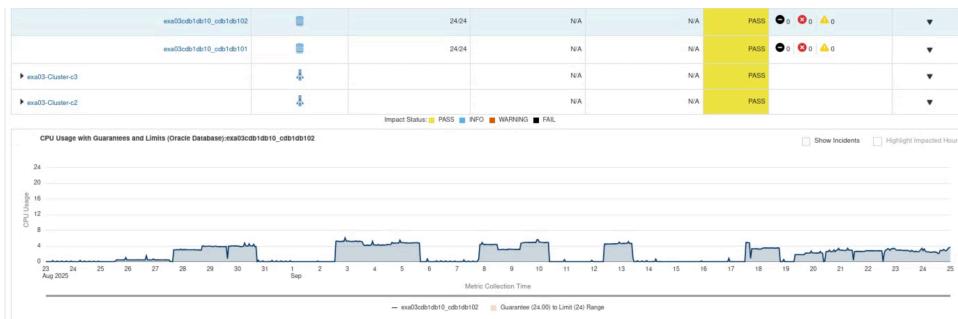
4. This cluster contains a single database **exa03cdb1db10**

CPU Impact							
Group By		Filter by Target Name		Type	Status		
Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c1	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c4	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c10	Cluster	8	N/A	N/A	PASS	0	▼
exa03cdb1db10	Database	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c3	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c2	Cluster	8	N/A	N/A	PASS	0	▼

5. Expand the database **exa03cdb1db10** and select the instance **exa03cdb1db10_cdb1db102** by clicking on its row (*Clicking on the instance name opens the instance home page*)

CPU Impact							
Group By		Filter by Target Name		Type	Status		
Name	Target Type	Allocated vCPUs	Exposed Hours	Impacted Hours	Status	Incidents	Actions
exa03-Cluster-c4	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c10	Cluster	8	N/A	N/A	PASS	0	▼
exa03cdb1db10	Database	8	N/A	N/A	PASS	0	▼
exa03cdb1db10_cdb1db102	Instance	8	24/24	N/A	PASS	0 0 0 0	▼
exa03cdb1db10_cdb1db101	Instance	8	24/24	N/A	PASS	0 0 0 0	▼
exa03-Cluster-c3	Cluster	8	N/A	N/A	PASS	0	▼
exa03-Cluster-c2	Cluster	8	N/A	N/A	PASS	0	▼

Impact Status: ■ PASS ■ INFO ■ WARNING ■ FAIL

6. As we can see, this database never exceeds the red striped line, meaning there are available CPU resources. This allows us to release CPUs from this cluster and reallocate them to **exa03-Cluster-C12** without increasing the overall number of allocated CPUs.



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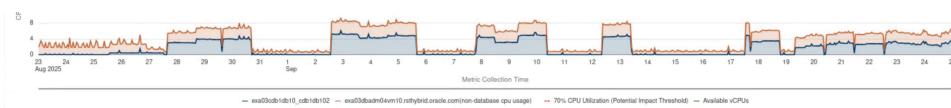
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Appendix

- **CPU Allocation:** CPUs are allocated to databases by setting the database's CPU_COUNT parameter, which limits the number of CPUs that the database is permitted to use simultaneously. By default, the database is permitted to use all the CPUs in the machine. Setting CPU_COUNT to 16 (for example) gives a database permission to use up to 16 CPUs simultaneously.
- **Partitioning:** A cluster is said to be partitioned when each database running in the cluster has dedicated CPUs. Each database gets a specific number of CPUs for its exclusive use, and those CPUs are always available to the database, regardless of whether the database needs those CPUs at a point in time or not. Dedicating CPUs to databases provides perfect performance isolation between databases. When predictable database performance is a primary concern, partitioning is an appropriate database packing strategy. But it comes at a cost: low CPU utilization across the cluster. Many database workloads are 'spiky', with high peak CPU consumption that only occurs occasionally.

Dedicating enough CPUs to each database to support its peak CPU consumption leaves most of the CPUs idle most of the time. Oversubscription. Better overall CPU utilization can be achieved when database workloads are spiky by oversubscribing the machines in a cluster. A machine is said to be

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Acknowledgements

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- **Last Updated By/Date** - Anand Prabhu, Principal Member of Technical Staff, Enterprise Manager September 2025

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