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Enterprise

HPE Cloud Optimizer

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Linux operating system

Sizing Guide

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Chapter 1: Introduction

HPE Cloud Optimizer is a web-based analysis and visualization tool that analyzes capacity and performance trends of elements in virtualized environments. It enables virtualization monitoring by providing an overview of the environment, near-real-time and historical data analysis and triaging using an interactive dashboard. It also enables monitoring for cloud and hypervisor environments. HPE Cloud Optimizer helps you visualize performance data for elements in the context of each other to rapidly analyze bottlenecks. HPE Cloud Optimizer provides capacity analysis, performance monitoring, graphing, and reporting in a single interface. For more information on HPE Cloud Optimizer, visit the HPE Cloud Optimizer home page at [**http://www.hpe.com/software/cloudoptimizer**](http://www.hpe.com/software/cloudoptimizer).

This document provides information on the performance tests performed on HPE Cloud Optimizer and the results obtained. It also provides the sizing recommendations for optimal performance of the product.

Chapter 2: Performance Tests

The performance testing for HPE Cloud Optimizer is performed in various test environments, varying the number of instances being monitored and the number of resources allocated to HPE Cloud Optimizer.

Note: Instance count includes the total number of VMs and hosts (both powered off and powered on) in the monitored environment.

The following diagram illustrates the Typical VMware vCenter Deployment for Performance Testing Scenario. The actual deployment scenarios are covered in the respective sections.

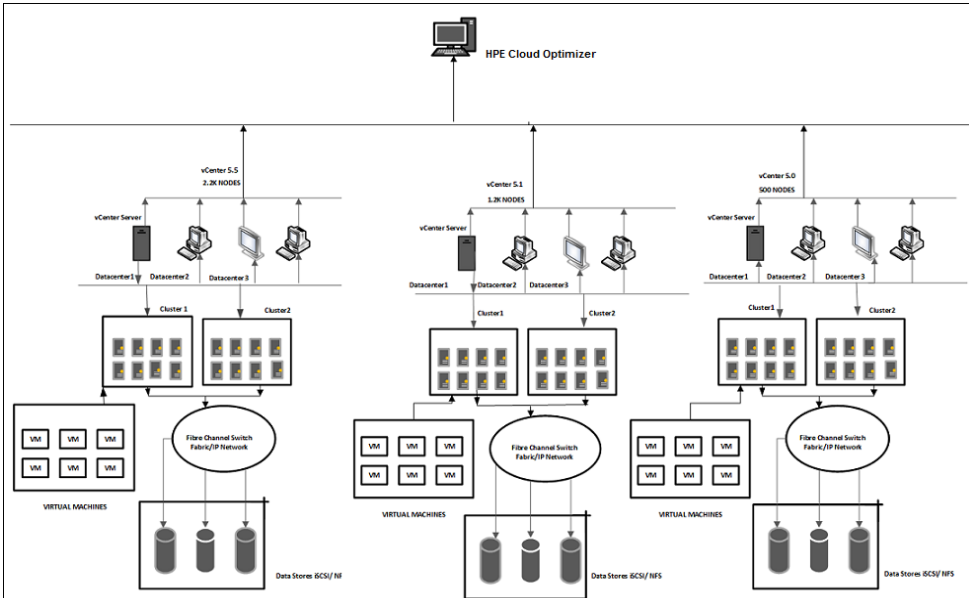


Image 1: Typical VMware vCenter Deployment for Performance Testing Scenario

Test Results for VMware vCenter:

- For Small Size Environment
- For Medium Size Environment
- For Large Size Environment

For Small Size Environment

This section describes the performance test conducted on HPE Cloud Optimizer in a small environment. A small environment is a HPE Cloud Optimizer setup with approximately 1000 node instances.

The following table lists the performance test environment.

Item	Value
Total Instances	1000
CPU	2 vCPUs
Memory	4 GB
Disk Space	67 GB
HPE Cloud Optimizer Installation Type	HPE Cloud Optimizer Virtual Appliance
Platform	CentOS 6.5 x64
License Type	Premium License
Tomcat Server Heap Size	1 GB
VI Server Heap Size	1.5 GB
Integration	HP Operations Manager <i>i</i> (OMi)
Business Groupings	2 Business Groupings containing 500 VMs each

Datasource Versions

The vCenter versions used to run the tests are 5.0, 5.1, 5.5, and 6.0.

Scenario

VMware vCenter datasources are added to HPE Cloud Optimizer. HPE Cloud Optimizer and vCenter servers are in the same subnet and have a total of 1000 instances. On an average, 85 percent of node instances consisting of Guests and ESXi Hosts are always up and running throughout the test duration.

The following table provides the details of the Small Size Environment:

Datcenters	Clusters	Hosts	VMs/Guests	Datastores
2	8	10	1000	~100

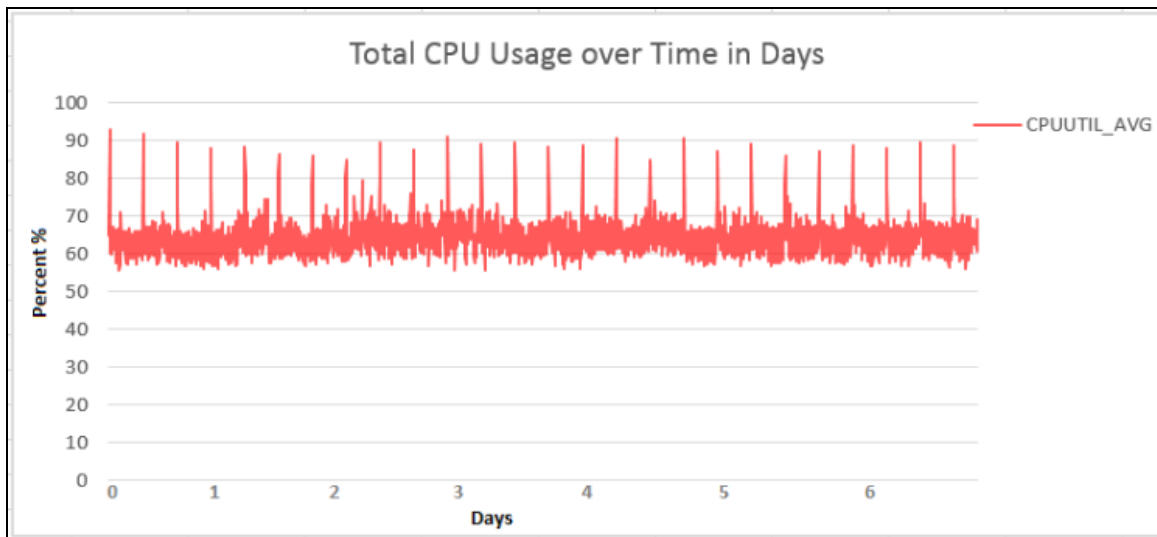
The CPU and memory utilization is observed for the test duration. The test results are calculated for 7 days at 30 seconds interval.

Results

The following section gives the test results for the scenario.

CPU Utilization

The following graph shows the CPU utilization.

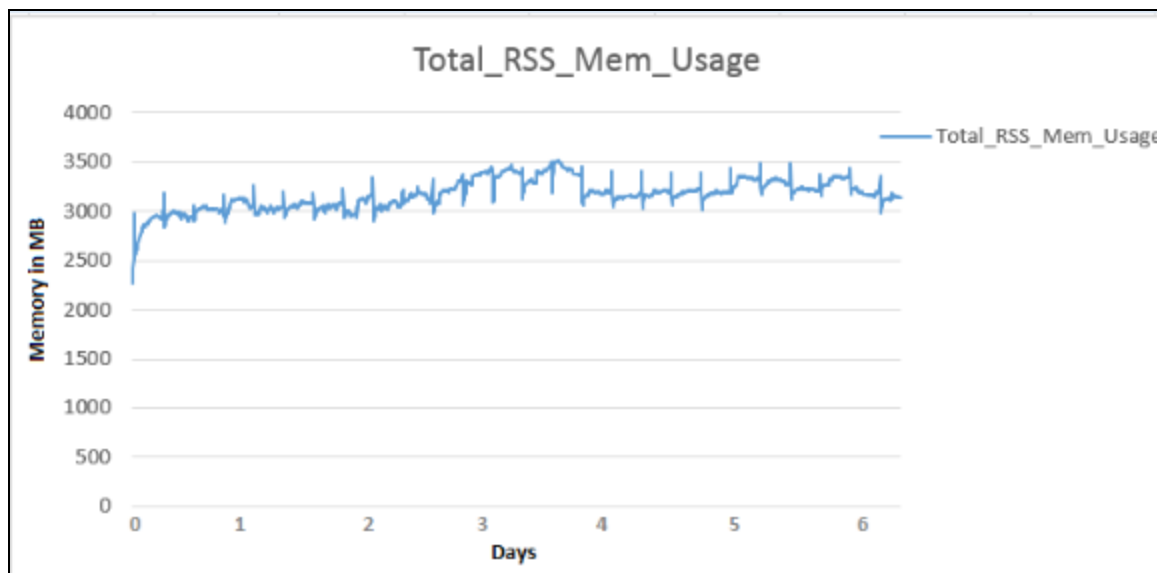


Conclusion

The approximate CPU utilization is 1 vCPU out of the 2 vCPUs allocated.

Memory Utilization

The following graph shows the memory utilization.



Conclusion

The approximate memory usage is 3 GB out of the 4 GB allocated.

For Medium Size Environment

This section describes the performance test conducted on HPE Cloud Optimizer in a medium environment. A medium environment is a HPE Cloud Optimizer setup with approximately 3500 node instances.

The following table lists the performance test environment.

Item	Value
Total Instances	3500
CPU	4 vCPUs
Memory	16 GB
Disk Space	67 GB
HPE Cloud Optimizer Installation Type	HPE Cloud Optimizer Virtual Appliance
Platform	CentOS 6.5 x64
License Type	Premium License
Tomcat Server Heap Size	2 GB

Item	Value
VI Server Heap Size	3 GB
Integration	HP Operations Manager <i>i</i> (OM <i>i</i>)
Business Groupings	2 Business Groupings containing 1750 VMs each

Datasource Versions

The vCenter versions used to run the tests are 5.0, 5.1, 5.5, and 6.0.

Scenario

VMware vCenter datasources are added to HPE Cloud Optimizer. Approximately, the vCenters have a total of 85 percent of active node instances consisting of Guest and Hosts.

The following table provides the details of the Medium Size Environment:

Datcenters	Clusters	Hosts	VMs/Guests	Datstores
6	20	25	3500	~1500

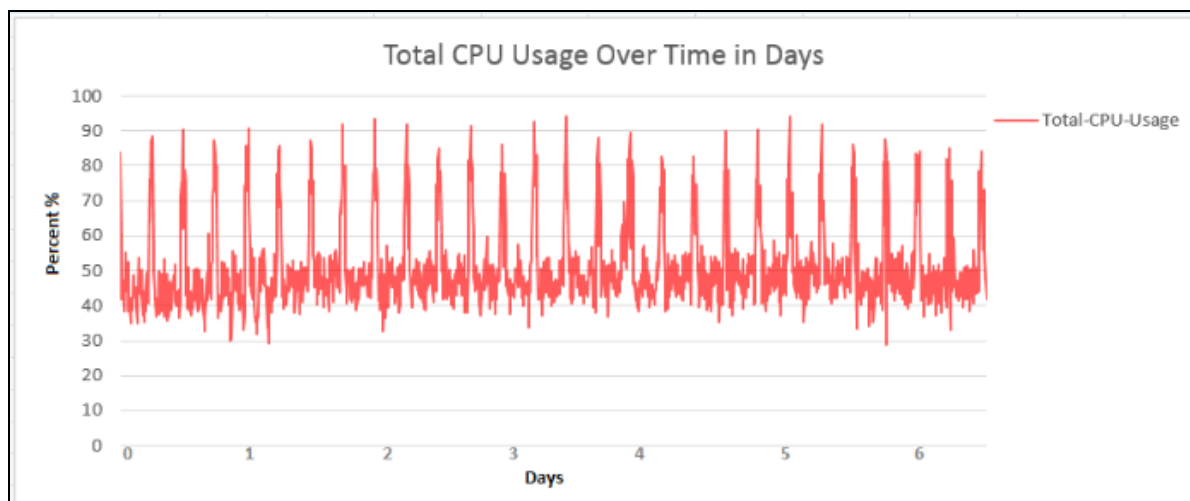
The CPU and memory utilization is observed for the test duration. The test results are calculated for 7 days at 30 seconds interval.

Results

Following section details the test results for the scenario.

CPU Utilization

The following graph shows the CPU utilization.

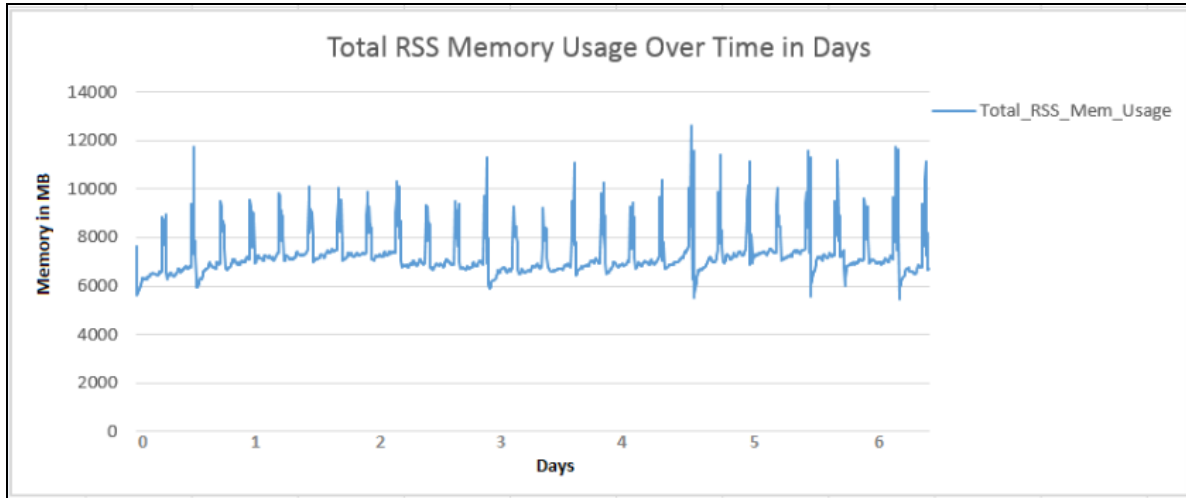


Conclusion

The approximate CPU utilization is 3 vCPUs out of the 4 vCPUs allocated.

Memory Utilization

The following graph shows the memory utilization.



Conclusion

The approximate memory usage is 12 GB out of the 16 GB allocated.

For Large Size Environment

This section describes the performance test conducted on HPE Cloud Optimizer in a large environment. A large environment is a HPE Cloud Optimizer setup with approximately 10,000 node instances.

The following table lists the performance test environment.

Item	Value
Total Instances	10,000
CPU	8 vCPUs
Memory	24 GB
HPE Cloud Optimizer Installation Type	HPE Cloud Optimizer Virtual Appliance
Platform	CentOS 6.5 x64

Item	Value
Disk Size	67 GB
License Type	Premium License
Tomcat Server Heap Size	4 GB
VI Server Heap Size	3 GB
Integration	HP Operations Manager <i>i</i> (OM <i>i</i>)
Business Groupings	2 Business Groupings containing 5000 VMs each

Datasource Versions

The vCenter versions used to run the tests are 5.0, 5.1, 5.5, and 6.0.

Scenario

VMware vCenter datasources are added to HPE Cloud Optimizer. HPE Cloud Optimizer and vCenter servers are in the same subnet and have a total of 10,000 instances. On an average, 85 percent VMs are always up and running throughout the test duration.

The following table provides the details of the Large Size Environment:

Datacenters	Clusters	Hosts	VMs/Guests	Datastores
16	90	660	10000	~2000

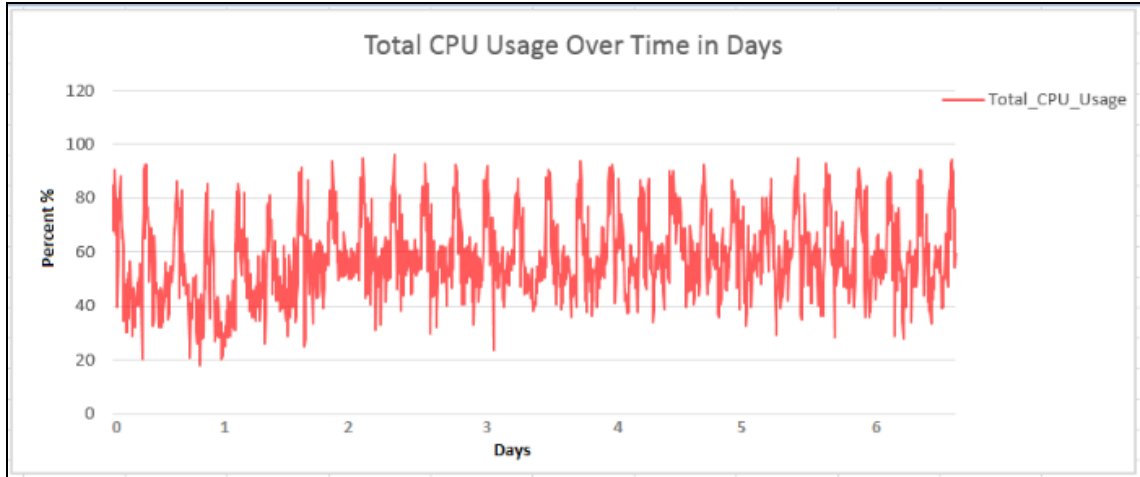
The CPU and memory utilization is observed for the test duration. The test results are calculated for 7 days at 30 seconds interval.

Results

Following section details the test results for the scenario.

CPU Utilization

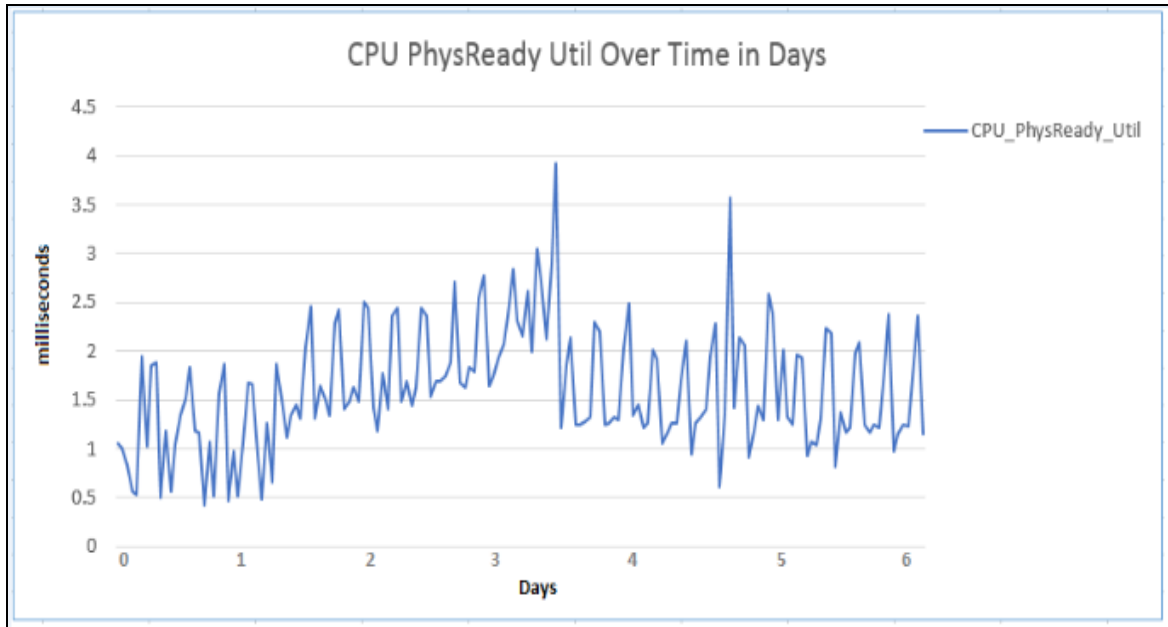
The following graph shows the CPU utilization for the test scenario.



Conclusion

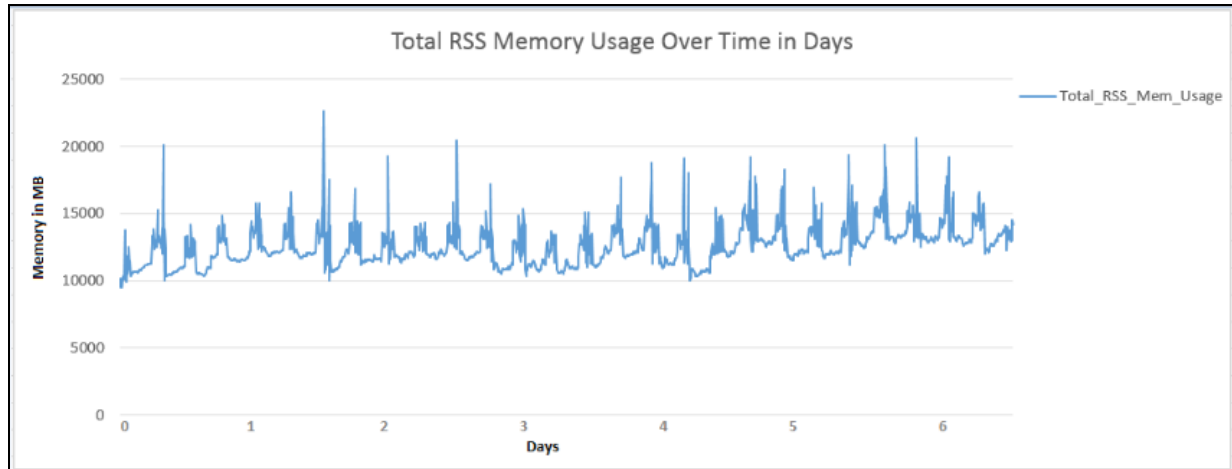
The approximate CPU utilization is 5 vCPUs out of the 8 vCPUs allocated.

Also, from the CPU PhysReadyUtil graph, it is observed that the saturation level is well under the optimum utilization. The host is able to meet the CPU demand from the system, there is no CPU saturation and the system is performing well.



Memory Utilization

The following graph shows the memory utilization for the test scenario.



Conclusion

The approximate memory usage is 20 GB out of the 24 GB allocated.

Chapter 3: Recommendations

Based on the test results using HPE Cloud Optimizer, following best practices are recommended:

- It is recommended to have a maximum of only 10,000 instances with Premium License or Express License for a typical setup having 8 vCPUs and 24 GB memory.
- It is recommended to select the size of HPE Cloud Optimizer VA during the deployment of the HPE Cloud Optimizer OVA.

The following table lists the recommended resource allocation for HPE Cloud Optimizer Virtual Appliance monitoring different number of instances.

Resource Allocation Table for HPE Cloud Optimizer VA									
Sizing Configuration	Number of Instances	vCPUs - 2.792 GHz per vCPU	RAM (GB)	Disk (GB)	Network Usage (Mbps)	Tomcat Server Heap Size (GB)	VI Server Heap Size (GB)	Business Grouping Members	License Type
Small Size	Up to 1000	2	4	67	1-2	1	1.5	1000	Premium or Express
Medium Size	1000 - 3500	4	16	67	3-4	2	3	3500	Premium or Express
Large Size	3500 - 10,000	8	24	67	4-5	4	3	10,000	Premium or Express

Note: Network usage might vary based on the number of events that are generated. In the test setup, it is observed that the network usage reaches up to 50 Mbps at times when the number of events generated at vCenter is high.

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