

# vRealize Operations Definitions for Metrics, Properties, and Alerts

vRealize Operations Manager 6.5



vmware®

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# About vRealize Operations Manager Reference for Metrics, Properties, and Alerts

The *vRealize Operations Manager Reference for Metrics, Properties, and Alerts* provides information about the metric, properties, and alert definitions provided with vRealize Operations Manager.

## Intended Audience

This information is intended for anyone who wants to install and configure vRealize Operations Manager by using a virtual appliance deployment. The information is written for experienced virtual machine administrators who are familiar with enterprise management applications and datacenter operations.

## VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to <http://www.vmware.com/support/pubs>.

# Metric Definitions in vRealize Operations Manager

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Metric definitions provide an overview of how the metric value is calculated or derived. If you understand the metric, you can better tune vRealize Operations Manager to display results that help you to manage your environment.

vRealize Operations Manager collects data from objects in your environment. Each piece of data collected is called a metric observation or value. vRealize Operations Manager uses the VMware vCenter® adapter to collect raw metrics. vRealize Operations Manager uses the vRealize Operations Manager adapter to collect self-monitoring metrics. In addition to the metrics it collects, vRealize Operations Manager calculates capacity metrics, badge metrics, and metrics to monitor the health of your system.

All metric definitions are provided. The metrics reported on your system depend on the objects in your environment. You can use metrics to help troubleshoot problems. See the *vRealize Operations Manager User Guide*.

## Changes in Metric Availability

The CPU Demand of Recommended (%) metric is no longer available in vRealize Operations Manager version 6.x. To approximate the metric, create a super metric using the following calculations, and add it to your Views and Reports as needed.

$$\left( (\text{CPU|Stress Free Demand (MHz)}) \times (\text{CPU|Current Size in Unit(s)}) \right) \div \left( (\text{CPU|Recommended Size (vCPUs)}) \times (\text{CPU|Current Size (MHz)}) \right)$$

For more information about super metrics, see the vRealize Operations Manager Information Center.

This chapter includes the following topics:

- [Metrics for vCenter Server Components](#)
- [Calculated Metrics](#)
- [Self-Monitoring Metrics for vRealize Operations Manager](#)
- [Metrics for the Operating Systems and Remote Service Monitoring Plug-ins in Endpoint Operations Management](#)

## Metrics for vCenter Server Components

vRealize Operations Manager connects to VMware vCenter Server® instances through the vCenter adapter to collect metrics for vCenter Server components and uses formulas to derive statistics from those metrics. You can use metrics to troubleshoot problems in your environment.

vCenter Server components are listed in the `describe.xml` file for the vCenter adapter. The following example shows sensor metrics for the host system in the `describe.xml` file.

```
<ResourceGroup instanced="false" key="Sensor" nameKey="1350" validation="">
  <ResourceGroup instanced="false" key="fan" nameKey="1351" validation="">
    <ResourceAttribute key="currentValue" nameKey="1360" dashboardOrder="1" dataType="float"
defaultMonitored="false" isDiscrete="false" isRate="false" maxVal="" minVal="" unit="percent"/>
    <ResourceAttribute key="healthState" nameKey="1361" dashboardOrder="1" dataType="float"
defaultMonitored="false" isDiscrete="false" isRate="false" maxVal="" minVal="" />
  </ResourceGroup>
  <ResourceGroup instanced="false" key="temperature" nameKey="1352" validation="">
    <ResourceAttribute key="currentValue" nameKey="1362" dashboardOrder="1" dataType="float"
defaultMonitored="false" isDiscrete="false" isRate="false" maxVal="" minVal="" />
    <ResourceAttribute key="healthState" nameKey="1363" dashboardOrder="1" dataType="float"
defaultMonitored="false" isDiscrete="false" isRate="false" maxVal="" minVal="" />
  </ResourceGroup>
</ResourceGroup>
```

Each `ResourceAttribute` element includes the name of a metric that appears in the UI and is documented as a Metric Key.

**Table 1-1. Sensor Metrics for Host System Cooling**

Metric Key	Metric Name	Description
Sensor fan currentValue	Speed	Fan speed.
Sensor fan healthState	Health State	Fan health state.
Sensor temperature currentValue	Temperature	Host system temperature.
Sensor temperature healthState	Health State	Host system health state.

## vSphere Metrics

vRealize Operations Manager collects CPU use, disk, memory, network, and summary metrics for objects in the vSphere world.

Capacity metrics can be calculated for vSphere world objects. See [Capacity and Project-Based Metrics](#).

### CPU Usage Metrics

CPU usage metrics provide information about CPU use.

**Table 1-2. CPU Usage Metrics**

Metric Key	Metric Name	Description
cpu capacity_usagepct_average	Capacity Usage	CPU usages as a percent during the interval.
cpu capacity_contentionPct	CPU Contention	Percent of time the virtual machine is unable to run because it is contending for access to the physical CPU(s).
cpu demandPct	Demand (%)	CPU resource entitlement to CPU demand ratio (in percents).
cpu demandmhz	Demand (MHz)	The amount of CPU resources a virtual machine would use if there were no CPU contention or CPU limit.
cpu demand_average	Demand	CPU demand in megahertz.
cpu iowait	IO Wait	IO wait (ms).
cpu numpackages	Number of CPU Sockets	Number of CPU sockets.
cpu capacity_contention	Overall CPU Contention	Overall CPU contention in milliseconds.
cpu capacity_provisioned	Provisioned Capacity (MHz)	capacity in MHz of the physical CPU cores.
cpu corecount_provisioned	Provisioned vCPU(s)	Number of provisioned CPU cores.
cpu reservedCapacity_average	Reserved Capacity (MHz)	Total CPU capacity reserved by virtual machines.
cpu usagemhz_average	Usage (MHz)	<p>CPU usages, as measured in megahertz, during the interval.</p> <ul style="list-style-type: none"> <li>■ VM - Amount of actively used virtual CPU. This is the host's view of the CPU usage, not the guest operating system view.</li> <li>■ Host - Sum of the actively used CPU of all powered on virtual machines on a host. The maximum possible value is the frequency of the two processors multiplied by the number of processors. For example, if you have a host with four 2 GHz CPUs running a virtual machine that is using 4000 MHz, the host is using two CPUs completely: <math>400 / (4 \times 2000) = 0.50</math></li> </ul>
cpu wait	Wait	Total CPU time spent in wait state. The wait total includes time spent in the CPU Idle, CPU Swap Wait, and CPU I/O Wait states.
cpu workload	Workload (%)	Percent of workload

## Memory Metrics

Memory metrics provide information about memory use and allocation.

**Table 1-3. Memory Metrics**

Metric Key	Metric Name	Description
mem host_contentionPct	Contention	Percent host memory contention.
mem host_demand	Machine Demand (KB)	Host memory demand in kilobytes.



Metric Key	Metric Name	Description
mem host_provisioned	Provisioned Memory	Provisioned host memory in kilobytes.
mem reservedCapacity_average	Reserved Capacity (KB)	Total amount of memory reservation used by powered-on virtual machines and vSphere services on the host.
mem host_usable	Usable Memory (KB)	Usable host memory in kilobytes.
mem host_usage	Host Usage (KB)	Host memory use in kilobytes.
mem host_usagePct	Usage/Usable (%)	Memory usage as percentage of total configured or available memory.
mem workload	Workload (%)	Percent of workload.

## Network Metrics

Network metrics provide information about network performance.

**Table 1-4. Network Metrics**

Metric Key	Metric Name	Description
net droppedPct	Packets Dropped (%)	Percent network packets dropped.
net usage_average	Usage Rate (KB per second)	Sum of the data transmitted and received for all of the NIC instances of the host or virtual machine.
net workload	Workload (%)	Percent of workload.

## Disk Metrics

Disk metrics provide information about disk use.

**Table 1-5. Disk Metrics**

Metric Key	Metric Name	Description
disk commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection cycle.
disk usage_average	Usage Rate (KB per second)	Average of the sum of the data read and written for all of the disk instances of the host or virtual machine.
disk workload	Workload (%)	Percent of workload.

## Summary Metrics

Summary metrics provide information about overall performance.

**Table 1-6. Summary Metrics**

Metric Key	Metric Name	Description
summary number_running_hosts	Number of Running Hosts	Number of running hosts.
summary number_running_vms	Number of Running VMs	Number of running virtual machines.
summary total_number_clusters	Total Number of Clusters	Total number of clusters.

Metric Key	Metric Name	Description
summary total_number_datastores	Total Number of Datastores	Total number of datastores.
summary total_number_hosts	Total Number of Hosts	Total number of hosts.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary total_number_datacenters	Total Number of Datacenters	Total number of data centers.
summary number_running_vcpus	Number VCPUs on Powered on VMs	Number of virtual CPUs on powered-on virtual machines.
summary avg_vm_density	Average Running VM Count per Running Host	Average running virtual machine count per running host.

## vCenter Server Metrics

vRealize Operations Manager collects CPU use, disk, memory, network, and summary metrics for vCenter Server system objects.

vCenter Server metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

## CPU Usage Metrics

CPU usage metrics provide information about CPU use.

**Table 1-7. CPU Usage Metrics**

Metric Key	Metric Name	Description
cpu capacity_usagepct_average	Capacity Usage (%)	Percent capacity used.
cpu capacity_contentionPct	CPU Contention (%)	Percent CPU contention.
cpu demandPct	Demand (%)	Percent demand.
cpu demandmhz	Demand (MHz)	Demand in megahertz.
cpu demand_average	Demand	CPU Demand.
cpu iowait	IO Wait (ms)	IO wait time in milliseconds.
cpu numpackages	Number of CPU Sockets	Number of CPU sockets.
cpu capacity_contention	Overall CPU Contention (ms)	Overall CPU contention in milliseconds.
cpu capacity_provisioned	Provisioned Capacity (MHz)	Provisioned capacity in megahertz.
cpu corecount_provisioned	Provisioned vCPU	Number of provisioned virtual CPU cores.
cpu reservedCapacity_average	Reserved Capacity (MHz)	Sum of the reservation properties of the immediate children of the host's root resource pool.
cpu usagemhz_average	Usage (MHz)	Average CPU use in megahertz.
cpu wait	Wait (ms)	CPU time spent on the idle state.
cpu overhead_average	Overhead	Amount of CPU that is overhead.

Metric Key	Metric Name	Description
cpu demand_without_overhead	Demand without overhead	Value of demand excluding any overhead.
cpu vm_capacity_provisioned	Provisioned Capacity	Provisioned capacity (MHz).

## Datastore Metrics

Datastore metrics provide information about the datastore.

**Table 1-8. Datastore Metrics**

Metric Key	Metric Name	Description
datastore maxObserved_NumberRead	Max Observed Reads per second	Max observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate	Max observed rate of reading data from the datastore.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.
datastore maxObserved_Write	Max Observed Write Rate	Max observed rate of writing data from the datastore.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Maximum observed number of outstanding IO operations.
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read Rate	Amount of data read in the performance interval.
datastore write_average	Write Rate	Amount of data written to disk in the performance interval.

## Disk Metrics

Disk metrics provide information about disk use.

**Table 1-9. Disk Metrics**

Metric Key	Metric Name	Description
disk commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection cycle.
disk totalLatency_average	Disk Command Latency (ms)	Average amount of time taken for a command from the perspective of the guest operating system. This metric is the sum of the Kernel Device Command Latency and Physical Device Command Latency metrics.
disk usage_average	Usage Rate (KBps)	Average of the sum of the data read and written for all of the disk instances of the host or virtual machine.

Metric Key	Metric Name	Description
disk sum_queued_oio	Total queued outstanding operations	Sum of queued operations and outstanding operations.
disk max_observed	Max Observed OIO	Max observed IO for a disk.

## Diskspace Metrics

Disk space metrics provide information about disk space use.

**Table 1-10. Diskspace Metrics**

Metric Key	Metric Name	Description
diskspace total_usage	Total disk space used (KB)	Total disk space used on all datastores visible to this object.
diskspace total_capacity	Total disk space (KB)	Total disk space on all datastores visible to this object.
diskspace total_provisioned	Total provisioned disk space (KB)	Total provisioned disk space on all datastores visible to this object.

## Memory Metrics

Memory metrics provide information about memory use and allocation.

**Table 1-11. Memory Metrics**

Metric Key	Metric Name	Description
mem host_contentionPct	Contention (%)	Percent host memory contention.
mem host_demand	Machine Demand (KB)	Host memory demand in kilobytes.
mem host_systemUsage	ESX System Usage	Memory usage by the VMkernel and ESX user-level services.
mem host_provisioned	Provisioned Memory (KB)	Provisioned host memory in kilobytes.
mem reservedCapacity_average	Reserved Capacity (KB)	Sum of the reservation properties of the immediate children of the host's root resource pool.
mem host_usable	Usable Memory (KB)	Usable host memory in kilobytes.
mem host_usage	Host Usage (KB)	Host memory use in kilobytes.
mem host_usagePct	Usage/Usable (%)	Percent host memory used.
mem host_contention	Contention (KB)	Host contention in kilobytes.
mem overhead_average	VM Overhead (KB)	Memory overhead reported by host.

## Network Metrics

Network metrics provide information about network performance.

**Table 1-12. Network Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
net droppedPct	Packets Dropped (%)	Percent network packets dropped.
net usage_average	Usage Rate (KBps)	Sum of the data transmitted and received for all of the NIC instances of the host or virtual machine.
net packetsRx_summation	Packets Received	Number of packets received in the performance interval.
net packetsTx_summation	Packets Transmitted	Number of packets transmitted in the performance interval.
net droppedRx_summation	Received Packets Dropped	Number of received packets dropped in the performance interval.
net droppedTx_summation	Transmitted Packets Dropped	Number of transmitted packets dropped in the performance interval.
net maxObserved_KBps	Max Observed Throughput (KBps)	Max observed rate of network throughput.
net maxObserved_Tx_KBps	Max Observed Transmitted Throughput (KBps)	Max observed transmitted rate of network throughput.
net maxObserved_Rx_KBps	Max Observed Received Throughput (KBps)	Max observed received rate of network throughput.
net transmitted_average	Data Transmit Rate (KBps)	Average amount of data transmitted per second.
net received_average	Data Receive Rate (KBps)	Average amount of data received per second.

## Summary Metrics

Summary metrics provide information about overall performance.

**Table 1-13. Summary Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
summary number_running_hosts	Number of Running Hosts	Number of hosts that are on.
summary number_running_vms	Number of Running VMs	Number of virtual machines that are on.
summary total_number_clusters	Total Number of Clusters	Total number of clusters.
summary total_number_datastores	Total Number of Datastores	Total number of datastores.
summary total_number_hosts	Total Number of Hosts	Total number of hosts.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary max_number_vms	Maximum Number of VMs	Maximum number of virtual machines.
summary workload_indicator	Workload Indicator (%)	Percent workload indicator.
summary total_number_datacenters	Total Number of Datacenters	Total number of datacenters.
summary number_powered_on_cores	Number of Cores on Powered On Hosts	Number of cores on powered-on hosts.

Metric Key	Metric Name	Description
summary number_running_vcpus	Number VCPUs on Powered on VMs	Number of virtual CPUs on powered-on virtual machines.
summary avg_vm_density	Average Running VM Count per Running Host	Average running virtual machine count per running host.
summary vc_query_time	VC Query Time (ms)	vCenter Server query time in milliseconds.
summary derived_metrics_comp_time	Derived Metrics Computation Time (ms)	Derived metrics computation time in milliseconds.
summary number_objs	Number of objects	Number of objects.
summary number_vc_events	Number of VC Events	Number of vCenter Server events.
summary number_sms_metrics	Number of SMS Metrics	Number of SMS metrics.
summary collector_mem_usage	Collector Memory Usage (MB)	Collector memory use in megabytes.

## Virtual Machine Metrics

vRealize Operations Manager collects configuration, CPU use, memory, datastore, disk, virtual disk, guest file system, network, power, disk space, storage, and summary metrics for virtual machine objects.

Capacity metrics can be calculated for virtual machine objects. See [Capacity and Project-Based Metrics](#).

## Configuration Metrics for Virtual Machines

Configuration metrics provide information about virtual machine configuration.

**Table 1-14. Configuration Metrics for Virtual Machines**

Metric Key	Metric Name	Description
config hardware thin_Enabled	Thin Provisioned Disk	Thin Provisioned Disk.
config hardware num_Cpu	Number of CPUs	Number of CPUs for a Virtual Machine.
config hardware disk_Space	Disk Space	Disk space metrics.

## CPU Usage Metrics for Virtual Machines

CPU usage metrics provide information about CPU use.

**Table 1-15. CPU Use Metrics for Virtual Machines**

Metric Key	Metric Name	Description
cpu iowait	IO Wait (ms)	CPU time spent waiting for IO.
cpu wait	Wait (ms)	Wait time in milliseconds.
cpu capacity_contention	Overall CPU Contention (ms)	The amount of time the CPU cannot run due to contention.
cpu reservation_used	Reservation Used	CPU Reservation Used.
cpu effective_limit	Effective Limit	CPU Effective Limit.

Metric Key	Metric Name	Description
cpu estimated_entitlement	Estimated Entitlement	CPU Estimated Entitlement.
cpu idlePct	Idle (%)	Percentage time that CPU is idle.
cpu iowaitPct	IO Wait (%)	Percentage IO Wait.
cpu swapwaitPct	Swap wait (%)	Percentage swap wait for CPU.
cpu waitPct	Wait (%)	Percentage of total CPU time spent in wait state.
cpu systemSummationPct	System (%)	Percentage CPU time spent on system processes.
cpu demandOverLimit	Demand Over Limit (MHz)	Amount of CPU Demand that is over the configured CPU Limit.
cpu demandOverCapacity	Demand Over Capacity (MHz)	Amount of CPU Demand that is over the configured CPU Capacity.
cpu sizePctReduction	Recommended Size Reduction (%)	Percentage of recommended CPU size reduction.
cpu perCpuCoStopPct	Normalized Co-stop	Percentage of co-stop time, normalized across all vCPUs.
cpu numberToAdd	Recommended number of vCPUs to Add	Recommended number of vCPUs to Add to the VM.
cpu numberToRemove	Recommended number of vCPUs to Remove	Recommended number of vCPUs to Remove from the VM.
cpu capacity_entitlement	Capacity entitlement (MHz)	CPU entitlement for the VM after taking limits into account.
cpu corecount_provisioned	Provisioned CPU Cores	Number of provisioned CPU cores.
cpu capacity_demandEntitlementPct	Capacity Demand Entitlement (%)	Percent capacity demand entitlement.
cpu capacity_contentionPct	CPU Contention (%)	CPU contention as a percentage of 20-second collection interval.
cpu capacity_provisioned	Provisioned Capacity (MHz)	Provisioned CPU capacity in megahertz.
cpu demandmhz	Demand (MHz)	CPU demand in megahertz.
cpu host_demand_for_aggregation	Host demand for aggregation	Host demand for aggregation.
cpu demand_average	Demand (ms)	The total CPU time that the VM could use if there was no contention.
cpu demandPct	Demand (%)	CPU demand as a percentage of the provisioned capacity.
cpu dynamic_entitlement	Dynamic Entitlement	CPU Dynamic Entitlement.
cpu usage_average	Usage (%)	CPU Usage as a percentage of 20-second collection interval.
cpu usagemhz_average	Usage (MHz)	CPU use in megahertz.
cpu system_summation	System (ms)	CPU time spent on system processes.

Metric Key	Metric Name	Description
cpu wait_summation	Wait (ms)	Total time that a virtual CPU can not be run. It could be idle (halted) or waiting for an external event such as I/O.
cpu ready_summation	Ready (ms)	CPU time spent in the ready state.
cpu readyPct	Ready (%)	CPU time spent in the ready state as a percentage of the collection interval.
cpu used_summation	Used (ms)	CPU time that is used.
cpu extra_summation	Extra (ms)	Extra CPU time in milliseconds.
cpu guaranteed_latest	Guaranteed (ms)	CPU time that is guaranteed for the virtual machine.
cpu swapwait_summation	Swap Wait (ms)	Swap wait time in milliseconds.
cpu costop_summation	Co-stop (ms)	Time the VM is ready to run, but is unable to due to co-scheduling constraints.
cpu costopPct	Co-stop (%)	Percentage of time the VM is ready to run, but is unable to due to co-scheduling constraints.
cpu idle_summation	Idle (ms)	CPU time that is idle.
cpu latency_average	Latency	Percentage of time the VM is unable to run because it is contending for access to the physical CPUs.
cpu maxlimited_summation	Max Limited	Time the VM is ready to run, but is not run due to maxing out its CPU limit setting.
cpu overlap_summation	Overlap	Time the VM was interrupted to perform system services on behalf of that VM or other VMs.
cpu run_summation	Run	Time the VM is scheduled to run.
cpu entitlement_latest	Entitlement Latest	Entitlement Latest.

## CPU Utilization for Resources Metrics for Virtual Machines

CPU utilization for resources metrics provide information about resource CPU use.



**Table 1-16. CPU Utilization for Resources Metrics for Virtual Machines**

Metric Key	Metric Name	Description
rescpu actav1_latest rescpu actav5_latest rescpu actav15_latest rescpu actpk1_latest rescpu actpk5_latest rescpu actpk15_latest	CPU Active (%) ( <i>interval</i> )	The average active time (actav) or peak active time (actpk) for the CPU during various intervals.
rescpu runav1_latest rescpu runav5_latest rescpu runav15_latest rescpu runpk1_latest rescpu runpk5_latest rescpu runpk15_latest	CPU Running (%) ( <i>interval</i> )	The average runtime (runav) or peak active time (runpk) for the CPU during various intervals.
rescpu maxLimited1_latest rescpu maxLimited5_latest rescpu maxLimited15_latest	CPU Throttled (%) ( <i>interval</i> )	Amount of CPU resources over the limit that were refused, average over various intervals.
rescpu sampleCount_latest	Group CPU Sample Count	The sample CPU count.
rescpu samplePeriod_latest	Group CPU Sample Period (ms)	The sample period.

## Memory Metrics for Virtual Machines

Memory metrics provide information about memory use and allocation.

**Table 1-17. Memory Metrics for Virtual Machines**

Metric Key	Metric Name	Description
mem host_active	Host Active (KB)	Host active memory use in kilobytes.
mem host_usage	Usage (KB)	Memory use in kilobytes.
mem host_contention	Contention (KB)	Memory contention in kilobytes.
mem host_contentionPct	Contention (%)	Percent memory contention.
mem guest_provisioned	Guest Configured Memory (KB)	Guest operating system configured memory in kilobytes.
mem guest_dynamic_entitlement	Guest Dynamic Entitlement (KB)	Guest Memory Dynamic Entitlement.
mem guest_activePct	Guest Active Memory (%)	Percent guest operating system active memory.
mem guest_nonpageable_estimate	Guest Non Pageable Memory (KB)	Guest operating system non-pageable memory in kilobytes.
mem reservation_used	Reservation Used	Memory Reservation Used.
mem effective_limit	Effective Limit	Memory Effective Limit.
mem estimated_entitlement	Estimated Entitlement	Memory Estimated Entitlement.
mem host_demand_for_aggregation	Demand for aggregation	Host demand for aggregation.

Metric Key	Metric Name	Description
mem numa.remote_latest	NUMA Remote Latest	Non-uniform memory access Remote (Kb).
mem numa.local_latest	NUMA Local Latest	Non-uniform memory access Local (Kb).
mem numa.migrations_latest	NUMA Migrations Latest	Non-uniform memory access Migrations (number).
mem numa.locality_average	NUMA Locality Average	Non-uniform memory access Locality (%).
mem demandOverLimit	Demand Over Limit	Amount of Memory Demand that is over the configured Memory Limit.
mem demandOverCapacity	Demand Over Capacity	Amount of Memory Demand that is over the configured Memory Capacity.
mem sizePctReduction	Recommended Size Reduction (%)	Percentage of recommended Memory size reduction.
mem balloonPct	Balloon (%)	Percentage of total memory that has been reclaimed via ballooning.
mem guest_usage	Guest Usage (KB)	Guest operating system use in kilobytes.
mem guest_demand	Guest Demand (KB)	Guest operating system demand in kilobytes.
mem host_nonpageable_estimate	Guest Non Pageable Memory (KB)	Guest operating system non-pageable memory in kilobytes.
mem host_demand	Host Demand (KB)	Memory demand in kilobytes.
mem host_demand_reservation	Demand with Reservation (KB)	Memory Demand with Reservation considered in KB.
mem guest_workload	Guest Workload	Guest Workload (%).
mem host_workload	Host Workload	Host Workload (%).
mem vmmemctl_average	Balloon (%)	Amount of memory currently used by the virtual machine memory control.
mem active_average	Guest Active (%)	Amount of memory that is actively used.
mem granted_average	Granted (KB)	Amount of memory available for use.
mem shared_average	Shared (KB)	Amount of shared memory in kilobytes.
mem zero_average	Zero (KB)	Amount of memory that is all 0.
mem swapped_average	Swapped (KB)	amount of unreserved memory in kilobytes.
mem swaptarget_average	Swap Target (KB)	Amount of memory that can be swapped in kilobytes.
mem swpin_average	Swap In (KB)	Swap-in memory in kilobytes.
mem swpout_average	Swap Out (KB)	amount of memory swapped out in kilobytes.
mem usage_average	Usage (%)	Memory currently in use as a percentage of total available memory.
mem vmmemctltarget_average	Balloon Target (KB)	Amount of memory that can be used by the virtual machine memory control.

Metric Key	Metric Name	Description
mem consumed_average	Consumed (KB)	Amount of host memory consumed by the virtual machine for guest memory in kilobytes.
mem overhead_average	Overhead (KB)	Memory overhead in kilobytes.
mem host_dynamic_entitlement	Host Dynamic Entitlement	Mem Machine Dynamic Entitlement.
mem swapiRate_average	Swap In Rate (KBps)	Rate at which memory is swapped from disk into active memory during the interval.
mem swapoutRate_average	Swap Out Rate (KBps)	Rate at which memory is being swapped from active memory to disk during the current interval.
mem activewrite_average	Active Write (KB)	Active writes in kilobytes.
mem compressed_average	Compressed (KB)	Compressed memory in kilobytes.
mem compressionRate_average	Compression Rate (KBps)	Compression rate in kilobytes per second.
mem decompressionRate_average	Decompression Rate (KBps)	Decompression rate in kilobytes per second.
mem overheadMax_average	Overhead Max (KB)	Maximum overhead in kilobytes.
mem zipSaved_latest	Zip Saved (KB)	Zip-saved memory in kilobytes.
mem zipped_latest	Zipped (KB)	Zipped memory in kilobytes.
mem entitlement_average	Entitlement	Amount of host physical memory the VM is entitled to, as determined by the ESX schedule.
mem latency_average	Latency	Percentage of time the VM is waiting to access swapped or compressed memory.
mem capacity.contention_average	Capacity Contention	Capacity Contention.
mem  lSwapInRate_average	Swap In Rate from Host Cache	Rate at which memory is being swapped from host cache into active memory.
mem  lSwapOutRate_average	Swap Out Rate to Host Cache	Rate at which memory is being swapped to host cache from active memory.
mem  lSwapUsed_average	Swap Space Used in Host Cache	Space used for caching swapped pages in the host cache.
mem overheadTouched_average	Overhead Touched	Actively touched overhead memory (KB) reserved for use as the virtualization overhead for the VM.

## Datastore Metrics for Virtual Machines

Datastore metrics provide information about datastore use.

**Table 1-18. Datastore Metrics for Virtual Machines**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
datastore commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore oio	Number of Outstanding IO Operations	Number of outstanding IO operations.
datastore demand	Demand	Datastore demand.
datastore totalLatency_average	Disk Command Latency (ms)	The average amount of time taken for a command from the perspective of a Guest OS. This is the sum of Kernel Command Latency and Physical Device Command Latency.
datastore usage_average	Usage Average (KBps)	Usage Average (KBps).
datastore used	Used Space (MB)	Used space in megabytes.
datastore notshared	Not Shared (GB)	Space used by VMs that is not shared.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read Rate (KBps)	Rate of reading data from the datastore in kilobytes per second.
datastore totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation from the datastore. Total latency = kernel latency + device latency.
datastore totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation to the datastore. Total latency = kernel latency + device latency.
datastore write_average	Write Rate	Rate of writing data to the datastore.
datastore maxTotalLatency_latest	Highest Latency	Highest Latency.
datastore totalLatency_max	Total Latency Max	Total Latency Max (ms).
datastore maxObserved_NumberRead	Max Observed Reads per second	Max observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate	Max observed rate of reading data from the datastore.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.

Metric Key	Metric Name	Description
datastore maxObserved_Write	Max Observed Write Rate	Max observed rate of writing data from the datastore.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Max Observed Number of Outstanding IO Operations.

## Disk Metrics for Virtual Machines

Disk metrics provide information about disk use.

**Table 1-19. Disk Metrics for Virtual Machines**

Metric Key	Metric Name	Description
disk numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
disk numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
disk commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
disk usage_average	Usage Rate (KBps)	Use rate in kilobytes per second.
disk usage_capacity	I/O Usage Capacity	I/O Usage Capacity.
disk diskoio	Number of Outstanding IO Operations	Number of outstanding IO operations.
disk diskqueued	Queued Operations	Queued operations.
disk diskdemand	Demand (%)	Percent demand.
disk sum_queued_oio	Total Queued Outstanding operations	Sum of Queued Operation and Outstanding Operations.
disk max_observed	Max Observed OIO	Max Observed IO for a disk.
disk read_average	Read Rate (KBps)	Amount of data read in the performance interval.
disk write_average	Write Rate (KBps)	Amount of data written to disk in the performance interval.
disk numberRead_summation	Read Requests	Number of times data was read from the disk in the defined interval.
disk numberWrite_summation	Write Requests	Number of times data was written to the disk in the defined interval.
disk busResets_summation	Bus Resets	The number of bus resets in the performance interval.
disk commands_summation	Commands Issued	The number of disk commands issued in the performance interval.
disk commandsAborted_summation	Commands Aborted	The number of disk commands aborted in the performance interval.
disk maxTotalLatency_latest	Highest Latency	Highest latency.

Metric Key	Metric Name	Description
disk scsiReservationConflicts_summation	SCSI Reservation Conflicts	SCSI Reservation Conflicts.
disk totalReadLatency_average	Disk Read Latency	The average amount of time taken for a read from the perspective of a Guest OS. This is the sum of Kernel Read Latency and Physical Device Read Latency.
disk totalWriteLatency_average	Disk Write Latency	The average amount of time taken for a write from the perspective of a Guest OS. This is the sum of Kernel Write Latency and Physical Device Write Latency.
disk totalLatency_average	Disk Command Latency (ms)	The average amount of time taken for a command from the perspective of a Guest OS. This is the sum of Kernel Command Latency and Physical Device Command Latency.

## Virtual Disk Metrics for Virtual Machines

Virtual disk metrics provide information about virtual disk use.

**Table 1-20. Virtual Disk Metrics for Virtual Machines**

Metric Key	Metric Name	Description
virtualDisk usage	Usage	Average CPU usage as a percentage.
virtualDisk totalLatency	Total Latency	Total latency.
virtualDisk commandsAveraged_average	Commands Per Second	Average number of commands per second.
virtualDisk numberReadAveraged_average	Read Requests	Average number of read commands issued per second to the virtual disk during the collection interval.
virtualDisk numberWriteAveraged_average	Write Requests	Average number of write commands issued per second to the virtual disk during the collection interval.
virtualDisk read_average	Read Rate (KBps)	Rate of reading data from the virtual disk in kilobytes per second.
virtualDisk totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation from the virtual disk. Total latency = kernel latency + device latency.
virtualDisk totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation to the virtual disk. Total latency = kernel latency + device latency.
virtualDisk write_average	Write Rate (KBps)	Rate of writing data from the virtual disk in kilobytes per second.
virtualDisk busResets_summation	Bus Resets	The number of bus resets in the performance interval.
virtualDisk commandsAborted_summation	Commands Aborted	The number of disk commands aborted in the performance interval.

Metric Key	Metric Name	Description
virtualDisk readLoadMetric_latest	Read Load	Storage DRS virtual disk metric read load.
virtualDisk readOIO_latest	Outstanding Read Requests	Average number of outstanding read requests to the virtual disk.
virtualDisk writeLoadMetric_latest	Write Load	Storage DRS virtual disk write load.
virtualDisk writeOIO_latest	Outstanding Write Requests	Average number of outstanding write requests to the virtual disk.
virtualDisk smallSeeks_latest	Number of Small Seeks	Small Seeks.
virtualDisk mediumSeeks_latest	Number of Medium Seeks	Medium Seeks.
virtualDisk largeSeeks_latest	Number of Large Seeks	Large Seeks.
virtualDisk readLatencyUS_latest	Read Latency (microseconds)	Read Latency in microseconds.
virtualDisk writeLatencyUS_latest	Write Latency (microseconds)	Write Latency in microseconds.
virtualDisk readIOSize_latest	Average Read request size	Read IO size.
virtualDisk writeIOSize_latest	Average Write request size	Write IO size.

## Guest File System Metrics for Virtual Machines

Guest file system metrics provide information about guest file system capacity and free space.

**Table 1-21. Guest File System Metrics for Virtual Machines**

Metric Key	Metric Name	Description
guestfilesystem capacity	Guest File System Capacity (MB)	Total capacity on guest file system in megabytes.
guestfilesystem freespace	Guest File System Free (MB)	Total free space on guest file system in megabytes.
guestfilesystem percentage	Guest File System Usage (%)	Percent guest file system.
guestfilesystem usage	Guest File System Usage	Total usage of guest file system.
guestfilesystem freespace_total	Total Guest File System Free (GB)	Total free space on guest file system.
guestfilesystem capacity_total	Total Guest File System Capacity(GB)	Total capacity on guest file system.
guestfilesystem percentage_total	Total Guest File System Usage (%)	Guest file system space utilization.
guestfilesystem usage_total	Total Guest File System Usage	Total usage of guest file system.

## Network Metrics for Virtual Machines

Network metrics provide information about network performance.

**Table 1-22. Network Metrics for Virtual Machines**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
net demand	Demand (%)	Percent demand.
net usage_average	Usage Rate (KBps)	The sum of the data transmitted and received for all the NIC instances of the host or virtual machine.
net packetsRxPerSec	Packets Received per second	Number of packets received in the performance interval.
net packetsTxPerSec	Packets Transmitted per second	Number of packets transmitted in the performance interval.
net transmitted_average	Data Transmit Rate (KBps)	Average amount of data transmitted in kilobytes per second.
net received_average	Data Receive Rate (KBps)	Average amount of data received per second.
net PacketsPerSec	Packets per second	Number of packets transmitted and received per second.
net usage_capacity	I/O Usage Capacity	IO use capacity.
net maxObserved_KBps	Max Observed Throughput (KBps)	Maximum observed throughput in kilobytes per second.
net maxObserved_Tx_KBps	Max Observed Transmitted Throughput	Max observed transmitted rate of network throughput.
net maxObserved_Rx_KBps	Max Observed Received Throughput	Max observed received rate of network throughput.
net packetsRx_summation	Packets Received	Number of packets received in the performance interval.
net packetsTx_summation	Packets Transmitted	Number of packets transmitted in the performance interval.
net droppedRx_summation	Received Packets Dropped	Number of received packets dropped in the performance interval.
net droppedTx_summation	Transmitted Packets Dropped	Number of transmitted packets dropped in the performance interval.
net droppedPct	Packets Dropped (%)	Percentage of packets dropped.
net dropped	Packets Dropped	Number of packets dropped in the performance interval.
net broadcastTx_summation	Broadcast Packets Transmitted	Number of broadcast packets transmitted during the sampling interval.
net broadcastRx_summation	Broadcast Packets Received	Number of broadcast packets received during the sampling interval.
net bytesRx_average	bytes Rx (KBps)	Average amount of data received per second.
net bytesTx_average	bytes Tx (KBps)	Average amount of data transmitted per second.



Metric Key	Metric Name	Description
net multicastRx_summation	Multicast Packets Received	Number of multicast packets received.
net multicastTx_summation	Multicast Packets Transmitted	Number of multicast packets transmitted.
net host_transmitted_average	VM to Host Data Transmit Rate	Average amount of data transmitted per second between VM and host.
net host_received_average	VM to Host Data Receive Rate	Average amount of data received per second between VM and host.
net host_usage_average	VM to Host Usage Rate	The sum of the data transmitted and received for all the NIC instances between VM and host.
net host_maxObserved_Tx_KBps	VM to Host Max Observed Transmitted Throughput	Max observed transmitted rate of network throughput between VM and host.
net host_maxObserved_Rx_KBps	VM to Host Max Observed Received Throughput	Max observed received rate of network throughput between VM and host.
net host_maxObserved_KBps	VM to Host Max Observed Throughput	Max observed rate of network throughput between VM and host.
net transmit_demand_average	Data Transmit Demand Rate	Data transmitted demand rate.
net receive_demand_average	Data Receive Demand Rate	Data received demand rate.

## System Metrics for Virtual Machines

System metrics for virtual machines provide general information about the virtual machine, such as its build number and running state.

**Table 1-23. System Metrics for Virtual Machines**

Metric Key	Metric Name	Description
sys poweredOn	Powered ON	Powered on virtual machines. 1 if powered on, 0 if powered off, -1 if unknown
sys uptime_latest	Uptime (seconds)	Number of seconds since system startup.
sys heartbeat_summation	Heartbeat	Number of heartbeats from the virtual machine in the defined interval.
sys vmotionEnabled	vMotion Enabled	1 if vMotion is enabled or 0 if vMotion is not enabled.
sys productString	Product String	VMware product string.
sys build	Build Number	VMware build number.
sys osUptime_latest	OS Uptime	Total time elapsed, in seconds, since last operating system boot-up.

## Power Metrics for Virtual Machines

Power metrics provide information about power use.

**Table 1-24. Power Metrics for Virtual Machines**

Metric Key	Metric Name	Description
power energy_summation	Energy (Joule)	Energy use in joules.
power power_average	Power (Watt)	Average power use in watts.

## Disk Space Metrics for Virtual Machines

Disk space metrics provide information about disk space use.

**Table 1-25. Disk Space Metrics for Virtual Machines**

Metric Key	Metric Name	Description
diskspace notshared	Not Shared (GB)	Unshared space in kilobytes.
diskspace numvmdisk	Number of Virtual Disks	Number of virtual disks.
diskspace provisioned	Provisioned Space (GB)	Provisioned space in gigabytes.
diskspace provisionedSpace	Provisioned Space for VM	Provisioned space for VM.
diskspace shared	Shared Used (GB)	Shared used space in gigabytes.
diskspace snapshot	Snapshot Space (GB)	Space used by snapshots.
diskspace diskused	Virtual Disk Used (GB)	Space used by virtual disks in gigabytes.
diskspace used	Virtual machine used (GB)	Space used by virtual machine files in gigabytes.
diskspace total_usage	Total disk space used	Total disk space used on all datastores visible to this object.
diskspace total_capacity	Total disk space	Total disk space on all datastores visible to this object.
diskspace total_provisioned	Total provisioned disk space	Total provisioned disk space on all datastores visible to this object.
diskspace activeNotShared	Active not shared	Unshared disk space used by VMs excluding snapshot.

## Storage Metrics for Virtual Machines

Storage metrics provide information about storage use.

**Table 1-26. Storage Metrics for Virtual Machines**

Metric Key	Metric Name	Description
storage commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
storage contention	Contention percentage	Percent contention.
storage demandKBps	Demand (KBps)	Demand in kilobytes per second.
storage totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation.
storage read_average	Read Rate (KBps)	Read throughput rate in kilobytes per second.

Metric Key	Metric Name	Description
storage numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
storage totalLatency_average	Total Latency (ms)	Total latency in milliseconds.
storage usage_average	Total Usage (KBps)	Total throughput rate in kilobytes per second.
storage totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation.
storage write_average	Write Rate (KBps)	Write throughput rate in kilobytes per second.
storage numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.

## Summary Metrics for Virtual Machines

Summary metrics provide information about overall performance.

**Table 1-27. Summary Metrics for Virtual Machines**

Metric Key	Metric Name	Description
summary workload_indicator	Workload Indicator (%)	Percent workload indicator.
summary cpu_shares	CPU Shares	CPU shares.
summary mem_shares	Memory Shares	Memory shares.
summary number_datastore	Number of Datastores	Number of datastores.
summary number_network	Number of Networks	Number of networks.
summary running	Running	Number of running virtual machines.
summary desktop_status	Desktop Status	Horizon View Desktop Status.

## Host System Metrics

vRealize Operations Manager collects many metrics for host systems, including CPU use, datastore, disk, memory, network, storage, and summary metrics for host system objects.

Capacity metrics can be calculated for host system objects. See [Capacity and Project-Based Metrics](#).

## vFlash Module Metrics for Host Systems

vFlash Module metrics provide information about the host system's flash devices.

**Table 1-28. vFlash Module Metrics for Host Systems**

Metric Key	Metric Name	Description
vflashModule numActiveVMDKs_latest	Latest Number of Active VM Disks	Latest Number of Active VM Disks.

## Configuration Metrics for Host Systems

Configuration metrics provide information about host system configuration.

**Table 1-29. Configuration Metrics for Host Systems**

Metric Key	Metric Name	Description
configuration dasConfig  admissionControlPolicy failoverHost	Failover Hosts	Failover Hosts.

## Hardware Metrics for Host Systems

Hardware metrics provide information about host system hardware.

**Table 1-30. Hardware Metrics for Host Systems**

Metric Key	Metric Name	Description
hardware cpuinfo num_CpuCores	Number of CPUs	Number of CPUs for a host.

## CPU Usage Metrics for Host Systems

CPU usage metrics provide information about CPU use.

**Table 1-31. CPU Metrics for Host Systems**

Metric Key	Metric Name	Description
cpu capacity_usagepct_average	Capacity Usage (%)	Percent CPU capacity used.
cpu usage_average	Usage (%)	Average CPU usage as a percentage.
cpu capacity_contentionPct	CPU Contention (%)	Percent of time the virtual machine is unable to run because it is contending for access to the physical CPU(s).
cpu demandPct	Demand (%)	The amount of CPU resources a virtual machine would use if there were no CPU contention or CPU limit.
cpu demandmhz	Demand (MHz)	CPU demand in megahertz.
cpu iowait	IO Wait (ms)	IO wait time in milliseconds.
cpu numpackages	Number of CPU Sockets	Number of CPU sockets.
cpu capacity_contention	Overall CPU Contention (ms)	Overall CPU contention in milliseconds.
cpu capacity_provisioned	Provisioned Capacity (MHz)	Capacity in MHz of the physical CPU cores.
cpu corecount_provisioned	Provisioned virtual CPUs	Provisioned virtual CPUs.
cpu wait	Total Wait	CPU time spent in idle state.
cpu demand_average	Demand	CPU demand.
cpu used_summation	Used (msec)	Time accounted to the virtual machine. If a system service runs on behalf of this virtual machine, the time spent by that service (represented by cpu.system) should be charged to this virtual machine. If not, the time spent (represented by cpu.overlap) should not be charged against this virtual machine.
cpu usagemhz_average	Usage (MHz)	CPU use in megahertz.

Metric Key	Metric Name	Description
cpu reservedCapacity_average	Reserved Capacity (MHz)	The sum of the reservation properties of the (immediate) children of the host's root resource pool.
cpu totalCapacity_average	Total Capacity (MHz)	Total CPU capacity in megahertz.
cpu idle_summation	Idle (ms)	CPU idle time in milliseconds.
cpu overhead_average	Overhead (KB)	Amount of CPU overhead.
cpu demand_without_overhead	Demand without overhead	Value of demand excluding any overhead.
cpu coreUtilization_average	Core Utilization (%)	Percent core utilization.
cpu utilization_average	Utilization(%)	Percent CPU utilization.
cpu coreUtilization_average	Core Utilization (%)	Core Utilization.
cpu utilization_average	Utilization (%)	Utilization.
cpu costop_summation	Co-stop (ms)	Time the VM is ready to run, but is unable to due to co-scheduling constraints.
cpu latency_average	Latency (%)	Percentage of time the VM is unable to run because it is contending for access to the physical CPUs.
cpu ready_summation	Ready (ms)	Time spent in ready state.
cpu run_summation	Run (ms)	Time the virtual machine is scheduled to run.
cpu swapwait_summation	Swap wait (ms)	Amount of time waiting for swap space.
cpu wait_summation	Wait (ms)	Total CPU time spent in wait state.
cpu vm_capacity_provisioned	Provisioned Capacity	Provisioned capacity (MHz).
cpu acvmWorkloadDisparityPcttive_longterm_load	Active Host Load For Balance (Long Term)	Active Host Load For Balance (Long Term).
cpu active_shortterm_load	Active Host Load For Balance (Short Term)	Active Host Load For Balance (Short Term).

## CPU Utilization for Resources Metrics for Host Systems

CPU utilization for resources metrics provide information about CPU activity.

**Table 1-32. CPU Utilization for Resources Metrics for Host Systems**

Metric Key	Metric Name	Description
rescpu actav1_latest rescpu actav5_latest rescpu actav15_latest rescpu actpk1_latest rescpu actpk5_latest rescpu actpk15_latest	CPU Active (%) ( <i>interval</i> )	Average active time for the CPU over the past minute, past five minutes, and at one-minute, five-minute, and 15-minute peak active times.
rescpu runav1_latest rescpu runav5_latest rescpu runav15_latest rescpu runpk1_latest rescpu runpk5_latest rescpu runpk15_latest	CPU Running (%) ( <i>interval</i> )	Average run time for the CPU over the past minute, past five minutes, past 15 minutes, and at one-minute, five-minute, and 15-minute peak times.
rescpu maxLimited1_latest rescpu maxLimited5_latest rescpu maxLimited15_latest	CPU Throttled (%) ( <i>interval</i> )	Scheduling limit over the past minute, past five minutes, and past 15 minutes
rescpu sampleCount_latest	Group CPU Sample Count	Group CPU sample count.
rescpu samplePeriod_latest	Group CPU Sample Period (ms)	Group CPU sample period in milliseconds.

## Datastore Metrics for Host Systems

Datastore metrics provide information about datastore use.

**Table 1-33. Datastore Metrics for Host Systems**

Metric Key	Metric Name	Notes
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore maxObserved_NumberRead	Max Observed Reads per second	Max observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate	Max observed rate of reading data from the datastore.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.
datastore maxObserved_Write	Max Observed Write Rate	Max observed rate of writing data from the datastore.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Max Observed Number of Outstanding IO Operations.
datastore commandsAveraged_average	Commands Averaged	Average number of commands issued per second during the collection interval.
datastore oio	Number of Outstanding IO Operations	Number of outstanding IO operations.

Metric Key	Metric Name	Notes
datastore totalLatency_average	Disk Command Latency (ms)	The average amount of time taken for a command from the perspective of a Guest OS. This is the sum of Kernel Command Latency and Physical Device Command Latency.
datastore usage_average	Usage Average (KBps)	Usage Average (KBps).
datastore demand	Demand	Demand.
datastore datastoreIops_average	Storage I/O Control aggregated IOPS	Aggregate number of IO operations on the datastore.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read Rate (KBps)	Rate of reading data from the datastore in kilobytes per second.
datastore sizeNormalizedDatastoreLatency_average	Storage I/O Control normalized latency (ms)	Normalized latency in microseconds on the datastore. Data for all virtual machines is combined.
datastore totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation from the datastore. Total latency = kernel latency + device latency.
datastore totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation to the datastore. Total latency = kernel latency + device latency.
datastore write_average	Write Rate (KBps)	Rate of writing data to the datastore in kilobytes per second.
datastore datastoreMaxQueueDepth_latest	Max Queue Depth	Max Queue Depth.
datastore maxTotalLatency_latest	Highest Latency	Highest Latency.
datastore totalLatency_max	Total Latency Max	Total Latency Max (ms).
datastore datastoreNormalReadLatency_latest	Read Latency	Read Latency.
datastore datastoreNormalWriteLatency_latest	Write Latency	Write Latency.
datastore datastoreReadBytes_latest	Data Read	Data Read.
datastore datastoreReadIops_latest	Data Read Rate	Data Rate.
datastore datastoreReadLoadMetric_latest	Read Load	Storage DRS metric read load.
datastore datastoreReadOIO_latest	Outstanding Read Requests	Outstanding Read Requests.
datastore datastoreWriteBytes_latest	Data Written	Data Written.
datastore datastoreWriteIops_latest	Data Write Rate	Data Write Rate.
datastore datastoreWriteLoadMetric_latest	Write Load	Storage DRS metric write load.

Metric Key	Metric Name	Notes
datastore datastoreWriteOIO_latest	Outstanding Write Requests	Outstanding Write Requests.
datastore vmPopulationAvgWorkload	Average Observed Virtual Machine Disk I/O Workload	Average Observed Virtual Machine Disk I/O Workload on the Host.
datastore vmPopulationMaxWorkload	Maximum Observed VM Disk I/O Workload	Maximum Observed VM Disk I/O Workload on the Host.
datastore vmWorkloadDisparityPct	VM Disk I/O Workload Disparity	Percentage Disk I/O workload disparity among the VMs on the Host.

## Disk Metrics for Host Systems

Disk metrics provide information about disk use.

**Table 1-34. Disk Metrics for Host Systems**

Metric Key	Metric Name	Description
disk usage_average	Usage Rate (KBps)	Average of the sum of the data read and written for all of the disk instances of the host or virtual machine.
disk usage_capacity	I/O Usage Capacity	I/O Usage Capacity.
disk commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
disk totalLatency_average	Disk Command Latency (ms)	The average amount of time taken for a command from the perspective of a Guest OS. This is the sum of Kernel Command Latency and Physical Device Command Latency.
disk numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
disk numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
disk numberRead_summation	Read Requests	Number of times data was read from the disk in the defined interval.
disk numberWrite_summation	Write Requests	Number of times data was written to the disk in the defined interval.
disk read_average	Read Rate	Amount of data read in the performance interval.
disk write_average	Write Rate	Amount of data written to disk in the performance interval.
disk busResets_summation	Bus Resets	The number of bus resets in the performance interval.
disk commands_summation	Commands Issued	The number of disk commands issued in the performance interval.



Metric Key	Metric Name	Description
disk commandsAborted_summation	Commands Aborted	The number of disk commands aborted in the performance interval.
disk deviceReadLatency_average	Physical Device Read Latency (ms)	The average time taken to complete a read from the physical device.
disk kernelReadLatency_average	Kernel Disk Read Latency (ms)	The average time spent in ESX Server VMKernel per read.
disk totalReadLatency_average	Disk Read Latency (ms)	The average amount of time taken for a read from the perspective of a Guest OS. This is the sum of Kernel Read Latency and Physical Device Read Latency.
disk queueReadLatency_average	Queue Read Latency (ms)	The average time spent in the ESX Server VMKernel queue per read.
disk deviceWriteLatency_average	Physical Device Write Latency (ms)	The average time taken to complete a write from the physical device.
disk kernelWriteLatency_average	Kernel Disk Write Latency (ms)	The average time spent in ESX Server VMKernel per write.
disk totalWriteLatency_average	Disk Write Latency (ms)	The average amount of time taken for a write from the perspective of a Guest OS. This is the sum of Kernel Write Latency and Physical Device Write Latency.
disk queueWriteLatency_average	Queue Write Latency (ms)	The average time spent in the ESX Server VMKernel queue per write.
disk deviceLatency_average	Physical Device Command Latency (ms)	The average time taken to complete a command from the physical device.
disk kernelLatency_average	Kernel Disk Command Latency (ms)	The average time spent in ESX Server VMKernel per command.
disk queueLatency_average	Queue Command Latency (ms)	The average time spent in the ESX Server VMKernel queue per command.
disk diskoio	Number of Outstanding IO Operations	Number of Outstanding IO Operations.
disk diskqueued	Queued Operations	Queued Operations.
disk diskdemand	Demand	Demand.
disk sum_queued_oio	Total Queued Outstanding operations	Sum of Queued Operation and Outstanding Operations.
disk max_observed	Max Observed OIO	Max Observed IO for a disk.
disk maxTotalLatency_latest	Highest Latency	Highest Latency.
disk maxQueueDepth_average	Max Queue Depth	Maximum queue depth during the collection interval.
disk scsiReservationConflicts_summation	SCSI Reservation Conflicts	SCSI Reservation Conflicts.

## Memory Metrics for Host Systems

Memory metrics provide information about memory use and allocation.

**Table 1-35. Memory Metrics for Host Systems**

Metric Key	Metric Name	Description
mem host_contentionPct	Contention (%)	Percent host contention.
mem host_contention	Contention (KB)	Host contention in kilobytes.
mem host_usage	Host Usage (KB)	Machine usage in kilobytes.
mem host_demand	Machine Demand (KB)	Host demand in kilobytes.
mem host_usageVM	Overall Memory used to run VMs on Host (KB)	Overall memory used to run virtual machines on the host in kilobytes.
mem host_provisioned	Provisioned Memory (KB)	Provisioned memory in kilobytes.
mem host_minfree	Minimum Free Memory (KB)	Minimum free memory.
mem reservedCapacityPct	Reserved Capacity (%)	Percent reserved capacity.
mem host_usable	Usable Memory (KB)	Usable memory in kilobytes.
mem host_usagePct	Usage (%)	Memory currently in use as a percentage of total available memory.
mem host_systemUsage	ESX System Usage	Memory usage by the VMkernel and ESX user-level services.
mem active_average	Guest Active (KB)	Amount of memory that is actively used.
mem consumed_average	Consumed (KB)	Amount of host memory consumed by the virtual machine for guest memory.
mem granted_average	Granted (KB)	Amount of memory available for use.
mem heap_average	Heap (KB)	Amount of memory allocated for heap.
mem heapfree_average	Heap Free (KB)	Amount of free space in the heap.
mem overhead_average	VM Overhead (KB)	Memory overhead reported by host.
mem reservedCapacity_average	Reserved Capacity (KB)	Reserved capacity in kilobytes.
mem shared_average	Shared (KB)	Amount of shared memory in kilobytes.
mem sharedcommon_average	Shared Common (KB)	Amount of shared common memory in kilobytes.
mem swpin_average	Swap In (KB)	Amount of memory swapped in.
mem swapout_average	Swap Out (KB)	Amount of memory swapped out.
mem swapped_average	Swap Used (KB)	Amount of memory used for swapped space in kilobytes.
mem sysUsage_average	VM kernel Usage (KB)	Amount of memory used by the VM kernel.

Metric Key	Metric Name	Description
mem unreserved_average	Unreserved (KB)	Amount of unreserved memory in kilobytes.
mem vmmemctl_average	Balloon (KB)	Amount of memory currently used by the virtual machine memory control.
mem zero_average	Zero (KB)	Amount of memory that is all zero.
mem state_latest	State (0-3)	Overall state of the memory. The value is an integer between 0 (high) and 3 (low).
mem host_usage	Usage (KB)	Host memory use in kilobytes.
mem usage_average	Usage (%)	Memory currently in use as a percentage of total available memory.
mem swapinRate_average	Swap In Rate (KBps)	Rate at which memory is swapped from disk into active memory during the interval in kilobyte per second.
mem swapoutRate_average	Swap Out Rate (KBps)	Rate at which memory is being swapped from active memory to disk during the current interval in kilobytes per second.
mem activewrite_average	Active Write (KB)	Average active writes in kilobytes.
mem compressed_average	Compressed (KB)	Average memory compression in kilobytes.
mem compressionRate_average	Compression Rate (KBps)	Average compression rate in kilobytes per second.
mem decompressionRate_average	Decompression Rate (KBps)	Decompression rate in kilobytes per second.
mem totalCapacity_average	Total Capacity (KB)	Total capacity in kilobytes.
mem latency_average	Latency	Percentage of time the VM is waiting to access swapped or compressed memory.
mem capacity.contention_average	Capacity Contention	Capacity Contention.
mem   SwapInRate_average	Swap In Rate from Host Cache	Rate at which memory is being swapped from host cache into active memory.
mem   SwapIn_average	Swap In from Host Cache	Amount of memory swapped-in from host cache.
mem   SwapOutRate_average	Swap Out Rate to Host Cache	Rate at which memory is being swapped to host cache from active memory.
mem   SwapOut_average	Swap Out to Host Cache	Amount of memory swapped-out to host cache.
mem   SwapUsed_average	Swap Space Used in Host Cache	Space used for caching swapped pages in the host cache.

Metric Key	Metric Name	Description
mem lowfreethreshold_average	Low Free Threshold	Threshold of free host physical memory below which ESX will begin reclaiming memory from VMs through ballooning and swapping.
mem vmWorkloadDisparityPct	VM Memory Workload Disparity	Percentage Memory workload disparity among the VMs on the Host.
mem active_longterm_load	Active Host Load For Balance (Long Term)	Active Host Load For Balance (Long Term).
mem active_shortterm_load	Active Host Load For Balance (Short Term)	Active Host Load For Balance (Short Term).

## Network Metrics for Host Systems

Network metrics provide information about network performance.

**Table 1-36. Network Metrics for Host Systems**

Metric Key	Metric Name	Description
net packetsRxPerSec	Packets Received per second	Number of packets received in the performance interval.
net packetsTxPerSec	Packets Transmitted per second	Number of packets transmitted in the performance interval.
net packetsPerSec	Packets per second	Number of packets transmitted and received per second.
net usage_average	Usage Rate (KBps)	The sum of the data transmitted and received for all the NIC instances of the host or virtual machine.
net usage_capacity	I/O Usage Capacity	I/O Usage Capacity.
net maxObserved_KBps	Max Observed Throughput	Max observed rate of network throughput.
net maxObserved_Tx_KBps	Max Observed Transmitted Throughput	Max observed transmitted rate of network throughput.
net maxObserved_Rx_KBps	Max Observed Received Throughput	Max observed received rate of network throughput.
net demand	Demand (%)	Percent demand.
net transmitted_average	Data Transmit Rate (KBps)	Average amount of data transmitted per second.
net received_average	Data Receive Rate (KBps)	Average amount of data received per second.
net packetsRx_summation	Packets Received	Number of packets received in the performance interval.
net packetsTx_summation	Packets Transmitted	Number of packets transmitted in the performance interval.
net droppedRx_summation	Received Packets Dropped	Number of received packets dropped in the performance interval.

Metric Key	Metric Name	Description
net droppedTx_summation	Transmitted Packets Dropped	Number of transmitted packets dropped in the performance interval.
net droppedPct	Packets Dropped (%)	Percent packets dropped.
net dropped	Packets Dropped	Number of packets dropped in the performance interval.
net bytesRx_average	bytes Rx (KBps)	Average amount of data received per second.
net bytesTx_average	bytes Tx (KBps)	Average amount of data transmitted per second.
net broadcastRx_summation	Broadcast Packets Received	Number of broadcast packets received during the sampling interval.
net broadcastTx_summation	Broadcast Packets Transmitted	Number of broadcast packets transmitted during the sampling interval.
net errorsRx_summation	Error Packets Received	Number of packets with errors received.
net errorsTx_summation	Error Packets Transmitted	Number of packets with errors transmitted.
net multicastRx_summation	Multicast Packets Received	Number of multicast packets received.
net multicastTx_summation	Multicast Packets Transmitted	Number of multicast packets transmitted.
net throughput.usage.ft_average	FT Throughput Usage	FT Throughput Usage.
net throughput.usage.hbr_average	HBR Throughput Usage	HBR Throughput Usage.
net throughput.usage.iscsi_average	iSCSI Throughput Usage	iSCSI Throughput Usage.
net throughput.usage.nfs_average	NFS Throughput Usage	NFS Throughput Usage.
net throughput.usage.vm_average	VM Throughput Usage	VM Throughput Usage.
net throughput.usage.vmotion_average	vMotion Throughput Usage	vMotion Throughput Usage.
net unknownProtos_summation	Unknown Protocol Frames Received	Number of frames with unknown protocol received.

## System Metrics for Host Systems

System metrics provide information about the amount of CPU that resources and other applications use.

**Table 1-37. System Metrics for Host Systems**

Metric Key	Metric Name	Description
sys poweredOn	Power ON	1 if the host system is powered on, 0 if the host system is powered off, or -1 if the power state is unknown.
sys uptime_latest	Uptime (seconds)	Number of seconds since the last system startup.
sys diskUsage_latest	Disk Usage (%)	Percent disk use.
sys resourceCpuUsage_average	Resource CPU Usage (MHz)	Amount of CPU that the Service Console and other applications use.

Metric Key	Metric Name	Description
sys resourceCpuAct1_latest	Resource CPU Active (1 min. average)	Percentage of resource CPU that is active. Average value during a one-minute period.
sys resourceCpuAct5_latest	Resource CPU Active (%) (5 min. average)	Percentage of resource CPU that is active. Average value during a five-minute period.
sys resourceCpuAllocMax_latest	Resource CPU Alloc Max (MHz)	Maximum resource CPU allocation in megahertz.
sys resourceCpuAllocMin_latest	Resource CPU Alloc Min (MHz)	Minimum resource CPU allocation in megahertz.
sys resourceCpuAllocShares_latest	Resource CPU Alloc Shares	Number of resource CPU allocation shares.
sys resourceCpuMaxLimited1_latest	Resource CPU Max Limited (%) (1 min. average)	Percent of resource CPU that is limited to the maximum amount. Average value during a one-minute period.
sys resourceCpuMaxLimited5_latest	Resource CPU Max Limited (%) (5 min. average)	Percentage of resource CPU that is limited to the maximum amount. Average value during a five-minute period.
sys resourceCpuRun1_latest	Resource CPU Run1 (%)	Percent resource CPU for Run1.
sys resourceCpuRun5_latest	Resource CPU Run5 (%)	Percent resource CPU for Run5.
sys resourceMemAllocMax_latest	Resource Memory Alloc Max (KB)	Maximum resource memory allocation in kilobytes.
sys resourceMemAllocMin_latest	Resource Memory Alloc Min (KB)	Minimum resource memory allocation in kilobytes.
sys resourceMemAllocShares_latest	Resource Memory Alloc Shares	Number of resource memory shares allocated.
sys resourceMemCow_latest	Resource Memory Cow (KB)	Cow resource memory in kilobytes.
sys resourceMemMapped_latest	Resource Memory Mapped (KB)	Mapped resource memory in kilobytes.
sys resourceMemOverhead_latest	Resource Memory Overhead (KB)	Resource memory overhead in kilobytes.
sys resourceMemShared_latest	Resource Memory Shared (KB)	Shared resource memory in kilobytes.
sys resourceMemSwapped_latest	Resource Memory Swapped (KB)	Swapped resource memory in kilobytes.
sys resourceMemTouched_latest	Resource Memory Touched (KB)	Touched resource memory in kilobytes.
sys resourceMemZero_latest	Resource Memory Zero (KB)	Zero resource memory in kilobytes.
sys resourceMemConsumed_latest	Resource Memory Consumed	Resource Memory Consumed Latest (KB).
sys resourceFdUsage_latest	Resource File descriptors usage	Resource File descriptors usage (KB).
sys vmotionEnabled	vMotion Enabled	1 if vMotion is enabled or 0 if vMotion is not enabled.
sys notInMaintenance	Not in Maintenance	Not in maintenance.

## Management Agent Metrics for Host Systems

Management agent metrics provide information about memory use.

**Table 1-38. Management Agent Metrics for Host Systems**

Metric Key	Metric Name	Description
managementAgent memUsed_average	Memory Used (%)	Amount of total configured memory that is available for use.
managementAgent swapUsed_average	Memory Swap Used (KB)	Sum of the memory swapped by all powered-on virtual machines on the host.
managementAgent swapIn_average	Memory Swap In (KBps)	Amount of memory that is swapped in for the Service Console.
managementAgent swapOut_average	Memory Swap Out (KBps)	Amount of memory that is swapped out for the Service Console.
managementAgent cpuUsage_average	CPU Usage	CPU usage.

## Storage Path Metrics for Host Systems

Storage path metrics provide information about data storage use.

**Table 1-39. Storage Adapter Metrics for Host Systems**

Metric Key	Metric Name	Description
storagePath totalLatency	Total Latency (ms)	Total latency in milliseconds.
storagePath usage	Total Usage (KBps)	Total latency in kilobytes per second.
storagePath read_average	Read Rate (KBps)	Rate of reading data from the virtual disk.
storagePath write_average	Write Rate (KBps)	Rate of writing data.
storagePath commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
storagePath numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
storagePath totalWriteLatency_average	Writes per second	Average number of write commands issued per second during the collection interval.
storagePath numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
storagePath totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation by the storage adapter.
storagePath maxTotalLatency_latest	Highest Latency	Highest Latency.
storagePath storagePathName	Storage Path Name	Storage path name.

## Storage Adapter Metrics for Host Systems

Storage adapter metrics provide information about data storage use.

**Table 1-40. Storage Adapter Metrics for Host Systems**

Metric Key	Metric Name	Description
storageAdapter usage	Total Usage (KBps)	Total latency.
storageAdapter portWWN	Port WWN	Port World Wide Name.
storageAdapter commandsAveraged_average	Commands per second	Average number of commands issued per second by the storage adapter during the collection interval.
storageAdapter numberReadAveraged_average	Reads per second	Average number of read commands issued per second by the storage adapter during the collection interval.
storageAdapter numberWriteAveraged_average	Writes per second	Average number of write commands issued per second by the storage adapter during the collection interval.
storageAdapter read_average	Read Rate (KBps)	Rate of reading data by the storage adapter.
storageAdapter totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation by the storage adapter. Total latency is the sum of kernel latency and device latency.
storageAdapter totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation by the storage adapter. Total latency is the sum of kernel latency and device latency.
storageAdapter write_average	Write Rate (KBps)	Rate of writing data by the storage adapter.
storageAdapter demand	Demand	Demand.
storageAdapter maxTotalLatency_latest	Highest Latency	Highest Latency.
storageAdapter outstandingIOs_average	Outstanding Requests	Outstanding Requests.
storageAdapter queueDepth_average	Queue Depth	Queue Depth.
storageAdapter queueLatency_average	Queue Command Latency (ms)	The average time spent in the ESX Server VM Kernel queue per command.
storageAdapter queued_average	Queued	Queued.

## Storage Metrics for Host Systems

Storage metrics provide information about storage use.

**Table 1-41. Storage Metrics for Host Systems**

Metric Key	Metric Name	Description
storage commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
storage totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation in milliseconds.



Metric Key	Metric Name	Description
storage read_average	Read Rate (KBps)	Read throughput rate in kilobytes.
storage numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
storage totalLatency_average	Total Latency (ms)	Total latency in milliseconds.
storage usage_average	Total Usage (KBps)	Total throughput rate in kilobytes per second.
storage totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation in milliseconds.
storage write_average	Write Rate (KBps)	Write throughput rate in kilobytes per second.
storage numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.

## Sensor Metrics for Host Systems

Sensor metrics provide information about host system cooling.

**Table 1-42. Fan Metrics for Host Systems**

Metric Key	Metric Name	Description
Sensor fan currentValue	Speed (%)	Percent fan speed.
Sensor fan healthState	Health State	Fan health state.
Sensor temperature currentValue	Temp C	Fan temperature in centigrade.
Sensor temperature healthState	Health State	Fan health state.

## Power Metrics for Host Systems

Power metrics provide information about host system power use.

**Table 1-43. Power Metrics for Host Systems**

Metric Key	Metric Name	Description
power energy_summation	Energy (Joule)	Host power use in joules.
power power_average	Power (Watt)	Host power use in watts.
power powerCap_average	Power Cap (Watt)	Host power capacity in watts.

## Disk Space Metrics for Host Systems

Disk space metrics provide information about disk space use.

**Table 1-44. Disk Space Metrics for Host Systems**

Metric Key	Metric Name	Description
diskspace notshared	Not Shared (GB)	Unshared disk space in gigabytes.
diskspace numvmdisk	Number of Virtual Disks	Number of virtual disks.
diskspace shared	Shared Used (GB)	Used shared disk space in gigabytes.
diskspace snapshot	Snapshot Space (GB)	Disk space used by snapshots in gigabytes.
diskspace diskused	Virtual Disk Used (GB)	Disk space used by virtual disks in gigabytes.
diskspace used	Virtual machine used (GB)	Disk space used by virtual machines in gigabytes.
diskspace total_usage	Total disk space used	Total disk space used on all datastores visible to this object.
diskspace total_capacity	Total disk space	Total disk space on all datastores visible to this object.
diskspace total_provisioned	Total provisioned disk space	Total provisioned disk space on all datastores visible to this object .

## Summary Metrics for Host Systems

Summary metrics provide information about overall host system performance.

**Table 1-45. Summary Metrics for Host Systems**

Metric Key	Metric Name	Description
summary number_running_vms	Number of Running VMs	Number of virtual machines that are on.
summary max_number_vms	Maximum Number of VMs	Maximum number of virtual machines
summary number_vmotion	Number of vMotions	Number of vMotions.
summary total_number_datastores	Total Number of Datastores	Total Number of Datastores.
summary number_running_vcpus	Number of VCPUs on Powered On VMs	Total number of VCPUs of Virtual Machines that are powered on.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary workload_indicator	Workload Indicator (%)	Percent workload indicator.

## HBR Metrics for Host Systems

Host-based replication (HBR) metrics provide information about vSphere replication.

**Table 1-46. HBR Metrics for Host Systems**

Metric Key	Metric Name	Description
hbr hbrNetRx_average	Replication Data Received Rate	Replication Data Received Rate.
hbr hbrNetTx_average	Replication Data Transmitted Rate	Replication Data Transmitted Rate.
hbr hbrNumVms_average	Replicated VM Count	Number of replicated virtual machines.

## Cluster Compute Resource Metrics

vRealize Operations Manager collects configuration, storage, disk space, CPU use, disk, memory, network, power, and summary metrics for cluster compute resources.

Cluster Compute Resource metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

## Configuration Metrics for Cluster Compute Resources

Configuration metrics provide information about configuration settings.

**Table 1-47. Configuration Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
configuration dasconfig failoverLevel	Failover Level	DAS configuration failover level.
configuration dasconfig activeAdministrationControlPolicy	Active Admission Control Policy	DAS configuration active admission control policy.
configuration dasconfig admissionControlPolicy cpuFailoverResourcesPercent	CPU Failover Resources Percent	Percent CPU failover resources for DAS configuration admission control policy.
configuration dasconfig admissionControlPolicy memoryFailoverResourcesPercent	Memory Failover Resources Percent	Percent memory failover resources for DAS configuration admission control policy.

## Storage Metrics for Cluster Compute Resources

Storage metrics provide information about storage use.

**Table 1-48. Storage Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
storage usage_average	Total Usage	Total throughput rate in kilobytes per second.

## Disk Space Metrics for Cluster Compute Resources

Disk space metrics provide information about disk space use.

**Table 1-49. Disk Space Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
diskspace used	Virtual machine used (GB)	Space used by virtual machine files in gigabytes.
diskspace total_usage	Total disk space used	Total disk space used on all datastores visible to this object.
diskspace total_capacity	Total disk space	Total disk space on all datastores visible to this object.
diskspace total_provisioned	Total provisioned disk space	Total provisioned disk space on all datastores visible to this object.

Metric Key	Metric Name	Description
diskspace diskused	Virtual Disk Used (GB)	Space used by virtual disks in gigabytes.
diskspace snapshot	Snapshot Space (GB)	Space used by snapshots in gigabytes.
diskspace shared	Shared Used (GB)	Shared used space in gigabytes.
diskspace notshared	Not Shared (GB)	Space used by VMs that is not shared.

## CPU Usage Metrics for Cluster Compute Resources

CPU usage metrics provide information about CPU use.

**Table 1-50. CPU Usage Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
cpu capacity_usagepct_average	Capacity Usage	Percent capacity used.
cpu capacity_contentionPct	CPU Contention	CPU capacity contention.
cpu demandPct	Demand	CPU demand percentage.
cpu demandmhz	Demand	Demand in megahertz.
cpu iowait	IO Wait	IO wait time in milliseconds.
cpu numpackages	Number of CPU Sockets	Number of CPU sockets.
cpu capacity_contention	Overall CPU Contention	Overall CPU contention in milliseconds.
cpu capacity_provisioned	Host Provisioned Capacity	Provisioned CPU capacity in megahertz.
cpu corecount_provisioned	Provisioned vCPUs	Number of provisioned CPU cores.
cpu reservedCapacity_average	Reserved Capacity	The sum of the reservation properties of the (immediate) children of the host's root resource pool in megahertz.
cpu wait	Wait	CPU time spent on idle state in milliseconds.
cpu usagemhz_average	Usage (MHz)	Average CPU use in megahertz.
cpu totalCapacity_average	Total Capacity	Total CPU capacity in megahertz.
cpu demand_average	Demand	CPU Demand.
cpu overhead_average	Overhead	Amount of CPU overhead.
cpu demand_without_overhead	Demand without overhead	Value of demand excluding any overhead.
cpu vm_capacity_provisioned	Provisioned Capacity	Provisioned Capacity (MHz).
cpu num_hosts_stressed	Number of hosts stressed	Number of hosts stressed.
cpu stress_balance_factor	Stress Balance Factor	Stress Balance Factor.
cpu min_host_capacity_remaining	Lowest Provider Capacity Remaining	Lowest Provider Capacity Remaining.
cpu workload_balance_factor	Workload Balance Factor	Workload Balance Factor.
cpu max_host_workload	Highest Provider Workload	Highest Provider Workload.

Metric Key	Metric Name	Description
cpu host_workload_disparity	Host workload Max-Min Disparity	Difference of Max and Min host workload in the container.
cpu host_stress_disparity	Host stress Max-Min Disparity	Difference of Max and Min host stress in the container.

## Disk Metrics for Cluster Compute Resources

Disk metrics provide information about disk use.

**Table 1-51. Disk Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
disk commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
disk totalLatency_average	Disk Command Latency (ms)	Average amount of time taken for a command from the perspective of the guest operating system. This metric is the sum of the Kernel Command Latency and Physical Device Command Latency metrics.
disk totalReadLatency_average	Disk Read Latency	Average amount of time for a read operation from the virtual disk. The total latency is the sum of Kernel latency and device latency.
disk totalWriteLatency_average	Disk Write Latency	The average amount of time taken for a read from the perspective of a Guest OS. This is the sum of Kernel Read Latency and Physical Device Read Latency.
disk numberRead_summation	Read Rate (KBps)	Number of times data was read from the disk in the defined interval.
disk numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
disk usage_average	Usage Rate (KBps)	Average of the sum of the data read and written for all of the disk instances of the host or virtual machine.
disk numberWrite_summation	Write Rate (KBps)	Number of times data was written to disk during the collection interval.
disk numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
disk read_average	Read Requests	Amount of data read from the disk during the collection interval.
disk write_average	Write Requests	Amount of data written to the disk during the collection interval.
disk commands_summation	Commands Issued	Number of disk commands issued during the collection interval.

Metric Key	Metric Name	Description
disk sum_queued_oio	Total Queued Outstanding operations	Sum of queued operation and outstanding operations.
disk max_observed	Max Observed OIO	Max observed outstanding IO for a disk.

## Memory Metrics for Cluster Compute Resources

Memory metrics provide information about memory use and allocation.

**Table 1-52. Memory Metrics for Cluster Computer Resources**

Metric Key	Metric Name	Description
mem activewrite_average	Active Write (KB)	Active writes in kilobytes.
mem compressed_average	Compressed (KB)	Average compression in kilobytes.
mem compressionRate_average	Compression Rate (KBps)	Average compression rate in kilobytes.
mem consumed_average	Consumed (KB)	Amount of host memory consumed by the virtual machine for guest memory.
mem host_contentionPct	Contention	Machine contention percentage.
mem host_contention	Contention (KB)	Contention in kilobytes.
mem decompressionRate_average	Decompression Rate (KBps)	Decompression rate in kilobytes.
mem granted_average	Granted (KB)	Amount of memory available for use.
mem active_average	Guest Active (KB)	Amount of memory that is actively used.
mem heap_average	Heap (KB)	Amount of memory allocated for heap.
mem heapfree_average	Heap Free (KB)	Free space in the heap.
mem vmemctl_average	Balloon	Amount of memory currently used by the virtual machine memory control.
mem overhead_average	VM Overhead (KB)	Memory overhead reported by host.
mem host_provisioned	Provisioned Memory (KB)	Provisioned memory in kilobytes.
mem reservedCapacity_average	Reserved Capacity (KB)	Reserved capacity in kilobytes.
mem shared_average	Shared (KB)	Amount of shared memory.
mem sharedcommon_average	Shared Common (KB)	Amount of shared common memory.
mem swpin_average	Swap In (KB)	Amount of memory that is swapped in for the service console.
mem swpinRate_average	Swap In Rate (KBps)	Rate at which memory is swapped from disk into active memory during the interval.
mem swapout_average	Swap Out (KB)	Amount of memory that is swapped out for the service console.
mem swapoutRate_average	Swap Out Rate (KBps)	Rate at which memory is being swapped from active memory into disk during the current interval.
mem swapused_average	Swap Used (KB)	Amount of memory used for swap space.

Metric Key	Metric Name	Description
mem totalCapacity_average	Total Capacity (KB)	Total capacity in kilobytes.
mem unreserved_average	Unreserved (KB)	Amount of unreserved memory.
mem host_usable	Usable Memory (KB)	Usable memory in kilobytes.
mem host_usagePct	Usage/Usable	Percent memory used.
mem host_usage	Host Usage (KB)	Memory use in kilobytes.
mem host_demand	Machine Demand	Memory Machine Demand in KB.
mem host_systemUsage	ESX System Usage	Memory usage by the VMkernel and ESX user-level services.
mem usage_average	Usage	Memory currently in use as a percentage of total available memory.
mem sysUsage_average	VM kernel Usage (KB)	Amount of memory that the VM kernel uses.
mem zero_average	Zero (KB)	Amount of memory that is all 0.
mem num_hosts_stressed	Number of hosts stressed	Number of hosts stressed.
mem stress_balance_factor	Stress Balance Factor	Stress balance factor.
mem min_host_capacity_remaining	Lowest Provider Capacity Remaining	Lowest provider capacity remaining.
mem workload_balance_factor	Workload Balance Factor	Workload balance factor.
mem max_host_workload	Highest Provider Workload	Highest provider workload.
mem host_workload_disparity	Host workload Max-Min Disparity	Difference of Max and Min host workload in the container.
mem host_stress_disparity	Host stress Max-Min Disparity	Difference of Max and Min host stress in the container.

## Network Metrics for Cluster Compute Resources

Network metrics provide information about network performance.

**Table 1-53. Network Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
net received_average	Data Receive Rate (KBps)	Average amount of data received per second.
net transmitted_average	Data Transmit Rate (KBps)	Average amount of data transmitted per second.
net dropped	Packets Dropped	Number of packets dropped in the performance interval.
net droppedPct	Packets Dropped (%)	Percentage of packets dropped.
net packetsRx_summation	Packets Received	Number of packets received in the performance interval.
net packetsTx_summation	Packets Transmitted	Number of packets transmitted in the performance interval.
net droppedRx_summation	Received Packets Dropped	Number of received packets dropped in the performance interval.

Metric Key	Metric Name	Description
net droppedTx_summation	Transmitted Packets Dropped	Number of transmitted packets dropped in the performance interval.
net usage_average	Usage Rate (KBps)	The sum of the data transmitted and received for all the NIC instances of the host or virtual machine.
net maxObservedKBps	Max Observed Throughput	Max observed rate of network throughput.
net maxObserved_Tx_KBps	Max Observed Transmitted Throughput	Max observed transmitted rate of network throughput.
net maxObserved_Rx_KBps	Max Observed Received Throughput	Max observed received rate of network throughput.

## Datastore Metrics for Cluster Compute Resources

Datastore metrics provide information about Datastore use.

**Table 1-54. Datastore Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
datastore maxObserved_NumberRead	Max Observed Reads per second	Max observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate	Max observed rate of reading data from the datastore.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.
datastore maxObserved_Write	Max Observed Write Rate	Max observed rate of writing data from the datastore.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Max Observed Number of Outstanding IO Operations.
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read Rate	Amount of data read in the performance interval.
datastore write_average	Write Rate	Amount of data written to disk in the performance interval.

## Cluster Services Metrics for Cluster Compute Resources

Cluster Services metrics provide information about cluster services.



**Table 1-55. Cluster Services Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
clusterServices effectivecpu_average	Effective CPU Resources (MHz)	VMware DRS effective CPU resources available.
clusterServices effectivemem_average	Effective Memory Resources (KB)	VMware DRS effective memory resources available.

## Power Metrics for Cluster Compute Resources

Power metrics provide information about power use.

**Table 1-56. Power Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
power energy_summation	Energy (Joule)	Energy use in joules.
power power_average	Power (Watt)	Average power use in watts.
power powerCap_average	Power Cap (Watt)	Average power capacity in watts.

## Summary Metrics for Cluster Compute Resources

Summary metrics provide information about overall performance.

**Table 1-57. Summary Metrics for Cluster Compute Resources**

Metric Key	Metric Name	Description
summary number_running_hosts	Number of Running Hosts	Number of running hosts.
summary number_running_vms	Number of Running VMs	Number of running virtual machines.
summary number_vmotion	Number of vMotions	Number of vMotions.
summary total_number_hosts	Total Number of Hosts	Total number of hosts.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary max_number_vms	Maximum Number of VMs	Maximum Number of virtual machines.
summary workload_indicator	Workload Indicator	Percent workload indicator.
summary total_number_datastores	Total Number of Datastores	Total number of datastores.
summary number_running_vcpus	Number of VCPUs on Powered On VMs	Number of virtual CPUs on powered-on virtual machines.
summary avg_vm_density	Average Running VM Count per Running Host	Average number of running virtual machines per running host.

Metric Key	Metric Name	Description
summary avg_vm_cpu	Average Provisioned Capacity (MHz) per Running VM	Average provisioned capacity, in megahertz, per running virtual machine.
summary avg_vm_mem	Average Provisioned Memory (KB) per Running VM	Average provisioned memory, in kilobytes. per running virtual machine.

## Resource Pool Metrics

vRealize Operations Manager collects configuration, CPU usage, memory, and summary metrics for resource pool objects.

Resource Pool metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

## Configuration Metrics for Resource Pools

Configuration metrics provide information about memory and CPU allocation configuration.

**Table 1-58. Configuration Metrics for Resource Pools**

Metric Key	Metric Name	Description
config mem_alloc_reservation	Memory Allocation Reservation	Memory Allocation Reservation.

## CPU Usage Metrics for Resource Pools

CPU usage metrics provide information about CPU use.

**Table 1-59. CPU Usage Metrics for Resource Pools**

Metric Key	Metric Name	Description
cpu capacity_demandEntitlementPct	Capacity Demand Entitlement (%)	CPU Capacity Demand Entitlement Percentage.
cpu capacity_entitlement	Capacity entitlement (MHz)	CPU Capacity Entitlement.
cpu capacity_contentionPct	CPU Contention (%)	CPU capacity contention.
cpu demandmhz	Demand (MHz)	CPU demand in megahertz.
cpu capacity_contention	Overall CPU Contention (ms)	Overall CPU contention in milliseconds.
cpu usagemhz_average	Usage	Average CPU use in megahertz.
cpu effective_limit	Effective limit	CPU effective limit.
cpu reservation_used	Reservation Used	CPU reservation used.
cpu estimated_entitlement	Estimated entitlement	CPU estimated entitlement.

Metric Key	Metric Name	Description
cpu dynamic_entitlement	Dynamic entitlement	CPU dynamic entitlement.
cpu demand_without_overhead	Demand without overhead	Value of demand excluding any overhead

## Memory Metrics for Resource Pools

Memory metrics provide information about memory use and allocation.

**Table 1-60. Memory Metrics for Resource Pools**

Metric Key	Metric Name	Description
mem vmemctl_average	Balloon (KB)	Amount of memory currently used by the virtual machine memory control.
mem compressionRate_average	Compression Rate (KBps)	Compression rate in kilobytes per second.
mem consumed_average	Consumed (KB)	Amount of host memory consumed by the virtual machine for guest memory.
mem host_contentionPct	Contention (%)	Machine contention percentage.
mem guest_usage	Guest usage	Guest memory entitlement.
mem guest_demand	Guest demand	Guest memory entitlement.
mem host_contention	Contention (KB)	Machine contention in kilobytes.
mem decompressionRate_average	Decompression Rate (KBps)	Decompression rate in kilobytes per second.
mem granted_average	Granted (KB)	Average of memory available for use.
mem active_average	Guest Active (KB)	Amount of memory that is actively used.
mem overhead_average	VM Overhead (KB)	Memory overhead reported by host.
mem shared_average	Shared (KB)	Amount of shared memory.
mem reservation_used	Reservation Used	Memory Reservation Used.
mem dynamic_entitlement	Dynamic Entitlement	Memory Dynamic Entitlement.
mem effective_limit	Effective Limit	Memory Effective Limit.
mem swpinRate_average	swpinRate_average	Rate at which memory is swapped from disk into active memory during the interval.
mem swapoutRate_average	swapoutRate_average	Rate at which memory is being swapped from active memory to disk during the current interval.
mem swapped_average	Swapped (KB)	Amount of unreserved memory.
mem usage_average	Usage (%)	Memory currently in use as a percentage of total available memory.
mem zero_average	Zero (KB)	Amount of memory that is all zero.
mem zipped_latest	Zipped (KB)	Latest zipped memory in kilobytes.
mem swpin_average	Swap In (KB)	Amount of memory swapped in kilobytes.

Metric Key	Metric Name	Description
mem swapout_average	Swap Out (KB)	Amount of memory swapped out in kilobytes.
mem swapused_average	Swap Used (KB)	Amount of memory used for swap space in kilobytes.
mem guest_provisioned	Guest Configured Memory (KB)	Guest configured memory in kilobytes.

## Summary Metrics for Resource Pools

Summary metrics provide information about overall performance.

**Table 1-61. Summary Metrics for Resource Pools**

Metric Key	Metric Name	Description
summary number_running_vms	Number of Running VMs	Number of running virtual machines.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary iowait	IO Wait (ms)	IO wait time in milliseconds.

## Datacenter Metrics

vRealize Operations Manager collects CPU usage, disk, memory, network, storage, disk space, and summary metrics for datacenter objects.

Datacenter metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

## CPU Usage Metrics for Datacenters

CPU usage metrics provide information about CPU use.

**Table 1-62. CPU Usage Metrics for Datacenters**

Metric Key	Metric Name	Description
cpu capacity_usagepct_average	Capacity Usage (%)	Percent capacity used.
cpu capacity_contentionPct	CPU Contention (%)	CPU capacity contention.
cpu demandPct	Demand (%)	CPU demand percentage.
cpu demandmhz	Demand	Demand in megahertz.
cpu demand_average	Demand (MHz)	CPU Demand.
cpu overhead_average	Overhead (KB)	Amount of CPU overhead.
cpu demand_without_overhead	Demand without overhead	Value of demand excluding any overhead.
cpu wait	Total Wait	CPU time spent on idle state.
cpu numpackages	Number of CPU Sockets	Number of CPU sockets.
cpu capacity_contention	Overall CPU Contention (ms)	Overall CPU contention in milliseconds.

Metric Key	Metric Name	Description
cpu capacity_provisioned	Host Provisioned Capacity (MHz)	Host provisioned capacity in megahertz.
cpu corecount_provisioned	Provisioned vCPU(s)	Provisioned vCPU(s).
cpu reservedCapacity_average	Reserved Capacity (MHz)	The sum of the reservation properties of the (immediate) children of the host's root resource pool.
cpu usagemhz_average	Usage	Average CPU usage in megahertz.
cpu iowait	IO Wait	IO wait time in milliseconds.
cpu vm_capacity_provisioned	Provisioned Capacity	Provisioned Capacity.
cpu stress_balance_factor	Stress Balance Factor	Stress Balance Factor.
cpu min_host_capacity_remaining	Lowest Provider Capacity Remaining	Lowest Provider Capacity Remaining.
cpu workload_balance_factor	Workload Balance Factor	Workload Balance Factor.
cpu max_host_workload	Highest Provider Workload	Highest Provider Workload.
cpu host_workload_disparity	Host workload Max-Min Disparity	Difference of Max and Min host workload in the container.
cpu host_stress_disparity	Host stress Max-Min Disparity	Difference of Max and Min host stress in the container.

## Disk Metrics for Datacenters

Disk metrics provide information about disk use.

**Table 1-63. Disk Metrics for Datacenters**

Metric Key	Metric Name	Description
disk commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
disk totalLatency_average	Disk Command Latency (ms)	Average amount of time taken for a command from the perspective of the guest operating system. This metric is the sum of the Kernel Disk Command Latency and Physical Device Command Latency metrics.
disk usage_average	Usage Rate (KBps)	Average of the sum of the data read and written for all of the disk instances of the host or virtual machine.
disk sum_queued_oio	Total queued outstanding operations	Sum of queued operations and outstanding operations.
disk max_observed	Max observed OIO	Max observed IO for a disk.

## Memory Metrics for Datacenters

Memory metrics provide information about memory use and allocation.

**Table 1-64. Memory Metrics for Datacenters**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
mem host_contentionPct	Contention (%)	Machine Contention Percentage.
mem host_demand	Machine Demand (KB)	Memory machine demand in kilobytes.
mem host_systemUsage	ESX System Usage	Memory usage by the VM kernel and ESX user-level services.
mem host_provisioned	Provisioned Memory (KB)	Provisioned host memory in kilobytes.
mem reservedCapacity_average	Reserved Capacity (KB)	Reserved memory capacity in kilobytes.
mem host_usable	Usable Memory (KB)	Usable host memory in kilobytes.
mem host_usage	Host Usage	Host memory use in kilobytes.
mem host_usagePct	Usage/Usable (%)	Percent host memory used.
mem overhead_average	VM Overhead	Memory overhead reported by host.
mem stress_balance_factor	Stress Balance Factor	Stress Balance Factor.
mem min_host_capacity_remaining	Lowest Provider Capacity Remaining	Lowest Provider Capacity Remaining.
mem workload_balance_factor	Workload Balance Factor	Workload Balance Factor.
mem max_host_workload	Highest Provider Workload	Highest Provider Workload.
mem host_workload_disparity	Host workload Max-Min Disparity	Difference of Max and Min host workload in the container.
mem host_stress_disparity	Host stress Max-Min Disparity	Difference of Max and Min host stress in the container.

## Network Metrics for Datacenters

Network metrics provide information about network performance.

**Table 1-65. Network Metrics for Datacenters**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
net droppedPct	Packets Dropped	Percentage of packets dropped.
net maxObservedKBps	Max Observed Throughput	Max observed rate of network throughput.
net maxObserved_Tx_KBps	Max Observed Transmitted Throughput	Max observed transmitted rate of network throughput.
net maxObserved_Rx_KBps	Max Observed Received Throughput	Max observed received rate of network throughput.
net transmitted_average	Data Transmit Rate	Average amount of data transmitted per second.
net received_average	Data Receive Rate	Average amount of data received per second.
net usage_average	Usage Rate (KBps)	The sum of the data transmitted and received for all the NIC instances of the host or virtual machine.

## Storage Metrics for Datacenters

Storage metrics provide information about storage use.

**Table 1-66. Storage Metrics for Datacenters**

Metric Key	Metric Name	Description
storage usage_average	Total Usage	Total throughput rate.

## Datastore Metrics for Datacenters

Datastore metrics provide information about Datastore use.

**Table 1-67. Datastore Metrics for Datacenters**

Metric Key	Metric Name	Description
datastore maxObserved_NumberRead	Max Observed Reads per second	Max observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate	Max observed rate of reading data from the datastore.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.
datastore maxObserved_Write	Max Observed Write Rate	Max observed rate of writing data from the datastore.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Max Observed Number of Outstanding IO Operations.
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read Rate	Amount of data read in the performance interval.
datastore write_average	Write Rate	Amount of data written to disk in the performance interval.

## Disk Space Metrics for Datacenters

Disk space metrics provide information about disk use.

**Table 1-68. Disk Space Metrics for Datacenters**

Metric Key	Metric Name	Description
diskspace used	Virtual machine used	Used virtual machine disk space in gigabytes.
diskspace total_usage	Total disk space used	Total disk space used on all datastores visible to this object.
diskspace total_capacity	Total disk space	Total disk space on all datastores visible to this object.
diskspace total_provisioned	Total provisioned disk space	Total provisioned disk space on all datastores visible to this object.
diskspace notshared	Not Shared (GB)	Unshared disk space in gigabytes.
diskspace shared	Shared Used (GB)	Shared disk space in gigabytes.
diskspace snapshot	Snapshot Space (GB)	Snapshot disk space in gigabytes.
diskspace diskused	Virtual Disk Used (GB)	Used virtual disk space in gigabytes.
diskspace numvmdisk	Number of Virtual Disks	Number of Virtual Disks.

## Summary Metrics for Datacenters

Summary metrics provide information about overall performance.

**Table 1-69. Summary Metrics for Datacenters**

Metric Key	Metric Name	Description
summary number_running_hosts	Number of Running Hosts	Number of hosts that are ON.
summary number_running_vms	Number of Running VMs	Number of running virtual machines.
summary max_number_vms	Maximum Number of VMs	Maximum number of virtual machines.
summary total_number_clusters	Total Number of Clusters	Total number of clusters.
summary total_number_hosts	Total Number of Hosts	Total number of hosts.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary total_number_datastores	Total Number of Datastores	Total number of datastores.
summary number_running_vcpus	Number of VCPUs on Powered On VMs	Total number of VCPUs of virtual machines that are powered on.
summary workload_indicator	Workload Indicator	Workload indicator.
summary avg_vm_density	Average Running VM Count per Running Host	Average number of running virtual machines per running host.

## Custom Datacenter Metrics

vRealize Operations Manager collects CPU usage, memory, summary, network, and datastore metrics for custom datacenter objects.



Custom datacenter metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

## CPU Usage Metrics for Custom Datacenters

CPU usage metrics provide information about CPU use.

**Table 1-70. CPU Usage Metrics for Custom Datacenters**

Metric Key	Metric Name	Description
cpu capacity_provisioned	Host Provisioned Capacity	Host provisioned capacity (MHz).
cpu corecount_provisioned	Provisioned vCPU(s)	Provisioned vCPU(s).
cpu demand_without_overhead	Demand without overhead	Value of demand excluding any overhead.
cpu num_hosts_stressed	Number of hosts stressed	Number of hosts stressed.
cpu stress_balance_factor	Stress Balance Factor	Stress balance factor.
cpu min_host_capacity_remaining	Lowest Provider Capacity Remaining	Lowest provider capacity remaining.
cpu workload_balance_factor	Workload Balance Factor	Workload balance factor.
cpu max_host_workload	Highest Provider Workload	Highest provider workload.
cpu host_workload_disparity	Host workload Max-Min Disparity	Host workload max-min disparity.
cpu host_stress_disparity	Host stress Max-Min Disparity	Difference of max and min host stress in the container.

## Memory Metrics for Custom Datacenters

Memory metrics provide information about memory use.

**Table 1-71. Memory Metrics for Custom Datacenters**

Metric Key	Metric Name	Description
mem host_usable	Usable Memory	Usable memory.
mem host_demand	Machine Demand	Memory machine demand in KB.
mem num_hosts_stressed	Number of hosts stressed	Number of hosts stressed.
mem stress_balance_factor	Stress Balance Factor	Stress balance factor.
mem min_host_capacity_remaining	Lowest Provider Capacity Remaining	Lowest provider capacity remaining.
mem workload_balance_factor	Workload Balance Factor	Workload balance factor.
mem max_host_workload	Highest Provider Workload	Highest provider workload.
mem host_workload_disparity	Host workload Max-Min Disparity	Host workload max-min disparity.
mem host_stress_disparity		Host stress max-min disparity.

## Summary Metrics for Custom Datacenters

Summary metrics provide information about overall performance.

**Table 1-72. Summary Metrics for Custom Datacenters**

Metric Key	Metric Name	Description
summary number_running_vms	Number of Running VMs	Number of virtual machines that are ON.
summary max_number_vms	Maximum Number of VMs	Maximum number of virtual machines.
summary status	Status	Status of datacenter.

## Network Metrics for Custom Datacenters

Network metrics provide information about network performance.

**Table 1-73. Network Metrics for Custom Datacenters**

Metric Key	Metric Name	Description
net usage_average	Usage Rate	The sum of the data transmitted and received for all the NIC instances of the host or virtual machine.
net maxObserved_KBps	Max Observed Throughput	Max observed rate of network throughput.
net maxObserved_Tx_KBps	Max Observed Transmitted Throughput	Max observed transmitted rate of network throughput.
net maxObserved_Rx_KBps	Max Observed Received Throughput	Max observed received rate of network throughput.
net transmitted_average	Data Transmit Rate	Average amount of data transmitted per second.
net received_average	Data REceive Rate	Average amount of data received per second.

## Datastore Metrics for Custom Datacenters

Datastore metrics provide information about datastore use.

**Table 1-74. Datastore Metrics for Custom Datacenters**

Metric Key	Metric Name	Description
datastore maxObserved_NumberRead	Max Observed Reads per second	Max observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate	Max observed rate of reading data from the datastore.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.
datastore maxObserved_Write	Max Observed Write Rate	Max observed rate of writing data from the datastore.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Max observer number of outstanding IO operations.

Metric Key	Metric Name	Description
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read rate	Amount of data read in the performance interval.
datastore write_average	Write rate	Amount of data written to disk in the performance interval.

## Storage Pod Metrics

vRealize Operations Manager collects datastore and disk space metrics for storage pod objects.

Storage Pod metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

**Table 1-75. Datastore Metrics for Storage Pods**

Metric Key	Metric Name	Description
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.
datastore read_average	Read Rate	Amount of data read in the performance interval.
datastore write_average	Write Rate	Amount of data written to disk in the performance interval.
datastore usage_average	Usage Average	Usage Average.
datastore totalReadLatency_average	Read Latency	Average amount of time for a read operation from the datastore. Total latency = kernel latency + device latency.
datastore totalWriteLatency_average	Write Latency	Average amount of time for a write operation to the datastore. Total latency = kernel latency + device latency.
datastore totalLatency_average	Disk Command Latency	The average amount of time taken for a command from the perspective of a Guest OS. This is the sum of Kernel Command Latency and Physical Device Command Latency.
datastore commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.

**Table 1-76. Diskspace Metrics for Storage Pods**

Metric Key	Metric Name	Description
diskspace disktotal	Total used	Total space used.
diskspace freespace	Freespace	Unused space available on datastore.
diskspace capacity	Capacity	Total capacity of datastore.
diskspace used	Virtual Machine used	Space used by virtual machine files.
diskspace snapshot	Snapshot Space	Space used by snapshots.

## VMware Distributed Virtual Switch Metrics

vRealize Operations Manager collects network and summary metrics for VMware distributed virtual switch objects.

VMware Distributed Virtual Switch metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

**Table 1-77. Network Metrics for VMware Distributed Virtual Switches**

Metric Key	Metric Name	Description
network port_statistics rx_bytes	Total Ingress Traffic	Total ingress traffic (KBps).
network port_statistics tx_bytes	Total Egress Traffic	Total egress traffic (KBps).
network port_statistics ucast_tx_pkts	Egress Unicast Packets per second	Egress unicast packets per second.
network port_statistics mcast_tx_pkts	Egress Multicast Packets per second	Egress multicast packets per second.
network port_statistics bcast_tx_pkts	Egress Broadcast Packets per second	Egress broadcast packets per second.
network port_statistics ucast_rx_pkts	Ingress Unicast Packets per second	Ingress unicast packets per second.
network port_statistics mcast_rx_pkts	Ingress Multicast Packets per second	Ingress multicast packets per second.
network port_statistics bcast_rx_pkts	Ingress Broadcast Packets per second	Ingress broadcast packets per second.
network port_statistics dropped_tx_pkts	Egress Dropped Packets per second	Egress dropped packets per second.
network port_statistics dropped_rx_pkts	Ingress Dropped Packets per second	Ingress dropped packets per second.
network port_statistics rx_pkts	Total Ingress Packets per second	Total ingress packets per second.
network port_statistics tx_pkts	Total Egress Packets per second	Total egress packets per second.
network port_statistics utilization	Utilization	Use (KBps).

Metric Key	Metric Name	Description
network port_statistics dropped_pkts	Total Dropped Packets per second	Total dropped packets per second.
network port_statistics dropped_pkts_pct	Percentage of Dropped Packets	Percentage of dropped packets.
network port_statistics maxObserved_rx_bytes	Max Observed Ingress Traffic (KBps)	Max observed ingress traffic (KBps).
network port_statistics maxObserved_tx_bytes	Max Observed Egress Traffic (KBps)	Max observed egress traffic (KBps).
network port_statistics maxObserved_utilization	Max Observed Utilization (KBps)	Max observed utilization (KBps).

**Table 1-78. Summary Metrics for VMware Distributed Virtual Switches**

Metric Key	Metric Name	Description
summary max_num_ports	Maximum Number of Ports	Maximum number of ports.
summary used_num_ports	Used Number of Ports	Used number of ports.
summary num_blocked_ports	Number of Blocked Ports	Number of blocked ports.

**Table 1-79. Host Metrics for VMware Distributed Virtual Switches**

Metric Key	Metric Name	Description
host mtu_mismatch	MTU Mismatch	Maximum Transmission Unit (MTU) mismatch.
host teaming_mismatch	Teaming Mismatch	Teaming mismatch.
host mtu_unsupported	Unsupported MTU	Unsupported MTU.
host vlans_unsupported	Unsupported VLANs	Unsupported VLANs.
host config_outofsync	Config Out Of Sync	Config Out Of Sync.
host attached_pnics	Number of Attached pNICs	Number of attached physical NICs.

## Distributed Virtual Port Group Metrics

The vCenter Adapter instance collects network and summary metrics for distributed virtual port groups.

Distributed Virtual Port Group metrics include capacity and badge metrics. See definitions in:

- [Capacity and Project-Based Metrics](#)
- [Badge Metrics](#)

**Table 1-80. Network Metrics for Distributed Virtual Port Groups**

Metric Key	Metric Name	Description
network port_statistics rx_bytes	Ingress Traffic	Ingress traffic (KBps).
network port_statistics tx_bytes	Egress Traffic	Egress traffic (KBps).

Metric Key	Metric Name	Description
network port_statistics ucast_tx_pkts	Egress Unicast Packets per second	Egress unicast packets per second.
network port_statistics mcast_tx_pkts	Egress Multicast Packets per second	Egress multicast packets per second.
network port_statistics bcast_tx_pkts	Egress Broadcast Packets per second	Egress broadcast packets per second.
network port_statistics ucast_rx_pkts	Ingress Unicast Packets per second	Ingress unicast packets per second.
network port_statistics mcast_rx_pkts	Ingress Multicast Packets per second	Ingress multicast packets per second.
network port_statistics bcast_rx_pkts	Ingress Broadcast Packets per second	Ingress broadcast packets per second.
network port_statistics dropped_tx_pkts	Egress Dropped Packets per second	Egress dropped packets per second.
network port_statistics dropped_rx_pkts	Ingress Dropped Packets per second	Ingress dropped packets per second.
network port_statistics rx_pkts	Total Ingress Packets per second	Total Ingress packets per second.
network port_statistics tx_pkts	Total Egress Packets per second	Total Egress packets per second.
network port_statistics utilization	Utilization	Utilization (KBps).
network port_statistics dropped_pkts	Total Dropped Packets per second	Total dropped packets per second.
network port_statistics dropped_pkts_pct	Percentage of Dropped Packets	Percentage of dropped packets.
network port_statistics maxObserved_rx_bytes	Max Observed Ingress Traffic (KBps)	Max observed ingress traffic (KBps).
network port_statistics maxObserved_tx_bytes	Max Observed Egress Traffic (KBps)	Max observed egress traffic (KBps).
network port_statistics maxObserved_utilization	Max Observed Utilization (KBps)	Max observed utilization (KBps).

**Table 1-81. Summary Metrics for Distributed Virtual Port Groups**

Metric Key	Metric Name	Description
summary max_num_ports	Maximum Number of Ports	Maximum number of ports.
summary used_num_ports	Used Number of Ports	Used number of ports.
summary num_blocked_ports	Number of Blocked Ports	Number of blocked ports.

## Datastore Metrics

vRealize Operations Manager collects capacity, device, and summary metrics for datastore objects.

Capacity metrics can be calculated for datastore objects. See [Capacity and Project-Based Metrics](#).

## Capacity Metrics for Datastores

Capacity metrics provide information about datastore capacity.

**Table 1-82. Capacity Metrics for Datastores**

Metric Key	Metric Name	Description
capacity available_space	Available Space (GB)	Available space in gigabytes.
capacity contention	Data Store Capacity Contention	Datastore capacity contention.
capacity provisioned	Provisioned (GB)	Datastore size.
capacity total_capacity	Total Capacity (GB)	Total capacity in gigabytes.
capacity used_space	Used Space (GB)	Used space in gigabytes.
capacity workload	Workload (%)	Capacity workload.
capacity uncommitted	Uncommitted Space (GB)	Uncommitted space in gigabytes.
capacity consumer_provisioned	Total Provisioned Consumer Space	Total Provisioned Consumer Space.
capacity usedSpacePct	Used Space (%)	Percentage of datastore space used.

## Device Metrics for Datastores

Device metrics provide information about device performance.

**Table 1-83. Devices Metrics for Datastores**

Metric Key	Metric Name	Description
devices busResets_summation	Bus Resets	Number of bus resets in the performance interval.
devices commandsAborted_summation	Commands Aborted	Number of disk commands aborted in the performance interval.
devices commands_summation	Commands Issued	Number of disk commands issued in the performance interval.
devices totalLatency_average	Disk Command Latency (ms)	Average time taken for a command from the perspective of a guest operating system. This metric is the sum of Kernel Disk Command Latency and Physical Device Command Latency metrics.
devices totalReadLatency_average	Disk Read Latency (ms)	Average time taken for a read from the perspective of a guest operating system. This metric is the sum of the Kernel Disk Read Latency and Physical Device Read Latency metrics.
devices totalWriteLatency_average	Disk Write Latency (ms)	Average amount of time for a write operation to the datastore. Total latency is the sum of kernel latency and device latency.

Metric Key	Metric Name	Description
devices kernelLatency_average	Kernel Disk Command Latency (ms)	Average time spent in ESX Server V. Kernel per command.
devices kernelReadLatency_average	Kernel Disk Read Latency (ms)	Average time spent in ESX host VM Kernel per read.
devices kernelWriteLatency_average	Kernel Disk Write Latency (ms)	Average time spent in ESX Server VM Kernel per write.
devices number_running_hosts	Number of Running Hosts	Number of running hosts that are powered on.
devices number_running_vms	Number of Running VMs	Number of running virtual machines that are powered on.
devices deviceLatency_average	Physical Device Command Latency (ms)	Average time taken to complete a command from the physical device.
devices deviceReadLatency_average	Physical Device Read Latency (ms)	Average time taken to complete a read from the physical device.
devices queueLatency_average	Queue Command Latency (ms)	Average time spent in the ESX Server VM Kernel queue per command.
devices queueReadLatency_average	Queue Read Latency (ms)	Average time spent in the ESX Server VM Kernel queue per read.
devices queueWriteLatency_average	Queue Write Latency (ms)	Average time spent in the ESX Server VM Kernel queue per write.
devices read_average	Read Rate (KBps)	Amount of data read in the performance interval.
devices numberRead_summation	Read Requests	Number of times data was read from the disk in the defined interval.
devices numberReadAveraged_average	Reads per second	Average number of read commands issued per second to the datastore during the collection interval.
devices usage_average	Usage Average (KBps)	Average use in kilobytes per second.
devices write_average	Write Rate (KBps)	Amount of data written to disk in the performance interval.
devices numberWrite_summation	Write Requests	Number of times data was written to the disk in the defined interval.
devices numberWriteAveraged_average	Writes per second	Average number of write commands issued per second to the datastore during the collection interval.
devices commandsAveraged_average	Commands per second	Average number of commands issued per second during the collection interval.
devices deviceWriteLatency_average	Physical Device Write Latency (ms)	Average time taken to complete a write from the physical disk.

## Datastore Metrics for Datastores

Datastore metrics provide information about datastore use.



**Table 1-84. Datastore Metrics for Datastores**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
datastore totalLatency_average	Disk Command Latency (ms)	The average amount of time taken for a command from the perspective of a Guest OS. This is the sum of Kernel Command Latency and Physical Device Command Latency.
datastore usage_average	Usage Average (KBps)	Average use in kilobytes per second.
datastore totalReadLatency_average	Read Latency (ms)	Average amount of time for a read operation from the datastore. Total latency = kernel latency + device latency.
datastore totalWriteLatency_average	Write Latency (ms)	Average amount of time for a write operation to the datastore. Total latency = kernel latency + device latency.
datastore demand	Demand	Demand.
datastore demand_indicator	Demand Indicator	Demand Indicator.
datastore maxObserved_NumberRead	Max Observed Reads per Second	Maximum observed average number of read commands issued per second during the collection interval.
datastore maxObserved_Read	Max Observed Read Rate (KBps)	Max observed rate of reading data from the datastore.
datastore maxObserved_ReadLatency	Max Observed Read Latency (ms)	Max observed average amount of time for a read operation from the datastore. Total latency = kernel latency + device latency.
datastore maxObserved_NumberWrite	Max Observed Writes per second	Max observed average number of write commands issued per second during the collection interval.
datastore maxObserved_Write	Max Observed Write Rate (KBps)	Max observed rate of writing data from the datastore.
datastore maxObserved_WriteLatency	Max Observed Write Latency (ms)	Max observed average amount of time for a write operation from the datastore. Total latency = kernel latency + device latency.
datastore maxObserved_OIO	Max Observed Number of Outstanding IO Operations	Maximum observed number of outstanding IO operations.
datastore demand_oio	Outstanding IO requests	OIO for datastore.
datastore numberReadAveraged_average	Reads per second	Average number of read commands issued per second during the collection interval.
datastore numberWriteAveraged_average	Writes per second	Average number of write commands issued per second during the collection interval.

Metric Key	Metric Name	Description
datastore read_average	Read rate	Amount of data read in the performance interval.
datastore write_average	Write rate	Amount of data written to disk in the performance interval.

## About Datastore Metrics for Virtual SAN

The metric named `datastore|oio|workload` is not supported on Virtual SAN datastores. This metric depends on `datastore|demand_oio`, which is supported for Virtual SAN datastores.

The metric named `datastore|demand_oio` also depends on several other metrics for Virtual SAN datastores, one of which is not supported.

- The metrics named `devices|numberReadAveraged_average` and `devices|numberWriteAveraged_average` are supported.
- The metric named `devices|totalLatency_average` is not supported.

As a result, vRealize Operations Manager does not collect the metric named `datastore|oio|workload` for Virtual SAN datastores.

## Disk Space Metrics for Datastores

Disk space metrics provide information about disk space use.

**Table 1-85. Disk Space Metrics for Datastores**

Metric Key	Metric Name	Description
diskspace notshared	Not Shared (GB)	Unshared space in gigabytes.
diskspace numvmdisk	Number of Virtual Disks	Number of virtual disks.
diskspace provisioned	Provisioned Space (GB)	Provisioned space in gigabytes.
diskspace shared	Shared Used (GB)	Shared used space in gigabytes.
diskspace snapshot	Snapshot Space (GB)	Snapshot space in gigabytes.
diskspace diskused	Virtual Disk Used (GB)	Virtual disk used space in gigabytes.
diskspace used	Virtual machine used (GB)	Virtual machine used space in gigabytes.
diskspace total_usage	Total disk space used	Total disk space used on all datastores visible to this object.
diskspace total_capacity	Total disk space	Total disk space on all datastores visible to this object.
diskspace total_provisioned	Total provisioned disk space	Total provisioned disk space on all datastores visible to this object.
diskspace disktotal	Total used (GB)	Total used space in gigabytes.
diskspace swap	Swap File Space (GB)	Swap file space in gigabytes.
diskspace otherused	Other VM Space (GB)	Other virtual machine space in gigabytes.
diskspace freespace	Freespace (GB)	Unused space available on datastore.

Metric Key	Metric Name	Description
diskspace capacity	Capacity (GB)	Total capacity of datastore in gigabytes.
diskspace overhead	Overhead	Amount of disk space that is overhead.

## Summary Metrics for Datastores

Summary metrics provide information about overall performance.

**Table 1-86. Summary Metrics for Datastores**

Metric Key	Metric Name	Description
summary total_number_hosts	Total Number of Hosts	Total number of hosts.
summary total_number_vms	Total Number of VMs	Total number of virtual machines.
summary max_number_vms	Maximum Number of VMs	Maximum number of virtual machines.
summary workload_indicator	Workload Indicator	Workload indicator.
summary total_number_clusters	Total Number of Clusters	Total number of clusters.

## Template Metrics for Datastores

**Table 1-87. Template Metrics for Datastores**

Metric Key	Metric Name	Description
template used	Virtual Machine used	Space used by virtual machine files.
template accessTime	Access Time	Last access time.

## Calculated Metrics

vRealize Operations Manager calculates metrics for capacity, badges, and the health of the system. Calculated metrics apply to a subset of objects found in the `describe.xml` file that describes each adapter.

From data that the vCenter adapter collects, vRealize Operations Manager calculates metrics for objects of type:

- vSphere World
- Virtual Machine
- Host System
- Datastore

From data that the vRealize Operations Manager adapter collects, vRealize Operations Manager calculates metrics for objects of type:

- Node
- Cluster

## Capacity and Project-Based Metrics

The capacity engine computes and publishes metrics that help you to plan your resource use based on consumer demand. Project-based metrics are a subset of capacity metrics that help to plan future resource use based on predicted consumer demand.

### Capacity Metrics Group

For the capacity metrics group, full metric names include the name of the resource container. For example, if density metrics are computed for CPU or memory, the actual metric names appear as `cpu|density` or `mem|density`.

Only resource containers enabled for the capacity computations have relevant metrics. Not all metric types are generated for all resource containers. For example, if CPU or memory resource containers are enabled in a policy for density, but the network resource container is not, then `cpu|density` and `mem|density` metrics are calculated but `network|density` metrics are not.

A capacity metric definition includes resource containers that act as a consumer or a provider. For example in vSphere, the virtual machines are consumers of CPU and memory that the ESX host provides.

**Table 1-88. Capacity Metrics Group**

Metric Key	Metric Name	Generated for	Description
capacityRemainingUsingConsumers_average	Capacity Remaining for Average Consumer Profile	Provider	Number of average-size consumers that can fit into the capacity remaining. An average-size consumer demands 50% of total capacity.
capacityRemainingUsingConsumers_small	Capacity Remaining for Small Consumer Profile	Provider	Number of small-size consumers that can fit into the capacity remaining. A small-size consumer demands 0 - 33% of the total capacity.
capacityRemainingUsingConsumers_medium	Capacity Remaining for Medium Consumer Profile	Provider	Number of medium-size consumers that can fit into the capacity remaining. A medium-size consumer demands 33-66% of the total capacity.
capacityRemainingUsingConsumers_large	Capacity Remaining for Large Consumer Profile	Provider	Number of large-size consumers that can fit into the capacity remaining. A large-size consumer demands 66-100% of the total capacity.
capacityRemaining	Capacity Remaining (%)	Both	Percent capacity remaining in the resource container. For example, if the resource container is memory and 2 GB out of 10 GB of memory is free, the <code>capacityRemaining</code> = 20%.
underusedpercent	Under used (%)	Both	Percent capacity not being used.

Metric Key	Metric Name	Generated for	Description
idletimepercent	Idle time (%)	Both	Percent time a resource is idle based on use over time. Time is a policy setting. If not set, the default period is 30 days. For example, if a resource is idle for a total of 6 days out of 30 days, idletimepercent = 20%.
wasteValue	Reclaimable Capacity	Both	Amount of reclaimable capacity based on consumer demand over time. Time is a policy setting. If not set, the default period is 30 days. For example, if a vSphere host is configured with 10 GB of memory but only 2 GB of memory is used on average over 30 days, then wasteValue = 8 GB.
size.recommendation	Recommended Size	Both	Capacity recommendation based on demand over time. Time is a policy setting. If not set, the default period is 30 days. For example, if consumer demand is 2 GB of memory on average over 30 days, then the capacity recommendation is 2 GB.
optimal.vConsumption.per.pConsumption	Optimal consumption ratio	Provider	Ratio of ideal resource consumption to provision based on consumer demand over time. Ideal resource consumption is when the current capacity satisfies demand. Time is a policy setting. If not set, the default period is 30 days.
vConsumption.per.pConsumption	Consumption ratio	Provider	Ratio of current resource consumption to provision based on consumer demand.
object.demand	Stress Free Demand	Both	Demand based on peak analysis of raw demand values.
object.capacity	Usable Capacity	Both	Total capacity minus buffers. Capacity buffer is a policy setting.
object.demand.percent	Effective Demand (%)	Both	Percent capacity required by effective demand.
powered.on.consumer.count	Number of powered on consumers	Both	Number of consumers that are using a resource.
base.demand	Computed Demand	Both	Demand for an object based on self or consumer demand without the peak consideration policy setting.

Metric Key	Metric Name	Generated for	Description
actual.capacity	Current size	Both	Actual capacity without buffers
wastePercent	Reclaimable Capacity (%)	Both	Percent of reclaimable capacity based on consumer demand over time. Time is a policy setting. If not set, the default period is 30 days. For example, if a vSphere host is configured with 10 GB of memory but only 2 GB of memory is used on average over 30 days, then wastePercent = 80%.

## Object-level Metrics Group

Object-level metrics are calculated to track capacity use for all objects of a particular object type.

**Table 1-89. Object-level Metrics Group**

Metric Key	Metric Name	Description
summary timeRemaining	Time Remaining	Time remaining before usable capacity runs out. Usable capacity excludes capacity reserved for HA and buffers.
summary isStress	Is Stressed	Value equals 1 or a yellow badge indicates that an object is stressed. Value equals 0 or a green badge indicates that the object is not stressed. For a stress badge defined in a policy, when the stress exceeds the lowest threshold, the badge color changes from green to yellow.
summary capacityRemainingValue	Capacity Remaining Value	Capacity remaining.
summary oversized	Is Oversized	Indicates if an object has too much capacity configured, value of 1, or not, value of 0.
summary idle	Is Idle	Indicates if an object is idle (value of 1) or not (value of 0).
summary poweredOff	Powered Off	Indicates power state of an object. Value of 1 means ON and value of 0 means OFF.
summary capacityRemainingUsingConsumers_average	Capacity Remaining (Average consumer profile)	Capacity remaining based on average consumer demand.
summary capacityRemainingUsingConsumers_small	Capacity Remaining (Small consumer profile)	Capacity remaining based on small consumer demand.
summary capacityRemainingUsingConsumers_medium	Capacity Remaining (Medium consumer profile)	Capacity remaining based on medium consumer demand.
summary capacityRemainingUsingConsumers_large	Capacity Remaining (Large consumer profile)	Capacity remaining based on large consumer demand.

Metric Key	Metric Name	Description
summary capacityRemaining_min	Capacity Remaining (Based on instantaneous peak)	Capacity remaining based on peak demand or stress.
summary capacity.provider.count	Number of Capacity providers	Number of capacity providers.
summary consumer.count	Number of Capacity consumers	Number of capacity consumers.
summary consumer.count.per.provider.count	Consumer Provider ratio	Ratio of number of consumers to number of providers.
summary optimal.consumer.per.provider	Optimal Consumer Provider ratio	Ratio of consumer to provider that would be optimal based on consumer demand.

## Project-Based Metrics

Project-based metrics are calculated for a change in resources or demand that could affect capacity at some time in the future. See *vRealize Operations Manager User Guide*. Most metrics appear with `_whatif` appended to the capacity metric name. For example, the what-if applicable metric for capacity remaining is published as `capacityRemaining_whatif`.

## Badge Metrics

Badge metrics provide information for badges in the user interface. They report the health, risk, and efficiency of objects in your environment.

vRealize Operations Manager 6.x analyzes badge metric data at five-minute averages, instead of hourly. As a result, you might find that efficiency and risk badge calculations are more sensitive than in previous versions. Badge metrics continue to be published nightly.

**Table 1-90. Badge Metrics**

Metric Key	Metric Name	Description
badge alert_count_critical	Alert Count Critical	Count of critical alerts on the object.
badge alert_count_immediate	Alert Count Immediate	Count of immediate alerts on the object.
badge alert_count_info	Alert Count Info	Count of info alerts on the object.
badge alert_count_warning	Alert Count Warning	Count of warning alerts on the object.
badge anomaly	Anomaly	Overall score for anomalies, on a scale of 100.
badge capacityRemaining	Capacity Remaining	Overall score for capacity remaining, on a scale of 100.
badge compliance	Compliance	Overall score for compliance, on a scale of 100.
badge density	Density	Overall score for density, on a scale of 100.
badge efficiency	Efficiency	Overall score for efficiency. The score will be one of these discrete values representing each state of the badge: Green - 100, Yellow - 75, Orange - 50, Red - 25, Unknown: -1.

Metric Key	Metric Name	Description
badge efficiency_classic	Legacy Efficiency	The legacy efficiency score computed on a scale of 100 as per vCenter Operations Manager version 5.x. For backward compatibility purposes.
badge efficiency_state	Efficiency State	Represents the state of the efficiency badge with discrete values - Green: 1, Yellow: 2, Orange: 3, Red: 4, Unknown: -1.
badge fault	Fault	Overall score for fault, on a scale of 100.
badge health	Health	Overall score for health. The score will be one of these discrete values representing each state of the badge: Green - 100, Yellow - 75, Orange - 50, Red - 25, Unknown: -1.
badge health_classic	Legacy Health	The legacy health score computed on a scale of 100 as per vCenter Operations Manager 5.x. For backward compatibility purposes.
badge health_state	Health State	Represents the state of health badge with discrete values - Green: 1, Yellow: 2, Orange: 3, Red: 4, Unknown: -1
badge risk	Risk	Overall score for risk. The score will be one of these discrete values representing each state of the badge: Green - 0, Yellow - 25, Orange - 50, Red - 75, Unknown: -1.
badge risk_classic	Legacy Risk	The legacy risk score computed on a scale of 100 as per vCenter Operations Manager 5.x. For backward compatibility purposes.
badge risk_state	Risk State	Represents the state of risk badge with discrete values - Green: 1, Yellow: 2, Orange: 3, Red: 4, Unknown: -1.
badge stress	Stress	Overall score of stress, on a scale of 100.
badge timeRemaining	Time Remaining - Real Time	Overall score of real time remaining, on a scale of 100.
badge waste	Waste	Overall score of waste, on a scale of 100.
badge workload	Workload (%)	Overall score of workload, on a scale of 100.

## System Metrics

System metrics provide information used to monitor the health of the system. They help you to identify problems in your environment.

**Table 1-91. System Metrics**

Metric Key	Metric Name	Description
System Attributes health	Self - Health Score	System health score of self resource
System Attributes all_metrics	Self - Metric Count	Number of metrics of self resource
System Attributes ki_metrics	Self - KPI Count	Number of KPI metrics of self resource



Metric Key	Metric Name	Description
System Attributes active_alarms	Self - Active Anomaly Count	Number of active alarms of self resource
System Attributes new_alarms	Self - New Anomaly Count	Number of new alarms of self resource
System Attributes active_ki_alarms	Self - Active KPI Breach Count	Number of active KPI alarms of self resource
System Attributes new_ki_alarms	Self - New KPI Breach Count	Number of new KPI alarms of self resource
System Attributes total_alarms	Self - Total Anomalies	Number of total alarms of self resource
System Attributes change_index	Self - Change Index	Change index of self resource(100 - health score)
System Attributes child_all_metrics	Full Set - Metric Count	Number of metrics of child resources
System Attributes child_ki_metrics	Full Set - KPI Count	Number of KPI metrics of child resources
System Attributes child_active_alarms	Full Set - Active Anomaly Count	Number of active alarms of child resources
System Attributes child_new_alarms	Full Set - New Anomaly Count	Number of new alarms of child resources
System Attributes child_active_ki_alarms	Full Set - Active KPI Breach Count	Number of active KPI alarms of child resources
System Attributes child_new_ki_alarms	Full Set - New KPI Breach Count	Number of new KPI alarms of child resources
System Attributes availability	Availability	Resource availability (0-down, 1-Up, -1-Unknown)
System Attributes alert_count_critical	Alert Count Critical	Number of Critical alerts
System Attributes alert_count_immediate	Alert Count Immediate	Number of Immediate alerts
System Attributes alert_count_warning	Alert Count Warning	Number of Warning alerts
System Attributes alert_count_info	Alert Count Info	Number of Info alerts

## Self-Monitoring Metrics for vRealize Operations Manager

vRealize Operations Manager uses the vRealize Operations Manager adapter to collect metrics that monitor its own performance. These self-monitoring metrics drive capacity models for vRealize Operations Manager objects and are useful for diagnosing problems with vRealize Operations Manager.

### Analytics Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager analytics service, including threshold checking metrics.

**Table 1-92. Analytics Metrics**

Metric Key	Metric Name	Description
ActiveAlarms	Active DT Symptoms	Active DT Symptoms.
ActiveAlerts	Active Alerts	Active alerts.

Metric Key	Metric Name	Description
PrimaryResourcesCount	Number of primary objects	Number of primary objects
LocalResourcesCount	Number of local objects	Number of local objects
PrimaryMetricsCount	Number of primary metrics	Number of primary metrics
LocalMetricsCount	Number of local metrics	Number of local metrics
ReceivedResourceCount	Number of received objects	Number of received objects
ReceivedMetricCount	Number of received metrics	Number of received metrics
LocalFDSIZE	Number of forward data entries	Number of locally stored primary and redundant entries in forward data region.
LocalPrimaryFDSIZE	Number of primary forward data entries	Number of locally stored primary entries in forward data region.
LocalFDAItSize	Number of alternative forward data entries	Number of locally stored primary and redundant entries in alternative forward data region.
LocalPrimaryFDAItSize	Number of alternative primary forward data entries	Number of locally stored primary entries in alternative forward data region.
CurrentHeapSize	Current heap size	Current heap size.
MaxHeapSize	Max heap size	Max heap size
CommittedMemory	Committed memory	Committed memory
CPUUsage	CPU usage	CPU usage
Threads	Threads	Threads
UpStatus	Threads	Threads

## Overall Threshold Checking Metrics for the Analytics Service

Overall threshold checking captures various metrics for work items used to process incoming observation data. All metrics keys for the overall threshold checking metrics begin with OverallThresholdChecking, as in OverallThresholdChecking|Count or OverallThresholdChecking|CheckThresholdAndHealth|OutcomeObservationsSize|TotalCount.

**Table 1-93. Overall Threshold Checking Metrics for the Analytics Service**

Metric Key	Metric Name	Description
Count	Count	Count
Duration TotalDuration	Total	Total length of duration (ms)
Duration AvgDuration	Average	Average duration (ms)
Duration MinDuration	Minimum	Minimum duration (ms)
Duration MaxDuration	Maximum	Maximum duration (ms)
IncomingObservationsSize TotalCount	Total	Total

Metric Key	Metric Name	Description
IncomingObservationsSize AvgCount	Average	Average
IncomingObservationsSize MinCount	Minimal	Minimal
IncomingObservationsSize MaxCount	Maximal	Maximal
CheckThresholdAndHealth Count	Count	Count
CheckThresholdAndHealth Duration TotalDuration	Total	Total length of duration (ms)
CheckThresholdAndHealth Duration AvgDuration	Average	Average duration (ms)
CheckThresholdAndHealth Duration MinDuration	Minimum	Minimum duration (ms)
CheckThresholdAndHealth Duration MaxDuration	Maximum	Maximum duration (ms)
CheckThresholdAndHealth OutcomeObservationsSize TotalCount	Total	Total
CheckThresholdAndHealth OutcomeObservationsSize AvgCount	Average	Average
CheckThresholdAndHealth OutcomeObservationsSize MinCount	Minimal	Minimal
CheckThresholdAndHealth OutcomeObservationsSize MaxCount	Maximal	Maximal
SuperMetricComputation Count	Count	Count
SuperMetricComputation Duration TotalDuration	Total	Total length of duration (ms)
SuperMetricComputation Duration AvgDuration	Average	Average duration (ms)
SuperMetricComputation Duration MinDuration	Minimum	Minimum duration (ms)
SuperMetricComputation Duration MaxDuration	Maximum	Maximum duration (ms)
SuperMetricComputation SuperMetricsCount TotalCount	Total	Total
SuperMetricComputation SuperMetricsCount  AvgCount	Average	Average
SuperMetricComputation SuperMetricsCount  MinCount	Minimal	Minimal
SuperMetricComputation SuperMetricsCount  MaxCount	Maximal	Maximal
StoreObservationToFSDB Count	Count	Count
StoreObservationToFSDB Duration TotalDuration	Total	Total length of duration (ms)
StoreObservationToFSDB Duration AvgDuration	Average	Average duration (ms)
StoreObservationToFSDB Duration MinDuration	Minimum	Minimum duration (ms)
StoreObservationToFSDB Duration MaxDuration	Maximum	Maximum duration (ms)

Metric Key	Metric Name	Description
StoreObservationToFSDb StoredObservationsSize TotalCount	Total	Total
StoreObservationToFSDb StoredObservationsSize AvgCount	Average	Average
StoreObservationToFSDb StoredObservationsSize MinCount	Minimal	Minimal
StoreObservationToFSDb StoredObservationsSize MaxCount	Maximal	Maximal
UpdateResourceCache Count	Count	Count
UpdateResourceCache Duration TotalDuration	Total	Total
UpdateResourceCache Duration AvgDuration	Average	Average
UpdateResourceCache Duration MinDuration	Minimum	Minimum
UpdateResourceCache Duration MaxDuration	Maximum	Maximum
UpdateResourceCache ModificationEstimateCount TotalCount	Total	The number of estimated modifications done during each resource cache object update.
UpdateResourceCache ModificationEstimateCount AvgCount	Average	Average
UpdateResourceCache ModificationEstimateCount MinCount	Minimal	Minimal
UpdateResourceCache ModificationEstimateCount MaxCount	Maximal	Maximal
ManageAlerts Count	Count	The total number of times the threshold checking work items perform alert updates.
ManageAlerts Duration TotalDuration	Total	The duration for the alert updates operations.
ManageAlerts Duration AvgDuration	Average	Average
ManageAlerts Duration MinDuration	Minimum	Minimum
ManageAlerts Duration MaxDuration	Maximum	Maximum
UpdateSymptoms Count	Count	The total number of times the threshold checking work items check and build symptoms.
UpdateSymptoms Duration TotalDuration	Total	The duration for the check and build symptoms operation.
UpdateSymptoms Duration AvgDuration	Average	Average
UpdateSymptoms Duration MinDuration	Minimum	Minimum
UpdateSymptoms Duration MaxDuration	Maximum	Maximum

## Dynamic Threshold Calculation Metrics for the Analytics Service

All metrics keys for the dynamic threshold calculation metrics begin with DtCalculation, as in DtCalculation|DtDataWrite|WriteOperationCount or DtCalculation|DtAnalyze|AnalyzeOperationCount.

**Table 1-94. Dynamic Threshold Calculation Metrics for the Analytics Service**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
DtDataWrite WriteOperationCount	Write operation count	Write operation count
DtDataWrite Duration TotalDuration	Total	Total length of duration (ms)
DtDataWrite Duration AvgDuration	Average	Average duration (ms)
DtDataWrite Duration MinDuration	Minimum	Minimum duration (ms)
DtDataWrite Duration MaxDuration	Maximum	Maximum duration (ms)
DtDataWrite SavedDtObjectCount TotalCount	Total	Total
DtDataWrite SavedDtObjectCount AvgCount	Average	Average
DtDataWrite SavedDtObjectCount MinCount	Minimal	Minimal
DtDataWrite SavedDtObjectCount MaxCount	Maximal	Maximal
DtAnalyze AnalyzeOperationCount	Analyze Operation Count	Analyze Operation Count
DtAnalyze Duration TotalDuration	Total	Total length of duration (ms)
DtAnalyze Duration AvgDuration	Average	Average duration (ms)
DtAnalyze Duration MinDuration	Minimum	Minimum duration (ms)
DtAnalyze Duration MaxDuration	Maximum	Maximum duration (ms)
DtAnalyze AnalyzedMetricsCount TotalCount	Total	Total
DtAnalyze AnalyzedMetricsCount AvgCount	Average	Average
DtAnalyze AnalyzedMetricsCount MinCount	Minimal	Minimal
DtAnalyze AnalyzedMetricsCount MaxCount	Maximal	Maximal
DtDataRead ReadOperationsCount	Read Operation Count	Read Operation Count
DtDataRead Duration TotalDuration	Total	Total length of duration (ms)
DtDataRead Duration AvgDuration	Average	Average duration (ms)
DtDataRead Duration MinDuration	Minimum	Minimum duration (ms)
DtDataRead Duration MaxDuration	Maximum	Maximum duration (ms)
DtDataRead ReadDataPointsCount TotalCount	Total	Total
DtDataRead ReadDataPointsCount AvgCount	Average	Average
DtDataRead ReadDataPointsCount MinCount	Minimal	Minimal
DtDataRead ReadDataPointsCount MaxCount	Maximal	Maximal

**Table 1-95. Function Call Metrics for the Analytics Service**

Metric Key	Metric Name	Description
FunctionCalls Count	Number of function calls	Number of function calls
FunctionCalls AvgDuration	Average execution time	Average execution time
FunctionCalls MaxDuration	Max execution time	Max execution time

## Collector Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager Collector service objects.

**Table 1-96. Collector Metrics**

Metric Key	Metric Name	Description
ThreadpoolThreadsCount	Number of pool threads	Number of pool threads.
RejectedFDCount	Number of rejected forward data	Number of rejected forward data
RejectedFDAItCount	Number of rejected alternative forward data	Number of rejected alternative forward data
SentFDCount	Number of sent objects	Number of sent objects
SentFDAItCount	Number of alternative sent objects	Number of alternative sent objects
CurrentHeapSize	Current heap size (MB)	Current heap size.
MaxHeapsize	Max heap size (MB)	Maximum heap size.
CommittedMemory	Committed memory (MB)	Amount of committed memory.
CPUUsage	CPU usage	CPU usage.
Threads	Threads	Number of threads.
UpStatus	Up Status	Up Status

## Controller Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager Controller objects.

**Table 1-97. Controller Metrics**

Metric Key	Metric Name	Description
RequestedMetricCount	Number of requested metrics	Number of requested metrics
ApiCallsCount	Number of API calls	Number of API calls
NewDiscoveredResourcesCount	Number of discovered objects	Number of discovered objects

## FSDB Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager file system database (FSDB) objects.

**Table 1-98. FSDB Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
StoragePoolElementsCount	Number of storage work items	Number of storage work items
FsdbState	Fsdb state	Fsdb state
StoredResourcesCount	Number of stored objects	Number of stored objects
StoredMetricsCount	Number of stored metrics	Number of stored metrics

**Table 1-99. Storage Thread Pool Metrics for FSDB**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
StoreOperationsCount	Store operations count	Store operations count
StorageThreadPool Duration TotalDuration	Total	Total number of duration (ms)
StorageThreadPool Duration AvgDuration	Average	Average duration (ms)
StorageThreadPool Duration MinDuration	Minimum	Minimum duration (ms)
StorageThreadPool Duration MaxDuration	Maximum	Maximum duration (ms)
StorageThreadPool SavedMetricsCount TotalCount	Total	Total
StorageThreadPool SavedMetricsCount AvgCount	Average	Average
StorageThreadPool SavedMetricsCount MinCount	Minimal	Minimal
StorageThreadPool SavedMetricsCount MaxCount	Maximal	Maximal

## Product UI Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager product user interface objects.

**Table 1-100. Product UI Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
ActiveSessionsCount	Active sessions	Active sessions
CurrentHeapSize	Current heap size	Current heap size.
MaxHeapSize	Max heap size	Maximum heap size.
CommittedMemory	Committed memory	Amount of committed memory.
CPUUsage	CPU usage	Percent CPU use.
Threads	Threads	Number of threads.
SessionCount	Number of active sessions	Number of active sessions
SelfMonitoringQueueSize	Self Monitoring queue size	Self Monitoring queue size

**Table 1-101. API Call Metrics for the Product UI**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
APICalls HTTPRequesterRequestCount	HTTPRequester request count	HTTPRequester request count
APICalls AvgHTTPRequesterRequestTime	HTTPRequester average request time	HTTPRequester average request time (ms)
APICalls FailedAuthenticationCount	Failed Authentication Count	Failed Authentication Count
APICalls AvgAlertRequestTime	Average alert request time	Average alert request time (ms)
APICalls AlertRequestCount	Alert request count	Alert request count
APICalls AvgMetricPickerRequestTime	Average metric-picker request time	Average metric-picker request time (ms)
APICalls MetricPickerRequestCount	Metric picker request count	Metric picker request count
APICalls HeatmapRequestCount	Heatmap request count	Heatmap request count
APICalls AvgHeatmapRequestTime	Average HeatMap request time	Average HeatMap request time (ms)
APICalls MashupChartRequestCount	Mashup Chart request count	Mashup Chart request count
APICalls AvgMashupChartRequestTime	Average Mashup Chart request time	Average Mashup Chart request time (ms)
APICalls TopNRequestCount	Top N request count	Top N request count
APICalls AvgTopNRequestTime	Average Top N request time	Average Top N request time (ms)
APICalls MetricChartRequestCount	Metric Chart request count	Metric Chart request count
APICalls AvgMetricChartRequestTime	Average MetricChart request time	Average MetricChart request time (ms)

## Admin UI Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager administration user interface objects.

**Table 1-102. Admin UI Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
CurrentHeapSize	Current heap size	Current heap size (MB).
MaxHeapSize	Max heap size	Maximum heap size (MB).
CommittedMemory	Committed memory	Amount of committed memory (MB) .
CPUUsage	CPU usage	CPU usage (%).
Threads	Threads	Number of threads.
SessionCount	Number of active sessions	Number of active sessions
SelfMonitoringQueueSize	Self Monitoring queue size	Self Monitoring queue size



**Table 1-103. API Call Metrics for the Admin UI**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
APICalls HTTPRequesterRequestCount	HTTPRequester request count	HTTPRequester request count
APICalls AvgHTTPRequesterRequestTime	HTTPRequester average request time	HTTPRequester average request time (ms)

## Suite API Metrics

vRealize Operations Manager collects metrics for the VMware vRealize Operations Management Suite API objects.

**Table 1-104. Suite API Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
UsersCount	Number of users	Number of users
ActiveSessionsCount	Active sessions	Active sessions
GemfireClientReconnects	Gemfire Client Reconnects	Gemfire Client Reconnects
GemfireClientCurrentCalls	Gemfire Client Total Outstanding	Gemfire Client Total Outstanding
CurrentHeapSize	Current heap size	Current heap size (MB) .
MaxHeapsize	Max heap size	Maximum heap size (MB) .
CommittedMemory	Committed memory	Amount of committed memory (MB).
CPUUsage	CPU usage	CPU usage (%) .
CPUProcessTime	CPU process time	CPU process time (ms)
CPUProcessTimeCapacity	CPU process time capacity	CPU process time capacity (ms)
Threads	Threads	Number of threads.

**Table 1-105. Gemfire Client Call Metrics for the Suite API**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
GemfireClientCalls TotalRequests	Total Requests	Total Requests
GemfireClientCalls AvgResponseTime	Average Response Time	Average Response Time (ms)
GemfireClientCalls MinResponseTime	Minimum Response Time	Minimum Response Time (ms)
GemfireClientCalls MaxResponseTime	Maximum Response Time	Maximum Response Time
GemfireClientCalls RequestsPerSecond	Requests per Second	Requests per Second
GemfireClientCalls CurrentRequests	Current Requests	Current Requests
GemfireClientCalls RequestsCount	Requests Count	Requests Count
GemfireClientCalls ResponsesCount	Responses Count	Responses Count

**Table 1-106. API Call Metrics for the Suite API**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
APICalls TotalRequests	Total Requests	Total Requests
APICalls AvgResponseTime	Average Response Time (ms)	Average Response Time (ms)
APICalls MinResponseTime	Minimum Response Time (ms)	Minimum Response Time (ms)
APICalls MaxResponseTime	Maximum Response Time	Maximum Response Time
APICalls ServerErrorResponseCount	Server Error Response Count	Server Error Response Count
APICalls FailedAuthenticationCount	Failed Authentication Count	Failed Authentication Count
APICalls FailedAuthorizationCount	Failed Authorization Count	Failed Authorization Count
APICalls RequestsPerSecond	Requests per Second	Requests per Second
APICalls CurrentRequests	Current Requests	Current Requests
APICalls ResponsesPerSecond	Responses per Second	Responses per Second
APICalls RequestsCount	Requests Count	Requests Count
APICalls ResponsesCount	Responses Count	Responses Count

## Cluster and Slice Administration Metrics

vRealize Operations Manager collects metrics for vRealize Operations Manager Cluster and Slice Administration (CaSA) objects.

**Table 1-107. Cluster and Slice Administration Metrics**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
CurrentHeapSize	Current heap size	Current heap size (MB).
MaxHeapsize	Max heap size	Maximum heap size (MB).
CommittedMemory	Committed memory	Amount of committed memory (MB).
CPUUsage	CPU usage	CPU usage (%)
Threads	Threads	Number of threads.

**Table 1-108. API Call Metrics for Cluster and Slice Administration**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
API Calls TotalRequests	Total Requests	Total Requests
API Calls AvgResponseTime	Average Response Time	Average Response Time (ms)
API Calls MinResponseTime	Minimum Response Time	Minimum Response Time (ms)
API Calls MaxResponseTime	Maximum Response Time	Maximum Response Time (ms)
API Calls ServerErrorResponseCount	Server Error Response Count	Server Error Response Count
API Calls FailedAuthenticationCount	Failed Authentication Count	Failed Authentication Count
API Calls FailedAuthorizationCount	Minimum Response Time	Minimum Response Time (ms)

## Watchdog Metrics

vRealize Operations Manager collects watchdog metrics to ensure that the vRealize Operations Manager services are running and responsive.

### Watchdog Metrics

The watchdog metric provides the total service count.

**Table 1-109. Watchdog Metrics**

Metric Key	Metric Name	Description
ServiceCount	Service Count	Service Count

### Service Metrics

Service metrics provide information about watchdog activity.

**Table 1-110. Metrics for the vRealize Operations Manager Watchdog Service**

Metric Key	Metric Name	Description
Service Enabled	Enabled	Enabled
Service Restarts	Restarts	Number of times the process has been unresponsive and been restarted by Watchdog.
Service Starts	Starts	Number of times the process has been revived by Watchdog.
Service Stops	Stops	Number of times the process has been stopped by Watchdog.

## Node Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager node objects.

Metrics can be calculated for node objects. See [Calculated Metrics](#).

**Table 1-111. Node Metrics**

Metric Key	Metric Name	Description
Component Count	Component count	The number of vRealize Operations Manager objects reporting for this node
PrimaryResourcesCount	Number of primary objects	Number of primary objects
LocalResourcesCount	Number of local objects	Number of local objects
PrimaryMetricsCount	Number of primary metrics	Number of primary metrics
LocalMetricsCount	Number of local metrics	Number of local metrics
PercentDBStorageAvailable	Percent disk available /storage/db	Percent disk available /storage/db
PercentLogStorageAvailable	Percent disk available /storage/log	Percent disk available /storage/log

**Table 1-112. Memory Metrics for the Node**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
mem actualFree	Actual Free	Actual Free
mem actualUsed	Actual Used	Actual Used
mem free	Free	Free )
mem used	Used	Used
mem total	Total	Total
mem demand_gb	Estimated memory demand	Estimated memory demand

**Table 1-113. Swap Metrics for the Node**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
swap total	Total	Total
swap free	Free	Free
swap used	Used	Used
swap pageIn	Page in	Page in
swap pageOut	Page out	Page out

**Table 1-114. Resource Limit Metrics for the Node**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
resourceLimit numProcesses	Number of processes	Number of processes
resourceLimit openFiles	Number of open files	Number of open files
resourceLimit openFilesMax	Number of open files maximum limit	Number of open files maximum limit
resourceLimit numProcessesMax	Number of processes maximum limit	Number of processes maximum limit

**Table 1-115. Network Metrics for the Node**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
net allInboundTotal	All inbound connections	All inbound total
net allOutboundTotal	All outbound connections	All outbound total
net tcpBound	TCP bound	TCP bound
net tcpClose	TCP state CLOSE	Number of connections in TCP CLOSE
net tcpCloseWait	TCP state CLOSE WAIT	Number of connections in TCP state CLOSE WAIT
net tcpClosing	TCP state CLOSING	Number of connections in TCP state CLOSING
net tcpEstablished	TCP state ESTABLISHED	Number of connections in TCP state ESTABLISHED

Metric Key	Metric Name	Description
net tcpIdle	TCP state IDLE	Number of connections in TCP state IDLE
net tcpInboundTotal	TCP inbound connections	TCP inbound connections
net tcpOutboundTotal	TCP outbound connections	TCP outbound connections
net tcpLastAck	TCP state LAST ACK	Number of connections in TCP state LAST ACK
net tcpListen	TCP state LISTEN	Number of connections in TCP state LISTEN
net tcpSynRecv	TCP state SYN RCVD	Number of connections in TCP state SYN RCVD
net tcpSynSent	TCP state SYN_SENT	Number of connections in TCP state SYN_SENT
net tcpTimeWait	TCP state TIME WAIT	Number of connections in TCP state TIME WAIT

**Table 1-116. Network Interface Metrics for the Node**

Metric Key	Metric Name	Description
net iface speed	Speed	Speed (bits/sec)
net iface rxPackets	Receive packets	Number of received packets
net iface rxBytes	Receive bytes	Number of received bytes
net iface rxDropped	Receive packet drops	Number of received packets dropped
net iface rxFrame	Receive packets frame	Number of receive packets frame
net iface rxOverruns	Receive packets overruns	Number of receive packets overrun
net iface txPackets	Transmit packets	Number of transmit packets
net iface txBytes	Transmit bytes	Number of transmit bytes
net iface txDropped	Transmit packet drops	Number of transmit packets dropped
net iface txCarrier	Transmit carrier	Transmit carrier
net iface txCollisions	Transmit packet collisions	Number of transmit collisions
net iface txErrors	Transmit packet errors	Number of transmit errors
net iface txOverruns	Transmit packet overruns	Number of transmit overruns

**Table 1-117. Disk Filesystem Metrics for the Node**

Metric Key	Metric Name	Description
disk fileSystem total	Total	Total
disk fileSystem available	Available	Available
disk fileSystem used	Used	Used

Metric Key	Metric Name	Description
disk fileSystem files	Total file nodes	Total file nodes
disk fileSystem filesFree	Total free file nodes	Total free file nodes
disk fileSystem queue	Disk queue	Disk queue
disk fileSystem readBytes	Read bytes	Number of bytes read
disk fileSystem writeBytes	Write bytes	Number of bytes written
disk fileSystem reads	Reads	Number of reads
disk fileSystem writes	Writes	Number of writes

**Table 1-118. Disk Installation Metrics for the Node**

Metric Key	Metric Name	Description
disk installation used	Used	Used
disk installation total	Total	Total
disk installation available	Available	Available

**Table 1-119. Disk Database Metrics for the Node**

Metric Key	Metric Name	Description
disk db used	Used	Used
disk db total	Total	Total
disk db available	Available	Available

**Table 1-120. Disk Log Metrics for the Node**

Metric Key	Metric Name	Description
disk log used	Used	Used
disk log total	Total	Total
disk log available	Available	Available

**Table 1-121. CPU Metrics for the Node**

Metric Key	Metric Name	Description
cpu combined	Combined load	Combined load (User + Sys + Nice + Wait)
cpu idle	Idle	Idle time fraction of total available cpu (cpu load)
cpu irq	Irq	Interrupt time fraction of total available cpu (cpu load)
cpu nice	Nice	Nice time fraction of total available cpu (cpu load)

Metric Key	Metric Name	Description
cpu softirq	Soft Irq	Soft interrupt time fraction of total available cpu (cpu load)
cpu stolen	Stolen	Stolen time fraction of total available cpu (cpu load)
cpu sys	Sys	Sys time fraction of total available cpu (cpu load)
cpu user	User (cpu load)	User time fraction of total available cpu (cpu load)
cpu wait	Wait (cpu load)	Wait time fraction of total available cpu (cpu load)
cpu total	Total available for a cpu	Total available for a cpu
cpu allCpuCombined	Total combined load for all cpus	Total combined load for all cpus (cpu load)
cpu allCpuTotal_ghz	Available	Available
cpu allCpuCombined_ghz	Used	Used
cpu allCpuCombined_percent	CPU usage	CPU usage (%)

**Table 1-122. Device Metrics for the Node**

Metric Key	Metric Name	Description
device iops	Reads/Writes per second	Average number of read/write commands issued per second during the collection interval.
device await	Average transaction time	Average transaction time (milliseconds).
device iops_readMaxObserved	Maximum observed reads per second	Maximum observed reads per second.
device iops_writeMaxObserved	Maximum observed writes per second	Maximum observed writes per second.

**Table 1-123. Service Metrics for the Node**

Metric Key	Metric Name	Description
service proc fdUsage	Total number of open file descriptors	Total number of open file descriptors.

**Table 1-124. NTP Metrics for the Node**

Metric Key	Metric Name	Description
ntp serverCount	Configured server count	Configured server count
ntp unreachableCount	Unreachable server count	Unreachable server count
ntp unreachable	Unreachable	Is the NTP server unreachable. Value of 0 is reachable, 1 means the server was not reached or didn't respond.

**Table 1-125. Heap Metrics for the Node**

Metric Key	Metric Name	Description
heap CurrentHeapSize	Current heap size	Current heap size
heap MaxHeapSize	Max heap size	Max heap size
heap CommittedMemory	Committed Memory	Committed Memory

## Cluster Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager cluster objects including dynamic threshold calculation metrics and capacity computation metrics.

Metrics can be calculated for cluster objects. See [Calculated Metrics](#).

## Cluster Metrics

Cluster metrics provide host, resource, and metric counts on the cluster.

**Table 1-126. Cluster Metrics**

Metric Key	Metric Name	Description
HostCount	Number of Nodes in Cluster	Number of Nodes in Cluster
PrimaryResourcesCount	Number of primary resources	Number of primary resources
LocalResourcesCount	Number of local resources	Number of local resources
PrimaryMetricsCount	Number of primary metrics	Number of primary metrics
ReceivedResourceCount	Number of received resources	Number of received resources
ReceivedMetricCount	Number of received metrics	Number of received metrics

## DT Metrics

DT metrics are dynamic threshold metrics for the cluster. Non-zero values appear only if metric collection occurs while the dynamic threshold calculations are running.



**Table 1-127. DT Metrics for the Cluster**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
dt isRunning	Running	Running
dt dtRunTime	Running duration	Running duration (ms)
dt StartTime	Running start time	Running start time
dt percentage	Percent	Percent (%)
dt executorCount	Executor Node Count	Executor Node Count
dt resourceCount	Resource Count	Resource Count
dt fsdbReadTime	FSDB Read Time	FSDB Read Time (ms)
dt dtObjectSaveTime	DT Object Save Time	DT Object Save Time (ms)
dt dtHistorySaveTime	DT History Save Time	DT History Save Time (ms)
dt executor resourceCount	Resource Count	Resource Count

## Capacity Computation (CC) Metrics

CC metrics are capacity computation metrics for the cluster. Non-zero values appear only if metric collection occurs while the capacity computation calculations are running.

**Table 1-128. CC Metrics for the Cluster**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
cc isRunning	Running	Running
cc runTime	Total Run Time	Total Run Time
cc startTime	Start time	Start time
cc finishTime	Finish Time	Finish Time
cc totalResourcesToProcess	Total Objects Count	Total Objects Count
cc progress	Progress	Progress
cc phase1TimeTaken	Phase 1 Computation Time	Phase 1 Computation Time
cc phase2TimeTaken	Phase 2 Computation Time	Phase 2 Computation Time

## Gemfire Cluster Metrics

Gemfire metrics provide information about the Gemfire cluster.

**Table 1-129. Gemfire cluster Metrics for the Cluster**

<b>Metric Key</b>	<b>Metric Name</b>	<b>Description</b>
GemfireCluster System AvgReads	Average reads per second	The average number of reads per second for all members
GemfireCluster System AvgWrites	Average writes per second	The average number of writes per second for all members

Metric Key	Metric Name	Description
GemfireCluster System DiskReadsRate	Disk reads rate	The average number of disk reads per second across all distributed members
GemfireCluster System DiskWritesRate	Disk writes rate	The average number of disk writes per second across all distributed members
GemfireCluster System GarbageCollectionCount	Total garbage collection count	The total garbage collection count for all members
GemfireCluster System GarbageCollectionCountDelta	New garbage collection count	The new garbage collection count for all members
GemfireCluster System JVMPauses	JVM pause count	The number of detected JVM pauses
GemfireCluster System JVMPausesDelta	New JVM pause count	The number of new detected JVM pauses
GemfireCluster System DiskFlushAvgLatency	Disk flush average latency	Disk flush average latency (msec)
GemfireCluster System NumRunningFunctions	Number of running functions	The number of map-reduce jobs currently running on all members in the distributed system
GemfireCluster System NumClients	Number of clients	The number of connected clients
GemfireCluster System TotalHitCount	Total hit count	Total number of cache hits for all regions
GemfireCluster System TotalHitCountDelta	New hit count	Number of new cache hits for all regions
GemfireCluster System TotalMissCount	Total miss count	The total number of cache misses for all regions
GemfireCluster System TotalMissCountDelta	New miss count	Number of new cache misses for all regions
GemfireCluster System Member FreeSwapSpace	Swap space free	Swap space free (MB)
GemfireCluster System Member TotalSwapSpace	Swap space total	Swap space total (MB)
GemfireCluster System Member CommittedVirtualMemorySize	Committed virtual memory size	Committed virtual memory size (MB)
GemfireCluster System Member SystemLoadAverage	System load average	System load average
GemfireCluster System Member FreePhysicalMemory	Free physical memory	Free physical memory (MB)
GemfireCluster System Member TotalPhysicalMemory	Total physical memory	Total physical memory (MB)
GemfireCluster System Member CacheListenerCallsAvgLatency	Average cache listener calls latency	Average cache listener calls latency (msec)
GemfireCluster System Member CacheWriterCallsAvgLatency	Average cache writer calls latency	Average cache writer calls latency (msec)
GemfireCluster System Member DeserializationAvgLatency	Average deserialization latency	Average deserialization latency (msec)

Metric Key	Metric Name	Description
GemfireCluster System Member FunctionExecutionRate	Function executions per second	Function executions per second
GemfireCluster System Member JVMPauses	Number of JVM pauses	Number of JVM pauses
GemfireCluster System Member NumRunningFunctions	Number of running functions	Number of running functions
GemfireCluster System Member PutsRate	Puts per second	Puts per second
GemfireCluster System Member GetsRate	Gets per second	Gets per second
GemfireCluster System Member GetsAvgLatency	Average gets latency	Average gets latency (msec)
GemfireCluster System Member PutsAvgLatency	Average puts latency	Average puts latency (msec)
GemfireCluster System Member SerializationAvgLatency	Average serialization latency	Average serialization latency (msec)
GemfireCluster System Member Disk DiskFlushAvgLatency	Flush average latency	Flush average latency (msec)
GemfireCluster System Member Disk DiskReadsRate	Average reads per second	Average reads per second
GemfireCluster System Member Disk DiskWritesRate	Average writes per second	Average writes per second
GemfireCluster System Member Network BytesReceivedRate	Average received bytes per second	Average received bytes per second
GemfireCluster System Member Network BytesSentRate	Average sent bytes per second	Average sent bytes per second
GemfireCluster System Member JVM GCTimeMillis	Garbage Collection time	Total amount of time spent on garbage collection
GemfireCluster System Member JVM GCTimeMillisDelta	New Garbage Collection time	New amount of time spent on garbage collection
GemfireCluster System Member JVM TotalThreads	Total threads	Total threads
GemfireCluster System Member JVM CommittedMemory	Committed Memory	Committed Memory (MB)
GemfireCluster System Member JVM MaxMemory	Max Memory	Max Memory (MB)
GemfireCluster System Member JVM UsedMemory	Used Memory	Used Memory (MB)
GemfireCluster Region SystemRegionEntryCount	Entry Count	Entry Count
GemfireCluster Region DestroyRate	Destroys per second	Destroys per second
GemfireCluster Region CreatesRate	Creates per second	Creates per second
GemfireCluster Region GetsRate	Gets per second	Gets per second
GemfireCluster Region BucketCount	Bucket count	Bucket count

Metric Key	Metric Name	Description
GemfireCluster Region AvgBucketSize	Average number of entries per bucket	Average number of entries per bucket
GemfireCluster Region Member ActualRedundancy	Actual redundancy	Actual redundancy
GemfireCluster Region Member BucketCount	Bucket count	Bucket count
GemfireCluster Region Member AvgBucketSize	Average number of entries per bucket	Average number of entries per bucket
GemfireCluster Region Member CreatesRate	Creates per second	Creates per second
GemfireCluster Region Member GetsRate	Gets per second	Gets per second
GemfireCluster Region Member DestroyRate	Destroys per second	Destroys per second
GemfireCluster Region Member MissCount	Number of misses count	Number of cache misses
GemfireCluster Region Member MissCountDelta	Number of new cache misses	Number of new cache misses
GemfireCluster Region Member HitCount	Number of hits count	Number of cache hits
GemfireCluster Region Member HitCountDelta	Number of new cache hits	Number of new cache hits

## Threshold Checking Metrics

Threshold checking metrics check the processed and computed metrics for the cluster.

**Table 1-130. Threshold Checking Metrics for the Cluster**

Metric Key	Metric Name	Description
ThresholdChecking ProcessedMetricCount	Number of processed metrics	Number of processed metrics
ThresholdChecking ProcessedMetricRate	Received metric processing rate (per second)	Received metric processing rate (per second)
ThresholdChecking ComputedMetricCount	Number of computed metrics	Number of computed metrics
ThresholdChecking ComputedMetricRate	Computed metric processing rate (per second)	Computed metric processing rate (per second)

## Memory Metrics

Memory metrics provide memory CPU use information for the cluster.

**Table 1-131. Memory Metrics for the Cluster**

Metric Key	Metric Name	Description
Memory AvgFreePhysicalMemory	Average free physical memory	Average free physical memory (GB)
Memory TotalFreePhysicalMemory	Free physical memory	Free physical memory (GB)
Memory TotalMemory	Total Available Memory	Total Available Memory (GB)
Memory TotalUsedMemory	Actual Used Memory	Actual Used Memory (GB)
Memory TotalDemandMemory	Memory Demand	Memory Demand (GB)

## Elastic Memory Metrics

Elastic memory metrics provide reclaimable memory CPU use information for the cluster.

**Table 1-132. Memory Metrics for the Cluster**

Metric Key	Metric Name	Description
ElasticMemory TotalMemory	Total Available Memory	Total Available Memory (GB)
ElasticMemory TotalUsedMemory	Actual Used Memory	Actual Used Memory (GB)
ElasticMemory TotalDemandMemory	Memory Demand	Memory Demand (GB)

## CPU Metrics

CPU metrics provide CPU information for the cluster.

**Table 1-133. CPU Metrics for the Cluster**

Metric Key	Metric Name	Description
cpu TotalCombinedUsage	CPU Load	CPU Load
cpu TotalAvailable	CPU Available	CPU Available
cpu TotalAvailable_ghz	Available	Available (GHz)
cpu TotalUsage_ghz	Used	Used (GHz)
cpu TotalUsage	CPU usage	CPU usage (%)

## Disk Metrics

Disk metrics provide available disk information for the cluster.

**Table 1-134. Disk Metrics for the Cluster**

Metric Key	Metric Name	Description
Disk DatabaseStorage AvgAvailable	Average node disk available	Average node disk available
Disk DatabaseStorage MinAvailable	Minimum node disk available	Minimum node disk available
Disk DatabaseStorage MaxAvailable	Maximum node disk available	Maximum node disk available
Disk DatabaseStorage TotalAvailable	Available	Available
Disk DatabaseStorage Total	Total	Total
Disk DatabaseStorage TotalUsed	Used	Used
Disk LogStorage AvgAvailable	Average node disk available	Average node disk available
Disk LogStorage MinAvailable	Minimum node disk available	Minimum node disk available
Disk LogStorage MaxAvailable	Maximum node disk available	Maximum node disk available
Disk LogStorage TotalAvailable	Available	Available
Disk LogStorage Total	Total	Total
Disk LogStorage TotalUsed	Used	Used

## Persistence Metrics

vRealize Operations Manager collects metrics for various persistence resources or service groups.

### Activity Metrics

Activity metrics relate to the activity framework.

**Table 1-135. Activity Metrics for Persistence**

Metric Key	Metric Name	Description
Activity RunningCount	Number Running	Number Running
Activity ExecutedCount	Number Executed	Number Executed
Activity SucceededCount	Number Succeeded	Number Succeeded
Activity FailedCount	Number Failed	Number Failed

### Controller XDB Metrics

Controller metrics relate to the master database.

**Table 1-136. Controller XDB Metrics for Persistence**

Metric Key	Metric Name	Description
ControllerXDB Size	Size	Size (Bytes)
ControllerXDB TempDBSize	Temporary DB Size	Temporary DB Size (Bytes)
ControllerXDB TotalObjectCount	Total Object Count	Total Object Count
ControllerXDB AvgQueryDuration	Average Query Duration	Average Query Duration (ms)
ControllerXDB MinQueryDuration	Minimum Query Duration	Minimum Query Duration (ms)
ControllerXDB MaxQueryDuration	Maximum Query Duration	Maximum Query Duration (ms)
ControllerXDB TotalTransactionCount	Total Transaction Count	Total Transaction Count
ControllerXDB LockOperationErrorCount	Lock Operation Error Count	Lock Operation Error Count
ControllerXDB DBCorruptionErrorCount	DB Corruption Error Count	DB Corruption Error Count
ControllerXDB DBMaxSessionExceededCount	DB Maximum Sessions Exceeded Count	DB Maximum Sessions Exceeded Count
ControllerXDB NumberWaitingForSession	Number of operations waiting for a session	Number of operations waiting for a session from the session pool
ControllerXDB AvgWaitForSessionDuration	Average acquisition time from session pool	Average acquisition time from session pool
ControllerXDB MinWaitForSessionDuration	Minimum acquisition time from session pool	Minimum acquisition time from session pool
ControllerXDB MaxWaitForSessionDuration	Maximum acquisition time from session pool	Maximum acquisition time from session pool

Metric Key	Metric Name	Description
ControllerXDB TotalGetSessionCount	Total requests for a session from the session pool	Total requests for a session from the session pool
ControllerXDB MaxActiveSessionCount	Maximum Concurrent Session Count	Maximum concurrent session count during the past collection interval.

## Alarm SQL Metrics

Alarm metrics relate to the persistence of alerts and symptoms.

**Table 1-137. Alarm XDB Metrics for Persistence**

Metric Key	Metric Name	Description
AlarmSQL Size	Size (Bytes)	Size (Bytes)
AlarmSQL AvgQueryDuration	Average Query Duration (ms)	Average Query Duration (ms)
AlarmSQL MinQueryDuration	Minimum Query Duration (ms)	Minimum Query Duration (ms)
AlarmSQL MaxQueryDuration	Maximum Query Duration (ms)	Maximum Query Duration (ms)
AlarmSQL TotalTransactionCount	Total Transaction Count	Total Transaction Count
AlarmSQL TotalAlarms	Alarm Total Object Count	Alarm Total Object Count
AlarmSQL TotalAlerts	Alert Total Object Count	Alert Total Object Count
AlarmSQL AlertTableSize	Alert Table Size	Alert Table Size
AlarmSQL AlarmTableSize	Alarm Table Size	Alarm Table Size

## Key Value Store Database (KVDB)

KVDB metrics relate to the persistence of storing key-value data.

Metric Key	Metric Name	Description
KVDB AvgQueryDuration	Average Query Duration	Average Query Duration
KVDB MinQueryDuration	Minimum Query Duration	Minimum Query Duration
KVDB MaxQueryDuration	Maximum Query Duration	Maximum Query Duration
KVDB TotalTransactionCount	Total Transaction Count	Total Transaction Count

## Historical Inventory Service XDB Metrics

Historical inventory service metrics relate to the persistence of configuration properties and their changes.

**Table 1-138. Historical XDB Metrics for Persistence**

Metric Key	Metric Name	Description
HisXDB FunctionCalls Count HisXDB FunctionCalls	Number of Function calls	Number of Function calls
HisXDB FunctionCalls AvgDuration	Average execution time	Average execution time
HisXDB FunctionCalls MaxDuration	Max execution time	Max execution time

Metric Key	Metric Name	Description
HisXDB Size	Size	Size (Bytes)
HisXDB TempDBSize	Temporary DB Size	Temporary DB Size (Bytes)
HisXDB TotalObjectCount	Total Object Count	Total Object Count
HisXDB AvgQueryDuration	Average Query Duration	Average Query Duration (ms)
HisXDB MinQueryDuration	Minimum Query Duration	Minimum Query Duration (ms)
HisXDB MaxQueryDuration	Maximum Query Duration	Maximum Query Duration (ms)
HisXDB TotalTransactionCount	Total Transaction Count	Total Transaction Count
HisXDB LockOperationErrorCount	Lock Operation Error Count	Lock Operation Error Count
HisXDB DBCorruptionErrorCount	DB Corruption Error Count	DB Corruption Error Count
HisXDB DBMaxSessionExceededCount	DB Maximum Sessions Exceeded Count	DB Maximum Sessions Exceeded Count
HisXDB NumberWaitingForSession	Number of operations waiting for a session	Number of operations waiting for a session from the session pool
HisXDB AvgWaitForSessionDuration	Average acquisition time from session pool	Average acquisition time from session pool
HisXDB MinWaitForSessionDuration	Minimum acquisition time from session pool	Minimum acquisition time from session pool
HisXDB MaxWaitForSessionDuration	Maximum acquisition time from session pool	Maximum acquisition time from session pool
HisXDB TotalGetSessionCount	Total requests for a session from the session pool	Total requests for a session from the session pool
HisXDB HisActivitySubmissionCount	HIS activity submission count	Number of Historical Inventory Service activities submitted
HisXDB HisActivityCompletionCount	HIS activity completion count	Number of Historical Inventory Service activities completed
HisXDB HisActivityCompletionDelayAvg	HIS activity average completion delay	The average amount of time from activity submission to completion
HisXDB HisActivityCompletionDelayMax	HIS activity maximum completion delay	The maximum amount of time from activity submission to completion
HisXDB HisActivityAbortedCount	HIS activity abort count	Number of Historical Inventory Service activities aborted

## Remote Collector Metrics

vRealize Operations Manager collects metrics for the vRealize Operations Manager remote collector node objects.



**Table 1-139. Remote Collector Metrics**

Metric Key	Metric Name	Description
ComponentCount	Component Count	The number of vRealize Operations Manager Objects reporting for this node.

**Table 1-140. Memory Metrics for the Remote Collector**

Metric Key	Metric Name	Description
mem actualFree	Actual Free	Actual Free
mem actualUsed	Actual Used	Actual Used
mem free	Free	Free )
mem used	Used	Used
mem total	Total	Total
mem demand_gb	Estimated memory demand	Estimated memory demand

**Table 1-141. Swap Metrics for the Remote Collector**

Metric Key	Metric Name	Description
swap total	Total	Total
swap free	Free	Free
swap used	Used	Used
swap pageIn	Page in	Page in
swap pageOut	Page out	Page out

**Table 1-142. Resource limit Metrics for the Remote Collector**

Metric Key	Metric Name	Description
resourceLimit numProcesses	Number of processes	Number of processes
resourceLimit openFiles	Number of open files	Number of open files
resourceLimit openFilesMax	Number of open files maximum limit	Number of open files maximum limit
resourceLimit numProcessesMax	Number of processes maximum limit	Number of processes maximum limit

**Table 1-143. Network Metrics for the Remote Collector**

Metric Key	Metric Name	Description
net allInboundTotal	All inbound connections	All inbound total
net allOutboundTotal	All outbound connections	All outbound total
net tcpBound	TCP bound	TCP bound
net tcpClose	TCP state CLOSE	Number of connections in TCP CLOSE

Metric Key	Metric Name	Description
net tcpCloseWait	TCP state CLOSE WAIT	Number of connections in TCP state CLOSE WAIT
net tcpClosing	TCP state CLOSING	Number of connections in TCP state CLOSING
net tcpEstablished	TCP state ESTABLISHED	Number of connections in TCP state ESTABLISHED
net tcpIdle	TCP state IDLE	Number of connections in TCP state IDLE
net tcpInboundTotal	TCP inbound connections	TCP inbound connections
net tcpOutboundTotal	TCP outbound connections	TCP outbound connections
net tcpLastAck	TCP state LAST ACK	Number of connections in TCP state LAST ACK
net tcpListen	TCP state LISTEN	Number of connections in TCP state LISTEN
net tcpSynRecv	TCP state SYN RCVD	Number of connections in TCP state SYN RCVD
net tcpSynSent	TCP state SYN_SENT	Number of connections in TCP state SYN_SENT
net tcpTimeWait	TCP state TIME WAIT	Number of connections in TCP state TIME WAIT

**Table 1-144. Network Interface Metrics for the Remote Collector**

Metric Key	Metric Name	Description
net iface speed	Speed	Speed (bits/sec)
net iface rxPackets	Receive packets	Number of received packets
net iface rxBytes	Receive bytes	Number of received bytes
net iface rxDropped	Receive packet drops	Number of received packets dropped
net iface rxFrame	Receive packets frame	Number of receive packets frame
net iface rxOverruns	Receive packets overruns	Number of receive packets overrun
net iface txPackets	Transmit packets	Number of transmit packets
net iface txBytes	Transmit bytes	Number of transmit bytes
net iface txDropped	Transmit packet drops	Number of transmit packets dropped
net iface txCarrier	Transmit carrier	Transmit carrier
net iface txCollisions	Transmit packet collisions	Number of transmit collisions
net iface txErrors	Transmit packet errors	Number of transmit errors
net iface txOverruns	Transmit packet overruns	Number of transmit overruns

**Table 1-145. Disk Filesystem Metrics for the Remote Collector**

Metric Key	Metric Name	Description
disk fileSystem total	Total	Total
disk fileSystem available	Available	Available
disk fileSystem used	Used	Used
disk fileSystem files	Total file nodes	Total number of file nodes
disk fileSystem filesFree	Total free file nodes	Total free file nodes
disk fileSystem queue	Disk queue	Disk queue
disk fileSystem readBytes	Read bytes	Number of bytes read
disk fileSystem writeBytes	Write bytes	Number of bytes written
disk fileSystem reads	Reads	Number of reads
disk fileSystem writes	Writes	Number of writes

**Table 1-146. Disk Installation Metrics for the Remote Collector**

Metric Key	Metric Name	Description
disk installation used	Used	Used
disk installation total	Total	Total
disk installation available	Available	Available

**Table 1-147. Disk Database Metrics for the Remote Collector**

Metric Key	Metric Name	Description
disk db used	Used	Used
disk db total	Total	Total
disk db available	Available	Available

**Table 1-148. Disk Log Metrics for the Remote Collector**

Metric Key	Metric Name	Description
disk log used	Used	Used
disk log total	Total	Total
disk log available	Available	Available

**Table 1-149. CPU Metrics for the Remote Collector**

Metric Key	Metric Name	Description
cpu combined	Combined load	Combined load (User + Sys + Nice + Wait)
cpu idle	Idle	Idle time fraction of total available cpu (cpu load)

Metric Key	Metric Name	Description
cpu irq	Irq	Interrupt time fraction of total available cpu (cpu load)
cpu nice	Nice	Nice time fraction of total available cpu (cpu load)
cpu softirq	Soft Irq	Soft interrupt time fraction of total available cpu (cpu load)
cpu stolen	Stolen	Stolen time fraction of total available cpu (cpu load)
cpu sys	Sys	Sys time fraction of total available cpu (cpu load)
cpu user	User	User time fraction of total available cpu (cpu load)
cpu wait	Wait	Wait time fraction of total available cpu (cpu load)
cpu total	Total available for a cpu	Total available for a cpu
cpu allCpuCombined	Total combined load for all cpus	Total combined load for all cpus (cpu load)
cpu allCpuTotal_ghz	Available	Available
cpu allCpuCombined_ghz	Used	Used
cpu allCpuCombined_percent	CPU usage	CPU usage (%)

**Table 1-150. Device Metrics for the Remote Collector**

Metric Key	Metric Name	Description
device iops	Reads/writes per second	Average number of read/write commands issued per second during the collection interval
device await	Average transaction time	Average transaction time (milliseconds)

**Table 1-151. Service Metrics for the Remote Collector**

Metric Key	Metric Name	Description
service proc fdUsage	Total number of open file descriptors	Total number of open file descriptors (Linux). Total number of open handles (Windows)

**Table 1-152. NTP Metrics for the Remote Collector**

Metric Key	Metric Name	Description
ntp serverCount	Configured server count	Configured server count
ntp unreachableCount	Unreachable server count	Unreachable server count
ntp unreachable	Unreachable	Is the NTP server unreachable. Value of 0 is reachable, 1 means the server was not reached or didn't respond.

## Metrics for the Operating Systems and Remote Service Monitoring Plug-ins in Endpoint Operations Management

vRealize Operations Manager collects metrics for the object types in the Operating Systems and Remote Service Monitoring plug-ins.

Due to rounding in metric time calculation, there can be situations in which the Resource Availability metric is rounded up. Rounding up the metric appears as gaps in the metrics reported by the Endpoint Operations Management agent. However, the metrics are fully reported.

### Operating Systems Plug-in Metrics

The Operating Systems plug-in collects metrics for object types such Linux, AIX, Solaris, and Windows. The Operating Systems plug-in also collects metrics for Windows services, Script services, and Multiprocess services.

### AIX Metrics

The Operating Systems Plug-in discovers the metrics for the AIX object type. AIX 6.1 and 7.1 are supported.

**Table 1-153. AIX metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
System Uptime	AVAILABILITY	True
File System Reads/Writes	THROUGHPUT	False
File System Reads/Writes per Minute	THROUGHPUT	False
Tcp Passive Opens	THROUGHPUT	False
Tcp Out Segs per Minute	THROUGHPUT	False
Tcp Attempt Fails	THROUGHPUT	False
Tcp Estab Resets per Minute	THROUGHPUT	False
Tcp Retrans Segs	THROUGHPUT	False
Tcp Out Segs	THROUGHPUT	False

Name	Category	KPI
Tcp Estab Resets	THROUGHPUT	False
Tcp Active Opens	THROUGHPUT	False
Tcp Curr Estab	THROUGHPUT	False
Tcp In Errs	THROUGHPUT	False
Tcp In Errs per Minute	THROUGHPUT	False
Tcp Active Opens per Minute	THROUGHPUT	False
Tcp Out Rsts per Minute	THROUGHPUT	False
Tcp Out Rsts	THROUGHPUT	False
Tcp Attempt Fails per Minute	THROUGHPUT	False
Tcp Passive Opens per Minute	THROUGHPUT	False
Tcp In Segs per Minute	THROUGHPUT	False
Tcp In Segs	THROUGHPUT	False
Tcp Retrans Segs per Minute	THROUGHPUT	False
Cpu Wait Time	UTILIZATION	False
Cpu Idle	UTILIZATION	False
Cpu Idle Time	UTILIZATION	False
Cpu Idle Time per Minute	UTILIZATION	False
Cpu Wait Time per Minute	UTILIZATION	False
Cpu Usage	UTILIZATION	True
Cpu Wait	UTILIZATION	False
Cpu Nice	UTILIZATION	False
Free Memory	UTILIZATION	False
Load Average 15 Minutes	UTILIZATION	False
Load Average 5 Minutes	UTILIZATION	False
Load Average 1 Minute	UTILIZATION	False
Nfs Server V3 Write per Minute	UTILIZATION	False
Nfs Server V3 Readlink per Minute	UTILIZATION	False
Nfs Server V3 Readdirplus per Minute	UTILIZATION	False
Nfs Server V3 Commit per Minute	UTILIZATION	False
Nfs Server V3 Access	UTILIZATION	False
Nfs Server V3 Access per Minute	UTILIZATION	False
Nfs Server V3 Rename per Minute	UTILIZATION	False
Nfs Server V3 Fsstat per Minute	UTILIZATION	False
Nfs Server V3 Create per Minute	UTILIZATION	False
Nfs Server V3 Mkdir per Minute	UTILIZATION	False

Name	Category	KPI
Nfs Server V3 Mknod	UTILIZATION	False
Nfs Server V3 Read per Minute	UTILIZATION	False
Nfs Server V3 Fsstat	UTILIZATION	False
Nfs Server V3 Link	UTILIZATION	False
Nfs Server V3 Write	UTILIZATION	False
Nfs Server V3 Lookup per Minute	UTILIZATION	False
Nfs Server V3 Link per Minute	UTILIZATION	False
Nfs Server V3 Rmdir per Minute	UTILIZATION	False
Nfs Server V3 Mkdir	UTILIZATION	False
Nfs Server V3 Remove per Minute	UTILIZATION	False
Nfs Server V3 Symlink	UTILIZATION	False
Nfs Server V3 Symlink per Minute	UTILIZATION	False
Nfs Server V3 Remove	UTILIZATION	False
Nfs Server V3 Null	UTILIZATION	False
Nfs Server V3 Readdirplus	UTILIZATION	False
Nfs Server V3 Readdir	UTILIZATION	False
Nfs Server V3 Getattr per Minute	UTILIZATION	False
Nfs Server V3 Read	UTILIZATION	False
Nfs Server V3 Lookup	UTILIZATION	False
Nfs Server V3 Pathconf	UTILIZATION	False
Nfs Server V3 Readlink	UTILIZATION	False
Nfs Server V3 Pathconf per Minute	UTILIZATION	False
Nfs Server V3 Mknod per Minute	UTILIZATION	False
Nfs Server V3 Setattr per Minute	UTILIZATION	False
Nfs Server V3 Setattr	UTILIZATION	False
Nfs Server V3 Create	UTILIZATION	False
Nfs Server V3 Fsinfo per Minute	UTILIZATION	False
Nfs Server V3 Fsinfo	UTILIZATION	False
Nfs Server V3 Getattr	UTILIZATION	False
Nfs Server V3 Rmdir	UTILIZATION	False
Nfs Server V3 Readdir per Minute	UTILIZATION	False
Nfs Server V3 Rename	UTILIZATION	False
Nfs Server V3 Commit	UTILIZATION	False
Nfs Server V3 Null per Minute	UTILIZATION	False
Number of CPUs	UTILIZATION	False

Name	Category	KPI
Page Major faults	UTILIZATION	False
Percent Used Memory	UTILIZATION	True
Page Major faults per Second	UTILIZATION	False
Page Faults per Second	UTILIZATION	False
Page Faults	UTILIZATION	False
Percent Used Swap	UTILIZATION	True
Percent Free Swap	UTILIZATION	False
Percent Free Memory	UTILIZATION	False
Running Processes	UTILIZATION	False
Sleeping Processes	UTILIZATION	False
Stopped Processes	UTILIZATION	False
System Cpu Time per Minute	UTILIZATION	False
System Cpu	UTILIZATION	False
System Cpu Time	UTILIZATION	False
Swap Used	UTILIZATION	False
Swap Pages In	UTILIZATION	False
Swap Pages In per Minute	UTILIZATION	False
Swap Total	UTILIZATION	False
Swap Free	UTILIZATION	False
Swap Pages Out	UTILIZATION	False
Swap Pages Out per Minute	UTILIZATION	False
Total disk capacity	UTILIZATION	False
Total Processes	UTILIZATION	False
Total Memory	UTILIZATION	False
Total disk usage	UTILIZATION	False
User Cpu Time	UTILIZATION	False
User Cpu	UTILIZATION	False
User Cpu Time per Minute	UTILIZATION	False
Used Memory	UTILIZATION	False
Zombie Processes	UTILIZATION	False

## Linux Metrics

The Operating Systems Plug-in discovers the metrics for the Linux object type.



**Table 1-154. Linux Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
System Uptime	AVAILABILITY	False
File System Reads/Writes	THROUGHPUT	False
File System Reads/Writes per Minute	THROUGHPUT	False
Tcp Attempt Fails	THROUGHPUT	False
Tcp State Established	THROUGHPUT	False
Tcp Estab Resets per Minute	THROUGHPUT	False
Tcp Retrans Segs	THROUGHPUT	False
Tcp State LISTEN	THROUGHPUT	False
Tcp State CLOSING	THROUGHPUT	False
Tcp State SYN_SENT	THROUGHPUT	False
Tcp State TIME_WAIT	THROUGHPUT	False
Tcp State SYN_RECV	THROUGHPUT	False
Tcp In Errs per Minute	THROUGHPUT	False
Tcp Out Segs per Minute	THROUGHPUT	False
Tcp Passive Opens per Minute	THROUGHPUT	False
Tcp Out Segs	THROUGHPUT	False
Tcp Estab Resets	THROUGHPUT	False
Tcp Active Opens	THROUGHPUT	False
Tcp Outbound Connections	THROUGHPUT	False
Tcp Curr Estab	THROUGHPUT	False
Tcp In Errs	THROUGHPUT	False
Tcp Inbound Connections	THROUGHPUT	False
Tcp Active Opens per Minute	THROUGHPUT	False
Tcp Out Rsts per Minute	THROUGHPUT	False
Tcp In Segs	THROUGHPUT	False
Tcp Retrans Segs per Minute	THROUGHPUT	False
Tcp Passive Opens	THROUGHPUT	False
Tcp Out Rsts	THROUGHPUT	False
Tcp State FIN_WAIT1	THROUGHPUT	False
Tcp State FIN_WAIT2	THROUGHPUT	False
Tcp State CLOSE_WAIT	THROUGHPUT	False
Tcp In Segs per Minute	THROUGHPUT	False

Name	Category	KPI
Tcp State CLOSE	THROUGHPUT	False
Tcp State LAST_ACK	THROUGHPUT	False
Tcp Attempt Fails per Minute	THROUGHPUT	False
Cpu Stolen	UTILIZATION	False
Cpu Wait Time	UTILIZATION	False
Cpu Irq Time per Minute	UTILIZATION	False
Cpu SoftIrq Time	UTILIZATION	False
Cpu Stolen Time per Minute	UTILIZATION	False
Cpu Stolen Time	UTILIZATION	False
Cpu Idle Time	UTILIZATION	False
Cpu Irq	UTILIZATION	False
Cpu SoftIrq Time per Minute	UTILIZATION	False
Cpu Idle Time per Minute	UTILIZATION	False
Cpu Wait Time per Minute	UTILIZATION	False
Cpu Irq Time	UTILIZATION	False
Cpu SoftIrq	UTILIZATION	False
Cpu Idle	UTILIZATION	False
Cpu Usage	UTILIZATION	True
Cpu Wait	UTILIZATION	False
Cpu Nice	UTILIZATION	False
Free Memory	UTILIZATION	False
Free Memory (+ buffers/cache)	UTILIZATION	False
Load Average 15 Minutes	UTILIZATION	False
Load Average 5 Minutes	UTILIZATION	False
Load Average 1 Minute	UTILIZATION	False
Nfs Server V3 Readlink per Minute	UTILIZATION	False
Nfs Server V3 Readdirplus per Minute	UTILIZATION	False
Nfs Server V3 Commit per Minute	UTILIZATION	False
Nfs Server V3 Access	UTILIZATION	False
Nfs Server V3 Access per Minute	UTILIZATION	False
Nfs Server V3 Remove	UTILIZATION	False
Nfs Server V3 Rename per Minute	UTILIZATION	False
Nfs Server V3 Fsstat per Minute	UTILIZATION	False
Nfs Server V3 Create per Minute	UTILIZATION	False

Name	Category	KPI
Nfs Server V3 Mkdir per Minute	UTILIZATION	False
Nfs Server V3 Mknod	UTILIZATION	False
Nfs Server V3 Read per Minute	UTILIZATION	False
Nfs Server V3 Fsstat	UTILIZATION	False
Nfs Server V3 Link	UTILIZATION	False
Nfs Server V3 Write	UTILIZATION	False
Nfs Server V3 Remove per Minute	UTILIZATION	False
Nfs Server V3 Lookup per Minute	UTILIZATION	False
Nfs Server V3 Link per Minute	UTILIZATION	False
Nfs Server V3 Rmdir per Minute	UTILIZATION	False
Nfs Server V3 Mkdir	UTILIZATION	False
Nfs Server V3 Mknod per Minute	UTILIZATION	False
Nfs Server V3 Getattr per Minute	UTILIZATION	False
Nfs Server V3 Null	UTILIZATION	False
Nfs Server V3 Readdirplus	UTILIZATION	False
Nfs Server V3 Lookup	UTILIZATION	False
Nfs Server V3 Pathconf	UTILIZATION	False
Nfs Server V3 Readlink	UTILIZATION	False
Nfs Server V3 Write per Minute	UTILIZATION	False
Nfs Server V3 Readdir	UTILIZATION	False
Nfs Server V3 Setattr per Minute	UTILIZATION	False
Nfs Server V3 Setattr	UTILIZATION	False
Nfs Server V3 Read	UTILIZATION	False
Nfs Server V3 Pathconf per Minute	UTILIZATION	False
Nfs Server V3 Symlink per Minute	UTILIZATION	False
Nfs Server V3 Fsinfo per Minute	UTILIZATION	False
Nfs Server V3 Fsinfo	UTILIZATION	False
Nfs Server V3 Getattr	UTILIZATION	False
Nfs Server V3 Rmdir	UTILIZATION	False
Nfs Server V3 Readdir per Minute	UTILIZATION	False
Nfs Server V3 Create	UTILIZATION	False
Nfs Server V3 Rename	UTILIZATION	False
Nfs Server V3 Commit	UTILIZATION	False
Nfs Server V3 Null per Minute	UTILIZATION	False
Number of CPUs	UTILIZATION	False

Name	Category	KPI
Page Major faults	UTILIZATION	False
Page Major faults per Second	UTILIZATION	False
Page Faults per Second	UTILIZATION	False
Percent Free Swap	UTILIZATION	False
Percent Free Memory	UTILIZATION	False
Percent Used Memory	UTILIZATION	True
Percent Used Swap	UTILIZATION	True
Page Faults	UTILIZATION	False
Running Processes	UTILIZATION	False
Sleeping Processes	UTILIZATION	False
Stopped Processes	UTILIZATION	False
Swap Pages Out per Minute	UTILIZATION	False
Swap Pages In per Minute	UTILIZATION	False
Swap Free	UTILIZATION	False
Swap Pages Out	UTILIZATION	False
Swap Used	UTILIZATION	False
Swap Total	UTILIZATION	False
Swap Pages In	UTILIZATION	False
System Cpu	UTILIZATION	False
System Cpu Time per Minute	UTILIZATION	False
System Cpu Time	UTILIZATION	False
Total disk capacity	UTILIZATION	False
Total Processes	UTILIZATION	False
Total Memory	UTILIZATION	False
Total disk usage	UTILIZATION	False
User Cpu Time	UTILIZATION	False
Used Memory (- buffers/cache)	UTILIZATION	False
User Cpu	UTILIZATION	False
User Cpu Time per Minute	UTILIZATION	False
Used Memory	UTILIZATION	False
Zombie Processes	UTILIZATION	False

## Solaris Metrics

The Operating Systems Plug-in discovers the metrics for the Solaris object type. Solaris x86 and SPARC are supported.

**Table 1-155. Solaris Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
System Uptime	AVAILABILITY	False
File System Reads/Writes	THROUGHPUT	False
File System Reads/Writes per Minute	THROUGHPUT	False
Tcp Attempt Fails	THROUGHPUT	False
Tcp State Established	THROUGHPUT	False
Tcp Estab Resets per Minute	THROUGHPUT	False
Tcp Retrans Segs	THROUGHPUT	False
Tcp State LISTEN	THROUGHPUT	False
Tcp State CLOSING	THROUGHPUT	False
Tcp State SYN_SENT	THROUGHPUT	False
Tcp State TIME_WAIT	THROUGHPUT	False
Tcp State SYN_RECV	THROUGHPUT	False
Tcp In Errs per Minute	THROUGHPUT	False
Tcp Out Segs per Minute	THROUGHPUT	False
Tcp Passive Opens per Minute	THROUGHPUT	False
Tcp Out Segs	THROUGHPUT	False
Tcp Estab Resets	THROUGHPUT	False
Tcp Active Opens per Minute	THROUGHPUT	False
Tcp Outbound Connections	THROUGHPUT	False
Tcp Curr Estab	THROUGHPUT	False
Tcp In Errs	THROUGHPUT	False
Tcp Inbound Connections	THROUGHPUT	False
Tcp Active Opens	THROUGHPUT	False
Tcp Out Rsts per Minute	THROUGHPUT	False
Tcp In Segs	THROUGHPUT	False
Tcp Retrans Segs per Minute	THROUGHPUT	False
Tcp Passive Opens	THROUGHPUT	False
Tcp Out Rsts	THROUGHPUT	False
Tcp State FIN_WAIT1	THROUGHPUT	False
Tcp State FIN_WAIT2	THROUGHPUT	False
Tcp State CLOSE_WAIT	THROUGHPUT	False
Tcp In Segs per Minute	THROUGHPUT	False
Tcp State CLOSE	THROUGHPUT	False

Name	Category	KPI
Tcp State LAST_ACK	THROUGHPUT	False
Tcp Attempt Fails per Minute	THROUGHPUT	False
Cpu Wait Time	UTILIZATION	False
Cpu Idle Time	UTILIZATION	False
Cpu Idle Time per Minute	UTILIZATION	False
Cpu Wait Time per Minute	UTILIZATION	False
Cpu Idle	UTILIZATION	False
Cpu Usage	UTILIZATION	True
Cpu Wait	UTILIZATION	False
Cpu Nice	UTILIZATION	False
Free Memory	UTILIZATION	False
Load Average 15 Minutes	UTILIZATION	False
Load Average 5 Minutes	UTILIZATION	False
Load Average 1 Minute	UTILIZATION	False
Nfs Server V3 Readlink per Minute	UTILIZATION	False
Nfs Server V3 Readdirplus per Minute	UTILIZATION	False
Nfs Server V3 Commit per Minute	UTILIZATION	False
Nfs Server V3 Access	UTILIZATION	False
Nfs Server V3 Access per Minute	UTILIZATION	False
Nfs Server V3 Remove	UTILIZATION	False
Nfs Server V3 Rename per Minute	UTILIZATION	False
Nfs Server V3 Fsstat per Minute	UTILIZATION	False
Nfs Server V3 Create per Minute	UTILIZATION	False
Nfs Server V3 Mkdir per Minute	UTILIZATION	False
Nfs Server V3 Mknod	UTILIZATION	False
Nfs Server V3 Read per Minute	UTILIZATION	False
Nfs Server V3 Fsstat	UTILIZATION	False
Nfs Server V3 Link	UTILIZATION	False
Nfs Server V3 Write	UTILIZATION	False
Nfs Server V3 Remove per Minute	UTILIZATION	False
Nfs Server V3 Lookup per Minute	UTILIZATION	False
Nfs Server V3 Link per Minute	UTILIZATION	False
Nfs Server V3 Rmdir per Minute	UTILIZATION	False
Nfs Server V3 Mkdir	UTILIZATION	False
Nfs Server V3 Mknod per Minute	UTILIZATION	False

Name	Category	KPI
Nfs Server V3 Getattr per Minute	UTILIZATION	False
Nfs Server V3 Null	UTILIZATION	False
Nfs Server V3 Readdirplus	UTILIZATION	False
Nfs Server V3 Lookup	UTILIZATION	False
Nfs Server V3 Pathconf	UTILIZATION	False
Nfs Server V3 Readlink	UTILIZATION	False
Nfs Server V3 Write per Minute	UTILIZATION	False
Nfs Server V3 Readdir	UTILIZATION	False
Nfs Server V3 Setattr per Minute	UTILIZATION	False
Nfs Server V3 Setattr	UTILIZATION	False
Nfs Server V3 Read	UTILIZATION	False
Nfs Server V3 Pathconf per Minute	UTILIZATION	False
Nfs Server V3 Symlink per Minute	UTILIZATION	False
Nfs Server V3 Symlink	UTILIZATION	False
Nfs Server V3 Finfo per Minute	UTILIZATION	False
Nfs Server V3 Finfo	UTILIZATION	False
Nfs Server V3 Getattr	UTILIZATION	False
Nfs Server V3 Rmdir	UTILIZATION	False
Nfs Server V3 Readdir per Minute	UTILIZATION	False
Nfs Server V3 Create	UTILIZATION	False
Nfs Server V3 Rename	UTILIZATION	False
Nfs Server V3 Commit	UTILIZATION	False
Nfs Server V3 Null per Minute	UTILIZATION	False
Number of CPUs	UTILIZATION	False
Page Major faults	UTILIZATION	False
Page Major faults per Second	UTILIZATION	False
Page Faults per Second	UTILIZATION	False
Percent Free Swap	UTILIZATION	False
Percent Free Memory	UTILIZATION	False
Percent Used Memory	UTILIZATION	True
Percent Used Swap	UTILIZATION	True
Page Faults	UTILIZATION	False
Running Processes	UTILIZATION	False
Sleeping Processes	UTILIZATION	False
Stopped Processes	UTILIZATION	False

Name	Category	KPI
Swap Pages Out per Minute	UTILIZATION	False
Swap Pages In per Minute	UTILIZATION	False
Swap Free	UTILIZATION	False
Swap Pages Out	UTILIZATION	False
Swap Used	UTILIZATION	False
Swap Total	UTILIZATION	False
Swap Pages In	UTILIZATION	False
System Cpu	UTILIZATION	False
System Cpu Time per Minute	UTILIZATION	False
System Cpu Time	UTILIZATION	False
Total disk capacity	UTILIZATION	False
Total Processes	UTILIZATION	False
Total Memory	UTILIZATION	False
Total disk usage	UTILIZATION	False
User Cpu Time	UTILIZATION	False
User Cpu	UTILIZATION	False
User Cpu Time per Minute	UTILIZATION	False
Used Memory	UTILIZATION	False
Zombie Processes	UTILIZATION	False

## Microsoft Windows Metrics

The Operating Systems Plug-in discovers the metrics for the Microsoft Windows object type. Microsoft Windows Server 2012 R2 and 2008 R2 are supported.

**Table 1-156. Microsoft Windows Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
System Uptime	AVAILABILITY	False
Avg. Disk sec/Transfer	THROUGHPUT	False
File System Reads/Writes	THROUGHPUT	False
File System Reads/Writes per Minute	THROUGHPUT	False
Tcp Attempt Fails	THROUGHPUT	False
Tcp State Established	THROUGHPUT	False
Tcp Estab Resets per Minute	THROUGHPUT	False
Tcp Retrans Segs	THROUGHPUT	False
Tcp State LISTEN	THROUGHPUT	False



Name	Category	KPI
Tcp State CLOSING	THROUGHPUT	False
Tcp State SYN_SENT	THROUGHPUT	False
Tcp State TIME_WAIT	THROUGHPUT	False
Tcp State SYN_RECV	THROUGHPUT	False
Tcp In Errs per Minute	THROUGHPUT	False
Tcp Out Segs per Minute	THROUGHPUT	False
Tcp Passive Opens per Minute	THROUGHPUT	False
Tcp Out Segs	THROUGHPUT	False
Tcp Estab Resets	THROUGHPUT	False
Tcp Active Opens	THROUGHPUT	False
Tcp Outbound Connections	THROUGHPUT	False
Tcp Curr Estab	THROUGHPUT	False
Tcp In Errs	THROUGHPUT	False
Tcp Inbound Connections	THROUGHPUT	False
Tcp Active Opens per Minute	THROUGHPUT	False
Tcp Out Rsts per Minute	THROUGHPUT	False
Tcp In Segs	THROUGHPUT	False
Tcp Retrans Segs per Minute	THROUGHPUT	False
Tcp Passive Opens	THROUGHPUT	False
Tcp Out Rsts	THROUGHPUT	False
Tcp State FIN_WAIT1	THROUGHPUT	False
Tcp State FIN_WAIT2	THROUGHPUT	False
Tcp State CLOSE_WAIT	THROUGHPUT	False
Tcp In Segs per Minute	THROUGHPUT	False
Tcp State CLOSE	THROUGHPUT	False
Tcp State LAST_ACK	THROUGHPUT	False
Tcp Attempt Fails per Minute	THROUGHPUT	False
Cpu Idle Time	UTILIZATION	False
Cpu Idle Time per Minute	UTILIZATION	False
Cpu Usage	UTILIZATION	True
Free Memory	UTILIZATION	False
Memory Page Faults/sec	UTILIZATION	False
Memory System Driver Resident Bytes	UTILIZATION	False
Memory Available Bytes	UTILIZATION	False
Memory System Driver Total Bytes	UTILIZATION	False

Name	Category	KPI
Memory % Committed Bytes In Use	UTILIZATION	False
Memory Standby Cache Core Bytes	UTILIZATION	False
Memory Transition Pages RePurposed/sec	UTILIZATION	False
Memory Write Copies/sec	UTILIZATION	False
Memory Available KBytes	UTILIZATION	False
Memory Page Reads/sec	UTILIZATION	False
Memory Committed Bytes	UTILIZATION	False
Memory Pool Nonpaged Bytes	UTILIZATION	False
Memory System Code Resident Bytes	UTILIZATION	False
Memory Page Writes/sec	UTILIZATION	False
Memory Available MBytes	UTILIZATION	False
Memory Standby Cache Normal Priority Bytes	UTILIZATION	False
Memory Pages/sec	UTILIZATION	False
Memory Modified Page List Bytes	UTILIZATION	False
Memory Cache Faults/sec	UTILIZATION	False
Memory Pool Nonpaged Allocs	UTILIZATION	False
Memory System Code Total Bytes	UTILIZATION	False
Memory Pool Paged Allocs	UTILIZATION	False
Memory Pages Input/sec	UTILIZATION	False
Memory Pool Paged Bytes	UTILIZATION	False
Memory Pool Paged Resident Bytes	UTILIZATION	False
Memory Cache Bytes	UTILIZATION	False
Memory Standby Cache Reserve Bytes	UTILIZATION	False
MemoryFreeSystemPageTableEntries	UTILIZATION	False
Memory Free %26 Zero Page List Bytes	UTILIZATION	False
Memory System Cache Resident Bytes	UTILIZATION	False
Memory Cache Bytes Peak	UTILIZATION	False
Memory Commit Limit	UTILIZATION	False
Memory Transition Faults/sec	UTILIZATION	False
Memory Pages Output/sec	UTILIZATION	False
Number of CPUs	UTILIZATION	False
Percent Free Swap	UTILIZATION	False
Percent Free Memory	UTILIZATION	False
Percent Used Memory	UTILIZATION	True
Percent Used Swap	UTILIZATION	True

Name	Category	KPI
Running Processes	UTILIZATION	False
Sleeping Processes	UTILIZATION	False
Stopped Processes	UTILIZATION	False
Swap Pages Out per Minute	UTILIZATION	False
Swap Pages In per Minute	UTILIZATION	False
Swap Free	UTILIZATION	False
Swap Pages Out	UTILIZATION	False
Swap Used	UTILIZATION	False
Swap Total	UTILIZATION	False
Swap Pages In	UTILIZATION	False
System Cpu	UTILIZATION	False
System Cpu Time per Minute	UTILIZATION	False
System Cpu Time	UTILIZATION	False
Total disk capacity	UTILIZATION	False
Total Processes	UTILIZATION	False
Total Memory	UTILIZATION	True
Total disk usage	UTILIZATION	False
User Cpu Time	UTILIZATION	False
User Cpu	UTILIZATION	False
User Cpu Time per Minute	UTILIZATION	False
Used Memory	UTILIZATION	False
Zombie Processes	UTILIZATION	False

## Windows Service Metrics

The Operating Systems Plug-in discovers the metrics for Windows service.

**Table 1-157. Windows Services Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
Start Time	AVAILABILITY	False
Start Type	AVAILABILITY	False
Cpu User Time	UTILIZATION	False
Cpu Usage	UTILIZATION	True
Cpu Total Time per Minute	UTILIZATION	False
Cpu System Time per Minute	UTILIZATION	False

Name	Category	KPI
Cpu Total Time	UTILIZATION	False
Cpu User Time per Minute	UTILIZATION	False
Cpu System Time	UTILIZATION	False
Memory Size	UTILIZATION	True
Open Handles	UTILIZATION	False
Resident Memory Size	UTILIZATION	False
Threads	UTILIZATION	False

If you stop an Endpoint Operations Management agent by using Windows Services, and remove the data directory from inside the agent installation directory, when you start the agent again, using Windows Services, no metrics are collected. If you are deleting the data directory, do not use Windows Services to stop and start an Endpoint Operations Management agent. Stop the agent using `epops-agent.bat stop`. Delete the data directory, then start the agent using `epops-agent.bat start`.

## Script Metrics

The Operating Systems Plug-in discovers the metrics for the Script service.

**Table 1-158. Script Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
Execution Time	THROUGHPUT	True
Result Value	UTILIZATION	True

## Multiprocess Service Metrics

The Operating Systems Plug-in discovers the metrics for the Multiprocess service.

**Table 1-159. Multiprocess Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
Cpu User Time	UTILIZATION	False
Cpu Usage	UTILIZATION	True
Cpu Total Time per Minute	UTILIZATION	False
Cpu System Time per Minute	UTILIZATION	False
Cpu Total Time	UTILIZATION	False
Cpu User Time per Minute	UTILIZATION	False
Cpu System Time	UTILIZATION	False
Memory Size	UTILIZATION	True

Name	Category	KPI
Number of Processes	UTILIZATION	False
Resident Memory Size	UTILIZATION	False

## Remote Service Monitoring Plug-in Metrics

The Remote Service Monitoring plug-in collects metrics for object types such HTTP Check, TCP Check, and ICMP Check.

### HTTP Check Metrics

The Remote Service Monitoring Plug-in discovers the metrics for the HTTP Check object type.

**Table 1-160. HTTP Check Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
Last Modified	AVAILABILITY	False
State CLOSE	THROUGHPUT	False
State CLOSE_WAIT	THROUGHPUT	False
State ESTABLISHED	THROUGHPUT	False
Inbound Connections	THROUGHPUT	False
State TIME_WAIT	THROUGHPUT	False
All Inbound Connections	THROUGHPUT	False
State SYN_SENT	THROUGHPUT	False
State FIN_WAIT2	THROUGHPUT	False
Outbound Connections	THROUGHPUT	False
State LAST_ACK	THROUGHPUT	False
Response Time	THROUGHPUT	True
State CLOSING	THROUGHPUT	False
All Outbound Connections	THROUGHPUT	False
State SYN_RECV	THROUGHPUT	False
State FIN_WAIT1	THROUGHPUT	False
Response Code	UTILIZATION	True

### ICMP Check Metrics

The Remote Service Monitoring Plug-in discovers the metrics for the ICMP Check object type.

**Table 1-161. ICMP Check Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
Response Time	THROUGHPUT	True

## TCP Check Metrics

The Remote Service Monitoring Plug-in discovers the metrics for the TCP Check object type.

**Table 1-162. TCP Check Metrics**

Name	Category	KPI
Resource Availability	AVAILABILITY	True
Response Time	THROUGHPUT	True
State CLOSE	THROUGHPUT	False
State CLOSE_WAIT	THROUGHPUT	False
State ESTABLISHED	THROUGHPUT	False
Inbound Connections	THROUGHPUT	False
State TIME_WAIT	THROUGHPUT	False
All Inbound Connections	THROUGHPUT	False
State SYN_SENT	THROUGHPUT	False
State FIN_WAIT2	THROUGHPUT	False
Outbound Connections	THROUGHPUT	False
State LAST_ACK	THROUGHPUT	False
State CLOSING	THROUGHPUT	False
All Outbound Connections	THROUGHPUT	False
State SYN_RECV	THROUGHPUT	False
State FIN_WAIT1	THROUGHPUT	False

# Property Definitions in vRealize Operations Manager

## 2

Properties are attributes of objects in the vRealize Operations Manager environment. You use properties in symptom definitions. You can also use properties in dashboards, views, and reports.

vRealize Operations Manager uses adapters to collect properties for target objects in your environment. Property definitions for all objects connected through the vCenter adapter are provided. The properties collected depend on the objects in your environment.

You can add symptoms based on properties to an alert definition so that you are notified if a change occurs to properties on your monitored objects. For example, disk space is a hardware property of a virtual machine. You can use disk space to define a symptom that warns you when the value falls below a certain numeric value. See the *vRealize Operations Manager User Guide*.

vRealize Operations Manager generates Object Type Classification and Subclassification properties for every object. You can use object type classification properties to identify whether an object is an adapter instance, custom group, application, tier, or a general object with property values *ADAPTER\_INSTANCE*, *GROUP*, *BUSINESS\_SERVICE*, *TIER*, or *GENERAL*, respectively.

This chapter includes the following topics:

- [Properties for vCenter Server Components](#)
- [Self-Monitoring Properties for vRealize Operations Manager](#)

## Properties for vCenter Server Components

The VMware vSphere solution is installed with vRealize Operations Manager and includes the vCenter adapter. vRealize Operations Manager uses the vCenter adapter to collect properties for objects in the vCenter Server system.

vCenter Server components are listed in the `describe.xml` file for the vCenter adapter. The following example shows the runtime property `memoryCap` or Memory Capacity for the virtual machine in the `describe.xml`.

```
<ResourceGroup instanced="false" key="runtime" nameKey="5300" validation="">
  <ResourceAttribute key="memoryCap" nameKey="1780" dashboardOrder="200" dataType="float"
    defaultMonitored="true" isDiscrete="false" isRate="false" maxVal=""
    minVal="" isProperty="true" unit="kb"/>
</ResourceGroup>
```

The ResourceAttribute element includes the name of the property that appears in the UI and is documented as a Property Key. `isProperty = "true"` indicates that ResourceAttribute is a property.

## vCenter Server Properties

vRealize Operations Manager collects summary and event properties for vCenter Server system objects.

**Table 2-1. Summary Properties Collected for vCenter ServerSystem Objects**

Property Key	Property Name	Description
summary version	Version	Version
summary vcuuid	VirtualCenter ID	Virtual Center ID
summary vcfullname	Product Name	Product Name

**Table 2-2. Event Properties Collected for vCenter ServerSystem Objects**

Property Key	Property Name	Description
event time	Last VC Event Time	Last Virtual Center Event Time
event key	Last VC Event ID	Last Virtual Center Event ID

**Table 2-3. Custom Field Manager Property Collected for vCenter ServerSystem Objects**

Property Key	Property Name	Description
CustomFieldManager CustomFieldDef	Custom Field Def	Custom Field Def for VCenter Tagging information at Adapter level.

## Virtual Machine Properties

vRealize Operations Manager collects configuration, runtime, CPU, memory, network I/O, summary, guest file system, and properties about datastore use for virtual machine objects.

**Table 2-4. Properties Collected for Virtual Machine Objects to Support VIN Adapter Localization**

Property Key	Property Name	Description
RunsOnApplicationComponents	Application components running on the Virtual Machine	Application components running on the Virtual Machine
DependsOnApplicationComponents	Application components the Virtual Machine depends on	Application components running on other machines that this Virtual Machine depends on.

**Table 2-5. Configuration Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
config name	Name	Name
config guestFullName	Guest Fullname	Guest OS full name configured by the user.



Property Key	Property Name	Description
config hardware numCpu	Number of virtual CPUs	Number of virtual CPUs
config hardware memoryKB	Memory	Memory
config hardware thinEnabled	Thin Provisioned Disk	Indicates whether thin provisioning is enabled
config hardware diskSpace	Disk Space	Disk Space
config cpuAllocation reservation	Reservation	CPU reservation
config cpuAllocation limit	Limit	CPU limit
config cpuAllocation shares shares	Shares	CPU shares
config memoryAllocation reservation	Reservation	CPU reservation
config memoryAllocation limit	Limit	Limit
config memoryAllocation shares shares	Shares	Memory shares
config extraConfig mem_hotadd	Memory Hot Add	Memory Hot Add Configuration
config extraConfig vcpu_hotadd	VCPU Hot Add	VCPU Hot Add Configuration
config extraConfig vcpu_hotremove	VCPU Hot Remove	VCPU Hot Remove Configuration
config security disable_autoinstall	Disable tools auto install (isolation.tools.autoInstall.disable)	Disable tools auto install (isolation.tools.autoInstall.disable)
config security disable_console_copy	Disable console copy operations (isolation.tools.copy.disable)	Disable console copy operations (isolation.tools.copy.disable)
config security disable_console_dnd	Disable console drag and drop operations (isolation.tools.dnd.disable)	Disable console drag and drop operations (isolation.tools.dnd.disable)
config security enable_console_gui_options	Enable console GUI operations (isolation.tools.setGUIOptions.enable)	Enable console GUI operations (isolation.tools.setGUIOptions.enable)
config security disable_console_paste	Disable console paste operations (isolation.tools.paste.disable)	Disable console paste operations (isolation.tools.paste.disable)
config security disable_disk_shrinking_shrink	Disable virtual disk shrink (isolation.tools.diskShrink.disable)	Disable virtual disk shrink (isolation.tools.diskShrink.disable)
config security disable_disk_shrinking_wiper	Disable virtual disk wiper (isolation.tools.diskWiper.disable)	Disable virtual disk wiper (isolation.tools.diskWiper.disable)
config security disable_hgfs	Disable HGFS file transfers (isolation.tools.hgfsServerSet.disable)	Disable HGFS file transfers (isolation.tools.hgfsServerSet.disable)
config security disable_independent_nonpersistent	Avoid using independent nonpersistent disks (scsiX:Y.mode)	Avoid using independent nonpersistent disks (scsiX:Y.mode)
config security enable_intervm_vmci	Enable VM-to-VM communication through VMCI (vmci0.unrestricted)	Enable VM-to-VM communication through VMCI (vmci0.unrestricted)
config security enable_logging	Enable VM logging (logging)	Enable VM logging (logging)
config security disable_monitor_control	Disable VM Monitor Control (isolation.monitor.control.disable)	Disable VM Monitor Control (isolation.monitor.control.disable)

Property Key	Property Name	Description
config security enable_non_essential_3D_features	Enable 3D features on Server and desktop virtual machines (mks.enable3d)	Enable 3D features on Server and desktop virtual machines (mks.enable3d)
config security disable_unexposed_features_autologon	Disable unexposed features - autologon (isolation.tools.ghi.autologon.disable)	Disable unexposed features - autologon (isolation.tools.ghi.autologon.disable)
config security disable_unexposed_features_biosbbs	Disable unexposed features - biosbbs (isolation.bios.bbs.disable)	Disable unexposed features - biosbbs (isolation.bios.bbs.disable)
config security disable_unexposed_features_getcreds	Disable unexposed features - getcreds (isolation.tools.getCreds.disable)	Disable unexposed features - getcreds (isolation.tools.getCreds.disable)
config security disable_unexposed_features_launchmenu	Disable unexposed features - launchmenu (isolation.tools.ghi.launchmenu.change)	Disable unexposed features - launchmenu (isolation.tools.ghi.launchmenu.change)
config security disable_unexposed_features_memfs	Disable unexposed features - memfs (isolation.tools.memSchedFakeSampleStats.disable)	Disable unexposed features - memfs (isolation.tools.memSchedFakeSampleStats.disable)
config security disable_unexposed_features_protocolhandler	Disable unexposed features - protocolhandler (isolation.tools.ghi.protocolhandler.info.disable)	Disable unexposed features - protocolhandler (isolation.tools.ghi.protocolhandler.info.disable)
config security disable_unexposed_features_shellaction	Disable unexposed features - shellaction (isolation.ghi.host.shellAction.disable)	Disable unexposed features - shellaction (isolation.ghi.host.shellAction.disable)
config security disable_unexposed_features_toporequest	Disable unexposed features - toporequest (isolation.tools.dispTopoRequest.disable)	Disable unexposed features - toporequest (isolation.tools.dispTopoRequest.disable)
config security disable_unexposed_features_trashfolderstate	Disable unexposed features - trashfolderstate (isolation.tools.trashFolderState.disable)	Disable unexposed features - trashfolderstate (isolation.tools.trashFolderState.disable)
config security disable_unexposed_features_trayicon	Disable unexposed features - trayicon (isolation.tools.ghi.trayicon.disable)	Disable unexposed features - trayicon (isolation.tools.ghi.trayicon.disable)
config security disable_unexposed_features_unity	Disable unexposed features - unity (isolation.tools.unity.disable)	Disable unexposed features - unity (isolation.tools.unity.disable)
config security disable_unexposed_features_unity_interlock	Disable unexposed features - unity-interlock (isolation.tools.unityInterlockOperation.disable)	Disable unexposed features - unity-interlock (isolation.tools.unityInterlockOperation.disable)
config security disable_unexposed_features_unity_taskbar	Disable unexposed features - unity-taskbar (isolation.tools.unity.taskbar.disable)	Disable unexposed features - unity-taskbar (isolation.tools.unity.taskbar.disable)

Property Key	Property Name	Description
config security disable_unexposed_features_unity_unityactive	Disable unexposed features - unity-unityactive (isolation.tools.unityActive.disable)	Disable unexposed features - unity-unityactive (isolation.tools.unityActive.disable)
config security disable_unexposed_features_unity_windowcontents	Disable unexposed features - unity-windowcontents (isolation.tools.unity.windowContents.disable)	Disable unexposed features - unity-windowcontents (isolation.tools.unity.windowContents.disable)
config security disable_unexposed_features_unitypush	Disable unexposed features - unitypush (isolation.tools.unity.push.update.disable)	Disable unexposed features - unitypush (isolation.tools.unity.push.update.disable)
config security disable_unexposed_features_versionget	Disable unexposed features - versionget (isolation.tools.vmxDnDVersionGet.disable)	Disable unexposed features - versionget (isolation.tools.vmxDnDVersionGet.disable)
config security disable_unexposed_features_versionset	Disable unexposed features - versionset (isolation.tools.guestDnDVersionSet.disable)	Disable unexposed features - versionset (isolation.tools.guestDnDVersionSet.disable)
config security disable_vix_messages	Disable VIX messages from the VM (isolation.tools.vixMessage.disable)	Disable VIX messages from the VM (isolation.tools.vixMessage.disable)
config security enable_vga_only_mode	Disable all but VGA mode on virtual machines (svga.vgaOnly)	Disable all but VGA mode on virtual machines (svga.vgaOnly)
config security limit_console_connection	Limit number of console connections (RemoteDisplay.maxConnection)	Limit number of console connections (RemoteDisplay.maxConnection)
config security limit_log_number	Limit number of log files (log.keepOld)	Limit number of log files (log.keepOld)
config security limit_log_size	Limit log file size (log.rotateSize)	Limit log file size (log.rotateSize)
config security limit_setinfo_size	Limit VMX file size (tools.setInfo.sizeLimit)	Limit VMX file size (tools.setInfo.sizeLimit)
config security enable_console_VNC	Enable access to VM console via VNC protocol (RemoteDisplay.vnc.enabled)	Enable access to VM console via VNC protocol (RemoteDisplay.vnc.enabled)
config security disable_device_interaction_connect	Disable unauthorized removal, connection of devices (isolation.device.connectable.disable)	Disable unauthorized removal, connection of devices (isolation.device.connectable.disable)
config security disable_device_interaction_edit	Disable unauthorized modification of devices (isolation.device.edit.disable)	Disable unauthorized modification of devices (isolation.device.edit.disable)
config security enable_host_info	Enable send host information to guests (tools.guestlib.enableHostInfo)	Enable send host information to guests (tools.guestlib.enableHostInfo)
config security network_filter_enable	Enable dvfilter network APIs (ethernetX.filterY.name)	Enable dvfilter network APIs (ethernetX.filterY.name)
config security vmsafe_cpumem_agentaddress	VMsafe CPU/memory APIs - IP address (vmsafe.agentAddress)	VMsafe CPU/memory APIs - IP address (vmsafe.agentAddress)

Property Key	Property Name	Description
config security vmsafe_cpumem_agentport	VMsafe CPU/memory APIs - port number (vmsafe.agentPort)	VMsafe CPU/memory APIs - port number (vmsafe.agentPort)
config security vmsafe_cpumem_enable	Enable VMsafe CPU/memory APIs (vmsafe.enable)	Enable VMsafe CPU/memory APIs (vmsafe.enable)
config security disconnect_devices_floppy	Disconnect floppy drive	Disconnect floppy drive
config security disconnect_devices_cd	Disconnect CD-ROM	Disconnect CD-ROM
config security disconnect_devices_usb	Disconnect USB controller	Disconnect USB controller
config security disconnect_devices_parallel	Disconnect parallel port	Disconnect parallel port
config security disconnect_devices_serial	Disconnect serial port	Disconnect serial port

**Note** Security properties not collected by default. They are collected only if the *vSphere Hardening Guide* policy is applied to the objects, or if the *vSphere Hardening Guide* alerts are manually enabled in the currently applied policy.

For more information on the *vSphere Hardening Guide* alerts, see the *vRealize Operations Manager User Guide*.

**Table 2-6. Runtime Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
runtime memoryCap	Memory Capacity	Memory Capacity

**Table 2-7. CPU Usage Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
cpu limit	CPU limit	CPU limit
cpu reservation	CPU reservation	CPU reservation
cpu speed	CPU	CPU Speed
cpu cpuModel	CPU Model	CPU Model

**Table 2-8. Memory Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
mem host_reservation	VM Reservation	Mem Machine Reservation
mem host_limit	VM Limit	Mem Machine Limit

**Table 2-9. Network Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
net mac_address	Mac Address	Mac Address
net ip_address	IP Address	IP Address
net subnet_mask	Subnet Mask	Subnet Mask

Property Key	Property Name	Description
net default_gateway	Default Gateway	Default Gateway
net nvp_vm_uuid	NVP VM UUID	NVP VM UUID

**Table 2-10. Summary Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
summary customTag customTagValue	Value	Custom Tag Value
summary tag	vSphere Tag	vSphere Tag Name
summary parentCluster	Parent Cluster	Parent Cluster
summary parentHost	Parent Host	Parent Host
summary parentDatacenter	Parent Datacenter	Parent Datacenter
summary parentVcenter	Parent Vcenter	Parent Vcenter
summary guest fullName	Guest OS Full Name	Guest OS Full Name as identified by VMware tools
summary guest ipAddress	Guest OS IP Address	Guest OS IP Address
summary guest toolsRunningStatus	Tools Running Status	Guest Tools Running Status
summary guest toolsVersionStatus2	Tools Version Status	Guest Tools Version Status 2
summary guest vrealize_operations_agent_id	vRealize Operations Agent ID	An ID to identify a VM in Agent Adapter's world
summary guest vrealize_operations_euc_agent_id	vRealize Operations Euc Agent ID	An ID to identify a VM in Agent Adapter's world
summary config numEthernetCards	Number of NICs	Number of NICs
summary config isTemplate	VM Template	Indicates whether it is a VM Template
summary runtime powerState	Power State	Power State
summary runtime connectionState	Connection State	Connection State

**Table 2-11. Datastore Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
datastore maxObservedNumberRead	Highest Observed Number of Read Requests	Highest Observed Number of Read Requests
datastore maxObservedRead	Highest Observed Read Rate	Highest Observed Read Rate (KBps)
datastore maxObservedNumberWrite	Highest Observed Number of Write Requests	Highest Observed Number of Write Requests
datastore maxObservedWrite	Highest Observed Write Rate	Highest Observed Write Rate (KBps)
datastore maxObservedOIO	Highest Observed Outstanding Requests	Highest Observed Outstanding Requests

**Table 2-12. Guest File System Properties Collected for Virtual Machine Objects**

Property Key	Property Name	Description
guestfilesystem capacity_property	Guest File System Capacity Property	Total capacity of guest file system as a property, reported for each file system.
guestfilesystem capacity_property_total	Total Guest File System Capacity Property	Overall total capacity of guest file system as a property, reported across all file systems.

## Host System Properties

vRealize Operations Manager collects configuration, hardware, runtime, CPU, network I/O, summary, and properties about datastore use for host system objects.

**Table 2-13. Configuration Properties Collected for Host System Objects**

Property Key	Property Name	Description
config name	Name	Name
config diskSpace	Disk Space	Disk Space
config network nnic	Number of NICs	Number of NICs
config network linkspeed	Average Physical NIC Speed	Average Physical NIC Speed
config network dnsserver	DNS Server	List of DNS Servers
config product productLineId	Product Line ID	Product Line ID
config product apiVersion	API Version	API Version
config storageDevice plugStoreTopology numberOfPath	Total number of Path	Total number of storage paths
config storageDevice multipathInfo numberOfActivePath	Total number of Active Path	Total number of active storage paths
config storageDevice multipathInfo multipathPolicy	Multipath Policy	Multipath Policy
config hyperThread available	Available	Indicates whether hyperthreading is supported by the server
config hyperThread active	Active	Indicates whether hyperthreading is active
config ntp server	NTP Servers	NTP Servers
config security ntpServer	NTP server	NTP server
config security enable_ad_auth	Enable active directory authentication	Enable active directory authentication
config security enable_chap_auth	Enable mutual chap authentication	Enable mutual chap authentication
config security enable_auth_proxy	Enable authentication proxy (UserVars.ActiveDirectoryVerifyCAM Certificate)	Enable authentication proxy (UserVars.ActiveDirectoryVerifyCAMCertificate)
config security syslog_host	Remote log host (Syslog.global.logHost)	Remote log host (Syslog.global.logHost)

Property Key	Property Name	Description
config security dcui_access	Users who can override lock down mode and access the DCUI (DCUI.Access)	Users who can override lock down mode and access the DCUI (DCUI.Access)
config security shell_interactive_timeout	Shell interactive timeout (UserVars.ESXiShellInteractiveTimeOut)	Shell interactive timeout (UserVars.ESXiShellInteractiveTimeOut)
config security shell_timeout	Shell timeout (UserVars.ESXiShellTimeOut)	Shell timeout (UserVars.ESXiShellTimeOut)
config security dvfilter_bind_address	Dvfilter bind ip address (Net.DVFilterBindIpAddress)	Dvfilter bind ip address (Net.DVFilterBindIpAddress)
config security syslog_dir	Log directory (Syslog.global.logDir)	Log directory (Syslog.global.logDir)
config security firewallRule allowedHosts	Allowed hosts	Allowed hosts in the firewall configuration
config security service isRunning	Running	Indicates whether a service is running or not. Services are: Direct Console UI, ESXi shell, SSH, or NTP Daemon.
config security service ruleSet	Ruleset	Ruleset for each service.
config security service policy	Policy	Policy for each service.

**Note** Security properties not collected by default. They are collected only if the *vSphere Hardening Guide* policy is applied to the objects, or if the *vSphere Hardening Guide* alerts are manually enabled in the currently applied policy.

For more information on the *vSphere Hardening Guide* alerts, see the *vRealize Operations Manager User Guide*.

**Table 2-14. Hardware Properties Collected for Host System Objects**

Property Key	Property Name	Description
hardware memorySize	Memory Size	Memory Size
hardware cpuInfo numCpuCores	Number of CPU Cores	Number of CPU Cores
hardware cpuInfo hz	CPU Speed per Core	CPU Speed per Core
hardware cpuInfo numCpuPackages	Number of CPU Packages	Number of CPU Packages
hardware cpuInfo powerManagementPolicy	Active CPU Power Management Policy	Active CPU Power Management Policy
hardware cpuInfo powerManagementTechnology	Power Management Technology	Power Management Technology
hardware cpuInfo biosVersion	BIOS Version	BIOS Version

**Table 2-15. Runtime Properties Collected for Host System Objects**

Property Key	Property Name	Description
runtime connectionState	Connection State	Connection State
runtime powerState	Power State	Power State
runtime maintenanceState	Maintenance State	Maintenance State
runtime memoryCap	Memory Capacity	Memory Capacity

**Table 2-16. Configuration Manager Properties Collected for Host System Objects**

Property Key	Property Name	Description
configManager memoryManager consoleReservationInfo serviceConsoleReserved	Service Console Reserved	Service console reserved memory

**Table 2-17. CPU Usage Properties Collected for Host System Objects**

Property Key	Property Name	Description
cpu speed	CPU	CPU Speed
cpu cpuModel	CPU Model	CPU Model

**Table 2-18. Network Properties Collected for Host System Objects**

Property Key	Property Name	Description
net maxObservedKBps	Highest Observed Throughput	Highest Observed Throughput (KBps)
net mgmt_address	Management Address	Management Address
net ip_address	IP Address	IP Address
net discoveryProtocol cdp managementIpAddress	Management IP Address	Management IP Address
net discoveryProtocol cdp systemName	System Name	System Name
net discoveryProtocol cdp portName	Port Name	Port Name
net discoveryProtocol cdp vlan	VLAN	VLAN
net discoveryProtocol cdp mtu	MTU	MTU
net discoveryProtocol cdp hardwarePlatform	Hardware Platform	Hardware Platform
net discoveryProtocol cdp softwareVersion	Software Version	Software Version
net discoveryProtocol cdp timeToLive	Time to Live	Time to Live
net discoveryProtocol lldp managementIpAddress	Management IP Address	Management IP Address
net discoveryProtocol lldp systemName	System Name	System Name
net discoveryProtocol lldp portName	Port Name	Port Name



Property Key	Property Name	Description
net discoveryProtocol lldp vlan	VLAN	VLAN
net discoveryProtocol lldp timeToLive	Time to Live	Time to Live

**Table 2-19. System Properties Collected for Host System Objects**

Property Key	Property Name	Description
sys build	Build number	VMWare build number
sys productString	Product String	VMWare product string

**Table 2-20. Summary Properties Collected for Host System Objects**

Property Key	Property Name	Description
summary version	Version	Version
summary hostuuid	Host UUID	Host UUID
summary evcMode	Current EVC Mode	Current EVC Mode
summary customTag customTagValue	Value	Custom Tag Value
summary tag	vSphere Tag	vSphere Tag Name
summary parentCluster	Parent Cluster	Parent Cluster
summary parentDatacenter	Parent Datacenter	Parent Datacenter
summary parentVcenter	Parent Vcenter	Parent Vcenter

**Table 2-21. Datastore Properties Collected for Host System Objects**

Property Key	Property Name	Description
datastore maxObservedNumberRead	Highest Observed Number of Read Requests	Highest Observed Number of Read Requests
datastore maxObservedRead	Highest Observed Read Rate	Highest Observed Read Rate (KBps)
datastore maxObservedNumberWrite	Highest Observed Number of Write Requests	Highest Observed Number of Write Requests
datastore maxObservedWrite	Highest Observed Write Rate	Highest Observed Write Rate (KBps)
datastore maxObservedOIO	Highest Observed Outstanding Requests	Highest Observed Outstanding Requests

## Cluster Compute Resource Properties

vRealize Operations Manager collects configuration and summary properties for cluster compute resource objects.

**Table 2-22. Configuration Properties Collected for Cluster Compute Resource Objects**

Property Key	Property Name	Description
config name	Name	Name

**Table 2-23. Summary Properties Collected for Cluster Compute Resource Objects**

Property Key	Property Name	Description
summary parentDatacenter	Parent Datacenter	Parent Datacenter
summary parentVcenter	Parent Vcenter	Parent Vcenter
summary customTag customTagValue	Value	Custom Tag Value
summary tag	vSphere Tag	vSphere Tag Name

**Table 2-24. DR, DAS, and DPM Configuration Properties Collected for Cluster Compute Resource Objects**

Property Key	Property Name	Description
configuration drsconfig enabled	Enabled	Indicates whether DRS is enabled
configuration drsconfig defaultVmBehavior	Default DRS Behaviour	Default DRS Behaviour
configuration drsconfig affinityRules	Affinity Rules	DRS Affinity Rules
configuration dasconfig enabled	HA Enabled	HA Enabled
configuration dasconfig admissionControlEnabled	Admission Control Enabled	Admission Control Enabled
configuration dpmconfiginfo enabled	DPM Enabled	DPM Enabled
configuration dpmconfiginfo defaultDpmBehavior	Default DPM Behaviour	Default DPM Behaviour

DRS properties are collected for disaster recovery. DAS properties are collected for high availability service, formerly distributed availability service. DPM properties are collected for distributed power management.

## Resource Pool Properties

vRealize Operations Manager collects configuration, CPU, memory, and summary properties for resource pool objects.

**Table 2-25. Configuration Properties Collected for Resource Pool Objects**

Property Key	Property Name	Description
config name	Name	Name
config cpuAllocation reservation	Reservation	CPU reservation
config cpuAllocation limit	Limit	CPU limit
config cpuAllocation expandableReservation	Expandable Reservation	CPU expandable reservation
config cpuAllocation shares shares	Shares	CPU shares
config memoryAllocation reservation	Reservation	Memory reservation
config memoryAllocation limit	Limit	Memory limit

Property Key	Property Name	Description
config memoryAllocation expandableReservation	Expandable Reservation	Memory expandable reservation
config memoryAllocation shares shares	Shares	Memory shares

**Table 2-26. CPU Usage Properties Collected for Resource Pool Objects**

Property Key	Property Name	Description
cpu limit	CPU Limit	CPU Limit
cpu reservation	CPU reservation	CPU Reservation
cpu expandable_reservation	CPU expandable reservation	CPU Expandable Reservation
cpu shares	CPU Shares	CPU Shares
cpu corecount_provisioned	Provisioned vCPU(s)	Provisioned vCPU(s)

**Table 2-27. Memory Properties Collected for Resource Pool Objects**

Property Key	Property Name	Description
mem limit	Memory limit	Memory limit
mem reservation	Memory reservation	Memory reservation
mem expandable_reservation	Memory expandable reservation	Memory expandable reservation
mem shares	Memory Shares	Memory Shares

**Table 2-28. Summary Properties Collected for Resource Pool Objects**

Property Key	Property Name	Description
summary customTag customTagValue	Value	Custom Tag Value
summary tag	vSphere Tag	vSphere Tag Name

## Data Center Properties

vRealize Operations Manager collects configuration and summary properties for data center objects.

**Table 2-29. Configuration Properties Collected for Data Center Objects**

Property Key	Property Name	Description
config name	Name	Name

**Table 2-30. Summary Properties Collected for Data Center Objects**

Property Key	Property Name	Description
summary parentVcenter	Parent Vcenter	Parent Vcenter
summary customTag customTagValue	Value	Custom Tag Value
summary tag	vSphere Tag	vSphere Tag Name

## Storage Pod Properties

vRealize Operations Manager collects configuration and summary properties for storage pod objects.

**Table 2-31. Configuration Properties Collected for Storage Pod Objects**

Property Key	Property Name	Description
config name	Name	Name
config sdrsconfig  vmStorageAntiAffinityRules	VM storage antiaffinity rules	Storage Distributed Resource Scheduler (SDRS) VM anti-affinity rules
config sdrsconfig vmdkAntiAffinityRules	VMDK antiaffinity rules	Storage Distributed Resource Scheduler (SDRS) Virtual Machine Disk (VMDK) anti-affinity rules

## VMware Distributed Virtual Switch Properties

vRealize Operations Manager collects configuration and summary properties for VMware distributed virtual switch objects.

**Table 2-32. Configuration Properties Collected for VMware Distributed Virtual Switch Objects**

Property Key	Property Name	Description
config name	Name	Name

**Table 2-33. Capability Properties Collected for VMware Distributed Virtual Switch Objects**

Property Key	Property Name	Description
capability nicTeamingPolicy	NIC Teaming Policy	NIC Teaming Policy

## Distributed Virtual Port Group Properties

vRealize Operations Manager collects configuration and summary properties for distributed virtual port group objects.

**Table 2-34. Configuration Properties Collected for Distributed Virtual Port Group Objects**

Property Key	Property Name	Description
config name	Name	Name

**Table 2-35. Summary Properties Collected for Distributed Virtual Port Group Objects**

Property Key	Property Name	Description
summary active_uplink_ports	Active DV uplinks	Active DV uplinks

## Datastore Properties

vRealize Operations Manager collects configuration, summary, and properties about datastore use for datastore objects.

**Table 2-36. Configuration Properties Collected for Datastore Objects**

Property Key	Property Name	Description
config name	Name	Name

**Table 2-37. Summary Properties Collected for Datastore Objects**

Property Key	Property Name	Description
summary diskCapacity	Disk Capacity	Disk Capacity
summary isLocal	Is Local	Is local datastore
summary customTag customTagValue	Value	Custom Tag Value
summary accessible	Datastore Accessible	Datastore Accessible

**Table 2-38. Datastore Properties Collected for Datastore Objects**

Property Key	Property Name	Description
datastore hostcount	Host Count	Host Count
datastore hostScsiDiskPartition	Host SCSI Disk Partition	Host SCSI Disk Partition
datastore maxObservedNumberRead	Highest Observed Number of Read Requests	Highest Observed Number of Read Requests
datastore maxObservedRead	Highest Observed Read Rate	Highest Observed Read Rate (KBps)
datastore maxObservedReadLatency	Highest Observed Read Latency	Highest Observed Read Latency
datastore maxObservedNumberWrite	Highest Observed Number of Write Requests	Highest Observed Number of Write Requests
datastore maxObservedWrite	Highest Observed Write Rate	Highest Observed Write Rate (KBps)
datastore maxObservedWriteLatency	Highest Observed Write Latency	Highest Observed Write Latency
datastore maxObservedOIO	Highest Observed Outstanding Requests	Highest Observed Outstanding Requests

# Self-Monitoring Properties for vRealize Operations Manager

vRealize Operations Manager uses the vRealize Operations Manager adapter to collect properties that monitor its own objects. These self-monitoring properties are useful for monitoring changes within vRealize Operations Manager.

## Analytics Properties

vRealize Operations Manager collects properties for the vRealize Operations Manager analytics service.

**Table 2-39. Properties Collected for Analytics Service Objects**

Property Key	Property Name	Description
HAEnabled	HA Enabled	Indicates HA is enabled with a value of 1, disabled with a value of 0.
ControllerDBRole	Role	Indicates persistence service role for the controller: 0 – Master, 1 – Replica, 4 – Client..
ShardRedundancyLevel	Shard redundancy level	The target number of redundant copies for Object data.
LocatorCount	Locator Count	The number of configured locators in the system
ServersCount	Servers Count	The number of configured servers in the system

## Node Properties

vRealize Operations Manager collects properties for the vRealize Operations Manager node objects.

**Table 2-40. Configuration Properties Collected for Node Objects**

Property Key	Property Name	Description
config numCpu	Number of CPU	Number of CPUs
config numCoresPerCpu	Number of cores per CPU	Number of cores per CPU
config coreFrequency	Core Frequency	Core Frequency

**Table 2-41. Memory Properties Collected for Node Objects**

Property Key	Property Name	Description
mem RAM	System RAM	System RAM

**Table 2-42. Service Properties Collected for Node Objects**

Property Key	Property Name	Description
service proc pid	Process ID	Process ID

## Remote Collector Properties

vRealize Operations Manager collects properties for the vRealize Operations Manager remote collector objects.

**Table 2-43. Configuration Properties Collected for Remote Collector Objects**

Property Key	Property Name	Description
config numCpu	Number of CPU	Number of CPUs
config numCoresPerCpu	Number of cores per CPU	Number of cores per CPU
config coreFrequency	Core Frequency	Core Frequency

**Table 2-44. Memory Properties Collected for Remote Collector Objects**

Property Key	Property Name	Description
mem RAM	System RAM	System RAM

**Table 2-45. Service Properties Collected for Remote Collector Objects**

Property Key	Property Name	Description
service proc pid	Process ID	Process ID

# Alert Definitions in vRealize Operations Manager

## 3

Alert definitions are a combination of symptoms and recommendations that identify problem areas in vRealize Operations Manager and generate alerts on which you act for those areas.

Alert definitions are provided for various objects in your environment. You can also create your own alert definitions. See the *vRealize Operations Manager User Guide*.

- [Cluster Compute Resource Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the Cluster Compute Resource objects in your environment.

- [Host System Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the Host System objects in your environment..

- [vSphere Distributed Port Group](#)

The vCenter adapter provides alert definitions that generate alerts on the vSphere Distributed Port objects in your environment.

- [Virtual Machine Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the virtual machine objects in your environment.

- [vSphere Distributed Switch Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the vSphere Distributed Switch objects in your environment.

- [vCenter Server Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the vCenter Server objects in your environment.

- [Datastore Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the datastore objects in your environment.

- [Data Center Alert Definitions](#)

The vCenter adapter provides alert definitions that generate alerts on the Data Center objects in your environment.



## ■ Custom Data Center Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the Custom Data Center objects in your environment.

## Cluster Compute Resource Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the Cluster Compute Resource objects in your environment.

### Health/Symptom-Based

These alert definitions have the following impact and criticality information.

**Impact**

Health

**Criticality**

Symptom-based

Alert Definition	Symptoms	Recommendations
DRS-enabled cluster has CPU contention caused by less than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster CPU contention at warning/ immediate/critical level</li> <li>■ &gt; 0 descendant virtual machines have [ Virtual machine CPU demand at warning/ immediate/critical level ]</li> <li>■ &lt;= 50% of descendant virtual machines have [Virtual machine CPU demand at warning/ immediate/ critical level ]</li> </ul>	Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.
DRS-enabled cluster has CPU contention caused by more than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster CPU contention at warning/ immediate/critical level</li> <li>■ Cluster CPU workload at warning/ immediate/critical level</li> <li>■ &gt; 50% of descendant virtual machines have [ Virtual machine CPU demand at warning/ immediate/ critical level ]</li> </ul>	1 Use vSphere vMotion to migrate some virtual machines to a different cluster if possible. 2 Add more hosts to the cluster to increase CPU capacity.

Alert Definition	Symptoms	Recommendations
DRS-enabled cluster has CPU contention caused by overpopulation of virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster CPU contention at warning/ immediate/critical level</li> <li>■ Cluster CPU workload at warning/ immediate/critical level</li> <li>■ == 0 descendant virtual machines have [ Virtual machine CPU demand at warning/ immediate/critical level ]</li> </ul>	<ol style="list-style-type: none"> <li>1 Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.</li> <li>2 Add more hosts to the cluster to increase CPU capacity.</li> </ol>
DRS-enabled cluster has unexpected high CPU workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster CPU workload above DT</li> <li>■ Cluster CPU workload at warning/ immediate/critical level</li> </ul>	<ol style="list-style-type: none"> <li>1 Check the applications running on the virtual machines in the cluster to determine whether high CPU workload is an expected behavior.</li> <li>2 Add more hosts to the cluster to increase CPU capacity.</li> <li>3 Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.</li> </ol>
DRS-enabled cluster has memory contention caused by less than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster memory contention at warning/immediate/critical level</li> <li>■ &gt; 0 descendant virtual machines have [ Virtual machine memory workload at warning /immediate/ critical level ]</li> <li>■ &lt;= 50% of descendant virtual machines have [Virtual machine memory workload at warning/ immediate/critical level ]</li> </ul>	Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.
DRS-enabled cluster has memory contention caused by more than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster memory contention at warning/immediate/critical level</li> <li>■ Cluster memory workload at warning/immediate/critical level</li> <li>■ &gt; 50% of descendant virtual machines have [ Virtual machine memory demand at warning/ immediate/critical level ]</li> </ul>	<ol style="list-style-type: none"> <li>1 Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.</li> <li>2 Add more hosts to the cluster to increase memory capacity.</li> </ol>

Alert Definition	Symptoms	Recommendations
DRS-enabled cluster has memory contention caused by overpopulation of virtual machines.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster memory contention at warning/immediate/critical level</li> <li>■ Cluster memory workload at warning/immediate/critical level</li> <li>■ == 0 descendant virtual machines have [ Virtual machine memory demand at warning /immediate/ critical level ]</li> </ul>	<ol style="list-style-type: none"> <li>1 Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.</li> <li>2 Add more hosts to the cluster to increase memory capacity.</li> </ol>
More than 5% of virtual machines in the cluster have memory contention caused by memory compression, ballooning or swapping.	<ul style="list-style-type: none"> <li>■ ! Virtual machine memory limit is set AND</li> <li>■ &gt; 5% of descendant virtual machines have [ virtual machine memory contention is at warning/immediate/ critical level] AND</li> <li>■ &gt; 5% of descendant virtual machines have [ Virtual machine memory is compressed OR</li> <li>■ Virtual machine is using swap OR</li> <li>■ Virtual machine memory ballooning is at warning/immediate/critical level]</li> </ul>	<ol style="list-style-type: none"> <li>1 Add more hosts to the cluster to increase memory capacity.</li> <li>2 vSphere vMotion some virtual machines off the host or cluster.</li> </ol>
DRS-enabled cluster has unexpected high memory workload and contention.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ Cluster memory contention above DT</li> <li>■ Cluster memory content is at warning/immediate/critical level</li> <li>■ Cluster memory workload at warning/immediate/critical level</li> </ul>	<ol style="list-style-type: none"> <li>1 Check the applications running on the virtual machines in the cluster to determine whether high memory workload is an expected behavior.</li> <li>2 Add more hosts to the cluster to increase memory capacity.</li> <li>3 Use vSphere vMotion to migrate some virtual machines to a different cluster if possible.</li> </ol>

Alert Definition	Symptoms	Recommendations
vSphere HA failover resources are insufficient.	vSphere HA failover resources are insufficient (fault symptom)	<ul style="list-style-type: none"> <li>■ Use similar CPU and memory reservations for all virtual machines in the cluster OR</li> <li>■ Use a different vSphere HA admission control policy, such as reserving a percentage of cluster resource for failover OR</li> <li>■ Use advanced options to specify a cap for the slot size.</li> </ul> <p>For more information, see the vSphere Availability Guide. Hosts that have vSphere HA agent errors are not good candidates for providing failover capacity in the cluster and their resources are not considered for vSphere HA admission control purposes. If many hosts have a vSphere HA agent error, the vCenter Server generates this event leading to the fault. To resolve vSphere HA agent errors, check the event logs for the hosts to determine the cause of the errors. After you resolve any configuration problems, reconfigure vSphere HA on the affected hosts or on the cluster</p>
vSphere HA master missing.	vCenter Server is unable to find a master vSphere HA agent (fault symptom)	Check the fault page under the <b>Analysis</b> tab for this object to find more objects.

## Host System Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the Host System objects in your environment..

### Health/Symptom-Based

These alert definitions have the following impact and criticality information.

<b>Impact</b>	Health
<b>Criticality</b>	Symptom-based

Alert Definition	Symptoms	Recommendations
Host has CPU contention caused by less than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ ! Host inside a cluster</li> <li>■ Host CPU contention is at warning/ immediate/critical level</li> <li>■ &gt; 0 child virtual machines have [ Virtual machine CPU demand at warning /immediate/critical level ]</li> <li>■ &lt;= 50% of child virtual machines have [Virtual machine CPU demand at warning/ immediate/critical level ]</li> </ul>	Use vSphere vMotion to migrate some virtual machines with high CPU workload to other hosts that have available CPU capacity.
Host has CPU contention caused by more than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ ! Host inside a cluster</li> <li>■ Host CPU contention is at warning/ immediate/critical level</li> <li>■ Host CPU demand at warning/ immediate/critical level</li> <li>■ &gt; 50% of child virtual machines have [Virtual machine CPU demand at warning/ immediate/critical level ]</li> </ul>	1 Use vSphere vMotion to migrate some virtual machines with high CPU workload to other hosts that have available CPU capacity. 2 Upgrade the host or use a host that has larger CPU capacity.
Host has CPU contention due to overpopulation of virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ ! Host inside a cluster</li> <li>■ Host CPU contention is at warning/ immediate/critical level</li> <li>■ Host CPU demand at warning/ immediate/critical level</li> <li>■ Zero child virtual machines have [ Virtual machine CPU demand at warning/ immediate/critical level ]</li> </ul>	1 Use vSphere vMotion to migrate some virtual machines with high CPU workload to other hosts that have available CPU capacity. 2 Upgrade the host or use a host that has larger CPU capacity.
Host in a non-DRS cluster has CPU contention caused by less than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Host inside a cluster</li> <li>■ [ ! DRS Enabled OR ! DRS fully automated ]</li> <li>■ Host CPU contention is at warning/ immediate/critical level</li> <li>■ &gt; 0 child virtual machines have [ Virtual machine CPU demand at warning /immediate/critical level ]</li> <li>■ &lt;= 50% of child virtual machines have [Virtual machine CPU demand at warning /immediate/critical level ]</li> </ul>	Use vSphere vMotion to migrate some virtual machines with high CPU workload to other hosts that have available CPU capacity.

Alert Definition	Symptoms	Recommendations
Host in a non-DRS cluster has CPU contention caused by more than half of the virtual machines.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Host inside a cluster</li> <li>■ [ ! DRS Enabled OR ! DRS fully automated ]</li> <li>■ Host CPU contention at warning/immediate/critical level</li> <li>■ Host CPU demand at warning/immediate/critical level</li> <li>■ &gt; 50% of child virtual machines have [ Virtual machine CPU demand at warning /immediate/critical level ]</li> </ul>	<ol style="list-style-type: none"> <li>1 Use vSphere vMotion to migrate some virtual machines with high CPU workload to other hosts that have available CPU capacity.</li> <li>2 Upgrade the host or use a host that has larger CPU capacity.</li> </ol>
Host in a non-DRS cluster has CPU contention due to overpopulation of virtual machines.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Host inside a cluster</li> <li>■ [ ! DRS Enabled OR ! DRS fully automated ]</li> <li>■ Host CPU contention at warning/immediate/critical level</li> <li>■ Host CPU demand at warning/immediate/critical level</li> <li>■ Zero child virtual machines have [ Virtual machine CPU demand at warning /immediate/critical level</li> </ul>	<ol style="list-style-type: none"> <li>1 Use vSphere vMotion to migrate some virtual machines with high CPU workload to other hosts that have available CPU capacity.</li> <li>2 Upgrade the host or use a host that has larger CPU capacity.</li> </ol>
Host has memory contention caused by less than half of the virtual machines.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ ! Host inside a cluster</li> <li>■ Host memory contention at warning/immediate/critical level</li> <li>■ &gt; 0 child virtual machines have [ Virtual machine memory workload at warning /immediate/critical level ]</li> <li>■ &lt;= 50% of child virtual machines have [Virtual machine memory workload at warning /immediate/critical level ]</li> </ul>	Use vSphere vMotion to migrate some virtual machines with high memory workload to other hosts that have available memory capacity.
Host has memory contention caused by more than half of the virtual machines.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ ! Host inside a cluster</li> <li>■ Host memory workload at warning/immediate/critical level</li> <li>■ Host memory contention at warning/immediate/critical level</li> <li>■ &gt; 50% of child virtual machines have [ Virtual machine memory workload at warning /immediate/critical level ]</li> </ul>	<ol style="list-style-type: none"> <li>1 Use vSphere vMotion to migrate some virtual machines with high memory workload to other hosts that have available memory capacity.</li> <li>2 Upgrade the host to use a host that has larger memory capacity.</li> </ol>

Alert Definition	Symptoms	Recommendations
Host has memory contention due to overpopulation of virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ ! Host inside a cluster</li> <li>■ Host memory workload at warning/ immediate/critical level</li> <li>■ Host memory contention at warning/ immediate/critical level</li> <li>■ Zero child virtual machines have [ Virtual machine memory workload at warning/ immediate/critical level ]</li> </ul>	1 Use vSphere vMotion to migrate some virtual machines with high memory workload to other hosts that have available memory capacity. 2 Upgrade the host or use a host that has larger memory capacity.
Host in a non-DRS cluster has memory contention caused by less than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Host inside a cluster</li> <li>■ [ ! DRS Enabled OR ! DRS fully automated ]</li> <li>■ Host memory contention at warning/ immediate/critical level</li> <li>■ &gt; 0 child virtual machines have [ Virtual machine memory workload at warning/ immediate/critical level ]</li> <li>■ &lt;= 50% of child virtual machines have [Virtual machine memory workload at warning/ immediate/ critical level ]</li> </ul>	Use vSphere vMotion to migrate some virtual machines with high memory workload to other hosts that have available memory capacity.
Host in a non-DRS cluster has memory contention caused by more than half of the virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Host inside a cluster</li> <li>■ [ ! DRS Enabled OR ! DRS fully automated ]</li> <li>■ Host memory workload at warning/ immediate/critical level</li> <li>■ Host memory contention at warning/ immediate/critical level</li> <li>■ &gt; 50% of child virtual machines have [ Virtual machine memory workload at warning /immediate/critical level ]</li> </ul>	1 Use vSphere vMotion to migrate some virtual machines with high memory workload to other hosts that have available memory capacity. 2 Upgrade the host or use a host that has larger memory capacity.
Host in a non-DRS cluster has memory contention due to overpopulation of virtual machines.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Host inside a cluster</li> <li>■ [ ! DRS Enabled OR ! DRS fully automated ]</li> <li>■ Host memory workload at warning/ immediate/critical level</li> <li>■ Host memory contention at warning/ immediate/critical level</li> <li>■ Zero child virtual machines have [ Virtual machine memory workload at warning /immediate/critical level ]</li> </ul>	1 Use vSphere vMotion to migrate some virtual machines with high memory workload to other hosts that have available memory capacity. 2 Upgrade the host or use a host that has larger memory capacity.

Alert Definition	Symptoms	Recommendations
Host is experiencing high number of received packets dropped.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Host network received packets dropped</li> <li>■ Host network received packets dropped above DT</li> <li>■ Host network data receive workload at Warning level</li> <li>■ Host network data receive workload above DT</li> <li>■ Host CPU demand at Critical level</li> </ul>	<ol style="list-style-type: none"> <li>1 If the host has one CPU, upgrade the host or use a host that has larger CPU capacity.</li> <li>2 Add an additional NIC to the host.</li> <li>3 Reduce the amount of network traffic being generated by virtual machines by moving some of them to a host with lower network traffic.</li> </ol>
Host is experiencing high number of transmitted packets dropped.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Host network transmitted packets dropped</li> <li>■ Host network transmitted packets dropped above DT</li> <li>■ Host network data transmit workload at Warning level</li> <li>■ Host network data transmit workload above DT</li> <li>■ Host is dropping high percentage of packets</li> </ul>	<ol style="list-style-type: none"> <li>1 Add an additional NIC to the host.</li> <li>2 Reduce the amount of network traffic being generated by virtual machines by moving some of them to a host with lower network traffic.</li> </ol>
ESXi host has detected a link status 'flapping' on a physical NIC.	Physical NIC link state flapping (fault symptom).	ESXi disables the device to avoid the link flapping state. You might need to replace the physical NIC. The alert will be canceled when the NIC is repaired and functioning. If you replace the physical NIC, you might need to manually cancel the alert.
ESXi host has detected a link status down on a physical NIC.	Physical NIC link state down (fault symptom).	ESXi disables the device to avoid the link flapping state. You might need to replace the physical NIC. The alert will be canceled when the NIC is repaired and functioning. If you replace the physical NIC, you might need to manually cancel the alert.
Battery sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Battery sensor health is red OR</li> <li>■ Battery sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
BMC sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ BMC sensor health is red OR</li> <li>■ BMC sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.



Alert Definition	Symptoms	Recommendations
Fan sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Fan sensor health is red OR</li> <li>■ Fan sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
Hardware sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Hardware sensor health is red OR</li> <li>■ Hardware sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
Memory sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Memory sensor health is red OR</li> <li>■ Memory sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exist.
Power sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Power sensor health is red OR</li> <li>■ Power sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
Processor sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Processor sensor health is red</li> <li>■ Processor sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
SEL sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ SEL sensor health is red OR</li> <li>■ SEL sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
Storage sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Storage sensor health is red OR</li> <li>■ Storage sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.

Alert Definition	Symptoms	Recommendations
System Board sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ System board sensor health is red OR</li> <li>■ System board sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
Temperature sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Temperature sensor health is red OR</li> <li>■ Temperature sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.
Voltage sensors are reporting problems.	<ul style="list-style-type: none"> <li>■ Voltage sensor health is red OR</li> <li>■ Voltage sensor health is yellow</li> </ul>	Change or replace the hardware if necessary. Contact the hardware vendor for assistance. After the problem is resolved, the alert will be canceled when the sensor that reported the problem indicates that the problem no longer exists.

## Health/Critical

These alert definitions have the following impact and criticality information.

**Impact** Health

**Criticality** Critical

Alert Definition	Symptoms	Recommendations
Host has lost connection to vCenter.	<ul style="list-style-type: none"> <li>■ Connection to the host has been lost (fault symptom) OR</li> <li>■ Host disconnected from vCenter</li> </ul>	Log on to the vSphere Client and vSphere Web Client and manually reconnect the host to the vCenter Server server. After the connection to the host is restored to the vCenter Server, the alert is cancelled.
vSphere High Availability (HA) has detected a network-isolated host.	vSphere HA detected a network isolated host (fault symptom).	Resolve the networking problem that prevents the host from pinging its isolation addresses and communicating with other hosts. Make sure that the management networks that vSphere HA uses include redundancy. With redundancy, vSphere HA can communicate over more than one path, which reduces the chance of a host becoming isolated.

Alert Definition	Symptoms	Recommendations
vSphere High Availability (HA) has detected a possible host failure.	vSphere HA detected a host failure (fault symptom).	<p>Find the computer that has the duplicate IP address and reconfigure it to have a different IP address. This fault is cleared and the alert canceled when the underlying problem is resolved, and the vSphere HA master agent is able to connect to the HA agent on the host.</p> <p><b>Note</b> You can use the Duplicate IP warning in the <code>/var/log/vmkernel</code> log file on an ESX host or the <code>/var/log/messages</code> log file on an ESXi host to identify the computer that has the duplicate IP address.</p>
Host is experiencing network contention caused by too much traffic.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Host is experiencing dropped network packets</li> <li>■ Host network workload at warning/immediate/critical level</li> </ul>	<ol style="list-style-type: none"> <li>1 Review the load balancing policy in the Port Group and the vSwitch.</li> <li>2 Add an additional NIC to the host.</li> <li>3 Reduce the amount of network traffic being generated by virtual machines by moving some of them to a host with lower network traffic.</li> </ol>
The host has lost connectivity to a dvPort.	Lost network connectivity to dvPorts (fault symptom).	Replace the physical adapter or reset the physical switch. The alert will be canceled when connectivity is restored to the dvPort.

Alert Definition	Symptoms	Recommendations
The host has lost connectivity to the physical network.	Lost network connectivity (fault symptom).	<p>To determine the actual failure or to eliminate possible problems, check the status of the vmnic in the vSphere Client or from the ESX service console:</p> <ul style="list-style-type: none"> <li>■ To check the status in the vSphere Client, select the ESX host, click <b>Configuration</b>, and then click <b>Networking</b>. The vmnics currently assigned to virtual switches appear in the diagrams. If a vmnic displays a red X, that link is currently down.</li> <li>■ From the service console, run the command: <code>esxcfg-nics</code>. The output that appears is similar to the following:  Name PCI Driver Link Speed Duplex  Description  -----  ----- vmnic0 04:04.00 tg3 Up  1000Mbps Full Broadcom BCM5780  Gigabit Ethernet vmnic1 04:04.01 tg3  Up 1000Mbps Full Broadcom  BCM5780 Gigabit Ethernet. The Link column shows the status of the link between the network adapter and the physical switch. The status can be either Up or Down. If some network adapters are up and others are down, you might need to verify that the adapters are connected to the intended physical switch ports. To verify the connections, bring down each ESX host port on the physical switch, run <code>esxcfg-nics -l</code>, and observe the affected vmnics.</li> </ul> <p>Verify that the vmnic identified in the alert is still connected to the switch and configured properly:</p> <ul style="list-style-type: none"> <li>■ Make sure that the network cable is still connected to the switch and to the host.</li> <li>■ Make sure that the switch is connected to the system, is still functioning properly, and has not been inadvertently misconfigured. For more information, see the switch documentation.</li> <li>■ Check for activity between the physical switch and the vmnic. You can check activity by performing a network trace or observing activity LEDs.</li> <li>■ Check for network port settings on the physical switch.</li> </ul> <p>To reconfigure the service console IP address if the affected vmnic is associated with a service console, see <a href="http://kb.vmware.com/kb/1000258">http://kb.vmware.com/kb/1000258</a> If the problem is caused by your hardware,</p>

Alert Definition	Symptoms	Recommendations
The host lost connectivity to a Network File System (NFS) server.	Lost connection to NFS server (fault symptom).	<ol style="list-style-type: none"> <li>1 Verify the NFS server is running.</li> <li>2 Check the network connection to make sure the ESX host can connect to the NFS server.</li> <li>3 Determine whether the other hosts that use the same NFS mount are experiencing the same problem, and check the NFS server status and share points.</li> <li>4 Make sure that you can reach the NFS server by logging into the service console and using vmkping to ping the NFS server: "vmkping &lt;nfs server&gt;".</li> <li>5 For advanced troubleshooting information, see <a href="http://kb.vmware.com/kb/1003967">http://kb.vmware.com/kb/1003967</a></li> </ol>
A fatal error occurred on a PCIe bus during system reboot.	A fatal PCIe error occurred.	Check and replace the PCIe device identified in the alert as the cause of the problem. Contact the vendor for assistance.
A fatal memory error was detected at system boot time.	A fatal memory error occurred.	Replace the faulty memory or contact the vendor.

## Health/Immediate

These alert definitions have the following impact and criticality information.

### Impact

Health

### Criticality

Immediate

Alert Definition	Symptom	Recommendations
The host has lost redundant connectivity to a dvPort.	Lost network redundancy to DVPorts (fault symptom).	Replace the physical adapter or reset the physical switch. The alert will be canceled when connectivity is restored to the DVPort.
The host has lost redundant uplinks to the network.	Lost network redundancy (fault symptom).	<p>To determine the actual failure or to eliminate possible problems, first connect to ESX through SSH or the console:</p> <ol style="list-style-type: none"> <li>1 Identify the available uplinks by running <code>esxcfg-nics -l</code>.</li> <li>2 Remove the reported vmnic from the port groups by running <code>esxcfg-vswitch -U &lt;affected vmnic&gt; affected vSwitch</code>.</li> <li>3 Link available uplinks to the affected port groups by running <code>esxcfg-vswitch -L &lt;available vmnic&gt; affected vSwitch</code>.</li> </ol> <p>Next, check the status of the vmnic in vSphere Client or the ESX service console:</p> <ol style="list-style-type: none"> <li>1 In vSphere Client, select the ESX host, click <b>Configuration</b>, and then click <b>Networking</b>.</li> </ol> <p>The vmnics currently assigned to virtual switches appear in the diagrams. If a vmnic displays a red X, that link is currently unavailable.</p> <ol style="list-style-type: none"> <li>2 From the service console, run <code>esxcfg-nics -l</code>. The output that appears is similar to the following example: Name PCI Driver Link Speed Duplex Description.</li> </ol> <pre> ----- ----- vmnic0 04:04.00 tg3 Up 1000Mbps Full Broadcom BCM5780 Gigabit Ethernet vmnic1 04:04.01 tg3 Up 1000Mbps Full Broadcom BCM5780 Gigabit Ethernet. The Link column shows the status of the link between the network adapter and the physical switch. The status can be either Up or Down. If some network adapters are up and others are down, you might need to verify that the adapters are connected to the intended physical switch ports. To verify the connections, shut down each ESX host port on the physical switch, run the "esxcfg-nics -l" command, and observe the affected vmnics. Verify that the vmnic identified in the alert is still connected to the switch and configured properly: </pre> <ol style="list-style-type: none"> <li>1 Make sure that the network cable is still connected to the switch and to the host.</li> <li>2 Make sure that the switch is connected to the system, is still functioning properly, and does not</li> </ol>

Alert Definition	Symptom	Recommendations
A PCIe error occurred during system boot, but the error is recoverable.	A recoverable PCIe error occurred.	The PCIe error is recoverable, but the system behavior is dependent on how the error is handled by the OEM vendor's firmware. Contact the vendor for assistance.
A recoverable memory error has occurred on the host.	A recoverable memory error occurred.	Since recoverable memory errors are vendor-specific, contact the vendor for assistance.

## Risk/Symptom-Based

These alert definitions have the following impact and criticality information.

<b>Impact</b>	Risk
<b>Criticality</b>	Symptom-based

Alert Definition	Symptom	Recommendations
ESXi Host is violating vSphere 5.5 Hardening Guide.	<ul style="list-style-type: none"> <li>■ Active directory authentication disabled OR</li> <li>■ Non-compliant NTP service startup policy OR</li> <li>■ SSH service is running OR</li> <li>■ NTP service stopped OR</li> <li>■ Non-compliant timeout value for automatically disabling local and remote shell access OR</li> <li>■ vSphere Authentication Proxy not used for password protection when adding ESXi hosts to active directory OR</li> <li>■ Persistent logging disabled OR</li> <li>■ Bidirectional CHAP for iSCSI traffic disabled OR</li> <li>■ Non-compliant firewall setting to restrict access to NTP client OR</li> <li>■ NTP server for time synchronization not configured OR</li> <li>■ Non-compliant ESXi Shell service startup policy OR</li> <li>■ Non-compliant firewall setting to restrict access to SNMP server OR</li> <li>■ ESXi Shell service is running OR</li> <li>■ Non-compliant DCUI service startup policy OR</li> <li>■ Dvfilter bind IP address configured OR</li> <li>■ Non-compliant SSH service startup policy OR</li> <li>■ DCUI service is running OR</li> <li>■ Non-compliant idle time before an interactive shell is automatically logged out OR</li> <li>■ Non-compliant DCUI access user list OR</li> <li>■ Remote syslog is not enabled</li> </ul>	Fix the vSphere 5.5 Hardening Guide Rules Violations according to the recommendations in the <a href="#">vSphere5 Hardening Guide</a>

## vSphere Distributed Port Group

The vCenter adapter provides alert definitions that generate alerts on the vSphere Distributed Port objects in your environment.



## Health/Critical

These alert definitions have the following impact and criticality information.

**Impact** Health

**Criticality** Critical

Alert Definition	Symptom	Recommendations
One or more ports are in link down state.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Port is connected</li> <li>■ One or more ports are in a link down state</li> </ul>	Verify that there is physical connectivity for the NICs on the host. Verify the admin status on the port.

## Virtual Machine Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the virtual machine objects in your environment.

### Health/Symptom-Based

These alert definitions have the following impact and criticality information.

**Impact** Health

**Criticality** Symptom-based

Alert Definition	Symptom	Recommendations
Virtual machine is experiencing memory compression, ballooning or swapping due to memory limit.	<ul style="list-style-type: none"> <li>■ Virtual machine memory limit is set AND</li> <li>■ Virtual machine memory demand exceeds configured memory limit AND</li> <li>■ [Virtual machine memory is compressed OR</li> <li>■ Virtual machine is using swap OR</li> <li>■ Virtual machine memory ballooning is at warning/immediate/critical level] AND</li> <li>■ Recommended virtual machine memory size</li> </ul>	Increase the memory limit for the virtual machine to match the recommended memory size. Alternatively, remove memory limit for the virtual machine.
Virtual machine has CPU contention caused by swap wait.	Virtual machine CPU swap wait is at warning/Immediate/Critical level.	<ol style="list-style-type: none"> <li>1 Upgrade the host with more memory.</li> <li>2 Use vSphere vMotion to migrate this virtual machine to a different host or cluster.</li> <li>3 Set memory reservations for the virtual machine to prevent swapping.</li> </ol>

Alert Definition	Symptom	Recommendations
Virtual machine has CPU contention caused by IO wait.	Virtual machine CPU I/O wait is at warning/immediate/critical level.	Increase the datastore I/O capacity for the connected data stores to reduce CPU I/O wait on the virtual machine.
Virtual machine has unexpected high CPU workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine CPU demand at warning/immediate/critical level</li> <li>■ Anomaly is starting to/moderately/critically high</li> </ul>	1 Check the guest applications to determine whether high CPU workload is an expected behavior. 2 Add more CPU capacity for this virtual machine.
Virtual machine has unexpected high memory workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine memory workload is at Warning/Immediate/Critical level</li> <li>■ Anomaly is starting to/moderately/critically high</li> </ul>	1 Check the guest applications to determine whether high memory workload is an expected behavior. 2 Add more memory for this virtual machine.
Virtual machine has memory contention due to swap wait and high disk read latency.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine CPU swap wait is at warning/immediate/critical level (5/10/15)</li> <li>■ Virtual machine has read latency at warning level</li> <li>■ Recommended virtual machine memory size</li> </ul>	Add more memory for this virtual machine.
Virtual machine has memory contention due to memory compression, ballooning or swapping.	<ul style="list-style-type: none"> <li>■ ! Virtual machine memory limit is set AND</li> <li>■ Virtual machine has memory contention at warning/immediate/critical level AN</li> <li>■ [ Virtual machine memory ballooning at warning/immediate/critical level OR</li> <li>■ Virtual machine memory is compressed OR</li> <li>■ Virtual machine is using swap]</li> </ul>	1 Add memory reservations to this virtual machine to prevent ballooning and swapping. 2 Use vSphere vMotion to migrate this virtual machine to a different host or cluster.
Virtual machine has unexpected high disk I/O workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine disk I/O workload at Warning/Immediate/Critical level (80/90/95)</li> <li>■ Virtual machine disk I/O workload above DT</li> </ul>	1 Check the applications running on the virtual machine to determine whether high disk I/O workload is an expected behavior. 2 Use vSphere Storage vMotion to migrate this virtual machine to a different datastore with higher IOPS.
Virtual machine has disk I/O read latency problem.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine disk read latency at Warning /Immediate/Critical level</li> <li>■ Virtual machine disk read latency above DT</li> <li>■ Virtual machine has low co-stop</li> <li>■ Virtual machine has low CPU swap wait</li> </ul>	1 Check whether you have enabled Storage IO control on the datastores connected to the virtual machine. 2 Increase IOPS for the datastores connected to the virtual machine. 3 Use vSphere Storage vMotion to migrate this virtual machine to a different datastore with higher IOPS.

Alert Definition	Symptom	Recommendations
Virtual machine has disk I/O write latency problem.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine disk write latency at Warning/ Immediate/Critical level</li> <li>■ Virtual machine disk write latency above DT</li> <li>■ Virtual machine has low CPU swap wait (&lt; 3 ms)</li> </ul>	<ol style="list-style-type: none"> <li>1 Check whether you have enabled Storage IO Control on the data stores connected to the datastore.</li> <li>2 Increase IOPS for the data stores connected to the virtual machine.</li> <li>3 If the virtual machine has multiple snapshots, delete the older snapshots.</li> <li>4 Use vSphere Storage vMotion to migrate some virtual machines to a different datastore.</li> </ol>
Virtual machine has disk I/O latency problem caused by snapshots.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine CPU I/O wait is at warning/immediate/critical level</li> <li>■ Virtual machine has at least one snapshot</li> <li>■ All child datastores have [ ! Disk command latency at warning level ]</li> </ul>	<ol style="list-style-type: none"> <li>1 If the virtual machine has multiple snapshots, delete the older snapshots.</li> <li>2 Reduce the number of snapshots by consolidating the snapshots into one snapshot. In vSphere Client, select the VM, right-click, select <b>Snapshot</b>, and then <b>Consolidate</b>.</li> </ol>
Virtual machine is consuming disk space in a rapid and unexpected manner.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Guest file system overall disk space usage reaching warning/immediate/ critical limit (80, 90, 95)</li> <li>■ Virtual machine disk space time remaining high (&gt; 60 days)</li> <li>■ Guest file system space usage above DT</li> <li>■ Guest partition disk space usage</li> </ul>	<ol style="list-style-type: none"> <li>1 Check the application and verify that it is behaving correctly.</li> <li>2 Add a new hard disk to the virtual machine and configure the guest file system partition to use the disk.</li> </ol>
One or more guest file systems is out of disk space.	One or more guest file systems out of disk space (Fault symptom).	Add a new hard disk to the virtual machine and configured the guest file system partition to use the disk.
Not enough resources for vSphere HA to start the virtual machine.	Not enough resources for vSphere HA to start VM (Fault symptom).	<ol style="list-style-type: none"> <li>1 If virtual machine CPU reservation is set, decrease the CPU reservation configuration.</li> <li>2 If virtual machine memory reservation is set, decrease the memory reservation configuration.</li> <li>3 Add more hosts to cluster.</li> <li>4 Bring any failed hosts online or resolve a network partition, if one exists.</li> <li>5 If DRS is in manual mode, look for pending recommendations and approve the recommendations so that vSphere HA failover can proceed.</li> </ol>
The Fault tolerance state of the virtual machine has changed to "Disabled" state.	VM fault tolerance state changed to disabled (Fault symptom).	Enable the secondary virtual machine indicated in the alert.

Alert Definition	Symptom	Recommendations
vSphere HA failed to restart a network isolated virtual machine.	vSphere HA failed to restart a network isolated virtual machine (Fault symptom).	Manually power on the virtual machine.
The fault tolerance state of the virtual machine has changed to "Needs Secondary" state.	VM Fault Tolerance state changed to needs secondary (Fault symptom).	Keep HA enabled when Fault tolerance (FT) is required to protect virtual machines.
vSphere HA cannot perform a failover operation for the virtual machine	vSphere HA virtual machine failover unsuccessful (Fault symptom)	<ol style="list-style-type: none"> <li>1 If the error information reports that a file is locked, the virtual machine might be powered on a host that the vSphere HA master agent can no longer monitor by using the management network or heartbeat datastores.</li> <li>2 The virtual machine might have been powered on by a user on a host outside of the cluster. If any hosts are declared offline, determine whether a networking or storage problem caused the situation.</li> <li>3 If the error information reports that the virtual machine is in an invalid state, an in-progress operation might be preventing access to the virtual machine files. Determine whether any operations are in progress, such as a clone operation that is taking a long time to complete.</li> <li>4 You can also try to power on the virtual machine and investigate any returned errors.</li> </ol>
Virtual machine is experiencing memory compression, ballooning or swapping due to memory limit.	<ul style="list-style-type: none"> <li>■ Virtual machine memory limit is set</li> <li>■ Virtual machine memory demand exceeds configured memory limit</li> <li>■ [Virtual machine memory is compressed OR</li> <li>■ Virtual machine is using swap OR</li> <li>■ Virtual machine memory ballooning is at warning/immediate/critical level]</li> <li>■ Recommended virtual machine memory size</li> </ul>	Increase the memory limit for the virtual machine to match the recommended memory size. Alternatively, remove memory limit for the virtual machine.

## Efficiency/Symptom-Based

These alert definitions have the following impact and criticality information.

### Impact

Efficiency

### Criticality

Symptom-based

Alert Definition	Symptom	Recommendations
Virtual machine has large disk snapshots.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine has large disk snapshots</li> <li>■ Reclaimable snapshot waste</li> <li>■ Datastore space usage reaching warning/immediate/critical limit</li> </ul>	If the virtual machine has multiple snapshots, delete the older snapshots.

## Efficiency/Warning

These alert definitions have the following impact and criticality information.

**Impact** Efficiency

**Criticality** Warning

Alert Definition	Symptom	Recommendations
Virtual machine is idle.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine is idle</li> <li>■ Virtual machine high ready time on each vCPU</li> <li>■ ! Virtual machine is powered off</li> </ul>	Power off this virtual machine to allow for other virtual machines to use CPU and memory that this virtual machine is wasting.

## Risk/Symptom-Based

These alert definitions have the following impact and criticality information.

**Impact** Risk

**Criticality** Symptom-based

Alert Definition	Symptom	Recommendations
Virtual machine has CPU contention caused by co-stop.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine CPU co-stop at warning/immediate/critical level</li> <li>■ ! Virtual machine is powered off</li> <li>■ Number of vCPUs to remove from virtual machine</li> </ul>	Review the symptoms listed and remove the number of vCPUs from the virtual machine as recommended by the symptom.
Virtual machine has chronic high CPU workload leading to CPU stress.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine CPU stress is at warning/immediate/critical level</li> <li>■ Recommended number of vCPUs to add</li> </ul>	Add more CPU capacity for this virtual machine.

Alert Definition	Symptom	Recommendations
Virtual machine has high CPU co-stop due to snapshots.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Virtual machine CPU co-stop is at warning/immediate/critical level</li> <li>■ Virtual machine has at least one snapshot</li> </ul>	<p>To reduce the high co-stop (%CSTP) values and increase virtual machine performance, consolidate any snapshots into the main virtual disk. In the vSphere Client, select the VM, right click, and select <b>Snapshot</b>, and then <b>Consolidate</b>. After consolidation, the %CSTP value is reduced or eliminated and VM performance is improved. If performance is not improved enough, continue researching other potential VM performance issues. See VMware KB: <a href="http://kb.vmware.com/kb/2000058">http://kb.vmware.com/kb/2000058</a></p>
Virtual machine has chronic high memory workload leading to memory stress.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Virtual machine memory stress at warning/immediate/critical level</li> <li>■ Recommended virtual machine memory size &gt; 0</li> </ul>	<p>Add more memory for the VM.</p>
Virtual machine is projected to run out of disk space.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Virtual machine disk space time remaining low (&lt;= 60 days)</li> <li>■ ! Guest file system space usage above DT</li> <li>■ ! Guest file system overall disk space usage reaching warning limit (85%)</li> <li>■ Guest partition disk space usage</li> </ul>	<ol style="list-style-type: none"> <li>1 Check the application configuration to determine whether the virtual machine disk capacity will be sufficient.</li> <li>2 Add a new hard disk to the virtual machine and configured the guest file system partition to use the disk.</li> </ol>

Alert Definition	Symptom	Recommendations
Virtual machine is running out of disk space.	<p>Symptoms include all of the following:</p> <ul style="list-style-type: none"> <li>■ Guest file system overall disk space usage reaching warning/immediate/critical limit (80, 90, 95)</li> <li>■ Virtual machine disk space time remaining low (&lt;= 60 days)</li> <li>■ ! Guest file system space usage above DT</li> <li>■ Guest partition disk space usage</li> </ul>	<ol style="list-style-type: none"> <li>1 Add a new hard disk to the virtual machine and configured the guest file system partition to use the disk.</li> <li>2 Reclaim disk space using in-guest disk cleanup mechanisms.</li> </ol>
Virtual machine is violating vSphere 5.5 hardening guide.	<ul style="list-style-type: none"> <li>■ Unrestricted VM-to-VM communication through VMCI OR</li> <li>■ VMsafe CPU/Memory APIs-port number configured OR</li> <li>■ Dvfilter network API enabled OR</li> <li>■ Non-compliant max VMX file size OR</li> <li>■ Non-compliant max VM log file size OR</li> <li>■ Allow unauthorized modification of device settings OR</li> <li>■ Allow unauthorized connect and disconnect of devices OR</li> <li>■ Tools auto install not disabled OR</li> <li>■ Non-compliant max number of remote console connections OR</li> <li>■ Allow VM to obtain detailed information about the physical host OR</li> <li>■ Non-compliant max VM log file count OR</li> <li>■ Feature not exposed in vSphere: MemsFss is not disabled OR</li> <li>■ VMsafe CPU/memory API enabled OR</li> <li>■ Parallel port connected OR</li> <li>■ Console drag and drop operation not disabled OR</li> <li>■ Console copy operation not disabled OR</li> <li>■ Serial port connected OR</li> <li>■ Feature not exposed in vSphere: AutoLogon is not disabled OR</li> <li>■ Use independent non persistent disk OR</li> <li>■ Feature not exposed in vSphere: UnityPush is not disabled OR</li> <li>■ Shrink virtual disk not disabled - diskShrink OR</li> <li>■ Feature not exposed in vSphere: GetCreds is not disabled OR</li> <li>■ CD-ROM connected OR</li> <li>■ Feature not exposed in vSphere: HGFSServerSet is not disabled OR</li> <li>■ Console paste operation not disabled OR</li> </ul>	Fix the vSphere 5.5 hardening guide rule violations according to the recommendations in the vSphere Hardening Guide (XLSX).

## Risk/Warning

These alert definitions have the following impact and criticality information.

**Impact**

Risk

**Criticality**

Warning

Alert Definition	Symptom	Recommendations
Virtual machine is demanding more CPU than the configured limit.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Virtual machine CPU limit is set</li> <li>■ Virtual machine CPU demand exceeds configured limit</li> <li>■ ! Virtual machine's CPU demand exceeds its provisioned capacity</li> </ul>	Increase or remove CPU limits on the VM.

## vSphere Distributed Switch Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the vSphere Distributed Switch objects in your environment.

### Health/Critical

These alert definitions have the following impact and criticality information.

**Impact**

Health

**Criticality**

Critical

Alert Definition	Symptom	Recommendations
Network traffic is blocked for one or more ports.	Network traffic is blocked for one or more ports.	Check the security policy on the port groups as well as any ACL rule configuration.

### Health/Warning

These alert definitions have the following impact and criticality information.

**Impact**

Health

**Criticality**

Warning



Alert Definition	Symptom	Recommendations
Distributed Switch configuration is out of sync.	Distributed Switch configuration is out of sync with the vCenter Server.	Change the distributed switch configuration to match the host. Identify the distributed switch properties that are out of sync. If these properties were changed locally on the host in order to maintain connectivity, update the distributed switch configuration in the vCenter Server. Otherwise, re-apply the the vCenter Server configuration to this host.
One or more VLANs are unsupported by the physical switch.	One or more VLANs are unsupported by the physical switch.	Ensure the VLAN configuration on the physical switch and the distributed port groups are consistent.
Teaming configuration does not match the physical switch.	Teaming configuration does not match the physical switch.	Ensure the teaming configuration on the physical switch and the distributed switch are consistent.
The MTU on the Distributed Switch is not allowed by one or more VLANs on the host.	The MTU on the Distributed Switch is not allowed by one or more VLANs on the host.	Ensure the MTU configuration on the physical switch and the distributed switch are consistent.
There is an MTU mismatch between the host and a physical switch.	There is an MTU mismatch between the host and a physical switch.	Adjust the MTU configuration on the host to match the physical switch. Change the MTU configuration on the physical switch.

## Risk/Warning

These alert definitions have the following impact and criticality information.

**Impact**

Risk

**Criticality**

Warning

Alert Definition	Symptom	Recommendations
The distributed switch configuration is incorrect.	Host without redundant physical connectivity to the distributed switch.	Verify that at least two NICs on each host is connected to the distributed switch.

## vCenter Server Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the vCenter Server objects in your environment.

## Health/Symptom-Based

These alert definitions have the following impact and criticality information.

### Impact

Health

### Criticality

Symptom-based

Alert Definition	Symptom	Recommendations
A problem occurred with a vCenter Server component.	The vCenter Server health changed (fault symptom).	The actions to take to resolve the problems depend on the specific problem that caused the fault. Review the issue details, and check the documentation.
Duplicate object name found in the vCenter Server.	Duplicate object name found in the vCenter Server.	Ensure the virtual machines names are unique before enabling the Name-Based Identification feature.
The vCenter Server Storage data collection failed.	The vCenter Server storage data collection failed.	Ensure vCenter Management Webservice is started and Storage Management Service is functioning.

## Datastore Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the datastore objects in your environment.

## Health/Symptom-Based

These alert definitions have the following impact and criticality information.

### Impact

Health

### Criticality

Symptom-based

Alert Definition	Symptom	Recommendations
Datastore has unexpected high Disk I/O workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Datastore disk I/O workload at warning/immediate/critical level</li> <li>■ Datastore disk I/O workload above DT</li> </ul>	1 Check the applications running on the virtual machines placed on the datastore to determine whether high disk I/O workload is expected behavior. 2 Increase IOPS for the datastore.
Datastore is consuming disk space in a rapid and unexpected manner.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Datastore space usage reaching warning/immediate/critical level</li> <li>■ Datastore space growth above DT</li> <li>■ Datastore time remaining high</li> </ul>	1 Check if there is an unexpected provisioning of virtual machines on this datastore. 2 Use vSphere Storage vMotion to migrate some virtual machines to a different datastore. 3 Add more capacity to the datastore.

## Health/Critical

These alert definitions have the following impact and criticality information.

<b>Impact</b>	Health
<b>Criticality</b>	Critical

Alert Definition	Symptom	Recommendations
A storage device for a datastore has been detected to be off.	Storage device has been turned off administratively (fault symptom).	Ask the administrator about the device state. The fault will be resolved and the alert canceled if the device is turned on. If SCSI devices are detached or permanently removed, you must manually cancel the alert.
Datastore has lost connectivity to a storage device.	Host(s) lost connectivity to storage device(s) (fault symptom).	<p>The storage device path, for example, vmhba35 : C1 : T0 : L7, contains several potential failure points: Path Element   Failure Point</p> <p>----- vmhba35  </p> <p>HBA (Host Bus Adapter) C1   Channel T0   Target (storage processor port) L7   LUN (Logical Unit Number or Disk Unit).</p> <p>To determine the cause of the failure or to eliminate possible problems: Identify the available storage paths to the reported storage device by running <code>esxcfg-mpath</code></p> <ul style="list-style-type: none"> <li>– 1. For more information, see <a href="http://kb.vmware.com/kb/1003973">http://kb.vmware.com/kb/1003973</a>. Check that a rescan does not restore visibility to the targets. For information on rescanning the storage device by using the command-line interface and the vSphere Client, see <a href="http://kb.vmware.com/kb/1003988">http://kb.vmware.com/kb/1003988</a>.</li> </ul> <p>Determine whether the connectivity issue is with the iSCSI storage or the fiber storage.</p> <p>Troubleshoot the connectivity to the iSCSI storage by using the software initiator:</p> <ol style="list-style-type: none"> <li>1 Check whether a ping to the storage array fails from ESX. For more information, see <a href="http://kb.vmware.com/kb/1003486">http://kb/vmware.com/kb/1003486</a></li> <li>2 Check whether a vmkping to each network portal of the storage array fails. For more information, see <a href="http://kb.vmware.com/kb/10037828">http://kb.vmware.com/kb/10037828</a>.</li> <li>3 Check that the initiator is registered on the array. For more information, contact your storage vendor.</li> <li>4 Check that the following physical hardware is functioning correctly: Ethernet switch, Ethernet cables between the switch and the ESX host, and Ethernet cables between the switch and the storage array.</li> </ol> <p>To troubleshoot the connectivity to the fiber-attached storage, check the fiber switch. The fiber switch zoning configuration permits the ESX host to see the storage array. If you require assistance, contact your switch vendor.</p> <p>The fiber switch propagates RSCN messages to the ESX hosts. For more information about configuring the fiber switch, see <a href="http://kb.vmware.com/kb/1003973">http://kb.vmware.com/kb/1003973</a></p>

## Health/Immediate

These alert definitions have the following impact and criticality information.

<b>Impact</b>	Health
<b>Criticality</b>	Immediate

Alert Definition	Symptom	Recommendations
Datastore has one or more hosts that have lost redundant paths to a storage device.	Host(s) lost redundancy to storage device(s) (fault symptom).	<p>The storage device path, for example, vmhba35:C1:T0:L7, contains several potential failure points:</p> <p>Path Element   Failure Point</p> <p>----- vmhba35   HBA (Host Bus Adapter) C1   Channel T0   Target (storage processor port) L7   LUN (Logical Unit Number or Disk Unit).</p> <p>Use the following guidance to determine the cause of the failure or to eliminate possible problems. Identify the available storage paths to the reported storage device by running <code>esxcfg-mpath -l</code>. For more information, see <a href="http://kb.vmware.com/kb/1003973">http://kb.vmware.com/kb/1003973</a>.</p> <p>Check that a rescan does not restore visibility to the targets. For information on rescanning the storage device by using the command-line interface and the vSphere Client, see <a href="http://kb.vmware.com/kb/1003988">http://kb.vmware.com/kb/1003988</a>.</p> <p>Determine whether the connectivity issue is with the iSCSI storage or the fiber storage. Troubleshoot the connectivity to the iSCSI storage by using the software initiator:</p> <ol style="list-style-type: none"> <li>1 Check whether a ping to the storage array fails from ESX. For more information, see <a href="http://kb.vmware.com/kb/1003486">http://kb.vmware.com/kb/1003486</a>.</li> <li>2 Check whether a vmkping to each network portal of the storage array fails. For more information, see <a href="http://kb.vmware.com/kb/10037828">http://kb.vmware.com/kb/10037828</a>.</li> <li>3 Check that the initiator is registered on the array. For more information, contact your storage vendor.</li> <li>4 Check that the following physical hardware is functioning correctly: Ethernet switch, Ethernet cables between the switch and the ESX host, and Ethernet cables between the switch and the storage array.</li> </ol> <p>To troubleshoot the connectivity to the fiber-attached storage, check the fiber switch. The fiber switch zoning configuration permits the ESX host to see the storage array. If you require assistance, contact your switch vendor. The fiber switch propagates RSCN messages to the ESX hosts. For more information about configuring the fiber switch, see <a href="http://kb.vmware.com/kb/1002301">http://kb.vmware.com/kb/1002301</a>.</p> <p>Finally, check the following physical hardware: the storage processors on the array, the fiber switch and the Gigabit</p>

## Risk/Symptom-Based

These alert definitions have the following impact and criticality information.

**Impact**

Risk

**Criticality**

Symptom-based

Alert Definition	Symptom	Recommendations
Datastore is running out of disk space.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ Datastore space usage reaching warning/immediate/critical level</li> <li>■ ! Datastore space growth above DT</li> <li>■ Datastore space time remaining is low</li> </ul>	<ol style="list-style-type: none"> <li>1 Add more capacity to the datastore.</li> <li>2 Use vSphere vMotion to migrate some virtual machines to a different datastore.</li> <li>3 Delete unused snapshots of virtual machines from datastore.</li> <li>4 Delete any unused templates on the datastore.</li> </ol>
Datastore is projected to run out of disk space.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ ! Datastore space usage reaching warning level</li> <li>■ ! Datastore space growth above DT</li> <li>■ Datastore space time remaining is low</li> </ul>	<ol style="list-style-type: none"> <li>1 Check if datastore usage is a planned growth and expand the storage if necessary.</li> <li>2 Use vSphere vMotion to migrate some virtual machines to a different datastore.</li> </ol>

## Data Center Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the Data Center objects in your environment.

### Risk/Symptom-Based

These alert definitions have the following impact and criticality information:

**Impact**

Risk

**Criticality**

Symptom-based

Alert Definition	Symptoms	Recommendations
Data center has unbalanced CPU "demand" workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ DC is unbalanced on CPU "demand" workload</li> <li>■ DC has significant CPU "demand" workload difference</li> <li>■ At least one cluster in DC has high CPU "demand" workload</li> </ul>	Rebalance the container to spread the workload more evenly.
Data center has unbalanced memory "demand" workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully enabled</li> <li>■ DC is unbalanced on memory "demand" workload difference</li> <li>■ At least one cluster in DC has high memory "demand" workload</li> </ul>	Rebalance the container to spread the workload more evenly.
Data center has unbalanced memory "consumed" workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ DC is unbalanced on memory "consumed" workload</li> <li>■ DC has significant memory "consumed" workload difference</li> <li>■ At least one cluster in DC has high memory "consumed" workload</li> </ul>	Rebalance the container to spread the workload more evenly.

## Custom Data Center Alert Definitions

The vCenter adapter provides alert definitions that generate alerts on the Custom Data Center objects in your environment.

### Risk/Symptom-Based

These alert definitions have the following impact and criticality information.

**Impact**

Risk

**Criticality**

Symptom-based



Alert Definition	Symptoms	Recommendations
Custom data center has unbalanced CPU "demand" workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ CDC is unbalanced on CPU "demand" workload</li> <li>■ CDC has significant CPU "demand" workload difference</li> <li>■ At least one cluster in CDC has high CPU "demand" workload</li> </ul>	Rebalance the container to spread the workload more evenly.
Custom data center has unbalanced memory "demand" workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ CDC is unbalanced on memory "demand" workload</li> <li>■ CDC has significant memory "demand" workload difference</li> <li>■ At least one cluster in CDC has high memory "demand" workload</li> </ul>	Rebalance the container to spread the workload more evenly.
Custom Datacenter has unbalanced memory "consumed" workload.	Symptoms include all of the following: <ul style="list-style-type: none"> <li>■ DRS enabled</li> <li>■ DRS fully automated</li> <li>■ CDC is unbalanced on memory "consumed" workload</li> <li>■ CDC has significant memory "consumed" workload difference</li> <li>■ At least one cluster in CDC has high memory "consumed" workload</li> </ul>	Rebalance the container to spread the workload more evenly.