

vRealize Operations Management Pack for AWS Installation and Configuration Guide 3.0



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Management Pack for AWS

The *VMware vRealize™ Operations Management Pack™ for AWS Guide* describes how to install and configure the Amazon Web Services (AWS) adapter for vRealize Operations Manager.

Intended Audience

This information is intended for anyone who needs to install or configure the Management Pack for AWS.

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>.

Introduction to the Management Pack for AWS



The Management Pack for AWS is an embedded adapter with diagnostic dashboards for vRealize Operations Manager. The adapter collects metrics from Amazon Web Services.

This chapter includes the following topics:

- [Supported AWS Services](#)
- [Management Pack for AWS Dashboards](#)
- [Charges for AWS Metrics](#)
- [View Management Pack for AWS Objects](#)

Supported AWS Services

The Management Pack for AWS supports the following services.

Service	Abbreviation	Description
Elastic MapReduce	EMR	Enables developers, researchers, analysts, and data scientists to easily process vast amounts of data.
Classic Load Balancer	ELB	Provides basic load balancing across multiple Amazon EC2 instances and operates at both the request level and connection level. Classic load balancer is intended for applications that are built within the EC2-Classical network.
Application Load Balancer	ELB	Best suited for load balancing of HTTP and HTTPS traffic, this balancer provides advanced request routing targeted at the delivery of modern application architectures, including microservices and containers.
Network Load Balancer	ELB	Best suited for load balancing of TCP traffic where extreme performance is required.
Auto Scaling Group	ASG	Web service designed to start or stop Elastic Compute Cloud instances, based on user-defined policies, schedules, and health checks.
Elastic Compute Cloud	EC2	Provides resizable computing capacity in the Amazon Web Services cloud.
Elastic Block Store	EBS	Provides block-level storage volumes for use with Amazon Elastic Compute Cloud instances.

Service	Abbreviation	Description
Amazon Relational Database Service	RDS	Provides familiar SQL databases while automatically managing administrative tasks.
ElastiCache		Improves application performance by allowing you to retrieve information from an in-memory caching system.
Simple Queue Service	SQS	Provides a reliable, highly scalable, hosted queue for storing messages.
Elastic Container Registry	ECR	Fully managed Docker container registry that makes it easy for developers to store, manage, and deploy Docker container images.
Elastic Container Service	ECS	Highly scalable, high performance container orchestration service that supports Docker containers and allows you to easily run and scale containerized applications on AWS.
Lambda		AWS Lambda lets you run code without provisioning or managing servers.
DynamoDB	DYN	Fast and flexible NoSQL database service for all applications that need consistent, single-digit millisecond latency at any scale.
DAX	DAX	Fully managed, highly available, in-memory cache for DynamoDB.
Redshift	RED	Fully managed data warehouse that makes it simple and cost-effective to analyze all your data using standard SQL and your existing Business Intelligence (BI) tools.
Virtual Private Cloud	VPC	Lets you provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define.
CloudFront Distribution		AmazonCloudFront is a global content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to your viewers with low latency and high transfer speeds.
Direct Connect		AWS Direct Connect makes it easy to establish a dedicated network connection from your premises to AWS.
VPN Connection		Connect your Amazon VPC to remote networks by using a VPN connection.
VPC NAT Gateway	vpc	Use a network address translation (NAT) gateway to enable instances in a private subnet to connect to the internet or other AWS services, but prevent the internet from initiating a connection with those instances.
Elastic IP		Elastic IP address is a static IPv4 address designed for dynamic cloud computing, which is reachable from the Internet.
CloudFormationStack		AWS CloudFormation provides a common language for you to describe and provision all the infrastructure resources in your cloud environment.
S3	S3	Object storage built to store and retrieve any amount of data from anywhere.

Service	Abbreviation	Description
WorkSpaces		Amazon WorkSpaces is a fully managed, secure Desktop-as-a-Service (Daas) solution which runs on AWS.
Hosted zone		A hosted zone is a collection of records for a specified domain.
Health Checks		To discover the availability of your EC2 instances, a load balancer periodically sends pings, attempts connections, or sends requests to test the EC2 instances.

For more information about Amazon Web Services, go to the Amazon Web Services site at <http://aws.amazon.com/>.

Management Pack for AWS Dashboards

Dashboards provide the user interface you use to monitor and troubleshoot Amazon Web Services problems in vRealize Operations Manager.

You can access the dashboards by selecting **Dashboards > All Dashboards**, and then selecting **AWS**.

Table 1-1. AWS MP 2.1 Dashboards

Dashboard Name	Purpose
AWS Alerts	The Alerts dashboard reports system-generated performance information for Amazon Web Services. In vRealize Operations Manager 5.8 and later, the dashboard also displays alerts received from Amazon Web Services Cloudwatch.
AWS ASG Utilization	Use the Auto Scaling Group (ASG) dashboard to identify which ASG groups have a high utilization across the metrics CPU, Disk IO, Network Transmissions, Received/Sent, and Number of Instances in the ASG. Use that information to determine whether any action is needed to adjust the ASG parameters. For example, you might need to raise or lower the scaling threshold for the CPU metric. ASG metrics are not collected by default. You must enable them when creating the group. This applies only to the metrics belonging directly to the auto scale group, for example GroupDesiredCapacity. It does not apply to the aggregate instance metrics for the ASG, for example Instance Aggregate CPU Utilization.
AWS Disk Space	Use the Disk Space dashboard to monitor EBS volumes to see whether they are running out of disk space and take appropriate action to anticipate future storage needs. Amazon Web Services does not report disk space by default. For more information on accessing additional metrics, including disk space, and corresponding pricing, go to the Amazon Web Services documentation page at http://docs.aws.amazon.com/AmazonCloudWatch/latest/DeveloperGuide/mon-scripts.html

Table 1-1. AWS MP 2.1 Dashboards (Continued)

Dashboard Name	Purpose
AWS Instance Heatmap	Use the Instance Heatmap to monitor CPU/Disk/Network metric elements and identify instances that perform poorly.
AWS Instance Utilization	Use to identify which EC2 instances have high use across the metrics for CPU, Disk IO, Network Transmissions, Received/Sent, and Memory. Use that information to determine whether you can optimize the system by making adjustments to EC2 instances.
AWS Troubleshooting	<p>This dashboard is most helpful when someone calls in with a problem and you know which device they are using. You can search for that type of device or the specific device, if you know the name.</p> <p>When you select the device, the relationship tree displays the item, its parents and children. You can observe the Health, Workload, Anomalies, and Faults to get an overview of how the system is functioning in those areas. You can use information in the Interesting Metrics widget to help identify the root cause of issues. The Health, Anomalies, and Events Mash-up widget allows you to compare changes in the system to see how they might affect one another.</p>
AWS Volume Performance	Use the Volume Performance dashboard to identify Elastic Block Store (EBS) volumes that are experiencing high disk read time, high disk write time, a high volume of disk read operations, or a high volume of disk write operations.

Table 1-2. AWS - All Other Dashboards

Dashboard Name	Purpose
AWS Services <ul style="list-style-type: none"> ■ CloudFormation Stacks ■ Compute: EC2 ■ Compute: Elastic Containers ■ Compute: Lambda Functions ■ Database: Dynamo ■ Database: ElastiCache ■ Database: RDS ■ Database: Redshift ■ Desktop: Workspaces ■ Network: Load Balancers ■ Network: VPS ■ Simple Queue Services ■ Storage 	Select AWS Services and then select a dashboard to view specific service-related information.
AWS Availability	Use this dashboard to view the availability of each AWS service.

Table 1-2. AWS - All Other Dashboards (Continued)

Dashboard Name	Purpose
AWS Inventory	Use this dashboard to view the count of each AWS service instance in each region.
AWS Optimization	Use this dashboard to view if you are effectively using AWS services.

Charges for AWS Metrics

Amazon charges you for the metrics you collect. You can reduce costs by choosing only the metrics that are most helpful and filtering out those that are of less interest.

By default, the Management Pack for AWS requests data every 5 minutes. Every collection cycle makes one CloudWatch call per metric, per object. Currently, there are 10 basic metrics for EC2 instances and 10 basic metrics for EBS volumes. Given these figures, you can estimate the costs over time.

For information about metric costs, see <http://aws.amazon.com/cloudwatch/pricing/>.

Based on the costs associated with running the adapter, you can take advantage of some of the features that limit the amount of data you collect from AWS.

- Turn off auto discovery and use manual discovery. Choose only those objects that are critical to your system.
- Subscribe only to specific critical regions or services.
- Use white and black list filtering to select object import by name.
- Go to the default attribute package for each object. Turn off collection of metrics that are not critical for your system.

View Management Pack for AWS Objects

You can use the inventory tree to browse and select objects. The inventory tree shows a hierarchical arrangement of the Management Pack for AWS objects by region.

Procedure

- 1 In the left pane of vRealize Operations Manager, click the **Environment** icon.
- 2 In the Environment Overview, under the Inventory Trees, click **AWS Resources by Regions**.
- 3 Click the triangle next to any object to expand the tree and show the child objects.
- 4 Select an object in the inventory tree to display information about the object.

Install the Management Pack

A management pack is the part of the solution that you install. After you install the management pack, you configure an adapter instance.

Prerequisites

- The solution that you downloaded includes a PAK file. Save that PAK file to a temporary folder on your local system.
- Verify that the time and date on the vCenter Manager host machine are set correctly. The time and date must be within 900 seconds of the time and date on the Amazon server, or the Management Pack for AWS does not collect metrics. For instructions on setting your Network Time Protocol see KB article 2012069 *Configuring Network Time Protocol (NTP) on ESX/ESXi hosts using thevSphere Client*.

Procedure

- 1 Log in to the vRealize Operations Manager user interface with admin privileges.
- 2 In the left pane of vRealize Operations Manager, click the **Administration** icon and click **Solutions**.
- 3 On the **Solutions** tab, click the plus sign.
- 4 Browse to locate the temporary folder and select the PAK file.
For example, `managementpack_name-buildnumber.pak`.
- 5 If you are upgrading the management pack from a previous version, select the **Reset Default Content** check box.
If you do not select this check box, you will experience duplicated content such as dashboards and alert definitions when the management pack is installed.
- 6 Click **Upload**.
The upload might take several minutes.
- 7 Read and accept the EULA, and click **Next**.
Installation details appear in the window during the process.
- 8 Ensure that you install the PAK file on the master node.
- 9 When the installation is complete, click **Finish**.

The installer creates the `amazon_aws_adapter3` folder and `amazon_aws_adapter3.jar` file under the `vcenter-ops/user/plugins/inbound` folder.

What to do next

Validate certificates so that the adapter collects metrics and displays data.

- 1 Select **Administration > Management**, and select **Global Settings**.
- 2 Select **Enable Standard Certificate Validation**, and click the **Edit** icon.
- 3 Select the **Enable Standard Certificate Validation** check box, and click **OK**.

Add an Instance of the Management Pack for AWS

You can add a Management Pack for AWS instance to your vRealize Operations Manager implementation.

Prerequisites

- Install the Management Pack for AWS.
- Obtain the Access Key and Secret Key values. See [Generate Required Access Keys](#). These values are not the same as your log in credentials for the Amazon Web Services site.
- Determine the services for which you collect metrics. See, [Supported AWS Services](#)
- Determine the regions to which you subscribe. Amazon Web Services is divided into 9 regions. The default value * includes all regions in your subscription. If you do not want to subscribe to all regions, you can specify region identifiers in the Regions field.

Table 2-1. Amazon Web Services Regions

Region Friendly Name	Region Identifier
US East (N. Virginia)	us-east-1
US East (Ohio)	us-east-2
US West (N. California)	us-west-1
US West (Oregon)	us-west-2
Asia Pacific (Tokyo)	ap-northeast-1
Asia Pacific (Seoul)	ap-northeast-2
Asia Pacific (Mumbai)	ap-south-1
Asia Pacific (Singapore)	ap-southeast-1
Asia Pacific (Sydney)	ap-southeast-2
Canada (Central)	ca-central-1
China (Beijing)	cn-north-1
China (Ningxia)	cn-northwest-1
EU (Frankfurt)	eu-central-1
EU (Ireland)	eu-west-1

Table 2-1. Amazon Web Services Regions (Continued)

Region Friendly Name	Region Identifier
EU (London)	eu-west-2
EU (Paris)	eu-west-3
South America (São Paulo)	sa-east-1

- Determine any black list or white list filters. These filters use regular expressions to filter in or out specific objects by name. For example, a white list filter of `.*indows.*` allows only objects with a name including "indows". A blacklist filter of `.*indows.*` filters out all objects with that string in their name.

Procedure

- 1 In the left pane of vRealize Operations Manager, click the **Administration** icon and select **Solutions**.
- 2 Select **MP for AWS**, and click the **Configure** icon.
- 3 Configure the instance settings.

Option	Action
Display name	Enter a name for the adapter instance.
Description	Enter a description.
Credential	<p>Add the credentials used to access the AWS environment by clicking the plus sign.</p> <ul style="list-style-type: none"> ■ Enter an instance name for the credential values you are creating. This is not the name of the adapter instance, but a friendly name for the Access Key and Secret Key credential. ■ Enter your Access Key and Secret Key values. ■ Enter any required local proxy information for your network.

- 4 Click the arrow to the left of the **Advanced Settings** to configure advanced settings.

Option	Action
Collector	Select the collector upon which you want to run the adapter instance. A collector gathers objects into its inventory for monitoring. The collector specified by default has been selected for optimal data collecting.
Services	Type the services from which to capture metrics. The default value * includes all services. If you do not want to use all services, you can specify the services you use. You type the services as comma-separated values. For example, <code>ec2, asg</code> . The Management Pack for AWS uses only the abbreviated service names, not the full names of the services.
Regions	Type the regions to which to subscribe. You type the regions as comma-separated values. Use an asterisk (*) to indicate you want to subscribe to all regions. For example, <code>sa-east-1, eu-west-1</code>
Support Auto Discovery	Set this option to true for automatic discovery of AWS services. If you set this value to false, when you create a new adapter instance you must perform manual discovery of services.

Option	Action
White List Regex	Add regular expressions to allow only objects with names that fit the criteria you specify.
Black List Regex	Add regular expressions to filter out objects by name.

5 Click **Test Connection** to validate the connection.

6 Click **Save Settings**.

What to do next

Make sure that vRealize Operations Manager is collecting data.

Where to View the Information	Information to View
Collection Status and Collection State columns in the MP for AWS Solution Details pane on the Solutions tab.	The strings <code>Collecting</code> or <code>Data receiving</code> appear approximately ten minutes after you have configured the adapter.
Environment Overview	The objects related to AWS are added to the inventory trees.
Dashboards	Management Pack for AWS dashboards are added to vRealize Operations Manager.

Configuring the Management Pack for AWS

3

To configure the Management Pack for AWS, you must install it to vRealize Operations Manager and optionally change properties to customize management pack operation.

An Amazon Web Services account has multiple types of credentials associated with the account. Sign-in credentials are used to access the Amazon Web Services Web-based console, key pairs are used to access EC2 instances, and access keys are used in the REST API that Amazon Web Services exposes.

Because the AWS adapter is based on the REST API, you must use access keys when you set up the adapter. You generate access keys from the Amazon Web Services console. You can create credentials on a per user basis. Access keys are not a username-password pair, but a generated sequence of characters.

Note While it is not required, VMware recommends that you create a guest type account, which has read-only access to Amazon Web Services, and use the access keys associated with this account. When you create a guest group with default permissions, they do not include read access to the Elastic Map Reduce (EMR) service. You must use the IAM console to add the following permission:

```
elasticmapreduce:DescribeJobFlows
```

This chapter includes the following topics:

- [Generate Required Access Keys](#)
- [Configuring IAM Permissions](#)
- [Update Configuration Settings in the Properties File](#)
- [Tagging Groups](#)
- [Amazon Web Services Metrics](#)
- [Security Considerations](#)

Generate Required Access Keys

To configure Management Pack for AWS, you must acquire an access key and secret key from the Amazon server. You can acquire these keys as an Amazon Web Services Admin user or as an Amazon Identity and Access Management (IAM) user. These instructions are provided for your convenience. For the latest instructions, see the online documentation on the AWS site.

Generate Access Keys as Amazon Web Services Admin User

If you are logged in as the Amazon Web Services Admin user, you can generate the security credentials.

Procedure

- 1 Log in as the admin user.
- 2 Select **Security Credentials** from the **My Account** pop-up menu.
- 3 Click **Access Keys**.
- 4 Create and record the Access Key and Secret Key.

The Secret Key is not stored after creation. Guard these values carefully, because these keys allow complete access to your Amazon Web Services instance.

What to do next

If you create a default guest group with the default permissions, the default permissions do not include read access to the Elastic Map Reduce (EMR) service. You must use the IAM console to add the `elasticmapreduce:DescribeJobFlows` permission.

Generate Access Keys as Amazon Web Services Identity and Access Management User

You can generate required access keys as an Amazon Identity and Access Management (IAM) user.

You can always generate access keys for your own account. If you have administrative privileges, you can also generate keys for other users.

Procedure

- 1 Log in as an IAM user.
- 2 Go to the IAM service, and click the IAM user record for which to create access keys.
- 3 Click the **Security Credentials** tab for that user.

You must either be that user or have administrative privileges to create keys for other users.

- 4 In the Access Keys section, click **Manage Keys**.
- 5 Create and record the access keys.

The secret key is not stored online after it is created.

What to do next

If you create a default guest group with the default permissions, the permissions do not include read access to the Elastic Map Reduce (EMR) service. You must use the IAM console to add the `elasticmapreduce:DescribeJobFlows` permission.

Configuring IAM Permissions

When you set up IAM users and groups, you can stipulate which permissions the account has for API calls. The keys you use when you set up the adapter instance must have certain permissions enabled.

Table 3-1. IAM Permissions

Service	Required	Permissions
Cloudwatch	Yes.	listMetrics describeAlarms getMetricStatistics
EC2	describeRegions is required. describeInstances and describeVolumes are only required if you subscribe to the EC2 service.	describeInstances describeVolumes describeRegions
ASG	Required if subscribing to the ASG service.	describeAutoScalingGroups
ELB	Required if subscribing to the ELB service.	describeLoadBalancers
EMR	Required if subscribing to the EMR service.	describeJobFlows
RDS	Required if subscribing to RDS service.	DescribeDBInstances
ElasticCache	Required if subscribing to ElasticCache service.	DescribeCacheClusters
SQS	Required if subscribing to SQS service.	ListQueues
Elastic MapReduce		listClusters
Classic Load Balancer		describeLoadBalancers describeTags
Application Load Balancer		describeLoadBalancers describeTags
Network Load Balancer		describeLoadBalancers describeTags
Auto Scaling Group		describeAutoScalingGroups
Elastic Compute Cloud		describeInstances describeVolumes describeVpcs describeAddresses describeRegions
Elastic Block Store		describeVolumes
Amazon Relational Database RDS Service		describeDBInstances listTagsForResource
ElastiCache		describeCacheClusters listTagsForResource

Table 3-1. IAM Permissions (Continued)

Service	Required	Permissions
Simple Queue Service		listQueues listQueueTags
Elastic Container Registry		describeRepositories describeImages
Elastic Container Service		listClusters listServices
Lambda		listFunctions listTags
DynamoDB		listTables describeTable listTagsOfResource
DAX		describeClusters listTags
Redshift		describeClusters
Virtual Private Cloud		describeVpcs
Cloud Front Distribution		listDistributions listStreamingDistributions listTagsForResource
Direct Connect		describeConnections
VPN Connection		describeVpnConnections
VPC NAT Gateway		describeNatGateways
Elastic IP		describeAddresses
CloudformationStack		describeStacks describeStackResources
S3		listBuckets getBucketTaggingConfiguration
Workspaces		describeWorkspaces describeTags
Hosted Zone		listHostedZones listTagsForResource
Health Checks		listHealthChecks listTagsForResource

Update Configuration Settings in the Properties File

The `amazonaws.properties` file provides configuration options.

Table 3-2. Amazon Web Services Property Settings

Property	Description
firstcollecthistoryhours	Determines how far in the past to collect data when the adapter starts. The default is 0, meaning no historical collection.
maxquerywindowminutes	The maximum query window for collections, in minutes. The default is 60. The adapter asks AWS for metrics for a maximum of this many minutes.
maxhoursback	The maximum number of hours back from the current time that the adapter attempts to collect. The default value is 336, or two weeks, because Cloudwatch keeps only two weeks worth of metrics.
includetransient	False by default. Set to true to allow the adapter to import known transient objects. Transient objects currently include any EMR job that is set to terminate on completion and all of the supporting cluster EC2 instances that belong to that job.
threadcount	Default is 4. Controls how many threads are active while making calls to cloudwatch to get metrics. This threadcount is per region. The total number of threads is this value times the number of regions.
collecttimeout	Controls how long the adapter waits for all metric collection calls to return from AWS during a collection cycle. The value is measured in seconds. The default value is 240 seconds, which is in line with the default 5 minute collection cycle.

Tagging Groups

The Management Pack for AWS uses tagging groups. The tagging groups appear under the AWS Entity Status in the Environment Overview pane.

Table 3-3. Tagging Groups

Group Name	Description
PoweredOn	Objects with this tag are in the running state.
PoweredOff	Objects with this tag are in the stopped state.
Transient	Objects with this tag are not expected to persist for long periods of time.
NotExisting	Objects with this tag do not exist in the Amazon Web Services system. You can use this tag to take advantage of the periodic purge feature of vRealize Operations Manager, that the <code>controller.properties</code> file on the Analytics server controls.

Amazon Web Services Metrics

Each of the Amazon Web Services collects defined metrics that you can use for monitoring and troubleshooting performance in your Amazon Web Services implementation.

Available Metrics

For a complete, up-to-date listing of available metrics, go to the Amazon Web Services documentation page at

http://docs.aws.amazon.com/AmazonCloudWatch/latest/DeveloperGuide/supported_services.html.

More metrics are available, for an extra fee, beyond the default metrics. See the Amazon Web Services documentation page at

<http://docs.aws.amazon.com/AmazonCloudWatch/latest/DeveloperGuide/mon-scripts.html>.

Security Considerations

There are security issues that must be considered when installing the Management Pack for AWS.

vRealize Operations Manager administrators can install a variety of management packs. VMware creates some management packs, while others are written by third party developers. Although adapters execute independently, they execute within a common runtime environment in the vRealize Operations Manager collector host. Java language security protects adapters from interference with other adapters, but all execute within the common JRE process trust zone. You should only load and use management packs that you have obtained from a publisher you trust. You should verify the management pack's code integrity before loading into vRealize Operations Manager.

You can verify the integrity of a management pack by generating an md5 or sha1 hash for the management pack's binary, and comparing it to the sha1 or md5 hash file accompanying the management pack binary.

Although adapters execute independently, they can make configuration changes to the collector host or Java runtime environment that can affect the security of other adapters. For example, at installation time an adapter can modify the list of trusted certificates. During execution, an adapter can change the TLS/SSL certificate validation scheme, and thereby change how other adapters validate certificates. The vRealize Operations Manager system and collector hosts do not isolate adapters beyond the natural isolation provided by Java execution. The system trusts all adapters equally.

Adapters are responsible for their own data security. When collecting data or making configuration changes to data sources, each adapter provides its own mechanisms and guarantees regarding the confidentiality, integrity, and authenticity of collected data.

The Management Pack for AWS relies on the AWS SDK for Java. The protocol used is https. There is currently no way to disable this and use http. The latest Javadoc for the AWS SDK can be found here:

<http://docs.aws.amazon.com/AWSJavaSDK/latest/javadoc/>

Management Pack for Amazon Web Services Object Model

4

The Management Pack for AWS imports Amazon ElastiCache metrics which collect data for vRealize Operations Manager components.

This chapter includes the following topics:

- [EC2](#)
- [EC2 Volume](#)
- [EC2 Load Balancer](#)
- [Network Load Balancer](#)
- [Application Load Balancer](#)
- [EC2 Auto Scale Group](#)
- [EMR Job Flow](#)
- [Entity Status](#)
- [ElastiCache Cache Node](#)
- [Rds_dbinstance](#)
- [Lambda](#)
- [Redshift Cluster](#)
- [Redshift Node](#)
- [Workspace](#)
- [ECS Cluster](#)
- [ECS Service](#)
- [DynamoDB](#)
- [S3 Bucket](#)
- [VPC Nat Gateway](#)
- [Dax Cluster](#)
- [DAX Node](#)

- [Direct Connect](#)
- [Health Check](#)
- [ElastiCache Cache Cluster](#)

EC2

The following metrics are available for each EC2 instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AmazonCloudWatch/latest/DeveloperGuide/ec2-metricscollected.html>.

Table 4-1. EC2 Metrics

Name	Category	Type	Unit	Instanced
DiskReadOps	Disk Space	Metric	Count	No
DiskWriteOps	Disk Space	Metric	Count	No
DiskReadBytes	Disk Space	Metric	Bytes	No
DiskWriteBytes	Disk Space	Metric	Bytes	No
Disk I/O	Disk Space	Metric	Count	No
CPUUtilization	CPU	Metric	Percent	No
CPUCreditUsage	CPU	Metric	Count	No
CPUCreditBalance	CPU	Metric	Count	No
NetworkIn	Network	Metric	Bytes	No
NetworkOut	Network	Metric	Bytes	No
NetworkPacketsIn	Network	Metric	Count	No
NetworkPacketsOut	Network	Metric	Count	No
Network I/O	Network	Metric	Count	No
StatusCheckFailed	Status	Metric	Count	No
StatusCheckFailed_Instance	Status	Metric	Count	No
StatusCheckFailed_System	Status	Metric	Count	No
Runtime	Status	Metric	Hours	No
Memory Available	Memory	Metric	Megabytes	No
MemoryUsed	Memory	Metric	Megabytes	No
MemoryUtilization	Memory	Metric	Percent	No
SwapUsed	Memory	Metric	Megabytes	No
SwapUtilization	Memory	Metric	Percent	No
pagefileAvailable	Memory	Metric	Megabytes	No

Table 4-1. EC2 Metrics (Continued)

Name	Category	Type	Unit	Instanced
pagefileUsed	Memory	Metric	Megabytes	No
pagefileUtilization	Memory	Metric	Percent	No
DiskSpaceAvailable	Filesystem	Metric	Gigabytes	No
DiskSpaceUsed	Filesystem	Metric	Gigabytes	No
DiskSpaceUtilization	Filesystem	Metric	Percent	No
VolumAvailable	Filesystem	Metric	Gigabytes	No
VolumeUsed	Filesystem	Metric	Gigabytes	No
VolumeUtilization	Filesystem	Metric	Percent	No
sec	Perfmon	Metric	Count	No
Processor Queue Length	Perfmon	Metric	Count	No

EC2 Volume

The following metrics are available for each EC2 Volume instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/monitoring-volume-status.html>

Table 4-2. EC2 Volume Metrics

Name	Category	Type	Unit	Instanced
VolumeReadBytes	Disk Space	Metric	Bytes	No
VolumeWriteBytes	Disk Space	Metric	Bytes	No
VolumeReadOps	Disk Space	Metric	Count	No
VolumeWriteOps	Disk Space	Metric	Count	No
VolumeTotalReadTime	Disk Space	Metric	Seconds	No
VolumeTotalWriteTime	Disk Space	Metric	Seconds	No
VolumeIdleTime	Disk Space	Metric	Seconds	No
VolumeQueueLength	Disk Space	Metric	Count	No
VolumeThroughputPercentage	Disk Space	Metric	Percent	No
VolumeConsumedReadWriteOps	Disk Space	Metric	Count	No
VolumeCapacity	Disk Space	Metric	Count	No

EC2 Load Balancer

The following metrics are available for each EC2 Load Balancer instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at http://docs.aws.amazon.com/ElasticLoadBalancing/latest/DeveloperGuide/US_MonitoringLoadBalancerWithCW.html

Table 4-3. EC2 Load Balancer Metrics

Name	Category	Type	Unit	Instanced
Latency	General	Metric	Seconds	No
RequestCount	General	Metric	Count	No
HealthyHostCount	General	Metric	Count	No
UnHealthyHostCount	General	Metric	Count	No
HTTPCode_ELB_4XX	General	Metric	Count	No
HTTPCode_ELB_5XX	General	Metric	Count	No
HTTPCode_Backend_2XX	General	Metric	Count	No
HTTPCode_Backend_3XX	General	Metric	Count	No
HTTPCode_Backend_4XX	General	Metric	Count	No
HTTPCode_Backend_5XX	General	Metric	Count	No
BackendConnectionErrors	General	Metric	Count	No
SurgeQueueLength	General	Metric	Count	No
SpilloverCount	General	Metric	Count	No

Network Load Balancer

The following metrics are available for each Network Load Balancer instance in your vRealize Operations Manager environment.

Table 4-4. Network Load Balancer Metrics

Name	Category	Type	Unit	Instanced
HealthyHostCount	General	Metric	Count	No
UnHealthyHostCount	General	Metric	Count	No
ActiveFlowCount	General	Metric	Count	No

Table 4-4. Network Load Balancer Metrics (Continued)

Name	Category	Type	Unit	Instanced
ConsumedLCUs	General	Metric	Count	No
NewFlowCount	General	Metric	Count	No
ProcessedBytes	General	Metric	Bytes	No
TCP_Client_Reset_Count	General	Metric	Count	No
TCP_ELB_Reset_Count	General	Metric	Count	No
TCP_Target_Reset_Count	General	Metric	Count	No

Application Load Balancer

The following metrics are available for each Application Load Balancer instance in your vRealize Operations Manager environment.

Table 4-5. Application Load Balancer Metrics

Name	Category	Type	Unit	Instanced
ActiveConnectionCount	General	Metric	Count	No
ConsumedLCUs	General	Metric	Count	No
ClientTLSNegotiationErrorCount	General	Metric	Count	No
Latency	General	Metric	Seconds	No
RequestCount	General	Metric	Count	No
HealthyHostCount	General	Metric	Count	No
UnHealthyHostCount	General	Metric	Count	No
HTTPCode_ELB_4XX_Count	General	Metric	Count	No
HTTPCode_ELB_5XX_Count	General	Metric	Count	No
HTTPCode_Target_2XX_Count	General	Metric	Count	No
HTTPCode_Target_3XX_Count	General	Metric	Count	No
HTTPCode_Target_4XX_Count	General	Metric	Count	No
HTTPCode_Target_5XX_Count	General	Metric	Count	No
IPv6ProcessedBytes	General	Metric	Bytes	No

Table 4-5. Application Load Balancer Metrics (Continued)

Name	Category	Type	Unit	Instanced
IPv6RequestCount	General	Metric	Count	No
NewConnectionCount	General	Metric	Count	No
RejectedConnectionCount	General	Metric	Count	No
ProcessedBytes	General	Metric	Bytes	No
RuleEvaluations	General	Metric	Count	No
TargetResponseTime	General	Metric	Seconds	No
TargetTLSNegotiationErrorCount	General	Metric	Count	No

EC2 Auto Scale Group

The following metrics are available for each EC2 Auto Scale Group instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AutoScaling/latest/DeveloperGuide/as-instance-monitoring.html>

Table 4-6. EC2 Auto Scale Group Metrics

Name	Category	Type	Unit	Instanced
GroupMinSize	General	Metric	Count	No
GroupMaxSize	General	Metric	Count	No
GroupDesiredCapacity	General	Metric	Count	No
GroupInServiceInstances	General	Metric	Count	No
GroupPendingInstances	General	Metric	Count	No
GroupTerminatingInstances	General	Metric	Count	No
GroupTotalInstances	General	Metric	Count	No
DiskReadOps	Disk	Metric	Count	No
DiskWriteOps	Disk	Metric	Count	No
DiskReadBytes	Disk	Metric	Bytes	No
DiskWriteBytes	Disk	Metric	Bytes	No
Aggregate Disk I/O	Disk	Metric	Bytes	No
Aggregate Disk I/O	Disk	Metric	Count	No
CPUUtilization	CPU	Metric	Percent	No
NetworkIn	Network	Metric	Bytes	No

Table 4-6. EC2 Auto Scale Group Metrics (Continued)

Name	Category	Type	Unit	Instanced
NetworkOut	Network	Metric	Bytes	No
StatusCheckFailed	Status	Metric	Count	No
StatusCheckFailed_Instance	Status	Metric	Count	No
StatusCheckFailed_System	Status	Metric	Count	No

EMR Job Flow

The following metrics are available for each EMR Job Flow instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AmazonCloudWatch/latest/DeveloperGuide/emr-metricscollected.html>

Table 4-7. EMR Job Flow Metrics

Name	Category	Type	Unit	Instanced
CoreNodesPending	Health	Metric	Count	No
CoreNodesRunning	Health	Metric	Count	No
JobsFailed	Health	Metric	Count	No
JobsRunning	Health	Metric	Count	No
LiveDataNodes	Health	Metric	Percent	No
LiveTaskTrackers	Health	Metric	Percent	No
MissingBlocks	Health	Metric	Count	No
TaskNodesPending	Health	Metric	Count	No
TaskNodesRunning	Health	Metric	Count	No
TotalLoad	Health	Metric	Count	No
CapacityRemainingGB	Health	Metric	Count	No
CorruptBlocks	Health	Metric	Count	No
PendingDeletionBlocks	Health	Metric	Count	No
UnderReplicatedBlocks	Health	Metric	Count	No
dfs.FSNamesystem.PendingReplicationBlocks	Health	Metric	Count	No
HDFSBytesRead	Performance and Progress	Metric	Count	No

Table 4-7. EMR Job Flow Metrics (Continued)

Name	Category	Type	Unit	Instanced
HDFSBytesWritten	Performance and Progress	Metric	Count	No
HDFSUtilization	Performance and Progress	Metric	Percent	No
ISIdle	Performance and Progress	Metric	Count	No
MapSlotsOpen	Performance and Progress	Metric	Percent	No
ReduceSlotsOpen	Performance and Progress	Metric	Percent	No
RemainingMapTasks	Performance and Progress	Metric	Count	No
RemainingMapTasks PerSlot	Performance and Progress	Metric	Ratio	No
RemainingReduceTasks	Performance and Progress	Metric	Count	No
RunningMapTasks	Performance and Progress	Metric	Count	No
RunningReduceTasks	Performance and Progress	Metric	Count	No
S3BytesRead	Performance and Progress	Metric	Count	No
S3BytesWritten	Performance and Progress	Metric	Count	No
HBaseMostRecentBackupDuration	HBase Backups	Metric	Minutes	No
HBaseTimeSinceLastSuccessfulBackup	HBase Backups	Metric	Minutes	No

Entity Status

The following metrics are available for each Entity Status instance in your vRealize Operations Manager environment.

Table 4-8. Entity Status Metrics

Name	Category	Type	Unit	Instanced
Total EC2 Instances	General	Metric		No
Active EC2 Instances	General	Metric		No
Number of S3 Buckets	General	Metric		No

Table 4-8. Entity Status Metrics (Continued)

Name	Category	Type	Unit	Instanced
Number of EC2 Volumes	General	Metric		No
Number of Load Balancers	General	Metric		No
Number of Auto Scaling Groups	General	Metric		No
Number of EMR Job Flows	General	Metric		No
Number of ElastiCache Clusters	General	Metric		No
Number of ElastiCache Nodes	General	Metric		No
Number of RDS DB Instances	General	Metric		No
Number of Lambda Functions	General	Metric		No
Number of Redshift Clusters	General	Metric		No
Number of Redshift Nodes	General	Metric		No
Number of ECR Repositories	General	Metric		No
Number of ECR Images	General	Metric		No
Number of SQS Queues	General	Metric		No
Number of WorkSpaces	General	Metric		No
Number of ECS Clusters	General	Metric		No
Number of ECS Services	General	Metric		No
Number of DynamoDB Tables	General	Metric		No
Number of DynamoDB Accelerator Clusters	General	Metric		No
Number of DynamoDB Accelerator Nodes	General	Metric		No
Number of VPC NAT Gateways	General	Metric		No

Table 4-8. Entity Status Metrics (Continued)

Name	Category	Type	Unit	Instanced
Number of Application Load Balancers	General	Metric		No
Number of CloudFormation Stacks	General	Metric		No
Number of Network Load Balancers	General	Metric		No
Number of Classic Load Balancers	General	Metric		No
Number of Security Groups	General	Metric		No
Number of Elastic IPs	General	Metric		No
Number of CloudFront Distribution	General	Metric		No

ElastiCache Cache Node

The following metrics are available for each ElastiCache Cache Node instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AmazonElastiCache/latest/UserGuide/CacheMetrics.Redis.html>, <http://docs.aws.amazon.com/AmazonElastiCache/latest/UserGuide/CacheMetrics.HostLevel.html>, and <http://docs.aws.amazon.com/AmazonElastiCache/latest/UserGuide/CacheMetrics.Memcached.html>.

Table 4-9. ElastiCache Cache Node Metrics

Name	Category	Type	Unit	Instanced
CPUUtilization	CPU	Metric	Percent	No
SwapUsage	Memory	Metric	Bytes	No
FreeableMemory	Memory	Metric	Bytes	No
NetworkBytesIn	Network	Metric	Bytes	No
NetworkBytesOut	Network	Metric	Bytes	No
BytesUsedForCacheItems	Memory	Metric	Bytes	No
BytesReadIntoMemcached	Memory	Metric	Bytes	No
BytesWrittenOutFromMemM	Memory	Metric	Bytes	No
BytesUsedForHash	Memory	Metric	Bytes	No
BytesUsedForCache	Memory	Metric	Bytes	No
CasBadval	Memory	Metric	Count	No

Table 4-9. ElastiCache Cache Node Metrics (Continued)

Name	Category	Type	Unit	Instanced
CasHits	Memory	Metric	Count	No
CasMisses	Memory	Metric	Count	No
UnusedMemory	Memory	Metric	Count	No
CmdFlush	Commands	Metric	Count	No
CmdGet	Commands	Metric	Count	No
CmdSet	Commands	Metric	Count	No
CmdConfigGet	Commands	Metric	Count	No
CmdConfigSet	Commands	Metric	Count	No
CmdTouch	Commands	Metric	Count	No
GetTypeCmds	Commands	Metric	Count	No
SetTypeCmds	Commands	Metric	Count	No
KeyBasedCmds	Commands	Metric	Count	No
StringBasedCmds	Commands	Metric	Count	No
HashBasedCmds	Commands	Metric	Count	No
ListBasedCmds	Commands	Metric	Count	No
SetBasedCmds	Commands	Metric	Count	No
SortedSetBasedCmds	Commands	Metric	Count	No
CurrConnections	Performance	Metric	Count	No
CurrItems	Performance	Metric	Count	No
DecrHits	Performance	Metric	Count	No
DecrMisses	Performance	Metric	Count	No
DeleteHits	Performance	Metric	Count	No
DeleteMisses	Performance	Metric	Count	No
Evictions	Performance	Metric	Count	No
GetHits	Performance	Metric	Count	No
GetMisses	Performance	Metric	Count	No
IncrHits	Performance	Metric	Count	No
IncrMisses	Performance	Metric	Count	No
Reclaimed	Performance	Metric	Count	No
CurrConfig	Performance	Metric	Count	No
EvictedUnfetched	Performance	Metric	Count	No
ExpiredUnfetched	Performance	Metric	Count	No
SlabsMoved	Performance	Metric	Count	No

Table 4-9. ElastiCache Cache Node Metrics (Continued)

Name	Category	Type	Unit	Instanced
TouchHits	Performance	Metric	Count	No
TouchMisses	Performance	Metric	Count	No
NewConnections	Performance	Metric	Count	No
NewItems	Performance	Metric	Count	No
CacheHits	Performance	Metric	Count	No
CacheMisses	Performance	Metric	Count	No
ReplicationLag	Performance	Metric	Count	No

Rds_dbinstance

The following metrics are available for each Rds_dbinstance in your vRealize Operations Manager environment.

Table 4-10. Rds_dbinstance Metrics

Name	Category	Type	Unit	Instanced
CPUUtilization	CPU	Metric	Percent	No
CPUCreditUsage	CPU	Metric	Count	No
CPUCreditBalance	CPU	Metric	Count	No
FreeableMemory	Memory	Metric	Bytes	No
BinLogDiskUsage	Disk	Metric	Bytes	No
DiskQueueDepth	Disk	Metric	Count	No
FreeStorageSpace	Disk	Metric	Bytes	No
SwapUsage	Disk	Metric	Bytes	No
ReadIOPS	Disk	Metric	Count/second	No
WriteIOPS	Disk	Metric	Count/second	No
ReadLatency	Disk	Metric	Seconds	No
WriteLatency	Disk	Metric	Seconds	No
ReadThroughput	Disk	Metric	Bytes/seconds	No
WriteThroughput	Disk	Metric	Bytes/seconds	No
DatabaseConnections	Performance	Metric	Count	No

Lambda

The following metrics are available for each Lambda instance in your vRealize Operations Manager environment.

Table 4-11. Lamda Metrics

Name	Category	Type	Unit	Instanced
Invocations	General	Metric	Count	No
Errors	General	Metric	Count	No
Duration	General	Metric	Milliseconds	No
Throttles	General	Metric	Count	No
IteratorAge	General	Metric	Milliseconds	No

Redshift Cluster

The following metrics are available for each Redshift Cluster instance in your vRealize Operations Manager environment.

Table 4-12. Redshift Cluster Metrics

Name	Category	Type	Unit	Instanced
CPUUtilization Average	CPU	Metric	Percent	No
DatabaseConnections	General	Metric	Count	No
HealthStatus	General	Metric	Count	No
MaintenanceMode	General	Metric	Count	No
PercentageDiskSpaceUsed	Disk	Metric	Percent	No
ReadIOPS	Disk	Metric	Count/second	No
ReadLatency	Disk	Metric	Count/second	No
ReadThroughput	Disk	Metric	Bytes/second	No
WriteIOPS	Disk	Metric	Count/second	No
WriteLatency	Disk	Metric	Seconds	No
WriteThroughput	Disk	Metric	Bytes/second	No
NetworkReceiveThroughput	Network	Metric	Bytes/second	No
NetworkTransmitThroughput	Network	Metric	Bytes/second	No

Redshift Node

The following metrics are available for each Redshift Node instance in your vRealize Operations Manager environment.

Table 4-13. Redshift Node Metrics

Name	Category	Type	Unit	Instanced
CPUUtilization Average	CPU	Metric	Percent	No
DatabaseConnections	General	Metric	Count	No
HealthStatus	General	Metric	Count	No
MaintenanceMode	General	Metric	Count	No
PercentageDiskSpaceUsed	Disk	Metric	Percent	No
ReadIOPS	Disk	Metric	Count/second	No
ReadLatency	Disk	Metric	Count/second	No
ReadThroughput	Disk	Metric	Bytes/second	No
WriteIOPS	Disk	Metric	Count/second	No
WriteLatency	Disk	Metric	Seconds	No
WriteThroughput	Disk	Metric	Bytes/second	No
NetworkReceiveThroughput	Network	Metric	Bytes/second	No
NetworkTransmitThroughput	Network	Metric	Bytes/second	No

Workspace

The following metrics are available for each Workspace instance in your vRealize Operations Manager environment.

Table 4-14. Workspace Metrics

Name	Category	Type	Unit	Instanced
Available	General	Metric	Count	No
Unhealthy	General	Metric	Count	No
ConnectionAttempt	General	Metric	Count	No
ConnectionSuccess	General	Metric	Count	No
ConnectionFailure	General	Metric	Count	No
SessionDisconnect	General	Metric	Count	No
UserConnected	General	Metric	Count	No
Stopped	General	Metric	Count	No
Maintenance	General	Metric	Count	No
SessionLaunchTime	General	Metric	Seconds	No
InSessionLatency	General	Metric	Milliseconds	No

ECS Cluster

The following metrics are available for each ECS Cluster instance in your vRealize Operations Manager environment.

Table 4-15. ECS Cluster Metrics

Name	Category	Type	Unit	Instanced
CPUReservation Average	CPU	Metric	Percent	No
CPUUtilization	CPU	Metric	Percent	No
MemoryReservation	Memory	Metric	Percent	No
MemoryUtilization	Memory	Metric	Percent	No

ECS Service

The following metrics are available for each ECS Service instance in your vRealize Operations Manager environment.

Table 4-16. ECS Service Metrics

Name	Category	Type	Unit	Instanced
CPUReservation Average	CPU	Metric	Percent	No
CPUUtilization	CPU	Metric	Percent	No
MemoryReservation	Memory	Metric	Percent	No
MemoryUtilization	Memory	Metric	Percent	No

DynamoDB

The following metrics are available for each DynamoDB instance in your vRealize Operations Manager environment.

Table 4-17. DynamoDB Metrics

Name	Category	Type	Unit	Instanced
ConditionalCheckFailedRequests	General	Metric	Count	No
ConsumedReadCapacityUnits	General	Metric	Count	No
ConsumedWriteCapacityUnits	General	Metric	Count	No
OnlineIndexConsumedWriteCapacity	General	Metric	Count	No

Table 4-17. DynamoDB Metrics (Continued)

Name	Category	Type	Unit	Instanced
OnlineIndexPercentageProgress	General	Metric	Count	No
OnlineIndexThrottleEvents Average	General	Metric	Count	No
ReadThrottleEvents	General	Metric	Count	No
ReturnedBytes Average	General	Metric	Count	No
ReturnedItemCount	General	Metric	Count	No
ReturnedRecordsCount	General	Metric	Count	No
SuccessfulRequestLatency	General	Metric	Count	No
SystemErrors	General	Metric	Count	No
TimeToLiveDeletedItemCount	General	Metric	Count	No
ThrottledRequests	General	Metric	Count	No
UserErrors	General	Metric	Count	No
WriteThrottleEvents Average	General	Metric	Count	No
ProvisionedReadCapacityUnits	General	Metric	Count	No
ProvisionedWriteCapacityUnit	General	Metric	Count	No

S3 Bucket

The following metrics are available for each S3 Bucket instance in your vRealize Operations Manager environment.

Table 4-18. S3 Bucket Metrics

Name	Category	Type	Unit	Instanced
BucketSizeBytes Average	General	Metric	Bytes	No
BucketSizeBytes Average	General	Metric	Count	No
AllRequests Average	General	Metric	Count	No
GetRequests Average	General	Metric	Count	No
PutRequests Average	General	Metric	Count	No
DeleteRequests Average	General	Metric	Count	No

Table 4-18. S3 Bucket Metrics (Continued)

Name	Category	Type	Unit	Instanced
HeadRequests Average	General	Metric	Count	No
PostRequests Average	General	Metric	Count	No
ListRequests Average	General	Metric	Count	No
BytesDownloaded Average	General	Metric	Bytes	No
BytesUploaded Average	General	Metric	Bytes	No
4xxErrors	General	Metric	Count	No
5xxErrors	General	Metric	Count	No
FirstByteLatency	General	Metric	Milliseconds	No
TotalRequestLatency	General	Metric	Milliseconds	No

VPC Nat Gateway

The following metrics are available for each VPC Nat Gateway instance in your vRealize Operations Manager environment.

Table 4-19. VPC Nat Gateway Metrics

Name	Category	Type	Unit	Instanced
ErrorPortAllocation	General	Metric	Count	No
ActiveConnectionCount	General	Metric	Count	No
ConnectionAttemptCount	General	Metric	Count	No
ConnectionEstablishedCount	General	Metric	Count	No
IdleTimeoutCount	General	Metric	Count	No
PacketsOutToDestination	Network	Metric	Count	No
PacketsOutToSource	Network	Metric	Count	No
PacketsInFromSource	Network	Metric	Count	No
PacketsInFromDestination	Network	Metric	Count	No
BytesOutToDestination	Network	Metric	Bytes	No
BytesOutToSource	Network	Metric	Bytes	No
BytesInFromSource	Network	Metric	Bytes	No

Table 4-19. VPC Nat Gateway Metrics (Continued)

Name	Category	Type	Unit	Instanced
BytesInFromDestination	Network	Metric	Bytes	No
PacketsDropCount	Network	Metric	Count	No

Dax Cluster

The following metrics are available for each Dax Cluster instance in your vRealize Operations Manager environment.

Table 4-20. DAX Cluster Metrics

Name	Category	Type	Unit	Instanced
ItemCacheMisses	General	Metric	Count	No
QueryCacheHits	General	Metric	Count	No
ScanCacheHits	General	Metric	Count	No
FailedRequestCount	General	Metric	Count	No
ScanCacheMisses	General	Metric	Count	No
ErrorRequestCount	General	Metric	Count	No
QueryCacheMisses	General	Metric	Count	No
TotalRequestCount	General	Metric	Count	No
EstimatedDbSize	General	Metric	Bytes	No
EvictedSize	General	Metric	Bytes	No
FaultRequestCount	General	Metric	Count	No
ScanRequestCount	General	Metric	Count	No
ItemCacheHits	General	Metric	Count	No
QueryRequestCount	General	Metric	Count	No
DeleteItemRequestCount	General	Metric	Count	No
GetItemRequestCount	General	Metric	Count	No
UpdateItemRequestCount	General	Metric	Count	No
BatchWriteItemRequestCount	General	Metric	Count	No
PutItemRequestCount	General	Metric	Count	No
BatchGetItemRequestCount	General	Metric	Count	No
PutItemRequestCount	General	Metric	Count	No

DAX Node

The following metrics are available for each DAX node instance in your vRealize Operations Manager environment.

Table 4-21. DAX Node Metrics

Name	Category	Type	Unit	Instanced
ItemCacheMisses	General	Metric	Count	No
QueryCacheHits	General	Metric	Count	No
ScanCacheHits	General	Metric	Count	No
FailedRequestCount	General	Metric	Count	No
ScanCacheMisses	General	Metric	Count	No
ErrorRequestCount	General	Metric	Count	No
QueryCacheMisses	General	Metric	Count	No
TotalRequestCount	General	Metric	Count	No
EstimatedDbSize	General	Metric	Bytes	No
EvictedSize	General	Metric	Bytes	No
FaultRequestCount	General	Metric	Count	No
ScanRequestCount	General	Metric	Count	No
ItemCacheHits	General	Metric	Count	No
QueryRequestCount	General	Metric	Count	No
DeleteItemRequestCount	General	Metric	Count	No
GetItemRequestCount	General	Metric	Count	No
UpdateItemRequestCount	General	Metric	Count	No
BatchWriteItemRequestCount	General	Metric	Count	No
PutItemRequestCount	General	Metric	Count	No
BatchGetItemRequestCount	General	Metric	Count	No
PutItemRequestCount	General	Metric	Count	No

Direct Connect

The following metrics are available for each Direct Connect instance in your vRealize Operations Manager environment.

Table 4-22. Direct Connect Metrics

Name	Category	Type	Unit	Instanced
ConnectionState	General	Metric	Count	No
ConnectionBpsEgress	General	Metric	Bits/Second	No
ConnectionBpsIngress	General	Metric	Bits/Second	No
ConnectionPpsEgress	General	Metric	Count/Second	No
ConnectionPpsIngress	General	Metric	Count/Second	No
ConnectionCRCErrorsCount	General	Metric	Count	No
ConnectionLightLevelTx	General	Metric	dBm	No
ConnectionLightLevelRx	General	Metric	dBm	No

Health Check

The following metrics are available for each Health Check instance in your vRealize Operations Manager environment.

Table 4-23. Health Check Metrics

Name	Category	Type	Unit	Instanced
ChildHealthCheckHealthyCount		Metric	Count	No
ConnectionTime		Metric	Milliseconds	No
HealthCheckPercentageHealthy		Metric	Percent	No
SSLHandshakeTime		Metric	Milliseconds	No
TimeToFirstByte		Metric	Milliseconds	No

ElastiCache Cache Cluster

The following metrics are available for each ElastiCache Cache Cluster instance in your vRealize Operations Manager environment.

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AmazonElastiCache/latest/UserGuide/CacheMetrics.Redis.html> and <http://docs.aws.amazon.com/AmazonElastiCache/latest/UserGuide/CacheMetrics.HostLevel.html>.

Table 4-24. ElasticCache Cache Cluster Metrics

Name	Category	Type	Unit	Instanced
CPUUtilization	CPU	Metric	Percent	No
NetworkBytesIn	Network	Metric	Bytes	No
NetworkBytesOut	Network	Metric	Bytes	No
SwapUsage	Memory	Metric	Bytes	No
FreeableMemory	Memory	Metric	Bytes	No
BytesUsedForCache	Memory	Metric	Bytes	No
GetTypeCmds	Commands	Metric	Count	No
SetTypeCmds	Commands	Metric	Count	No
KeyBasedCmds	Commands	Metric	Count	No
StringBasedCmds	Commands	Metric	Count	No
HashBasedCmds	Commands	Metric	Count	No
ListBasedCmds	Commands	Metric	Count	No
SetBasedCmds	Commands	Metric	Count	No
SortedSetBasedCmds	Commands	Metric	Count	No
CurrConnections	Performance	Metric	Count	No
CurrItems	Performance	Metric	Count	No
Evictions	Performance	Metric	Count	No
Reclaimed	Performance	Metric	Count	No
NewConnections	Performance	Metric	Count	No
NewItems	Performance	Metric	Count	No
CacheHits	Performance	Metric	Count	No
CacheMisses	Performance	Metric	Count	No
ReplicationLag	Performance	Metric	Count	No

Troubleshooting the Management Pack for AWS

5

Known troubleshooting information can help you to diagnose and correct problems with the Management Pack for AWS.

Review the log files for your Amazon Web Services instance for error messages as a starting point for troubleshooting issues. Review the `collector.log` file at `%ALIVE_BASE%/user/log/` for information about Management Pack for AWS test, describe, and discover operations. Review the `AmazonAWSAdapter_[adapter_instance_id].log` file at `%ALIVE_BASE%/user/log/adapters/AmazonAWSAdapter/` on the analytics virtual machine for information about collect and configure operations.

Adapter Fails to Collect Metrics Because of Timestamp Error

An Amazon Web Services adapter fails to collect and display metrics.

Problem

The Amazon Web Services instance log contains this message.

```
AWS Error Message: Request timestamp is too skewed. Timestamps must be
within 900 seconds of server time.
```

Cause

The time on the vRealize Operations Manager system is set to the wrong time and out of synchronization with the Amazon server. On the Amazon side, the time the request comes in is compared to the time the request was made. The time the request was made is based on the local client system time. If the times are too far apart, the Amazon server rejects the request.

Solution

Update the time on the vRealize Operations Manager system to the correct, current time.