

vRealize Operations Management Pack for AWS Installation and Configuration Guide 2.0

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Installation and Configuration Guide

The *VMware vRealize™ Operations Management Pack™ for AWS Installation and Configuration Guide* describes how to install and configure the Amazon Web Services 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

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

The Management Pack for AWS supports the following services.

Table 1-1. Supported Amazon Web Services

Service	Abbreviation	Description
Elastic MapReduce	EMR	Enables developers, researchers, analysts, and data scientists to easily process vast amounts of data.
Elastic Load Balancing	ELB	Distributes incoming application traffic across multiple Amazon Elastic Compute Cloud instances.
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.
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.

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

This chapter includes the following topics:

- [“Understanding Management Pack for AWS Dashboards,”](#) on page 8
- [“Charges for AWS Metrics,”](#) on page 9
- [“View Management Pack for AWS Objects,”](#) on page 9

Understanding Management Pack for AWS Dashboards

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

Table 1-2. Dashboards in the Management Pack for AWS

Dashboard Name	Purpose
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 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 Troubleshooting	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. 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.
AWS Instance Heatmap	Use the Instance Heatmap to monitor CPU/Disk/Network metric elements and identify instances that perform poorly.
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. Dashboards in the Management Pack for AWS (Continued)

Dashboard Name	Purpose
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
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.

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.

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 the vSphere 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 Click **Upload**.
The upload might take several minutes.
- 6 Read and accept the EULA, and click **Next**.
Installation details appear in the window during the process.
- 7 Ensure that you install the PAK file on the master node.
- 8 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

Configure an adapter instance for the management pack.

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,”](#) on page 16. 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.

Table 2-1. Supported Amazon Web Services

Service	Abbreviation
Elastic Compute Cloud. Includes Elastic Block Store (EBS) services.	EC2
Elastic Map Reduce	EMR
Elastic Load Balancing	ELB
Auto Scaling Groups	ASG
Relational Database Service	RDS
ElastiCache	EC2
Simple Queue Service	SQS

- 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 2-2. Amazon Web Services Regions

Region Friendly Name	Region Identifier
US East (Northern Virginia)	us-east-1
US West (Oregon)	us-west-2
US West (Northern California)	us-west-1
EU (Ireland)	eu-west-1
EU (Frankfurt)	eu-central-1
Asia Pacific (Singapore)	ap-southeast-1
Asia Pacific (Sydney)	ap-southeast-2
Asia Pacific (Tokyo)	ap-northeast-1
South America (Sao 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, ec2, asg . 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, sa-east-1, eu-west-1
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.
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

Verify that the adapter is configured and collecting data by viewing application-related data.

Table 2-3. Successful Configuration Indicators

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 Collecting or Data receiving 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

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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,”](#) on page 16
- [“Configuring IAM Permissions,”](#) on page 17
- [“Update Configuration Settings in the Properties File,”](#) on page 17
- [“Tagging Groups,”](#) on page 18
- [“Amazon Web Services Metrics,”](#) on page 18
- [“Security Considerations,”](#) on page 18

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

Update Configuration Settings in the Properties File

The `amazonaws.properties` file provides configuration options.

Table 3-2. Amazon Web Services Property Settings

Property	Description
<code>firstcollecthistoryhours</code>	Determines how far in the past to collect data when the adapter starts. The default is 0, meaning no historical collection.
<code>maxquerywindowminutes</code>	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.
<code>maxhoursback</code>	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.
<code>includetransient</code>	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.

Table 3-2. Amazon Web Services Property Settings (Continued)

Property	Description
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

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

This chapter includes the following topics:

- [“AWS EC2,”](#) on page 21
- [“AWS EC2 Volume,”](#) on page 22
- [“AWS EC2 Load Balancer,”](#) on page 23
- [“AWS EC2 Auto Scale Group,”](#) on page 24
- [“AWS EMR Job Flow,”](#) on page 24
- [“AWS ElastiCache Cache Cluster,”](#) on page 26
- [“AWS ElastiCache Cache Node,”](#) on page 27
- [“AWS RDS,”](#) on page 27
- [“AWS SQS,”](#) on page 28

AWS EC2

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

EC2 Metrics

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
CPUUtilization	CPU	Metric	Percent	No
CPUCreditUsage	CPU	Metric	Count	No
CPUCreditBalance	CPU	Metric	Count	No
NetworkIn	Network	Metric	Bytes	No

Table 4-1. EC2 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
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
pagefileUsed	Memory	Metric	Megabytes	No
Region	Resource Identifier	Property	String	No
Availability Zone	Resource Identifier	Property	String	No
InstanceID	Resource Identifier	Property	String	No
Type	Resource Identifier	Property	String	No
ImageId	Resource Identifier	Property	String	No

AWS EC2 Volume

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

EC2 Volume Metrics

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

Table 4-2. EC2 Volume Metrics (Continued)

Name	Category	Type	Unit	Instanced
VolumeConsumedReadWriteOps	Disk Space	Metric	Count	No
VolumeCapacity	Disk Space	Metric	Count	No
Region	Resource Identifier	Property	String	No
AvailabilityZone	Resource Identifier	Property	String	No
VolumeID	Resource Identifier	Property	String	No
Type	Resource Identifier	Property	String	No

AWS EC2 Load Balancer

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

EC2 Load Balancer Metrics

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
Region	Resource Identifier	Property	String	No
AvailabilityZone	Resource Identifier	Property	String	No

AWS EC2 Auto Scale Group

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

EC2 Auto Scale Group Metrics

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 4-4. 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
Region	Resource Identifier	Property	String	No
AvailabilityZone	Resource Identifier	Property	String	No

AWS EMR Job Flow

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

EMR Job Flow Metrics

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 4-5. 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

Table 4-5. EMR Job Flow Metrics (Continued)

Name	Category	Type	Unit	Instanced
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
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
RemainingMapTasksPerSlot	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
Region	Resource Identifier	Property	String	No
JobFlowId	Resource Identifier	Property	String	No

AWS ElastiCache Cache Cluster

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

ElastiCache Cache Cluster Metrics

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 4-6. ElasticCache Cache Cluster Metrics

Name	Category	Type	Unit	Instanced
BytesUsedForCacheItems	Memory	Metric	Bytes	No
BytesReadIntoMemcached	Memory	Metric	Bytes	No
BytesWrittenOutFromMemcached	Memory	Metric	Bytes	No
BytesUsedForHash	Memory	Metric	Bytes	No
Unused Memory	Memory	Metric	Bytes	No
BytesUsedForCache	Memory	Metric	Bytes	No
CasBadval	CAS	Metric	Count	No
CasHits	CAS	Metric	Count	No
CasMisses	CAS	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
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
Region	Resource Identifier	Property	String	No

Table 4-6. ElasticCache Cache Cluster Metrics (Continued)

Name	Category	Type	Unit	Instanced
AvailabilityZone	Resource Identifier	Property	String	No
Engine	Resource Identifier	Property	String	No

AWS ElastiCache Cache Node

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

ElastiCache Cache Node Metrics

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 4-7. 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
CacheClusterId	Resource Identifier	Property	String	No
CacheNodeId	Resource Identifier	Property	String	No

AWS RDS

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

RDS Metrics

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

Table 4-8. RDS Metrics

Name	Category	Type	Unit	Instanced
CPUUtilization	CPU	Metric	Percent	No
FreeableMemory	Memory	Metric	Bytes	No
BinLogDiskUsage	Disk Space	Metric	Bytes	No
DiskQueueDepth	Disk Space	Metric	Count	No
FreeStorageSpace	Disk Space	Metric	Bytes	No
SwapUsage	Disk Space	Metric	Bytes	No
ReadIOPS	Disk Space	Metric	Count/Second	No
WriteIOPS	Disk Space	Metric	Count/Second	No

Table 4-8. RDS Metrics (Continued)

Name	Category	Type	Unit	Instanced
ReadLatency	Disk Space	Metric	Seconds	No
WriteLatency	Disk Space	Metric	Seconds	No
ReadThroughput	Disk Space	Metric	Bytes/Seconds	No
WriteThroughput	Disk Space	Metric	Bytes/Seconds	No
DatabaseConnections	Performance	Metric	Count	No
ReplicaLag	Performance	Metric	Seconds	No
Region	Resource Identifier	Property	String	No
AvailabilityZone	Resource Identifier	Property	String	No
Engine	Resource Identifier	Property	String	No
DBInstanceClass	Resource Identifier	Property	String	No
Status	Resource Identifier	Property	String	No

AWS SQS

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

SQS Metrics

For a description of each metric, see the Amazon Web Service documentation at <http://docs.aws.amazon.com/AWSSimpleQueueService/latest/SQSDeveloperGuide/MonitorSQSwithCloudWatch.html>

Table 4-9. SQS Metrics

Name	Category	Type	Unit	Instanced
NumberOfMessagesSent	Statistics	Metric	Count	No
SentMessageSize	Statistics	Metric	Bytes	No
NumberOfMessagesReceived	Statistics	Metric	Count	No
NumberOfEmptyReceives	Statistics	Metric	Count	No
NumberOfMessagesDeleted	Statistics	Metric	Count	No
ApproximateNumberOfMessagesDelayed	Statistics	Metric	Count	No
ApproximateNumberOfMessagesVisible	Statistics	Metric	Count	No
ApproximateNumberOfMessagesNotVisible	Statistics	Metric	Count	No
Region	Resource Identifier	Property	String	No
QueueUrl	Resource Identifier	Property	String	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.

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