Data Collector Reference - Services

Cloud Insights

NetApp
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Data Collector Reference - Services

Telegraf Integration Data

The Cloud Insights Telegraf data collectors are powerful tools for gathering source-reported metrics from your data sources.

Cloud Insights provides different transform options for metrics collected using Telegraf. When adding these metrics to a widget, you are presented with a drop-down giving the transform choices:

None

Data is displayed as is, with no manipulation.

Rate

Current value divided by the time range since the previous observation.

Cumulative

The accumulation of the sum of previous values and the current value.

Delta

The difference between the previous observation value and the current value.

Delta rate

Delta value divided by the time range since the previous observation.

Cumulative Rate

Cumulative value divided by the time range since the previous observation.

Node Data Collection

Cloud Insights gathers metrics from the node on which you install an agent.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Hosts**, choose a platform.
2. Follow the instructions to configure the agent. The instructions vary depending on the type of Operating System or Platform you are using to collect data.

Objects and Counters

The following objects and their counters are collected as Node metrics:

Object:	Identifiers:	Attributes:	Datapoints:
Node Filesystem	Node UUID Device Path Type	Node IP Node Name Node OS Mode	Free Inodes Free Inodes Total Inodes Used Total Used Total Used
Node Disk	Node UUID Disk	Node IP Node Name Node OS	IO Time Total IOPS In Progress Read Bytes (per sec) Read Time Total Reads (per sec) Weighted IO Time Total Write Bytes (per sec) Write Time Total Writes (per sec) Current Disk Queue Length Write Time Read Time IO Time
Node CPU	Node UUID CPU	Node IP Node Name Node OS	System CPU Usage User CPU Usage Idle CPU Usage Processor CPU Usage Interrupt CPU Usage DPC CPU Usage

Object:	Identifiers:	Attributes:	Datapoints:
Node	Node UUID	Node IP Node Name Node OS	Kernel Boot Time Kernel Context Switches (per sec) Kernel Entropy Available Kernel Interrupts (per sec) Kernel Processes Forked (per sec) Memory Active Memory Available Total Memory Available Memory Buffered Memory Cached Memory Commit Limit Memory Committed As Memory Dirty Memory Free Memory High Free Memory High Total Memory Huge Page Size Memory Huge Pages Free Memory Huge Pages Total Memory Low Free Memory Low Total Memory Mapped Memory Page Tables Memory Shared Memory Slab Memory Swap Cached Memory Swap Free Memory Swap Total Memory Total Memory Used Total Memory Used Memory Vmalloc Chunk Memory Vmalloc Total Memory Vmalloc Used Memory Wired Memory Writeback Total Memory Writeback Tmp

Object:	Identifiers:	Attributes:	Datapoints:
Node Network	Network Interface Node UUID	Node Name Node IP Node OS	Bytes Received Bytes Sent Packets Outboud Discarded Packets Outboud Errors Packets Received Discarded Packets Received Errors Packets Received Packets Sent

Setup

Setup and Troubleshooting information can be found on the Configuring an Agent page.

MacOS Memory Usage

Cloud Insights (via Telegraf) and macOS report different numbers for memory usage. Both Telegraf and the Mac activity monitor use metrics gathered from *vm_stat*, however the total memory usage is calculated differently for each.

Telegraf calculates *Memory Used Total* as follows:

```
Memory Used Total = Memory Total - Memory Available Total
```

Where *Memory Available Total* is derived from the sum of "Pages free" and "Pages inactive" in *vm_stat*.

The Mac activity monitor, on the other hand, calculates Memory Used as follows:

```
Memory Used = App Memory + Wired Memory + Compressed
```

Where:

- *App Memory* is derived from the difference between “Anonymous pages” and “Pages purgeable” in *vm_stat*,
- *Wired Memory* is derived from “Pages wired down” in *vm_stat*, and
- *Compressed* is derived from “Pages occupied by compressor” in *vm_stat*.

ActiveMQ Data Collector

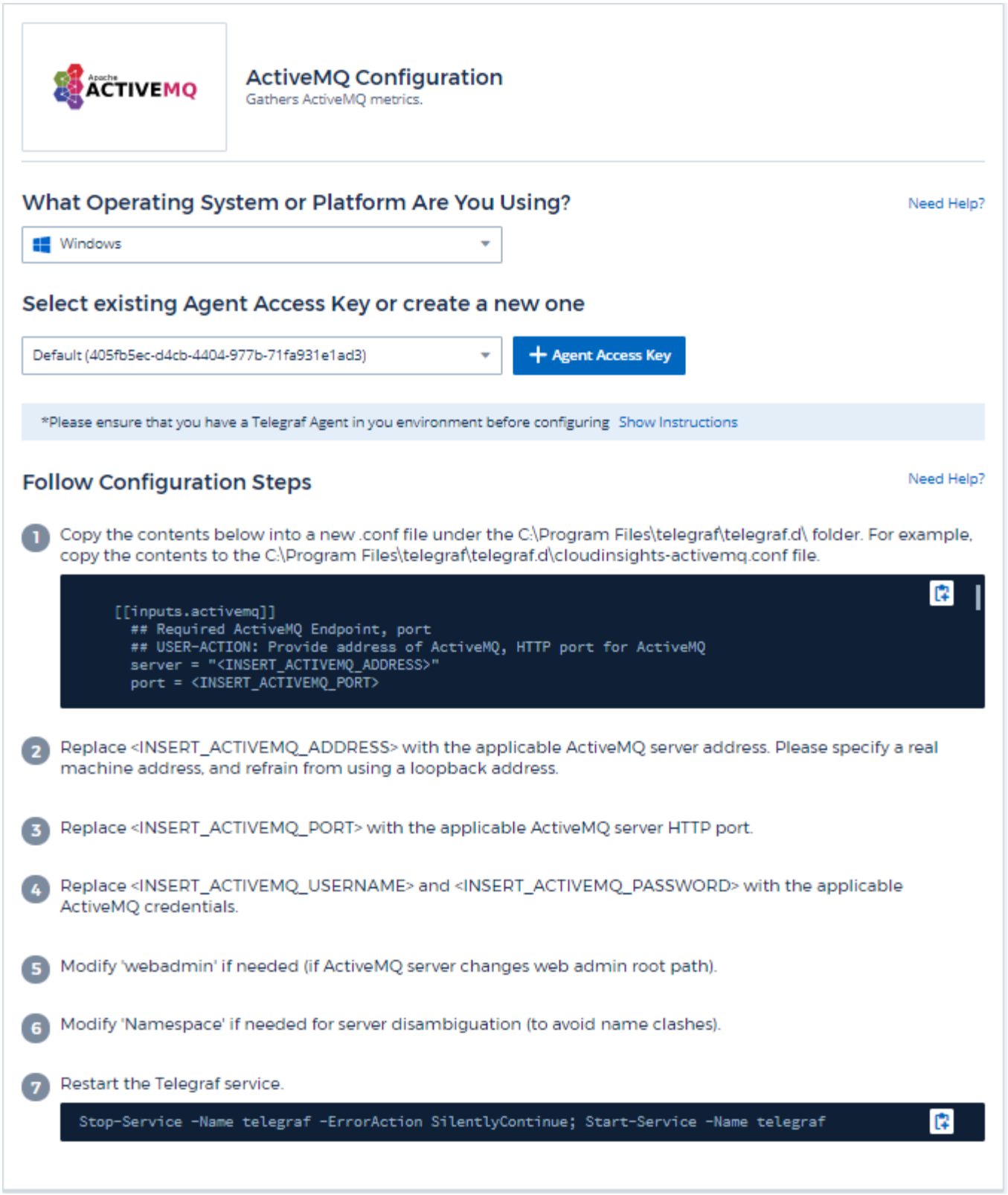
Cloud Insights uses this data collector to gather metrics from ActiveMQ.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose ActiveMQ.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the ActiveMQ documentation

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
ActiveMQ Queue	Namespace Queue Port Server	Node Name Node IP Node UUID	Consumer Count Dequeue Count Enqueue Count Queue Size

Troubleshooting

Additional information may be found from the Support page.

Apache Data Collector

This data collector allows collection of data from Apache servers in your environment.

Pre-requisites

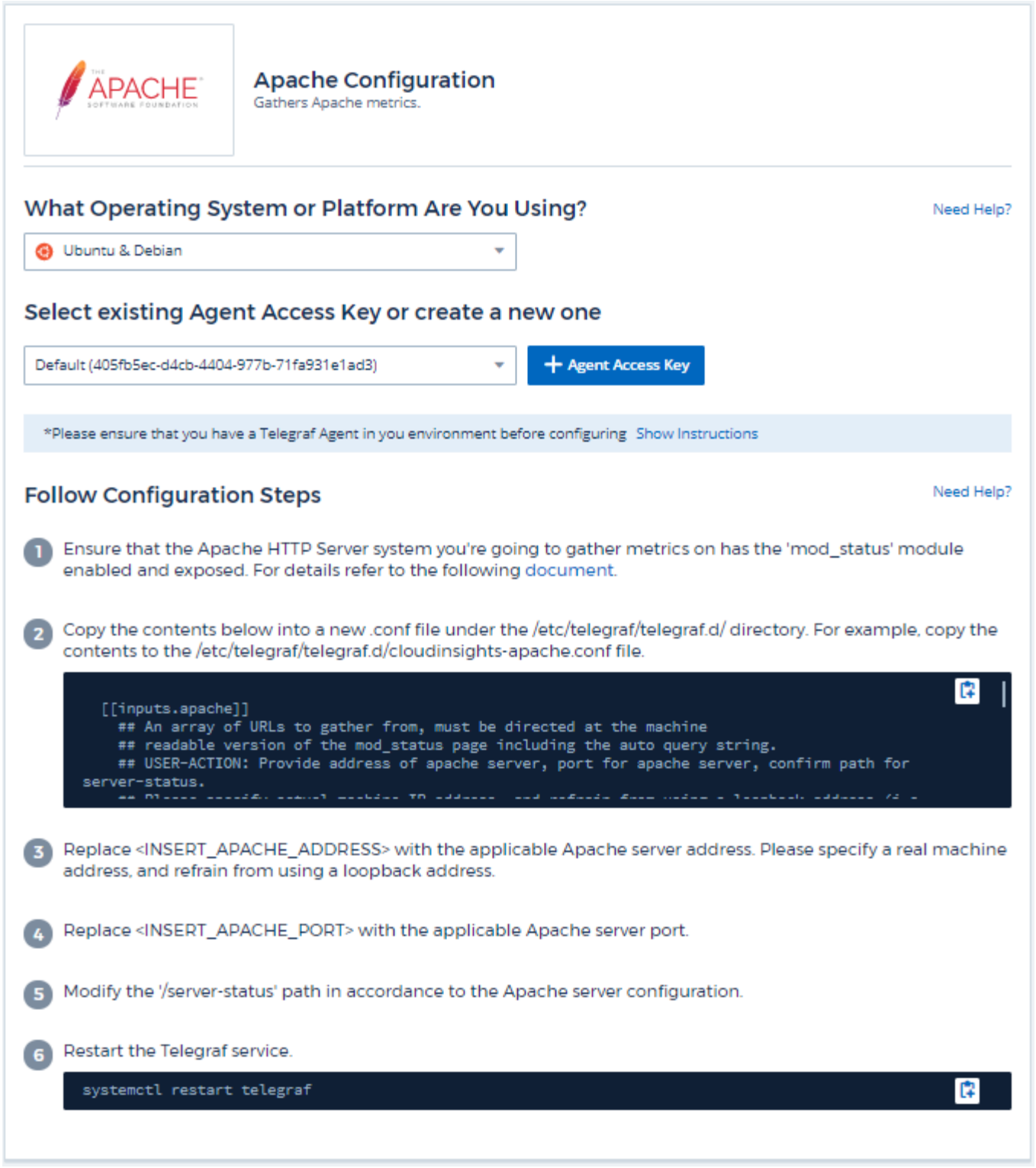
- You must have your Apache HTTP Server set up and properly running
- You must have sudo or administrator permissions on your agent host/VM
- Typically, the Apache *mod_status* module is configured to expose a page at the '/server-status?auto' location of the Apache server. The *ExtendedStatus* option must be enabled in order to collect all available fields. For information about how to configure your server, see the Apache module documentation: https://httpd.apache.org/docs/2.4/mod/mod_status.html#enable

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Apache.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Telegraf's plugin for Apache's HTTP Server relies on the 'mod_status' module to be enabled. When this is enabled, Apache's HTTP Server will expose an HTML endpoint that can be viewed on your browser or scraped for extraction of status of all Apache's HTTP Server configuration.

Compatibility:

Configuration was developed against Apache's HTTP Server version 2.4.38.

Enabling mod_status:

Enabling and exposing the 'mod_status' modules involves two steps:

- Enabling module
- Exposing stats from module

Enabling module:

The loading of modules is controlled by the config file under '/usr/local/apache/conf/httpd.conf'. Edit the config file and uncomment the following lines:

```
LoadModule status_module modules/mod_status.so
```

```
Include conf/extra/httpd-info.conf
```

Exposing stats from module:

The exposing of 'mod_status' is controlled by the config file under '/usr/local/apache2/conf/extra/httpd-info.conf'. Make sure you have the following in that configuration file (at least, other directives will be there):

```
# Allow server status reports generated by mod_status,
# with the URL of http://servername/server-status
<Location /server-status>
    SetHandler server-status
</Location>

#
# ExtendedStatus controls whether Apache will generate "full" status
# information (ExtendedStatus On) or just basic information (ExtendedStatus
# Off) when the "server-status" handler is called. The default is Off.
#
ExtendedStatus On
```

For detailed instructions on the 'mod_status' module, see the Apache documentation

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Apache	Namespace Server	Node IP Node Name Port Parent Server Config Generation Parent Server MPM Generation Server Uptime Is Stopping	Busy Workers Bytes per Request Bytes per Second CPU Children System CPU Children User CPU Load CPU System CPU User Asynchronous Connections Closing Asynchronous Connections Keep Alive Asynchronous Connections Writing Connections Total Duration per Request Idle Workers Load Average (last 1m) Load Average (last 15m) Load Average (last 5m) Processes Requests per Second Total Accesses Total Duration Total KBytes Scoreboard Closing Scoreboard DNS Lookups Scoreboard Finishing Scoreboard Idle Cleanup Scoreboard Keep Alive Scoreboard Logging Scoreboard Open Scoreboard Reading Scoreboard Sending Scoreboard Starting Scoreboard Waiting

Troubleshooting

Additional information may be found from the Support page.

Consul Data Collector

Cloud Insights uses this data collector to gather metrics from Consul.

This topic is considered Preview documentation and is subject to change.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Consul.

   If you haven't configured an Agent for collection, you are prompted to install an agent in your environment.

   If you have an agent already configured, select the appropriate Operating System or Platform and click **Continue**.

2. Follow the instructions in the Consul Configuration screen to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.

Setup

Information may be found in the Consul documentation.

Objects and Counters for consul

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Consul	Namespace Check ID Service Node	Node IP Node OS Node UUID Node Name Service Name Check Name Service ID Status	Critical Passing Warning

Troubleshooting

Additional information may be found from the Support page.

Couchbase Data Collector

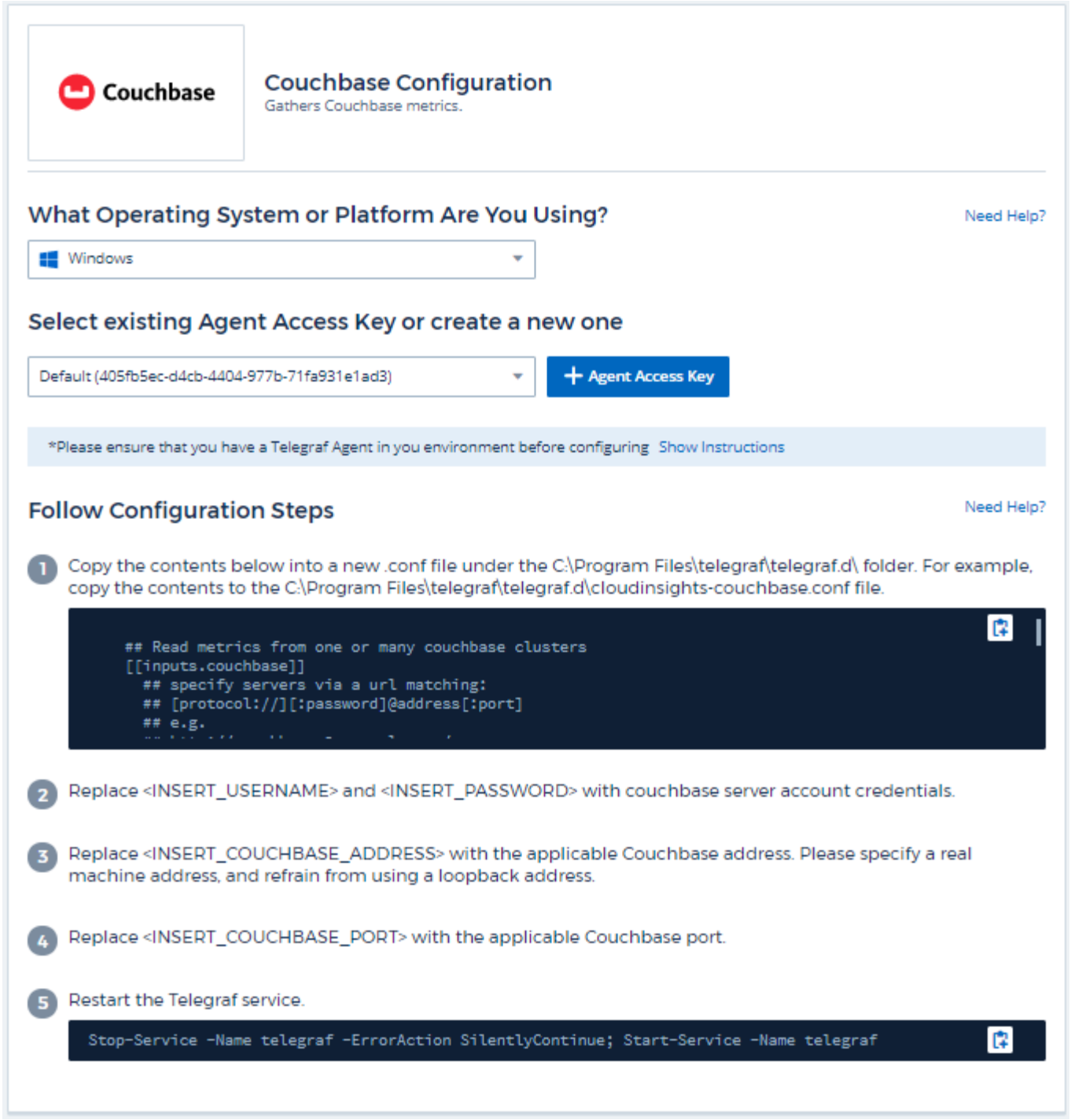
Cloud Insights uses this data collector to gather metrics from Couchbase.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Couchbase.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the Couchbase documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Couchbase Node	Namespace Cluster Couchbase Node Hostname	Node Name Node IP	Memory Free Memory Total
Couchbase Bucket	Namespace Bucket Cluster	Node Name Node IP	Data Used Data Fetches Disk Used Item Count Memory Used Operations Per Second Quota Used

Troubleshooting

Additional information may be found from the Support page.

CouchDB Data Collector

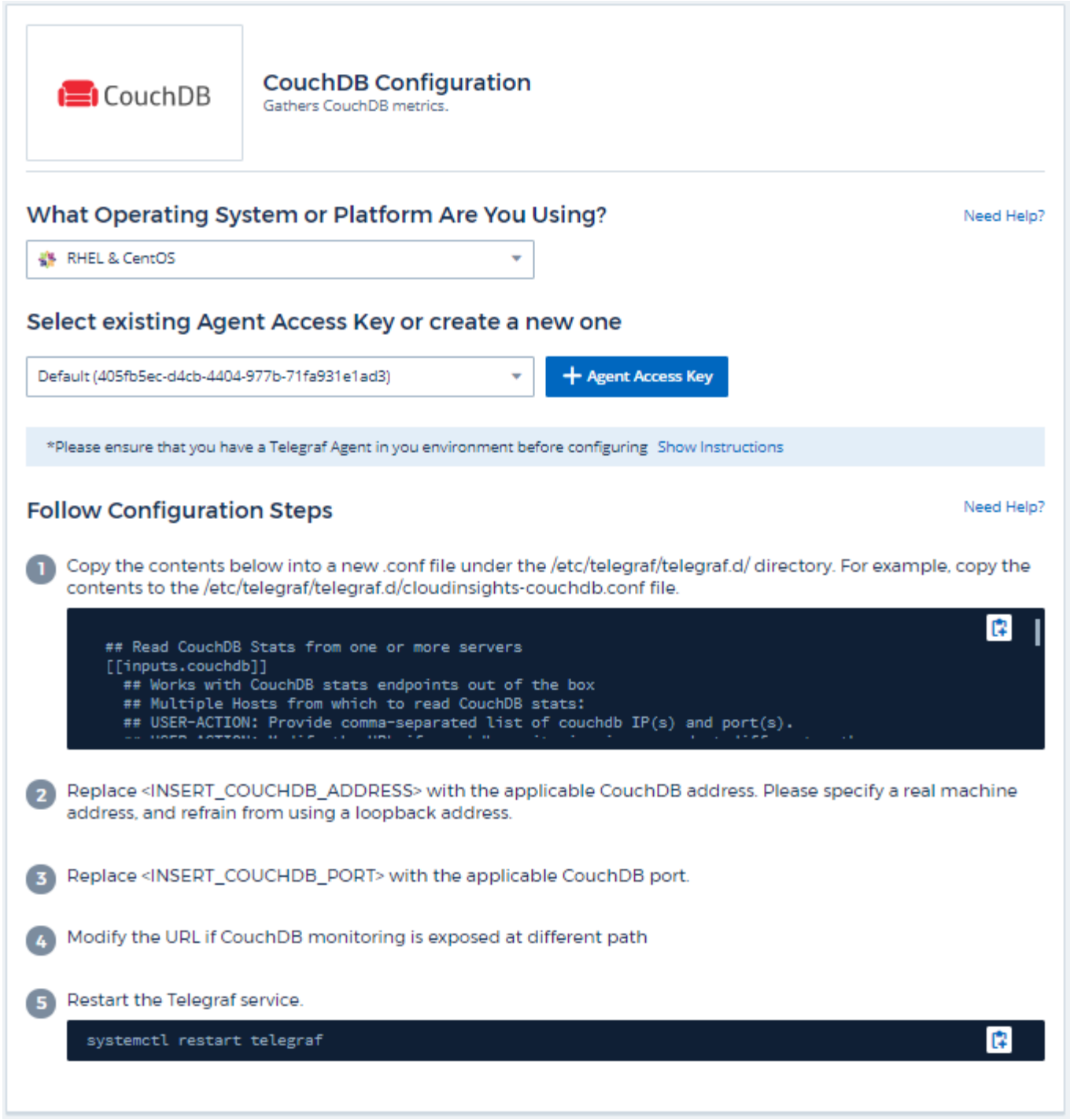
Cloud Insights uses this data collector to gather metrics from CouchDB.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose CouchDB.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the CouchDB documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
CouchDB	Namespace Server	Node Name Node IP	Authentication Cache Hits Authentication Cache Miss Database Reads Database Writes Databases Open Open OS Files Max Request Time Min Request Time Httpd Request Methods Copy Httpd Request Methods Delete Httpd Request Methods Get Httpd Request Methods Head Httpd Request Methods Post Httpd Request Methods Put Status Codes 200 Status Codes 201 Status Codes 202 Status Codes 301 Status Codes 304 Status Codes 400 Status Codes 401 Status Codes 403 Status Codes 404 Status Codes 405 Status Codes 409 Status Codes 412 Status Codes 500

Troubleshooting

Additional information may be found from the Support page.

Docker Data Collector

Cloud Insights uses this data collector to gather metrics from Docker.

This topic is considered Preview documentation and is subject to change.

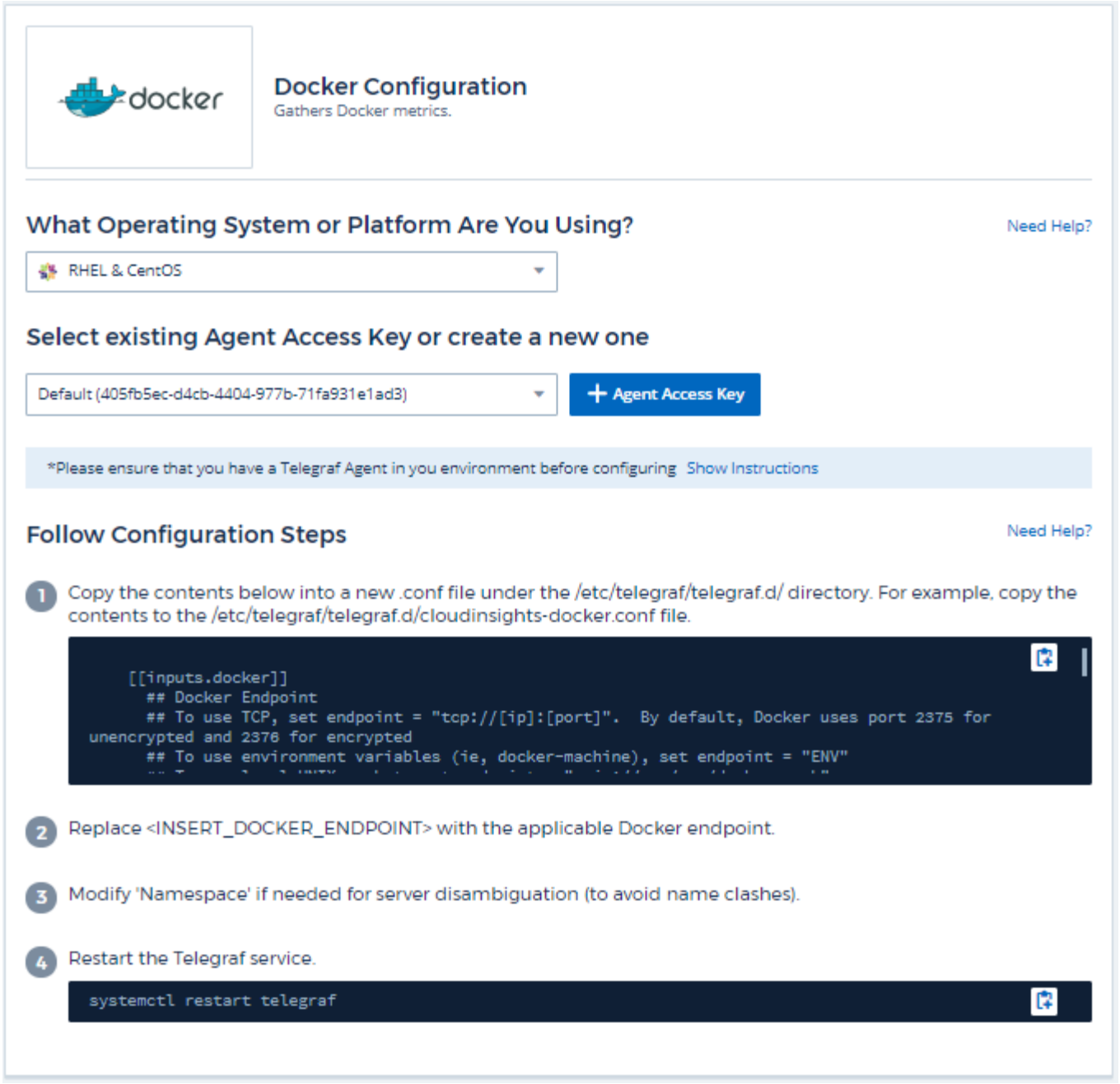
Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Docker.

   If you haven't configured an Agent for collection, you are prompted to install an agent in your environment.

   If you have an agent already configured, select the appropriate Operating System or Platform and click **Continue**.

2. Follow the instructions in the Docker Configuration screen to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

The Telegraf input plugin for Docker collects metrics through a specified UNIX socket or a TCP endpoint.

Compatibility

Configuration was developed against Docker version 1.12.6.

Setting Up

Accessing Docker through a UNIX socket

If the Telegraf agent is running on baremetal, add the telegraf Unix user to the docker Unix group by running the following:

```
sudo usermod -aG docker telegraf
```

If the Telegraf agent is running within a Kubernetes pod, expose the Docker Unix socket by mapping the socket into the pod as a volume and then mounting that volume to /var/run/docker.sock. For example, add the following to the PodSpec:

```
volumes:
...
- name: docker-sock
hostPath:
path: /var/run/docker.sock
type: File
```

Then, add the following to the Container:

```
volumeMounts:
...
- name: docker-sock
mountPath: /var/run/docker.sock
```

Note that the Cloud Insights installer provided for the Kubernetes platform takes care of this mapping automatically.

Access Docker through a TCP endpoint

By default, Docker uses port 2375 for unencrypted access and port 2376 for encrypted access.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Docker Engine	Namespace Docker Engine	Node Name Node IP Node UUID Node OS Kubernetes Cluster Docker Version Unit	Memory Containers Containers Paused Containers Running Containers Stopped CPUs Go Routines Images Listener Events Used File Descriptors Data Available Data Total Data Used Metadata Available Metadata Total Metadata Used Pool Blocksize

Object:	Identifiers:	Attributes:	Datapoints:
Docker Container	Namespace Container Name Docker Engine	Kubernetes Container Hash Kubernetes Container Ports Kubernetes Container Restart Count Kubernetes Container Termination Message Path Kubernetes Container Termination Message Policy Kubernetes Pod Termination Grace Period Container Image Container Status Container Version Node Name Kubernetes Container Log Path Kubernetes Container Name Kubernetes Docker Type Kubernetes Pod Name Kubernetes Pod Namespace Kubernetes Pod UID Kubernetes Sandbox ID Node IP Node UUID Docker Version Kubernetes IO Config Seen Kubernetes IO Config Source OpenShift IO SCC Kubernetes Description Kubernetes Display Name OpenShift Tags Kompose Service Pod Template Hash Controller Revision	Memory Active Anonymous Memory Active File Memory Cache Memory Hierarchical Limit Memory Inactive Anonymous Memory Inactive File Memory Limit Memory Mapped File Memory Max Usage Memory Page Fault Memory Page Major Fault Memory Paged In Memory Paged Out Memory Resident Set Size Memory Resident Set Size Huge Memory Total Active Anonymous Memory Total Active File Memory Total Cache Memory Total Inactive Anonymous Memory Total Inactive File Memory Total Mapped File Memory Total Page Fault Memory Total Page Major Fault Memory Total Paged In Memory Total Paged Out Memory Total Resident Set Size Memory Total Resident Set Size Huge Memory Total Unevictable

Object:	Identifiers:	Attributes:	Datapoints:
Docker Container Block IO	Namespace Container Name Device Docker Engine	Kubernetes Container Hash Kubernetes Container Ports Kubernetes Container Restart Count Kubernetes Container Termination Message Path Kubernetes Container Termination Message Policy Kubernetes Pod Termination Grace Period Container Image Container Status Container Version Node Name Kubernetes Container Log Path Kubernetes Container Name Kubernetes Docker Type Kubernetes Pod Name Kubernetes Pod Namespace Kubernetes Pod UID Kubernetes Sandbox ID Node IP Node UUID Docker Version Kubernetes Config Seen Kubernetes Config Source OpenShift SCC Kubernetes Description Kubernetes Display Name OpenShift Tags Schema Schema Version Pod Template Hash Controller Revision Hash	IO Service Bytes Recursive Async IO Service Bytes Recursive Read IO Service Bytes Recursive Sync IO Service Bytes Recursive Total IO Service Bytes Recursive Write IO Serviced Recursive Async IO Serviced Recursive Read IO Serviced Recursive Sync IO Serviced Recursive Total IO Serviced Recursive Write

Object:	Identifiers:	Attributes:	Datapoints:
Docker Container Network	Namespace Container Name Network Docker Engine	Container Image Container Status Container Version Node Name Node IP Node UUID Node OS K8s Cluster Docker Version Container ID	RX Dropped RX Bytes RX Errors RX Packets TX Dropped TX Bytes TX Errors TX Packets

Object:	Identifiers:	Attributes:	Datapoints:
Docker Container CPU	Namespace Container Name CPU Docker Engine	Kubernetes Container Hash Kubernetes Container Ports Kubernetes Container Restart Count Kubernetes Container Termination Message Path Kubernetes Container Termination Message Policy Kubernetes Pod Termination Grace Period Kubernetes Config Seen Kubernetes Config Source OpenShift SCC Container Image Container Status Container Version Node Name Kubernetes Container Log Path Kubernetes Container name Kubernetes Docker Type Kubernetes Pod Name Kubernetes Pod Namespace Kubernetes Pod UID Kubernetes Sandbox ID Node IP Node UUID Node OS Kubernetes Cluster Docker Version Kubernetes Description Kubernetes Display Name OpenShift Tags Schema Version Pod Template Hash	Throttling Periods Throttling Throttled Periods Throttling Throttled Time Usage In Kernel Mode Usage In User Mode Usage Percent Usage System Usage Total

Troubleshooting

Problem:	Try this:
I do not see my Docker metrics in Cloud Insights after following the instructions on the configuration page.	Check the Telegraf agent logs to see if it reports the following error: E! Error in plugin [inputs.docker]: Got permission denied while trying to connect to the Docker daemon socket If it does, take the necessary steps to provide the Telegraf agent access to the Docker Unix socket as specified above.

Additional information may be found from the Support page.

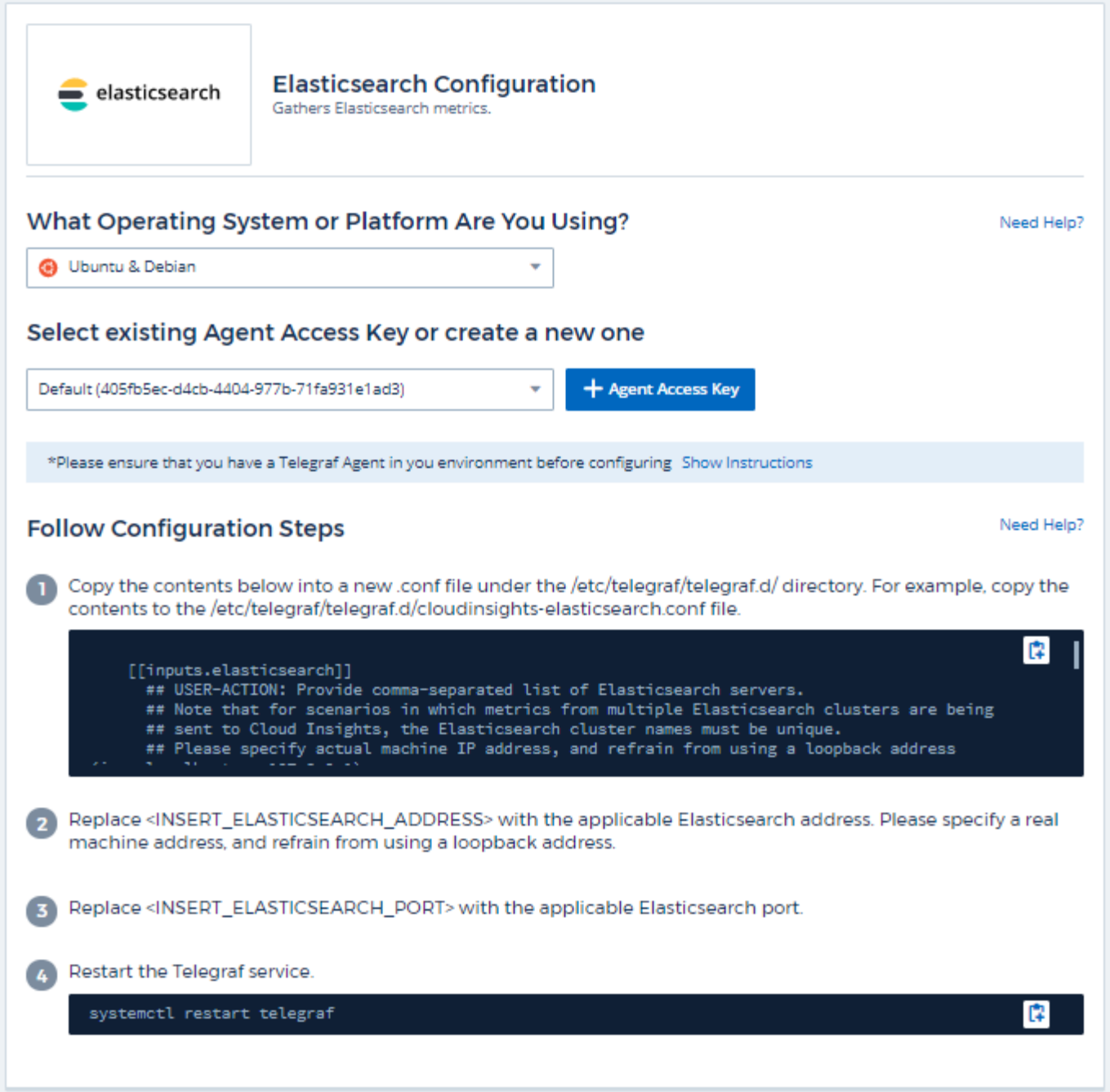
Elasticsearch Data Collector

Cloud Insights uses this data collector to gather metrics from Elasticsearch.

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Elasticsearch.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the Elasticsearch documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Elasticsearch Cluster	Namespace Cluster	Node IP Node Name Cluster Status	Master Node Count Total Node Count Filesystem Data Available (bytes) Filesystem Data Free (bytes) Filesystem Data Total (bytes) JVM Threads OS Allocated Proccessors OS Available Processors OS Mem Free (bytes) OS Mem Free OS Mem Total (bytes) OS Mem Used (bytes) OS Mem Used Process CPU Indices Completion Size (bytes) Indices Count Indices Docs Count Indices Docs Deleted Indices Field Data Evictions Indices Field Data Memory Size (bytes) Indices Query Cache Count Indices Cache Size Indices Segments Count Indices Segments Doc Values Memory (bytes) Indices Shards Index Primaries Avg Indices Shards Index Primaries Max Indices Shards Index Primaries Min Indices Shards Index Replication Avg Indices Shards Index Replication Max Indices Shards Index

Object:	Identifiers:	Attributes:	Datapoints:
Elasticsearch Node	Namespace Cluster ES Node ID ES Node IP ES Node	Zone ID	Machine Learning Enabled Machine Learning Memory Machine Learning Max Open Jobs X-Pack Installed Breakers Accounting Estimated Size (bytes) Breakers Accounting Limit Size (bytes) Breakers Accounting Overhead Breakers Accounting Tripped Breakers Field Data Estimated Size (bytes) Breakers Field Data Limit Size (bytes) Breakers Field Data Overhead Breakers Field Data Tripped Breakers In-Flight Sstimated Size (bytes) Breakers In-Flight Limit Size (bytes) Breakers In-Flight Overhead Breakers In-Flight Tripped Breakers Parent Estimated Size (bytes) Breakers Parent Limit Size (bytes) Breakers Parent Overhead Breakers Parent Tripped Breakers Request Estimated Size (bytes) Breakers Request Limit Size (bytes) Breakers Request Overhead

Troubleshooting

Additional information may be found from the Support page.

Flink Data Collector

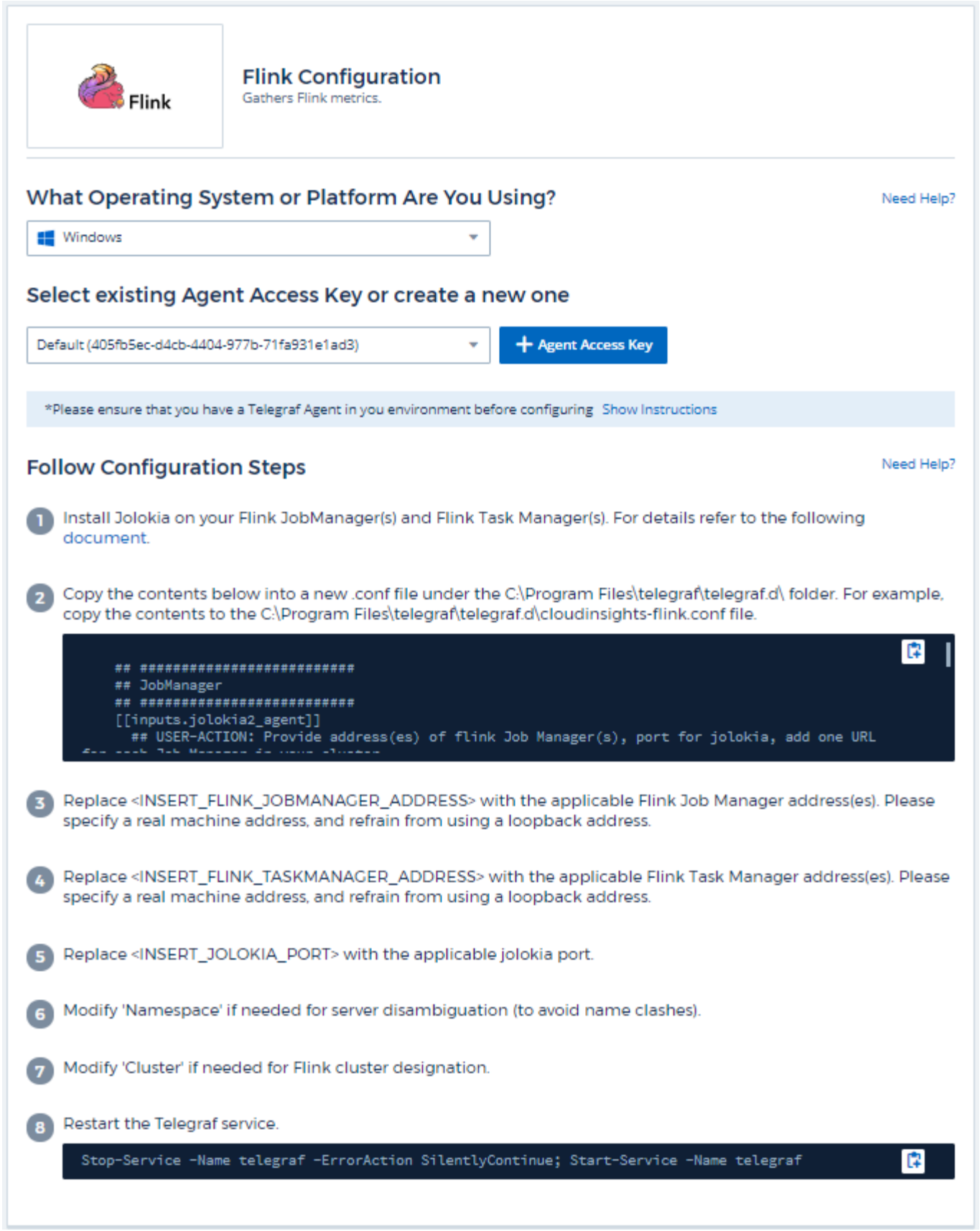
Cloud Insights uses this data collector to gather metrics from Flink.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Flink.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

A full Flink deployment involves the following components:

JobManager: The Flink master. Coordinates a series of TaskManagers (slaves). In a High Availability setup, system will have more than one JobManager.
TaskManager: The Flink slaves. This is where Flink operators get executed.
The Flink plugin is based on the telegraf's Jolokia plugin. As such as a requirement to gather info from all Flink components, JMX needs to be configured and exposed via Jolokia on all components.

Compatibility

Configuration was developed against Flink version 1.7.0.

Setting Up

Jolokia Agent Jar

For all individual components, a version the Jolokia agent jar file must be downloaded. The version tested against was Jolokia agent 1.6.0.

Instructions below assume that downloaded jar file (jolokia-jvm-1.6.0-agent.jar) is placed under location '/opt/flink/lib/'.

JobManager

To configure JobManager to expose the Jolokia API, you can setup the following environment variable on your nodes then restart the JobManager:

```
export FLINK_ENV_JAVA_OPTS="-javaagent:/opt/flink/lib/jolokia-jvm-1.6.0-
agent.jar=port=8778,host=0.0.0.0"
```

You can choose a different port for Jolokia (8778). If you have an internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP. Notice this IP needs to be accessible from the telegraf plugin.

TaskManager

To configure TaskManager(s) to expose the Jolokia API, you can setup the following environment variable on your nodes then restart the TaskManager:

```
export FLINK_ENV_JAVA_OPTS="-javaagent:/opt/flink/lib/jolokia-jvm-1.6.0-
agent.jar=port=8778,host=0.0.0.0"
```

You can choose a different port for Jolokia (8778). If you have an internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP. Notice this IP needs to be accessible from the telegraf plugin.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Flink Task Manager	Cluster Namespace Server	Node Name Task Manager ID Node IP	Network Available Memory Segments Network Total Memory Segments Garbage Collection PS MarkSweep Count Garbage Collection PS MarkSweep Time Garbage Collection PS Scavenge Count Garbage Collection PS Scavenge Time Heap Memory Committed Heap Memory Init Heap Memory Max Heap Memory Used Thread Count Daemon Thread Count Peak Thread Count Thread Count Total Started
Flink Job	Cluster Namespace server Job ID	Node Name Job Name Node IP Last Checkpoint External Path Restarting Time	Downtime Full Restarts Last Checkpoint Alignment Buffered Last Checkpoint Duration Last Checkpoint Size Number of Completed Checkpoints Number of Failed Checkpoints Number of in Progress Checkpoints Number of Checkpoints Uptime

Object:	Identifiers:	Attributes:	Datapoints:
Flink Job Manager	Cluster Namespace Server	Node Name Node IP	Garbage Collection PS MarkSweep Count Garbage Collection PS MarkSweep Time Garbage Collection PS Scavenge Count Garbage Collection PS Scavenge Time Heap Memory Committed Heap Memory Init Heap Memory Max Heap Memory Used Number Registered Task Managers Number Running Jobs Task Slots Available Task Slots Total Thread Count Daemon Thread Count Peak Thread Count Thread Count Total Started

Object:	Identifiers:	Attributes:	Datapoints:
Flink Task	Cluster Namespace Job ID Task ID	Server Node Name Job Name Sub Task Index Task Attempt ID Task Attempt Number Task Name Task Manager ID Node IP Current Input Watermark	Buffers In Pool Usage Buffers In Queue Length Buffers Out Pool Usage Buffers Out Queue Length Number Buffers In Local Number Bufffers In Local Per Second Count Number Buffers in Local Per Second Rate Number Buffers In Remote Number Buffers In Remote Per Second Count Number Buffers In Remote Per Second Rate Number Buffers Out Number Buffers Out Per Second Count Number Buffers Out Per Second Rate Number Bytes In Local Number Bytes In Local Per Second Count Number Bytes In Local Per Second Rate Number Bytes In Remote Number Bytes In Remote Per Second Count Number Bytes In Remote Per Second Rate Number Bytes Out Number Bytes Out Per Second Count Number Bytes Out Per Second Rate Number Records In Number Records In Per Second Count Number Records In Per Second Rate

Object:	Identifiers:	Attributes:	Datapoints:
Flink Task Operator	Cluster Namespace Job ID Operator ID Task ID	Server Node Name Job Name Operator Name Sub Task Index Task Attempt ID Task Attempt Number Task Name Task Manager ID Node IP	Current Input Watermark Current Output Watermark Number Records In Number Records In Per Second Count Number Records In Per Second Rate Number Records Out Number Records Out Per Second Count Number Records Out Per Second Rate Number Late Records Dropped Assigned Partitions Bytes Consumed Rate Commit Latency Avg Commit Latency Max Commit Rate Commits Failed Commits Succeeded Connection Close Rate Connection Count Connection Creation Rate Count Fetch Latency Avg Fetch Latency Max Fetch Rate Fetch Size Avg Fetch Size Max Fetch Throttle Time Avg Fetch Throttle Time Max Heartbeat Rate Incoming Byte Rate IO Ratio IO Time Avg (ns) IO Wait Ratio IO Wait Time Avg (ns) Join Rate Join Time Avg Last Heartbeat Ago

Troubleshooting

Additional information may be found from the Support page.

Hadoop Data Collector

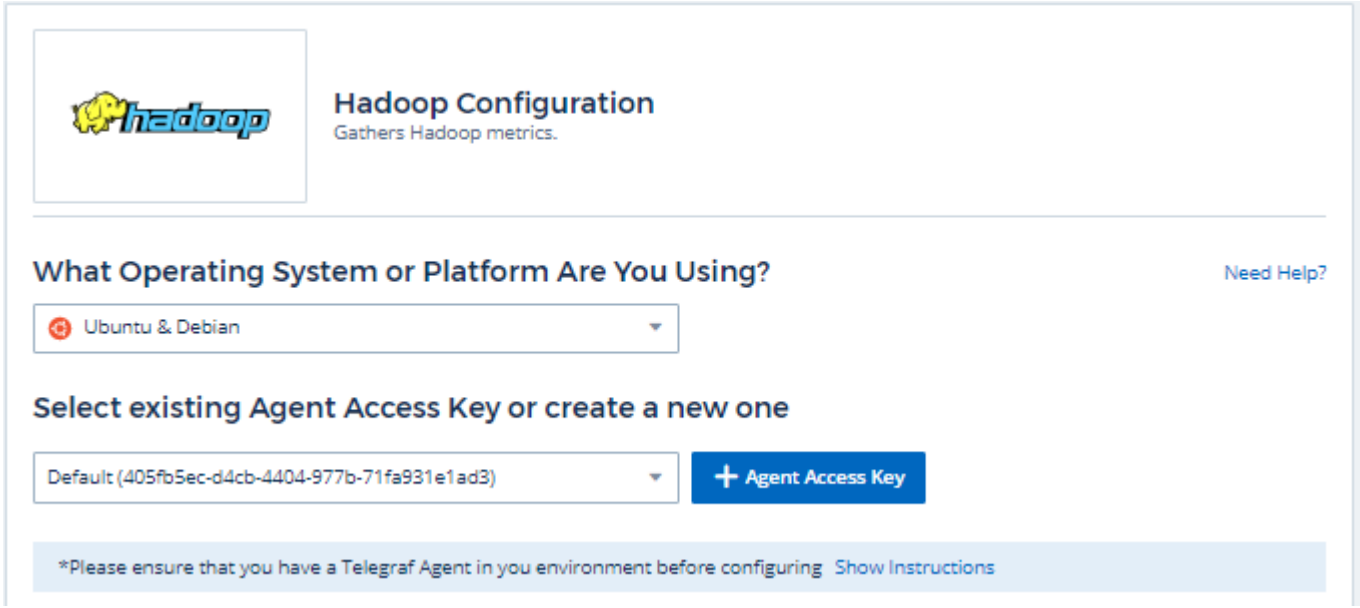
Cloud Insights uses this data collector to gather metrics from Hadoop.

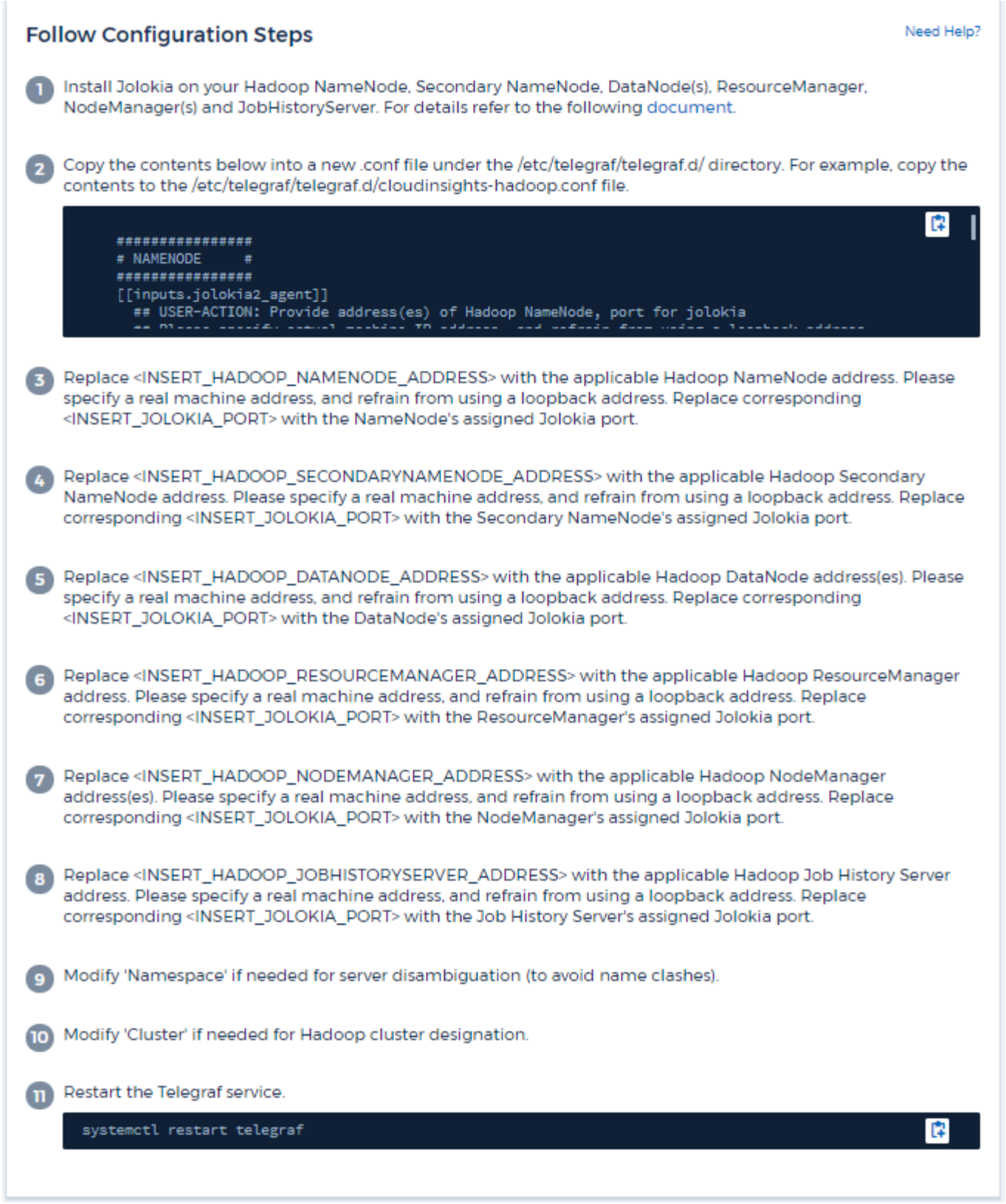
Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Hadoop.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.





Setup

A full Hadoop deployment involves the following components:

- NameNode: The Hadoop Distributed File System (HDFS) master. Coordinates a series of DataNodes

(slaves).

- Secondary NameNode: a warm failover for the main NameNode. In Hadoop the promotion to NameNode does not occur automatically. Secondary NameNode gathers information from NameNode to be ready to be promoted when needed.
- DataNode: The HDFS slave. Actual owner for data.
- ResourceManager: The compute master (Yarn). Coordinates a series of NodeManagers (slaves).
- NodeManager: the resource for compute. Actual location for running of applications.
- JobHistoryServer: name says it all.

The Hadoop plugin is based on the telegraf's Jolokia plugin. As such as a requirement to gather info from all Hadoop components, JMX needs to be configured and exposed via Jolokia on all components.

Compatibility

Configuration was developed against Hadoop version 2.9.2.

Setting Up

Jolokia Agent Jar

For all individual components, a version the Jolokia agent jar file must be downloaded. The version tested against was Jolokia agent 1.6.0.

Instructions below assume that downloaded jar file (jolokia-jvm-1.6.0-agent.jar) is placed under location '/opt/hadoop/lib/'.

NameNode

To configure NameNode to expose the Jolokia API, you can setup the following in <HADOOP_HOME>/etc/hadoop/hadoop-env.sh:

```
export HADOOP_NAMENODE_OPTS="$HADOOP_NAMENODE_OPTS -javaagent:/opt/hadoop/lib/jolokia-jvm
-1.6.0-agent.jar=port=7800,host=0.0.0.0 -Dcom.sun.management.jmxremote
-Dcom.sun.management.jmxremote.port=8000 -Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.password.file=$HADOOP_HOME/conf/jmxremote.password"
You can choose a different port for JMX (8000 above) and Jolokia (7800). If you have an
internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP.
Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-
Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use
at your own risk.
```

Secondary NameNode

To configure the Secondary NameNode to expose the Jolokia API, you can setup the following in

<HADOOP_HOME>/etc/hadoop/hadoop-env.sh:

```
export HADOOP_SECONDARYNAMENODE_OPTS="$HADOOP_SECONDARYNAMENODE_OPTS
-javaagent:/opt/hadoop/lib/jolokia-jvm-1.6.0-agent.jar=port=7802,host=0.0.0.0
-Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.port=8002
-Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.password.file=$HADOOP_HOME/conf/jmxremote.password"
You can choose a different port for JMX (8002 above) and Jolokia (7802). If you have an
internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP.
Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-
Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use
at your own risk.
```

DataNode

To configure the DataNodes to expose the Jolokia API, you can setup the following in <HADOOP_HOME>/etc/hadoop/hadoop-env.sh:

```
export HADOOP_DATANODE_OPTS="$HADOOP_DATANODE_OPTS -javaagent:/opt/hadoop/lib/jolokia-jvm
-1.6.0-agent.jar=port=7801,host=0.0.0.0 -Dcom.sun.management.jmxremote
-Dcom.sun.management.jmxremote.port=8001 -Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.password.file=$HADOOP_HOME/conf/jmxremote.password"
You can choose a different port for JMX (8001 above) and Jolokia (7801). If you have an
internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP.
Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-
Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use
at your own risk.
```

ResourceManager

To configure the ResourceManager to expose the Jolokia API, you can setup the following in <HADOOP_HOME>/etc/hadoop/hadoop-env.sh:

```
export YARN_RESOURCEMANAGER_OPTS="$YARN_RESOURCEMANAGER_OPTS
-javaagent:/opt/hadoop/lib/jolokia-jvm-1.6.0-agent.jar=port=7803,host=0.0.0.0
-Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.port=8003
-Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.password.file=$HADOOP_HOME/conf/jmxremote.password"
You can choose a different port for JMX (8003 above) and Jolokia (7803). If you have an
internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP.
Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-
Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use
at your own risk.
```

NodeManager

To configure the NodeManagers to expose the Jolokia API, you can setup the following in <HADOOP_HOME>/etc/hadoop/hadoop-env.sh:

```
export YARN_NODEMANAGER_OPTS="$YARN_NODEMANAGER_OPTS -javaagent:/opt/hadoop/lib/jolokia
-jvm-1.6.0-agent.jar=port=7804,host=0.0.0.0 -Dcom.sun.management.jmxremote
-Dcom.sun.management.jmxremote.port=8004 -Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.password.file=$HADOOP_HOME/conf/jmxremote.password"
You can choose a different port for JMX (8004 above) and Jolokia (7804). If you have an
internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP.
Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-
Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use
at your own risk.
```

JobHistoryServer

To configure the JobHistoryServer to expose the Jolokia API, you can setup the following in <HADOOP_HOME>/etc/hadoop/hadoop-env.sh:

```
export HADOOP_JOB_HISTORYSERVER_OPTS="$HADOOP_JOB_HISTORYSERVER_OPTS
-javaagent:/opt/hadoop/lib/jolokia-jvm-1.6.0-agent.jar=port=7805,host=0.0.0.0
-Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.port=8005
-Dcom.sun.management.jmxremote.password.file=$HADOOP_HOME/conf/jmxremote.password"
You can choose a different port for JMX (8005 above) and Jolokia (7805). If you have an
internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP.
Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-
Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use
at your own risk.
```

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Hadoop Secondary NameNode	Cluster Namespace Server	Node Name Node IP Compile Info Version	GC Count GC Copies Count GC Marks Sweep Compact Count GC Number Info Threshold Exceeded GC Number Warning Threshold Exceeded GC Time GC Copy Time GC Marks Sweep Compact Time GC Total Extra Sleep Time Logs Error Count Logs Fatal Count Logs Info Count Logs Warn Count Memory Heap Committed Memory Heap Max Memory Heap Used Memory Max Memory Non Heap Committed Memory Non Heap Max Memory Non Heap Used Threads Blocked Threads New Threads Runnable Threads Terminated Threads Timed Waiting Threads Waiting

Object:	Identifiers:	Attributes:	Datapoints:
Hadoop NodeManager	Cluster Namespace Server	Node Name Node IP	Containers Allocated Memory Allocate Memory Allocated Oportunistic Virtual Cores Allocated Oportunistic Virtual Cores Allocated Memory Available Virtual Cores Available Directories Bad Local Directories Bad Log Cache Size Before Clean Container Launch Duration Avg Time Container Launch Duration Number Of Operations Containers Completed Containers Failed Containers Initing Containers Killed Containers Launched Containers Reiniting ContaIners Rolled Back on Failure Containers Running Disk Utilization Good Local Directories Disk Utilization Good Log Directories Bytes Deleted Private Bytes Deleted Public Containers Running Opportunistic Bytes Deleted Total Shuffle Connections Shuffle Output Bytes Shuffle Outputs Failed Shuffle Outputs Ok GC Count GC Copies Count GC Marks Sweep Compact Count GC Number Info

Object:	Identifiers:	Attributes:	Datapoints:
Hadoop ResourceManager	Cluster Namespace Server	Node Name Node IP	ApplicationMaster Launch Delay Avg ApplicationMaster Launch Delay Number ApplicationMaster Register Delay Avg ApplicationMaster Register Delay Number NodeManager Active Number NodeManager Decomissioned Number NodeManager Decomissioning Number NodeManager Lost Number NodeManager Rebooted Number NodeManager Shutdown Number NodeManager Healthy Number NodeManager Memory Limit NodeManager Virtual Cores Limit Used Capacity Active Applications Active Users Aggregate Containers Allocated Aggregate Containers Preempted Aggregate Containers Released Aggregate Memory Seconds Preempted Aggregate Node Local Containers Allocated Aggregate Off Switch Containers Allocated Aggregate Ack Local Containers Allocated Aggregate Virtual Cores

Object:	Identifiers:	Attributes:	Datapoints:
Hadoop DataNode	Cluster Namespace Server	Node Name Node IP Cluster ID Version	Transceiver Count Transmits in Progress Cache Capacity Cache Used Capacity DFS Used Estimated Capacity Lost Total Last Volume Failure Rate Blocks Number Cached Blocks Number Failed to Cache Blocks Number Failed to Uncache Volumes Number Failed Capacity Remaining GC Count GC Copies Count GC Marks Sweep Compact Count GC Number Info Threshold Exceeded GC Number Warning Threshold Exceeded GC Time GC Copy Time GC Marks Sweep Compact Time GC Total Extra Sleep Time Logs Error Count Logs Fatal Count Logs Info Count Logs Warn Count Memory Heap Committed Memory Heap Max Memory Heap Used Memory Max Memory Non Heap Committed Memory Non Heap Max Memory Non Heap Used

Object:	Identifiers:	Attributes:	Datapoints:
Hadoop NameNode	Cluster Namespace Server	Node Name Node IP Transaction ID Last Written Time Since Last Loaded Edits HA State File System State Block Pool ID Cluster ID Compile Info Distinct Version Count Version	Block Capacity Blocks Total Capacity Total Capacity Used Capacity Used Non DFS Blocks Corrupt Estimated Capacity Lost Total Blocks Excess Heartbeats Expired Files Total File System Lock Queue Length Blocks Missing Blocks Missing Replication with Factor One Clients Active Data Nodes Dead Data Nodes Decommissioning Dead Data Nodes Decommissioning Live Data Nodes Decomissioning Encryption Zones Number Data Nodes Entering Maintenance Files Under Construction Data Nodes Dead in Maintenance Data Nodes Live in Maintenance Data Nodes Live Storages Stale Replication Pending Timeouts Data Node Message Pending Blocks Pending Deletion Blocks Pending Replication

Object:	Identifiers:	Attributes:	Datapoints:
Hadoop JobHistoryServer	Cluster Namespace Server	Node Name Node IP	GC Count GC Copies Count GC Marks Sweep Compact Count GC Number Info Threshold Exceeded GC Number Warning Threshold Exceeded GC Time GC Copy Time GC Marks Sweep Compact Time GC Total Extra Sleep Time Logs Error Count Logs Fatal Count Logs Info Count Logs Warn Count Memory Heap Committed Memory Heap Max Memory Heap Used Memory Max Memory Non Heap Committed Memory Non Heap Max Memory Non Heap Used Threads Blocked Threads New Threads Runnable Threads Terminated Threads Timed Waiting Threads Waiting

Troubleshooting

Additional information may be found from the Support page.

HAProxy Data Collector

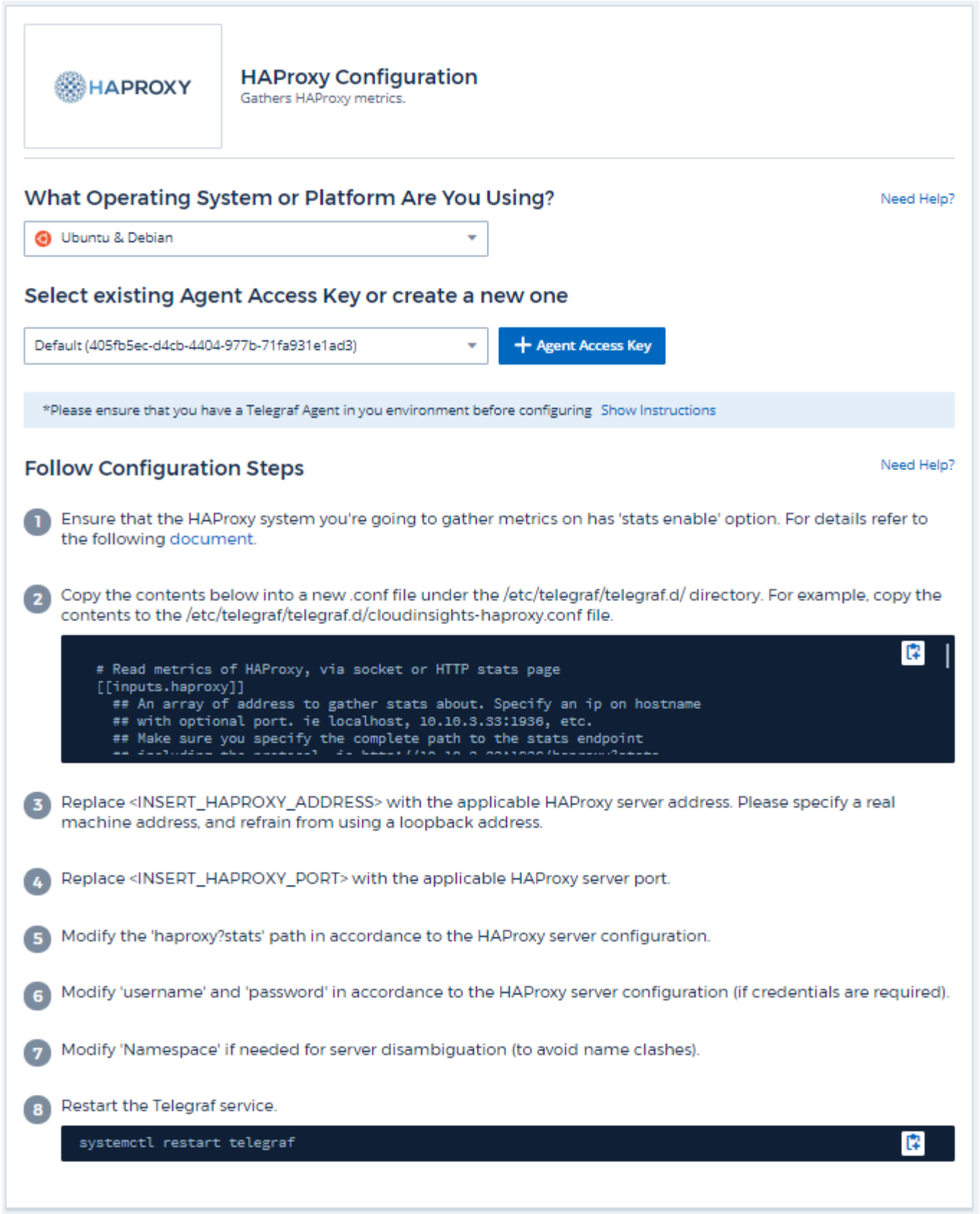
Cloud Insights uses this data collector to gather metrics from HAProxy.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose HAProxy.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Telegraf's plugin for HAProxy relies on HAProxy Stats enablement. This is a configuration built into

HAProxy but it is not enabled out of the box. When enabled, HAProxy will expose an HTML endpoint that can be viewed on your browser or scraped for extraction of status of all HAProxy configurations.

Compatibility:

Configuration was developed against HAProxy version 1.9.4.

Setting Up:

To enable stats, edit your haproxy configuration file and add the the following lines after the 'defaults' section, using your own user/password and/or haproxy URL:

```
stats enable
stats auth myuser:mypassword
stats uri  /haproxy?stats
```

The following is a simplified example configuration file with stats enabled:

```
global
  daemon
  maxconn 256

defaults
  mode http
  stats enable
  stats uri /haproxy?stats
  stats auth myuser:mypassword
  timeout connect 5000ms
  timeout client 50000ms
  timeout server 50000ms

frontend http-in
  bind *:80
  default_backend servers

frontend http-in9080
  bind *:9080
  default_backend servers_2

backend servers
  server server1 10.128.0.55:8080 check ssl verify none
  server server2 10.128.0.56:8080 check ssl verify none

backend servers_2
  server server3 10.128.0.57:8080 check ssl verify none
  server server4 10.128.0.58:8080 check ssl verify none
```

For complete and up to date instructions, see the HAProxy documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
HAProxy Frontend	Namespace Address Proxy	Node IP Node Name Proxy ID Mode Process id Sessions Rate Limit Server id Sessions Limit Status	Bytes In Bytes Out Cache Hits Cache Lookups Compression Bytes Bypassed Compression Bytes In Compression Bytes Out Compression Responses Connection Rate Connection Rate Max Connections Total Requests Denied by Connection Rule Requests Denied by Security Concerns Responses Denied by Security Concerns Requests Denied by Session Rule Requests Errors Responses 1xx Responses 2xx Responses 3xx Responses 4xx Responses 5xx Responses Other Requests Intercepted Sessions Rate Sessions Rate Max Requests Rate Requests Rate Max Requests Total Sessions Sessions Max Sessions Total Requests Rewrites

Object:	Identifiers:	Attributes:	Datapoints:
HAProxy Server	Namespace Address Proxy Server	Node IP Node Name Check Time to Finish Check Fall Configuration Check Health Value Check Rise Configuration Check Status Proxy ID Last Change Time Last Session Time Mode Process id Server id Status Weight	Active Servers Backup Servers Bytes In Bytes Out Check Downs Check Fails Client Aborts Connections Connection Average Time Downtime Total Denied Responses Connection Errors Response Errors Responses 1xx Responses 2xx Responses 3xx Responses 4xx Responses 5xx Responses Other Server Selected Total Queue Current Queue Max Queue Average Time Sessions per Second Sessions per Second Max Connection Reuse Response Time Average Sessions Sessions Max Server Transfer Aborts Sessions Total Sessions Total Time Average Requests Redispatches Requests Retries Requests Rewrites

Object:	Identifiers:	Attributes:	Datapoints:
HAProxy Backend	Namespace Address Proxy	Node IP Node Name Proxy ID Last Change Time Last Session Time Mode Process id Server id Sessions Limit Status Weight	Active Servers Backup Servers Bytes In Bytes Out Cache Hits Cache Lookups Check Downs Client Aborts Compression Bytes Bypassed Compression Bytes In Compression Bytes Out Compression Responses Connections Connection Average Time Downtime Total Requests Denied by Security Concerns Responses Denied by Security Concerns Connection Errors Response Errors Responses 1xx Responses 2xx Responses 3xx Responses 4xx Responses 5xx Responses Other Server Selected Total Queue Current Queue Max Queue Average Time Sessions per Second Sessions per Second Max Requests Total Connection Reuse Response Time Average Sessions Sessions Max Server Transfer Aborts Sessions Total Sessions Total Time

Troubleshooting

Additional information may be found from the Support page.

JVM Data Collector

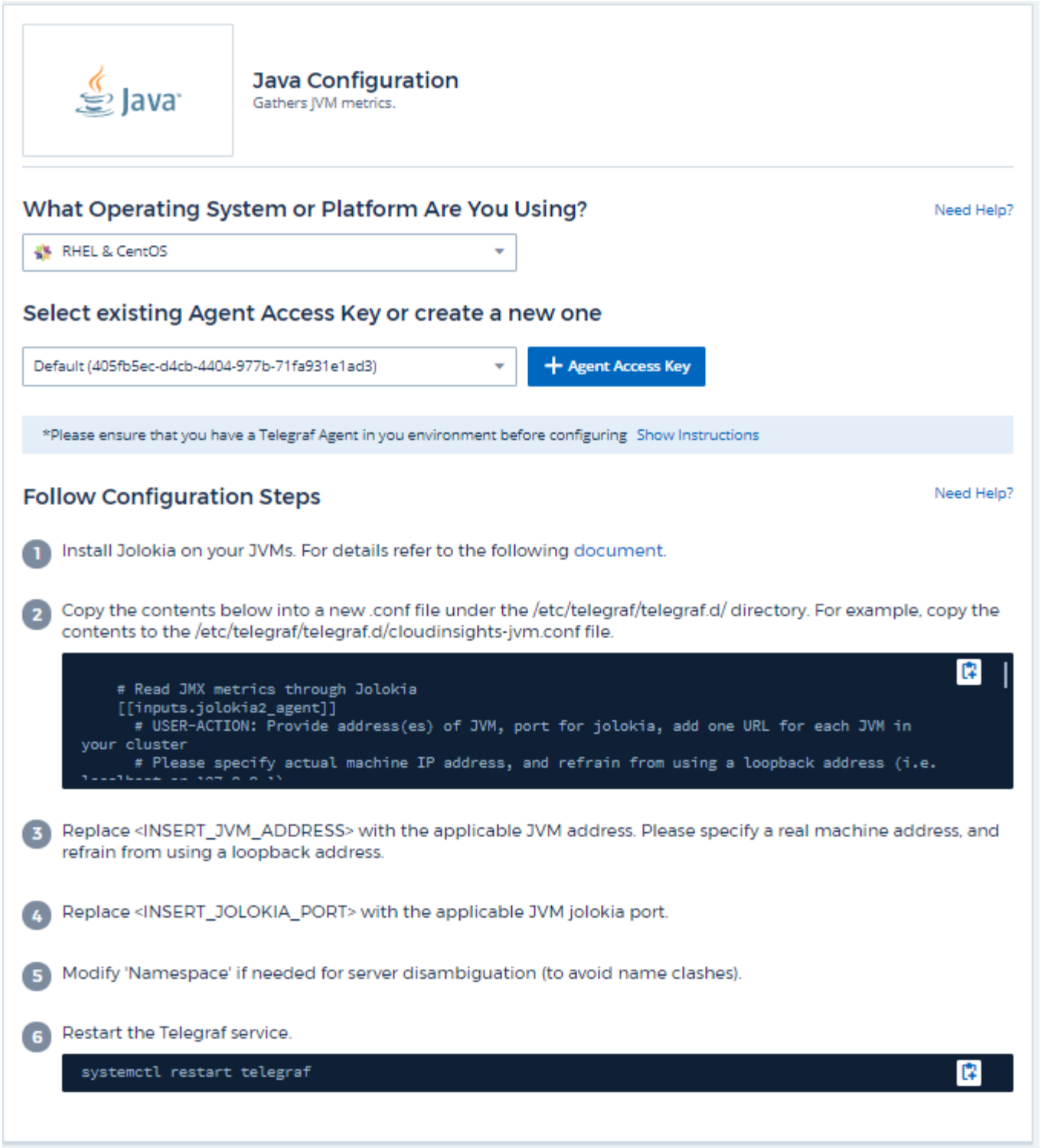
Cloud Insights uses this data collector to gather metrics from JVM.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose JVM.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in JVM documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
JVM	Namespace JVM	OS Architecture OS Name OS Version Runtime Specification Runtime Specification Vendor Runtime Specification Version Uptime Runtime VM Name Runtime VM Vendor Runtime VM Version Node Name Node IP	Class Loaded Class Loaded Total Class Unloaded Memory Heap Committed Memory Heap Init Memory Heap Used Max Memory Heap Used Memory Non Heap Committed Memory Non Heap Init Memory Non Heap Max Memory Non Heap Used Memory Objects Pending Finalization OS Processors Available OS Committed Virtual Memory Size OS Free Physical Memory Size OS Free Swap Space Size OS Max File Descriptor Count OS Open File Descriptors Count OS Processor CPU Load OS Processor CPU Time OS System CPU Load OS System Load Average OS Total Physical Memory Size OS Total Swap Space Size Thread Daemon Count Thread Peak Count Thread Count Thread Total Started Count Garbage Collector Copy Collection Count Garbage Collector Copy Collection Time Garbage Collector Mark-sweep Collection Count

Troubleshooting

Additional information may be found from the Support page.

Kafka Data Collector

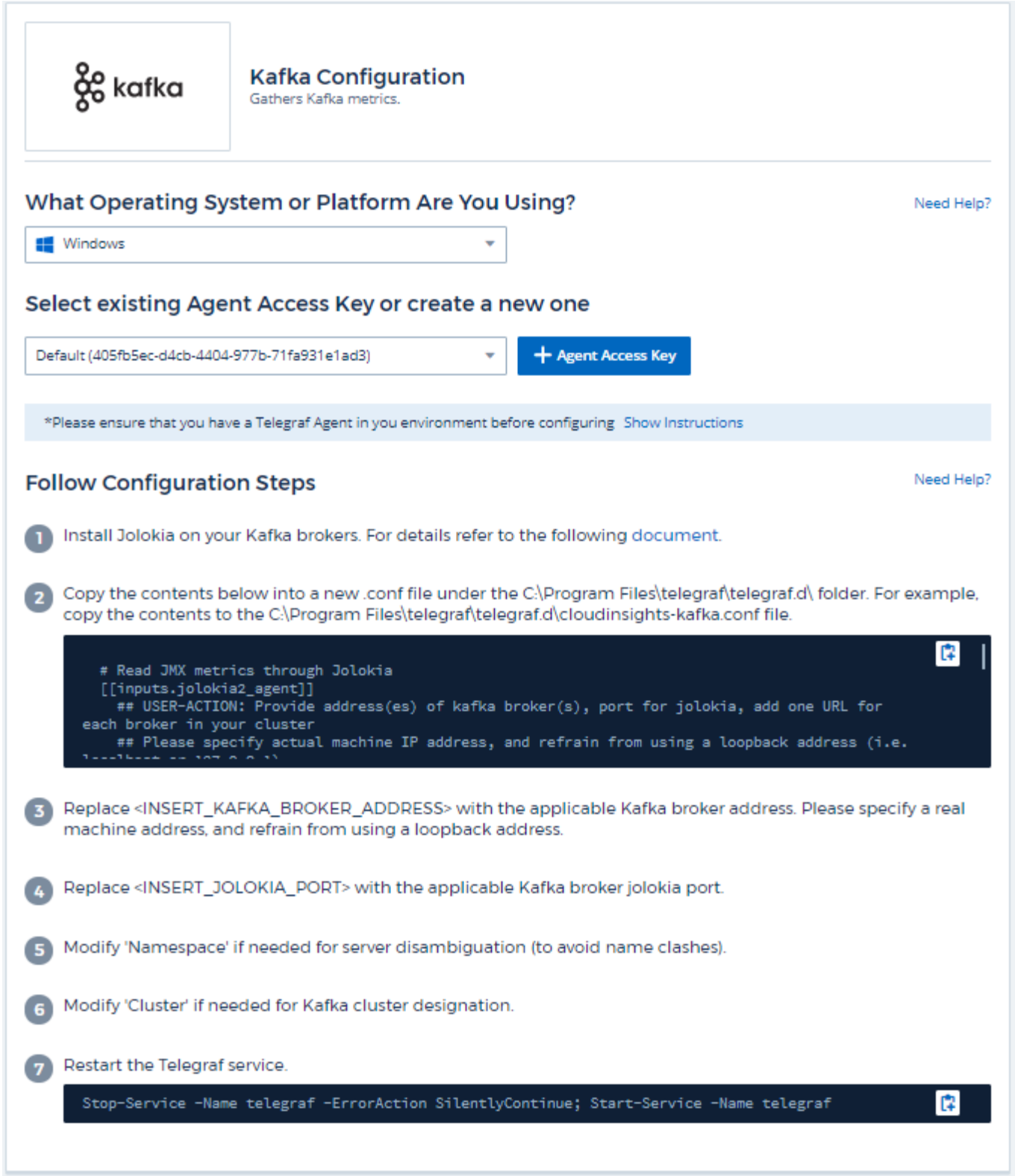
Cloud Insights uses this data collector to gather metrics from Kafka.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Kafka.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

The Kafka plugin is based on the telegraf's Jolokia plugin. As such as a requirement to gather info from all Kafka brokers, JMX needs to be configured and exposed via Jolokia on all components.

Compatibility

Configuration was developed against Kafka version 0.11.0.2.

Setting up

All the instructions below assume your install location for kafka is '/opt/kafka'. You can adapt instructions below to reflect your install location.

Jolokia Agent Jar

A version the Jolokia agent jar file must be downloaded. The version tested against was Jolokia agent 1.6.0.

Instructions below assume that the downloaded jar file (jolokia-jvm-1.6.0-agent.jar) is placed under the location '/opt/kafka/libs/'.

Kafka Brokers

To configure Kafka Brokers to expose the Jolokia API, you can add the following in <KAFKA_HOME>/bin/kafka-server-start.sh, just before the 'kafka-run-class.sh' call:

```
export JMX_PORT=9999
export RMI_HOSTNAME=`hostname -I`
export KAFKA_JMX_OPTS="-javaagent:/opt/kafka/libs/jolokia-jvm-1.6.0-
agent.jar=port=8778,host=0.0.0.0
-Dcom.sun.management.jmxremote.password.file=/opt/kafka/config/jmxremote.password
-Dcom.sun.management.jmxremote.ssl=false -Djava.rmi.server.hostname=$RMI_HOSTNAME
-Dcom.sun.management.jmxremote.rmi.port=$JMX_PORT"
```

Note that example above is using 'hostname -I' to setup the 'RMI_HOSTNAME' environment variable. In multiple IP machines, this will need to be tweaked to gather the IP you care about for RMI connections.

You can choose a different port for JMX (9999 above) and Jolokia (8778). If you have an internal IP to lock Jolokia onto you can replace the "catch all" 0.0.0.0 by your own IP. Notice this IP needs to be accessible from the telegraf plugin. You can use the option '-Dcom.sun.management.jmxremote.authenticate=false' if you don't want to authenticate. Use at your own risk.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Kafka Broker	Cluster Namespace Broker	Node Name Node IP	Replica Manager Fetcher Max Lag Zookeeper Client Connections Zookeeper Client Connections (15m rate) Zookeeper Client Connections (5m rate) Zookeeper Client Connections (mean rate) Zookeeper Client Connections (1m rate) Replica Manager Partition Count Thread Count Daemon Thread Count Peak Thread Count Current Thread Count Total Started Offline Partitions Produce Requests Total Time (50th Percentile) Produce Requests Total Time (75th Percentile) Produce Requests Total Time (95th Percentile) Produce Requests Total Time (98 Percentile) Produce Requests Total Time (999th Percentile) Produce Requests Total Time (99th Percentile) Produce Requests Total Time Produce Requests Total Time Max Produce Requests Total Time Mean Produce Requests Total Time Min Produce Requests Total Time Stddev Replica Manager ISR Shrinks

Troubleshooting

Additional information may be found from the Support page.

Kibana Data Collector

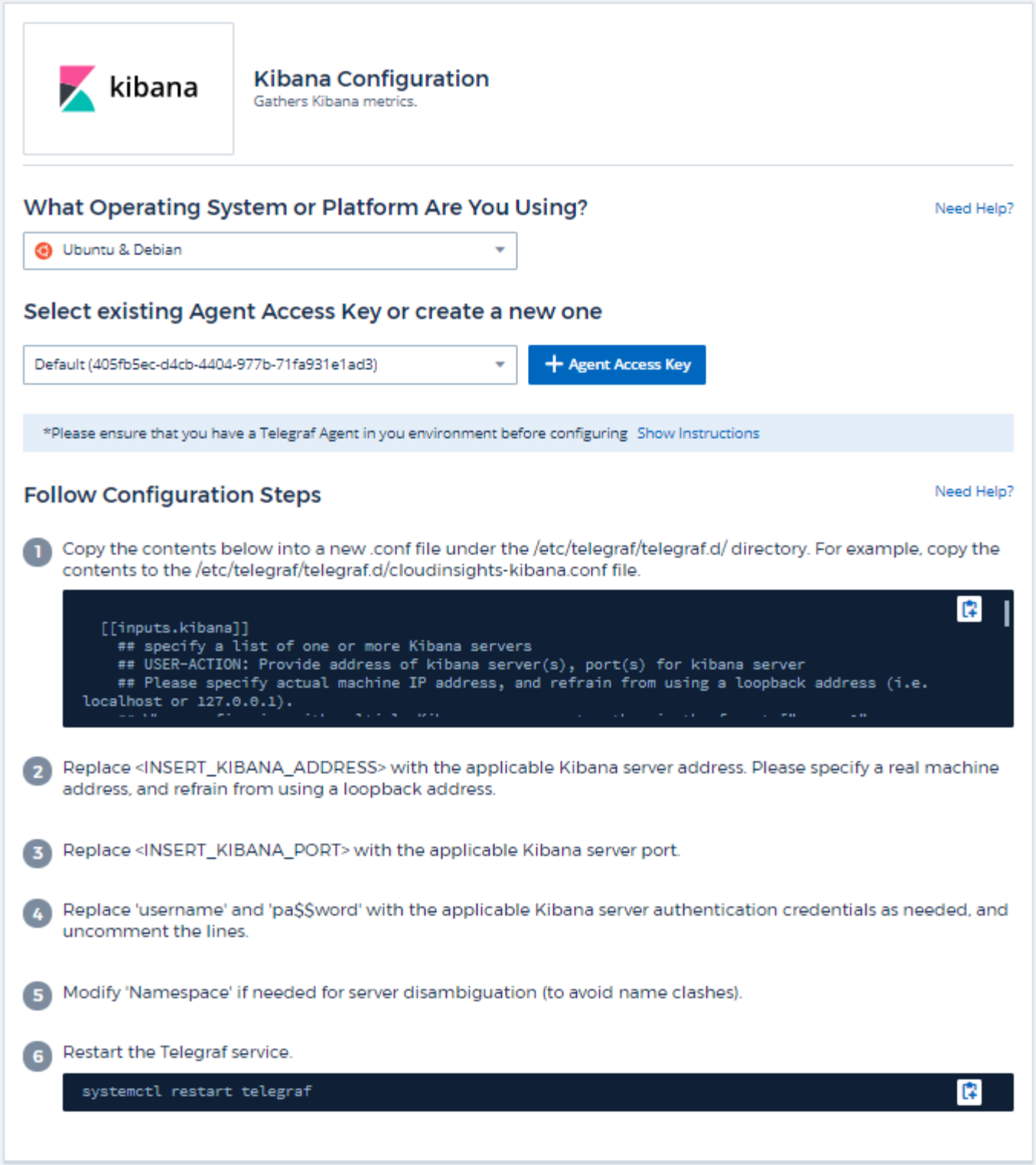
Cloud Insights uses this data collector to gather metrics from Kibana.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Kibana.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the Kibana documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Kibana	Namespace Address	Node IP Node Name Version Status	Concurrent Connections Heap Max Heap Used Requests per Second Response Time Average Response Time Max Uptime

Troubleshooting

Additional information may be found from the Support page.

Kubernetes Data Collector

Cloud Insights uses this data collector to gather Kubernetes Pod, Node, and Container metrics.

Installation

It is strongly recommended to deploy the Telegraf agent as a DaemonSet and a ReplicaSet within the Kubernetes environment itself, by selecting *Kubernetes* as the platform during agent installation.

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Kubernetes.

   If you haven't configured an Agent for collection, you are prompted to install an agent in your environment.

   If you have an agent already configured, select the appropriate Operating System or Platform and click **Continue**.

2. Follow the instructions in the Kubernetes Configuration screen to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data. The example below shows the instructions for installing the Kubernetes data collector on the Kubernetes platform:

Note that there are two different config maps that need updating: *telegraf-conf* for the DaemonSet and *telegraf-conf-rs* for the ReplicaSet. The latter is used to obtain kube-state-metrics data.

Setup

The Telegraf input plugin for Kubernetes collects metrics through the /stats/summary endpoint of the kubelet REST API as well as the kube-state-metrics server (if it exists).

Compatibility

Configuration was developed against Kubernetes version 1.9.1.

Configuring an Agent to Collect Data from Kubernetes

For Kubernetes environments, Cloud Insights deploys the Telegraf agent as a DaemonSet and a ReplicaSet. The pods in which the agents run need to have access to the following:

- hostPath
- configMap
- secrets

These Kubernetes objects are automatically created as part of the Kubernetes agent install command provided in the Cloud Insights UI. Some variants of Kubernetes, such as OpenShift, implement an added level of security that may block access to these components. The *SecurityContextConstraint* is not created as part of the Kubernetes agent install command provided in the Cloud Insights UI, and must be created manually. Once created, restart the Telegraf pod(s).

```
    apiVersion: v1
    kind: SecurityContextConstraints
    metadata:
      name: telegraf-hostaccess
      creationTimestamp:
      annotations:
        kubernetes.io/description: telegraf-hostaccess allows hostpath volume mounts for
restricted SAs.
      labels:
        app: ci-telegraf
    priority: 10
    allowPrivilegedContainer: false
    defaultAddCapabilities: []
    requiredDropCapabilities: []
    allowedCapabilities: []
    allowedFlexVolumes: []
    allowHostDirVolumePlugin: true
    volumes:
    - hostPath
    - configMap
    - secret
    allowHostNetwork: false
    allowHostPorts: false
    allowHostPID: false
    allowHostIPC: false
    seLinuxContext:
      type: MustRunAs
    runAsUser:
      type: RunAsAny
    supplementalGroups:
      type: RunAsAny
    fsGroup:
      type: RunAsAny
    readOnlyRootFilesystem: false
    users:
    - system:serviceaccount:monitoring:telegraf-user
    groups: []
```

Setting Up

For collecting Kubernetes metrics, the best practice is to deploy the Telegraf agent as a DaemonSet and a ReplicaSet within the Kubernetes environment of interest itself. The Cloud Insights agent install command does this if run on one of the Kubernetes nodes in the cluster. With the DaemonSet that is created, you can simply specify the "$HOSTIP" environment variable for <INSERT_KUBELET_ADDRESS> in the telegraf-conf ConfigMap.

The pods in which the Telegraf agents run need to have access to a valid Kubernetes access token file in order to use the required kubelet API. To configure a Telegraf agent running outside the Kubernetes cluster of interest, you must manually generate this Kubernetes access token file, and configure the Telegraf agent to use this access token file.

To manually generate the Kubernetes access token, run the following in a Bash shell:

```
SECRET=$(sudo kubectl --namespace kube-system describe sa default |grep Tokens |awk
'{print $2}')
```

```
TOKEN=$(sudo kubectl --namespace kube-system describe secrets $SECRET |grep ^token |awk
'{print $2}')
```

To verify that the access token works as needed, run the following to confirm the kubelet API is accessible:

```
curl -v -X GET -H "Authorization: Bearer $TOKEN"
https://<KUBELET_ADDRESS>:<KUBELET_PORT>/stats/summary
```

To create the required access token file, run the following:

```
mkdir -p /var/run/secrets/kubernetes.io/serviceaccount/
```

```
echo -n $TOKEN | sudo tee /var/run/secrets/kubernetes.io/serviceaccount/token
```

By default, the Kubernetes input plugin configuration provided by CloudInsights is set up to look for the required access token file in the location used above. After performing the steps above, restart the Telegraf agent for the changes to take effect.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Kubernetes Container	Namespace Pod Container Cluster	Kubernetes Node Node Name Node OS Node UUID Node IP	CPU Nanoseconds CPU Usage Nanocores Memory Major Page Faults Memory Resident Set Size (RSS) Memory Working Set Memory Page Faults Memory Usage Root Filesystem Available Root Filesystem Capacity Root Filesystem Used
Kubernetes Node	Kubernetes Node Cluster	Node Name Node OS Node UUID Node IP	CPU Usage Nanocores CPU Usage Nanoseconds Filesystem Available Filesystem Total Filesystem Used Memory Available Memory Usage Memory Major Page Faults Memory Page Faults Memory Resident Set Size (RSS) Memory Working Set Network RX Errors (per sec) Network RX Bytes (per sec) Network TX Errors (per sec) Network TX Bytes (per sec) Runtime Image Filesystem Available Runtime Image Filesystem Used Runtime Image Filesystem Capacity

Object:	Identifiers:	Attributes:	Datapoints:
Kubernetes Pod	Namespace Pod Cluster	Kubernetes Node Node Name Node IP Node OS Node UUID	Network TX Bytes (per sec) Network TX Errors (per sec) Network RX Bytes (per sec) Network RX Errors (per sec)
Kubernetes Pod Volume	Volume Pod Cluster Namespace	Kubernetes Node Node Name Node UUID Node IP Node OS	Available Capacity Used
Kubernetes System Container	System Container Kubernetes Node Cluster	Node Name Node IP Node OS Node UUID	CPU Usage Nanocores CPU Usage Core Nanoseconds Memory Major Page Faults Memory Page Faults Memory Resident Set Size (RSS) Memory Usage Memory Working Set Root Filesystem Available Root Filesystem Capacity Logs Filesystem Available Logs Filesystem Capacity

Installing the kube-state-metrics server

When you install the kube-state-metrics server you can enable collection of the following Kubernetes objects: StatefulSet, DaemonSet, Deployment, PV, PVC, ReplicaSet, Service, Namespace, Secret, ConfigMap, Pod Volume, and Ingress.

Use the following steps to install the kube-state-metrics server:

Steps

1. Create a temporary folder (for example, */tmp/kube-state-yaml-files/*) and copy the .yaml files from

https://github.com/kubernetes/kube-state-metrics/tree/master/examples/standard to this folder.

2. Run the following command to apply the .yaml files needed for installing kube-state-metrics:

```
kubectl apply -f /tmp/kube-state-yaml-files/
```

kube-state-metrics Counters

Use the following links to access information for the kube state metrics counters:

1. Cronjob Metrics
2. DaemonSet Metrics
3. Deployment Metrics
4. Endpoint Metrics
5. Horizontal Pod Autoscaler Metrics
6. Ingress Metrics
7. Job Metrics
8. LimitRange Metrics
9. Namespace Metrics
10. Node Metrics
11. Persistent Volume Metrics
12. Persistant Volume Claim Metrics
13. Pod Metrics
14. Pod Disruption Budget Metrics
15. ReplicaSet metrics
16. ReplicationController Metrics

Troubleshooting

Problem:	Try this:
I ran the Kubernetes agent installer command, but I do not see a Telegraf agent pod running via: sudo kubectl --namespace monitoring get pods	Check if there were any errors deploying the DaemonSet: sudo kubectl --namespace monitoring describe ds telegraf-ds If there are errors related to SecurityContextConstraints, do the following: 1. Generate the Telegraf DaemonSet YAML sudo kubectl --namespace monitoring get ds telegraf-ds -o yaml > /tmp/telegraf-ds.yaml 2. Stop the Telegraf service sudo kubectl --namespace monitoring delete ds telegraf-ds 3. Create the necessary SecurityContextConstraint (see "Configuring Agent to Collect Data" section) 4. Re-create the Telegraf DaemonSet
I configured Telegraf to obtain information about my Kubernetes cluster, but I don't see any information in Cloud Insights. I see "invalid header field value" errors in the Telegraf log file pertaining to the kubernetes input plugin I configured.	Ensure the referenced bearer_token file does not have a trailing newline. To verify, run the following command, and confirm that it returns 0: tail -c1 <bearer_token_file>

Additional information may be found from the Support page.

Memcached Data Collector

Cloud Insights uses this data collector to gather metrics from Memcached.

Installation

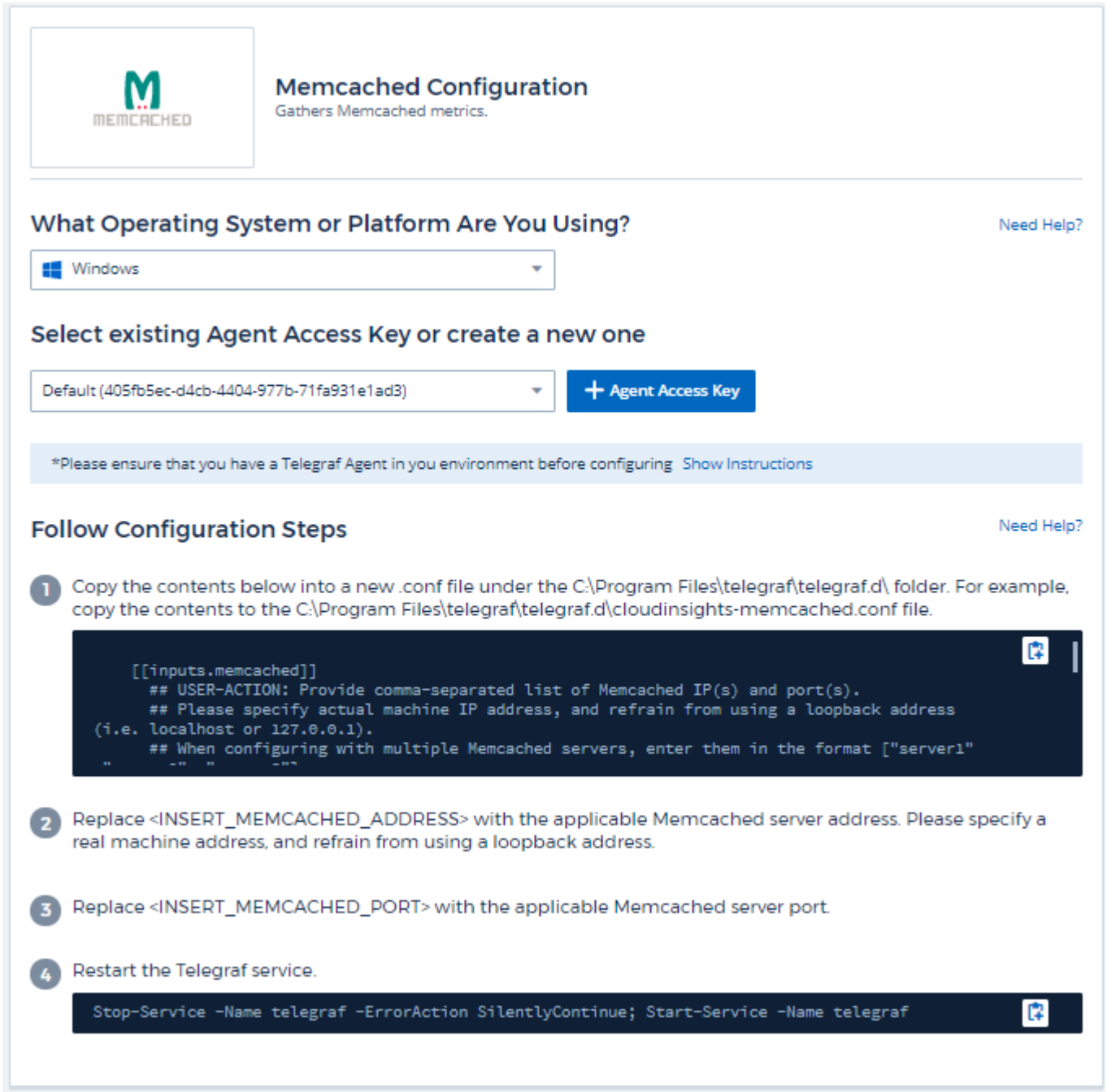
1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Memcached.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a

different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.

3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the Memcached wiki.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Memcached	Namespace Server	Node IP Node Name	Accepting Connections Handled Authentication Requests Failed Authentications Bytes Used Bytes Read (per sec) Bytes Written (per sec) CAS Badval CAS Hits CAS Misses Flush Reqs (per sec) Get Reqs (per sec) Set Reqs (per sec) Touch Reqs (per sec) Connection Yields (per sec) Connection Structures Open Connections Current Stored Items Decr Requests Hits (per sec) Decr Requests Misses (per sec) Delete Requests Hits (per sec) Delete Requests Misses (per sec) Items Evicted Valid Evictions Expired Items Get Hits (per sec) Get Misses (per sec) Used Hash Bytes Hash Is Expanding Hash Power Level Incr Requests Hits (per sec) Incr Requests Misses (per sec) Server Max Bytes Listen Disabled Num Reclaimed Worker Threads Count Total Opened

Troubleshooting

Additional information may be found from the Support page.

MongoDB Data Collector

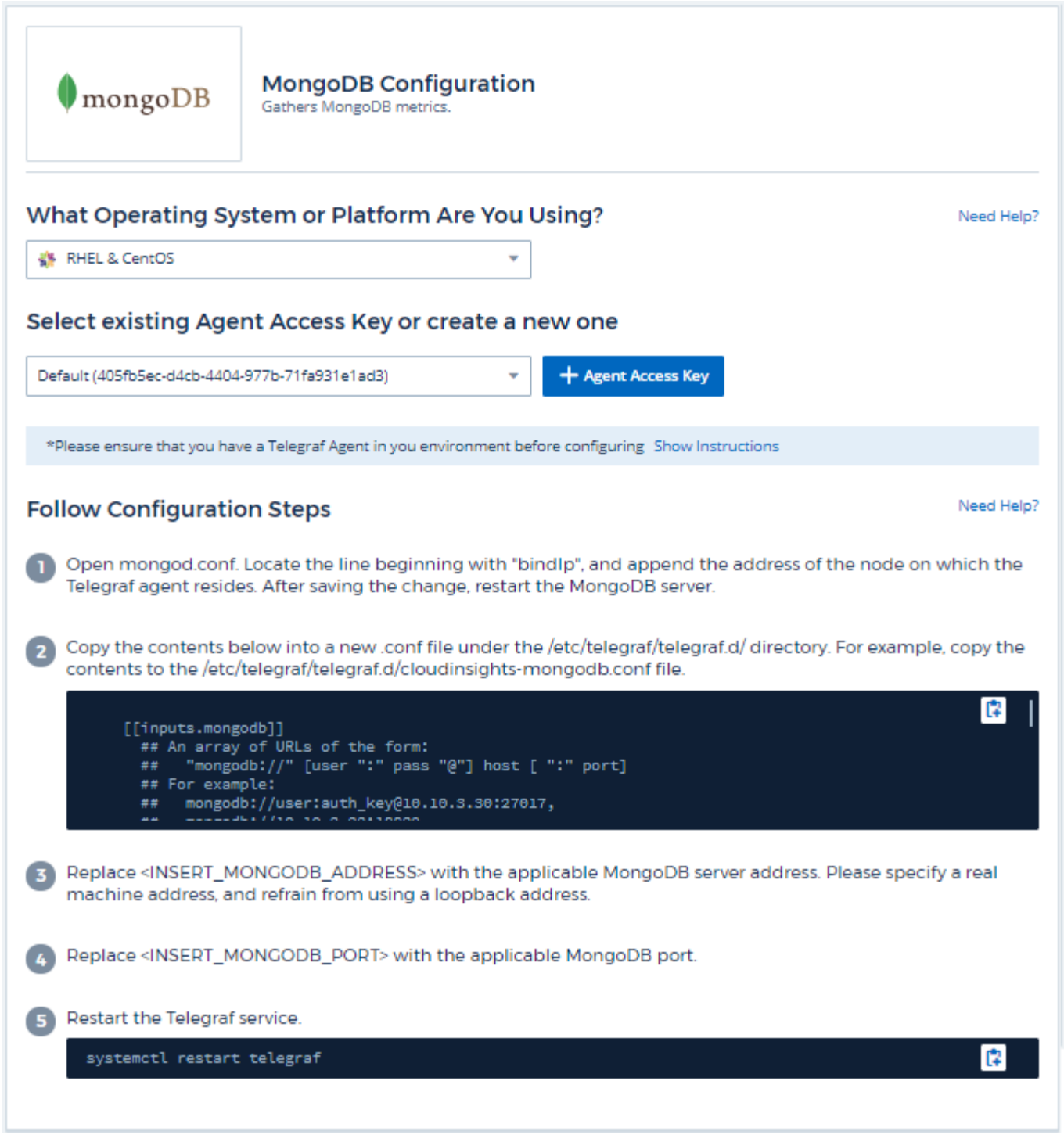
Cloud Insights uses this data collector to gather metrics from MongoDB.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose MongoDB.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the MongoDB documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
MongoDB	Namespace Hostname		
MongoDB Database	Namespace Hostname Database name		

Troubleshooting

Information may be found from the Support page.

MySQL Data Collector

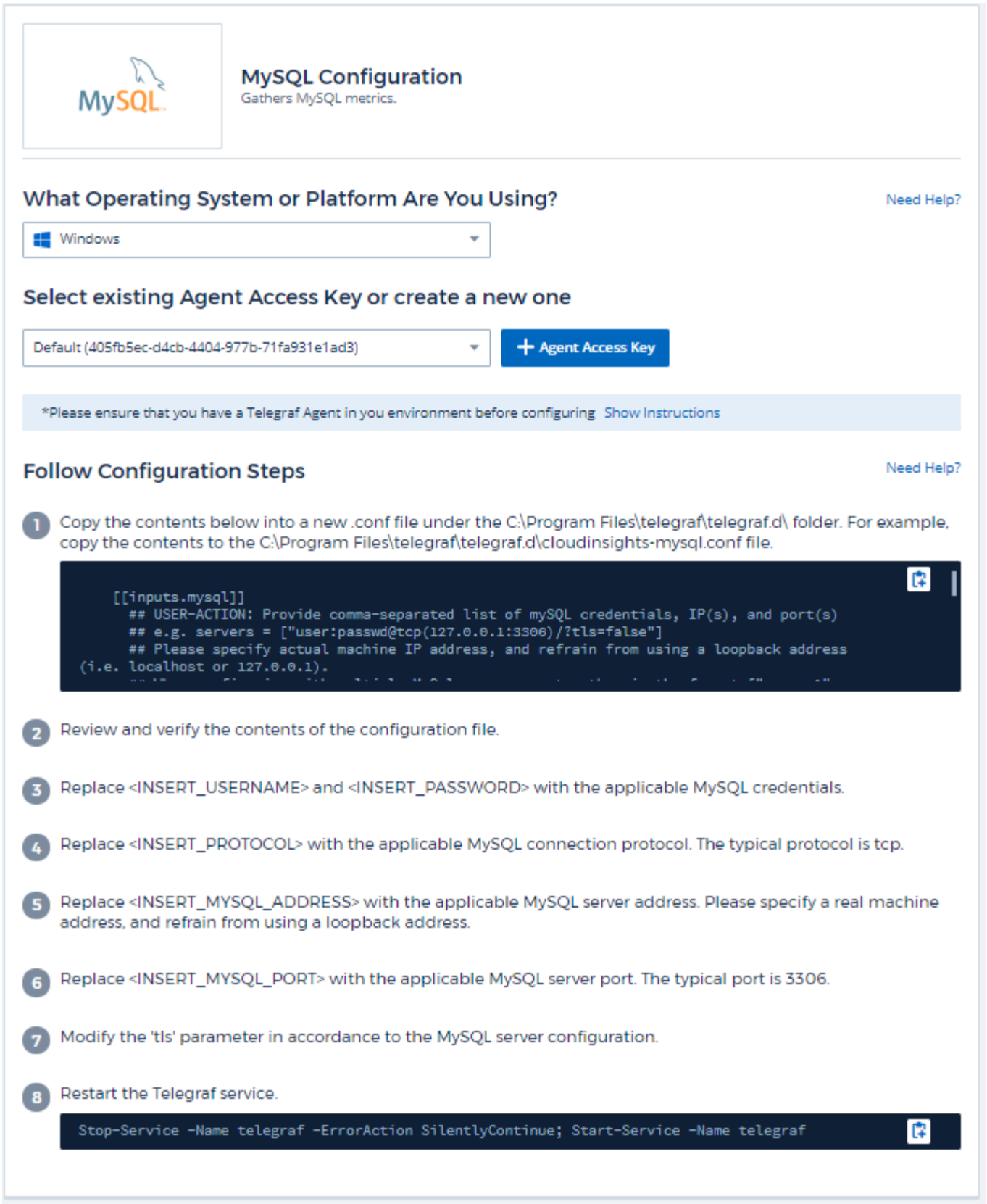
Cloud Insights uses this data collector to gather metrics from MySQL.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose MySQL.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the MySQL documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
MySQL	Namespace MySQL Server	Node IP Node Name	Aborted Clients (per sec) Aborted Connects (per sec) RX Bytes (per sec) TX Bytes (per sec) Commands Admin (per sec) Commands Alter Event Commands Alter Function Commands Alter Instance Commands Alter Procedure Commands Alter Server Commands Alter Table Commands Alter Tablespace Commands Alter User Commands Analyze Commands Assign To Keycache Commands Begin Commands Binlog Commands Call Procedure Commands Change DB Commands Change Master Commands Change Repl Filter Commands Check Commands Checksum Commands Commit Commands Create DB Commands Create Event Commands Create Function Commands Create Index Commands Create Procedure Commands Create Server Commands Create Table

Troubleshooting

Additional information may be found from the Support page.

Netstat Data Collector

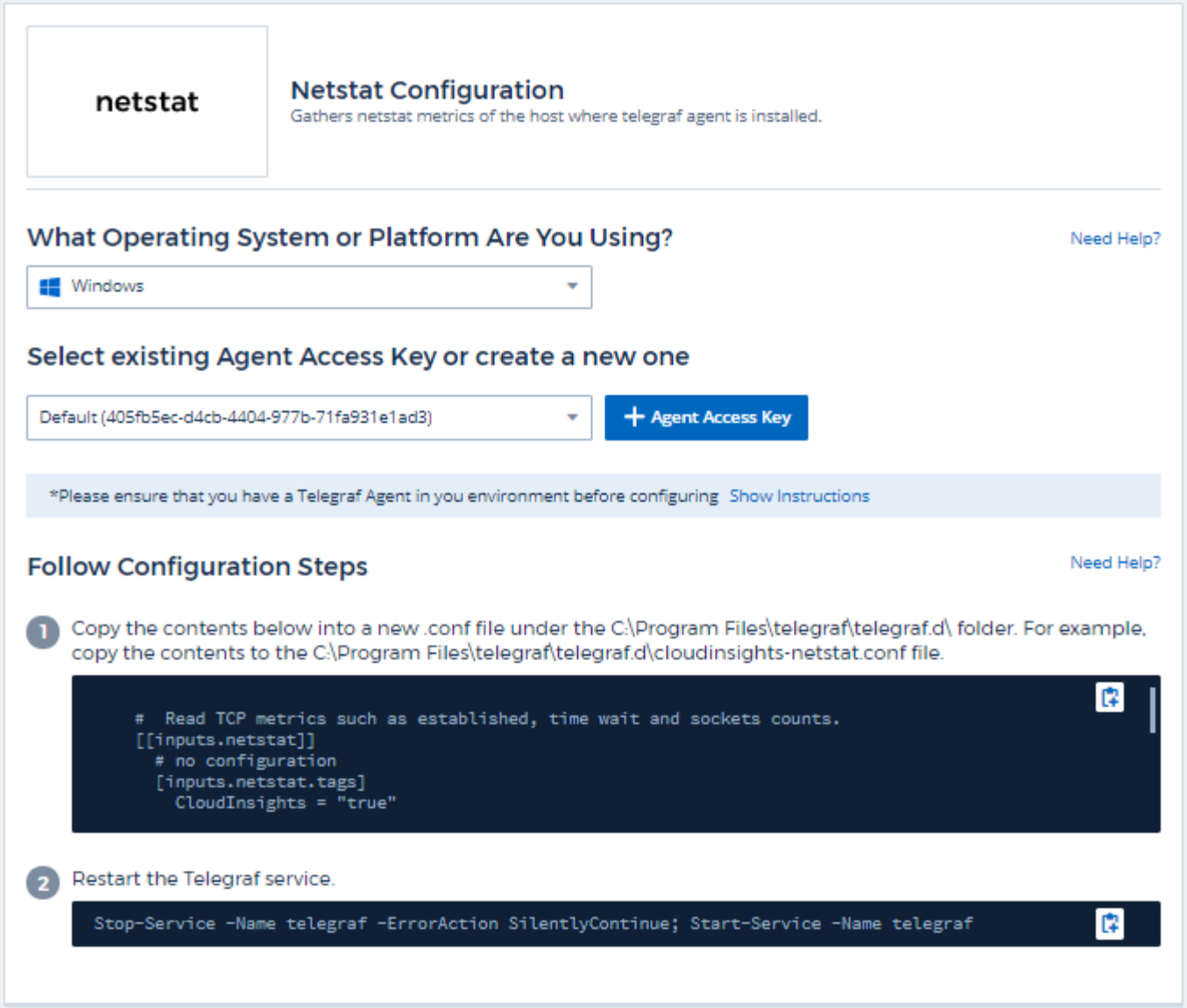
Cloud Insights uses this data collector to gather Netstat metrics.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Netstat.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Netstat	Node UUID	Node IP Node Name	

Troubleshooting

Additional information may be found from the Support page.

Nginx Data Collector

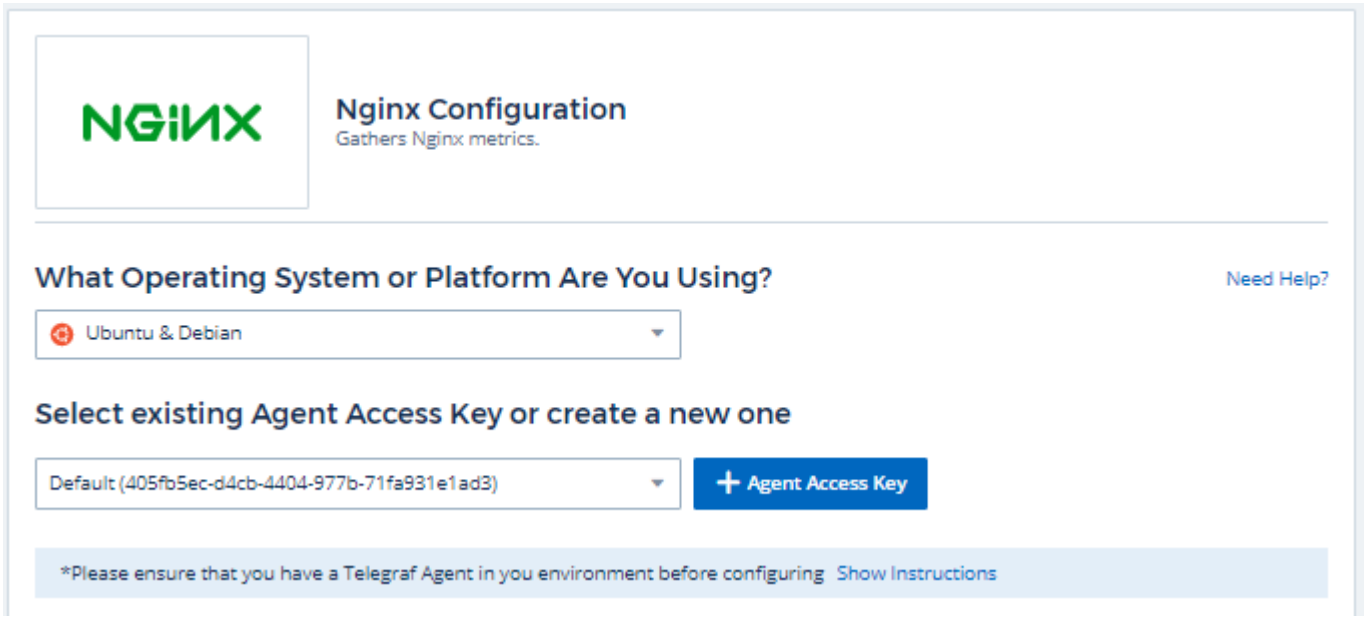
Cloud Insights uses this data collector to gather metrics from Nginx.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Nginx.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Nginx metric collection requires that Nginx http_stub_status_module be enabled.

Additional information may be found in the Nginx documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Nginx	Namespace Server	Node IP Node Name Port	Accepts Active Handled Reading Requests Waiting Writing

Troubleshooting

Additional information may be found from the Support page.

PostgreSQL Data Collector

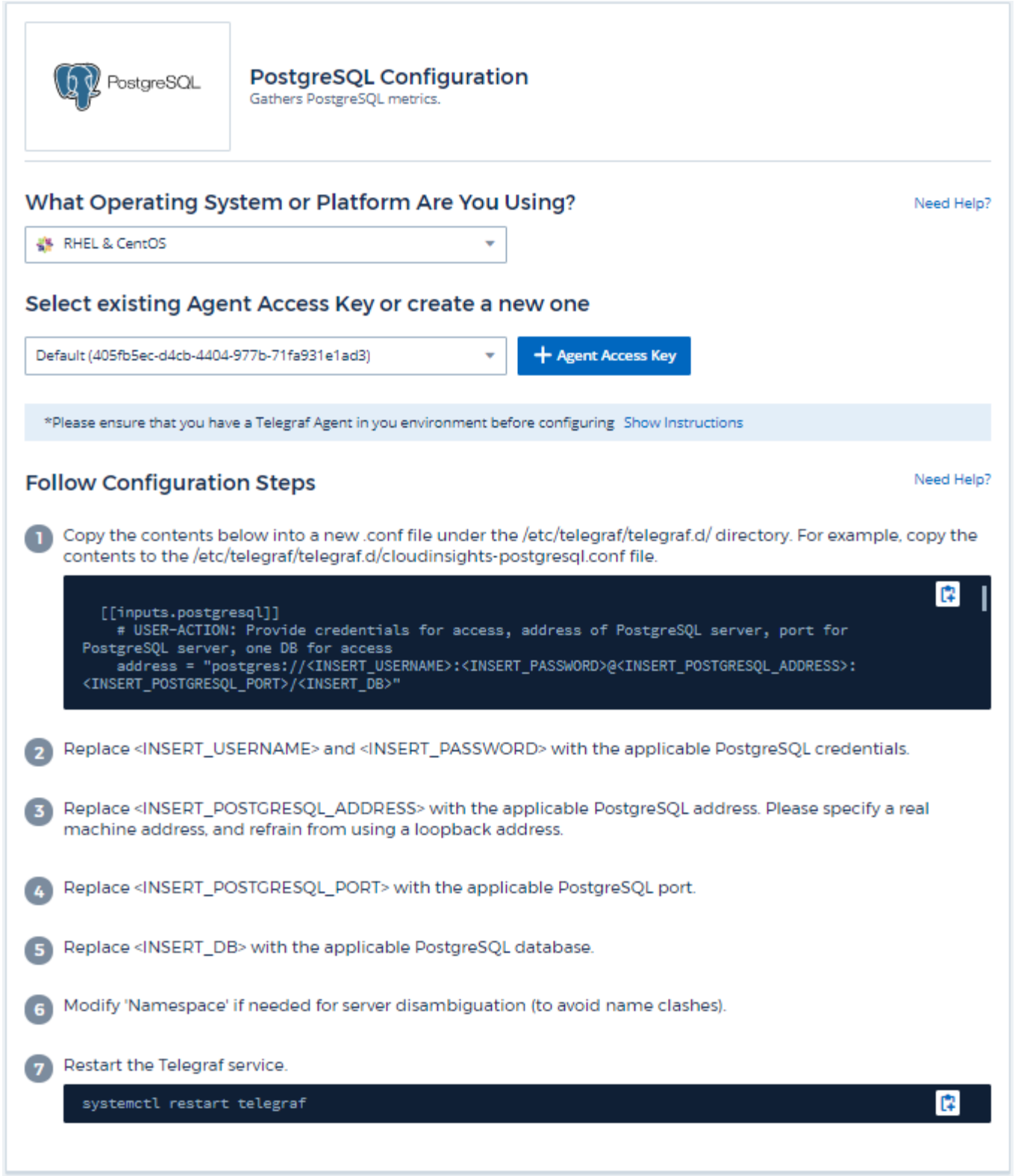
Cloud Insights uses this data collector to gather metrics from PostgreSQL.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose PostgreSQL.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the PostgreSQL documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
PostgreSQL Server	Namespace Database Server	Node Name Node IP	Buffers Allocated Buffers Backend Buffers Backend File Sync Buffers Checkpoint Buffers Clean Checkpoints Sync Time Checkpoints Write Time Checkpoints Requests Checkpoints Timed Max Written Clean
PostgreSQL Database	Namespace Database Server	Database OID Node Name Node IP	Blocks Read Time Blocks Write Time Blocks Hits Blocks Reads Conflicts Deadlocks Client Number Temp Files Bytes Temp Files Number Rows Deleted Rows Fetched Rows Inserted Rows Returned Rows Updated Transactions Committed Transactions Rollbacked

Troubleshooting

Additional information may be found from the Support page.

Puppet Agent Data Collector

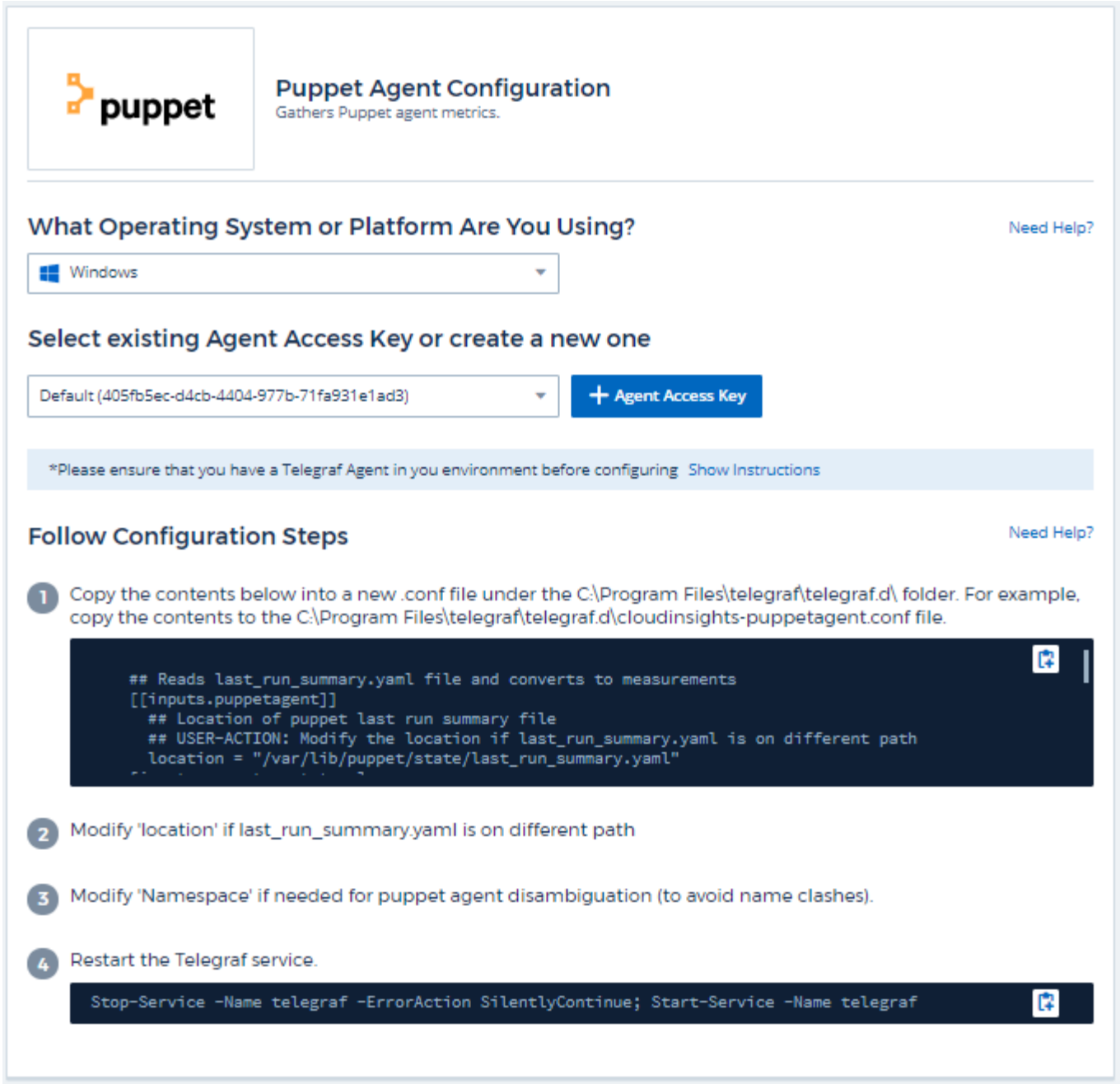
Cloud Insights uses this data collector to gather metrics from Puppet Agent.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Puppet.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the Puppet documentation

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:

Puppet Agent	Namespace Node UUID	Node Name Location Node IP Version Configstring Version Puppet	Changes Total Events Failure Events Success Events Total Resources Changed Resources Failed Resources Failed To Restart Resources Outofsync Resources Restarted Resources Scheduled Resources Skipped Resources Total Time Anchor Time Configretrieval Time Cron Time Exec Time File Time Filebucket Time Lastrun Time Package Time Schedule Time Service Time Sshauthorizedkey Time Total Time User

Troubleshooting

Additional information may be found from the Support page.

Redis Data Collector

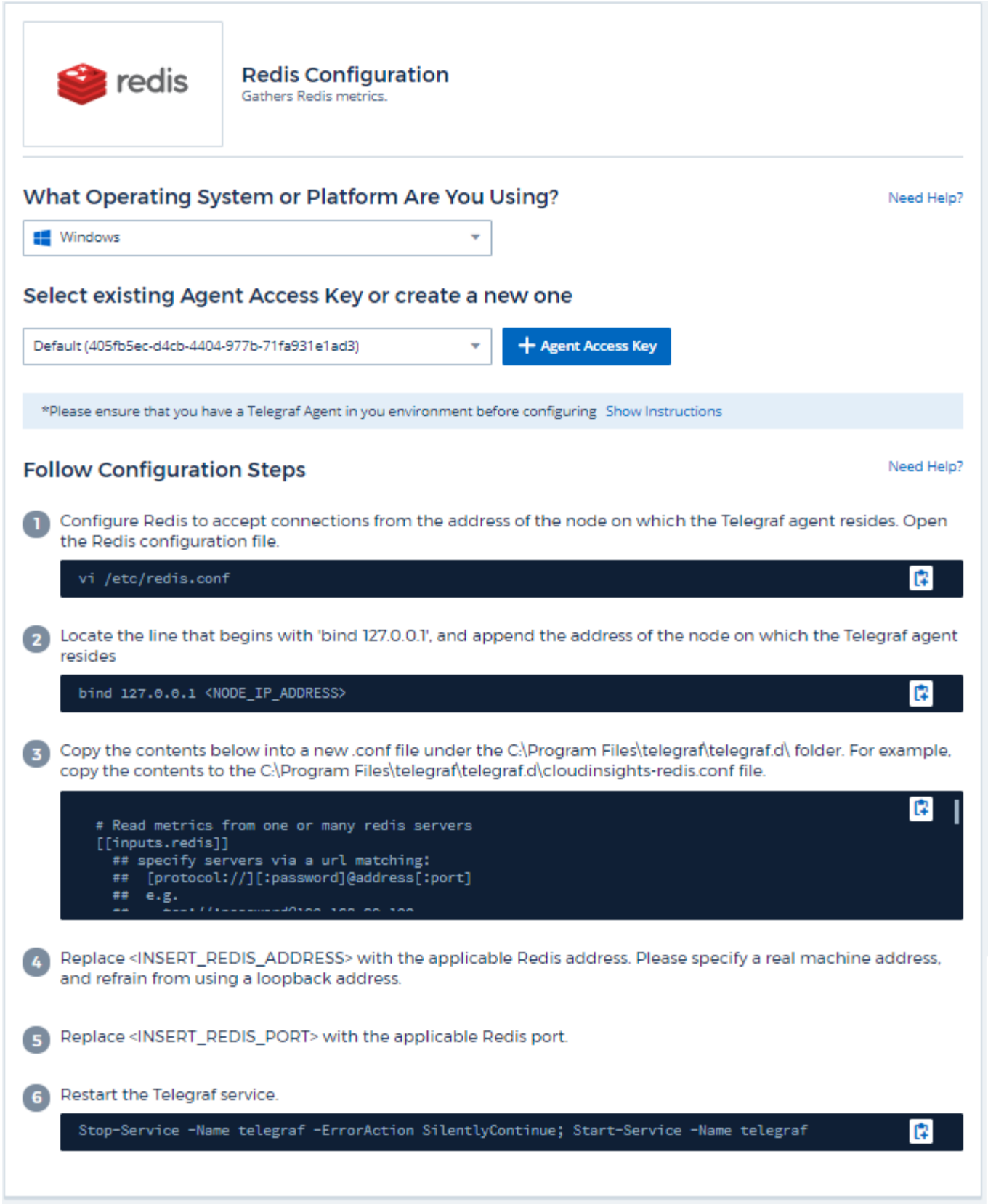
Cloud Insights uses this data collector to gather metrics from Redis. Redis is an open source, in-memory data structure store used as a database, cache, and message broker, supporting the following data structures: strings, hashes, lists, sets, and more.

Installation

1. From **Admin** > **Data Collectors**, click +**Data Collector**. Under **Services**, choose Redis.

   Select the Operating System or Platform on which the Telegraf agent is installed.

2. If you haven't already installed an Agent for collection, or you wish to install an Agent for a different Operating System or Platform, click *Show Instructions* to expand the Agent installation instructions.
3. Select the Agent Access Key for use with this data collector. You can add a new Agent Access Key by clicking the + **Agent Access Key** button. Best practice: Use a different Agent Access Key only when you want to group data collectors, for example, by OS/Platform.
4. Follow the configuration steps to configure the data collector. The instructions vary depending on the type of Operating System or Platform you are using to collect data.



Setup

Information may be found in the Redis documentation.

Objects and Counters

The following objects and their counters are collected:

Object:	Identifiers:	Attributes:	Datapoints:
Redis	Namespace Server		

Troubleshooting

Additional information may be found from the Support page.

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