



# Hadoop Data Collector

## Cloud Insights

Tony Lavoie

February 28, 2020

This PDF was generated from [https://docs.netapp.com/us-en/cloudinsights/task\\_config\\_telegraf\\_hadoop.html](https://docs.netapp.com/us-en/cloudinsights/task_config_telegraf_hadoop.html) on May 21, 2020. Always check docs.netapp.com for the latest.

# Table of Contents

- Hadoop Data Collector ..... 1
  - Installation ..... 1
  - Setup ..... 2
  - Objects and Counters ..... 5
  - Troubleshooting ..... 11

# 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.



**Hadoop Configuration**  
Gathers Hadoop metrics.

---

**What Operating System or Platform Are You Using?**[Need Help?](#)

Ubuntu & Debian ▼

**Select existing Agent Access Key or create a new one**

Default (405fb5ec-d4cb-4404-977b-71fa931e1ad3) ▼

+ Agent Access Key

\*Please ensure that you have a Telegraf Agent in you environment before configuring [Show Instructions](#)

## Follow Configuration Steps

[Need Help?](#)

- 1 Install Jolokia on your Hadoop NameNode, Secondary NameNode, DataNode(s), ResourceManager, NodeManager(s) and JobHistoryServer. For details refer to the following [document](#).
- 2 Copy the contents below into a new .conf file under the /etc/telegraf/telegraf.d/ directory. For example, copy the contents to the /etc/telegraf/telegraf.d/cloudinsights-hadoop.conf file.

```
#####  
# NAMENODE #  
#####  
[[inputs.jolokia2_agent]]  
  ## USER-ACTION: Provide address(es) of Hadoop NameNode, port for jolokia  
  ## Please specify actual host(s) to address and refrain from using a loopback address
```

- 3 Replace <INSERT\_HADOOP\_NAMENODE\_ADDRESS> with the applicable Hadoop NameNode address. Please specify a real machine address, and refrain from using a loopback address. Replace corresponding <INSERT\_JOLOKIA\_PORT> with the NameNode's assigned Jolokia port.
- 4 Replace <INSERT\_HADOOP\_SECONDARYNAMENODE\_ADDRESS> with the applicable Hadoop Secondary NameNode address. Please specify a real machine address, and refrain from using a loopback address. Replace corresponding <INSERT\_JOLOKIA\_PORT> with the Secondary NameNode's assigned Jolokia port.
- 5 Replace <INSERT\_HADOOP\_DATANODE\_ADDRESS> with the applicable Hadoop DataNode address(es). Please specify a real machine address, and refrain from using a loopback address. Replace corresponding <INSERT\_JOLOKIA\_PORT> with the DataNode's assigned Jolokia port.
- 6 Replace <INSERT\_HADOOP\_RESOURCEMANAGER\_ADDRESS> with the applicable Hadoop ResourceManager address. Please specify a real machine address, and refrain from using a loopback address. Replace corresponding <INSERT\_JOLOKIA\_PORT> with the ResourceManager's assigned Jolokia port.
- 7 Replace <INSERT\_HADOOP\_NODEMANAGER\_ADDRESS> with the applicable Hadoop NodeManager address(es). Please specify a real machine address, and refrain from using a loopback address. Replace corresponding <INSERT\_JOLOKIA\_PORT> with the NodeManager's assigned Jolokia port.
- 8 Replace <INSERT\_HADOOP\_JOBHISTORYSERVER\_ADDRESS> with the applicable Hadoop Job History Server address. Please specify a real machine address, and refrain from using a loopback address. Replace corresponding <INSERT\_JOLOKIA\_PORT> with the Job History Server's assigned Jolokia port.
- 9 Modify 'Namespace' if needed for server disambiguation (to avoid name clashes).
- 10 Modify 'Cluster' if needed for Hadoop cluster designation.
- 11 Restart the Telegraf service.

```
systemctl restart telegraf
```

## 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 Opportunistic Virtual Cores Allocated Opportunistic 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

<b>Object:</b>	<b>Identifiers:</b>	<b>Attributes:</b>	<b>Datapoints:</b>
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 Decommissioning 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.

## Copyright Information

Copyright © 2020 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

## Trademark Information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.