



# NetApp

## Cloud Insights

NetApp  
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# NetApp

## NetApp Cloud Volumes data collector

The NetApp Cloud Volumes data collector supports inventory collection from Cloud Volumes configurations.

### Configuration

Field	Description
Cloud Volumes API URL	URL for API connection to Cloud Volumes
API Key	Cloud Volumes API key
Secret Key	Cloud Volumes secret key

### Advanced configuration

Field	Description
Inventory Poll Interval (min)	Default is 60 minutes

### Troubleshooting

Additional information on this Data Collector may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

## NetApp ONTAP Data Management Software Data Collector

This data collector acquires inventory and performance data from storage systems running Clustered Data ONTAP using read-only API calls from an administrator account.

### Terminology

Cloud Insights acquires inventory and performance data from the Clustered Data ONTAP data collector. For each asset type acquired, the most common terminology used for the asset is shown. When viewing or troubleshooting this data collector, keep the following terminology in mind:

Vendor/Model Term	Cloud Insights Term
Disk	Disk

Vendor/Model Term	Cloud Insights Term
Raid Group	Disk Group
Cluster	Storage
Node	Storage Node
Aggregate	Storage Pool
LUN	Volume
Volume	Internal Volume

## Requirements

The following are requirements to configure and use this data collector:

- You must have access to an Administrator account used for read-only API calls.
- Username (with read-only role name to ontapi application to the default Vserver) and password to log into NetApp cluster)
- Port requirements: 80 or 433
- License requirements:
  - FCP license and mapped/masked volumes required for discovery

## Configuration

Field	Description
NetApp Management IP	IP address or fully-qualified domain name of the NetApp cluster
User Name	User name for NetApp cluster
Password	Password for NetApp cluster

## Advanced configuration

Field	Description
Communication Port	Port used for NetApp API
Inventory Poll Interval (min)	Default is 60 minutes.
Performance Poll Interval (sec)	Default is 900 seconds.

## Troubleshooting

Some things to try if you encounter problems with this data collector:

## Inventory

Problem:	Try this:
Receive 401 HTTP response or 13003 ZAPI error code and ZAPI returns “Insufficient privileges” or “not authorized for this command”	Check username and password, and user privileges/permissions.
Cluster version is < 8.1	Cluster minimum supported version is 8.1. Upgrade to minimum supported version.
ZAPI returns "cluster role is not cluster_mgmt LIF"	AU needs to talk to cluster management IP. Check the IP and change to a different IP if necessary
Error: “7 Mode filers are not supported”	This can happen if you use this data collector to discover 7 mode filer. Change IP to point to cdot filer instead.
ZAPI command fails after retry	AU has communication problem with the cluster. Check network, port number, and IP address. User should also try to run a command from command line from the AU machine.
AU failed to connect to ZAPI via HTTP	Check whether ZAPI port accepts plaintext. If AU tries to send plaintext to an SSL socket, the communication fails.
Communication fails with SSLException	AU is attempting to send SSL to a plaintext port on a filer. Check whether the ZAPI port accepts SSL, or use a different port.
Additional Connection errors:  ZAPI response has error code 13001, “database is not open”  ZAPI error code is 60 and response contains “API did not finish on time”  ZAPI response contains “initialize_session() returned NULL environment”  ZAPI error code is 14007 and response contains “Node is not healthy”	Check network, port number, and IP address. User should also try to run a command from command line from the AU machine.

## Performance

Problem:	Try this:
“Failed to collect performance from ZAPI” error	<p>This is usually due to perf stat not running. Try the following command on each node:</p> <pre>&gt; system node systemshell -node * -command "spmctl -h cmd -stop; spmctl -h cmd -exec"</pre>

Additional information may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

## NetApp Data ONTAP operating in 7-Mode data collector

For storage systems using Data ONTAP software operating in 7-Mode, you use the 7-mode data collector, which uses the CLI to obtain capacity and performance data.

### Terminology

Cloud Insights acquires the following inventory information from the NetApp 7-mode data collector. For each asset type acquired, the most common terminology used for this asset is shown. When viewing or troubleshooting this data collector, keep the following terminology in mind:

Vendor/Model Term	Cloud Insights Term
Disk	Disk
Raid Group	Disk Group
Filer	Storage
Filer	Storage Node
Aggregate	Storage Pool
LUN	Volume
Volume	Internal Volume

Note: These are common terminology mappings only and might not represent every case for this data collector.

### Requirements

You need the following to configure and use this data collector:

- IP addresses of the FAS storage controller and partner.
- Port 443
- A custom admin level username and password for controller and partner controller with the following role capabilities for 7-Mode:

- "api-\*": Use this to allow OnCommand Insight to execute all NetApp storage API commands.
- "login-http-admin": Use this to allow OnCommand Insight to connect to the NetApp storage via HTTP.
- "security-api-vfiler": Use this to allow OnCommand Insight to execute NetApp storage API commands to retrieve vFiler unit information.
- "cli-options": Use this to read storage system options.
- "cli-lun": Access these commands for managing LUNs. Displays the status (LUN path, size, online/offline state, and shared state) of the given LUN or class of LUNs.
- "cli-df": Use this to display free disk space.
- "cli-ifconfig": Use this to display interfaces and IP addresses.

## Configuration

Field	Description
Address of storage system	IP address or fully-qualified domain name for the NetApp storage system
User Name	User name for the NetApp storage system
Password	Password for the NetApp storage system
Address of HA Partner in Cluster	IP address or fully-qualified domain name for the HA Partner
User Name of HA Partner in Cluster	User name for the HA partner
Password of HA Partner Filer in Cluster	Password for the HA Partner

## Advanced configuration

Field	Description
Inventory Poll Interval (min)	Interval between inventory polls. The default is 20 minutes.
Connection Type	HTTPS or HTTP, also displays the default port
Override Connection Port	If blank, use the default port in the Connection Type field, otherwise enter the connection port to use
Performance Poll Interval (sec)	Interval between performance polls. The default is 300 seconds.

## Storage systems connection

As an alternative to using the default administrative user for this data collector, you can configure a

user with administrative rights directly on the NetApp storage systems so that this data collector can acquire data from NetApp storage systems.

Connecting to NetApp storage systems requires that the user, who is specified when acquiring the main pfiler (on which the storage system exist), meet the following conditions:

- The user must be on vfiler0 (root filer/pfiler).

Storage systems are acquired when acquiring the main pfiler.

- The following commands define the user role capabilities:
  - "api-\*": Use this to allow Cloud Insights to execute all NetApp storage API commands.

This command is required to use the ZAPI.

- "login-http-admin": Use this to allow Cloud Insights to connect to the NetApp storage via HTTP. This command is required to use the ZAPI.
- "security-api-vfiler": Use this to allow Cloud Insights to execute NetApp storage API commands to retrieve vFiler unit information.
- "cli-options": For "options" command and used for partner IP and enabled licenses.
- "cli-lun": Access these command for managing LUNs. Displays the status (LUN path, size, online/offline state, and shared state) of the given LUN or class of LUNs.
- "cli-df": For "df -s", "df -r", "df -A -r" commands and used to display free space.
- "cli-ifconfig": For "ifconfig -a" command and used for getting filer IP address.
- "cli-rdfile": For "rdfile /etc/netgroup" command and used for getting netgroups.
- "cli-date": For "date" command and used to get full date for getting Snapshot copies.
- "cli-snap": For "snap list" command and used for getting Snapshot copies.

If cli-date or cli-snap permissions are not provided, acquisition can finish, but Snapshot copies are not reported.

To acquire a 7-Mode data source successfully and generate no warnings on the storage system, you should use one of the following command strings to define your user roles. The second string listed here is a streamlined version of the first:

- login-http-admin,api-\*,security-api-vfile,cli-rdfile,cli-options,cli-df,cli-lun,cli-ifconfig,cli-date,cli-snap,\_
- login-http-admin,api-\*,security-api-vfile,cli-

## Troubleshooting

Some things to try if you encounter problems with this data collector:



## Inventory

Problem:	Try this:
Receive 401 HTTP response or 13003 ZAPI error code and ZAPI returns “Insufficient privileges” or “not authorized for this command”	Check username and password, and user privileges/permissions.
“Failed to execute command” error	<p>Check whether the user has the following permission on the device:</p> <ul style="list-style-type: none"><li>• api-*</li><li>• cli-date</li><li>• cli-df</li><li>• cli-ifconfig</li><li>• cli-lun</li><li>• cli-operations</li><li>• cli-rdfile</li><li>• cli-snap</li><li>• login-http-admin</li><li>• security-api-vfiler</li></ul> <p>Also check if the ONTAP version is supported by Cloud Insights and verify if the credentials used match device credentials</p>
Cluster version is < 8.1	Cluster minimum supported version is 8.1. Upgrade to minimum supported version.
ZAPI returns "cluster role is not cluster_mgmt LIF"	AU needs to talk to cluster management IP. Check the IP and change to a different IP if necessary
Error: “7 Mode filers are not supported”	This can happen if you use this data collector to discover 7 mode filer. Change IP to point to cdot filer instead.
ZAPI command fails after retry	AU has communication problem with the cluster. Check network, port number, and IP address. User should also try to run a command from command line from the AU machine.
AU failed to connect to ZAPI	Check IP/port connectivity and assert ZAPI configuration.
AU failed to connect to ZAPI via HTTP	Check whether ZAPI port accepts plaintext. If AU tries to send plaintext to an SSL socket, the communication fails.
Communication fails with SSLException	AU is attempting to send SSL to a plaintext port on a filer. Check whether the ZAPI port accepts SSL, or use a different port.

<b>Problem:</b>	<b>Try this:</b>
<p>Additional Connection errors:</p> <p>ZAPI response has error code 13001, “database is not open”</p> <p>ZAPI error code is 60 and response contains “API did not finish on time”</p> <p>ZAPI response contains “initialize_session() returned NULL environment”</p> <p>ZAPI error code is 14007 and response contains “Node is not healthy”</p>	<p>Check network, port number, and IP address. User should also try to run a command from command line from the AU machine.</p>
Socket timeout error with ZAPI	Check filer connectivity and/or increase timeout.
“C Mode clusters are not supported by the 7 Mode data source” error	Check IP and change the IP to a 7 Mode cluster.
“Failed to connect to vFiler” error	<p>Check that the acquiring user capabilities include the following at a minimum:</p> <p>api-*</p> <p>security-api-vfiler</p> <p>login-http-admin</p> <p>Confirm that filer is running minimum ONTAPI version 1.7.</p>

Additional information may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

## NetApp E-Series data collector

The NetApp E-Series data collector gathers inventory and performance data. The collector supports firmware 7.x+ using the same configurations and reporting the same data.

### Terminology

Cloud insight acquires the following inventory information from the NetApp E-Series data collector. For each asset type acquired, the most common terminology used for this asset is shown. When viewing or troubleshooting this data collector, keep the following terminology in mind:

<b>Vendor/Model Term</b>	<b>Cloud Insights Term</b>
Disk	Disk

Vendor/Model Term	Cloud Insights Term
Volume Group	Disk Group
Storage Array	Storage
Controller	Storage Node
Volume Group	Storage Pool
Volume	Volume

Note: These are common terminology mappings only and might not represent every case for this data collector.

## E-Series Terminology (Landing Page)

The following terms apply to objects or references that you might find on NetApp E-Series asset landing pages. Many of these terms apply to other data collectors as well.

### E-Series Storage

- Model – model name of the device.
- Vendor – same Vendor name you would see if you were configuring a new datasource
- Serial number – The array serial number. On cluster architecture storage systems like NetApp Clustered Data Ontap, this serial number may be less useful than the individual “Storage Nodes” serial numbers
- IP – generally will be the IP(s) or hostname(s) as configured in the data source
- Microcode version – firmware
- Raw Capacity – base 2 summation of all the physical disks in the system, regardless of their role
- Latency – a representation of what the host facing workloads are experiencing, across both reads and writes. Ideally, Cloud Insights is sourcing this value directly, but this is often not the case. In lieu of the array offering this up, Cloud Insights is generally performing an IOPs-weighted calculation derived from the individual volumes’ statistics.
- Throughput – the array’s total host facing throughput. Ideally sourced directly from the array, if unavailable, Cloud Insights is summing the volumes’ throughput to derive this value
- Management – this may contain a hyperlink for the management interface of the device. Created programmatically by the Cloud Insights datasource as part of inventory reporting

### E-Series Storage Pool

- Storage – what storage array this pool lives on. Mandatory
- Type – a descriptive value from a list of an enumerated list of possibilities. Most commonly will be “Thin Provisioning” or “RAID Group”

- Node – if this storage array’s architecture is such that pools belong to a specific storage node, its name will be seen here as a hyperlink to its own landing page
- Uses Flash Pool – Yes/No value
- Redundancy – RAID level or protection scheme. E-Series reports “RAID 7” for DDP pools
- Capacity – the values here are the logical used, usable capacity and the logical total capacity, and the percentage used across these. These value both include E-Series “preservation” capacity, resulting both in numbers and the percentage being higher than what the E-Series own user interface may show
- Over-committed capacity – If via efficiency technologies you have allocated a sum total of volume or internal volume capacities larger than the logical capacity of the storage pool, the percentage value here will be greater than 0%.
- Snapshot – snapshot capacities used and total, if your storage pool architecture dedicates part of its capacity to segments areas exclusively for snapshots
- Utilization – a percentage value showing the highest disk busy percentage of any disk contributing capacity to this storage pool. Disk utilization does not necessarily have a strong correlation with array performance – utilization may be high due to disk rebuilds, deduplication activities, etc in the absence of host driven workloads. Also, many arrays’ replication implementations may drive disk utilization while not showing as volume workload.
- IOPS – the sum IOPs of all the disks contributing capacity to this storage pool. If disk IOPs is not available on a given platform, this value will be sourced from the sum of volume IOPs for all the volumes sitting on this storage pool
- Throughput – the sum throughput of all the disks contributing capacity to this storage pool. If disk throughput is not available on a given platform, this value will be sourced from the sum of volume throughput for all the volumes sitting on this storage pool

## **E-Series Storage Node**

- Storage – what storage array this node is part of. Mandatory
- HA Partner – on platforms where a node will fail over to one and only one other node, it will generally be seen here
- State – health of the node. Only available when the array is healthy enough to be inventoried by a data source
- Model – model name of the node
- Version – version name of the device.
- Serial number – The node serial number
- Memory – base 2 memory if available
- Utilization – Generally a CPU utilization number, or in the case of NetApp Ontap, a controller stress index. Utilization is not currently available for NetApp E-Series
- IOPS – a number representing the host driven IOPs on this controller. Ideally sourced directly from

the array, if unavailable, it will be calculated by summing all the IOPs for volumes that belong exclusively to this node.

- Latency – a number representing the typical host latency or response time on this controller. Ideally sourced directly from the array, if unavailable, it will be calculated by performing an IOPs weighted calculation from volumes that belong exclusively to this node.
- Throughput – a number representing the host driven throughput on this controller. Ideally sourced directly from the array, if unavailable, it will be calculated by summing all the throughput for volumes that belong exclusively to this node.
- Processors – CPU count

## Requirements

- The IP address of each controller on the array
- Port requirement 2463

## Configuration

Field	Description
Comma-separated list of Array SANtricity Controller IPs	IP addresses and/or fully-qualified domain names for the array controllers

## Advanced configuration

Field	Description
Inventory Poll Interval (min)	Default is 30 minutes
Performance Poll Interval up to 3600 seconds	Default is 300 seconds

## Troubleshooting

Additional information on this Data Collector may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

# Configuring the NetApp HCI Management server data collector

The NetApp HCI Management server data collector collects NetApp HCI Host information and requires read-only privileges on all objects within the Management server.

This data collector acquires from the **NetApp HCI Management server only**. To collect data from the

storage system, you must also configure the [NetApp SolidFire](#) data collector.

## Terminology

Cloud Insights acquires the following inventory information from this data collector. For each asset type acquired, the most common terminology used for the asset is shown. When viewing or troubleshooting this data collector, keep the following terminology in mind:

Vendor/Model Term	Cloud Insights Term
Virtual disk	Disk
Host	Host
Virtual machine	Virtual machine
Data store	Data store
LUN	Volume
Fibre channel port	Port

These are common terminology mappings only and might not represent every case for this data collector.

## Requirements

The following information is required to configure this data collector:

- IP address of the NetApp HCI Management server
- Read-only username and password for the NetApp HCI Management server
- Read only privileges on all objects in the NetApp HCI Management server.
- SDK access on the NetApp HCI Management server – normally already set up.
- Port requirements: http-80 https-443
- Validate access:
  - Log into the NetApp HCI Management server using above username and password
  - Verify SDK enabled: telnet <vc\_ip> 443

## Setup and connection

Field	Description
Name	Unique name for the data collector
Acquisition unit	Name of acquisition unit

## Configuration

Field	Description
NetApp HCI Storage Cluster MVIP	Management Virtual IP Address
SolidFire Management Node (mNode)	Management Node IP Address
User name	User name used to access the NetApp HCI Management server
Password	Password used to access the NetApp HCI Management server
VCenter User Name	User name for VCenter
VCenter Password	Password for VCenter

## Advanced configuration

In the advanced configuration screen, check the **VM Performance** box to collect performance data. Inventory collection is enabled by default.

The following fields can be configured:

Field	Description
Inventory poll interval (min)	Default is 20
Filter VMs by	Select CLUSTER, DATACENTER, or ESX HOST
Choose 'Exclude' or 'Include' to Specify a List	Specify Whether to Include or Exclude VMs
Filter Device List	List of VMs to filter (comma separated, or semicolon separated if comma is used in the value) for for Filtering by ESX_HOST, CLUSTER, and DATACENTER Only
Performance poll interval (sec)	Default is 300

## Troubleshooting

Some things to try if you encounter problems with this data collector:

### Inventory

Problem:	Try this:
Error: Include list to filter VMs cannot be empty	If Include List is selected, please list valid DataCenter, Cluster, or Host names to filter VMs

<b>Problem:</b>	<b>Try this:</b>
Error: Failed to instantiate a connection to VirtualCenter at IP	Possible solutions:  * Verify credentials and IP address entered. * Try to communicate with Virtual Center using Infrastructure Client. * Try to communicate with Virtual Center using Managed Object Browser (e.g MOB).
Error: VirtualCenter at IP has non-conform certificate that JVM requires	Possible solutions:  * Recommended: Re-generate certificate for Virtual Center by using stronger (e.g. 1024-bit) RSA key. * Not Recommended: Modify the JVM java.security configuration to leverage the constraint jdk.certpath.disabledAlgorithms to allow 512-bit RSA key. See JDK 7 update 40 release notes at "http://www.oracle.com/technetwork/java/javase/7u40-relnotes-2004172.html"

Additional information may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

## NetApp SolidFire All-Flash Array data collector

The NetApp SolidFire All-Flash Array data collector supports inventory and performance collection from both iSCSI and Fibre Channel SolidFire configurations.

The SolidFire data collector utilizes the SolidFire REST API. The acquisition unit where the data collector resides needs to be able to initiate HTTPS connections to TCP port 443 on the SolidFire cluster management IP address. The data collector needs credentials capable of making REST API queries on the SolidFire cluster.

### Terminology

Cloud Insights acquires the following inventory information from the NetApp SolidFire All-Flash Array data collector. For each asset type acquired by Cloud Insights, the most common terminology used for this asset is shown. When viewing or troubleshooting this data collector, keep the following terminology in mind:

<b>Vendor/Model Term</b>	<b>Cloud Insights Term</b>
Drive	Disk



Vendor/Model Term	Cloud Insights Term
Cluster	Storage
Node	Storage Node
Volume	Volume
Fibre channel port	Port
Volume Access Group, LUN Assignment	Volume Map
iSCSI Session	Volume Mask

Note: These are common terminology mappings only and might not represent every case for this data collector.

## Requirements

The following are requirements for configuring this data collector:

- Management Virtual IP Address
- Read-only username and credentials
- Port 443

## Configuration

Field	Description
Management Virtual IP Address (MVIP)	Management Virtual IP address of the SolidFire Cluster
User Name	Name used to log into the SolidFire cluster
Password	Password used to log into the SolidFire cluster

## Advanced configuration

Field	Description
Connection Type	Choose connection type
Communication Port	Port used for NetApp API
Inventory Poll Interval (min)	Default is 20 minutes
Performance Poll Interval (sec)	Default is 300 seconds

## Troubleshooting

When SolidFire reports an error it is displayed in Cloud Insights as follows:

*An error message was received from a SolidFire device while trying to retrieve data. The call was <method> (<parameterString> ). The error message from the device was (check the device manual): <message>*

Where:

- The <method> is an HTTP method, such as GET or PUT.
- The <parameterString> is a comma separated list of parameters that were included in the REST call.
- The <message> is whatever the device returned as the error message.

Additional information on this Data Collector may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

## NetApp StorageGrid data collector

The NetApp StorageGrid data collector supports inventory collection from StorageGrid configurations.

### Configuration

Field	Description
StorageGrid Host IP Address	Management Virtual IP address of the StorageGrid appliance
User Name	Name used to log into the StorageGrid appliance
Password	Password used to log into the StorageGrid appliance

### Advanced configuration

Field	Description
Inventory Poll Interval (min)	Default is 60 minutes

### Troubleshooting

Additional information on this Data Collector may be found from the [Support](#) page or in the [Data Collector Support Matrix](#).

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