

# Cumulus NetQ Deployment Guide



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# Cumulus NetQ Deployment Guide

This guide is intended for network administrators who are responsible for installation, setup, and maintenance of Cumulus NetQ in their data center environment. NetQ offers the ability to monitor and manage your data center network infrastructure and operational health with simple tools based on open source Linux. This guide provides instructions and information about installing NetQ core capabilities, configuring optional capabilities, and upgrading an existing NetQ installation. This guide assumes you have already installed Cumulus Linux on your network switches and you are ready to add these NetQ capabilities.

For information about monitoring and troubleshooting your network, refer to the [Cumulus NetQ CLI User Guide](#) or the [Cumulus NetQ UI User Guide](#).



TIP

Before you get started, you should review the [release notes](#) for this version.

# Cumulus NetQ Overview

Cumulus® NetQ is a highly-scalable, modern network operations tool set that provides visibility and troubleshooting of your overlay and underlay networks in real-time. NetQ delivers actionable insights and operational intelligence about the health of your data center — from the container, virtual machine, or host, all the way to the switch and port. NetQ correlates configuration and operational status, and instantly identifies and tracks state changes while simplifying management for the entire Linux-based data center. With NetQ, network operations change from a manual, reactive, box-by-box approach to an automated, informed and agile one.

Cumulus NetQ performs three primary functions:

- **Data collection:** real-time and historical telemetry and network state information
- **Data analytics:** deep processing of the data
- **Data visualization:** rich graphical user interface (GUI) for actionable insight

NetQ is available as an on-site or in-cloud deployment.

Unlike other network operations tools, NetQ delivers significant operational improvements to your network management and maintenance processes. It simplifies the data center network by reducing the complexity through real-time visibility into hardware and software status and eliminating the guesswork associated with investigating issues through the analysis and presentation of detailed, focused data.

## Demystify Overlay Networks

While overlay networks provide significant advantages in network management, it can be difficult to troubleshoot issues that occur in the overlay one box at a time. You are

unable to correlate what events (configuration changes, power outages, etc.) may have caused problems in the network and when they occurred. Only a sampling of data is available to use for your analysis. By contrast, with Cumulus NetQ deployed, you have a network-wide view of the overlay network, can correlate events with what is happening now or in the past, and have real-time data to fill out the complete picture of your network health and operation.

In summary:

Without NetQ	With NetQ
Difficult to debug overlay network	View network-wide status of overlay network
Hard to find out what happened in the past	View historical activity with time-machine view
Periodically sampled data	Real-time collection of telemetry data for a more complete data set

## Protect Network Integrity with NetQ Validation

Network configuration changes can cause numerous trouble tickets because you are not able to test a new configuration before deploying it. When the tickets start pouring in, you are stuck with a large amount of data that is collected and stored in multiple tools making correlation of the events to the resolution required difficult at best.

Isolating faults in the past is challenging. By contrast, with Cumulus NetQ deployed, you can proactively verify a configuration change as inconsistencies and misconfigurations can be caught prior to deployment. And historical data is readily available to correlate past events with current issues.

In summary:

## Cumulus NetQ Overview

## Troubleshoot Issues Across the Network

Without NetQ	With NetQ
Reactive to trouble tickets	Catch inconsistencies and misconfigurations prior to deployment with integrity checks/validation
Large amount of data and multiple tools to correlate the logs/events with the issues	Correlate network status, all in one place
Periodically sampled data	Readily available historical data for viewing and correlating changes in the past with current issues

## Troubleshoot Issues Across the Network

Troubleshooting networks is challenging in the best of times, but trying to do so manually, one box at a time, and digging through a series of long and ugly logs make the job harder than it needs to be. Cumulus NetQ provides rolled up and correlated network status on a regular basis, enabling you to get down to the root of the problem quickly, whether it occurred recently or over a week ago. The graphical user interface makes this possible visually to speed the analysis.

In summary:

Without NetQ	With NetQ
Large amount of data and multiple tools to correlate the logs/events with the issues	Rolled up and correlated network status, view events and status together

Without NetQ	With NetQ
Past events are lost	Historical data gathered and stored for comparison with current network state
Manual, box-by-box troubleshooting	View issues on all devices all at once, pointing to the source of the problem

## Track Connectivity with NetQ Trace

Conventional trace only traverses the data path looking for problems, and does so on a node to node basis. For paths with a small number of hops that might be fine, but in larger networks, it can become extremely time consuming. With Cumulus NetQ both the data and control paths are verified providing additional information. It discovers misconfigurations along all of the hops in one go, speeding the time to resolution.

In summary:

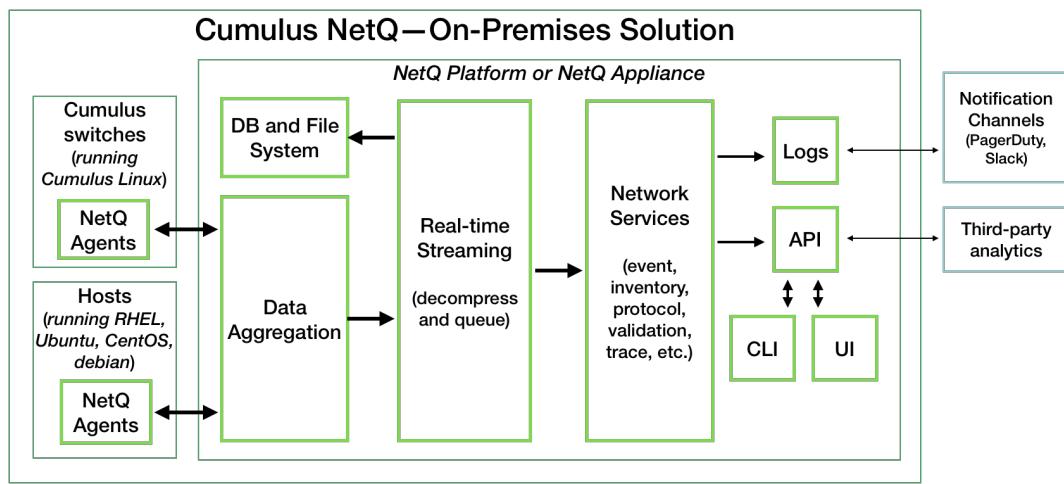
Without NetQ	With NetQ
Trace covers only data path; hard to check control path	Both data and control paths are verified
View portion of entire path	View all paths between devices all at once to find problem paths
Node-to-node check on misconfigurations	View any misconfigurations along all hops from source to destination

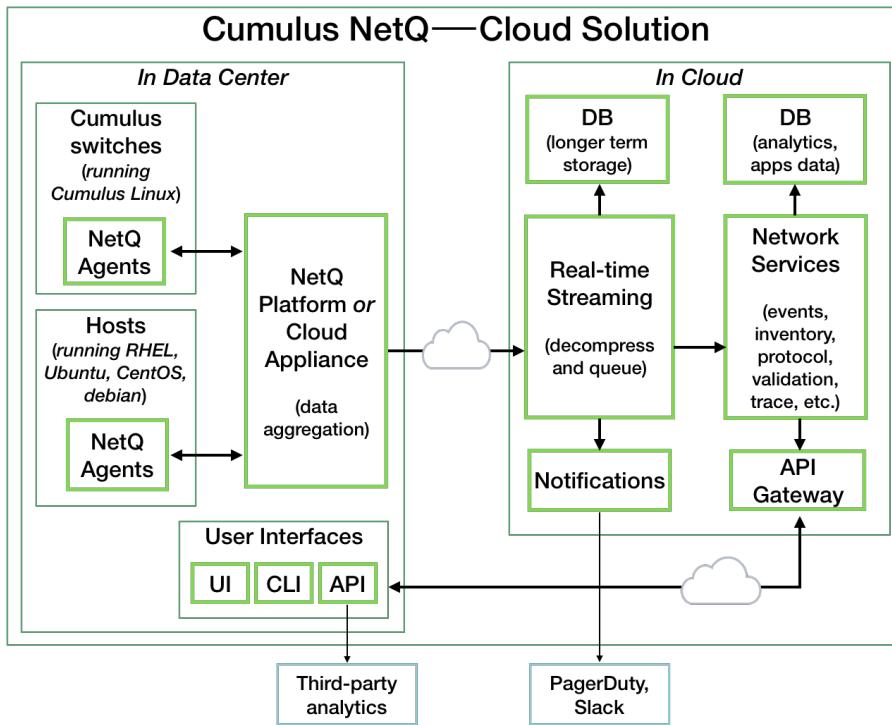
# Cumulus NetQ Components

Cumulus NetQ contains the following applications and key components:

- Telemetry data collection and aggregation
  - NetQ switch agents
  - NetQ host agents
  - Telemetry data aggregation
  - Database
- Data streaming
- Network services
- User interfaces

While these function apply to both the on-site and in-cloud solutions, where the functions reside varies, as shown here.





NetQ interfaces with event notification applications, third-party analytics tools.

Each of the NetQ components used to gather, store and process data about the network state are described here.

## NetQ Agents

NetQ Agents are software installed and running on every monitored *node* in the network — including Cumulus® Linux® switches, Linux bare-metal hosts, and virtual machines. The NetQ Agents push network data regularly and event information immediately to the NetQ Platform.

### Switch Agents

The NetQ Agents running on Cumulus Linux switches gather the following network data via [Netlink](#):

- Interfaces
- IP addresses (v4 and v6)

- IP routes (v4 and v6)
- Links
- Bridge FDB (MAC Address table)
- ARP Entries/Neighbors (IPv4 and IPv6)

for the following protocols:

- Bridging protocols: LLDP, STP, MLAG
- Routing protocols: BGP, OSPF
- Network virtualization: EVPN, LNV, VXLAN

The NetQ Agent is supported on Cumulus Linux 3.3.2 and later.

### Host Agents

The NetQ Agents running on hosts gather the same information as that for switches, plus the following network data:

- Network IP and MAC addresses
- Container IP and MAC addresses

The NetQ Agent obtains container information by listening to the Kubernetes orchestration tool.

The NetQ Agent is supported on hosts running Ubuntu 16.04, Red Hat® Enterprise Linux 7, and CentOS 7 Operating Systems.

### NetQ Core

The NetQ core performs the data collection, storage, and processing for delivery to various user interfaces. It is comprised of a collection of scalable components running entirely within a single server. The NetQ software queries this server, rather than

individual devices enabling greater scalability of the system. Each of these components is described briefly here.

### Data Aggregation

The data aggregation component collects data coming from all of the NetQ Agents. It then filters, compresses, and forwards the data to the streaming component. The server monitors for missing messages and also monitors the NetQ Agents themselves, providing alarms when appropriate. In addition to the telemetry data collected from the NetQ Agents, the aggregation component collects information from the switches and hosts, such as vendor, model, version, and basic operational state.

### Data Stores

Two types of data stores are used in the NetQ product. The first stores the raw data, data aggregations, and discrete events needed for quick response to data requests. The second stores data based on correlations, transformations and processing of the raw data.

### Real-time Streaming

The streaming component processes the incoming raw data from the aggregation server in real time. It reads the metrics and stores them as a time series, and triggers alarms based on anomaly detection, thresholds, and events.

### Network Services

The network services component monitors protocols and services operation individually and on a network-wide basis and stores status details.

### User Interfaces

NetQ data is available through several user interfaces:

- NetQ CLI (command line interface)

- NetQ UI (graphical user interface)
- NetQ RESTful API (representational state transfer application programming interface)

The CLI and UI query the RESTful API for the data to present. Standard integrations can be configured to integrate with third-party notification tools.

# Data Center Network Deployments

There are two deployment types that are commonly deployed for network management in the data center:

- Out-of-Band Management (recommended)
- In-band Management

A summary of each type is provided here.

 NOTE

Cumulus NetQ operates over layer 3, and can be used in both layer 2 bridged and layer 3 routed environments. Cumulus Networks always recommends layer 3 routed environments whenever possible.

### Out-of-Band Management Deployment

Cumulus Networks recommends deploying NetQ on an out-of-band (OOB) management network to separate network management traffic from standard network data traffic, but it is not required. This figure shows a sample CLOS-based network fabric design for a data center using an OOB management network overlaid on top, where NetQ is deployed.

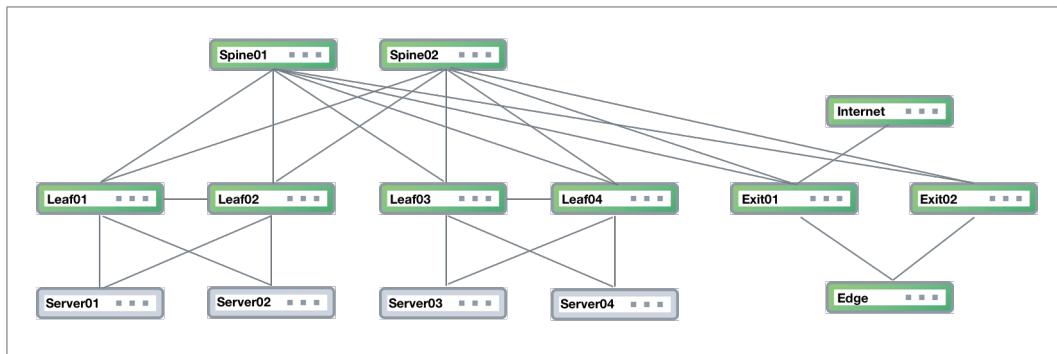
The physical *network* hardware includes:

- **Spine** switches: where data is aggregated and distributed ; also known as an aggregation switch, end-of-row (EOR) switch or distribution switch

# Data Center Network Deployments

- **Leaf** switches: where servers connect to the network; also known as a Top of Rack (TOR) or access switch
- **Server** hosts: where applications are hosted and data served to the user through the network
- **Exit** switch: where connections to outside the data center occur; also known as Border Leaf or Service Leaf
- **Edge** server (optional): where the firewall is the demarcation point, peering may occur through the exit switch layer to Internet (PE) devices
- **Internet** device (PE): where provider edge (PE) equipment communicates at layer 3 with the network fabric

The diagram shows physical connections (in the form of grey lines) between Spine 01 and four Leaf devices and two Exit devices, and Spine 02 and the same four Leaf devices and two Exit devices. Leaf 01 and Leaf 02 are connected to each other over a peerlink and act as an MLAG pair for Server 01 and Server 02. Leaf 03 and Leaf 04 are connected to each other over a peerlink and act as an MLAG pair for Server 03 and Server 04. The Edge is connected to both Exit devices, and the Internet node is connected to Exit 01.



Data Center Network Example

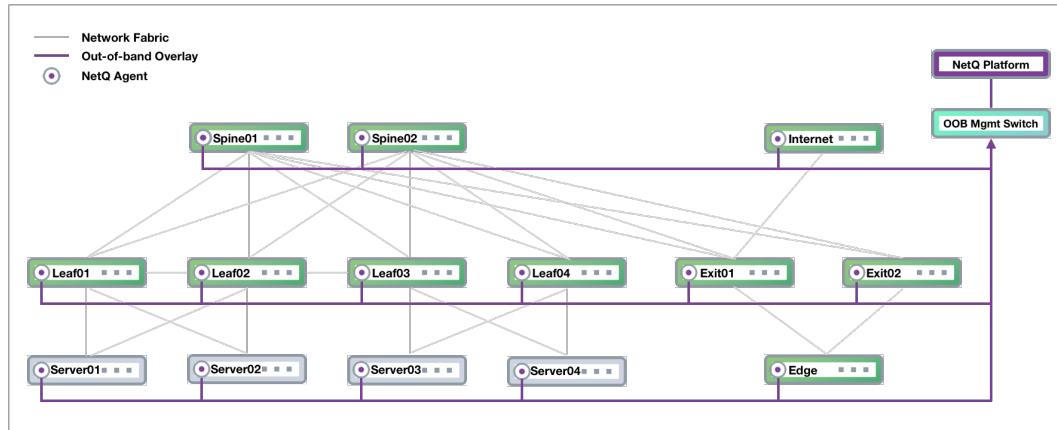
The physical *management* hardware includes:

- OOB Mgmt Switch: aggregation switch that connects to all of the network devices through communications with the NetQ Agent on each node

# Data Center Network Deployments

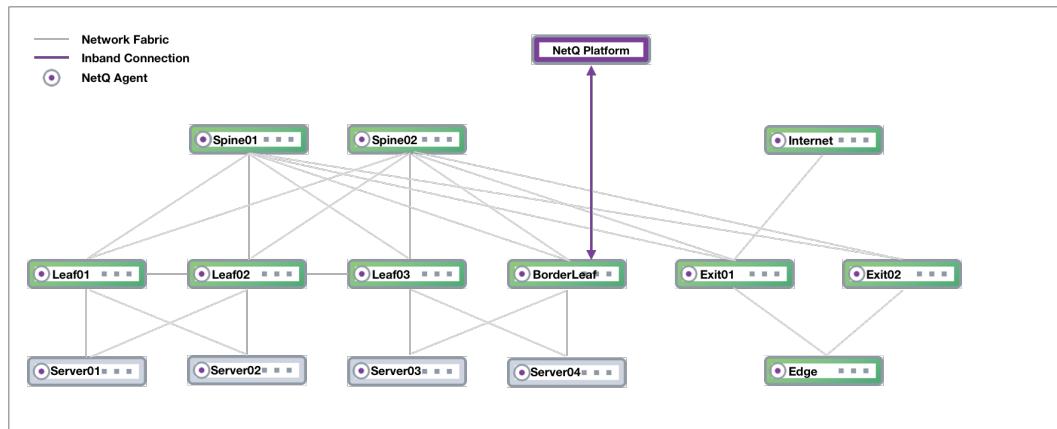
- NetQ Platform: hosts the telemetry software, database and user interfaces (refer to description above).

These switches are connected to each of the physical network devices through a virtual network overlay, shown with purple lines.



## In-band Management Deployment

While not the preferred deployment method, you might choose to implement NetQ within your data network. In this scenario, there is no overlay and all traffic to and from the NetQ Agents and the NetQ Platform traverses the data paths along with your regular network traffic. The roles of the switches in the CLOS network are the same, except that the NetQ Platform performs the aggregation function that the OOB management switch performed. If your network goes down, you might not have access to the NetQ Platform for troubleshooting.

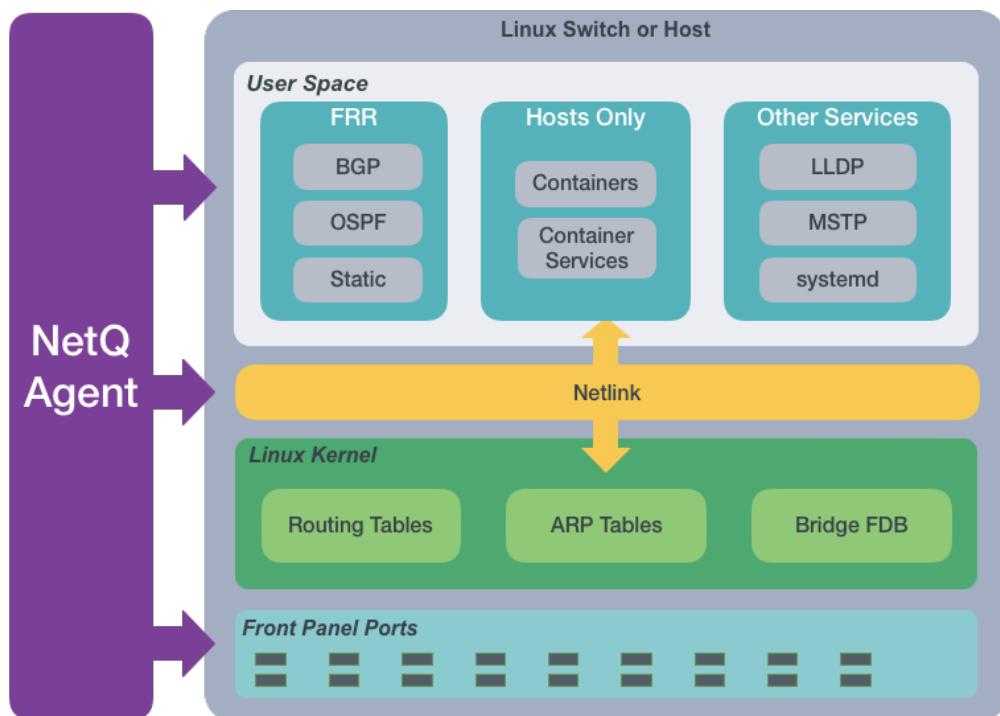


# Cumulus NetQ Operation

In either in-band or out-of-band deployments, NetQ offers network-wide configuration and device management, proactive monitoring capabilities, and performance diagnostics for complete management of your network. Each component of the solution provides a critical element to make this possible.

## The NetQ Agent

From a software perspective, a network switch has software associated with the hardware platform, the operating system, and communications. For data centers, the software on a Cumulus Linux network switch would be similar to the diagram shown here.



The NetQ Agent interacts with the various components and software on switches and hosts and provides the gathered information to the NetQ Platform. You can view the data using the NetQ CLI or UI.

The NetQ Agent polls the user space applications for information about the performance of the various routing protocols and services that are running on the switch. Cumulus Networks supports BGP and OSPF Free Range Routing (FRR) protocols as well as static addressing. Cumulus Linux also supports LLDP and MSTP among other protocols, and a variety of services such as systemd and sensors . For hosts, the NetQ Agent also polls for performance of containers managed with Kubernetes. All of this information is used to provide the current health of the network and verify it is configured and operating correctly.

For example, if the NetQ Agent learns that an interface has gone down, a new BGP neighbor has been configured, or a container has moved, it provides that information to the NetQ Platform. That information can then be used to notify users of the operational state change through various channels. By default, data is logged in the database, but you can use the CLI (`netq show events`) or configure the Event Service in NetQ to send the information to a third-party notification application as well. NetQ supports PagerDuty and Slack integrations.

The NetQ Agent interacts with the Netlink communications between the Linux kernel and the user space, listening for changes to the network state, configurations, routes and MAC addresses. NetQ uses this information to enable notifications about these changes so that network operators and administrators can respond quickly when changes are not expected or favorable.

For example, if a new route is added or a MAC address removed, NetQ Agent records these changes and sends that information to the NetQ Platform. Based on the configuration of the Event Service, these changes can be sent to a variety of locations for end user response.

The NetQ Agent also interacts with the hardware platform to obtain performance information about various physical components, such as fans and power supplies, on the switch. Operational states and temperatures are measured and reported, along with cabling information to enable management of the hardware and cabling, and proactive maintenance.

For example, as thermal sensors in the switch indicate that it is becoming very warm, various levels of alarms are generated. These are then communicated through notifications according to the Event Service configuration.

## The NetQ Platform

Once the collected data is sent to and stored in the NetQ database, you can:

- Validate configurations, identifying misconfigurations in your current network, in the past, or prior to deployment,
- Monitor communication paths throughout the network,
- Notify users of issues and management information,
- Anticipate impact of connectivity changes,
- and so forth.

### Validate Configurations

The NetQ CLI enables validation of your network health through two sets of commands: `netq check` and `netq show`. They extract the information from the Network Service component and Event service. The Network Service component is continually validating the connectivity and configuration of the devices and protocols running on the network. Using the `netq check` and `netq show` commands displays the status of the various components and services on a network-wide and complete software stack basis. For example, you can perform a network-wide check on all sessions of BGP with a single `netq check bgp` command. The command lists any devices that have misconfigurations

or other operational errors in seconds. When errors or misconfigurations are present, using the `netq show bgp` command displays the BGP configuration on each device so that you can compare and contrast each device, looking for potential causes. `netq check` and `netq show` commands are available for numerous components and services as shown in the following table.

Component or Service	Check	Show	Component or Service	Check	Show
Agents	X	X	LLDP		X
BGP	X	X	LNV	X	X
CLAG (MLAG)	X	X	MACs		X
Events		X	MTU	X	
EVPN	X	X	NTP	X	X
Interfaces	X	X	OSPF	X	X
Inventory		X	Sensors	X	X
IPv4/v6		X	Services		X
Kubernetes		X	VLAN	X	X
License	X		VXLAN	X	X

## Monitor Communication Paths

The trace engine is used to validate the available communication paths between two network devices. The corresponding `netq trace` command enables you to view all of the paths between the two devices and if there are any breaks in the paths. This example shows two successful paths between server12 and leaf11, all with an MTU of 9152. The first command shows the output in path by path tabular mode. The second command show the same output as a tree.

```
cumulus@switch:~$ netq trace 10.0.0.13 from 10.0.0.21
Number of Paths: 2
Number of Paths with Errors: 0
Number of Paths with Warnings: 0
Path MTU: 9152
Id Hop Hostname InPort      InTun, RtrIf  OutRtrIf, Tun  OutPort
-----
1 1 server12
2 leaf12    swp8          vlan1002    peerlink-1
3 leaf11    swp6          vlan1002
-----
2 1 server12
2 leaf11    swp8          vlan1002
-----
```

```
cumulus@switch:~$ netq trace 10.0.0.13 from 10.0.0.21 pretty
Number of Paths: 2
Number of Paths with Errors: 0
Number of Paths with Warnings: 0
Path MTU: 9152
hostd-12 bond1.1002 -- swp8 leaf12 <vlan1002> peerlink-1 -- swp6 <vlan1002>
leaf11 vlan1002
bond1.1002 -- swp8 leaf11 vlan1002
```

This output is read as:

- Path 1 traverses the network from server12 out bond1.1002 into leaf12 interface swp8 out VLAN1002 peerlink-1 into VLAN1002 interface swp6 on leaf11
- Path 2 traverses the network from server12 out bond1.1002 into VLAN1002 interface swp8 on leaf11.

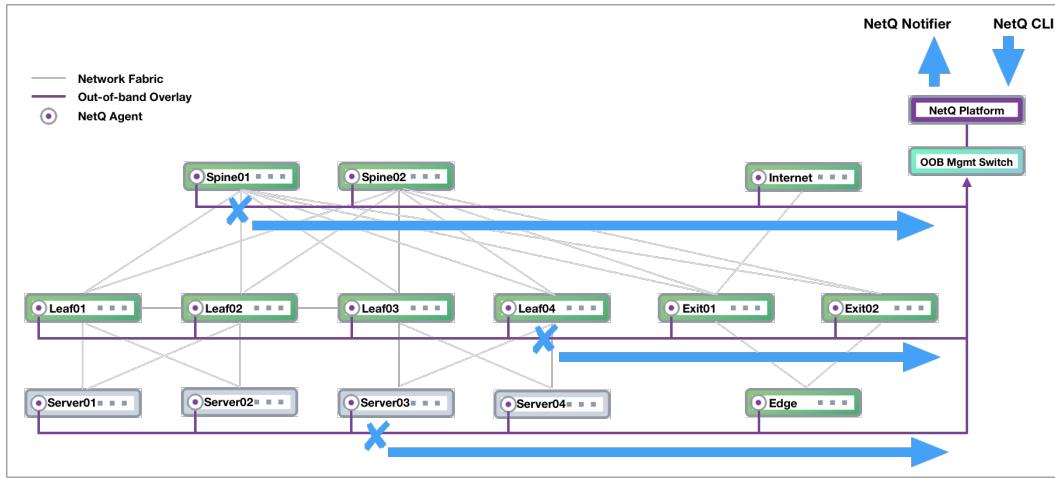
If the MTU does not match across the network, or any of the paths or parts of the paths have issues, that data is called out in the summary at the top of the output and shown in red along the paths, giving you a starting point for troubleshooting.

## View Historical State and Configuration

All of the check, show and trace commands can be run for the current status and for a prior point in time. For example, this is useful when you receive messages from the night before, but are not seeing any problems now. You can use the `netq check` command to look for configuration or operational issues around the time that the messages are timestamped. Then use the `netq show` commands to see information about how the devices in question were configured at that time or if there were any changes in a given timeframe. Optionally, you can use the `netq trace` command to see what the connectivity looked like between any problematic nodes at that time. This example shows problems occurred on spine01, leaf04, and server03 last night. The network administrator received notifications and wants to investigate. The diagram is followed by the commands to run to determine the cause of a BGP error on spine01. Note that the commands use the `around` option to see the results for last night and that they can be run from any switch in the network.

# Cumulus NetQ Operation

## The NetQ Platform



```

exit-1      DataVrf1082  swp6.4      firewall-1    BGP session with peer
firewall-1 swp6.4: AFI/ 1d:2h:6m:21s

                                                SAFI evpn not activated on peer

exit-1      DataVrf1082  swp7.4      firewall-2    BGP session with peer
firewall-2 (swp7.4 vrf 1d:1h:59m:43s

                                                DataVrf1082) failed,
                                                reason: Peer not configured

exit-1      default     swp6       firewall-1   BGP session with peer
firewall-1 swp6: AFI/SA 1d:2h:6m:21s

                                                FI evpn not activated on peer

exit-1      default     swp7       firewall-2   BGP session with peer
firewall-2 (swp7 vrf de 1d:1h:59m:43s

...
cumulus@switch:~$ netq exit-1 show bgp
Matching bgp records:
Hostname      Neighbor          VRF      ASN      Peer ASN  PfxRx  Last
Changed
-----
-----
exit-1      swp3(spine-1)      default   655537   655435   27/24/412 Fri
Feb 15 17:20:00 2019
exit-1      swp3.2(spine-1)    DataVrf1080 655537   655435   14/12/0
Fri Feb 15 17:20:00 2019
exit-1      swp3.3(spine-1)    DataVrf1081 655537   655435   14/12/0
Fri Feb 15 17:20:00 2019
exit-1      swp3.4(spine-1)    DataVrf1082 655537   655435   14/12/0
Fri Feb 15 17:20:00 2019
exit-1      swp4(spine-2)      default   655537   655435   27/24/412 Fri

```

Feb 15 17:20:00 2019							
exit-1	swp4.2(spine-2)	DataVrf1080	655537	655435	14/12/0		
Fri Feb 15 17:20:00 2019							
exit-1	swp4.3(spine-2)	DataVrf1081	655537	655435	14/12/0		
Fri Feb 15 17:20:00 2019							
exit-1	swp4.4(spine-2)	DataVrf1082	655537	655435	13/12/0		
Fri Feb 15 17:20:00 2019							
exit-1	swp5(spine-3)	default	655537	655435	28/24/412	Fri	
Feb 15 17:20:00 2019							
exit-1	swp5.2(spine-3)	DataVrf1080	655537	655435	14/12/0		
Fri Feb 15 17:20:00 2019							
exit-1	swp5.3(spine-3)	DataVrf1081	655537	655435	14/12/0		
Fri Feb 15 17:20:00 2019							
exit-1	swp5.4(spine-3)	DataVrf1082	655537	655435	14/12/0		
Fri Feb 15 17:20:00 2019							
exit-1	swp6(firewall-1)	default	655537	655539	73/69/-	Fri	
Feb 15 17:22:10 2019							
exit-1	swp6.2(firewall-1)	DataVrf1080	655537	655539	73/69/-		
Fri Feb 15 17:22:10 2019							
exit-1	swp6.3(firewall-1)	DataVrf1081	655537	655539	73/69/-		
Fri Feb 15 17:22:10 2019							
exit-1	swp6.4(firewall-1)	DataVrf1082	655537	655539	73/69/-		
Fri Feb 15 17:22:10 2019							
exit-1	swp7	default	655537	-	NotEstd	Fri Feb 15	
17:28:48 2019							
exit-1	swp7.2	DataVrf1080	655537	-	NotEstd	Fri Feb	
15 17:28:48 2019							
exit-1	swp7.3	DataVrf1081	655537	-	NotEstd	Fri Feb	
15 17:28:48 2019							

exit-1	swp7.4	DataVrf1082	655537	-	NotEstd	Fri Feb
15 17:28:48 2019						

## Manage Network Events

The NetQ notifier manages the events that occur for the devices and components, protocols and services that it receives from the NetQ Agents. The notifier enables you to capture and filter events that occur to manage the behavior of your network. This is especially useful when an interface or routing protocol goes down and you want to get them back up and running as quickly as possible, preferably before anyone notices or complains. You can improve resolution time significantly by creating filters that focus on topics appropriate for a particular group of users. You can easily create filters around events related to BGP, LNV, and MLAG session states, interfaces, links, NTP and other services, fans, power supplies, and physical sensor measurements.

For example, for operators responsible for routing, you can create an integration with a notification application that notifies them of routing issues as they occur. This is an example of a Slack message received on a *netq-notifier* channel indicating that the BGP session on switch *leaf04* interface *swp2* has gone down.



## Timestamps in NetQ

Every event or entry in the NetQ database is stored with a timestamp of when the event was captured by the NetQ Agent on the switch or server. This timestamp is based on the switch or server time where the NetQ Agent is running, and is pushed in UTC format. It is important to ensure that all devices are NTP synchronized to prevent events

from being displayed out of order or not displayed at all when looking for events that occurred at a particular time or within a time window.

Interface state, IP addresses, routes, ARP/ND table (IP neighbor) entries and MAC table entries carry a timestamp that represents the time the event happened (such as when a route is deleted or an interface comes up) — *except* the first time the NetQ agent is run. If the network has been running and stable when a NetQ agent is brought up for the first time, then this time reflects when the agent was started. Subsequent changes to these objects are captured with an accurate time of when the event happened.

Data that is captured and saved based on polling, and just about all other data in the NetQ database, including control plane state (such as BGP or MLAG), has a timestamp of when the information was *captured* rather than when the event *actually happened*, though NetQ compensates for this if the data extracted provides additional information to compute a more precise time of the event. For example, BGP uptime can be used to determine when the event actually happened in conjunction with the timestamp.

When retrieving the timestamp, command outputs display the time in three ways:

- For non-JSON output when the timestamp represents the Last Changed time, time is displayed in actual date and time when the time change occurred
- For non-JSON output when the timestamp represents an Uptime, time is displayed as days, hours, minutes, and seconds from the current time.
- For JSON output, time is displayed in microseconds that have passed since the Epoch time (January 1, 1970 at 00:00:00 GMT) .

This example shows the difference between the timestamp displays.

```
cumulus@switch:~$ netq show bgp
Matching bgp records:
Hostname      Neighbor          VRF      ASN      Peer ASN  PfxRx    Last
```

## Changed

-----  
-----

exit-1 swp3(spine-1) default 655537 655435 27/24/412 Fri  
Feb 15 17:20:00 2019

exit-1 swp3.2(spine-1) DataVrf1080 655537 655435 14/12/0  
Fri Feb 15 17:20:00 2019

exit-1 swp3.3(spine-1) DataVrf1081 655537 655435 14/12/0  
Fri Feb 15 17:20:00 2019

exit-1 swp3.4(spine-1) DataVrf1082 655537 655435 14/12/0  
Fri Feb 15 17:20:00 2019

exit-1 swp4(spine-2) default 655537 655435 27/24/412 Fri  
Feb 15 17:20:00 2019

exit-1 swp4.2(spine-2) DataVrf1080 655537 655435 14/12/0  
Fri Feb 15 17:20:00 2019

exit-1 swp4.3(spine-2) DataVrf1081 655537 655435 14/12/0  
Fri Feb 15 17:20:00 2019

exit-1 swp4.4(spine-2) DataVrf1082 655537 655435 13/12/0  
Fri Feb 15 17:20:00 2019

...

cumulus@switch:~\$ netq show agents

Matching agents records:

Hostname	Status	NTP Sync	Version	Sys Uptime
Agent Uptime	Reinitialize Time	Last Changed		

-----  
-----

leaf01	Fresh	yes	2.0.0-cl3u11~1549993210.e902a94	2h:32m: 33s
			2h:26m:19s	Tue Feb 12 18:13:28 2019

## Cumulus NetQ Operation

Timestamps in NetQ

leaf02	Fresh	yes	2.0.0-cl3u11~1549993210.e902a94	2h:32m:
33s	2h:26m:14s		2h:26m:14s	Tue Feb 12 18:13:33 2019
leaf11	Fresh	yes	2.0.0-ub16.04u11~1549993314.e902a94	2h:32m:
28s	2h:25m:49s		2h:25m:49s	Tue Feb 12 18:17:32 2019
leaf12	Fresh	yes	2.0.0-rh7u11~1549992132.c42c08f	2h:32m:
0s	2h:25m:44s		2h:25m:44s	Tue Feb 12 18:17:36 2019
leaf21	Fresh	yes	2.0.0-ub16.04u11~1549993314.e902a94	2h:32m:
28s	2h:25m:39s		2h:25m:39s	Tue Feb 12 18:17:42 2019
leaf22	Fresh	yes	2.0.0-rh7u11~1549992132.c42c08f	2h:32m:
0s	2h:25m:35s		2h:25m:35s	Tue Feb 12 18:17:46 2019
spine01	Fresh	yes	2.0.0-cl3u11~1549993210.e902a94	2h:32m:
33s	2h:27m:11s		2h:27m:11s	Tue Feb 12 18:13:06 2019
spine02	Fresh	yes	2.0.0-cl3u11~1549993210.e902a94	2h:32m:
33s	2h:27m:6s		2h:27m:6s	Tue Feb 12 18:13:11 2019
...				

cumulus@switch:~\$ netq show agents json

```
{
  "agents": [
    {
      "status": "Fresh",
      "lastChanged": 1549995208.3039999008,
      "reinitializeTime": 1549995146.0,
      "hostname": "leaf01",
      "version": "2.0.0-cl3u11~1549993210.e902a94",
      "sysUptime": 1549994772.0,
      "ntpSync": "yes",
      "agentUptime": 1549995146.0
    },
  ]
}
```

```
{  
    "status": "Fresh",  
    "lastChanged": 1549995213.3399999142,  
    "reinitializeTime": 1549995151.0,  
    "hostname": "leaf02",  
    "version": "2.0.0-cl3u11~1549993210.e902a94",  
    "sysUptime": 1549994772.0,  
    "ntpSync": "yes",  
    "agentUptime": 1549995151.0  
},  
{  
    "status": "Fresh",  
    "lastChanged": 1549995434.3559999466,  
    "reinitializeTime": 1549995157.0,  
    "hostname": "leaf11",  
    "version": "2.0.0-ub16.04u11~1549993314.e902a94",  
    "sysUptime": 1549994772.0,  
    "ntpSync": "yes",  
    "agentUptime": 1549995157.0  
},  
{  
    "status": "Fresh",  
    "lastChanged": 1549995439.3770000935,  
    "reinitializeTime": 1549995164.0,  
    "hostname": "leaf12",  
    "version": "2.0.0-rh7u11~1549992132.c42c08f",  
    "sysUptime": 1549994809.0,  
    "ntpSync": "yes",  
    "agentUptime": 1549995164.0
```

```
        },
        {
            "status": "Fresh",
            "lastChanged": 1549995452.6830000877,
            "reinitializeTime": 1549995176.0,
            "hostname": "leaf21",
            "version": "2.0.0-ub16.04u11~1549993314.e902a94",
            "sysUptime": 1549994777.0,
            "ntpSync": "yes",
            "agentUptime": 1549995176.0
        },
        {
            "status": "Fresh",
            "lastChanged": 1549995456.4500000477,
            "reinitializeTime": 1549995181.0,
            "hostname": "leaf22",
            "version": "2.0.0-rh7u11~1549992132.c42c08f",
            "sysUptime": 1549994805.0,
            "ntpSync": "yes",
            "agentUptime": 1549995181.0
        },
        {
            "status": "Fresh",
            "lastChanged": 1549995186.3090000153,
            "reinitializeTime": 1549995094.0,
            "hostname": "spine01",
            "version": "2.0.0-cl3u11~1549993210.e902a94",
            "sysUptime": 1549994772.0,
            "ntpSync": "yes",
```

```
"agentUptime":1549995094.0
},
{
  "status":"Fresh",
  "lastChanged":1549995191.4530000687,
  "reinitializeTime":1549995099.0,
  "hostname":"spine02",
  "version":"2.0.0-cl3u11~1549993210.e902a94",
  "sysUptime":1549994772.0,
  "ntpSync":"yes",
  "agentUptime":1549995099.0
},
...
...
```

 NOTE

If a NetQ Agent is restarted on a device, the timestamps for existing objects are not updated to reflect this new restart time. Their timestamps are preserved relative to the original start time of the Agent. A rare exception is if the device is rebooted between the time it takes the Agent being stopped and restarted; in this case, the time is once again relative to the start time of the Agent.

## Exporting NetQ Data

Data from the NetQ Platform can be exported in a couple of ways:

- use the `json` option to output command results to JSON format for parsing in other applications
- use the UI to export data from the full screen cards

### Example Using the CLI

You can check the state of BGP on your network with `netq check bgp`:

```
cumulus@leaf01:~$ netq check bgp
Total Nodes: 25, Failed Nodes: 3, Total Sessions: 220 , Failed Sessions: 24,
Hostname      VRF      Peer Name      Peer Hostname
Reason          Last Changed
-----
-----
exit01      DataVrf1080    swp6.2      firewall01      BGP session with peer
firewall01 swp6.2: AFI/ Tue Feb 12 18:11:16 2019
                                SAFI evpn not activated on peer
exit01      DataVrf1080    swp7.2      firewall02      BGP session with peer
firewall02 (swp7.2 vrf Tue Feb 12 18:11:27 2019
                                DataVrf1080) failed,
                                reason: Peer not configured
exit01      DataVrf1081    swp6.3      firewall01      BGP session with peer
firewall01 swp6.3: AFI/ Tue Feb 12 18:11:16 2019
                                SAFI evpn not activated on peer
exit01      DataVrf1081    swp7.3      firewall02      BGP session with peer
firewall02 (swp7.3 vrf Tue Feb 12 18:11:27 2019
```

```
DataVrf1081) failed,  
reason: Peer not configured
```

```
...
```

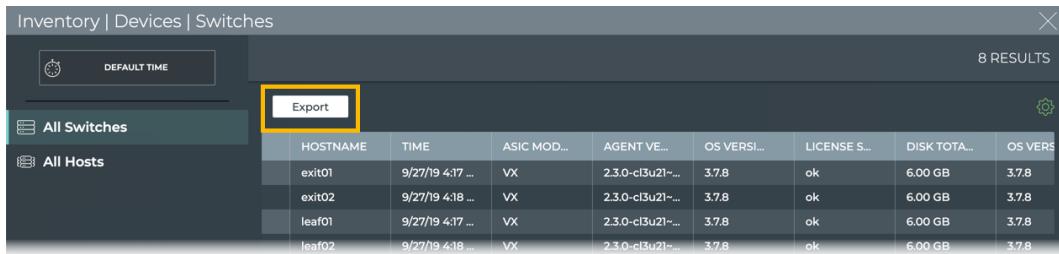
When you show the output in JSON format, this same command looks like this:

```
cumulus@leaf01:~$ netq check bgp json  
{  
    "failedNodes": [  
        {  
            "peerHostname": "firewall01",  
            "lastChanged": 1549995080.0,  
            "hostname": "exit01",  
            "peerName": "swp6.2",  
            "reason": "BGP session with peer firewall01 swp6.2: AFI/SAFI evpn not  
activated on peer",  
            "vrf": "DataVrf1080"  
        },  
        {  
            "peerHostname": "firewall02",  
            "lastChanged": 1549995449.7279999256,  
            "hostname": "exit01",  
            "peerName": "swp7.2",  
            "reason": "BGP session with peer firewall02 (swp7.2 vrf DataVrf1080) failed,  
reason: Peer not configured",  
            "vrf": "DataVrf1080"  
        },  
        {
```

```
"peerHostname":"firewall01",
"lastChanged":1549995080.0,
"hostname":"exit01",
"peerName":"swp6.3",
"reason":"BGP session with peer firewall01 swp6.3: AFI/SAFI evpn not
activated on peer",
"vrf":"DataVrf1081"
},
{
"peerHostname":"firewall02",
"lastChanged":1549995449.7349998951,
"hostname":"exit01",
"peerName":"swp7.3",
"reason":"BGP session with peer firewall02 (swp7.3 vrf DataVrf1081) failed,
reason: Peer not configured",
"vrf":"DataVrf1081"
},
...
],
"summary": {
  "checkedNodeCount": 25,
  "failedSessionCount": 24,
  "failedNodeCount": 3,
  "totalSessionCount": 220
}
}
```

## Example Using the UI

Open the full screen Switch Inventory card, select the data to export, and click **Export**.



Inventory   Devices   Switches								
		8 RESULTS						
DEFAULT TIME								
All Switches								
All Hosts								
		HOSTNAME	TIME	ASIC MOD..	AGENT VE..	OS VERSI..	LICENSE S..	DISK TOTA..
		exit01	9/27/19 4:17 ...	VX	2.3.0-cl3u21~...	3.7.8	ok	6.00 GB
		exit02	9/27/19 4:18 ...	VX	2.3.0-cl3u21~...	3.7.8	ok	6.00 GB
		leaf01	9/27/19 4:17 ...	VX	2.3.0-cl3u21~...	3.7.8	ok	6.00 GB
		leaf02	9/27/19 4:18 ...	VX	2.3.0-cl3u21~...	3.7.8	ok	6.00 GB

## Important File Locations

The primary configuration file for all Cumulus NetQ tools, `netq.yml`, resides in `/etc/netq` by default.

Log files are stored in `/var/logs/` by default.

Refer to [Investigate NetQ Issues](#) for a complete listing of configuration files and logs for use in issue resolution.

# Install NetQ

Installing NetQ software can be accomplished in one of three ways:

- Deploy the software on your own switch that is running Cumulus Linux version 3.3.2 or later (on-premises or cloud deployments)
- Purchase and deploy the Cumulus NetQ Appliance (for on-premises deployments)
- Purchase and deploy the Cumulus NetQ Cloud Appliance (for cloud deployments)

In all cases you must also load the NetQ Agent software onto the switches and hosts you want to monitor.

If you are upgrading from a prior version of NetQ, refer to [Upgrade NetQ](#) instead.

# Install NetQ Software on Your Server

The installation instructions in this topic describe how to install the Cumulus NetQ software onto your server for either an on-premises or in-cloud deployment. There are three key steps:

1. Verify your server meets the hardware and software requirements.
2. Load the software onto the switch.
3. Load the NetQ Agent onto the switches and hosts you want to monitor.

If you are upgrading from a prior version of NetQ, refer to [Upgrade NetQ](#) instead.

## Prerequisites

### Hardware Requirements

Cumulus NetQ software is supported on a variety of hardware.



#### IMPORTANT

You must meet these *minimum* hardware requirements to install the VM and have it run properly.

The NetQ software requires a server with the following:

<b>Hardware Component</b>	<b>Minimum On-site Requirement</b>	<b>Minimum Cloud Requirement</b>
Processor	Eight (8) virtual CPUs	Four (4) virtual CPUs
Memory	64 GB RAM	8 GB RAM
Local disk storage	256 GB SSD ( <b>Note:</b> This must be an SSD; use of other storage options can lead to system instability and are not supported.)	32 GB (SSD not required)
Network interface speed	1 Gb NIC	1 Gb NIC

You must also open the following ports on your hardware to use the NetQ software:

<b>Port</b>	<b>Deployment Type</b>	<b>Software Component Access</b>
31980	On-premises and cloud	NetQ Platform
32708	On-premises	API Gateway
32666	On-premises	Web-based User Interface

### NetQ Platform HyperVisor Requirements

The NetQ Platform can be installed as a Virtual Machine (VM) using one of the following hypervisors:

- VMware ESXi™ 6.5 for servers running Cumulus Linux, CentOS, Ubuntu and RedHat operating systems.
- KVM/QCOW (QEMU Copy on Write) image for servers running CentOS, Ubuntu and RedHat operating systems.

## NetQ Agent Operating System Requirements

NetQ 2.3 Agents are supported on the following switch and host operating systems:

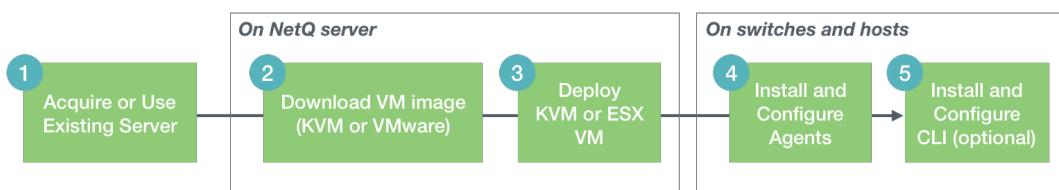
- Cumulus Linux 3.3.2 and later
- Ubuntu 16.04
- Ubuntu 18.04 (NetQ 2.2.2 and later)
- Red Hat® Enterprise Linux (RHEL) 7.1
- CentOS 7

## NetQ Application Support

The NetQ CLI, UI, and RESTful API are supported on NetQ 2.1.0 and later. NetQ 1.4 and earlier applications are not supported in NetQ 2.x.

## Install Workflow

Installation of NetQ involves installing the NetQ software, and installing and configuring the NetQ Agents. Additional steps are needed to [Integrate NetQ with Event Notification Applications](#). This flow chart shows the required steps to install and setup NetQ to start validating your network, and the optional steps of integrating with event notification applications and monitoring hosts.



## Install the NetQ Platform

The first step of the install process is to install the NetQ software onto your hardware (NetQ Platform).

The NetQ software is comprised of the following components:

- **NetQ applications:** network monitoring and analytics functionality

- **NetQ CLI:** command line user interface for monitoring network and administering NetQ through a terminal session
- **NetQ UI:** graphical interface for monitoring network and administering NetQ
- **NetQ API:** Restful application programming interface for accessing NetQ data and integrating with third-party tools
- **NetQ notifier:** application used to send event notifications to third-party notification tools



TIP

Cumulus Networks recommends you install the NetQ software on a server that is part of an out-of-band management network to ensure it can monitor in-band network issues without being affected itself. You should run the software on a separate, powerful server to ensure proper operation and for maximum usability and performance. Refer to [Hardware Requirements](#) for specifics.

## Install Cumulus NetQ for an On-premises Deployment

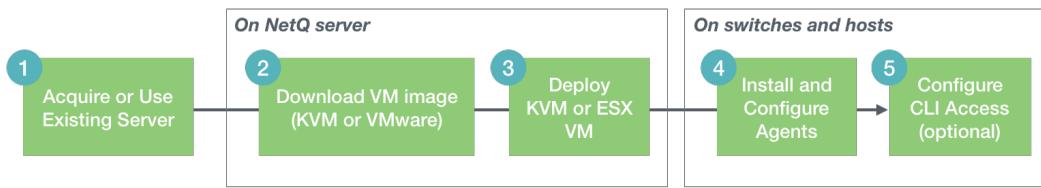
Follow the instructions in this section to install Cumulus NetQ software onto a server that is to be deployed and managed on your premises. For cloud deployments, refer to [Install Cumulus NetQ for a Cloud Deployment](#).

### On-Premises Install Workflow

Installation of NetQ involves installing the NetQ software, and installing and configuring the NetQ Agents. Additional steps are needed to [Integrate NetQ with Notification Applications](#).

## Install NetQ Software on Your Server

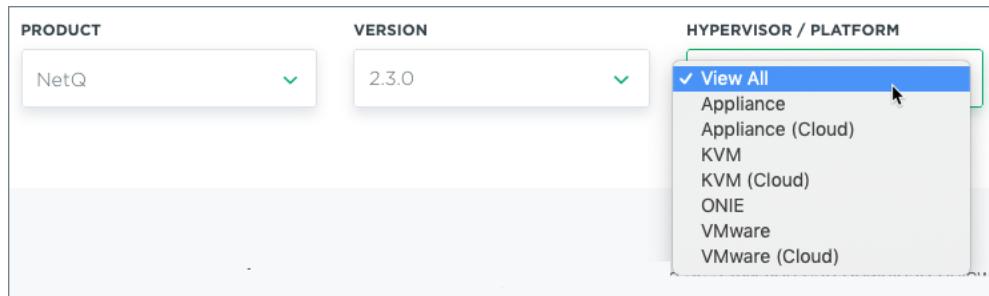
## Install Cumulus NetQ for an On-premises Deployment



### Install the NetQ Software

To install the NetQ software onto your own hardware using a VM image:

1. **IMPORTANT:** Confirm that your server hardware meets the requirements set out [here](#).
2. Download the NetQ Platform image.
  - a. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
  - b. Click **2.3** from the **Version** list box, and then select **2.3.x** from the submenu.
  - c. Optionally, select the hypervisor you wish to use (*VMware* or *KVM*) from the **Hypervisor/Platform** list box.



- d. Scroll down to review the images that match your selection criteria, and click **Download** for the image you want.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment

**RELEASED 2019-09-26**  
Version: 2.3.0

**HYPERVISOR**  
VMware

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
3091C24E8D68F34E9CCD3A2B3F9B639EE  
FD2C1B88871D527A4E2BBBAB6AE74C0

**IMPORTANT UPDATES**  
N/A

**DOWNLOAD**

**Upgrade available**  
Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
7E8B57676379CF3893A06022D722346781  
F7D076CE44ECF702FAF5FAA11BDC04

**UPGRADE**

**RELEASED 2019-09-26**  
Version: 2.3.0

**HYPERVISOR**  
KVM

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
DF0A00B0AEEE00D7F1EE8DEC86FF862  
C997B156CCA9A2FAC4D46A52B48378E8

**IMPORTANT UPDATES**  
N/A

**DOWNLOAD**

**Upgrade available**  
Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
7E8B57676379CF3893A06022D722346781  
F7D076CE44ECF702FAF5FAA11BDC04

**UPGRADE**

### 3. Open your hypervisor and set up your VM.

You can use these examples for reference or use your own hypervisor instructions.

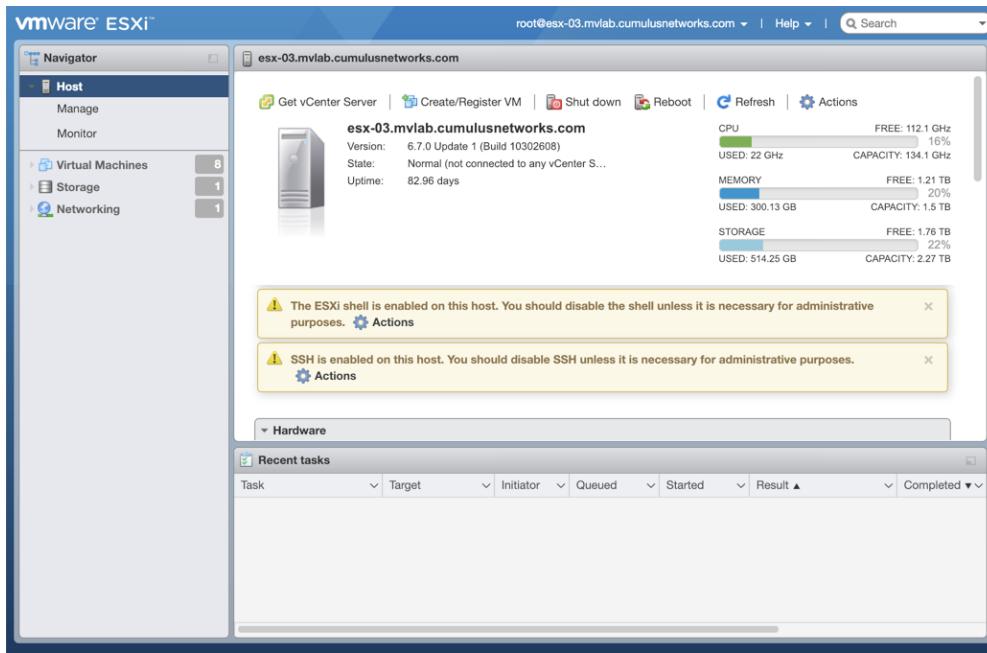
#### 4. VMware example

This example shows the VM setup process using an OVA file with VMware ESXi.

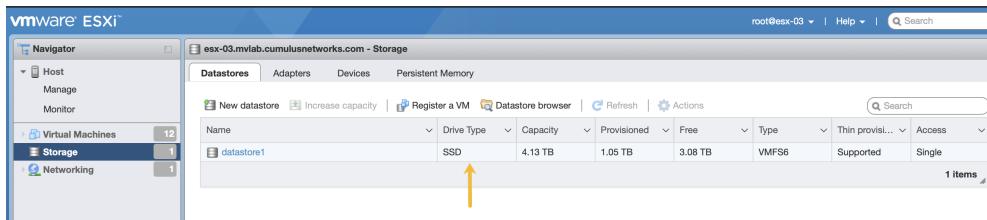
- Enter the address of the hardware in your browser.
- Log in to VMware using credentials with root access.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment



- c. For an on-site NetQ Platform deployment, click **Storage** in the Navigator to verify you have an SSD installed.



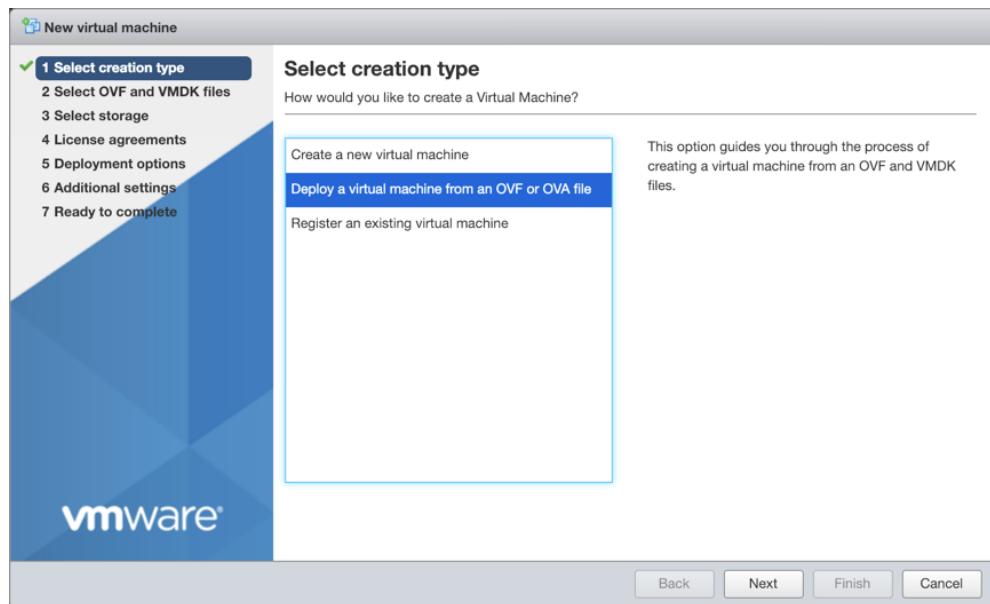
- d. Click **Create/Register VM** at the top of the right pane.



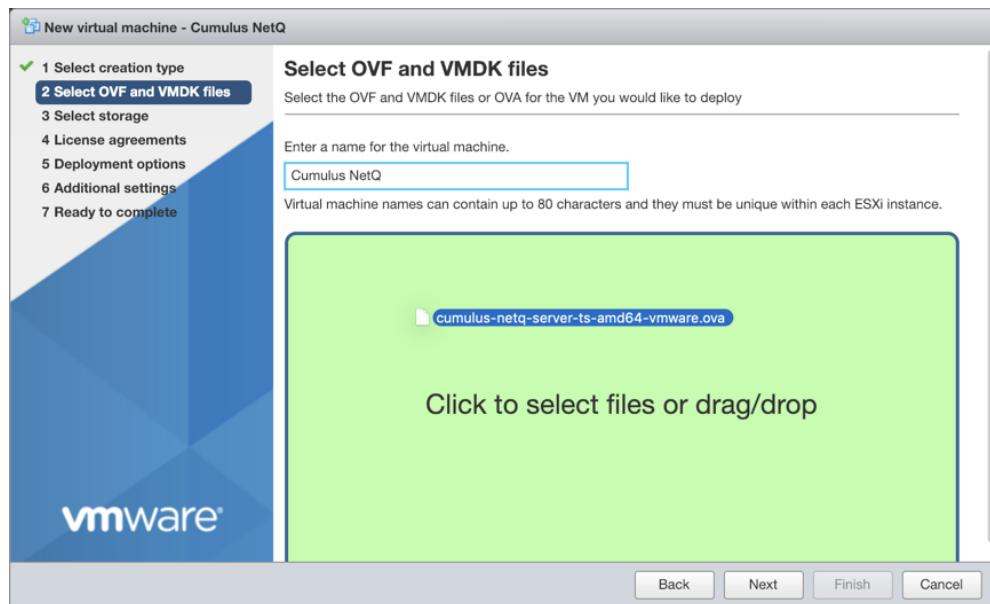
- e. Select **Deploy a virtual machine from an OVF or OVA file**, and click **Next**.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment



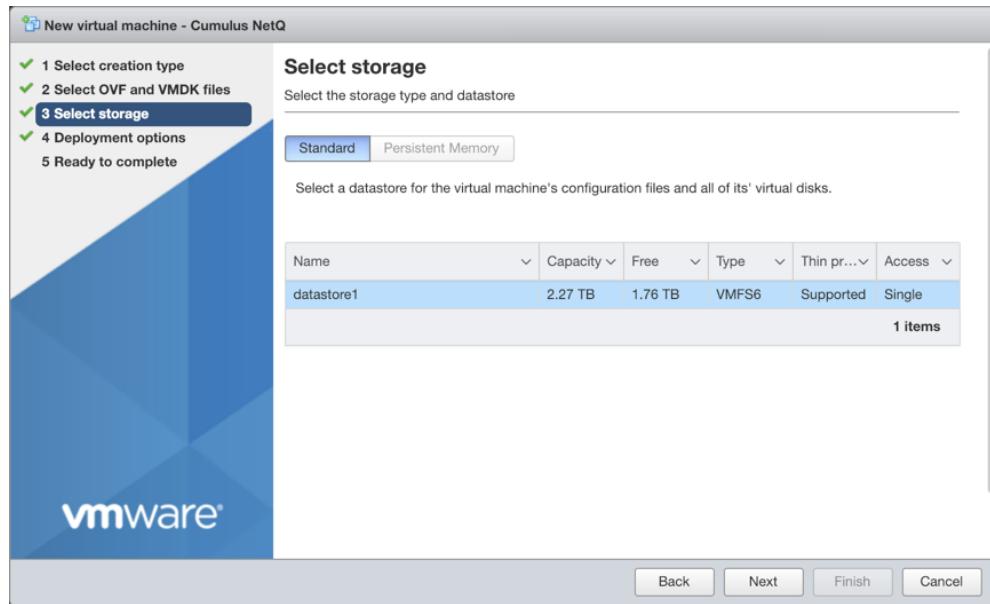
- f. Provide a name for the VM, for example *Cumulus NetQ*.
- g. Drag and drop the NetQ Platform image file you downloaded in Step 1 above.
- h. Click **Next**.



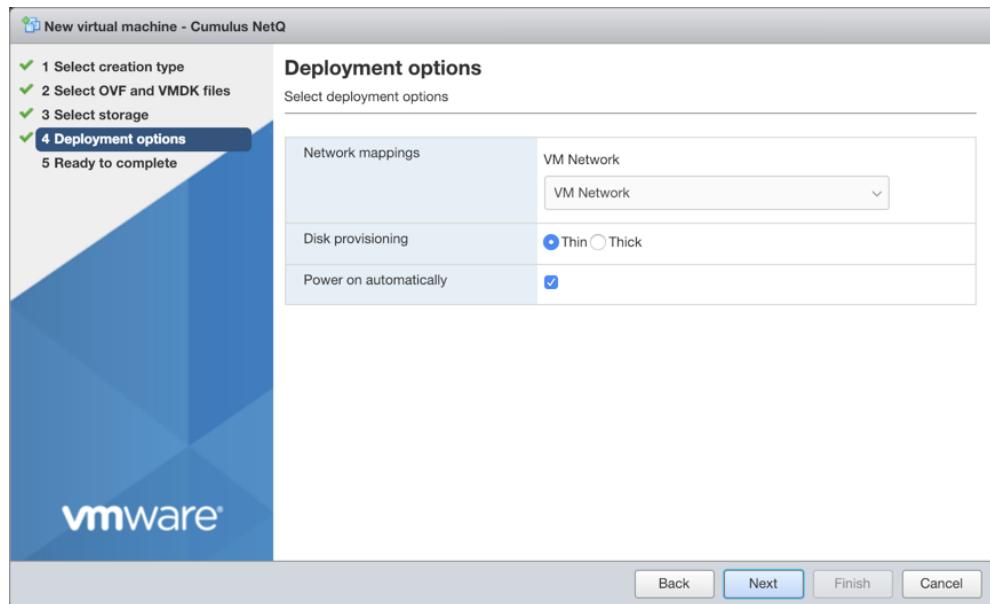
- i. Select the storage type and data store for the image to use, then click **Next**. In this example, only one is available.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment



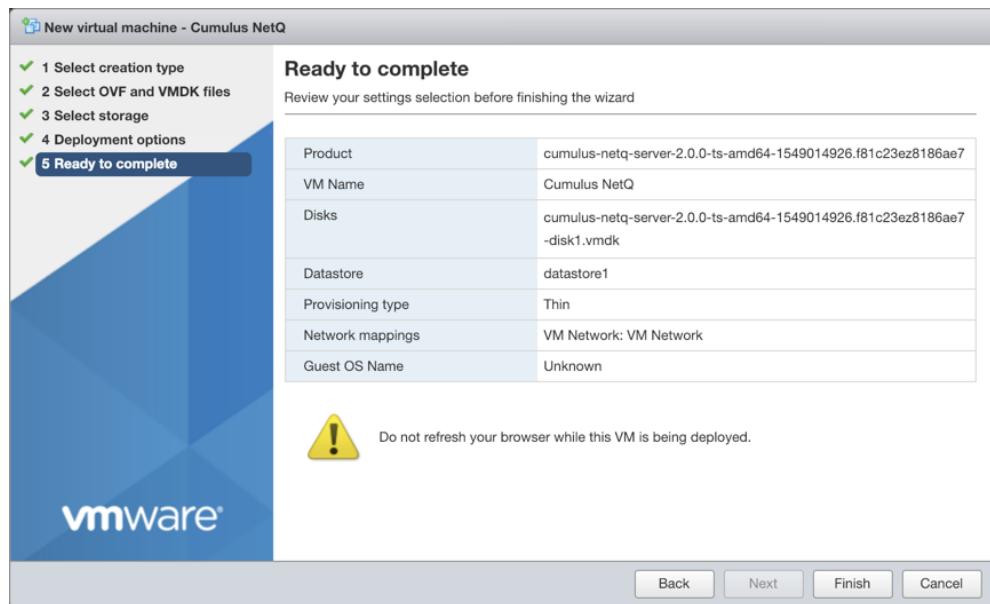
- j. Accept the default deployment options or modify them according to your network needs. Click **Next** when you are finished.



- k. Review the configuration summary. Click **Back** to change any of the settings, or click **Finish** to continue with the creation of the VM.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment

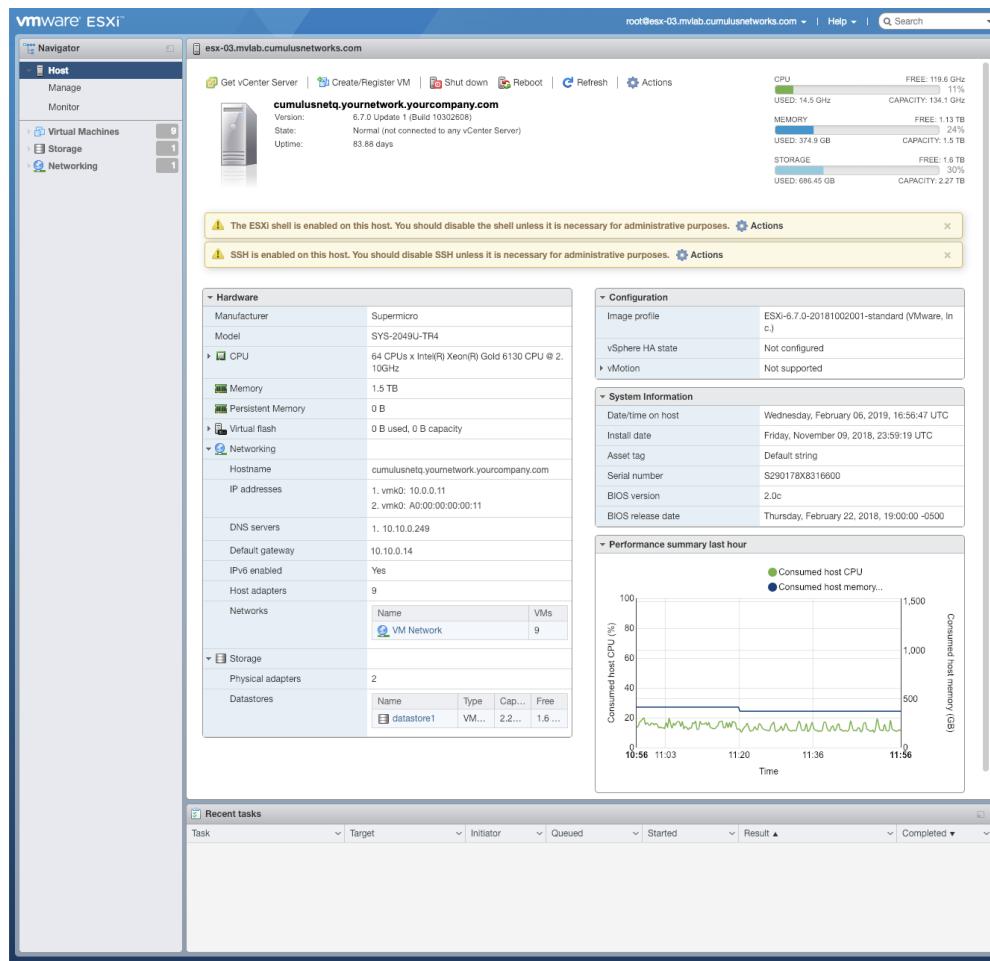


The progress of the request is shown in the Recent Tasks window at the bottom of the application. This may take some time, so continue with your other work until the upload finishes.

- I. Once completed, view the full details of the VM and hardware.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment



### 5. KVM example

This example shows the VM setup process for a system with Libvirt and KVM/QEMU installed.

- Confirm that the SHA256 checksum matches the one posted on the Cumulus Downloads website to ensure the image download has not been corrupted.

```
$ sha256sum ./Downloads/cumulus-netq-server-2.3.0-ts-amd64-qemu.qcow2
$ 6fff5f2ac62930799b4e8cc7811abb6840b247e2c9e76ea9ccba03f991f424244 ./
Downloads/cumulus-netq-server-2.2.0-ts-amd64-qemu.qcow2
```

- b. Copy the QCOW2 image to a directory where you want to run it.



TIP

Copy, instead of moving, the original QCOW2 image that was downloaded to avoid re-downloading it again later should you need to perform this process again.

```
$ sudo mkdir /vms  
$ sudo cp ./Downloads/cumulus-netq-server-2.3.0-ts-amd64-qemu.qcow2 /  
vms/ts.qcow2
```

- c. Create the VM.

For a Direct VM, where the VM uses a MACVLAN interface to sit on the host interface for its connectivity:

```
$ virt-install --name=netq_ts --vcpus=8 --memory=65536 --os-type=linux --os-  
variant=debian7 \  
--disk path=/vms/ts.qcow2,format=qcow2,bus=virtio,cache=none \  
--network=type=direct,source=eth0,model=virtio --import --noautoconsole
```

 NOTE

Replace the disk path value with the location where the QCOW2 image is to reside. Replace network model value (eth0 in the above example) with the name of the interface where the VM is connected to the external network.

Or, for a Bridged VM, where the VM attaches to a bridge which has already been setup to allow for external access:

```
$ virt-install --name=netq_ts --vcpus=8 --memory=65536 --os-type=linux --os-variant=debian7 \
--disk path=/vms/ts.qcow2,format=qcow2,bus=virtio,cache=none \
--network=bridge=br0,model=virtio --import --noautoconsole
```

 NOTE

Replace network bridge value (br0 in the above example) with the name of the (pre-existing) bridge interface where the VM is connected to the external network.

- d. Watch the boot process in another terminal window.

```
$ virsh console netq_ts
```

- e. From the Console of the VM, check to see which IP address Eth0 has obtained via DHCP, or alternatively set a static IP address with NCLU on the NetQ Appliance or Platform VM.

```
$ ip addr show eth0  
$ net add interface eth0 ip address 10.0.0.1  
$ net commit
```

 **IMPORTANT**

If you have changed the IP address or hostname of the NetQ server, you need to re-register this address with the Kubernetes containers before you can continue.

1. Reset all Kubernetes administrative settings. Run the command twice to make sure all directories and files have been reset.

```
cumulus@netq-platform:~$ sudo kubeadm reset -f
```

2. Remove the Kubernetes configuration.

```
cumulus@netq-platform:~$ sudo rm /home/cumulus/.kube/config
```

3. Reset the NetQ Platform install daemon.

```
cumulus@netq-platform:~$ sudo systemctl reset-failed
```

4. Reset the Kubernetes service.

```
cumulus@netq-platform:~$ sudo systemctl restart cts-kubectl-config
```

**Note:** Allow 15 minutes for the prompt to return.

## Verify On-Premises Installation

1. Verify you can access the NetQ CLI.

- a. From a terminal window, log in to the NetQ Platform using the default credentials (*cumulus/CumulusLinux!*).

```
<computer>:~<username>$ ssh cumulus@<netq-platform-ipaddress>
Warning: Permanently added '<netq-platform-hostname>,
192.168.1.254' (ECDSA) to the list of known hosts.
cumulus@<netq-platform-hostname>'s password: <enter CumulusLinux!
here>
```

Welcome to Cumulus (R) Linux (R)

For support and online technical documentation, visit  
<http://www.cumulusnetworks.com/support>

The registered trademark Linux (R) is used pursuant to a sublicense from LMI,  
the exclusive licensee of Linus Torvalds, owner of the mark on a world-wide  
basis.

cumulus@<netq-platform-hostname>:~\$

- b. Run the following command to verify all applications are operating properly.

## Install NetQ Software on Your Server

## Install Cumulus NetQ for an On-premises Deployment

```
cumulus@<netq-platform-hostname>:~$ netq show opta-health
```

Application	Status	Health	Kafka Stream	Git Hash	Timestamp
netq-app-macfdb	UP	true	up	14b42e6	Mon Jun 3 20:20:35 2019
netq-app-interface	UP	true		0fe11c6	Mon Jun 3 20:20:34 2019
netq-app-vlan	UP	true		4daed85	Mon Jun 3 20:20:35 2019
netq-app-sensors	UP	true	up	f37272c	Mon Jun 3 20:20:34 2019
...					
netq-app-ntp	UP	true	up	651c86f	Mon Jun 3 20:20:35 2019
netq-app-customermgmt	UP	true		7250354	Mon Jun 3 20:20:34 2019
netq-app-node	UP	true	up	f676c9a	Mon Jun 3 20:20:34 2019
netq-app-route	UP	true	up	6e31f98	Mon Jun 3 20:20:35 2019

```
cumulus@<netq-platform-hostname>:~$
```

 NOTE

Please allow 10-15 minutes for all applications to come up and report their status. If any of the applications or services display status as DOWN after 30 minutes, open a [support ticket](#) and attach the output of the opta-support command.

2. Verify that NTP is configured and running. NTP operation is critical to proper operation of NetQ. Refer to [Setting Date and Time](#) in the *Cumulus Linux User Guide* for details and instructions.

 TIP

If you are still experiencing issues with your installation, confirm that your DNS server is properly configured.

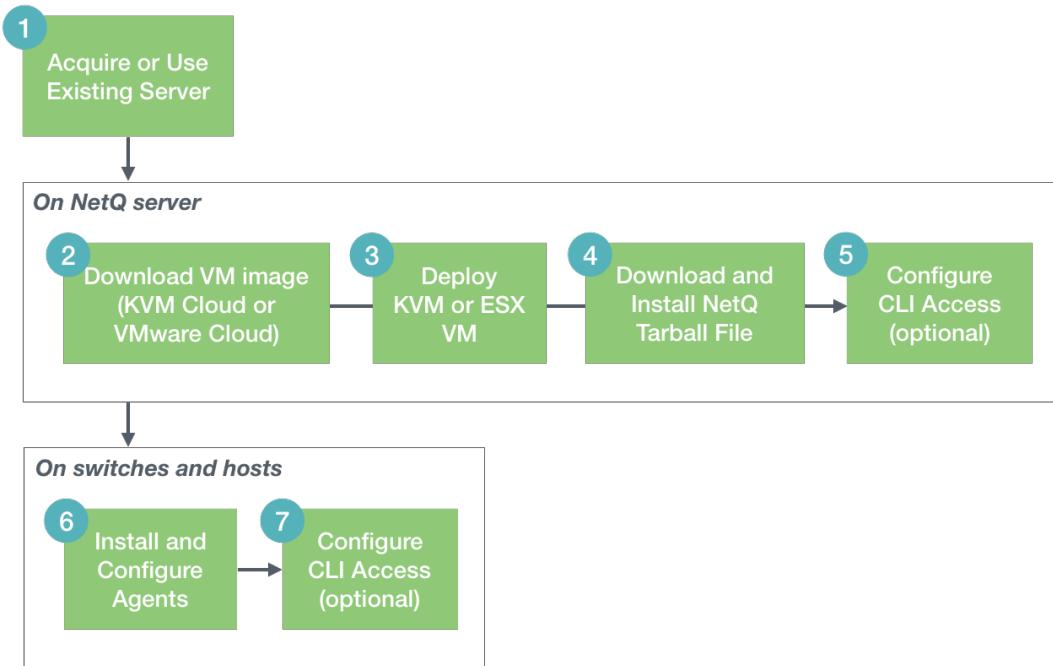
You are almost done. The NetQ server installation is complete. The final step is to install NetQ Agents on each of the switches and hosts you want monitored. Go to [Install the NetQ Agent and CLI on Switches](#) for these instructions.

## Install Cumulus NetQ for a Cloud Deployment

Follow the instructions in this section to install Cumulus NetQ software onto a server that is to be installed and managed on your premises, but that accesses the Cumulus NetQ Cloud for application and data storage. For on-premises deployments, refer to [Install Cumulus NetQ for an On-premises Deployment](#).

## Cloud Deployment Install Workflow

Installation of NetQ involves installing the NetQ software, and installing and configuring the NetQ Agents. Additional steps are needed to [Integrate NetQ with Notification Applications](#).

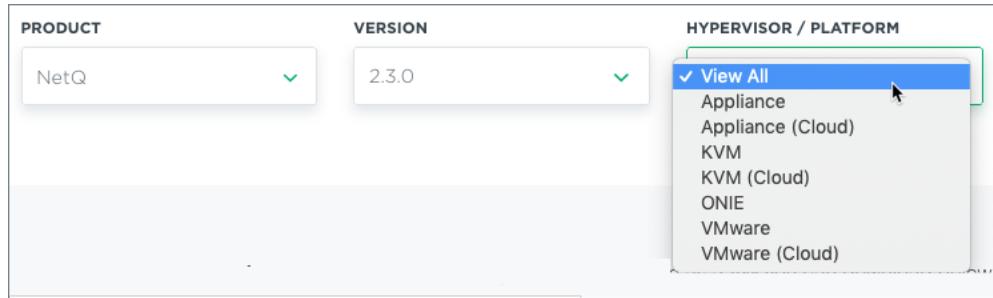


## Download NetQ Virtual Machine

To install the NetQ VM image onto your own hardware:

1. **IMPORTANT:** Confirm that your server hardware meets the requirements set out [here](#).
2. Download the NetQ Platform image.
  - a. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
  - b. Click **2.3** from the **Version** list box, and then select **2.3.x** from the submenu.
  - c. Optionally, select the hypervisor you wish to use (**VMware (Cloud)** or **KVM (Cloud)**) from the **Hypervisor/Platform** list box.

## Install NetQ Software on Your Server    Install Cumulus NetQ for a Cloud Deployment



- d. Scroll down to review the images that match your selection criteria, and click **Download** for the image you want.

**RELEASED 2019-09-26**  
Version: 2.3.0

**HYPERVISOR**  
VMware (Cloud)

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
6EF35B7A06E26368EA7659C02ABF4001B  
AB07753C2E0D2EDE53646B7B958F5C7

**IMPORTANT UPDATES**  
N/A

**DOWNLOAD**

**Upgrade available**  
Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
05942ABBF4A5C3FEA2BC43218EC248BF  
1AE000C5D11656C9AF9D96DFF8E1FA7

**UPGRADE**

**RELEASED 2019-09-26**  
Version: 2.3.0

**HYPERVISOR**  
KVM (Cloud)

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
126052D8BE511DAFDF75095258CC2C33E  
9E35A7E17163DA705320DA8C8AEEA3C

**IMPORTANT UPDATES**  
N/A

**DOWNLOAD**

**Upgrade available**  
Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
05942ABBF4A5C3FEA2BC43218EC248BF  
1AE000C5D11656C9AF9D96DFF8E1FA7

**UPGRADE**

3. Open your hypervisor and set up your VM.

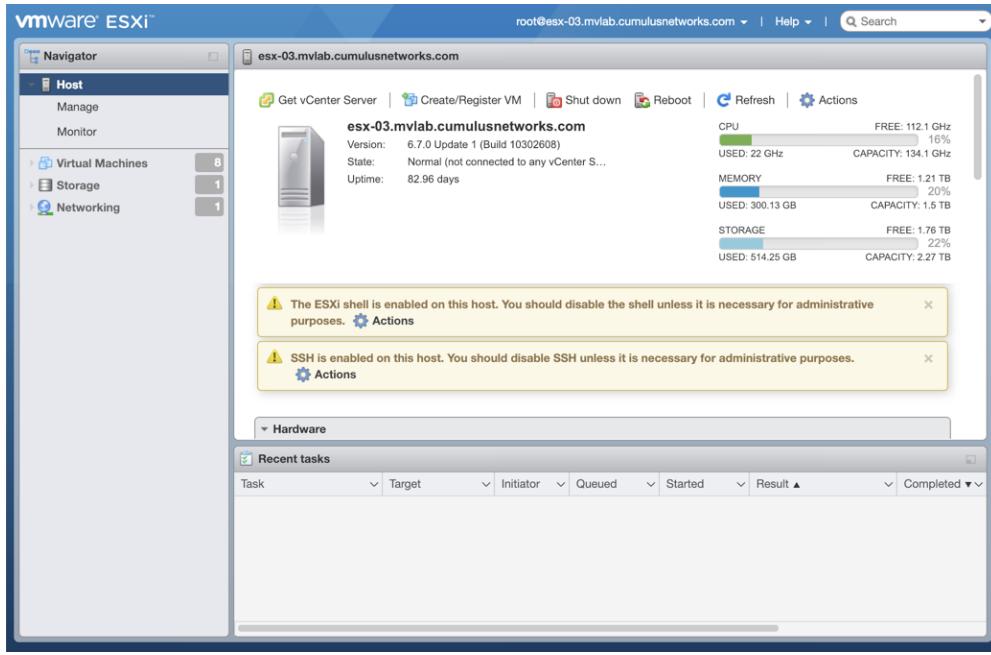
You can use these examples for reference or use your own hypervisor instructions.

### 4. VMware example

## Install NetQ Software on Your Server    Install Cumulus NetQ for a Cloud Deployment

This example shows the VM setup process using an OVA file with VMware ESXi.

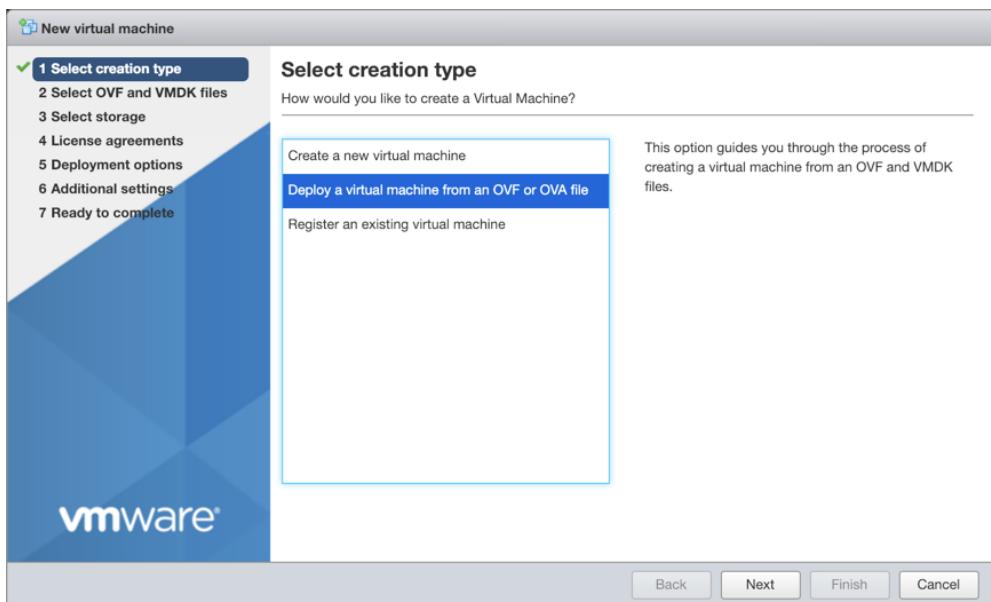
- Enter the address of the hardware in your browser.
- Log in to VMware using credentials with root access.



- Click **Create/Register VM** at the top of the right pane.



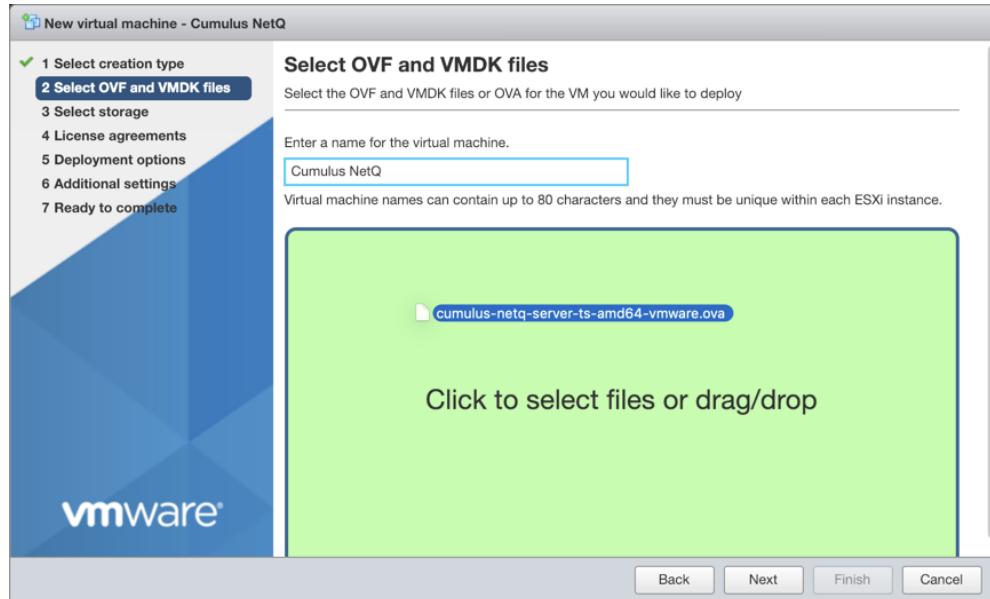
- Select **Deploy a virtual machine from an OVF or OVA file**, and click **Next**.



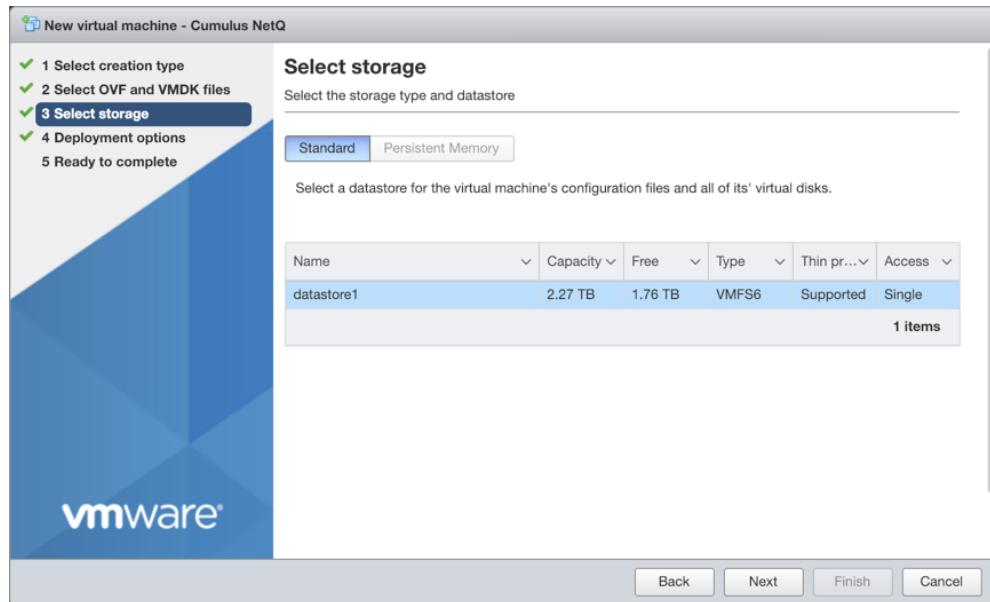
- Provide a name for the VM, for example *Cumulus NetQ*.

## Install NetQ Software on Your Server    Install Cumulus NetQ for a Cloud Deployment

- f. Drag and drop the NetQ Platform image file you downloaded in Step 1 above.
- g. Click **Next**.

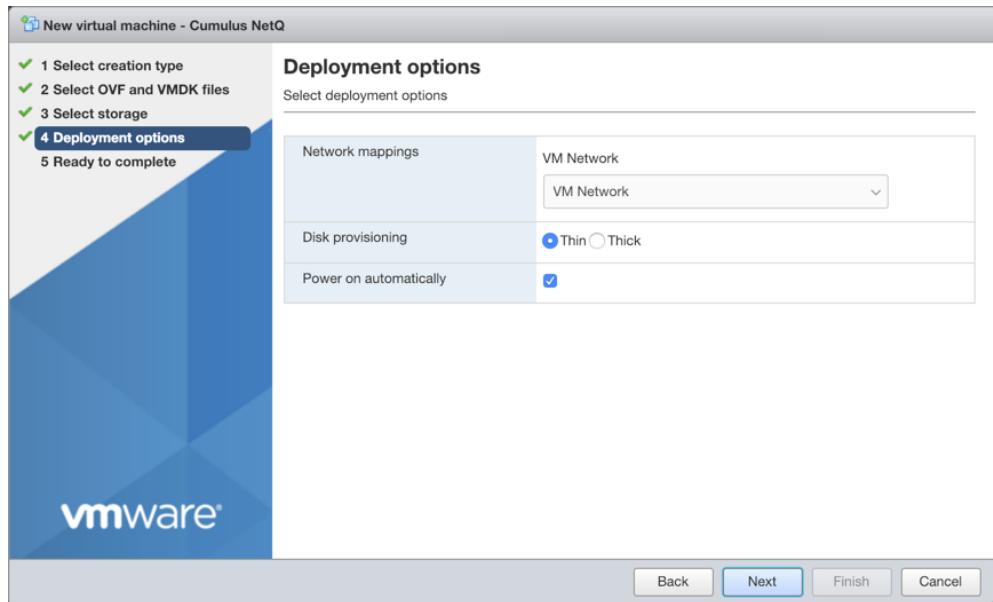


- h. Select the storage type and data store for the image to use, then click **Next**. In this example, only one is available.

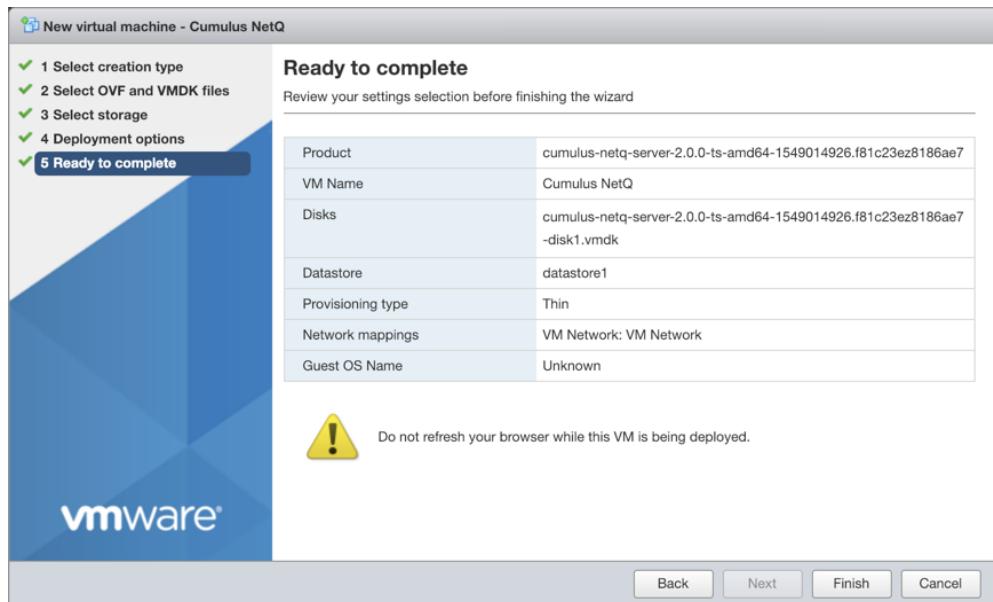


- i. Accept the default deployment options or modify them according to your network needs. Click **Next** when you are finished.

## Install NetQ Software on Your Server    Install Cumulus NetQ for a Cloud Deployment



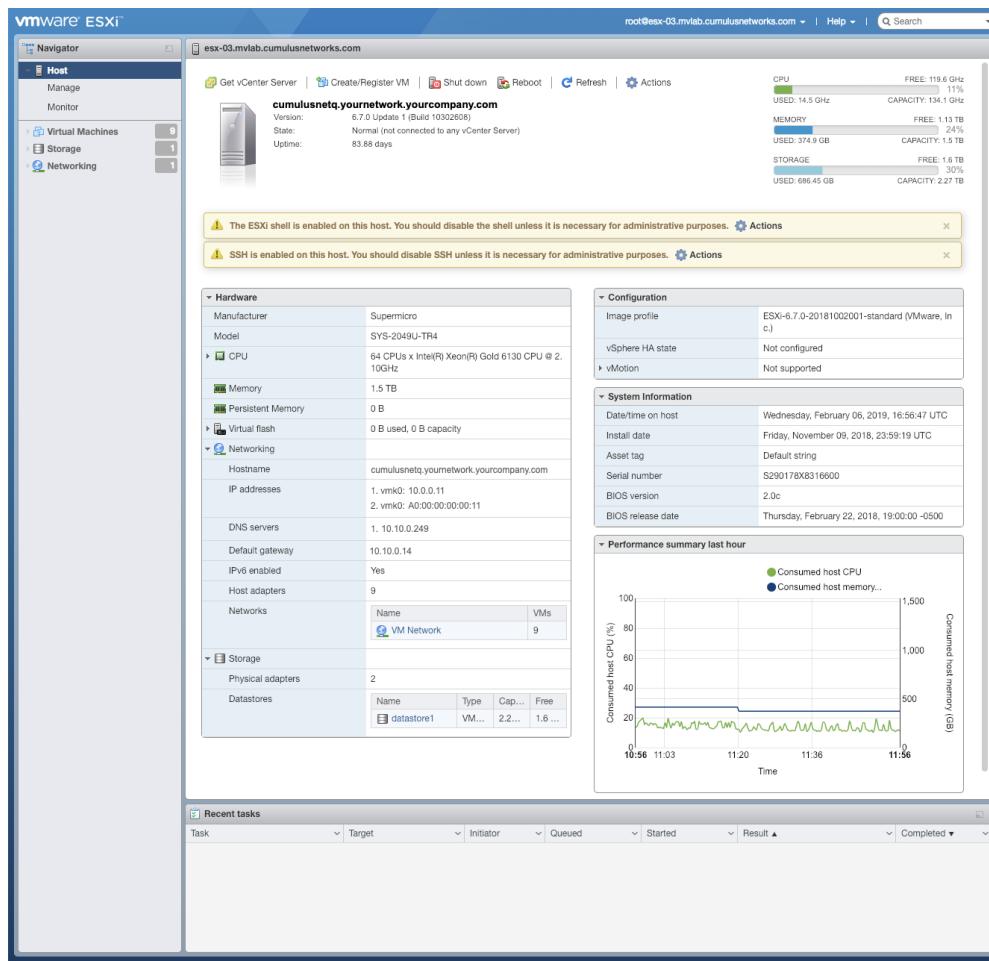
- j. Review the configuration summary. Click **Back** to change any of the settings, or click **Finish** to continue with the creation of the VM.



The progress of the request is shown in the Recent Tasks window at the bottom of the application. This may take some time, so continue with your other work until the upload finishes.

- k. Once completed, view the full details of the VM and hardware.

## Install NetQ Software on Your Server    Install Cumulus NetQ for a Cloud Deployment



### 5. KVM example

This example shows the VM setup process for a system with Libvirt and KVM/QEMU installed.

- Confirm that the SHA256 checksum matches the one posted on the Cumulus Downloads website to ensure the image download has not been corrupted.

```
$ sha256sum ./Downloads/cumulus-netq-server-2.3.0-ts-amd64-qemu.qcow2
$ 6fff5f2ac62930799b4e8cc7811abb6840b247e2c9e76ea9ccba03f991f424244 ./
Downloads/cumulus-netq-server-2.3.0-ts-amd64-qemu.qcow2
```

- b. Copy the QCOW2 image to a directory where you want to run it.



TIP

Copy, instead of moving, the original QCOW2 image that was downloaded to avoid re-downloading it again later should you need to perform this process again.

```
$ sudo mkdir /vms  
$ sudo cp ./Downloads/cumulus-netq-server-2.3.0-ts-amd64-qemu.qcow2 /  
vms/ts.qcow2
```

- c. Create the VM.

For a Direct VM, where the VM uses a MACVLAN interface to sit on the host interface for its connectivity:

```
$ virt-install --name=netq_ts --vcpus=8 --memory=65536 --os-type=linux --os-  
variant=debian7 \  
--disk path=/vms/ts.qcow2,format=qcow2,bus=virtio,cache=none \  
--network=type=direct,source=eth0,model=virtio --import --noautoconsole
```

 NOTE

Replace the disk path value with the location where the QCOW2 image is to reside. Replace network model value (eth0 in the above example) with the name of the interface where the VM is connected to the external network.

Or, for a Bridged VM, where the VM attaches to a bridge which has already been setup to allow for external access:

```
$ virt-install --name=netq_ts --vcpus=8 --memory=65536 --os-type=linux --os-variant=debian7 \
--disk path=/vms/ts.qcow2,format=qcow2,bus=virtio,cache=none \
--network=bridge=br0,model=virtio --import --noautoconsole
```

 NOTE

Replace network bridge value (br0 in the above example) with the name of the (pre-existing) bridge interface where the VM is connected to the external network.

- d. Watch the boot process in another terminal window.

```
$ virsh console netq_ts
```

- e. From the Console of the VM, check to see which IP address Eth0 has obtained via DHCP, or alternatively set a static IP address with NCLU on the NetQ Appliance or Platform VM.

```
$ ip addr show eth0  
$ net add interface eth0 ip address 10.0.0.1  
$ net commit
```

**IMPORTANT**

If you have changed the IP address or hostname of the NetQ server, you need to re-register this address with the Kubernetes containers before you can continue.

Step	Description	Command
1	Reset all Kubernetes administrative settings	<code>sudo kubeadm reset -f</code>
2	Remove the Kubernetes configuration	<code>sudo rm /home/cumulus/.kube/config</code>
3	Reset the NetQ Platform install daemon	<code>sudo systemctl reset-failed</code>
4	Reset the Kubernetes service	<code>sudo systemctl restart cts-kubectl-config</code>
		<b>Note:</b> Allow 15 minutes for the prompt to return.

## Download and Install NetQ Cloud Components

Download and install the tarball file.

The `config-key` was provided to you by Cumulus Networks via an email titled *A new site has been added to your Cumulus NetQ account*. If you have lost it, submit a [support request](#) to have it sent to you again.

**Note:** Be sure to replace the interface and key values with values appropriate for your configuration. This example uses eth0 and a sample key.

```
cumulus@netq-platform:~$ netq install opta interface eth0 tarball download  
config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="
```

**Note:** If you connect to your NetQ Cloud Server via proxy, you must identify the proxy with the `proxy-host` option, as follows:

```
cumulus@netq-platform:~$ netq install opta interface eth0 tarball download  
config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="  
proxy-host netqcloudproxy proxy-port 8000
```

 **IMPORTANT**

It is strongly recommended that you do not use environment variables in the `etc/environment` file (such as `http_proxy`, `https_proxy`, `HTTP_PROXY`, or `HTTPS_PROXY`) to define your proxy as this can cause the installation to fail.

If you must use environment variables, comment out these variables just before running the `netq install` command, and then uncomment them when you are finished with installation.

 **IMPORTANT**

If you changed the IP address or interface of the appliance to something other than what it was assigned previously, you must inform NetQ of the change.

If you changed the IP address, but kept the interface the same (for example, eth0), re-run the `netq install opta interface` command using your config-key:

```
cumulus@netq-platform:~$ netq install opta interface eth0 tarball  
NetQ-2.3.x-opta.tgz config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="
```

If you changed the interface (for example, eth0 to eth1), run the `netq install opta interface` command with the new interface and your config-key:

```
cumulus@netq-platform:~$ netq install opta interface eth1 tarball  
NetQ-2.2.x-opta.tgz config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="
```

 NOTE

You can optionally override selected default installation parameters using the file <text-config-file> option. By default, the data directory is /mnt, the Kubernetes pods are assigned to network addresses in the 10.244.0.0/16 range, the node name is *cumulus.netq*, and the scratch directory is /tmp. The override file must be in YAML format and written as shown in this example:

```
data-dir: /usr/share  
pod-network-dir: 10.1.1.0/16  
node-name: company-name.netq  
scratch-dir: /tmp/netq
```

The text-config-file value is then the full path to the YAML file; for example /home/username/overwrite-default.yml.

### Verify Cloud Installation

Now that your appliance is installed and configured, you can verify that all applications and services are operating properly.

```
cumulus@netq-platform:~$ netq show opta-health  
OPTA is healthy
```

## Configure CLI Access on Appliance

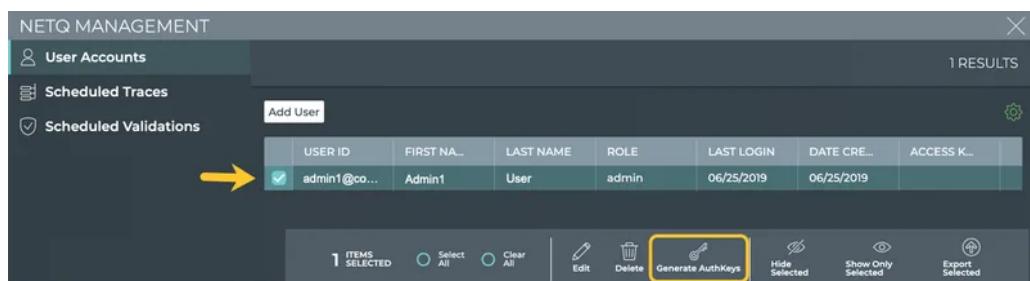
The CLI communicates through the API gateway in the NetQ Cloud. To access and configure the CLI on your NetQ Cloud server you will need your username and password to access the NetQ UI to generate an access-key and secret-key. Your credentials and NetQ Cloud addresses were provided by Cumulus Networks via an email titled *Welcome to Cumulus NetQ!*

To configure CLI access:

1. In your Internet browser, enter **netq.cumulusnetworks.com** into the address field to open the NetQ UI login page.
2. Enter your username and password.
3. From the Main Menu, select **Management** in the **Admin** column.



4. Click **Manage** on the User Accounts card.
5. Select your user and click **Generate AuthKeys**.



6. Copy these keys to a safe place.

 **IMPORTANT**

The secret key is only shown once. If you do not copy these, you will need to regenerate them and reconfigure CLI access.

In version 2.2.1 and later, you can save these keys to a YAML file for easy reference, and to avoid having to type or copy the key values. You can:

- store the file wherever you like, for example in `/home/cumulus/` or `/etc/netq`
- name the file whatever you like, for example `credentials.yml`, `creds.yml`, or `keys.yml`

BUT, the file must have the following format:

```
access-key: <user-access-key-value-here>
secret-key: <user-secret-key-value-here>
```

7. Configure access to the CLI:

- In NetQ 2.3.x, run the following commands. Replace the key values with your generated keys.

```
cumulus@netq-platform:~$ netq config add cli server
api.netq.cumulusnetworks.com access-key <text-access-key> secret-key <text-
secret-key> premises <text-premises-name> port 443
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
```

```
Updated cli server api.netq.cumulusnetworks.com vrf default port 443.
```

```
Please restart netqd (netq config restart cli)
```

```
cumulus@netq-platform:~$ netq config restart cli
```

```
Restarting NetQ CLI... Success!
```

- In NetQ 2.2.1 and later, if you have created a keys file as noted in the previous step, run the following commands. Be sure to include the *full path* to the file.

```
cumulus@netq-platform:~$ netq config add cli server
```

```
api.netq.cumulusnetworks.com cli-keys-file /full-path/credentials.yml port 443
```

```
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
```

```
Updated cli server api.netq.cumulusnetworks.com vrf default port 443.
```

```
Please restart netqd (netq config restart cli)
```

```
cumulus@netq-platform:~$ netq config restart cli
```

```
Restarting NetQ CLI... Success!
```

With your NetQ cloud server set up and configured, you are ready to install the NetQ Agent on each switch and host you want to monitor with NetQ. Follow the instructions in [Install the NetQ Agent and CLI on Switches](#) for details.

## Integrate with Event Notification Tools

If you want to proactively monitor events in your network, you can integrate NetQ with the PagerDuty or Slack notification tools. To do so you need to configure both the notification application itself to receive the messages, and NetQ with what messages to

send and where to send them. Refer to [Integrate NetQ with Notification Applications](#) to use the CLI for configuration.

## Set Up Security

When you set up and configured your Cumulus Linux switches, you likely configured a number of the security features available. Cumulus recommends the same security measures be followed for the NetQ Platform in the out-of-band-network. Refer to the [Securing Cumulus Linux white paper](#) for details.

Your Cumulus Linux switches have a number of ports open by default. A few additional ports must be opened to run the NetQ software (refer to [Default Open Ports in Cumulus Linux and NetQ](#) article).

# Install the Cumulus NetQ Appliance

The Cumulus NetQ appliance provides a complete monitoring solution for your network; the server comes preloaded with a Cumulus Linux image that includes Cumulus NetQ services, a Cumulus Linux license and certified cables and optics.

This topic helps you get your Cumulus NetQ appliance up and running in a few minutes.

## What's in the Box?

Inside the box that was shipped to you, you'll find:

- Your Cumulus NetQ appliance (a Supermicro 6019P-WTR server) with the Cumulus Linux OS, Cumulus NetQ services and license already installed
- Hardware accessories, such as power cables and rack mounting gear (note that network cables and optics ship separately)
- Information regarding your order

If you're looking for hardware specifications (including LED layouts and FRUs like the power supply or fans and accessories like included cables) or safety and environmental information, check out the [user manual](#) and [quick reference guide](#).

## Install Workflow

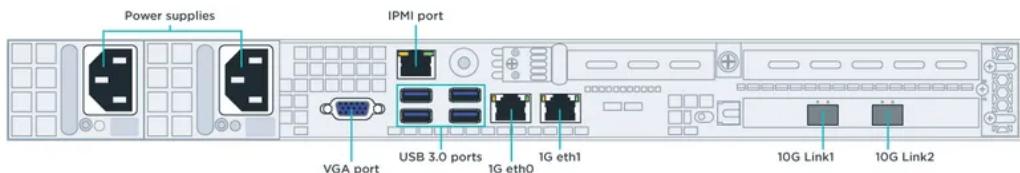
Install and set up your NetQ Appliance and switch and host Agents using the following steps:



## Install the Appliance

After you unbox the appliance:

1. Mount the appliance in the rack
2. Connect it to power following the procedures described in your appliance's user manual.
3. Connect the Ethernet cable to the 1G management port (eth0).
4. Power on the appliance.



If your network runs DHCP, you can configure Cumulus NetQ and Cumulus Linux over the network. If DHCP is not enabled, then you configure the appliance using the console cable provided.

## Configure the Password, Hostname and IP Address

Change the password and specify the hostname and IP address for the appliance before installing the NetQ software.

1. Log in to the appliance using the default login credentials:
  - **Username:** *cumulus*
  - **Password:** *CumulusLinux!*
2. Change your password for the cumulus account using the `passwd` command.

## Install the Cumulus NetQ Appliance

## Configure the Password, Hostname and IP Address

```
cumulus@netq-appliance:~$ passwd
```

3. The appliance's default hostname is *cumulus*. You can easily change it using the Cumulus Linux Network Command Line Utility (NCLU):

```
cumulus@netq-appliance:~$ net add hostname NEW_HOSTNAME
```

4. Identify the IP address. The appliance contains at least one dedicated Ethernet management port, named eth0, for out-of-band management. This is where NetQ Agents should send the telemetry data collected from your monitored switches and hosts. By default, eth0 uses DHCPv4 to get its IP address. You can view the address assigned using NCLU:

```
cumulus@netq-appliance:~$ net show interface eth0
```

Name	MAC	Speed	MTU	Mode
------	-----	-------	-----	------

---

UP	eth0	fc:1f:6b:81:2b:62	1G	1500	Mgmt
----	------	-------------------	----	------	------

IP Details

---

IP:	192.0.2.42/24
-----	---------------

IP Neighbor(ARP) Entries:	4
---------------------------	---

If instead, you want to set a static IP address, use the following NCLU command, substituting with your desired IP address:

## Install the Cumulus NetQ Appliance

## Configure the Password, Hostname and IP Address

```
cumulus@netq-appliance:~$ net add interface eth0 address 192.0.2.42/24
```

Review and commit your changes:

```
cumulus@netq-appliance:~$ net pending  
cumulus@netq-appliance:~$ net commit
```

 **IMPORTANT**

If you have changed the IP address or hostname of the NetQ Appliance, you need to re-register this address with the Kubernetes containers before you can continue.

1. Reset all Kubernetes administrative settings. Run the command twice to make sure all directories and files have been reset.

```
cumulus@netq-platform:~$ sudo kubeadm reset -f
```

2. Remove the Kubernetes configuration.

```
cumulus@netq-platform:~$ sudo rm /home/cumulus/.kube/config
```

3. Reset the NetQ Platform install daemon.

```
cumulus@netq-platform:~$ sudo systemctl reset-failed
```

4. Reset the Kubernetes service.

```
cumulus@netq-platform:~$ sudo systemctl restart cts-kubectl-config
```

**Note:** Allow 15 minutes for the prompt to return.

With your NetQ cloud server now set up and configured, you are ready to install the NetQ Agent on each switch and host you want to monitor with NetQ. Follow the instructions in [Install the NetQ Agent and CLI on Switches](#) for details.

## Intelligent Platform Management Interface - IPMI

The NetQ Appliance comes with Intelligent Platform Management Interface (IPMI). IPMI provides remote access to multiple users at different locations for networking. It also allows a system administrator to monitor system health and manage computer events remotely. For details, please read the [Supermicro IPMI user guide](#).

## Integrate with Event Notification Tools

If you want to proactively monitor events in your network, you can integrate NetQ with the PagerDuty or Slack notification tools. To do so you need to configure both the notification application itself to receive the messages, and NetQ with what messages to send and where to send them. Refer to [Integrate NetQ with Notification Applications](#) to use the CLI for configuration.

## Set Up Security

When you set up and configured your Cumulus Linux switches, you likely configured a number of the security features available. Cumulus recommends the same security

measures be followed for the NetQ Platform in the out-of-band-network. Refer to the [Securing Cumulus Linux white paper](#) for details.

Your Cumulus Linux switches have a number of ports open by default. A few additional ports must be opened to run the NetQ software (refer to [Default Open Ports in Cumulus Linux and NetQ](#) article).

# Install the Cumulus NetQ Cloud Appliance

The Cumulus NetQ Cloud Appliance provides secure streaming of telemetry data collected by NetQ Agents to the NetQ Cloud; the server comes preloaded with a Cumulus Linux image that includes basic Cumulus NetQ services, Cumulus Linux license, and certified cables and optics.

This topic helps you get your Cumulus NetQ Cloud Appliance up and running in a few minutes.

## What's in the Box?

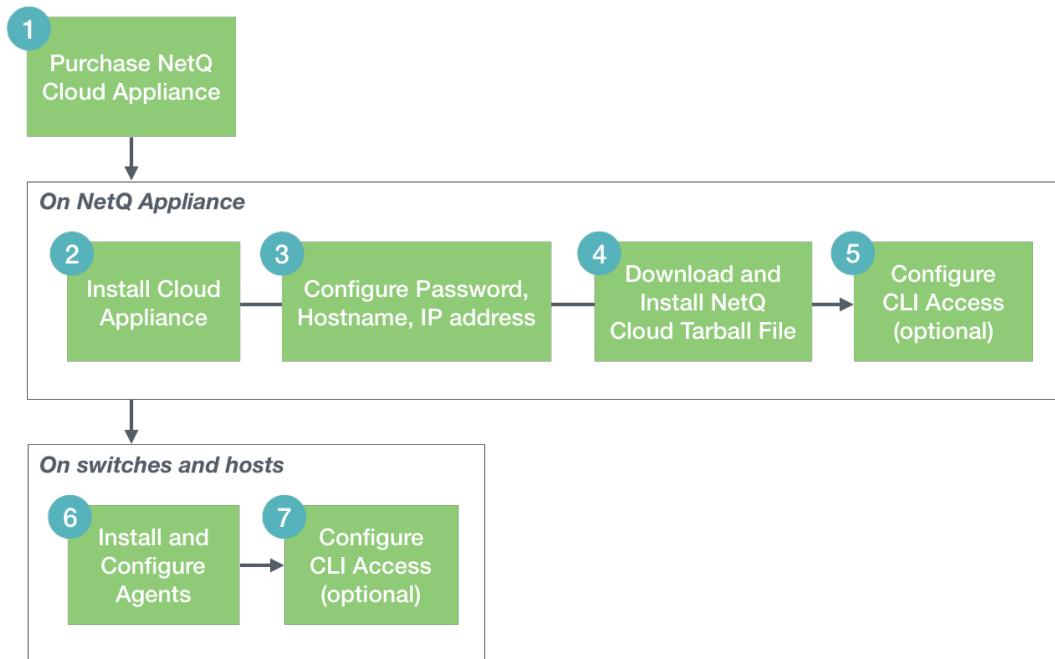
Inside the box that was shipped to you, you'll find:

- Your Cumulus NetQ Cloud Appliance (a Supermicro SuperServer E300-9D) with the Cumulus Linux OS, Cumulus NetQ services and licenses already installed
- Hardware accessories, such as power cables and rack mounting gear (note that network cables and optics ship separately)
- Information regarding your order

If you're looking for hardware specifications (including LED layouts and FRUs like the power supply or fans and accessories like included cables) or safety and environmental information, check out the appliance's [user manual](#).

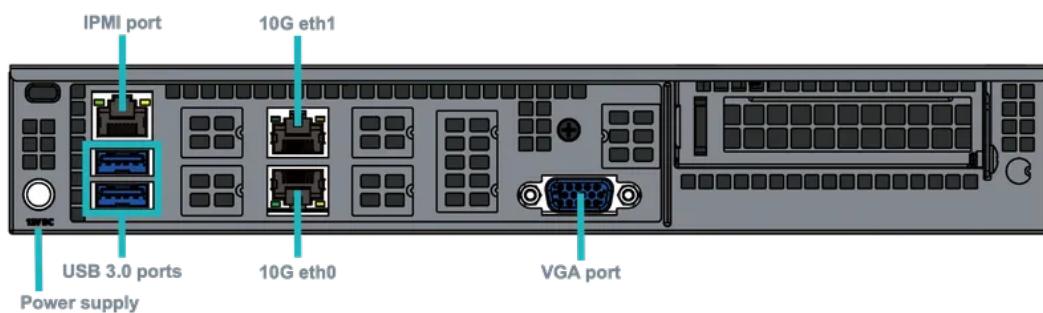
## Install Workflow

Install and set up your NetQ Appliance and switch and host Agents using the following steps:



## Install the Appliance

After you unbox the appliance, mount it in the rack and connect it to power following the procedures described in your appliance's [user manual](#). Connect the Ethernet cable to the 10G management port (eth0), then power on the appliance.



## Install the Cumulus NetQ Cloud Appliance

## Configure the Password, Hostname, and IP Address

If your network runs DHCP, you can configure Cumulus NetQ and Cumulus Linux over the network. If DHCP isn't enabled, then you configure the appliance using the console cable provided.

### Configure the Password, Hostname, and IP Address

Change the password and specify the hostname and IP address for the appliance before installing the NetQ software.

1. Log in to the appliance using the default login credentials:

- **Username:** *cumulus*
- **Password:** *CumulusLinux!*

2. Change your password for the *cumulus* account using the `passwd` command.

```
cumulus@netq-appliance:~$ passwd
```

3. The appliance's default hostname is *cumulus*. You can easily change it using the Cumulus Linux Network Command Line Utility (NCLU):

```
cumulus@netq-appliance:~$ net add hostname NEW_HOSTNAME
```

4. Identify the IP address. The appliance contains at least one dedicated Ethernet management port, named `eth0`, for out-of-band management. This is where NetQ Agents should send the telemetry data collected from your monitored switches and hosts. By default, `eth0` uses DHCPv4 to get its IP address. You can view the address assigned using NCLU:

## Install the Cumulus NetQ Cloud Appliance

## Download and Install the NetQ Cloud Software

```
cumulus@netq-appliance:~$ net show interface eth0
```

Name	MAC	Speed	MTU	Mode
------	-----	-------	-----	------

UP	eth0	fc:1f:6b:81:2b:62	1G	1500 Mgmt
----	------	-------------------	----	-----------

IP Details

IP:	192.0.2.42/24
-----	---------------

IP Neighbor(ARP) Entries: 4

If instead, you want to set a static IP address, use the following NCLU command, substituting with your desired IP address:

```
cumulus@netq-appliance:~$ net add interface eth0 address 192.0.2.42/24
```

Review and commit your changes:

```
cumulus@netq-appliance:~$ net pending
```

```
cumulus@netq-appliance:~$ net commit
```

## Download and Install the NetQ Cloud Software

Download and install the tarball file. The config-key was provided to you by Cumulus Networks via an email titled *A new site has been added to your Cumulus NetQ account*. If you have lost it, submit a [support request](#) to have it sent to you again.

**Note:** Be sure to replace the interface and key values with values appropriate for your configuration. This example uses eth0 and a sample key.

```
cumulus@netq-appliance:~$ netq install opta interface eth0 tarball download  
config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="
```

**Note:** If you connect to your NetQ Cloud Appliance via proxy, you must identify the proxy with the `proxy-host` option, as follows:

```
cumulus@netq-platform:~$ netq install opta interface eth0 tarball download  
config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="  
proxy-host netqcloudproxy proxy-port 8000
```



### IMPORTANT

It is strongly recommended that you do not use environment variables in the `etc/environment` file (such as `http_proxy`, `https_proxy`, `HTTP_PROXY`, or `HTTPS_PROXY`) to define your proxy as this can cause the installation to fail.

If you must use environment variables, comment out these variables just before running the `netq install` command, and then uncomment them when you are finished with installation.

 **IMPORTANT**

If you changed the IP address or interface of the appliance to something other than what it was assigned previously, you must inform NetQ of the change.

If you changed the IP address, but kept the interface the same (for example, eth0), re-run the `netq install opta interface` command using your config-key:

```
cumulus@netq-appliance:~$ netq install opta interface eth0 tarball  
NetQ-2.3.x-opta.tgz config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="
```

If you changed the interface (for example, eth0 to eth1), run the `netq install opta interface` command with the new interface and your config-key:

```
cumulus@netq-appliance:~$ netq install opta interface eth1 tarball  
NetQ-2.3.x-opta.tgz config-key  
"CNKaDBIjZ3buZhV2Mi5uZXRxZGV2LmN1bXVsdxNuZXw3b3Jrcy5jb20YuwM="
```

 NOTE

You can optionally override selected default installation parameters using the file <text-config-file> option. By default, the data directory is /mnt, the Kubernetes pods are assigned to network addresses in the 10.244.0.0/16 range, the node name is *cumulus.netq*, and the scratch directory is /tmp. The override file must be in YAML format and written as shown in this example:

```
data-dir: /usr/share  
pod-network-dir: 10.1.1.0/16  
node-name: company-name.netq  
scratch-dir: /tmp/netq
```

The text-config-file value is then the full path to the YAML file; for example /home/username/overwrite-default.yml.

### Verify Cloud Installation

Now that your appliance is installed and configured, you can verify that all applications and services are operating properly.

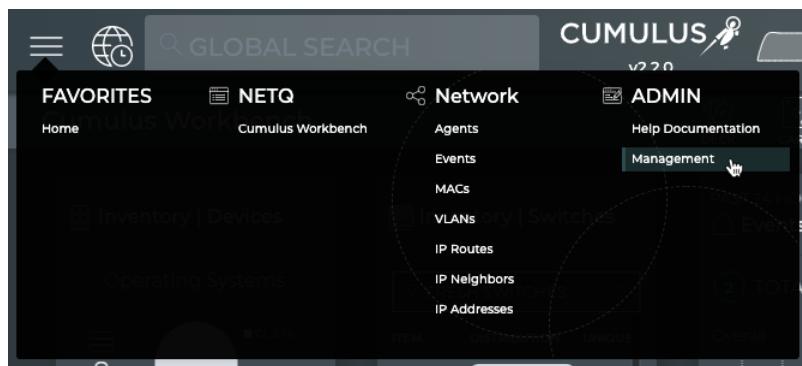
```
cumulus@netq-appliance:~$ netq show opta-health  
OPTA is healthy
```

## Configure CLI Access on Appliance

The CLI communicates through the API gateway in the NetQ Cloud. To access and configure the CLI on your NetQ Cloud server you will need your username and password to access the NetQ UI to generate an access-key and secret-key. Your credentials and NetQ Cloud addresses were provided by Cumulus Networks via an email titled *Welcome to Cumulus NetQ!*

To configure CLI access:

1. In your Internet browser, enter **netq.cumulusnetworks.com** into the address field to open the NetQ UI login page.
2. Enter your username and password.
3. From the Main Menu, select *Management* in the **Admin** column.



4. Click **Manage** on the User Accounts card.
5. Select your user and click **Generate AuthKeys**.

A screenshot of the NetQ Management interface. It shows a table of user accounts with one row selected. The columns are: USER ID, FIRST NAME, LAST NAME, ROLE, LAST LOGIN, DATE CRE., and ACCESS K.. A yellow arrow points to the 'Generate AuthKeys' button in the bottom right corner of the table row. Other buttons in the row include Edit, Delete, and Hide Selected. The table has a total of 1 RESULT.

6. Copy these keys to a safe place.

 **IMPORTANT**

The secret key is only shown once. If you don't copy these, you will need to regenerate them and reconfigure CLI access.

In version 2.2.1 and later, you can save these keys to a YAML file for easy reference, and to avoid having to type or copy the key values. You can:

- store the file wherever you like, for example in `/home/cumulus/` or `/etc/netq`
- name the file whatever you like, for example `credentials.yml`, `creds.yml`, or `keys.yml`

BUT, the file must have the following format:

```
access-key: <user-access-key-value-here>
secret-key: <user-secret-key-value-here>
```

7. Run the following command using your generated keys:

- In NetQ 2.3.x, run the following commands. Replace the key values with your generated keys.

```
cumulus@netq-appliance:~$ netq config add cli server
api.netq.cumulusnetworks.com access-key <text-access-key> secret-key <text-
secret-key> port 443
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
```

```
Updated cli server api.netq.cumulusnetworks.com vrf default port 443.
```

```
Please restart netqd (netq config restart cli)
```

```
cumulus@netq-appliance:~$ netq config restart cli
```

```
Restarting NetQ CLI... Success!
```

- In NetQ 2.2.1 and later, if you have created a keys file as noted in the previous step, run the following commands. Be sure to include the full path to the file.

```
cumulus@netq-appliance:~$ netq config add cli server
```

```
api.netq.cumulusnetworks.com cli-keys-file /full-path/credentials.yml port 443
```

```
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
```

```
Updated cli server api.netq.cumulusnetworks.com vrf default port 443.
```

```
Please restart netqd (netq config restart cli)
```

```
cumulus@netq-appliance:~$ netq config restart cli
```

```
Restarting NetQ CLI... Success!
```

With your NetQ cloud server set up and configured, you are ready to install the NetQ Agent on each switch and host you want to monitor with NetQ. Follow the instructions in [Install NetQ Agents and CLI on Switches](#) for details.

## Intelligent Platform Management Interface - IPMI

The NetQ Appliance comes with Intelligent Platform Management Interface (IPMI). IPMI provides remote access to multiple users at different locations for networking. It also allows a system administrator to monitor system health and manage computer events remotely. For details, please read the [Supermicro IPMI user guide](#).

## Integrate with Event Notification Tools

If you want to proactively monitor events in your network, you can integrate NetQ with the PagerDuty or Slack notification tools. To do so you need to configure both the notification application itself to receive the messages, and NetQ with what messages to send and where to send them. Refer to [Integrate NetQ with Notification Applications](#) to use the CLI for configuration.

## Set Up Security

When you set up and configured your Cumulus Linux switches, you likely configured a number of the security features available. Cumulus recommends the same security measures be followed for the NetQ Platform in the out-of-band-network. Refer to the [Securing Cumulus Linux white paper](#) for details.

Your Cumulus Linux switches have a number of ports open by default. A few additional ports must be opened to run the NetQ software (refer to [Default Open Ports in Cumulus Linux and NetQ](#) article).

# Install the NetQ Agent and CLI on Switches

After installing or upgrading your Cumulus NetQ software, you should install the corresponding version of the NetQ Agents on each node you want to monitor. The node can be a:

- Switch running Cumulus Linux version 3.3.2 or later
- Server running Red Hat RHEL 7.1
- Server running Ubuntu 16.04
- Server running Ubuntu 18.04 (NetQ 2.2.2 and later)
- Server running CentOS 7

This topic describes how to perform the installation and configuration. If you are upgrading, you can skip some of the steps which do not need to be performed a second time.

## Install a NetQ Agent

To install the NetQ Agent you need to install the OS-specific meta package, `cumulus-netq`, on each switch. Optionally, you can install it on hosts. The meta package contains the NetQ Agent and NetQ applications.

Instructions for installing the meta package on each node type are included here:

- [Install NetQ Agent on a Cumulus Linux Switch](#)
- [Install NetQ Agent on an Ubuntu Server](#)
- [Install NetQ Agent on a Red Hat or CentOS Server](#)

 NOTE

If your network uses a proxy server for external connections, you should first [configure a global proxy](#) so apt-get can access the meta package on the Cumulus Networks repository.

### Install NetQ Agent on a Cumulus Linux Switch

A simple process installs the NetQ Agent on a Cumulus switch.

1. Edit the `/etc/apt/sources.list` file to add the repository for Cumulus NetQ. **Note** that NetQ has a separate repository from Cumulus Linux.

```
cumulus@switch:~$ sudo nano /etc/apt/sources.list
...
deb http://apps3.cumulusnetworks.com/repos/deb CumulusLinux-3 netq-2.3
...
```

 TIP

The repository `deb http://apps3.cumulusnetworks.com/repos/deb CumulusLinux-3 netq-latest` can be used if you want to always retrieve the latest posted version of NetQ.

2. Update the local `apt` repository, then install the NetQ meta package on the switch.

```
cumulus@switch:~$ sudo apt-get update  
cumulus@switch:~$ sudo apt-get install cumulus-netq
```

3. Verify that **NTP** is running on the host node. Nodes must be in time synchronization with the NetQ Platform to enable useful statistical analysis.

```
cumulus@switch:~$ sudo systemctl status ntp  
[sudo] password for cumulus:  
● ntp.service - LSB: Start NTP daemon  
  Loaded: loaded (/etc/init.d/ntp; bad; vendor preset: enabled)  
  Active: active (running) since Fri 2018-06-01 13:49:11 EDT; 2 weeks 6 days ago  
    Docs: man:systemd-sysv-generator(8)  
  CGroup: /system.slice/ntp.service  
         └─2873 /usr/sbin/ntpd -p /var/run/ntpd.pid -g -c /var/lib/ntp/  
          ntp.conf.dhcp -u 109:114
```

4. Restart **rsyslog** so log files are sent to the correct destination.

```
cumulus@switch:~$ sudo systemctl restart rsyslog.service
```

5. Continue with **NetQ Agent configuration**.

### Install NetQ Agent on an Ubuntu Server

Before you install the NetQ Agent on an Ubuntu server, make sure the following packages are installed and running these minimum versions:

- iproute 1:4.3.0-1ubuntu3.16.04.1 all
- iproute2 4.3.0-1ubuntu3 amd64

- lldpd 0.7.19-1 amd64
- ntp 1:4.2.8p4+dfsg-3ubuntu5.6 amd64

 **IMPORTANT**

Make sure you are running **lldpd**, not **lldpad**. Ubuntu does not include **lldpd** by default, which is required for the installation.

To install this package, run the following commands:

```
root@ubuntu:~# apt-get update  
root@ubuntu:~# apt-get install lldpd  
root@ubuntu:~# systemctl enable lldpd.service  
root@ubuntu:~# systemctl start lldpd.service
```

To install the NetQ Agent on an Ubuntu server:

1. Reference and update the local **apt** repository.

```
root@ubuntu:~# wget -O- https://apps3.cumulusnetworks.com/setup/cumulus-  
apps-deb.pubkey | apt-key add -
```

2. Add the Ubuntu repository:

### 3. Ubuntu 16.04

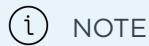
Create the file `/etc/apt/sources.list.d/cumulus-host-ubuntu-xenial.list` and add the following line:

```
root@ubuntu:~# vi /etc/apt/sources.list.d/cumulus-apps-deb-xenial.list
...
deb [arch=amd64] https://apps3.cumulusnetworks.com/repos/deb xenial netq-
latest
...
```

#### 4. Ubuntu 18.04

Create the file `/etc/apt/sources.list.d/cumulus-host-ubuntu-bionic.list` and add the following line:

```
root@ubuntu:~# vi /etc/apt/sources.list.d/cumulus-apps-deb-bionic.list
...
deb [arch=amd64] https://apps3.cumulusnetworks.com/repos/deb bionic netq-
latest
...
```



##### NOTE

The use of `netq-latest` in this example means that a get to the repository always retrieves the latest version of NetQ, even in the case where a major version update has been made. If you want to keep the repository on a specific version — such as `netq-2.2` — use that instead.

5. Install NTP on the server, if not already installed.

```
root@ubuntu:~# sudo apt-get install ntp
```

6. Configure the NTP server.

- a. Open the `/etc/ntp.conf` file in your text editor of choice.
- b. Under the Server section, specify the NTP server IP address or hostname.

7. Enable and start the NTP service.

```
root@ubuntu:~# sudo systemctl enable ntp.service
root@ubuntu:~# sudo systemctl start ntp.service
```

8. Verify NTP is operating correctly. Look for an asterisk (\*) or a plus sign (+) that indicates the clock is synchronized.

```
root@ubuntu:~# ntpq -pn
      remote          refid    st t when poll reach  delay  offset jitter
=====
+173.255.206.154 132.163.96.3    2 u   86 128 377  41.354  2.834  0.602
+12.167.151.2   198.148.79.209   3 u  103 128 377  13.395 -4.025  0.198
2a00:7600::41 .STEP.      16 u   -1024  0  0.000  0.000  0.000
\*129.250.35.250 249.224.99.213  2 u  101 128 377  14.588 -0.299  0.243
```

9. Install the meta package on the server.

```
root@ubuntu:~# apt-get update
root@ubuntu:~# apt-get install cumulus-netq
```

10. Continue with [NetQ Agent Configuration](#)

## Install NetQ Agent on a Red Hat or CentOS Server

Before you install the NetQ Agent on a Red Hat or CentOS server, make sure the following packages are installed and running these minimum versions:

- iproute-3.10.0-54.el7\_2.1.x86\_64
- llldpd-0.9.7-5.el7.x86\_64

### IMPORTANT

Make sure you are running **lldpd**, not **lldpad**. CentOS does not include **lldpd** by default, nor does it include **wget**, which is required for the installation.

To install this package, run the following commands:

```
root@rhel7:~# yum -y install epel-release
root@rhel7:~# yum -y install lldpd
root@rhel7:~# systemctl enable lldpd.service
root@rhel7:~# systemctl start lldpd.service
root@rhel7:~# yum install wget
```

- ntp-4.2.6p5-25.el7.centos.2.x86\_64
- ntpdate-4.2.6p5-25.el7.centos.2.x86\_64

To install the NetQ Agent on a Red Hat or CentOS server:

1. Reference and update the local **yum** repository.

```
root@rhel7:~# rpm --import https://apps3.cumulusnetworks.com/setup/
cumulus-apps-rpm.pubkey
root@rhel7:~# wget -O- https://apps3.cumulusnetworks.com/setup/cumulus-
apps-rpm-el7.repo > /etc/yum.repos.d/cumulus-host-el.repo
```

2. Edit `/etc/yum.repos.d/cumulus-host-el.repo` to set the `enabled=1` flag for the two NetQ repositories.

```
root@rhel7:~# vi /etc/yum.repos.d/cumulus-host-el.repo
...
[cumulus-arch-netq-2.3]
name=Cumulus netq packages
baseurl=https://apps3.cumulusnetworks.com/repos/rpm/el/7/
netq-2.3/$basearch
gpgcheck=1
enabled=1
[cumulus-noarch-netq-2.3]
name=Cumulus netq architecture-independent packages
baseurl=https://apps3.cumulusnetworks.com/repos/rpm/el/7/netq-2.3/noarch
gpgcheck=1
enabled=1
...
```

3. Install NTP on the server.

```
root@rhel7:~# yum install ntp
```

4. Configure the NTP server.

- a. Open the `/etc/ntp.conf` file in your text editor of choice.
- b. Under the Server section, specify the NTP server IP address or hostname.

5. Enable and start the NTP service.

```
root@rhel7:~# sudo systemctl enable ntpd.service
root@rhel7:~# sudo systemctl start ntpd.service
```

6. Verify NTP is operating correctly. Look for an asterisk (\*) or a plus sign (+) that indicates the clock is synchronized.

```
root@rhel7:~# ntpq -pn
      remote          refid    st t when poll reach  delay  offset jitter
=====
+173.255.206.154 132.163.96.3    2 u   86 128 377  41.354  2.834  0.602
+12.167.151.2   198.148.79.209  3 u  103 128 377  13.395 -4.025  0.198
 2a00:7600::41 .STEP.      16 u   -1024  0  0.000  0.000  0.000
 \*129.250.35.250 249.224.99.213  2 u  101 128 377  14.588 -0.299  0.243
```

7. Install the Bash completion and NetQ meta packages on the server.

```
root@rhel7:~# yum -y install bash-completion
root@rhel7:~# yum install cumulus-netq
```

8. Continue with [NetQ Agent Configuration](#).

## Configure Your NetQ Agents

Once the NetQ Agents have been installed on the network nodes you want to monitor, the NetQ Agents must be configured to obtain useful and relevant data. Two methods are available for configuring a NetQ Agent:

- Edit the configuration file on the device, or
- Configure and run NetQ CLI commands on the device.

### Configure NetQ Agents Using a Configuration File

You can configure the NetQ Agent in the `netq.yml` configuration file contained in the `/etc/netq/` directory.

1. Open the `netq.yml` file using your text editor of choice.
2. Locate the `netq-agent` section, or add it.
3. Set the parameters for the agent as follows:
  - `port`: 31980 (default configuration)
  - `server`: IP address of the NetQ server or appliance where the agent should send its collected data
  - `vrf`: default (default configuration)

Your configuration should be similar to this:

```
netq-agent:  
  port: 31980  
  server: 127.0.0.1  
  vrf: default
```

## Configure NetQ Agents Using the NetQ CLI

The NetQ CLI was installed when you installed the NetQ Agent; however, to use it to configure your NetQ Agents, you must first configure the CLI to communicate with your NetQ server or appliance.

### CONFIGURE THE NETQ CLI

Note that the steps to install the CLI are different depending on whether the NetQ software has been installed for an on-premises or cloud deployment.

Configuring the CLI for *on-premises* deployments requires only two commands:

```
netq config add cli server <ip-address-of-netq-server-or-appliance>
netq config restart cli
```

Configuring the CLI for *cloud* deployments also only requires two commands; however, there are a couple of additional options that you can apply:

- In NetQ 2.2.2 and later, if your nodes do not have Internet access, you can use the CLI proxy that is available on the NetQ cloud server or NetQ Cloud Appliance.
- In NetQ 2.2.1 and later, you can:
  - save your access credentials in a file and reference that file here to simplify the configuration commands
  - specify which premises you want to query

*For switches with Internet access* run the following commands, being sure to replace the key values with your generated keys.

```
$ netq config add cli server api.netq.cumulusnetworks.com access-key <text-access-key> secret-key <text-secret-key> port 443
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
Updated cli server api.netq.cumulusnetworks.com vrf default port 443. Please
restart netqd (netq config restart cli)

$ netq config restart cli
Restarting NetQ CLI... Success!
```

Or, if you have created a keys file as noted in the installation procedures for the NetQ Cloud server or Appliance, run the following commands. Be sure to include the *full path* to the file.

```
$ netq config add cli server api.netq.cumulusnetworks.com cli-keys-file /<full-path>/credentials.yml port 443
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
Updated cli server api.netq.cumulusnetworks.com vrf default port 443. Please
restart netqd (netq config restart cli)

$ netq config restart cli
Restarting NetQ CLI... Success!
```

If you have multiple premises, be sure to include which premises you want to query. Rerun this command to query a different premises.

```
$ netq config add cli server api.netq.cumulusnetworks.com access-key <text-access-key> secret-key <text-secret-key> premises <premises-name> port 443
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443
Updated cli server api.netq.cumulusnetworks.com vrf default port 443. Please
restart netqd (netq config restart cli)

$ netq config restart cli
Restarting NetQ CLI... Success!
```

*For switches without Internet access, you can use the CLI proxy that is part of the NetQ Cloud Server or Appliance with NetQ 2.2.2 and later to manage CLI access on your nodes. To make use of the proxy, you must point each switch or host to the NetQ Cloud Server or Appliance. Run the following commands, using the IP address of the proxy:*

```
$ netq config add cli server <proxy-ip-addr>
Updated cli server <proxy-ip-addr> vrf default port 443. Please restart netqd (netq
config restart cli)

$ netq config restart cli
Restarting NetQ CLI... Success!
```

#### CONFIGURE THE NETQ AGENT

Now that the CLI is configured, you can use it to configure the NetQ Agent to send telemetry data to the NetQ Server or Appliance.

 **IMPORTANT**

If you intend to use VRF, skip to [Configure the Agent to Use VRF](#). If you intend to specify a port for communication, skip to [Configure the Agent to Communicate over a Specific Port](#).

The same commands are used no matter the operating system (Cumulus Linux, Ubuntu, etc.). This example uses an IP address of 192.168.1.254 for the NetQ hardware.

```
$ netq config add agent server 192.168.1.254
Updated agent server 192.168.1.254 vrf default. Please restart netq-agent (netq
config restart agent).
$ netq config restart agent
```

#### CONFIGURE THE AGENT TO USE A VRF

While optional, Cumulus strongly recommends that you configure NetQ Agents to communicate with the NetQ Platform only via a [VRF](#), including a [management VRF](#). To do so, you need to specify the VRF name when configuring the NetQ Agent. For example, if the management VRF is configured and you want the agent to communicate with the NetQ Platform over it, configure the agent like this:

```
cumulus@leaf01:~$ netq config add agent server 192.168.1.254 vrf mgmt
cumulus@leaf01:~$ netq config restart agent
```

## CONFIGURE THE AGENT TO COMMUNICATE OVER A SPECIFIC PORT

By default, NetQ uses port 31980 for communication between the NetQ Platform and NetQ Agents. If you want the NetQ Agent to communicate with the NetQ Platform via a different port, you need to specify the port number when configuring the NetQ Agent like this:

```
cumulus@leaf01:~$ netq config add agent server 192.168.1.254 port 7379  
cumulus@leaf01:~$ netq config restart agent
```

# Upgrade NetQ

Cumulus NetQ 2.0.0 through 2.2.2 can be upgraded to the newest NetQ 2.3.0 release.

Two types of upgrades can be performed: an in-place upgrade, or a disk image upgrade. An in-place upgrade does not require you to backup and restore your data (but you may choose to do so), and does not update the NetQ operating system and kernels. A disk image upgrade requires you to backup and restore your data (if you want to keep it), and replaces all NetQ related software on the system.

Cumulus NetQ 1.x versions require a new install.

If you are upgrading from NetQ 2.x software installed on:

- Your own hardware server in an on-premises deployment, please follow the instructions in [Upgrade NetQ Software on Your On-premises Server](#).
- Your own hardware server in a cloud deployment, please follow the instructions in [Upgrade NetQ Software on Your Cloud Server](#).
- Your NetQ Appliance, please follow the instructions in [Upgrade NetQ Software on Your NetQ Appliance](#).
- Your NetQ Cloud Appliance, please follow the instructions in [Upgrade NetQ Software on Your NetQ Cloud Appliance](#).

If you are upgrading from NetQ 1.4.x (or earlier), please follow the instructions in [Install NetQ](#).

# Upgrade NetQ Software on Your On-premises Server

This document describes the steps required to upgrade the NetQ Software (versions 2.0 through 2.2) installed and running on your own server hardware to NetQ version 2.3.



## IMPORTANT

Cumulus Networks recommends upgrading NetQ only during a network maintenance window.



## NOTE

Events generated during the upgrade process will not be available in the database. Once the upgrade process is complete, the NetQ Agents resynchronize with the current state of the Host or Cumulus Linux switch with the NetQ Server.

## Prerequisites

Before you begin the upgrade process, please note the following:

- The minimum supported Cumulus Linux version for NetQ 2.3.x is 3.3.2.
- You must upgrade your NetQ Agents as well as the NetQ Platform.
- You can upgrade to NetQ 2.3.x without upgrading Cumulus Linux.

- The NetQ installer pod `netq-installer` should be up in either the *ContainerCreating* or *Running* state. The `netq-installer` pod state could also be *ContainerCreating*, in which case the host is initializing with the SSH keys.

## Hardware Requirements

Cumulus NetQ software is supported on a variety of hardware.



### IMPORTANT

Confirm that your hardware meets these *minimum* requirements to upgrade the VM.

The NetQ software requires a server with the following:

Hardware Component	Minimum Requirement
Processor	Eight (8) virtual CPUs
Memory	64 GB RAM
Local disk storage	256 GB SSD ( <b>Note:</b> This <i>must</i> be an SSD; use of other storage options can lead to system instability and are not supported.)
Network interface speed	1 Gb NIC

You must also open the following ports on your hardware to use the NetQ software:

Port	Software Component Access
31980	NetQ Server

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

Port	Software Component Access
32708	API Gateway
32666	Web-based User Interface

### NetQ Platform HyperVisor Requirements

The NetQ Platform can be installed as a Virtual Machine (VM) using one of the following hypervisors:

- VMware ESXi™ 6.5 for servers running Cumulus Linux, CentOS, Ubuntu and RedHat operating systems.
- KVM/QCOW (QEMU Copy on Write) image for servers running CentOS, Ubuntu and RedHat operating systems.

### NetQ Agent Operating System Requirements

NetQ 2.2 Agents are supported on the following switch and host operating systems:

- Cumulus Linux 3.3.2 and later
- Ubuntu 16.04 (NetQ 2.x.x)
- Ubuntu 18.04 (NetQ 2.2.2 and later)
- Red Hat® Enterprise Linux (RHEL) 7.1
- CentOS 7

### Perform an In-place Upgrade of Cumulus NetQ

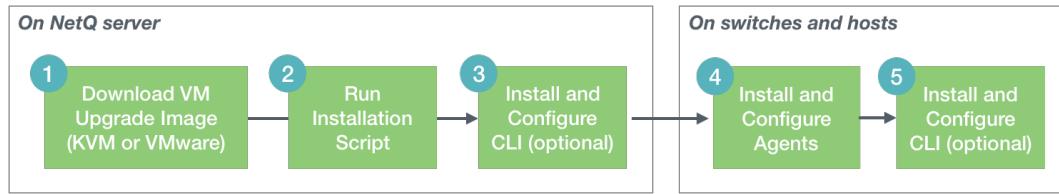
An in-place upgrade is recommended for upgrades from Cumulus NetQ 2.2.1 or 2.2.2. If you are upgrading from NetQ 2.2.0 or earlier, a [disk image upgrade](#) is recommended.

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

### In-place Upgrade Workflow

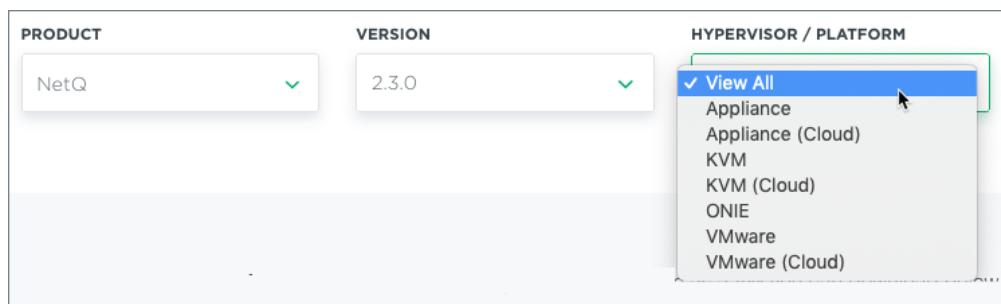
Upgrading NetQ in place involves downloading and installing the new version of NetQ applications, and upgrading and configuring the NetQ Agents. While optional, upgrading the CLI is recommended.



#### Download the NetQ Virtual Machine Upgrade Image

The first step in upgrading your on-premises NetQ Server is to obtain the VM upgrade image:

1. **IMPORTANT:** Confirm that your server hardware meets the requirements set out above.
2. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
3. Click **2.3** from the **Version** list box, and then select **2.3.0** from the submenu.
4. Optionally, select the hypervisor you wish to use (*VMware* or *KVM*) from the **Hypervisor/Platform** list box.



 NOTE

For customers with VMware/ESXi OVA deployments, Cumulus Networks recommends deploying a fresh installation of NetQ 2.3.0, rather than performing the upgrade from 2.1 or 2.2, to take advantage of the performance improvements available with the new vmxnet3 and Paravirtualization SCSI drivers. Customers with on-premises deployments must backup their NetQ data prior to the fresh installation to retain their data, and then follow the installation with a restoration. Follow the instructions in [Backup and Restore NetQ](#) and [Install NetQ Software on Your Server](#).

5. Scroll down to review the images that match your selection criteria.

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

The image shows two separate software upgrade pages from a web interface. Both pages have a light gray header bar at the top.

**Left Page (VMware Hypervisor):**

- RELEASED 2019-09-26**  
Version: 2.3.0
- HYPERVERISOR**  
VMware
- DETAILED VERSION**  
2.3.0
- SHA256 CHECKSUM**  
3091C24E8D68F34E9CCD3A2B3F9B639EE  
FD2C1B88871D527A4E2BBBAB6AE74C0
- IMPORTANT UPDATES**  
N/A
- DOWNLOAD** button

**Right Page (KVM Hypervisor):**

- RELEASED 2019-09-26**  
Version: 2.3.0
- HYPERVERISOR**  
KVM
- DETAILED VERSION**  
2.3.0
- SHA256 CHECKSUM**  
DF0A00B0AEEE00D7F91EE8DEC86FF862  
C997B156CCA9A2FAC4D46A52B48378E8
- IMPORTANT UPDATES**  
N/A
- DOWNLOAD** button

**Both Pages:**

- Upgrade available** message
- Text: Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.
- SHA256 CHECKSUM** details (different from the first page)
- UPGRADE** button (with a hand cursor icon)

6. Click **Upgrade** for the relevant version, being careful to select the correct deployment version.

### Run the Installation Script

You must first store the downloaded file in a location where the installation script can find it, export the installer script from the tgz file, and configure SSH access (if this is the first time you have upgraded this server).

1. From a terminal window, log in to the NetQ Server using your login credentials. This example uses the default *cumulus/CumulusLinux!* credentials.

```
<computer>:~<username>$ ssh cumulus@netq-platform  
cumulus@netq-platform's password:  
cumulus@netq-platform:~$
```

2. Change to the root user.

```
cumulus@netq-platform:~$ sudo -i  
[sudo] password for cumulus:  
root@netq-platform:~#
```

3. Create an *installables* subdirectory in the mount directory.

```
root@netq-platform:~# mkdir -p /mnt/installables/
```

4. Copy the upgrade image file, `NetQ-2.3.0.tgz`, into your new directory.

```
root@netq-platform:~# cd /mnt/installables/  
root@netq-platform:/mnt/installables# cp /home/usr/dir/NetQ-2.3.0.tgz ./
```

5. Export the installer script.

```
root@netq-platform:/mnt/installables# tar -xvf NetQ-2.3.0.tgz ./netq-install.sh
```

6. Verify the contents of the directory. You should have the image file and the `netq-install.sh` script.

```
root@netq-platform:/mnt/installables# ls -l  
total 9607744  
-rw-r--r-- 1 cumulus cumulus 5911383922 Aug 28 11:13 NetQ-2.3.0.tgz  
-rwxr-xr-x 1 \_lldpd \_lldpd 4309 Aug 28 10:34 netq-install.sh  
root@netq-platform:/mnt/installables#
```

### 7. Configure SSH access.

 NOTE

If you perform the upgrade more than once, you can skip this step after performing it once. If you have an existing SSH key, skip to step 7c.

#### a. Generate the SSH key to enable you to run the script.

 NOTE

Leave the passphrase blank to simplify running the script.

```
root@netq-platform:/mnt/installables# ssh-keygen -t rsa -b 4096
```

Generating public/private rsa key pair.

Enter file in which to save the key (/root/.ssh/id\_rsa):

Created directory '/root/.ssh'.

Enter passphrase (empty for no passphrase):

Enter same passphrase again:

```
Your identification has been saved in /root/.ssh/id_rsa.
```

```
Your public key has been saved in /root/.ssh/id_rsa.pub.
```

- b. Copy the key to the `authorized_keys` directory.

```
root@netq-platform:/mnt/installables# cat ~/.ssh/id_rsa.pub >> ~/.ssh/
authorized_keys
root@netq-platform:/mnt/installables# chmod 0600 ~/.ssh/authorized_keys
root@netq-platform:/mnt/installables#
```

- c. Associate the key with the installer.

```
root@netq-platform:/mnt/installables/# ./netq-install.sh --usekey ~/.ssh/id_rsa
[Tue Aug 27 04:50:07 2019] - File /root/.ssh/id_rsa exists on system...
[Tue Aug 27 04:50:08 2019] - checking the presence of existing installer-ssh-
keys
[Tue Aug 27 04:50:08 2019] - Able to find existence of secret key ..
[Tue Aug 27 04:50:08 2019] - Re-generating the newer installer-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Successfully created newer installer-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Re-generating the older instaler-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Successfully created older instaler-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Validating the status of netq-installer-deploy
pod ...
[Tue Aug 27 04:50:08 2019] - Able to find netq-installer-deploy pod: netq-
installer-deploy-56dc64b6f9-bk2lj
[Tue Aug 27 04:50:08 2019] - Terminating the netq-installer-deploy pod: netq-
installer-deploy-56dc64b6f9-bk2lj
[Tue Aug 27 04:50:09 2019] - Successfully terminated netq-installer-deploy
```

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

```
pod: netq-installer-deploy-56dc64b6f9-bk2lj ...
[Tue Aug 27 04:50:09 2019] - Checking the Status of netq-installer ....
[Tue Aug 27 04:50:09 2019] - The netq-installer is up and running ...
```

- Run the installation script to upgrade the NetQ software.

```
root@netq-platform:/mnt/installables# ./netq-install.sh --installbundle /mnt/
installables/NetQ-2.3.0.tgz --updateapps
[Tue Aug 27 04:51:29 2019] - Updating the netq-installer ...
[Tue Aug 27 04:51:29 2019] - Able to execute the command for updating netq-
installer ...
[Tue Aug 27 04:51:29 2019] - Checking initialization of netq-installer update ...
[Tue Aug 27 04:51:29 2019] - Update of netq-installer is in progress ...
*****
[Tue Aug 27 05:05:30 2019] - Validating the update of netq installer....
...
[Tue Aug 27 05:07:47 2019] - Checking the Status of netq-installer ....
[Tue Aug 27 05:07:47 2019] - The netq-installer is up and running ...
[Tue Aug 27 05:07:47 2019] - Able to execute the command for netq apps
updates ...
[Tue Aug 27 05:07:47 2019] - Checking initialization of apps update ...
[Tue Aug 27 05:07:52 2019] - netq apps update is in progress ...
*****
[Tue Aug 27 05:54:54 2019] - Successfully updated netq apps ....
[Tue Aug 27 05:54:54 2019] - Updating the release information on system...
[Tue Aug 27 05:54:54 2019] - Successfully finished netq apps update procedure.
```

```
[Tue Aug 27 05:54:54 2019] - Refer logs:/var/log/netq/netq_upgrade.log for  
more details !  
root@netq-platform:/mnt/installables#
```

 NOTE

Please allow about an hour for the upgrade to complete.

9. Verify the release has been updated successfully.

```
root@netq-platform:/mnt/installables# cat /etc/app-release  
APPLIANCE_VERSION=2.3.0  
APPLIANCE_MANIFEST_HASH=a7f34da
```

 **IMPORTANT**

If you have changed the IP Address or hostname of the NetQ Platform, you need to re-register this address or hostname with the Kubernetes containers before you can continue.

1. Reset all Kubernetes administrative settings. Run the command twice to make sure all directories and files have been reset.

```
cumulus@switch:~$ sudo kubeadm reset -f  
cumulus@switch:~$ sudo kubeadm reset -f
```

2. Remove the Kubernetes configuration.

```
cumulus@switch:~$ sudo rm /home/cumulus/.kube/config
```

3. Reset the NetQ Platform install daemon.

```
cumulus@switch:~$ sudo systemctl reset-failed
```

4. Reset the Kubernetes service.

```
cumulus@switch:~$ sudo systemctl restart cts-kubectl-config
```

**Note:** Allow 15 minutes for the prompt to return.

## Install and Configure the CLI

While optional, it is useful to have the updated CLI running on your server.

1. Verify your `/etc/apt/sources.list` file has the repository reference for Cumulus NetQ.

```
cumulus@switch:~$ sudo nano /etc/apt/sources.list  
...  
deb http://apps3.cumulusnetworks.com/repos/deb CumulusLinux-3 netq-2.3  
...
```

2. Update the local `apt` repository, then install the NetQ apps package on the switch.

```
cumulus@switch:~$ sudo apt-get update  
cumulus@switch:~$ sudo apt-get install netq-apps
```

3. Configure the CLI server, using the IP address of your NetQ server.

```
cumulus@switch:~$ netq config add cli server 192.168.1.254  
cumulus@switch:~$ netq config restart cli
```

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

### Verify the Operation of NetQ on Your Server

1. Run the `netq show opta-health` command to verify all applications are operating properly. Please allow 10-15 minutes for all applications to come up and report their status.

```
cumulus@<netq-platform-hostname>:~$ netq show opta-health
```

Application	Status	Health	Kafka Stream	Git Hash	Timestamp
netq-app-macfdb 20:20:35 2019	UP	true	up	14b42e6	Mon Jun 3
netq-app-interface 2019	UP	true		0fe11c6	Mon Jun 3 20:20:34
netq-app-vlan 2019	UP	true		4daed85	Mon Jun 3 20:20:35
netq-app-sensors 20:20:34 2019	UP	true	up	f37272c	Mon Jun 3
netq-app-topology 20:20:34 2019	UP	true		3f4a887	Mon Jun 3
kafka-broker	UP				Mon Jun 3 20:20:35 2019
netq-app-mstpinfo 20:20:35 2019	UP	true	up	ef5565d	Mon Jun 3
netq-app-address 20:20:35 2019	UP	true	up	7e0d03d	Mon Jun 3
netq-gui	UP				Mon Jun 3 20:20:35 2019
netq-app-kube 20:20:34 2019	UP	true	up	fbcaa9d	Mon Jun 3
netq-app-link 2019	UP	true	up	6c2b21a	Mon Jun 3 20:20:35

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

netq-app-ptm	UP	true	up	7162771	Mon Jun 3
20:20:34 2019					
netq-opta	UP	true		Mon Jun 3	20:20:34 2019
netq-app-clagsession	UP	true	up	356dda9	Mon Jun 3
20:20:34 2019					
netq-endpoint-gateway	UP	true		295e9ed	Mon Jun 3
20:20:34 2019					
netq-app-ospf	UP	true	up	e0e2ab0	Mon Jun 3
20:20:34 2019					
netq-app-lldp	UP	true	up	90582de	Mon Jun 3 20:20:35
2019					
netq-app-inventory	UP	true	up	bbf9938	Mon Jun 3
20:20:34 2019					
netq-app-tracecheck-scheduler	UP	true		5484c68	Mon Jun 3
20:20:34 2019					
netq-app-infra	UP	true	up	13f9e7c	Mon Jun 3 20:20:34
2019					
kafka-connect	UP			Mon Jun 3	20:20:35 2019
netq-app-search	UP	true	up	e47aab	Mon Jun 3
20:20:34 2019					
netq-app-procdevstats	UP	true	up	b8e280e	Mon Jun 3
20:20:34 2019					
netq-app-vxlan	UP	true	up	123c577	Mon Jun 3
20:20:34 2019					
zookeeper	UP			Mon Jun 3	20:20:35 2019
netq-app-resource-util	UP	true	up	41dfb07	Mon Jun 3
20:20:34 2019					
netq-app-evpn	UP	true	up	05a4003	Mon Jun 3
20:20:34 2019					

## Upgrade NetQ Software on Your On-premises Server

## Perform an In-place Upgrade of Cumulus NetQ

netq-api-gateway 2019	UP	true	c40231a	Mon Jun 3 20:20:34
netq-app-port 20:20:35 2019	UP	true	up	4592b70 Mon Jun 3
netq-app-macs 2019	UP	true		dd6cd96 Mon Jun 3 20:20:35
netq-app-notifier 20:20:35 2019	UP	true	up	da57b69 Mon Jun 3
netq-app-events 20:20:34 2019	UP	true	up	8f7b4d9 Mon Jun 3
netq-app-services 20:20:34 2019	UP	true	up	5094f4a Mon Jun 3
cassandra	UP			Mon Jun 3 20:20:35 2019
netq-app-configdiff 20:20:34 2019	UP	true	up	3be2ef1 Mon Jun 3
netq-app-neighbor 20:20:35 2019	UP	true	up	9ebe479 Mon Jun 3
netq-app-bgp 2019	UP	true	up	e68f7a8 Mon Jun 3 20:20:35
schema-registry	UP			Mon Jun 3 20:20:35 2019
netq-app-Inv 2019	UP	true	up	a9ca80a Mon Jun 3 20:20:34
netq-app-healthdashboard 20:20:34 2019	UP	true		eea044c Mon Jun 3
netq-app-ntp 2019	UP	true	up	651c86f Mon Jun 3 20:20:35
netq-app-customermgmt 20:20:34 2019	UP	true		7250354 Mon Jun 3
netq-app-node	UP	true	up	f676c9a Mon Jun 3

```
20:20:34 2019  
netq-app-route      UP    true    up      6e31f98  Mon Jun 3  
20:20:35 2019
```

 NOTE

If any of the applications or services display Status as DOWN after 30 minutes, open a [support ticket](#) and attach the output of the opta-support command.

2. Verify that NTP is configured and running. NTP operation is critical to proper operation of NetQ. Refer to [Setting Date and Time](#) in the *Cumulus Linux User Guide* for details and instructions.
3. Continue the NetQ upgrade by upgrading the NetQ Agent on each switch or host you want to monitor. Refer to [Install the NetQ Agents and CLI on Your Switches](#) for instructions.

## Perform a Disk Image Upgrade of Cumulus NetQ

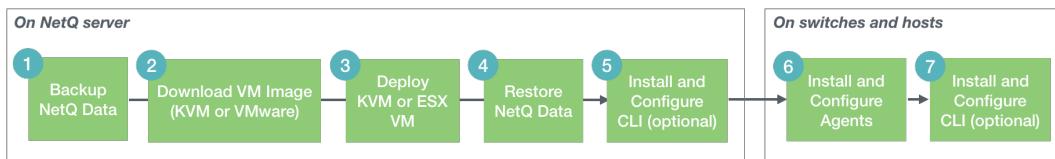
A disk image upgrade is recommended for upgrades from Cumulus NetQ 2.2.0 and earlier. If you are upgrading from NetQ 2.2.1 or 2.2.2, an [in-place upgrade](#) is sufficient.

### Disk Image Upgrade Workflow

Upgrading NetQ using a disk image involves backing up your NetQ data, downloading and installing the new version of NetQ software, restoring your data, and configuring the NetQ Agents. While optional, upgrading the CLI is recommended.

## Upgrade NetQ Software on Your On-premises Server

## Perform a Disk Image Upgrade of Cumulus NetQ



Please follow the instructions in the following topics in this order:

1. [Backup Your NetQ Data](#)
2. [Download and Install the New Software](#)
3. [Restore Your NetQ Data](#)
4. [Install and Configure NetQ Agent and CLI on Switches and Hosts](#)

# Upgrade NetQ Software on Your Cloud Server

This document describes the steps required to upgrade the NetQ Software (versions 2.0 through 2.2) installed and running on your NetQ cloud server to NetQ version 2.3.



## IMPORTANT

Cumulus Networks recommends upgrading NetQ only during a network maintenance window.



## NOTE

Events generated during the upgrade process will not be available in the database. Once the upgrade process is complete, the NetQ Agents resynchronize with the current state of the Host or Cumulus Linux switch with the NetQ Server.

## Prerequisites

Before you begin the upgrade process, please note the following:

- The minimum supported Cumulus Linux version for NetQ 2.3.x is 3.3.2.
- You must upgrade your NetQ Agents as well as the NetQ Platform.
- You can upgrade to NetQ 2.3.x without upgrading Cumulus Linux.

- The NetQ installer pod `netq-installer` should be up in either the *ContainerCreating* or *Running* state. The `netq-installer` pod state could also be *ContainerCreating*, in which case the host is initializing with the SSH keys.

## Hardware Requirements

Cumulus NetQ software is supported on a variety of hardware.



### IMPORTANT

Confirm that your hardware meets these *minimum* requirements to upgrade the VM.

The NetQ software requires a server with the following:

Hardware Component	Minimum Requirement
Processor	Four (4) virtual CPUs
Memory	8 GB RAM
Local disk storage	32 GB (SSD not required)
Network interface speed	1 Gb NIC

You must also open port 31980 on your hardware to use the NetQ software.

## NetQ Platform HyperVisor Requirements

The NetQ Platform can be installed as a Virtual Machine (VM) using one of the following hypervisors:

- VMware ESXi™ 6.5 for servers running Cumulus Linux, CentOS, Ubuntu and RedHat operating systems.

- KVM/QCOW (QEMU Copy on Write) image for servers running CentOS, Ubuntu and RedHat operating systems.

### NetQ Agent Operating System Requirements

NetQ 2.2 Agents are supported on the following switch and host operating systems:

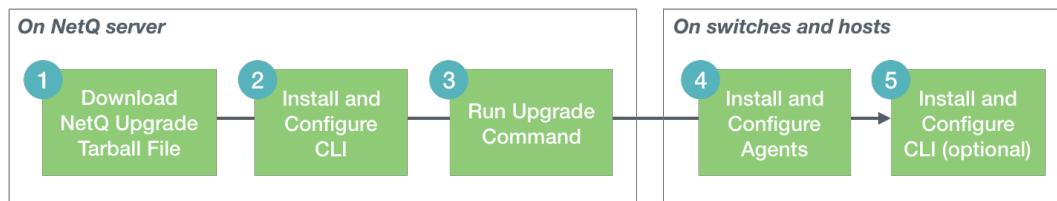
- Cumulus Linux 3.3.2 and later
- Ubuntu 16.04 (NetQ 2.x.x and later)
- Ubuntu 18.04 (NetQ 2.2.2 and later)
- Red Hat® Enterprise Linux (RHEL) 7.1
- CentOS 7

### Perform an In-place Upgrade of Cumulus NetQ

An in-place upgrade is recommended for upgrades from Cumulus NetQ 2.2.1 or 2.2.2. If you are upgrading from NetQ 2.2.0 or earlier, a [disk image upgrade](#) is recommended.

#### In-place Upgrade Workflow

Upgrading NetQ involves backing up your data, downloading and installing the new version of NetQ software, restoring your NetQ data, and upgrading and configuring the NetQ Agents.

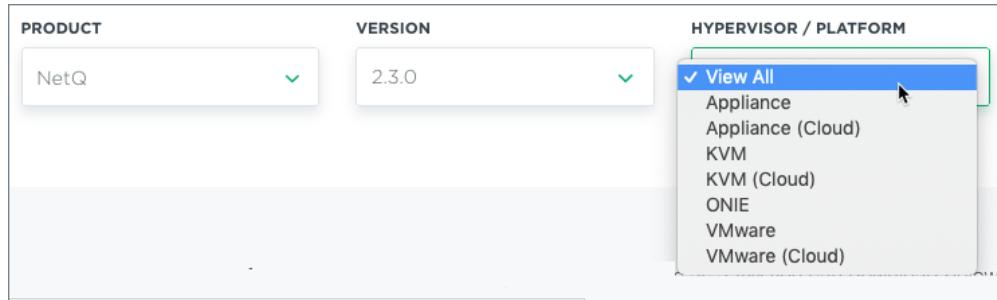


#### Download the NetQ Software

To upgrade the NetQ software on your own hardware using a VM image:

1. **IMPORTANT:** Confirm that your server hardware meets the requirements set out [above](#).

2. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
3. Click **2.3** from the **Version** list box, and then select **2.3.0** from the submenu.
4. Optionally, select the hypervisor you wish to use (*VMware (Cloud)* or *KVM (Cloud)*) from the **Hypervisor/Platform** list box.



NOTE

For customers with VMware/ESXi OVA deployments, Cumulus Networks recommends deploying a fresh installation of NetQ 2.2.2, rather than performing the upgrade from 2.1.x or 2.2.0, to take advantage of the performance improvements available with the new vmxnet3 and Paravirtualization SCSI drivers.

5. Scroll down to review the images that match your selection criteria.

## Upgrade NetQ Software on Your Cloud Server

## Perform an In-place Upgrade of Cumulus NetQ

**RELEASED 2019-09-26**  
Version: 2.3.0

---

**HYPervisor**  
VMware (Cloud)

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
6EF35B7A06E26368EA7659C02ABF4001B  
AB07753C2E0D2EDE53646B7B958F5C7

**IMPORTANT UPDATES**  
N/A

[DOWNLOAD](#)

---

**Upgrade available**

Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
05942ABBBF4A5C3FEA2BC43218EC248BF  
1AE000C5D11656C9AF9D96dff8e1fa7

[UPGRADE](#)

**RELEASED 2019-09-26**  
Version: 2.3.0

---

**HYPervisor**  
KVM (Cloud)

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
126052D8BE511DAFDF75095258CC2C33E  
9E35A7E17163DA705320DA8C8AEEA3C

**IMPORTANT UPDATES**  
N/A

[DOWNLOAD](#)

---

**Upgrade available**

Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
05942ABBBF4A5C3FEA2BC43218EC248BF  
1AE000C5D11656C9AF9D96dff8e1fa7

[UPGRADE](#)

6. Click **Upgrade** for the relevant version, being careful to select the correct deployment version.

### Install and Configure the CLI

You must upgrade the CLI to make use of the modified upgrade command. Additionally, the access and secret keys generated for previous releases must be changed. NetQ now uses symmetric keys instead of the asymmetric keys.

1. Verify your `/etc/apt/sources.list` file has the repository reference for Cumulus NetQ.

```
cumulus@switch:~$ sudo nano /etc/apt/sources.list
```

```
...
```

```
deb http://apps3.cumulusnetworks.com/repos/deb CumulusLinux-3 netq-2.3  
...
```

2. Update the local `apt` repository, then install the NetQ apps package on the switch.

```
cumulus@switch:~$ sudo apt-get update  
cumulus@switch:~$ sudo apt-get install netq-apps
```

3. Generate new access and secret keys for users.

- a. Open the NetQ UI.
- b. Click  , then select **Management** in the **Admin** column.



- c. Click **Manage** on the User Accounts card.
- d. Select a user and click **Delete AuthKeys** in the Edit menu.



- e. Select the user again and click **Generate AuthKeys**.
- f. Copy these keys to a safe place.

 **IMPORTANT**

The secret key is only shown once. If you don't copy these, you will need to regenerate them and reconfigure CLI access.

In version 2.2.1 and later, if you created a keys file, you can add these keys to that file.

4. Repeat these steps for all other users who should have CLI access.
5. Configure the CLI server, using the IP address of your NetQ server, the keys you just generated, and the name of the premises (if you have more than one).

```
cumulus@switch:~$ netq config add cli server 192.168.1.254 access-key <user-access-key> secret-key <user-secret-key> premises <premises-name> port 443  
Successfully logged into NetQ cloud at 192.168.1.254 port 443
```

```
cumulus@switch:~$ netq config restart cli  
Restarting NetQ CLI... Success!
```

#### Run the Upgrade Command

1. Use the `netq upgrade opta` command to install the VM you downloaded above.

```
cumulus@switch:~$ netq upgrade opta tarball NetQ-2.3.0-opta.tgz
```

2. Verify the release has been updated successfully.

```
cumulus@switch:~$ cat /etc/app-release  
APPLIANCE_VERSION=2.3.0  
APPLIANCE_MANIFEST_HASH=a7c3cda
```

 **IMPORTANT**

If you have changed the IP Address or hostname of the NetQ server, you need to re-register this address or hostname with the Kubernetes containers before you can continue.

1. Reset all Kubernetes administrative settings. Run the command twice to make sure all directories and files have been reset.

```
cumulus@switch:~$ sudo kubeadm reset -f  
cumulus@switch:~$ sudo kubeadm reset -f
```

2. Remove the Kubernetes configuration.

```
cumulus@switch:~$ sudo rm /home/cumulus/.kube/config
```

3. Reset the NetQ Platform install daemon.

```
cumulus@switch:~$ sudo systemctl reset-failed
```

4. Reset the Kubernetes service.

```
cumulus@switch:~$ sudo systemctl restart cts-kubectl-config
```

**Note:** Allow 15 minutes for the prompt to return.

## Verify the Operation of NetQ on Your Server

1. Run the `netq show opta-health` command to verify all applications are operating properly. Please allow 10-15 minutes for all applications to come up and report their status.

```
cumulus@<netq-platform-hostname>:~$ netq show opta-health  
OPTA is healthy
```

 NOTE

If the results do not indicate the server is healthy after 30 minutes, open a [support ticket](#) and attach the output of the `opta-support` command.

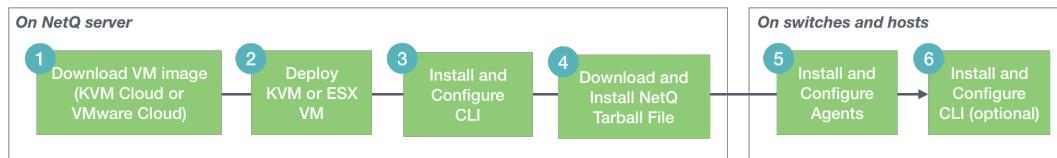
2. Verify that NTP is configured and running. NTP operation is critical to proper operation of NetQ. Refer to [Setting Date and Time](#) in the *Cumulus Linux User Guide* for details and instructions.
3. Continue the NetQ upgrade by upgrading the NetQ Agent on each switch or host you want to monitor. Refer to [Install the NetQ Agent and CLI on Switches](#) for instructions.

## Perform a Disk Image Upgrade of Cumulus NetQ

A disk image upgrade is recommended for upgrades from Cumulus NetQ 2.2.0 or earlier. An [in-place upgrade](#) is recommended for upgrades from NetQ 2.2.1 or 2.2.2.

## Disk Image Upgrade Workflow

Upgrading NetQ involves backing up your data, downloading and installing the new version of NetQ software, restoring your NetQ data, and upgrading and configuring the NetQ Agents.



Please follow the instructions in the following topics in this order:

1. [Backup Your NetQ Data](#)
2. [Download and Install the New Software](#)
3. [Restore Your NetQ Data](#)
4. [Install and Configure NetQ Agent and CLI on Switches and Hosts](#)

# Upgrade NetQ Software on Your NetQ Appliance

This document describes the steps required to upgrade the NetQ Software (versions 2.1 and 2.2) installed and running on your NetQ or NetQ Cloud Appliances to NetQ version 2.3.



## IMPORTANT

Cumulus Networks recommends only upgrading NetQ during a network maintenance window.



## NOTE

Events generated during the upgrade process will not be available in the database. Once the upgrade process is complete, the NetQ Agents resynchronize with the current state of the Host or Cumulus Linux switch with the NetQ or NetQ Cloud Appliance.

## Prerequisites

Before you begin the upgrade process, please note the following:

- Cumulus recommends upgrading your NetQ Agents to obtain the latest features and bug fixes, but it is not required.

## Upgrade NetQ Software on Your NetQ Appliance

## Perform an In-place Upgrade of Cumulus NetQ

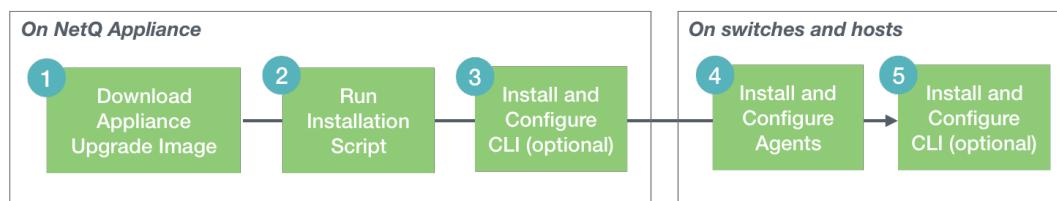
- The NetQ installer pod `netq-installer` should be up in either the *ContainerCreating* or *Running* state. The `netq-installer` pod state could also be *ContainerCreating*, in which case the host is initializing with the SSH keys.

## Perform an In-place Upgrade of Cumulus NetQ

An in-place upgrade is recommended for upgrades from Cumulus NetQ 2.2.1 and 2.2.2. If you are upgrading from NetQ 2.2.0 or earlier, a [disk image upgrade](#) is recommended.

### In-place Upgrade Workflow

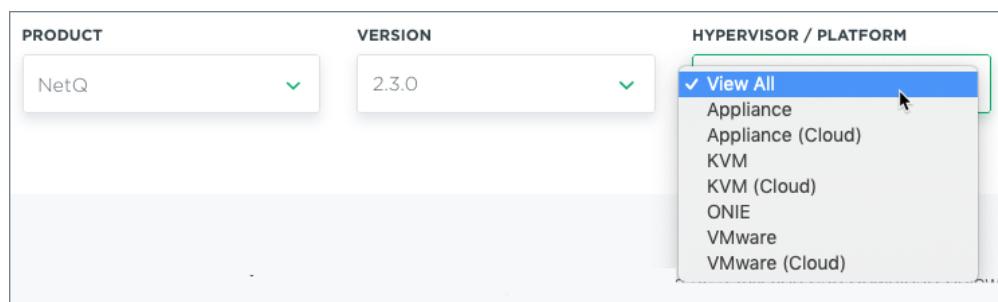
Upgrading NetQ in place involves downloading and installing the new version of NetQ applications, and upgrading and configuring the NetQ Agents. While optional, upgrading the CLI is recommended.



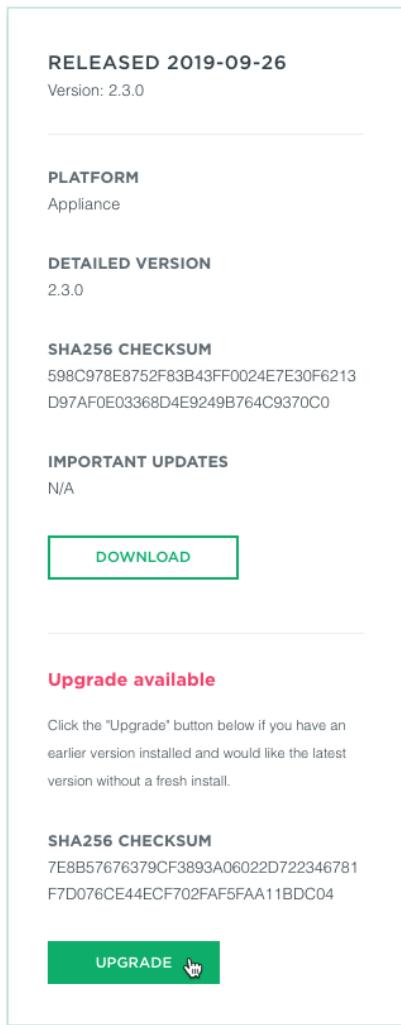
### Download Appliance Upgrade Image

The first step in upgrading your NetQ Appliance is to obtain the appliance upgrade image:

1. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
2. Click **2.3** from the **Version** list box, and then select **2.3.0** from the submenu.
3. From the **Hypervisor/Platform** list box, select **Appliance**.



### 4. Click **Upgrade**.



### Run the Installation Script

You must first store the downloaded file in a location where the installation script can find it, export the installer script from the tgz file, and configure SSH access (if this is the first time you have upgraded this server).

1. From a terminal window, log in to the appliance using your login credentials. This example uses the default *cumulus/CumulusLinux!* credentials, on a NetQ Appliance.

```
<computer>:~<username>$ ssh cumulus@netq-appliance  
cumulus@netq-appliance's password:  
cumulus@netq-appliance:~$
```

2. Change to the root user.

```
cumulus@netq-appliance:~$ sudo -i  
[sudo] password for cumulus:  
root@netq-appliance:~#
```

3. Copy the upgrade package (NetQ-2.3.0.tgz) into your new directory.

```
root@netq-appliance:~# cd /mnt/installables/  
root@netq-appliance:/mnt/installables# cp /home/usr/dir/NetQ-2.3.0.tgz ./
```

4. Export the installer script.

```
root@netq-appliance:/mnt/installables# tar -xvf NetQ-2.3.0.tgz ./netq-install.sh
```

5. Verify the contents of the directory. You should have the package and the `netq-install.sh` script.

```
root@netq-appliance:/mnt/installables# ls -l  
total 9607744  
-rw-r--r-- 1 cumulus cumulus 5911383922 Jul 23 11:13 NetQ-2.3.0.tgz
```

```
-rwxr-xr-x 1 llpd_llpd 4309 Jul 23 10:34 netq-install.sh  
root@netq-appliance:/mnt/installables#
```

6. Configure SSH access.

 NOTE

If you perform the upgrade more than once, you can skip this step after performing it once. If you have an existing SSH key, skip to step 6c.

a. Generate the SSH key to enable you to run the script.

 NOTE

Leave the passphrase blank to simplify running the script.

```
root@netq-appliance:/mnt/installables# ssh-keygen -t rsa -b 4096
```

Generating public/private rsa key pair.

Enter file in which to save the key (/root/.ssh/id\_rsa):

Created directory '/root/.ssh'.

Enter passphrase (empty for no passphrase):

Enter same passphrase again:

Your identification has been saved in /root/.ssh/id\_rsa.

Your public key has been saved in /root/.ssh/id\_rsa.pub.

b. Copy the key to the authorized\_keys directory.

```
root@netq-appliance:/mnt/installables# cat ~/.ssh/id_rsa.pub >> ~/.ssh/
authorized_keys
root@netq-appliance:/mnt/installables# chmod 0600 ~/.ssh/authorized_keys
root@netq-appliance:/mnt/installables#
```

- c. Associate the key with the installer.

```
root@net-appliance:/mnt/installables/# ./netq-install.sh --usekey ~/.ssh/id_rsa
[Tue Aug 27 04:50:07 2019] - File /root/.ssh/id_rsa exists on system...
[Tue Aug 27 04:50:08 2019] - checking the presence of existing installer-ssh-
keys
[Tue Aug 27 04:50:08 2019] - Able to find existence of secret key ..
[Tue Aug 27 04:50:08 2019] - Re-generating the newer installer-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Successfully created newer installer-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Re-generating the older instalero-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Successfully created older instalero-ssh-keys ...
[Tue Aug 27 04:50:08 2019] - Validating the status of netq-installer-deploy
pod ...
[Tue Aug 27 04:50:08 2019] - Able to find netq-installer-deploy pod: netq-
installer-deploy-56dc64b6f9-bk2lj
[Tue Aug 27 04:50:08 2019] - Terminating the netq-installer-deploy pod: netq-
installer-deploy-56dc64b6f9-bk2lj
[Tue Aug 27 04:50:09 2019] - Successfully terminated netq-installer-deploy
pod: netq-installer-deploy-56dc64b6f9-bk2lj ...
[Tue Aug 27 04:50:09 2019] - Checking the Status of netq-installer ....
[Tue Aug 27 04:50:09 2019] - The netq-installer is up and running ...
```

7. Run the installation script to upgrade the NetQ software.

```
root@net-appliance:/mnt/installables# ./netq-install.sh --installbundle /mnt/installables/NetQ-2.3.0.tgz --updateapps  
[Tue Aug 27 04:51:29 2019] - Updating the netq-installer ...  
[Tue Aug 27 04:51:29 2019] - Able to execute the command for updating netq-installer ...  
[Tue Aug 27 04:51:29 2019] - Checking initialization of netq-installer update ...  
[Tue Aug 27 04:51:29 2019] - Update of netq-installer is in progress ...  
*****0  
[Tue Aug 27 05:05:30 2019] - Validating the update of netq installer....  
  
...  
  
[Tue Aug 27 05:07:47 2019] - Checking the Status of netq-installer ....  
[Tue Aug 27 05:07:47 2019] - The netq-installer is up and running ...  
[Tue Aug 27 05:07:47 2019] - Able to execute the command for netq apps updates ...  
[Tue Aug 27 05:07:47 2019] - Checking initialization of apps update ...  
[Tue Aug 27 05:07:52 2019] - netq apps update is in progress ...  
*****0  
[Tue Aug 27 05:54:54 2019] - Successfully updated netq apps ....  
[Tue Aug 27 05:54:54 2019] - Updating the release information on system...  
[Tue Aug 27 05:54:54 2019] - Successfully finished netq apps update procedure.  
[Tue Aug 27 05:54:54 2019] - Refer logs:/var/log/netq/netq_upgrade.log for more details !  
root@netq-platform:/mnt/installables#
```

 NOTE

Please allow about an hour for the upgrade to complete.

8. Verify the release has been updated successfully.

```
root@net-appliance:/mnt/installables# cat /etc/app-release
APPLIANCE_VERSION=2.3.0
APPLIANCE_MANIFEST_HASH=a8f3cda
```

 **IMPORTANT**

If you have changed the IP Address or hostname of your appliance, you need to re-register this address with the Kubernetes containers before you can continue.

1. Reset all Kubernetes administrative settings. Run the command twice to make sure all directories and files have been reset.

```
cumulus@net-appliance:~$ sudo kubeadm reset -f  
cumulus@net-appliance:~$ sudo kubeadm reset -f
```

2. Remove the Kubernetes configuration.

```
cumulus@net-appliance:~$ sudo rm /home/cumulus/.kube/config
```

3. Reset the NetQ Platform install daemon.

```
cumulus@net-appliance:~$ sudo systemctl reset-failed
```

4. Reset the Kubernetes service.

```
cumulus@net-appliance:~$ sudo systemctl restart cts-kubectl-config
```

**Note:** Allow 15 minutes for the prompt to return.

## Install and Configure the CLI

Now that the core software is updated, you must update the CLI.

1. Edit the `/etc/apt/sources.list` file to add the repository for Cumulus NetQ.

```
cumulus@net-appliance:~$ sudo nano /etc/apt/sources.list  
...  
deb http://apps3.cumulusnetworks.com/repos/deb CumulusLinux-3 netq-2.3  
...
```

2. Update the local `apt` repository, then install the NetQ apps package on the switch.

```
cumulus@net-appliance:~$ sudo apt-get update  
cumulus@net-appliance:~$ sudo apt-get install netq-apps
```

3. Configure the CLI server, using the IP address assigned to your CLI server.

```
cumulus@net-appliance:~$ netq config add cli server 192.168.1.254  
cumulus@net-appliance:~$ netq config restart cli
```

## Upgrade NetQ Software on Your NetQ Appliance

## Perform an In-place Upgrade of Cumulus NetQ

### Verify the Operation of NetQ on Your Appliance

1. Run the `netq show opta-health` command to verify all applications are operating properly. Please allow 10-15 minutes for all applications to come up and report their status.

```
cumulus@net-appliance:~$ netq show opta-health
```

Application	Status	Health	Kafka Stream	Git Hash	Timestamp
netq-app-macfdb	UP	true	up	14b42e6	Mon Jun 3 20:20:35 2019
netq-app-interface	UP	true		0fe11c6	Mon Jun 3 20:20:34 2019
netq-app-vlan	UP	true		4daed85	Mon Jun 3 20:20:35 2019
netq-app-sensors	UP	true	up	f37272c	Mon Jun 3 20:20:34 2019
netq-app-topology	UP	true		3f4a887	Mon Jun 3 20:20:34 2019
kafka-broker	UP				Mon Jun 3 20:20:35 2019
netq-app-mstpinfo	UP	true	up	ef5565d	Mon Jun 3 20:20:35 2019
netq-app-address	UP	true	up	7e0d03d	Mon Jun 3 20:20:35 2019
netq-gui	UP				Mon Jun 3 20:20:35 2019
netq-app-kube	UP	true	up	fbcaa9d	Mon Jun 3 20:20:34 2019
netq-app-link	UP	true	up	6c2b21a	Mon Jun 3 20:20:35 2019

## Upgrade NetQ Software on Your NetQ Appliance

## Perform an In-place Upgrade of Cumulus NetQ

netq-app-ptm	UP	true	up	7162771	Mon Jun 3 20:20:34 2019
netq-opta	UP	true			Mon Jun 3 20:20:34 2019
netq-app-clagsession	UP	true	up	356dda9	Mon Jun 3 20:20:34 2019
netq-endpoint-gateway	UP	true		295e9ed	Mon Jun 3 20:20:34 2019
netq-app-ospf	UP	true	up	e0e2ab0	Mon Jun 3 20:20:34 2019
netq-app-lldp	UP	true	up	90582de	Mon Jun 3 20:20:35 2019
netq-app-inventory	UP	true	up	bbf9938	Mon Jun 3 20:20:34 2019
netq-app-tracecheck-scheduler	UP	true		5484c68	Mon Jun 3 20:20:34 2019
netq-app-infra	UP	true	up	13f9e7c	Mon Jun 3 20:20:34 2019
kafka-connect	UP				Mon Jun 3 20:20:35 2019
netq-app-search	UP	true	up	e47aaba	Mon Jun 3 20:20:34 2019
netq-app-procdevstats	UP	true	up	b8e280e	Mon Jun 3 20:20:34 2019
netq-app-vxlan	UP	true	up	123c577	Mon Jun 3 20:20:34 2019
zookeeper	UP				Mon Jun 3 20:20:35 2019
netq-app-resource-util	UP	true	up	41dfb07	Mon Jun 3 20:20:34 2019
netq-app-evpn	UP	true	up	05a4003	Mon Jun 3 20:20:34 2019

## Upgrade NetQ Software on Your NetQ Appliance

## Perform an In-place Upgrade of Cumulus NetQ

netq-api-gateway	UP	true	c40231a	Mon Jun 3
20:20:34 2019				
netq-app-port	UP	true	up	4592b70 Mon Jun 3
20:20:35 2019				
netq-app-macs	UP	true		dd6cd96 Mon Jun 3
20:20:35 2019				
netq-app-notifier	UP	true	up	da57b69 Mon Jun 3
20:20:35 2019				
netq-app-events	UP	true	up	8f7b4d9 Mon Jun 3
20:20:34 2019				
netq-app-services	UP	true	up	5094f4a Mon Jun 3
20:20:34 2019				
cassandra	UP			Mon Jun 3 20:20:35 2019
netq-app-configdiff	UP	true	up	3be2ef1 Mon Jun 3
20:20:34 2019				
netq-app-neighbor	UP	true	up	9ebe479 Mon Jun 3
20:20:35 2019				
netq-app-bgp	UP	true	up	e68f7a8 Mon Jun 3
20:20:35 2019				
schema-registry	UP			Mon Jun 3 20:20:35 2019
netq-app-lv	UP	true	up	a9ca80a Mon Jun 3
20:20:34 2019				
netq-app-healthdashboard	UP	true		eea044c Mon Jun 3
20:20:34 2019				
netq-app-ntp	UP	true	up	651c86f Mon Jun 3
20:20:35 2019				
netq-app-customermgmt	UP	true		7250354 Mon Jun 3
20:20:34 2019				
netq-app-node	UP	true	up	f676c9a Mon Jun 3

```
20:20:34 2019  
netq-app-route      UP    true   up      6e31f98 Mon Jun 3  
20:20:35 2019
```

 NOTE

If any of the applications or services display Status as DOWN after 30 minutes, open a [support ticket](#) and attach the output of the opta-support command.

2. Verify that NTP is configured and running. NTP operation is critical to proper operation of NetQ. Refer to [Setting Date and Time](#) in the *Cumulus Linux User Guide* for details and instructions.
3. Continue the NetQ upgrade by loading the NetQ Agent on each switch or host you want to monitor. Refer to [Install the NetQ Agents and CLI on Switches](#) for instructions.

## Perform a Disk Image Upgrade of Cumulus NetQ

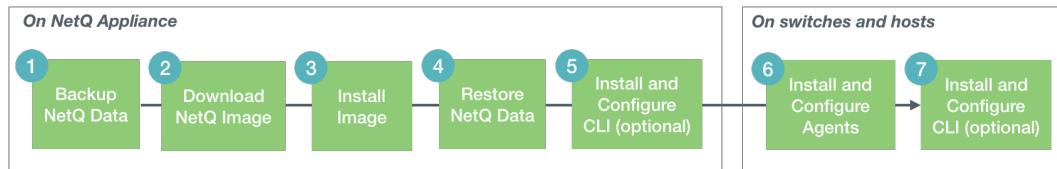
A disk image upgrade is recommended for upgrades from Cumulus NetQ 2.2.0 and earlier. If you are upgrading from NetQ 2.2.1 or 2.2.2, an [in-place upgrade](#) is sufficient.

### Disk Image Upgrade Workflow

Upgrading NetQ using a disk image involves backing up your NetQ data, downloading and installing the new version of NetQ software, restoring your data, and configuring the NetQ Agents. While optional, upgrading the CLI is recommended.

## Upgrade NetQ Software on Your NetQ Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ



### Backup Your NetQ Data

If you want to retain the data you have already collected with an earlier version of Cumulus NetQ, you need to backup that data as follows:

Run the provided backup script to create a backup file in `/opt/<backup-directory>` being sure to replace the `<backup-directory>` option with the name of the directory you want to use for the backup file.

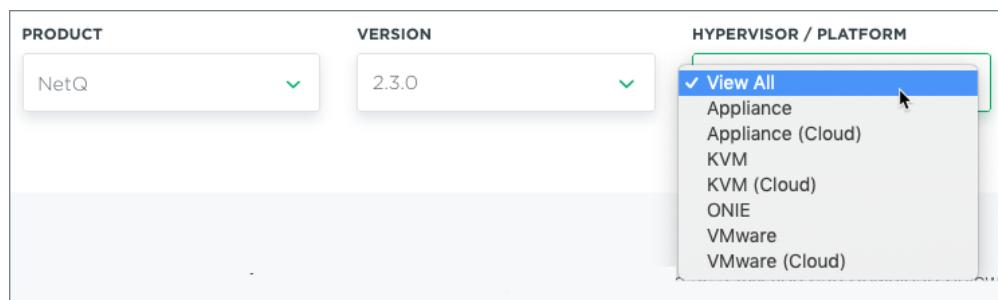
```
cumulus@<netq-appliance>:~$ ./backuprestore.sh --backup --localdir /opt/<backup-directory>
```

The file is named `netq_master_snapshot_<timestamp>.tar.gz`. For more detail about the script and the back up process, refer to [Backup NetQ](#).

### Download the NetQ Software Image

The next step is to obtain the new image.

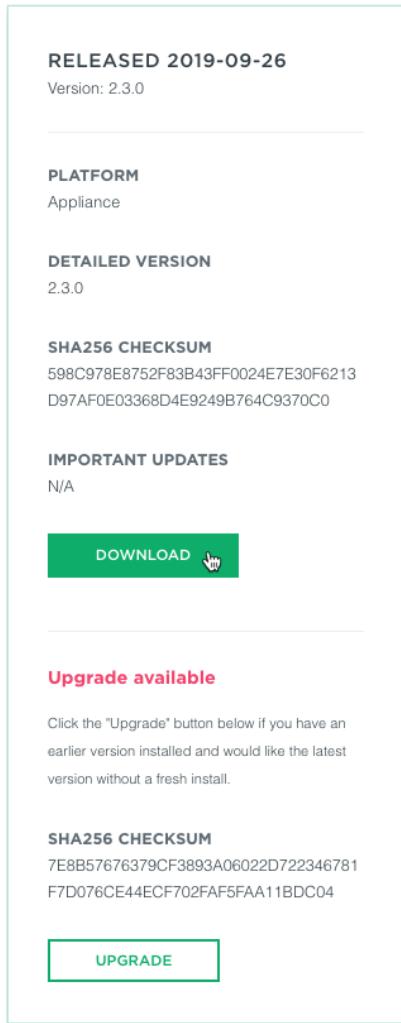
1. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
2. Click **2.3** from the **Version** list box, and then select **2.3.x** from the submenu.
3. From the **Hypervisor/Platform** list box, select **Appliance**.



## Upgrade NetQ Software on Your NetQ Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

4. Click **Download**.



### Install the Image Using ONIE

ONIE is an open source project (equivalent to PXE on servers) that enables the installation of network operating systems (NOS) on a bare metal switch. Use the `onie-install -a -i <image-location>` command to install the image from the web or local file.

- This example installs the image from a web server, then reboots the appliance.

```
cumulus@netq-appliance:~$ sudo onie-install -a -i http://10.0.1.251/cumulus-netq-server-2.3.0-ts-amd64.bin && sudo reboot
```

## Upgrade NetQ Software on Your NetQ Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

- This example installs the image from a local file, then reboots the appliance.

```
cumulus@netq-appliance:~$ sudo onie-install -a -i /home/<local-directory>/<path>/cumulus-netq-server-2.3.0-ts-amd64.bin && sudo reboot
```

### Restore Your NetQ Data

Restore the configuration files to the new release. Run the restore script being sure to replace the `backup-directory` option with the name of the directory where the backup file resides.

```
cumulus@netq-appliance:~$ ./backuprestore.sh --restore --localdir /opt/<backup-directory>
```

This uses the `netq_master_snapshot_<timestamp>.tar.gz` file to restore your data. For more detail about the script and the restoration process, refer to [Restore NetQ](#).

### Verify the Operation of NetQ on Your Appliance

1. Run the `netq show opta-health` command to verify all applications are operating properly. Please allow 10-15 minutes for all applications to come up and report their status.

```
cumulus@<netq-platform-hostname>:~$ netq show opta-health
```

Application	Status	Health	Kafka Stream	Git Hash	Timestamp
netq-app-macfdb	UP	true	up	14b42e6	Mon Jun 3 20:20:35 2019

## Upgrade NetQ Software on Your NetQ Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

netq-app-interface 2019	UP	true	0fe11c6	Mon Jun 3 20:20:34
netq-app-vlan 2019	UP	true	4daed85	Mon Jun 3 20:20:35
netq-app-sensors 20:20:34 2019	UP	true	up	f37272c Mon Jun 3
netq-app-topology 20:20:34 2019	UP	true		3f4a887 Mon Jun 3
kafka-broker	UP			Mon Jun 3 20:20:35 2019
netq-app-mstpinfo 20:20:35 2019	UP	true	up	ef5565d Mon Jun 3
netq-app-address 20:20:35 2019	UP	true	up	7e0d03d Mon Jun 3
netq-gui	UP			Mon Jun 3 20:20:35 2019
netq-app-kube 20:20:34 2019	UP	true	up	fbcaa9d Mon Jun 3
netq-app-link 2019	UP	true	up	6c2b21a Mon Jun 3 20:20:35
netq-app-ptm 20:20:34 2019	UP	true	up	7162771 Mon Jun 3
netq-opta	UP	true		Mon Jun 3 20:20:34 2019
netq-app-clagsession 20:20:34 2019	UP	true	up	356dda9 Mon Jun 3
netq-endpoint-gateway 20:20:34 2019	UP	true		295e9ed Mon Jun 3
netq-app-ospf 20:20:34 2019	UP	true	up	e0e2ab0 Mon Jun 3
netq-app-lldp 2019	UP	true	up	90582de Mon Jun 3 20:20:35

## Upgrade NetQ Software on Your NetQ Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

netq-app-inventory	UP	true	up	bbf9938	Mon Jun 3
20:20:34 2019					
netq-app-tracecheck-scheduler	UP	true		5484c68	Mon Jun 3
20:20:34 2019					
netq-app-infra	UP	true	up	13f9e7c	Mon Jun 3 20:20:34
2019					
kafka-connect	UP				Mon Jun 3 20:20:35 2019
netq-app-search	UP	true	up	e47aaba	Mon Jun 3
20:20:34 2019					
netq-app-procdevstats	UP	true	up	b8e280e	Mon Jun 3
20:20:34 2019					
netq-app-vxlan	UP	true	up	123c577	Mon Jun 3
20:20:34 2019					
zookeeper	UP				Mon Jun 3 20:20:35 2019
netq-app-resource-util	UP	true	up	41dfb07	Mon Jun 3
20:20:34 2019					
netq-app-evpn	UP	true	up	05a4003	Mon Jun 3
20:20:34 2019					
netq-api-gateway	UP	true		c40231a	Mon Jun 3 20:20:34
2019					
netq-app-port	UP	true	up	4592b70	Mon Jun 3
20:20:35 2019					
netq-app-macs	UP	true		dd6cd96	Mon Jun 3 20:20:35
2019					
netq-app-notifier	UP	true	up	da57b69	Mon Jun 3
20:20:35 2019					
netq-app-events	UP	true	up	8f7b4d9	Mon Jun 3
20:20:34 2019					
netq-app-services	UP	true	up	5094f4a	Mon Jun 3

## Upgrade NetQ Software on Your NetQ Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

20:20:34 2019	cassandra	UP			Mon Jun 3 20:20:35 2019
	netq-app-configdiff	UP	true	up	3be2ef1 Mon Jun 3
20:20:34 2019	netq-app-neighbor	UP	true	up	9ebe479 Mon Jun 3
20:20:35 2019	netq-app-bgp	UP	true	up	e68f7a8 Mon Jun 3 20:20:35
2019	schema-registry	UP			Mon Jun 3 20:20:35 2019
2019	netq-app-Inv	UP	true	up	a9ca80a Mon Jun 3 20:20:34
2019	netq-app-healthdashboard	UP	true		eea044c Mon Jun 3
20:20:34 2019	netq-app-ntp	UP	true	up	651c86f Mon Jun 3 20:20:35
2019	netq-app-customermgmt	UP	true		7250354 Mon Jun 3
20:20:34 2019	netq-app-node	UP	true	up	f676c9a Mon Jun 3
20:20:34 2019	netq-app-route	UP	true	up	6e31f98 Mon Jun 3
20:20:35 2019					

 NOTE

If any of the applications or services display Status as DOWN after 30 minutes, open a [support ticket](#) and attach the output of the opta-support command.

2. Verify that NTP is configured and running. NTP operation is critical to proper operation of NetQ. Refer to [Setting Date and Time](#) in the *Cumulus Linux User Guide* for details and instructions.
3. Continue the NetQ upgrade by upgrading the NetQ Agent on each switch or host you want to monitor. Refer to [Install NetQ Agents and CLI on Your Switches](#).

## Upgrade Tips

After you have upgraded NetQ, if you find that some issues remain, review these commonly encountered scenarios. If NetQ is still not operating as expected, please open a [support ticket](#) with a detailed description of your issues.

### No IP Address Assigned to the NetQ Appliance on Boot

A user did not configure an IP address when the system was first booted. Later the user assigned an IP address to eth0, but the NetQ appliance does not appear to be functioning.

You must reset the install daemon and restart the Kubernetes service. Follow these steps:

1. Reset the NetQ Appliance install daemon.

```
cumulus@switch:~$ sudo systemctl reset-failed
```

2. Restart the Kubernetes service.

```
cumulus@switch:~$ sudo systemctl restart cts-kubectl-config
```

# Upgrade NetQ Software on Your NetQ Cloud Appliance

This document describes the steps required to upgrade the NetQ Software (versions 2.1 through 2.2) installed and running on your NetQ Cloud Appliance to NetQ version 2.3.



## IMPORTANT

Cumulus Networks recommends only upgrading NetQ during a network maintenance window.



## NOTE

Events generated during the upgrade process will not be available in the database. Once the upgrade process is complete, the NetQ Agents resynchronize with the current state of the Host or Cumulus Linux switch with the NetQ or NetQ Cloud Appliance.

## Prerequisites

Before you begin the upgrade process, please note the following:

- Cumulus recommends upgrading your NetQ Agents to obtain the latest features and bug fixes, but it is not required.

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform an In-place Upgrade of Cumulus NetQ

- The NetQ installer pod `netq-installer` should be up in either the *ContainerCreating* or *Running* state. The `netq-installer` pod state could also be *ContainerCreating*, in which case the host is initializing with the SSH keys.



### IMPORTANT

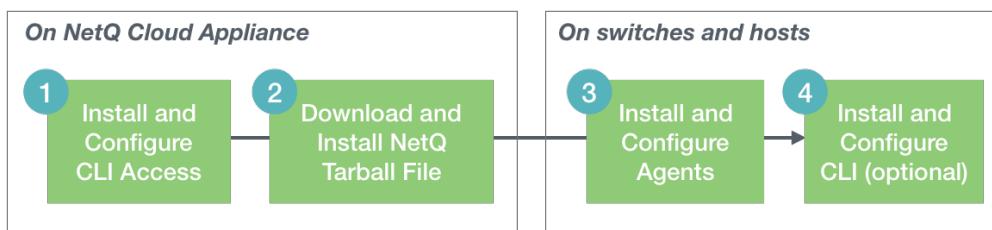
Cumulus Networks recommends you install the NetQ or NetQ Cloud Appliance as part of an out-of-band management network to ensure it can monitor in-band network issues without being affected itself.

## Perform an In-place Upgrade of Cumulus NetQ

An in-place upgrade is recommended for upgrades from Cumulus NetQ 2.2.1 and 2.2.2. If you are upgrading from NetQ 2.2.0 or earlier, a [disk image upgrade](#) is recommended.

### In-place Upgrade Workflow

Upgrading NetQ involves backing up your data, downloading and installing the new version of NetQ software, restoring your NetQ data, and upgrading and configuring the NetQ Agents.



### Install and Configure the CLI

The first step in upgrading NetQ software on your NetQ Cloud Appliance is to install and configure the CLI. This enables use of the new upgrade command. You must also regenerate the access and secret keys for users who need CLI access.

1. Verify or edit the `/etc/apt/sources.list` file to add the repository for Cumulus NetQ.

```
cumulus@netq-appliance:~$ sudo nano /etc/apt/sources.list  
...  
deb http://apps3.cumulusnetworks.com/repos/deb CumulusLinux-3 netq-2.3  
...
```

2. Update the local `apt` repository, then install the NetQ apps package on the switch.

```
cumulus@netq-appliance:~$ sudo apt-get update  
cumulus@netq-appliance:~$ sudo apt-get install netq-apps
```

3. Generate new access and secret keys for users.

- a. Open the NetQ UI.

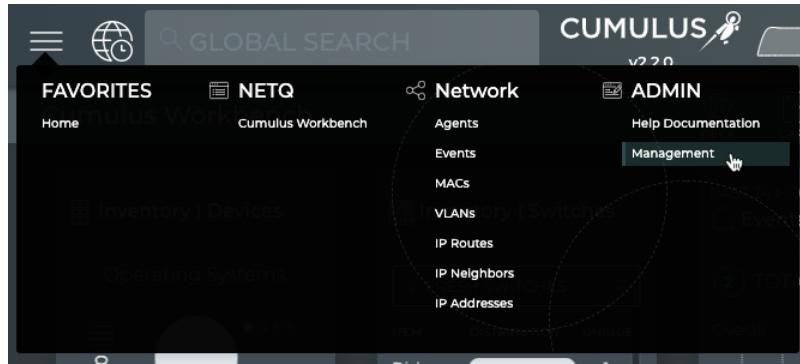
- b. Click



- , then select *Management* in the **Admin** column.

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform an In-place Upgrade of Cumulus NetQ



- Click **Manage** on the User Accounts card.
- Select a user and click **Delete AuthKeys** in the Edit menu.



- Select the user again and click **Generate AuthKeys**.
- Copy these keys to a safe place.

### IMPORTANT

The secret key is only shown once. If you don't copy these, you will need to regenerate them and reconfigure CLI access.

In version 2.2.1 and later, if you created a keys file, you can add these keys to that file.

- Repeat these steps for all other users who should have CLI access.
- Configure the CLI server, using the access and secret keys you just created and identifying the premises, if you have more than one.

```
cumulus@netq-appliance:~$ netq config add cli server
api.netq.cumulusnetworks.com access-key <user-access-key> secret-key <user-
```

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform an In-place Upgrade of Cumulus NetQ

```
secret-key> premises <premises-name> port 443
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443

cumulus@netq-appliance:~$ netq config restart cli
Restarting NetQ CLI... Success!
```

### Download and Install NetQ Software

1. Use the new CLI upgrade command to download and install the software in a single step.

```
cumulus@netq-appliance:~$ netq upgrade opta tarball download 2.3.0
2019-08-29 21:25:58.343212: opta-installer: Upgrading OPTA
2019-08-29 21:26:17.549618: opta-installer: Extracting tarball /mnt/installables/
NetQ-2.3.0-opta.tgz
2019-08-29 21:26:38.427990: opta-installer: Checking for configkey
2019-08-29 21:26:38.991100: opta-installer: Upgrading netq-installer pod
2019-08-29 21:30:45.981703: opta-installer: Upgrading netq-opta pod
2019-08-29 21:35:47.161308: opta-installer: Validating upgrade
-----
Successfully upgraded the opta
```

2. Confirm the upgrade was successful.

```
cumulus@netq-appliance:~$ cat /etc/app-release
APPLIANCE_VERSION=2.3.0
APPLIANCE_MANIFEST_HASH=a8f3cda
APPLIANCE_NAME="NetQ Cloud Appliance"
```

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform an In-place Upgrade of Cumulus NetQ

```
cumulus@netq-appliance:~$ dpkg -l | egrep "netq-agent|netq-apps"  
ii  netq-agent           2.3.0-cl3u20~156494d619.810054e  amd64  
    Cumulus NetQ Telemetry Agent for Cumulus Linux  
ii  netq-apps            2.3.0-cl3u20~156494d619.810054e  amd64  
    Cumulus NetQ Fabric Validation Application for Cumulus Linux
```

 **IMPORTANT**

If you have changed the IP Address or hostname of your appliance, you need to re-register this address with the Kubernetes containers before you can continue.

1. Reset all Kubernetes administrative settings. Run the command twice to make sure all directories and files have been reset.

```
cumulus@netq-appliance:~$ sudo kubeadm reset -f  
cumulus@netq-appliance:~$ sudo kubeadm reset -f
```

2. Remove the Kubernetes configuration.

```
cumulus@netq-appliance:~$ sudo rm /home/cumulus/.kube/config
```

3. Reset the NetQ Platform install daemon.

```
cumulus@netq-appliance:~$ sudo systemctl reset-failed
```

4. Reset the Kubernetes service.

```
cumulus@netq-appliance:~$ sudo systemctl restart cts-kubectl-config
```

**Note:** Allow 15 minutes for the prompt to return.

## Verify the Operation of NetQ

1. Run the `netq show opta-health` command to verify all applications are operating properly. Please allow 10-15 minutes for all applications to come up and report their status.

```
cumulus@netq-appliance:~$ netq show opta-health
OPTA is healthy
```

 NOTE

If the results do not indicate the server is healthy after 30 minutes, open a [support ticket](#) and attach the output of the `opta-support` command.

2. Verify that NTP is configured and running. NTP operation is critical to proper operation of NetQ. Refer to [Setting Date and Time](#) in the *Cumulus Linux User Guide* for details and instructions.
3. Continue the NetQ installation by loading the NetQ Agent on each switch or host you want to monitor. Refer to [Install NetQ Agents and CLI on Switches](#) for instructions.

## Perform a Disk Image Upgrade of Cumulus NetQ

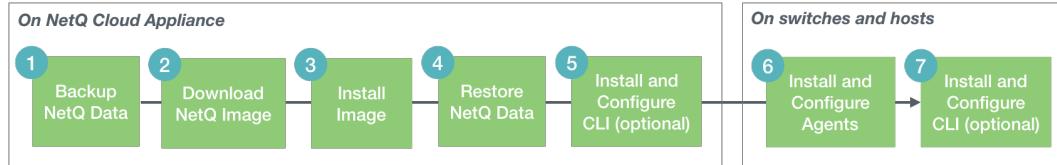
A disk image upgrade is recommended for upgrades from Cumulus NetQ 2.2.0 or earlier. An [in-place upgrade](#) is recommended for upgrades from NetQ 2.2.1 and 2.2.2.

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

### Disk Image Upgrade Workflow

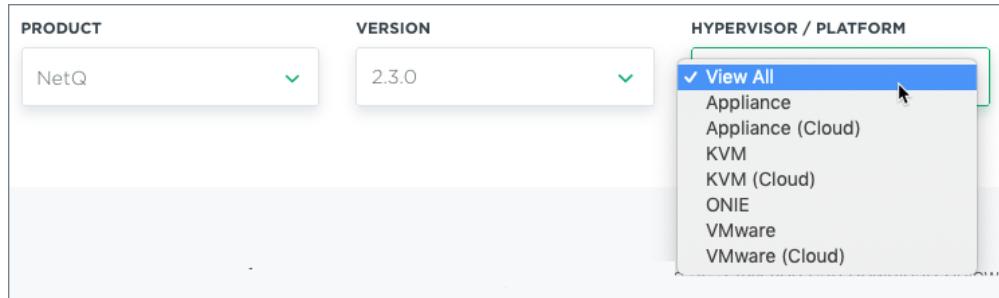
Upgrading NetQ involves downloading and installing the new version of NetQ software, and upgrading and configuring the NetQ Agents.



### Download the NetQ Software Image

The next step is to obtain the new image.

1. On the [Cumulus Downloads](#) page, select **NetQ** from the **Product** list box.
2. Click **2.3** from the **Version** list box, and then select **2.3.0** from the submenu.
3. From the **Hypervisor/Platform** list box, select **Appliance (Cloud)**.



4. Click **Download**.

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

**RELEASED 2019-09-26**  
Version: 2.3.0

---

**HYPervisor**  
Appliance (Cloud)

**DETAILED VERSION**  
2.3.0

**SHA256 CHECKSUM**  
92AAD3733E11716E86CB751BFF53C7D89  
3831BF50739CC9A4BD0184E1BECF655

**IMPORTANT UPDATES**  
N/A

**DOWNLOAD** 

---

**Upgrade available**

Click the "Upgrade" button below if you have an earlier version installed and would like the latest version without a fresh install.

**SHA256 CHECKSUM**  
05942ABBF4A5C3FEA2BC43218EC248BF  
1AE000C5D11656C9AF9D96DFF8E1FA7

**UPGRADE**

### Install the Image Using ONIE

ONIE is an open source project (equivalent to PXE on servers) that enables the installation of network operating systems (NOS) on a bare metal switch. Use the `onie-install -a -i <image-location>` command to install the image from the web or local file.

- This example installs the image from a web server, then reboots the appliance.

```
cumulus@netq-appliance:~$ sudo onie-install -a -i http://10.0.1.251/cumulus-netq-server-2.3.0-ts-amd64.bin && sudo reboot
```

- This example installs the image from a local file, then reboots the appliance.

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

```
cumulus@netq-appliance:~$ sudo onie-install -a -i /home/<local-directory>/<path>/cumulus-netq-server-2.3.0-ts-amd64.bin && sudo reboot
```

Verify the release has been updated successfully.

```
cumulus@netq-appliance:~$ cat /etc/app-release
APPLIANCE_VERSION=2.3.0
APPLIANCE_MANIFEST_HASH=a7b3cda
APPLIANCE_NAME="NetQ Cloud Appliance"
```

```
cumulus@netq-appliance:~$ dpkg -l | egrep "netq-agent|netq-apps"
ii  netq-agent          2.3.0-cl3u20~1569b48619.810054e  amd64
Cumulus NetQ Telemetry Agent for Cumulus Linux
ii  netq-apps           2.3.0-cl3u20~1569b48619.810054e  amd64
Cumulus NetQ Fabric Validation Application for Cumulus Linux
```

Verify the Operation of NetQ on Your Appliance

Verify all applications and services are operating properly.

```
cumulus@netq-platform:~$ netq show opta-health
OPTA is healthy
```

 NOTE

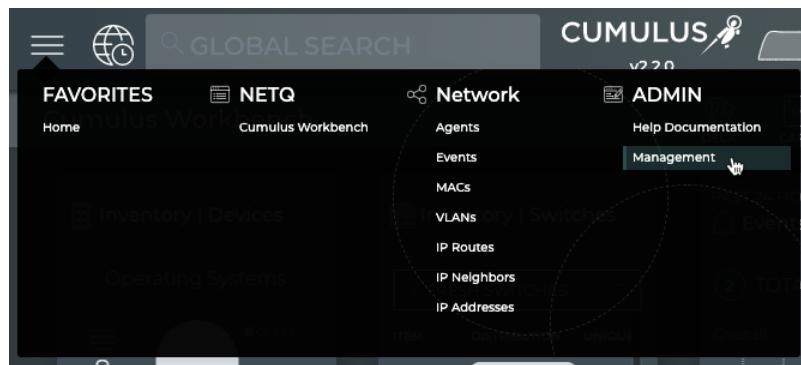
If the results do not indicate the server is healthy after 30 minutes, open a [support ticket](#) and attach the output of the opta-support command.

### Install and Configure the CLI

The CLI communicates through the API gateway in the NetQ Cloud. To access and configure the CLI on your NetQ Cloud server you will need your username and password to access the NetQ UI to generate an access-key and secret-key. Your credentials and NetQ Cloud addresses were provided by Cumulus Networks via an email titled *Welcome to Cumulus NetQ!*

To configure CLI access:

1. In your Internet browser, enter **netq.cumulusnetworks.com** into the address field to open the NetQ UI login page.
2. Enter your username and password.
3. From the Main Menu, select *Management* in the **Admin** column.



4. Click **Manage** on the User Accounts card.
5. Select your user and click **Generate AuthKeys**.

## Upgrade NetQ Software on Your NetQ Cloud Appliance

## Perform a Disk Image Upgrade of Cumulus NetQ

The screenshot shows the 'User Accounts' section of the NETQ Management interface. A yellow arrow points to the 'Generate AuthKeys' button in the toolbar, which is highlighted with a yellow border. The table below shows one user entry:

USER ID	FIRST NAME	LAST NAME	ROLE	LAST LOGIN	DATE CRE...	ACCESS K...
admin1@co...	Admin1	User	admin	06/25/2019	06/25/2019	

Below the table are several buttons: 'ITEMS SELECTED' (with a count of 1), 'Select All', 'Clear All', 'Edit', 'Delete', 'Generate AuthKeys' (highlighted), 'Hide Selected', 'Show Only Selected', and 'Export Selected'.

6. Copy these keys to a safe place.

**⚠️ IMPORTANT**

The secret key is only shown once. If you don't copy these, you will need to regenerate them and reconfigure CLI access.

In version 2.2.1 and later, you can save these keys to a YAML file for easy reference, and to avoid having to type or copy the key values. You can:

- store the file wherever you like, for example in `/home/cumulus/` or `/etc/netq/`
- name the file whatever you like, for example `credentials.yml`, `creds.yml`, or `keys.yml`

BUT, the file must have the following format:

```
access-key: <user-access-key-value-here>
secret-key: <user-secret-key-value-here>
```

7. Configure access to the CLI:

- In NetQ 2.3.x, run the following commands. Replace the key values with your generated keys.

```
cumulus@netq-platform:~$ netq config add cli server  
api.netq.cumulusnetworks.com access-key <text-access-key> secret-key <text-secret-key> port 443  
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443  
Updated cli server api.netq.cumulusnetworks.com vrf default port 443.  
Please restart netqd (netq config restart cli)  
  
cumulus@netq-platform:~$ netq config restart cli  
Restarting NetQ CLI... Success!
```

- In NetQ 2.2.1 or later, if you have created a keys file as noted in the previous step, run the following commands. Be sure to include the **full path** the to file.

```
cumulus@netq-platform:~$ netq config add cli server  
api.netq.cumulusnetworks.com cli-keys-file /full-path/credentials.yml port 443  
Successfully logged into NetQ cloud at api.netq.cumulusnetworks.com:443  
Updated cli server api.netq.cumulusnetworks.com vrf default port 443.  
Please restart netqd (netq config restart cli)  
  
cumulus@netq-platform:~$ netq config restart cli  
Restarting NetQ CLI... Success!
```

Now that the NetQ Cloud Appliance is configured, continue with the upgrade by upgrading the NetQ Agents and CLI on your switches and hosts. Follow the instructions in [Install NetQ Agents and CLI on Your Switches](#).

## Upgrade Tips

After you have upgraded NetQ, if you find that some issues remain, review these commonly encountered scenarios. If NetQ is still not operating as expected, please open a [support ticket](#) with a detailed description of your issues.

### No IP Address Assigned to the NetQ Cloud Appliance on Boot

A user did not configure an IP address when the system was first booted. Later the user assigned an IP address to eth0, but the NetQ appliance does not appear to be functioning.

You must reset the install daemon and restart the Kubernetes service. Follow these steps:

1. Reset the NetQ Appliance install daemon.

```
cumulus@switch:~$ sudo systemctl reset-failed
```

2. Restart the Kubernetes service.

```
cumulus@switch:~$ sudo systemctl restart cts-kubectl-config
```

# Backup and Restore NetQ

It is recommended that you back up your NetQ data according to your company policy. Typically this includes after key configuration changes and on a scheduled basis.

These topics describe how to backup and also restore your NetQ data for on-premises NetQ Platforms (running on your hardware) or for the on-premises NetQ Appliance.

 NOTE

These procedures *do not* apply to your NetQ Cloud server or the NetQ Cloud Appliance. Data backup is handled automatically with the NetQ Cloud service.

# Backup Your NetQ Instance

NetQ 2.x data is stored in a Cassandra database. A backup is performed by running scripts provided with the software and located in the `/usr/sbin` directory. When a backup is performed, a single tar file is created. The file is stored on a local drive that you specify and is named `netq_master_snapshot_<timestamp>.tar.gz`. Currently, only one backup file is supported, and includes the entire set of data tables. It is replaced each time a new backup is created.

 NOTE

If you upgrading to version 2.3.0 and need to back up NetQ 2.2.2 or earlier, you must request an updated backuprestore script from your local representative. The new script must be manually copied into the user/sbin directory.

If you are upgrading to version 2.3.1, you can use the script provided with the release to back up your data from earlier NetQ versions.

To create a backup:

1. Run the backup script to create a backup file in `/opt/<backup-directory>` being sure to replace the `backup-directory` option with the name of the directory you want to use for the backup file.

## Backup Your NetQ Instance

```
cumulus@<netq-platform/netq-appliance>:~$ ./backuprestore.sh --backup --  
localdir /opt/<backup-directory>
```



You can abbreviate the `backup` and `localdir` options of this command to `-b` and `-l` to reduce typing. If the backup directory identified does not already exist, the script creates the directory during the backup process.

This is a sample of what you see as the script is running:

```
[Fri 26 Jul 2019 02:35:35 PM UTC] - Received Inputs for backup ...  
[Fri 26 Jul 2019 02:35:36 PM UTC] - Able to find cassandra pod: cassandra-0  
[Fri 26 Jul 2019 02:35:36 PM UTC] - Continuing with the procedure ...  
[Fri 26 Jul 2019 02:35:36 PM UTC] - Removing the stale backup directory from  
cassandra pod...  
[Fri 26 Jul 2019 02:35:36 PM UTC] - Able to successfully cleanup up /opt/  
backuprestore from cassandra pod ...  
[Fri 26 Jul 2019 02:35:36 PM UTC] - Copying the backup script to cassandra  
pod ....  
/opt/backuprestore/createbackup.sh: line 1: cript: command not found  
[Fri 26 Jul 2019 02:35:48 PM UTC] - Able to execute /opt/backuprestore/  
createbackup.sh script on cassandra pod  
[Fri 26 Jul 2019 02:35:48 PM UTC] - Creating local directory:/tmp/  
backuprestore/ ...  
Directory /tmp/backuprestore/ already exists..cleaning up
```

## Backup Your NetQ Instance

```
[Fri 26 Jul 2019 02:35:48 PM UTC] - Able to copy backup from cassandra pod to  
local directory:/tmp/backuprestore/ ...  
[Fri 26 Jul 2019 02:35:48 PM UTC] - Validate the presence of backup file in  
directory:/tmp/backuprestore/  
[Fri 26 Jul 2019 02:35:48 PM UTC] - Able to find backup  
file:netq_master_snapshot_2019-07-26_14_35_37_UTC.tar.gz  
[Fri 26 Jul 2019 02:35:48 PM UTC] - Backup finished successfully!
```

2. Verify the backup file has been created.

```
cumulus@<netq-platform/netq-appliance>:~$ cd /opt/<backup-directory>  
cumulus@<netq-platform/netq-appliance>:~/opt/<backup-directory># ls  
netq_master_snapshot_2019-06-04_07_24_50_UTC.tar.gz
```

To create a scheduled backup, add `./backuprestore.sh --backup --localdir /opt/<backup-directory>` to an existing cron job, or create a new one.

# Restore Your NetQ Instance

You can restore NetQ data using the backup file you created in [Backup Your NetQ Instance](#). You can restore your instance to the same NetQ Platform or NetQ Appliance or to a new platform or appliance. You do not need to stop the server where the backup file resides to perform the restoration, but logins to the NetQ UI will fail during the restoration process. The restore option of the backup script, copies the data from the backup file to the database, decompresses it, verifies the restoration, and starts all necessary services. You should not see any data loss as a result of a restore operation.

To restore NetQ on the same hardware where the backup file resides:

1. Log in to the NetQ server.
2. Run the restore script being sure to replace the `backup-directory` option with the name of the directory where the backup file resides.

```
cumulus@<netq-platform/netq-appliance>:~$ ./backuprestore.sh --restore --  
localdir /opt/<backup-directory>
```



You can abbreviate the `restore` and `localdir` options of this command to `-r` and `-l` to reduce typing.

This is a sample of what you see while the script is running:

## Restore Your NetQ Instance

```
[Fri 26 Jul 2019 02:37:49 PM UTC] - Received Inputs for restore ...
```

WARNING: Restore procedure wipes out the existing contents of Database.

Once the Database is restored you loose the old data and cannot be recovered.

"Do you like to continue with Database restore:[Y(yes)/N(no)]. (Default:N)"

You must answer the above question to continue the restoration. After entering **Y** or **yes**, the output continues as follows:

```
[Fri 26 Jul 2019 02:37:50 PM UTC] - Able to find cassandra pod: cassandra-0
```

```
[Fri 26 Jul 2019 02:37:50 PM UTC] - Continuing with the procedure ...
```

```
[Fri 26 Jul 2019 02:37:50 PM UTC] - Backup local directory:/tmp/backuprestore/  
exists....
```

```
[Fri 26 Jul 2019 02:37:50 PM UTC] - Removing any stale restore directories ...
```

```
Copying the file for restore to cassandra pod ....
```

```
[Fri 26 Jul 2019 02:37:50 PM UTC] - Able to copy the local directory contents to  
cassandra pod in /tmp/backuprestore/.
```

```
[Fri 26 Jul 2019 02:37:50 PM UTC] - copying the script to cassandra pod in dir:/  
tmp/backuprestore/....
```

```
Executing the Script for restoring the backup ...
```

```
/tmp/backuprestore//createbackup.sh: line 1: cript: command not found
```

```
[Fri 26 Jul 2019 02:40:12 PM UTC] - Able to execute /tmp/backuprestore//  
createbackup.sh script on cassandra pod
```

```
[Fri 26 Jul 2019 02:40:12 PM UTC] - Restore finished successfully!
```

## Restore Your NetQ Instance

To restore NetQ on new hardware:

1. Copy the backup file from `/opt/<backup-directory>` on the older hardware to the backup directory on the new hardware.
2. Run the restore script on the new hardware, being sure to replace the `backup-directory` option with the name of the directory where the backup file resides.

```
cumulus@<netq-platform/netq-appliance>:~$ ./backuprestore.sh --restore --  
localdir /opt/<backup-directory>
```