



NVIDIA NETQ

HOLISTIC AND REAL-TIME VISIBILITY, TROUBLESHOOTING, AND MONITORING

As cloud-scale networking becomes the enterprise norm, so does complexity. Network operators must manage constant change within multiple network layers, and polling-based legacy network management tools simply cannot adapt.

Network operators often struggle with operational challenges, such as network disruption caused by maintenance and configuration changes, and simple misconfigurations can have a significant impact on operator workloads. Furthermore, business networks are often fairly large and complex, which means the set of tasks a network administrator will need to perform can quickly overwhelm manual efforts. This requires a shift, not only to modern networking, but also to modern operational tools as well.

NVIDIA® NetQ is a highly-scalable, modern network operations tool for open Network Operating Systems like Cumulus Linux and SONiC (software for open networking in the cloud). NetQ leverages fabric-wide telemetry data to provide visibility and troubleshooting of overlay and underlay network in real time. With NetQ you can realize several benefits:

- > Network outage prevention using validation and functional testing with network CI/CD (Continuous integration and continuous delivery)
- > Rapid root cause detection using network telemetry data including NVIDIA WHAT JUST HAPPENED® (WJH) data from NVIDIA switches reducing mean time to innocence
- > Network inventory and software upgrade functionality with push button simplicity
- > Network wide telemetry database to optimize network usage supporting GUI, CLI, API and plugins (Grafana, Prometheus, etc.)
- > Multiple event notification integrations (Syslog, PagerDuty, Slack, Email)



NetQ makes it easier to deploy, manage and scale your Cumulus Linux and SONiC environments.



NetQ is available for on-premises deployment or as cloud (SaaS) service.



Validate network state, intent and configuration across the entire network.



WJH telemetry dramatically reduces mean time to issue resolution by providing answers to: When, What, Who, Where and Why.

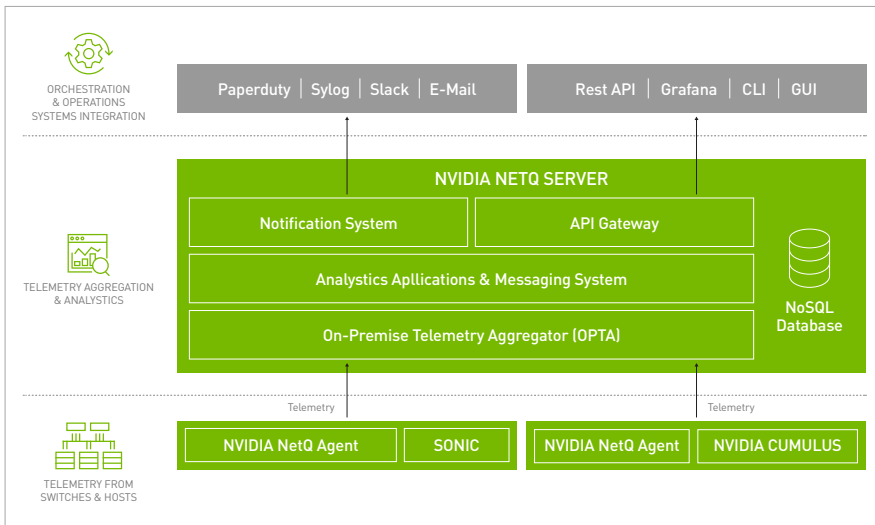


Figure 1: NVIDIA NetQ real-time telemetry data collection and deep analytics

PROTECT NETWORK INTEGRITY WITH VALIDATIONS AND CI/CD

Network configuration changes and software upgrades can cause numerous trouble tickets because of the inability to test before deploying in production. When the tickets start pouring in, you are stuck with a large amount of data that is collected and stored in multiple tools making correlating events to resolve issues difficult at best. NetQ can be used as the “functional test platform” for the network CI/CD in conjunction with NVIDIA Air. Customers benefit from testing the new configuration with NetQ in the NVIDIA Air environment (“digital twin”) and fix errors before deploying to their production network (“physical twin”). In the physical production network, NetQ validations provide insight into the live state of the network and not only shortens the troubleshooting time and also prevents network issues, for example, MTU mismatch, VLAN misconfigurations and more.

RAPID ROOT CAUSE DETECTION

NetQ greatly reduces time-to-innocence by pinpointing and isolating faults caused by network state changes. Working hand in hand with Cumulus Linux and SONiC, NetQ enables organizations to validate network state, both during regular operations and for post-mortem diagnostic analysis. NetQ provides both a CLI and robust GUI to allow for on-box interactions as part of your troubleshooting or visually as a high-level dashboard.

With NetQ trace, paths are verified providing additional information and it discovers misconfigurations along all the hops in one go, speeding the time to resolution. NetQ trace allows users to view all of the paths between devices to find potential problems.

The NetQ agents running on switches and hosts monitor various events in real time, like interface state, BGP neighbors, MACs, and routes providing a single source of truth for datacenter wide events. These events can be viewed via NetQ CLI, GUI and multiple third-party notification services like PagerDuty or Slack.

NetQ benefits:

- > Simplified scaling of Cumulus Linux
- > Open, disaggregated network
- > Speed mean-time-to-innocence
- > Maximize flexibility and control
- > Reduce Opex
- > Remove complexity
- > Reduce downtime
- > Increase productivity
- > Simplify upgrades and deployments/ configurations with LCM
- > Reduce security risks
- > Maximize value of network infrastructure

NetQ cloud benefits:

- > 24x7 secure access
- > Ease of installation and upgrades
- > Faster deployment
- > Unlimited scale
- > Simplified operations
- > Faster time-to-value

Features

- > Advanced telemetry
- > Deep analytics
- > Microservices architecture
- > Configuration management
- > Software upgrade management
- > Snapshot and compare
- > Validation
- > Trace
- > WJH
- > Topology
- > RoCE Monitoring
- > Notification Channels
- > HA Clustering

DEPLOY RELIABLE NETWORKING USING WJH

WJH is a hardware-accelerated telemetry feature available on NVIDIA Spectrum™ switches, which streams detailed and contextual telemetry data for analysis. WJH provides real-time visibility into problems in the network, such as hardware packet drops due to misconfigurations, buffer congestion, ACL, or layer 1 problems.

WJH provides telemetry data from the switches collected by NetQ, which is made available via CLI and GUI for analysis. When WJH capabilities are combined with NetQ, you can identify the packet drops anywhere in the fabric to improve network reliability.

- > By viewing current or historic drop information, including the reason for the drop
- > By identifying problematic flows or endpoints, and pinpoint exactly where communication is failing in the network
- > NetQ trace includes contextual WJH Drops information in the output.

You can also use gNMI (gRPC network management interface) to collect WJH data from the NetQ Agent.

NETQ COMPONENTS AND DEPLOYMENT OPTIONS

NetQ components

- > **NetQ Agents** run on Cumulus Linux and SONiC switches and other certified Linux systems - such as Ubuntu®, Red Hat®, and CentOS hosts. NetQ agents capture network data and other state information in real time and transmit the data to the NetQ server.
- > **NetQ Server** consists of telemetry data collection software, our “on-premises telemetry aggregator” (OPTA), data analytics applications and database. The NetQ applications and database can be deployed on premises or can be consumed as a cloud-based service (SaaS). NetQ server is supported on VMware ESXi and KVM.

NetQ on customer premises

In this deployment, all NetQ components are deployed on customer premises. Deployments can span a single site or multiple sites.

- > **Single site deployment:** NetQ agents running on switches and hosts collect and transmit data to the NetQ OPTA, which hosts the NetQ applications and database.
- > **Multi-site deployment:** For the multi-site NetQ implementation, the NetQ agents at each premises collect and transmit data from the switches and hosts at that premises to its local OPTA. The OPTAs then transmit the data to a common NetQ applications server for processing and storage.

For high availability, OPTAs and applications with storage can be deployed as a cluster.

NetQ as a cloud service

This is similar to the multi-site deployment, where the OPTAs run on customer premises securely connecting to NetQ multi-tenant cloud service operated and maintained by NVIDIA.

NETQ PHYSICAL APPLIANCE SPECIFICATIONS

The NetQ physical appliance is a 1RU rack mountable server available in two flavors. For deploying NetQ OPTA, Applications, and Database, use the NetQ physical appliance with 8 cores, 96GB DRAM, 960GB SSD, and 4TB hard drive. For deploying NetQ OPTA only, use the NetQ physical appliance with 4 cores, 16GB DRAM, and 240GB hard drive.

Technical Support Please visit the [NVIDIA support portal](#).

Learn more about NVIDIA ethernet switching solutions at: www.nvidia.com/en-us/networking/ethernet-switching/

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