

Cisco Network Insights for Data Center

Network Insights for Resources (NIR) and Network Insights Advisor (NIA)

Q Can the Network Insights for Resources (NIR) and Network Insights Advisor (NIA) applications be installed on either Cisco ACI™ or Cisco® Data Center Network Manager (DCNM)-based deployments?

A Yes, the NIR application can be installed on either ACI- or DCNM-based deployments. The same software image works for either deployment. There are no separate software images required.

Q What is the difference between Network Insights on Cisco ACI and Cisco NX-OS?

A None in terms of functionality:

- Common application store
- Common applications (NIR and NIA)
- Common architecture and microservices
- Common feature set
- Same log retention period (software and hardware telemetry)

The differences:

- Deployment model and compute/sizing requirements
- Features and corresponding resources that exist in ACI and not in standalone will show up in APIC and not in DCNM

Q Where is the application store where a customer can download Network Insights for Cisco ACI and Cisco NX-OS?

A <https://dcappcenter.cisco.com/>

Q Which platforms support software telemetry?

A All Cisco Nexus® platforms except Cisco Nexus 5000 and Cisco Nexus 6000 series switches.

Q Which platforms support hardware telemetry?

A Cisco Nexus 9000 EX/FX/FX2/GX platforms (fixed and modular). All of the future cloud-scale ASICs will have support for hardware telemetry as well.

Q Can a customer bring in their own data lake, correlation engine, and dashboards to consume telemetry data?

A Yes, but as of today, we only support consumption of software telemetry data into the customer's environment. For hardware telemetry, the customer is required to use APIC or DCNM as controllers with the Network Insights applications.

Q Can Network Insights be hosted on a third-party controller?

A No, Network Insights run only on a Cisco ACI APIC or on Cisco DCNM.

Q What is the log retention period in Network Insights?

A Software telemetry data for 30 days and flow telemetry for 7 days.

Q What is DCNM cluster mode?

A Starting with Cisco DCNM Release 11.1, the application framework in DCNM LAN OVA/ISO install has been extended to support cluster mode. DCNM active and standby still run as two separate instances. In an unclustered scenario with just active/standby DCNMs, the supported scale is 80 switches. To support a scaled scenario of up to 250 switches with Network Insights (as of Cisco DCNM Release 11.3), especially with other features, such as PM, VMM, EPL, etc., the requirement is to have a 3-node compute cluster. These three compute or worker nodes are installed in addition to the active/standby instances. The same OVA/ISO file is employed for the installation, but in the web installer, the compute mode should be selected, and the information about the DCNM VIP should be provided. In that way, once the compute node is installed, it can be discovered and will join the DCNM “mothership.” This is what we call DCNM LAN deployment in cluster mode.

Q Will APIC and DCNM force the required configurations for telemetry data to be pushed back to the controller?

A Yes, the controllers will be responsible to configure the switches.

Q When using Network Insights with DCNM, do I have to use DCNM to provision the fabric?

A With Network Insights, customer will have two options. The switches or fabric are in either managed mode or monitored mode. In monitored mode, the expectation is that the user will push the right configuration to the switches via some other mechanism (Cisco Network Services Orchestrator [NSO], custom tools, CLI, etc.). All the configurations required for the applications to work will be displayed in DCNM to make it easy to provision the switches.

Q Cisco ACI shows a capacity-planning dashboard as well. How different is this from NIR?

A APIC provides a capacity dashboard today; however, this data is not historical and not correlated. Network Insights gathers resource utilization and shows the utilization, trends, and anomalies when thresholds are exceeded, or a sudden change is observed from the normal behavior (that is, the rate of change).

Q Do we need to enable telemetry for NIR to work? If that is the case, does that mean the customer can no longer use NetFlow on his fabric?

A Yes, that is the case for NIR, if you want to use flow analytics. The other functions (software telemetry) will work without affecting NetFlow.

Q In what modes is Network Insights supported on DCNM?

A Starting with DCNM Release 11.2, Network Insights will be supported in LAN classic and LAN fabric mode.

Q Can customers auto-upgrade the Network Insights applications?

A Auto upgrade is discouraged for now. However, an “Upgrade available” message will pop up periodically with a list of improvements to incentivize customers.

Q How do the learning models in NIA get updated (for example, signatures)? Is that automatic, or do they have to be manually updated?

A Metadata will be updated automatically. In the future, we will enable a manual update for air-gapped deployments.

Q **What's the code used to define signatures used in NIA? How do we add to the repository?**

A Signatures are defined in JSON format. As of NIA Release 2.0.1, custom signatures cannot be added.

Q **In NIR, can we set custom thresholds for resource utilization?**

A Not at this time, but this will be enabled in a future release.

Q **How different is NetFlow from Flow telemetry?**

A NetFlow and Flow Telemetry use the same flow records stored in the flow table; however, the way these resources are transported from the switch differ. NetFlow uses CPU cycles, and the records are transported to a defined collector. Flow Telemetry, however, never uses the CPU; the records are transported periodically out the front panel port to the Network Insights application.

Q **What does a flow record consist of?**

A A flow record consists of the following:

- 5-tuple flow information
- Interface/queue information
- Flow start/stop time
- Flow latency

Q **What are the functionalities of the correlation engine in Network Insights?**

A The correlation engine is used to dynamically correlate raw telemetry data across the fabric from each node in order to provide useful insights. For example, if there is a routing-layer problem, the application can measure and evaluate the resources across Layer 1, Layer 2, and Layer 3 to root cause the issue. The correlation engine also stitches the flows together using tuple and timestamp information to give full end-to-end flow-path, latency, and ingress/egress information. It is also used to evaluate packet drops – the exact point in a network where they occur and the reason for the drops. The correlation engine is one of the most important microservices in Network Insights.

Q **Can NIA run on an APIC cluster, or does it require a Cisco Application Services Engine cluster?**

A NIA does not run on APIC. A Cisco Application Services Engine cluster is required to run the NIA application.

Q **Can NIR run on an APIC cluster, or does it require a Cisco Application Services Engine cluster ?**

A NIR can run on an APIC cluster, but to enable the flow-telemetry function, NIR must be installed on a Cisco Application Services Engine cluster.

Q **What encoding and transports are supported for telemetry data?**

A Software telemetry is encoded using GPB/JSON and transported over TCP to Network Insights. Hardware telemetry is not encoded and is transported over UDP to Network Insights. This data is written to a Kafka bus.

Q **What data lake does Network Insights use?**

A Uses Elastic Search in order to store data in a time-series database.

Q **What capacity planning features does NIR cover?**

A It covers the following:

- Current utilization of resources
- Trends across resources at a node and fabric level
- Any threshold violations across resources

All the above will be available for operational, configuration, and hardware resources (how many ports and how much bandwidth is in use) and for switch environmentals.

Q **Where can customers get more details if they want to build their own stack to consume telemetry data?**

A If a customer wishes to build their own receiver, we publish prototype files on GitHub. We have an integration with Telegraf for TCP/gRPC telemetry:

https://github.com/influxdata/telegraf/tree/master/plugins/inputs/cisco_telemetry_mdt

We also have integrations with Telegraf via gNMI:

https://github.com/influxdata/telegraf/tree/master/plugins/inputs/cisco_telemetry_gnmi

Q **Is NIR an Network Performance Monitoring and Diagnostics (NPMD) tool?**

A Network Insights represent network health from a couple of different factors; one of these is flow analytics, which are represented in one of the application dashboards. It will monitor the flow to where you can debug an application problem that has been discovered, which you instrument through the application to export directly from the ASIC. With that flow information, we can represent whether drops occurred for that flow, can represent the flow topology, etc.

Q **What platforms would NIA support?**

A As of NIA Release 2.0.1, NIA is supported on Cisco Nexus 9000 and Cisco Nexus 3000 platforms.

Q **What platforms would NIR support?**

A NIR supports Cisco Nexus 9000 platforms today, but with Release 2.2, it will support Cisco Nexus 7000 and Cisco Nexus 3000 platforms.

Q **How does NIA detect known caveats, and what next?**

A NIA detects them as follows:

- Network Insights Advisor collects logs for each switch and constantly matches the logs with digital signatures of known bugs.
- If it matches with a known caveat from the BORG database, NIA will display the devices affected and by which bug.
- NIA then generates an advisory with the recommended fix.
- If the fix is to upgrade the software, NIA will inform you about the bugs that will get fixed when you upgrade to a recommended release X.
- Users can also measure the upgrade's impact from within NIA, which runs pre- and post-checks, and measures if the upgrade will be disruptive or nondisruptive.

Q **What are the licenses required to run Network Insights on Cisco ACI?**

A Only leaf licenses are required.

Q **What are the licenses required to run Network Insights on Cisco NX-OS?**

A Spine and leaf licenses are required.

Q **Is Multi-Pod or Multi-Site supported in NIR for ACI?**

A Only Multi-Pod is supported; no data from the IPN.

Q **Is Multi-Site supported in NIR for NX-OS?**

A No Multi-Site is supported, as of NIR Release 2.1.

Q **How is data collected from the switches?**

A Using inband. If a customer uses out-of-band (OOB) today, inband can be enabled in parallel, and OOB can be chosen as the preferred connectivity. Note: For hardware telemetry, it is mandatory to use inband connectivity.

Q **What is the impact of non-FT-capable switches?**

A These devices are not show in tracepath, the same as for spines. NIR will use Link Layer Discovery Protocol (LLDP) information wherever possible to stitch flows across nonsupported platforms.

Q **Can a customer access the NIR data and events using other tools?**

A REST-API is supported today.

Q **Which functionality is supported on which kind of APIC cluster?**

A Software telemetry is supported on M3/L3 and Flow Telemetry on M3/L3 with APIC Service Engine.

Q **Do we have any information on what different metrics are collected by Network Insights depending on the Cisco Nexus model? For example, what's the information that a Cisco Nexus 9300-FX can get that an EX cannot? Or what's the difference between FX and FX2?**

A You can get control-plane information using software telemetry and flows or ASIC counters using hardware telemetry. Network Insights will collect this data, store it in a time series database, and correlate it to give users a lot more relevant data compared to the raw data from the switches – that's the power of Network Insights.

There are two applications: Network Insights for Resources (NIR) and Network Insights Advisor (NIA).

Software telemetry for NIR is supported on all Cisco Nexus platforms except the 5000 and 6000 series.

Hardware telemetry for NIR (FT, FTE, and SSX are sources of hardware telemetry for NIR).

The tables below list the capabilities per platform:

Cisco Nexus platform	Distributed Media Engine (DME)	NX-API	Release
Cisco Nexus 3000 Series Switches with 8GB+ DRAM	✓	✓	7.0(3)I7(1)
Cisco Nexus 9200 Platform Switches/Cisco Nexus 9300 Series Switches	✓	✓	7.0(3)I5(1)
Cisco Nexus 9500 Series Switches	✓	✓	7.0(3)I5(1)
Cisco Nexus 5000 Series Switches/Cisco Nexus 5500 Series NX-OS/Cisco Nexus 6000 Series Switches	✗	✗	N/A
Cisco Nexus 7000 Series Switches/Cisco Nexus 7700 18-Slot Switch	✗	✓	8.3(1)

Platform	Flow Telemetry	FTE	SSX
Cisco Nexus 9300-EX Series Switches/Cisco Nexus 9500-EX Series Switches	✓	✗	✗
Cisco Nexus 9300-FX Series Switches/Cisco Nexus 9500-FX Series Switch	✓	✓	✗
Cisco Nexus 9364C Switch	✗	✗	✓
Cisco Nexus 9300-FX2 Series Switches/Cisco Nexus 9500-FX2 Series Switches	✓	✓	✓

Q **Is there an evaluation version of the NIR application?**
A Yes, the NIR application is available in try-and-buy mode. Download the NIR application from the ACI App Center: <http://dcappcewwter.cisco.com/>

Q **Can the NIR application use remote storage?**
A Remote storage is currently not supported but is a road-map item.

Q **Is there any latency tolerance range between the NIR application and APIC software when the NIR application is hosted on the separate Cisco ACI Services Engine cluster?**
A The maximum supported latency is 500 milliseconds round-trip time (RTT).

Q **Are there any reachability requirements to meet between the NIR application and the APIC when the NIR application is hosted on the separate Cisco ACI Services Engine cluster?**
A The NIR application needs reachability to the APIC.

Q **To what do the switches export Flow Telemetry data?**
A Flow Telemetry data is exported to the NIR application.

Q **How frequently is the data exported?**
A The export interval is fixed at 1 sec and is not configurable.

Q **Is the Flow Telemetry data exported on infra VLAN?**
A No, it is exported on Inband End Point Group.

Q **For latency monitoring, what is the recommended clock source for reference?**
A The clock source is Precision Time Protocol (PTP); this is a mandatory configuration requirement.

Q **What is the typical amount of data generated by a single leaf per day for Event Analytics?**
A The typical amount is approximately 600 MB.

Q **What is the typical amount of data generated by Flow Analytics while monitoring 10,000 flows for a period of 24 hours?**
A The typical amount is approximately 1.2 TB.

Q **What is supported with respect to hardware telemetry for Cisco ACI and Cisco NX-OS?**
A Flow Telemetry is supported across Cisco Nexus 9000 EX/FX/FX2/GX platforms on both ACI and NX-OS.