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# Cisco Network Assurance Engine

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The Cisco® Network Assurance Engine solution provides continuous verification and analysis of the entire data center network, giving operators confidence that their network is operating consistently with their intent. It combines mathematically accurate network models with codified Cisco domain knowledge to generate “smart events” that pinpoint deviations from intent and offer recommendations for remediation.

Using comprehensive analysis spanning operator intent, controller policy, switch configurations, and data-plane state, Cisco Network Assurance Engine (NAE) helps operators proactively detect network outages and security policy vulnerabilities before they impact business, reduces risk by predicting change impact, and rapidly determines the root cause of problems. With a unified network repository and compliance rules, Network Assurance Engine simplifies audits and ensures compliance.

## Solution overview

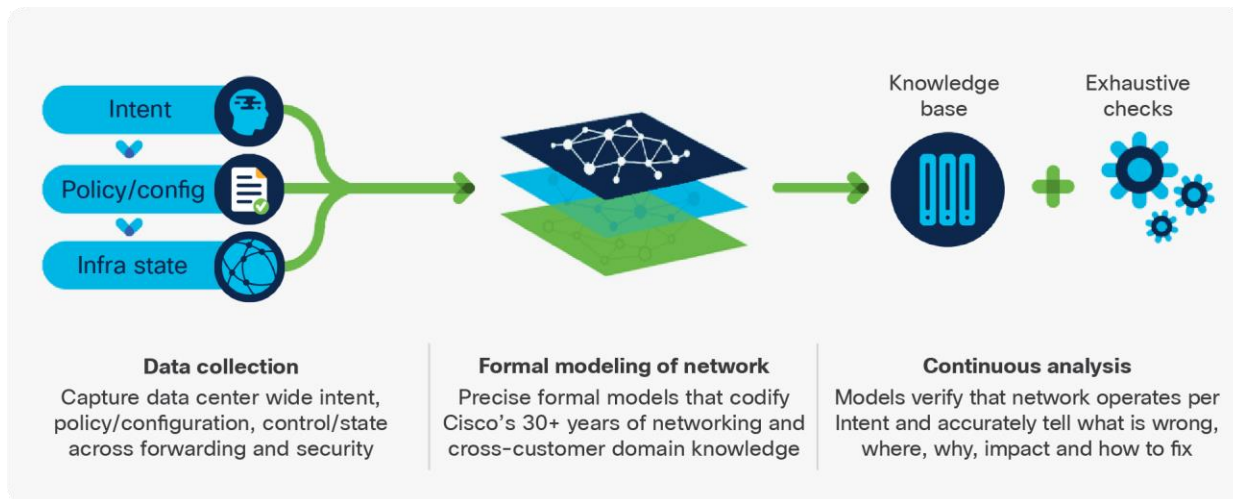
Cisco Network Assurance Engine is the critical intent-assurance pillar of Cisco’s vision for intent-based data center networks. Built on Cisco’s patented network verification technology, Network Assurance Engine is a comprehensive intent-assurance solution that mathematically verifies the entire data center network for correctness. It gives operators the confidence that their network is always operating consistently with their intent, even as it changes dynamically.

With Cisco Network Assurance Engine, operators can:

- **Predict the impact of changes:** Proactively verify changes for correctness to drive increased change agility while significantly reducing risk of human error-induced network failures.
- **Verify network wide behavior:** Continuously analyze and verify the dynamic state of the network against intent and policy to ensure connectivity and eliminate potential network outages and vulnerabilities before any business impact occurs.
- **Ensure network security policy and compliance:** Ensure network security policies and check for compliance against business rules to reduce security risk and achieve provable continuous compliance by policy and state.

Cisco Network Assurance Engine achieves all of the above by reading the entire policy—every configuration, the network wide state, and the operator’s intent—and building from these comprehensive and mathematically accurate models of network behavior. It then combines these models with more than 30 years of Cisco’s operational domain knowledge of networking to generate smart events that instantly pinpoint any deviations from intended behavior and suggest expert-level recommendations for remediation. By providing this continuous verification and validation of the entire data center network, Cisco Network Assurance Engine fundamentally transforms the operations paradigm from reactive to proactive (see Figure 1).

The Cisco Network Assurance Engine for the data center is supported on Cisco Application Centric Infrastructure (Cisco ACI®) and Cisco Data Center Network Manager (DCNM) for NX-OS-based deployments.



**Figure 1.**  
Cisco Network Assurance Engine: how it works

## Cisco Network Assurance Engine innovation

As the industry's most comprehensive intent-assurance suite, Cisco Network Assurance Engine ushers in an operational paradigm that promises to bring to networking the advantages of verification-driven, agile, proactive change management for network operations. Network Assurance Engine brings together unique capabilities, including:

- **Most complete vision for intent-based networks in the industry:** Architected from the ground up for seamless integration with the Cisco Application Centric Infrastructure (Cisco ACI) and NX-OS platform, delivering on the vision of intent-based networks for data centers.
- **Codified Cisco domain knowledge:** Built-in failure scenarios accurately pinpointing and powering smart events with steps for remediation.
- **Deep policy controller integration:** Ensures controller policy and configurations, correlating with dynamic network state.
- **Comprehensive analysis:** Captures, analyzes, and correlates the entire network state—including switch configurations and the hardware data-plane state.

## Features and benefits

**Table 1.** Cisco Network Assurance Engine Release 5.1: features and benefits

Feature	Benefits
<b>Multi-fabric</b>	Provide assurance for multi-tier Cisco ACI fabric and investment protection
<b>Global search</b>	Provide advanced search capability for events across the timeline
<b>Event lifecycle</b>	Discover the root cause of an event through its lifecycle
<b>Change management</b>	One-stop shop for information about the assurance on policy and config analysis changes.
<b>Explorer</b>	Explore associations and connectivity and understand the state of network deployment using powerful natural-language querying
<b>Communication compliance</b>	Ensure regulatory and business communication meets compliance at all times
<b>Configuration compliance</b>	Ensure that naming and golden template configurations meet IT requirements for enhanced productivity
<b>Pre-change analysis</b>	Predict the impact of the intended configuration changes to drive insight-driven change management
<b>TCAM utilization</b>	Manage TCAM capacity resources and security policy with advanced utilization analysis
<b>Event suppression</b>	Tailor results to displaying relevant events in an uncluttered dashboard
<b>Custom next steps</b>	Customized remediation actions; eliminates the need for run books for remediation issues
<b>Epoch Delta Health Analysis</b>	Comprehensive view of health drift between any two epochs, minimizing the change window
<b>Epoch Delta Policy/Config Analysis</b>	Comprehensive view of policy/config drift between any two epochs, minimizing troubleshooting time
<b>Load-balancer integration</b>	Ensures the configuration across Cisco ACI and load balancer, enabling high availability
<b>Cisco Multi-Site Orchestrator (MSO)</b>	Ensures site-to-site connectivity; provides an aggregated view across sites
<b>Topology</b>	Supports all Cisco ACI remote-leaf, Layer 3 EVPN, and multi-tier architectures

**Table 2.** Feature compatibility matrix

Feature	Cisco ACI	Cisco DCNM/NX-OS
Multi-fabric	Yes	No
Global search	Yes	Yes
Event lifecycle	Yes	Yes
Change management	Yes	Yes
Explorer	Yes	Yes
Communication compliance	Yes	No
Configuration compliance	Yes	No
Pre-change analysis	Yes	No
TCAM utilization	Yes	No
Event suppression	Yes	Yes
Custom next steps	Yes	Yes
Epoch Delta Health Analysis	Yes	Yes
Epoch Delta Policy/Config Analysis	Yes	Yes
Load-balancer integration	Yes	No
Cisco Multi-Site Orchestrator	Yes	No
Topology	Closed loop	VXLAN BGP EVPN

## Hardware platform support

### Cisco APIC software version support for Cisco Network Assurance Engine 5.1

**Table 3.** Cisco APIC software version and switch model compatibility

Cisco Nexus® 9000 Series Switch support	Cisco Nexus® 9000 Series Switch support
<b>All releases from Cisco APIC 3.2 through Cisco APIC 5.1</b>	N9K-M12PQ
	N9K-C9396PX
	N9K-M6PQ-E
	N9K-M6PQ
	N9K-C93128TX
	N9K-C9396TX
	N9K-C9372PX
	N9K-C9372TX
	N9K-C9332PQ
	N9K-C9372PX-E
	N9K-C93120TX
	N9K-C9372TX-E
	N9K-C93180YC-EX
	N9K-93180YC-EX
	N9K-C93108TC-EX
	N9K-C93180LC-EX
	N9K-C93108TC-FX
	N9K-C93108YC-FX
	N9K-C93180YC-FX
	N9K-C9348GC-FXP
	N9K-C9358GY-FXP
	N9K-C9336C-FX
	N9K-C9336C-FX2
	N9K-C93216TC-FX2
	N9K-C93240YC-FX2
	N9K-C93360YC-FX2
	N9K-C9316D-GX
	N9K-C93600CD-GX
	N9K-C9364C-GX
	N9K-X9716D-GX
	N9K-C9504-FM-G
	N9K-C9508-FM-G

## Cisco NX-OS fabric compatibility information with DCNM assurance group

**Table 4.** Cisco NX-OS fabric compatibility information with DCNM assurance group

Cisco DCNM release	NX-OS release	Cisco Nexus 9000 Series Switch support	Topology and deployment
<ul style="list-style-type: none"><li>• 11.4(1)</li><li>• 11.3(1)</li></ul>	<ul style="list-style-type: none"><li>• 9.3(5)</li><li>• 9.3(3)</li></ul>	The Cisco Nexus 9300-EX, -FX, -FX2, and -GX platform switches and the Cisco Nexus 9500 platform switches with -EX and -FX line cards are supported.	BGP eVPN VXLAN topology and deployments are supported.

## Deployment model

The Cisco Network Assurance Engine can be deployed as:

- A software-only virtual form factor that runs on three virtual machines, with specifications depending on the scale of the customer's fabric. The product is nonintrusive, requiring only fabric credentials without the need to deploy any sensors. The product typically takes less than one hour to deploy, install, and deliver detailed analysis results for the fabric.
- An application on the Cisco Nexus Dashboard that can be downloaded from the [Cisco DC App Center](#).

The Cisco Network Assurance Engine Release 5.1 application requires Cisco Nexus Dashboard Release 2.0.

## Cisco Network Assurance Engine licensing model

- Cisco Network Assurance Engine licenses are included as part of the Cisco Data Center Networking (DCN) Premier license.
- For customers who have a Cisco Data Center Network (DCN) Essentials or Advantage license, customers can acquire Cisco Network Assurance Engine licenses through a Day 2 Operations (Day2Ops) bundle.
- Cisco Network Assurance Engine licenses are available in subscription mode only.
- For Cisco ACI environments, the number of device licenses required is equal to the sum of the leafs. The spine switches do not require a device license.
- For a Cisco NX-OS/DCNM environment, licenses are required for all the devices. The number of add-on device licenses required is equal to the sum of the leafs, fixed spines, and/or modular spines.
- To learn more about Cisco ACI Smart Licensing, click [here](#). For a more detailed overview on Cisco Licensing, go to [cisco.com/go/licensingguide](https://cisco.com/go/licensingguide)
- Contact your Cisco account team to learn pricing and additional details.



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## Cisco Services for Network Assurance Engine

Accelerate implementation and adoption, gain network insight, speed remediation, and reduce risk with Cisco implementation service and solution support for Cisco Network Assurance Engine. Through knowledge sharing and experienced guidance, network operators can realize the full benefits of their product investment. Cisco Services experts focus on quick installation, discovery of the most important network and configuration smart events, and analysis of top vulnerabilities, and then provide strategic recommendations for remediation. By leveraging unique insights and expertise gained from many Cisco ACI deployments, Cisco Services can help identify and analyze the real impact of Cisco Network Assurance Engine to enhance and ensure data center reliability.

## Cisco General Terms

Cisco Network Assurance Engine is subject to the Cisco General Terms (see <https://www.cisco.com/go/eula>) and Cisco Supplemental General Terms (see [https://www.cisco.com/c/dam/en\\_us/about/doing\\_business/legal/seula/dcs\\_cisco\\_network\\_assurance\\_engine.pdf](https://www.cisco.com/c/dam/en_us/about/doing_business/legal/seula/dcs_cisco_network_assurance_engine.pdf)).

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Cisco [Network Assurance Engine](#)

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