IBN and Cisco DNA Center

NEXT

Video – Intent-Based Networking

You have learned of the many tools and software that can help you automate your network. Intent-Based Networking (IBN) and Cisco Digital Network Architecture (DNA) Center can take you one step in all together to create an automated network.

Click Play in the figure to view a video by Cisco's John Apostolopoulos and Anand Oswal explaining how artificial intelligence and intent-based networking (IBN) can improve networks.

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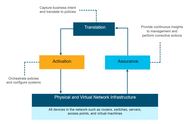
Intent-Based Networking Overview

IBN is the emerging industry model for the next generation of networking. IBN builds on Software Defined Networking (SDN), transforming a hardware centric and manual approach to designing and operating networks to one that is software centric and fully automated.

Business objectives for the network are expressed as intent. IBN captures business intent and uses analytics, machine learning, and automation to align the network continuously and dynamically as business needs change.

IBN captures and translates business intent into network policies that can be automated and applied consistently across the network.

Cisco views IBN as being three essential functions: translation, activation, and assurance. These functions interact with the underlying physical and virtual infrastructure, as shown in the figure.



- **Translation** – The translation function enables the network administrator to express the expected networking behavior that will best support the business intent.
- **Activation** – The automated intent then translates into a set of instructions that can be applied across the network. The activation function breaks those policies into the physical and virtual network infrastructure using networkwide automation.
- **Assurance** – Once the intent is translated, the expressed intent is monitored by the network at any point in time. The assurance function maintains a continuous validation and verification loop.

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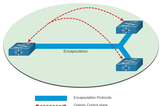
Network Infrastructure as Fabric

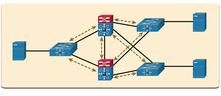
From the perspective of IBN, the physical and virtual network infrastructure is a fabric. Fabric is a term used to describe an overlay that implements the logical topology used to virtually connect to devices, as shown in the figure. The underlay fabric includes the devices that provide the underlay administrative level program. It also provides services and alternative forwarding methods not controlled by the underlying physical devices. For example, the overlay is where encapsulation protocols like IP security (IPsec) are applied to packets to provide secure communication. The underlay is responsible for the physical forwarding of packets specifically through particle exactly what happens in the overlay control plane. Notice that has the underlay are physically connected to and a concept of the overlay.

Example Overlay Network



The underlay network is the physical topology that includes all hardware required to meet business objectives. The underlay includes additional devices and specifies how these devices are connected, as shown in the figure. End points, such as the sensor in the figure, access the network through the Layer 2 devices. The underlay control plane is responsible for physical forwarding tasks.

Example Underlay Network



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Cisco Digital Network Architecture (DNA)

Cisco implements the IBN fabric using Cisco DNA. As displayed in the figure, the business intent is securely deployed into the network infrastructure (the fabric). Cisco DNA Center provides a single pane of glass (single interface) that focuses on automation, analytics, and assurance. Network information can then be analyzed to make sure the network is performing accurate, at its optimal level and is actively performing business and network policies.

Cisco DNA Continuous Implementation of Business Intent

Cisco DNA is a system that is constantly learning, adapting to support the business needs. The table lists some Cisco DNA products and solutions.

Cisco DNA Solution	Description	Benefits
SD-Access	• Fast policy based enterprise networking solution built using Cisco DNA • It uses a single network fabric across LAN and WLAN to provide a consistent user and device experience • It automates user devices, and application traffic and automates user access policies to establish the right policy for any user or device, with any application, across a network.	Enables network access in minutes for any user or device to any application without compromising security.
SD-WAN	• It uses a secure cloud-delivered architecture to centrally manage WAN connections • It simplifies and accelerates branch services, bands and rich WAN services to connect data centers, branches, campuses, and cloudlike facilities.	• Delivers better user experiences for applications residing on premises or in the cloud • Achieve greater agility and cost savings through easier deployments and transport independence.
Cisco DNA Assurance	• Uses to troubleshoot and increase IT productivity • It uses machine learning and analytics to provide 3 to 5 times performance and issue resolution, and predict to secure network performance. • It provides a single dashboard for network conditions that require attention.	• Allows you to identify root causes and promptly suggested remediation to resolve issues quickly The Cisco DNA Center provides an easy to use single dashboard with insights and drill-down capabilities. • Uses machine learning and artificial network intelligence to predict problems before they occur.
Cisco DNA Security	• Used to provide visibility by using the network as a sensor for real time analysis and intelligence. • Automation and analytics are used to enforce policy and contain threats across the network.	• Reduce risk and protect your organization against threats – even in encrypted traffic • Gain 360 degree visibility through real-time analytics for deep insight into network traffic • Lower complexity with end to end security.

These solutions are not mutually exclusive. For example, all four solutions could be deployed by an organization.

Many of these solutions are implemented using the Cisco DNA Center which provides a software dashboard for managing an enterprise network.

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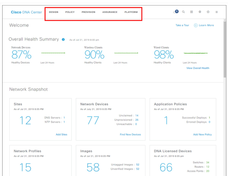
Cisco DNA Center

Cisco DNA Center is the foundational controller and analytics platform at the heart of Cisco DNA. It supports the expression of intent for multiple use cases, including basic automation capabilities, fabric provisioning, and policy-based segmentation in the enterprise network. Cisco DNA Center is a network management and command application that runs northbound APIs to simplify hardware and software platform providing a single pane of glass (single interface) that focuses on automation, analytics, and assurance.

The DNA Center network topology page gives you an overall health summary and network snapshot, as shown in the figure. From here, the network administrator can quickly drill down into areas of interest.



At the top, menus provide you access to DNA Center's five main areas, as shown in the figure, these are:

- **Design** – Model your entire network, from sites and buildings to devices and links, both physical and virtual, across campus, branch, WAN and cloud.
- **Policy** – Define business intent for your network, such as which groups of users and devices can access which parts of the network, and how they are managed.
- **Provision** – Provisions new services to automatically deploy across your network. Configure, test, and deploy network profiles and images, and complete.
- **Assurance** – Use proactive monitoring and insights from the network, devices, and applications to predict problems faster and ensure that policy and configuration changes are delivering the intended business outcomes for your organization.
- **Platform** – Open APIs to integrate with your preferred IT systems to create end-to-end solutions and add support for multi-vendor devices.

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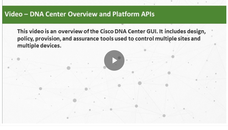
Video – DNA Center Overview and Platform APIs

This is Part One of a four-part series demonstrating the Cisco DNA Center.

Part One is an overview of the Cisco DNA Center GUI. It includes design, policy, provision, and assurance tools used to control multiple sites and multiple devices.

Click Play in the figure to view the video.



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Video – DNA Center Design and Provision

This is Part Two of a four-part series demonstrating the Cisco DNA Center.

Part Two is an overview of the Cisco DNA Center design and provision areas.

Click Play in the figure to view the video.

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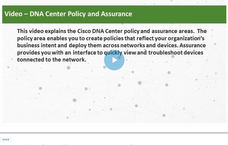
Video – DNA Center Policy and Assurance

This is Part Three of a four-part series demonstrating the Cisco DNA Center.

Part Three explains the Cisco DNA Center policy and assurance areas.

Click Play in the figure to view the video.



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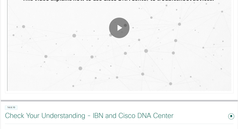
Video – DNA Center Troubleshooting User Connectivity

This is Part Four of a four-part series demonstrating the Cisco DNA Center.

Part Four explains how to use Cisco DNA Center to troubleshoot devices.

Click Play in the figure to view the video.



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Check Your Understanding – IBN and Cisco DNA Center

Check your understanding of IBN and Cisco DNA Center by choosing the BEST answer to the following questions.

1. Which IBN feature is responsible for continuous validation and verification that the network is meeting the expressed intent?
   - Translation
   - Activation
   - Assurance
   - Network Infrastructure
2. Which IBN feature enables the network administrator to express the expected networking behavior that will best support the business intent?
   - Translation
   - Activation
   - Assurance
   - Network Infrastructure
3. Which IBN feature breaks policies that capture intent into the physical and virtual network infrastructure using orchestration automation?
   - Translation
   - Activation
   - Assurance
   - Network Infrastructure
4. True or False: The underlay limits the number of devices the network administrator must program. It also provides services and alternative forwarding methods not controlled by the underlying physical devices.
   - True
   - False

Check

Show Me

Reset