

Cisco Application Policy Infrastructure Controller - Enterprise Module - Release 2.0

As part of Cisco's Digital Network Architecture (DNA), Cisco Application Policy Infrastructure Controller - Enterprise Module (APIC-EM) powers the deployment and management of the next generation digital ready network. DNA Center is the centralized management application available on APIC-EM and it works seamlessly with Network Data Platform (NDP) for analytics and assurance functions, and Identity Services Engine (ISE) for access control and access policy enforcement.

Product overview

The Cisco® Application Policy Infrastructure Controller - Enterprise Module (APIC-EM) is a Software-Defined Networking (SDN) controller for enterprise networks in the campus, branch and the WAN. It delivers an elastic platform for policy-based automation that simplifies and abstracts the network complexities. APIC-EM enables transformation of business intent to network control.

The platform is built to host multiple, easy-to-use SDN applications that use open, northbound Representational State Transfer (REST) APIs and drive network automation solutions. The platform also supports a number of southbound protocols that enable it to communicate with the breadth of network devices customers already have in place, thus extending the SDN benefits to both greenfield and brownfield environments, right from the start. SDN applications built on top of APIC-EM will dramatically lower operational expenditures and increase network agility to align with business needs.

The APIC-EM platform supports both wired and wireless enterprise networks across the Wide Area Network (WAN), campus and branch. It offers superior investment protection, and works with both existing and new infrastructure.

APIC-EM platform delivers many significant benefits, such as:

- Enable an intelligent, open, programmable network with open APIs
- Save time, resources, and costs through advanced automation services
- Transform business-intent policies into dynamic network configuration
- Provide a single point for network-wide automation and control

Table 1 describes the features and benefits of Cisco APIC-EM 2.0 release. The DNA Center application which runs on top of APIC-EM, is the common user interface for design, provisioning, policy automation and assurance across switching, routing and wireless devices.

Table 1. Cisco APIC-EM features and benefits

Feature	Description and Benefits
Network Discovery	Scans the devices and hosts in your network to build a centralized Inventory database. The Discovery function uses the following protocols and methods to retrieve device information, such as IP addresses, neighboring devices and hosts connected to the device: <ul style="list-style-type: none"> • Cisco Discovery Protocol (CDP) • Link Layer Discovery Protocol (LLDP) for end points • IP Device Tracking (IPDT) and Address Resolution Protocol (ARP) entries for host discovery • LLDP Media Endpoint Discovery (LLDP-MED) for discovering IP phones and some servers • Simple Network Management Protocol Version 2 and 3 (SNMPv2c, SNMPv3)
Network Information Database (NIDB)	Periodically scans the network to create a “single source of truth” for IT to build network inventory. This inventory includes all network devices, along with an abstraction for the entire enterprise network. The NIDB allows applications to be device-independent, so configuration differences between devices aren’t a problem.
Network Hierarchy	Allows you to manage your network in a hierarchical fashion by letting you add Areas and Buildings on a geospatial map. You can start by defining your Sites, then add Buildings to sites, and finally add floors with detailed floor plans to the building.
Network Topology Visualization	Auto-discovers and maps network devices to a physical topology with detailed device-level data. With its auto-visualization feature, it presents a highly interactive mechanism for viewing and troubleshooting the network. You can navigate across your Network Hierarchy, from site to physical layouts to floor plans, and can also customize the GUI to view logical layouts based on Policies and Layer 2 or Layer 3 protocol information.
Configuration Archive	Maintains an active archive of the start up and running configurations for all the devices that are managed in APIC-EM. These archives can be accessed through the APIs exposed by the APIC-EM controller.
Software Image and Patch Management	An easy to way to build a central repository of software images and Software Maintenance Updates (SMUs), and to apply it on to devices. Golden Image and Patch can be defined for a device family. It lets administrators to upgrade devices to the Software Image and Patch versions that are in compliance with golden versions defined in the repository.
Policy Management	Provides an ability to define business intent through Access policies. Access policy is defined as a set of rules governing the interaction of one or more endpoints with other endpoints through the network.
Role Based Access Control (RBAC)	Allows users to be mapped to one of the four predefined roles. Role determines what type of operations a user can perform within the system.
Public Key Infrastructure (PKI) certificate	The PKI service provides an integrated authentication server for automated key management. It automates the lifecycle management of issuing, renewing, and revoking the PKI X.509 certificate for apps that are built on top of APIC-EM. This service greatly simplifies the process of establishing and maintaining trust in the network.
Programmability	Full-fledged Representational State Transfer APIs (REST APIs) at the North-bound layer for programmability.
Backup and restore	Supports complete backup and restore of the entire database for added protection.
Cisco Identity Services Engine (ISE) Integration	Integrates with ISE through PxGrid for fabric overlay support.
3rd Party application support	Integrates with Infoblox to allow applications built on top of the platform to leverage IP Address Management capabilities from Infoblox.

Platform support

Cisco APIC-EM provides coverage for the Cisco enterprise switching, routing, and mobility products that are part of Software Defined Access portfolio. Refer to Table 2 for more details.

Table 2. Platforms that APIC-EM supports in general release 2.0

Device Type	Device Series
Switches	Catalyst 3650 Series Switches
	Catalyst 3850 Series Switches
	Catalyst 4500 Series Switches (Sup8E/9E)
	Catalyst 6800 Series Switches (C6840-X with Sup2T/6T, C6880-X with Sup2T/6T)
	Catalyst 9000 Series Switches (C9300, C9400 with Sup1E, C9500)

Device Type	Device Series
Routers	Cisco Nexus 7000 Series Switches (Nexus 7700 with Sup2E)
	ISR 4000 Series Integrated Services Routers (ISR 4430, ISR 4450)
	ASR 1000 Series Aggregated Services Routers (ASR 1000 X, ASR 1000 HX)
Wireless	Cisco 8540 Wireless Controller
	Cisco 5520 Wireless Controller
	Cisco 3504 Wireless Controller

Application Programming Interfaces (API)

APIC-EM supports both northbound and southbound APIs.

The northbound APIs are REST-based and can enable applications to discover and control your network elements using the HTTPs protocol with HTTPs verbs (for example, GET, POST, PUT, and DELETE) with JavaScript Object Notation (JSON) syntax. It is function-rich, highly secure, and can provide you with easy-to-use, programmatic control of your network elements, interfaces, and hosts.

For more information about available northbound APIs, refer to controller documentation or the [API Reference](#) under the APIC-EM section on DevNet.

The southbound interface speaks to network elements using Command-Line Interface (CLI), NetConf and Simple Network Management Protocol (SNMP). The use of CLI and SNMP can ensure that APIC-EM works with your existing Cisco products. APIC-EM takes advantage of other southbound technologies, like NetConf for the newer devices, as they are implemented.

System requirements

APIC-EM platform and DNA Center application comes pre-installed on a hardware appliance with the following specifications:

- CPU (cores): 44
- CPU speed: 2.4 GHz
- RAM: 256 GB (Single Node)
- Storage: 3.8 TB

Licensing and ordering

APIC-EM is available as part of the Cisco ONE DNA Essentials and DNA Advantage software licenses. Please refer to the following link for details: <http://www.cisco.com/go/one>.

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For more information

To learn more about the Cisco APIC-EM, visit: <http://www.cisco.com/go/apicem>.



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