

# Cisco APIC Enterprise Module Q&A

## (For External Audiences)

### APIC (Application Policy Infrastructure Controller) EM (Enterprise Module)

#### 1. APIC EM Definition

- **What is the Cisco APIC Enterprise Module (APIC EM)?**
  - APIC-EM is a policy based, hybrid, SDN controller for branch and access enterprise networks based on Cisco Routers and Switches.
- **How is the Cisco APIC Enterprise Module related to the Cisco ONE Enterprise Networks Architecture (ENA)?**
  - APIC-EM is a component of ENA that provides network element control and policy enforcement.
- **Is the Cisco APIC Enterprise Module a hardware device or software application?**
  - APIC-EM will be offered in a number of different packaging options
- **What equipment is required to install the Cisco APIC Enterprise Module – are there any special specs?**
  - APIC-EM operates as a VM and only requires compute, storage and memory conventionally available on a wide array of server products, including, Cisco UCS.
- **Is APIC-EM part of the Enterprise Networks? How is EN different from Borderless Networks (BN)?**
  - Yes, APIC-EM is part of the Enterprise Networks (EN) and provides the abstraction and open interface to control the network infrastructure. BN began the architectural approach by focusing on the integration between routing, switching and wireless platforms. EN expands on that work by moving towards open API, programmability and simplified networks. APIC-EM enhances Cisco's Unified Access by enabling the same policies to control wired and wireless networks.

#### 2. SDN, ACI, Cisco ONE and APIC: APIC for DC and APIC-EM

- **What is ACI? What is Cisco ONE and how are they related to APIC?**
  - ACI stands for Application Centric Infrastructure, which is Cisco's approach to creating network infrastructure for applications. Going beyond SDN, ACI provides network infrastructure that is optimized for applications through automated provisioning of network, compute and storage for applications. And finally, APIC is a family of controllers that automates the provisioning of the network, compute and storage across the end-to-end infrastructure, from DC to WAN and Access.
- **How is the Cisco APIC Enterprise Module different from the Cisco APIC?**
  - APIC-EM focuses on supplying user centric policy control across a broad range of existing Cisco Enterprise products for the branch and campus networks.

- Cisco APIC DC module focuses on providing flow based policy control for the next generation of Cisco data center hardware products.
- **Why does Cisco offer multiple controllers, instead of just a combined controller?**
  - ACI represents a common information model for APIC and APIC-EM. This provides a one policy model that can traverse all network domains. APIC focuses on workflow policy related aspects of the ACI and APIC EM focuses on user policy related aspects of ACI.
- **How will the APIC DC module work together with the APIC-EM?**
  - While each module will implement a network policy in the domain they work in, ACI will provide a common policy information model supported by northbound APIs for APIC and APIC-EM (via one DevKit) which will provide “write-once” functionality, allowing common applications to be deployed for both the Data Centre, Campus and WAN. For example, a common QoS application for a particular business application could be deployed with APIC enforcing the QoS policy in the data center with the DC module and doing the same for the WAN and Campus domains with the Enterprise Module.
- **What is the difference between XNC and APIC?**
  - APIC-EM supports network infrastructure, like, ISR, ASR, Catalyst and WLC deployed in branch and campus and WAN networks, whereas, XNC currently support Nexus Switches via Open-Flow. APIC DC module supports Nexus 9K family of switches deployed with ACI Fabric architecture. XNC currently supports 4 applications, including, Monitor Manager, Topology Independent Forwarding, Slicing and Virtual Patch Panel.
- **For large enterprise; how should we position Cariden vs APIC-EM?**
  - Cariden is for WAN provisioning of services whereas APIC Enterprise Module can be positioned for branch and campus configuration and automation. Good complementary functionality.

### 3. OpenDaylight and APIC-EM

- **How is the APIC-EM related to the open source OpenDaylight Controller (ODL)?**
  - The ODL controller is a basic functionality SDN controller distributed by The Linux Foundation. Two of the most important industry standards offered via OD are REST APIs as a format for northbound controller interfaces and the Service Abstraction Layer (SAL) for southbound controller interfaces. APIC EM supports both these standards.
- **What additional features does APIC EM offer that are not in the OpenDaylight Controller?**
  - ODL controllers have primarily focused on workflow control features (or services) for data center applications. APIC-EM focuses on user policy management for access and WAN. As such APIC-EM contains services that do not exist in ODL today. User identity and awareness, applications awareness, and ACI policy conversion and conflict resolution are examples.

## 4. APIC-EM Applications

- **What applications will be supported in the first release of APIC-EM**
  - Release 1.0 of APIC-EM will be shipped with an ACL inspection and interrogation application and QoS classification application.
- **Is the policy applied to a particular interface or to all the interfaces in the device?**
  - If the policy is defined by giving the user identity or the IP address of the host, then the policy will be attached to the interface on which this host is connected. If in the user information (identity or host IP) is not specified, then, the policy will be attached to all the interfaces which have hosts attached on them within the defined policy scope (tagging domain).
- **Is the policy applied to a particular device, group of devices or to all the devices?**
  - Administrator has the granularity to apply the policy to a single device, group or all the devices. This can be achieved by grouping the devices by tagging them with the same name and at the time of applying the policy this group can be selected.
- **If there are multiple applications in the network managing the policy then which will take precedence?**
  - Here, the recommendation would be for a Management Application to take advantage of APIC-EM to provide the normalization of various requests. If the management applications are not going through APIC-EM, then, it is up to the Network device to take input from multiple applications and apply the policy based on its granularity, accuracy and time at which it is submitted.

## 5. APIC EM APIs

- **What types of south-bound APIs does the Cisco APIC-EM support to interact with networking devices such as routers, switches and mobility infrastructure?**
  - APIC-EM will support the model driven by ODL SAL framework so that many device types can be supported via a plug and play method. For release 1.0 APIC-EM will support only a CLI southbound interface. Beyond release 1.0 APIC-EM will support an array of MD SAL compatible interfaces, including, OpenFlow and OnePK.
- **Do networking devices (routers, switches) need to support OpenFlow in order to work with the Cisco APIC Enterprise Module?**
  - No., only CLI is required for the targeted Release 1.0 use cases. APIC-EM also supports wide range of Cisco image versions across an array of platforms. APIC-EM enables applications to standardize on a common set of northbound APIs to request network control changes in order to reduce if not eliminate any CLI differences from platform to platform.
- **What types of north-bound APIs does the Cisco APIC Enterprise Module support to interact with the application layer, such as customer applications, services and policy engines?**

- APIC EM supports the REST API format to interface with an array of applications. It does not support OSGi framework as covered by other ODL based controllers.

## 6. APIC-EM and Cisco Prime and Cisco ISE

- **What is the difference between the APIC-EM and Cisco Identity Services Engine (ISE)?**
  - APIC-EM is considered a system for change. APIC-EM does not create policies or provide historic views of the network for creating policies. Prime is considered a system of record and provides these aspects. . ISE is a source for user identity information that is shared with APIC-EM to facilitate policy enforcement. The advanced policy management technology built into the APIC-EM allows for the dynamic application of various policies to various operational scenarios. ISE can be integrated with APIC-EM using the PxGrid interface.
- **What's the difference between the Cisco APIC Enterprise Module and Cisco Prime Infrastructure?**
  - APIC-EM provides network element management using a centralized control approach facilitated by SDN architecture. Prime provides broad network orchestration, lifecycle management and reporting management capability. While network element management has traditionally been a part of Prime support, the road map is to migrate the Prime network element management requirements to be supported via the APIC-EM. Communication between Prime and APIC-EM will be via the controller's northbound REST APIs. Wireless networking provides an example and blueprint for architecting such solutions.
  - Think of prime as an application on top of APIC-EM. The value of APIC-EM is to provide a single and consistent way to interact with infrastructure. The controller knows intimately the topology; the types of devices and their capabilities. Prime can take advantage of this knowledge to do things it needs to the network. It does not have to spend lots of time on element management. More importantly; with the NB API; other "apps" can interact dynamically with network policy. e.g. Sourcefire; Citrix
- **Since both the Cisco APIC Enterprise Module and Cisco Prime Infrastructure can configure and help troubleshoot my networking devices, what should be my primary tool for network configuration, monitoring and troubleshooting?**
  - The transition from an all Prime to a Prime plus APIC-EM approach will eventually lead to roles for Prime as a primary orchestration and reporting network management focal point, and APIC-EM as the primary network element management focal point. Prime will interact with APIC-EM via the northbound REST APIs for interoperability.
- **How to I coordinate policy and management across APIC modules?**
  - Cisco has developed a common policy management framework for northbound REST APIs across the domain specific modules in order to localize differences to specific services and functions for the specific domains. This also allows

orchestration and reporting tools to take advantage of the framework to embrace and extend its network management.

- **Would the APIC EM have location-based analytics built in? Or should we buy Cisco Mobility Service Engine (MSE) for the location-based analytics?**
  - MSE offers a high degree of location-based analytics. The primary purpose of APIC EM is its network element management and as a facilitator of analytics sourced from other products such as MSE. MSE acts as an input into APIC EM's analytics and the APIC EM can gather raw location data from multiple MSEs and offer business analytics as a service to applications.

## 7. APIC EM Functionality

- **How does APIC EM Scale?**
  - APIC EM uses an innovative new approach for SDN controller by which intelligence is built in that detects and manages service loads transparently. APIC-EM will spin up or down additional instantiations as necessary. APIC-EM operates within a CPU and memory allocation assigned to it at the time of installation or if APIC EM needs more such resources to scale.
- **What is the redundancy (HA: High Availability) model for the APIC EM? How many redundant APIC-EM instances are supported?**
  - The HA strategy is embedded in a broader strategy to provide transparent scalability of the number of instances deployed based on service loads. APIC-EM contains unique technology that will automatically manage this scalability. HA is implemented as part of this new technology.
- **How long does it take the APIC-EM software to update the network after the changes have been made?**
  - Usually on the order of minutes. Larger configurations might take longer, especially with bringing up a new device.
- **How are APIC-EM(s) Updated and Upgraded?**
  - APIC EM supports a connected cloud back end so that updates and upgrades can be sent directly to the controller (proxy will be the likely method). This is similar to how Google updates and upgrades Chrome.

## 8. APIC EM Network Devices

- **What all network devices does APIC-EM support?**
  - All models of Catalyst, ISR and ASRs are supported. In addition, WLC, N7K and CSR1000v will also be supported at FCS.
    1. ISR and ASR: IOS 12.4 or later, IOS-XE 15.1S1 or later.
    2. Catalyst: IOS 12.2(55) or later.
    3. WLC: Both AireOS (5508, 7500, 8500, WiSM) and IOS-XE based (5760) will be supported

4. Nexus 7K
5. CSR1000V

- **Does the APIC-EM support any wifi APs or the WLC built into the Catalyst 3850?**
  - Yes it will but not included in the Release 1.0 deliverables
- **Is there any limit on how many networking devices the Cisco APIC Enterprise Module can interact with at any time?**
  - Architecturally APIC-EM has been built to scale transparently by monitoring services loading and adding or reducing additional VM instantiations as necessary. Release 1.0 will have some scaling limits, as, only the basic scaling architecture elements will be available.
- **Are Cisco ASAs and SourceFire included in supported Network Devices?**
  - One of the use cases (proof of concept) is integration with Sourcefire to drive remediation actions across the EN to devices in an automated way. ASA is not supported at this time.
- **Does APIC EM support multi-vendor (non-Cisco) devices?**
  - With OpenFlow APIC-EM will support multi-vendors who also support OpenFlow. OpenFlow support for APIC-EM is on the roadmap.
- **How does APIC EM auto-detect network devices and learn the topology?**
  - APIC EM uses CDP (Cisco Discovery Protocol) and LLDP (Link Layer Discovery Protocol) to auto-detect network devices and create the real-time topology model.

## 9. APIC EM and IOS Versions

- **What IOS versions does the APIC EM support? Is IOS-XE, NX-OS supported as well?**
  - All IOS and IOS -XE and several versions of each. Please refer to the APIC-EM material for further clarification.
  - For lot of the currently deployed production networks, APIC-EM can be introduced without making any change to the infrastructure.

## 10. APIC EM Applications and 3rd Party Applications

- **Who are the recommended 3rd party application developers that Cisco recommends? Where can we buy applications for the APIC EM?**
  - Cisco supports both an internal network developers and an external network of developers. APIC-EM supports the Cisco Developer Network.
- **Is Cisco EnergyWise Suite an application for the Northbound APIs for APIC EM?**
  - Not prioritized right now but is possible in the near future.

## 11. APIC EM Use-Cases

- **What are the use cases of the Cisco APIC Enterprise Module?**

- APIC-EM is ideal for centralizing the inspection, interrogation, and execution of network control changes across the network when applications need such capabilities to realize high OPEX savings or substantially increase business agility. Network control management enables network administrators to directly or programmatically manages network control functions such as Quality of Service or Access Control List management. Connectivity to business applications also enables application developers to seamlessly request specific network control changes, typically programmatically, so that network control changes dynamically to improve the agility of the application. APIC EM converts these requests (called “intent policies”) into specific network control commands based on the policies placed into the APIC EM by network administrators.

## 12. APIC EM Packaging

- APIC-EM is packaged with all its dependencies in a self-contained Linux Virtual Machine (VM), which, can be deployed on any virtualized compute system.
- With its self-scaling functionality the VM can scale up or down based on real-time network need.
- The APIC-EM starts as soon as the VM boots up and can be accessed via any Web Browser, especially, Chrome.
- APIC-EM is not pre-packaged with a hardware appliance

## 13. APIC EM Pricing, Licensing and Availability

- **When will the APIC EM be available to the field for testing/training?**
  - APIC-EM is available now for Early Field Trials and for field testing/training.
- **How do I purchase the Cisco APIC Enterprise Module?**
  - APIC-EM will be offered as part of an array of options at FCS
- **Is there a free trial version of the Cisco APIC Enterprise Module available and if so, how can I get that free trial version?**
  - An EFT program for APIC-EM is available.
- **What licensing model does the Cisco APIC Enterprise Module have?**
  - Options to license APIC-EM will include software only and hardware bundling.
- **What is the warranty policy of the Cisco APIC Enterprise Module?**
  - 90-day standard warranty.

## 14. APIC EM Getting Started

- **How should I get started, and what should I do with this controller first?**
  - When using APIC-EM for the first time, selection and input of the network elements chosen for APIC-EM management must be entered into the APIC EM NIB. At this point administrator can use a central topology view of the network elements to

perform network control inspection and interrogation, and via applications also make network control changes.

- **Should I start with any particular part of my network?**
  - Yes, routers and switches should be discovered by APIC-EM
- **How are Host devices discovered?**
  - As APIC-EM periodically discovers the network infrastructure devices. From each device it will query the end hosts attached, using, CDP, LLDP and IP Device Tracking Databases.
- **What happens if the host moves?**
  - Since APIC-EM periodically discovers the network it will identify the host has moved and would move any policy associated with it to the new location.
- **Is there a mechanism to group the devices?**
  - Yes, routers and switches can be tagged with a unique name to form groups. Later when the policy is being applied then it can be enforced to this group of devices.

## 15. APIC EM and Cisco Services

- **When should I leverage Cisco Professional Services with the controller vs. what can enterprise customers like me do on my own?**
  - Professional Services are a great way to compliment in-house skills and experience to efficiently adopt SDN into production networks. Cisco Services include assessment and evaluation of SDN application candidates, as well as program planning and execution.