Cisco ONE Enterprise Networks Architecture

**Transform IT, Create Opportunities**

The Cisco® Open Network Environment (ONE) Enterprise Networks Architecture transforms IT through an open, programmable, and application-centric platform. This architecture opens new business opportunities through connected mobile experiences, cloud services, and user-developed applications. It delivers business agility and accelerates deployment of advanced services through superior network programmability designed to protect each customer’s existing network investments.

**Why Do I Need an EN Architecture?**

Enterprises have seen massive change over the last decade, but one thing has remained consistent: the enterprise network. Even as your network devices have become faster, more powerful, and more intelligent, the fundamental architecture of the network — and the way you provision and operate it — has stayed largely the same. Most of today’s networks require device-by-device configuration and provisioning, making it difficult to deploy new applications and integrate cloud services.

Based on Cisco ONE, the ONE Enterprise Networks Architecture delivers programmable, application-centric networks that optimize resources and increase agility of services, accelerate time to market, improve investment protection, and reduce operational risk. It transforms networks, making them more agile, high performing, and application-centric, while making the best use of existing network resources.

Combined with open and standard APIs, this architecture enables a rich ecosystem of third-party applications. With a high degree of programmatic access to your network, you can accelerate the deployment of enterprise services and applications. These capabilities unlock new business opportunities by enabling sophisticated connected mobile experiences (for example, advanced location-based services), diverse cloud services, and user-developed applications, allowing enterprises to respond quickly to new business opportunities.

**Cisco ONE**

Cisco ONE is a comprehensive, Cisco wide solution approach to making networks more open, programmable, and application aware. Cisco ONE is composed of three pillars that provide a programmable approach to both physical and virtual infrastructure:

- **Platform APIs:** Programmatic access to network infrastructure begins with APIs that can access the entire end-to-end network infrastructure. OpenFlow, onePK, RESTful, OSGI, and CLI are examples of such APIs.
- **Controllers and agents:** These provide for the automated provisioning of network services and applications. The controller interacts with agents embedded on network infrastructure elements and enables automated provisioning, orchestration, and access to networkwide analytics.
- **Virtual overlays:** Cisco ONE provides multiple ways of transparently connecting the physical and virtual infrastructure.

**Architecture Detail**

The Cisco ONE Enterprise Networks Architecture is based on Cisco ONE and built from three layers: the Network Element Layer, the Network Control Layer, and the Network Application Layer.

Figure 1 shows the Cisco ONE Enterprise Networks Architecture.

![Cisco ONE Enterprise Networks Architecture](image)

**Network Element Layer**

The Network Element Layer brings together the industry’s most comprehensive portfolio of enterprise routing, switching, wireless, and security devices and software designed to protect customers’ existing network investments. The Network Element Layer’s infrastructure solutions feature programmable Cisco application-specific integrated circuits (ASICs), a service-centric operating system, and open APIs to capture and export real-time network state and intelligence to higher layers of the network architecture, radically simplifying network operations.
The Network Element Layer supports OpenFlow, onePK, and CLI APIs, allowing greenfield and brownfield deployments to take advantage of new applications and services and making sure that the majority of Cisco’s currently deployed network devices will benefit from this architecture.

The Network Element Layer:
• Provides a trusted, scalable, end-to-end network infrastructure using Cisco IOS® Software and programmable Cisco ASICs
• Accelerates innovation and exposes deeper network intelligence with rich network status information
• Supports standards, deep Cisco intelligence, and brownfield deployments through three APIs: OpenFlow, onePK, and CLI

Network Control Layer
The Network Control Layer massively simplifies the provisioning of network services consistently across enterprise network devices. It links network elements with the applications that need to communicate with them and facilitates the exchange of real-time network data to provision network services and policies automatically across all of your network devices.

The Network Control Layer helps you to scale up services and applications more quickly and enables advanced network applications in a simpler and more automated way. The Network Control Layer delivers broad, deep, and rich networkwide analytics across LAN and WAN, wired and wireless, users and applications to accelerate innovation, optimization, and monetization opportunities.

The Network Control Layer:
• Enables a vast ecosystem of third-party applications through the open sourced OpenDaylight-based enterprise controller with standards-based northbound APIs (RESTful, OSGi)
• Provides for rapid deployment across routing, switching, mobility, and security with consistent and simplified end-to-end provisioning
• Accelerates innovation, optimization, and monetization opportunities through networkwide analytics providing rich network information and analytics
• Includes API support with OpenFlow for standards-based interoperability, onePK for deep Cisco intelligence, and CLI

Network Application Layer
The Network Application Layer contains Cisco and third-party applications optimized for network performance, innovation, and user experience across the enterprise network. Whether you use Cisco applications such as Cisco Prime™ or third-party network management applications, the Cisco ONE Enterprise Networks Architecture provides the network intelligence that applications need to efficiently manage and continually optimize the network.

These network-aware applications use APIs to draw on the combined intelligence of Cisco network elements and Network Control Layer orchestration capabilities to communicate and interact with the infrastructure in real time. Applications and services are now deeply aware of network conditions and can securely deliver an optimal user experience while simplifying IT operations.

The Network Application Layer:
• Creates application-centric networks through mutually aware applications and networks
• Enables a rich ecosystem of third-party applications and services that can draw from the intelligence of network elements and Network Control Layer orchestration through open APIs (RESTful, OSGi)
• Promotes innovation through network analytics and real-time infrastructure interaction available to all applications

Why Cisco?
Built with the most comprehensive, best-in-class switching, routing, mobility, and security portfolio, the Cisco ONE Enterprise Networks Architecture is designed to protect each customer’s existing network investments. With this architecture, you gain network visibility, control, and management, along with the security and optimization capabilities necessary to support new levels of performance. By partnering with Cisco, you’ll create an intelligent network that allows you to respond rapidly and enable innovation.

For More Information
For more information about Cisco ONE Enterprise Networks Architecture, visit www.cisco.com/go/enterprise.