Simplify and automate your network with Cisco DNA

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Agenda

- Software-Defined Networking (SDN) Market Drivers
- Cisco® APIC-EM Automate Network Configuration & Setup
- APIC-EM Applications and Demos
- Network Function Virtualization for Enterprise
- Customer Use Cases and Case Studies
- Summary
SDN Market Drivers
Digital Business Demands Operational Agility

“…While other components of IT infrastructure have become more programmable and allow for faster, automated provisioning, installing network circuits is still a painstakingly manual process…”

— Andrew Lerner, Gartner Research

### Network Expenses

<table>
<thead>
<tr>
<th>CAPEX</th>
<th>OPEX</th>
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<tbody>
<tr>
<td>33%</td>
<td>67%</td>
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Source: Forrester

### Deployment Speed

<table>
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<tr>
<th>Seconds</th>
<th>Computing</th>
<th>Networking</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>1000</td>
<td></td>
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</tbody>
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Source: Open Compute Project

80% Time IT spends on operations

57% CEOs are worried about IT strategy not supporting business growth
Cisco Digital Network Architecture

- **Network-enabled Applications**
  - **Cloud Service Management**
    - Policy | Orchestration
  - **Automation**
    - Abstraction and Policy Control from Core to Edge
  - **Analytics**
    - Network Data, Contextual Insights
  - **Virtualization**
    - Physical and Virtual Infrastructure | App Hosting

- **Open and Programmable | Standards-based**

- **Open APIs | Developers Environment**

- **Principles**
  - APIC-EM
  - Enterprise NFV

- **Benefits**
  - Automation and Assurance
  - Security and Compliance
  - Insights and Experiences

- **APIC-EM Enterprise NFV**

- **Cisco Digital Network Architecture**

- **Cloud-enabled | Software-delivered**
APIC-EM
Automate Network Configuration and Setup
Network-Wide Abstractions Simplify the Network

The SDN Ideal: Controller as the Application Platform

Applications
- Orchestration
- Automation
- Collaboration
- Security
- Virtualization

REST API

SOUTHBOUND ABSTRACTION LAYER
- CATALYST®
- CISCO NEXUS®
- ISR
- ASR
- ASA
- WIRELESS
- OTHER
APIC-EM

Resolves declarative business intent
Renders into domain-specific language

Application, User, and Business-Driven Policies

“Only corporate-owned devices in Group:FinExec can access quarterly results DB”

Network-Specific Control

Cisco® ISE + TrustSec + ACL Configuration Commands
Common Policy Model from Branch to Data Center

POLICY

DATA CENTER

Application Network Flow Profile
SLA, Security, QoS, Load Balancing

Cloud
Data Center

WAN AND ACCESS

User and Things Network Profile
QoS, Security, SLA, Device, Location, Role

WAN
Access

CISCO® ADVANTAGE

BROWNFIELD AND GREENFIELD

END TO END

POLICY FRAMEWORK: FOCUS ON APPLICATION AND USER ENABLEMENT
Cisco APIC-EM
Applications
Application Ecosystem Using Open APIs

**CISCO® Applications**
- IWAN
- Path Trace
- PnP
- Easy QoS
- ESA

**Third-Party Applications**
- IBM
- nectar
- ITALTEL
- hyperglance
- CITRIX
- One api

**RESTful APIs**

**153 APIC-EM DevNet Companies**

**20 Average Growth per Month**
APIC-EM Plug-and-Play (PnP) Application
Auto-Discovery of Provisioning Template

IT

New Router
New Switch

PnP Application

NETWORK

BENEFITS

Simple Workflow

Zero-Touch Provisioning

Open Architecture

SDN

Zero-touch Deployment
Shortened Deployment Time

No Onsite Expert Needed

Increased Security
Decreased Chance of Misconfiguration
APIC-EM IWAN Application
Uses Cisco Best Practices and Knowledge for SD-WAN

BENEFITS

Simple Workflow
Zero-Touch Provisioning
Network, Applications Monitoring
Business-Level Policies
Open Architecture

From Weeks to Minutes
Over 1000 CLI Commands Reduced to 10 GUI Clicks

Note: Cisco® IWAN App Release 1 targets less than 500 sites, 2 links per branch with the 4000 Series ISR
APIC-EM Path Trace Application
Accelerate Trouble-Ticket Processing

**BENEFITS**

- Simple Workflow
- Network, Applications Monitoring
- SDN
- Open Architecture

Easy Visual Discovery of Trouble Spots in the Communication Path Based on 5-tuple

OpEx for Ticket Processing Decreased by 84% - from 1.4 hours to Approximately 4 minutes
APIC-EM EasyQoS Application
Accelerate and Automate QoS Deployment Network-Wide

BENEFITS

- Simple Workflow – Select from Predefined Policies
- Fast & Automated Deployment of QoS in 250 ms
- 300% Reduction in Voice Jitter
- 50% Improvement in Video Quality
- Improved Application Experience

“The EasyQoS App reduces deployment times for network-wide QoS dramatically. We can now respond to changing application needs via policy-based automation within minutes or even seconds.”

Edeka Group, German’s largest supermarket company
Network Functions Virtualization for Enterprise
What Enterprise NFV Can Do for You

- Simplify day-to-day operations
- Quickly roll out new services and locations
- Gives you flexible deployment options

Simple and easy to design, provision, and manage the trusted services that are critical to your business
Customized Network Services for Your Network

1. Select your network functions
   - vRouter
   - vFirewall
   - vWAN optimization
   - vWLAN controller
   - Third-party services

2. Select your preferred platform
   - Cisco® ISR, UCS® E-Series
   - Cisco ENCS
   - Cisco® UCS C-Series

3. Orchestrate and automate services
   - APIC-EM with Enterprise Service Automation

IT Agility

Elastic Services
Run on Any Platform
Deploy in Minutes
What is Enterprise NFV?

- Freedom of choice
- Hardware Platform
- Hardware and software independence
- Virtualization Layer
- Consistent, trusted network services across all the platforms
- Virtual Network Functions (VNFs)
- Centralized orchestration and management
- SDN Applications

Cisco Enterprise NFV Architecture

Network services in minutes, on any platform

- ISR 4000 +
- UCS E-Series
- UCS C-Series
- Enterprise Network Compute System

Enterprise Service Automation (ESA) | Network Services Orchestrator (NSO)

Orchestration, Provisioning & Management

VNFs and Apps

Virtualization Layer

Host Platform

Network Functions Virtualization Infrastructure Software (NFVIS)

- Virtual Router (ISRv)
- Virtual Firewall (ASA & NGFWv)
- Virtual WAN Optimization (vWAAS)
- Virtual Wireless LAN Controller (vWLC)
- 3rd Party VNFs

New!
Customer Success Story
Symantec Network Automation Saves Time and Money

“QoS rollouts were once 6-month projects costing over $200,000. With Cisco APIC-EM EasyQoS, we will go from months to minutes with minimal costs.”

Brian McEvoy, Senior Network Engineer, Symantec
DNA Advisor Program
Helping You Navigate Your Digital Transformation Journey
www.cisco.com/go/dnaadvisor

Where Are Your Peers
Get your network ready for digital
IDC Digital Network Readiness and Benefits Survey Research

Where Are You
Map your own network readiness and next steps
Cisco DNA Readiness Advisor Brief On-line Self Assessment

Get Started
Plan your journey
Cisco DNA Readiness Planner Assessment and Report

Cisco Digital Network Readiness Model
5 Stages from Best Effort to Self-Driving
Call To Action: Enterprise SDN Delivers

- **Simplicity**
  - Network-wide abstraction that supports both greenfield and brownfield installations

- **Automation**
  - OpEx reduction through adoption of Cisco® best practices

- **Open Programmability**
  - Open, northbound REST APIs with agnostic southbound interfacing

- **Business Outcomes**
  - Dynamic network that adapts to business intent policy
APIC-EM Delivers IT Flexibility

Enabling Automation Through Innovative Management Principles
What is Enterprise NFV?

Enterprise Service Automation (ESA) | Network Services Orchestrator (NSO)

- Virtual Router (ISRv)
- Virtual Firewall (ASA & NGFW)
- Virtual WAN Optimization (vWAAS)
- Virtual Wireless LAN Controller (vWLC)
- 3rd Party VNFs

Network Functions Virtualization Infrastructure Software (NFVIS)

- ISR 4000 + UCS E-Series
- UCS C-Series
- Enterprise Network Compute System

Orchestration, Provisioning & Management

VNFs and Apps

Virtualization Layer

Host Platform
Automated Orchestration, Management, Policy
Cisco Enterprise Service Service Automation (ESA)

- Zero-touch deployment
- Automated orchestration of platform and VNFs
- Service chaining and licensing

- Create standard profiles for different types of branches
- Cisco® tested and validated designs
- Embedded approval process and versioning

- Health monitoring
- Dynamic scaling of services
- Operational SLA management
VNF and Application Layer:
Deploy Best-in-Class Services from Cisco & 3rd Party Across Physical and Virtual

- **ISRv**
  - High performance
  - Rich features
  - End-to-end support

- **NGFWv**
  - Harden virtual services
  - Enable secure access
  - On-premises or cloud management

- **Third-Party VNFs**
  - VNF program
  - Tested and certified
  - Streamlined support from Cisco and third party

- **vWAAS**
  - ISR WAAS: Leader in Gartner MQ
  - Superior caching with Akamai Connect

- **vWLC**
  - Survivability and scale
  - Built for small and medium-sized branches

- **ASAa**
  - Comprehensive protection
  - Full DC class
  - Featured functionality
  - Designed for NFV

- **Applications**
  - Microsoft Windows
  - Custom applications
Virtualization Layer: Enterprise NFV Infrastructure Software (NFVIS) Optimized for Network Services

**Network Hypervisor**
- Supports segmentation of virtual networks
- Abstract CPU, memory, and storage resources

**Zero-Touch Deployment**
- Automatic connection to PnP server
- Highly secure connection to the orchestration system
- Easy day-0 provisioning

**Lifecycle Management**
- Provisioning and launch of VNFs
- Failure and recovery monitoring
- Stop and restart services
- Dynamically add and remove services

**Service Chaining**
- Elastic service insertion
- Multiple independent service paths based on applications or user profiles

**Open API**
- Programmable API for service orchestration
- Rest and NETCONF API