We’re ready.
Are you?
Evolution of the Enterprise Architecture

Embracing and Enabling Digitalization

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Our Vision and Strategy

**Vision**: Change the way the world works, lives, plays, and learns

**Strategy**: We create solutions built on intelligent networks that solve our customers' challenges
Digital Transformation is Moving IT to the Boardroom

- UPS My Choice
  Delivery Control
  Personalized Service

- Workforce Efficiency
  WIP Inventory and Part Tracking

- Customer Experience
  Physical and Virtual RFID Content

- Starbucks Apps
  Order Ahead
  Skip the Line

- American Express
  Personalized Service Through Mobile
Unlock the Power that Exists in the Network Through Abstraction, Automation, and Policy Enforcement ...

So that you can Leverage the Power of Distributed Systems to ...

... and Enable Network-Wide Fidelity to an Expressed Intent (Policy)
A New Architecture for the Digital Organization

Digital Solutions
Workforce Experience, Customer Experience, Business Operations, City Operations

IT Capabilities
Delivered from Edge to Cloud Connectivity, Security, Automation, Insight

Network
Cloud
IoT
Datacenter
Analytics
Security
Collaboration
Network Requirements for the Digital Organization

- **Insights & Experiences**
  - Drive Business Innovations

- **Automation & Assurance**
  - Speed, Simplicity & Visibility

- **Security & Compliance**
  - Real-time and Dynamic Threat Defense

The Network Enables Digital Business
Network Requirements for the Digital Organization

- Visibility into Users behavior, Applications, Network performances
- Customer has the elements to make decision faster

- Abstraction, Intent, Policy → Automation
- Verification of Desired Result → Assurance

Using the Network as a Sensor for security threats and then Enforce Compliancy through Segmentation

Wi-Fi  Core  WAN  Cloud
Network Enables New Experiences

Workforce Experience
- Digital Workforce
- Personalized Workspaces
- Effective Collaboration

Customer Experience
- Omnichannel Experience
- Enhanced Points of Service
- Personalized Customer Experiences

Business Operations
- Business Insights
- Asset Management
- Facility Management

City Operations
- Citizen and visitor services
- Safety and security
- Ruggedized infrastructure

New Business Capabilities Built on the Network as a Platform
Evolution of Networking Software

How do I deliver new applications?

How do I improve security?

How do I achieve speed & simplicity?

How do I learn new software skills?

How does this come together?

Cisco Digital Network Architecture
Open | Extensible | Software-driven
Cisco Digital Network Architecture

Network-enabled Applications

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

Open & Programmable | Standards-Based

- Open APIs | Developers Environment

Cloud-enabled | Software-delivered

**Principles**

- Insights & Experiences
- Automation & Assurance
- Security & Compliance
Cisco Digital Network Architecture

- **Cloud Service Management**: Policy | Orchestration
  - Open APIs | Developers Environment
  - Automation: Abstraction & Policy Control from Core to Edge
  - Analytics: Network Data, Contextual Insights
  - Open & Programmable | Standards-Based
  - Virtualization: Physical & Virtual Infrastructure | App Hosting

- **Principles**
- **Insights & Experiences**
- **Automation & Assurance**
- **Security & Compliance**

- **Network-enabled Applications**
- **Cloud-enabled | Software-delivered**
Hosting and Hosted Network Functions

vBranch

Enterprise Fabric

WAN Agg

Encryption

Public Cloud

VPC

AWS

Microsoft Azure

NFVOS

NFVIS

vBranch

vSwitch

vSwitch

IPS

IPS

WAAS

WAAS

IPS

IPS

Apps

Apps

UNI

UNI

UNI

UNI

Network Interface (UNI)
Policies

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Building on a Strong Foundation of Hardware and Software Innovation

QFP
QuantumFlow Processor
Advanced, Multi-Core, Feature-Rich Routing Silicon
- Fully Programmable – leveraging the many features of IOS-XE with hardware performance
- Scalable – Massive number of CPU cores (40/64), ability to cascade multiple QFPs = consistent high performance
- Advanced on-chip QoS – 100,000+ hardware-based queues, sophisticated traffic shaping and control
- Secure – linkage to high-performance crypto capability for secure WAN transport
- Extensible Architecture – ability to scale both up and down – the foundation for a long-lived family of high-performance, flexible routing silicon

IOS-XE
The Evolution of IOS
Taking the Proven Strengths of IOS to the Next Level
- Operational and Services Uniformity – Routing, Switching, and Wireless consistency
- New Foundational Capabilities – HA and operational leadership, state decoupling, net database...
- Speed of Innovation Velocity – “Code once and Re-use Many” across multiple places in the network
- Foundation for Virtualization – providing for network hosting and integration of virtualized functions (VNFs, containers)
- Platform for the Future – the “software stage” for the next wave of Cisco innovation...

UADP
Unified Access Data Plane
Flexible, Programmable, High-Performance Switching Silicon
- Fully Programmable – excellent flexibility, ability to handle new encaps (VXLAN, GPE, etc) – hardware speed, software elasticity
- Scalable – Massive recirculation bandwidth and low recirculation latency provide excellent tunneling and services support for traffic flows
- Advanced on-chip QoS – client-level granularity, sophisticated bandwidth shaping, with integrated on-chip NetFlow for visibility
- Secure – integrated on-chip support for MACsec encryption (AES-128, CBC)
- Extensible Architecture – ability to scale both up and down – the foundation for a long-lived family of high-performance, flexible switching silicon

“People that are really serious about software should build their own hardware”
Evolution to a Policy Model

- Express **Business Intent**
- **Translate** into device specific policy / configuration
- **Leverage Abstraction** (the controller knows about the device specifics)
- **Automate the Deployment** across the Network
- **Insure Fidelity to the Expressed Intent** (keep everything in sync)

**De-coupling of User Identity and Topology**

Much easier to translate **business objectives** to network functionality – **Lowers TCO**

User policy based on user identity and user-to-group mapping

**Policy based Configuration** – **Dynamic**, able to be **automated** by the Controller

*Over time – Policy grows, static shrinks*
Controller-Led Networking
Bridging the Gap to Increased Success in Network Deployment and Use

Any given “custom” configuration has a very high probability of not being tested exactly as deployed “individually - as a one off” … which introduces potential issues ...

Automation Controller-Led Networking Deployment

- Joint development by the Cisco Product Teams, the Architects developing Best Practices, and the Controller Team – “Blessed Configurations”
- Testing by Cisco’s Solution, System, and Devtest teams against the deployment use cases developed jointly, above
- And will be deployed by 1000’s, with any unforeseen situations addressed ASAP due to widespread and standardized deployment

Greatly increased probability of success
Deploy, Report, Measure, Adjust, Repeat

Network Data, Contextual Insights

Automated Deployment

Applications
Network
Endpoints

Analytics

Run Reports
Deliver relevant content
Discover user insights

Instrumentation
Telemetry
Correlation

Measure and Adjust
Click here to Correct
Always Correct this way (and never ask me again)
Instrumentation

Insure all the relevant counters are exposed

Collect all relevant metrics for QoE
Telemetry

Get all the metrics off the Network Element available for further processing

Get the most relevant metrics off the device to a central repository
Monitoring

Real-time Visualization – Show me what’s happening

Real-time / Short-term feedback of QoE events
Reporting

Longer-Term Representation of Quality of Experience (compliance and variances)

Long-Term Storage, Retrieval and Representation of QoE Events
Analytics

Identify Failures to meet SLA, Anomalous Events, Trends, Exceptions, etc

Identify anomalous QoE trends
Root Cause Analysis
Determine What, Why, Where, and How to Fix – Exceptions, Anomalies, Trends
Remediation

Right-Click here to Correct
Check here to Always correct this way and Never Ask Again…

Automating the correction of the root cause
Cisco Digital Network Architecture

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- Open APIs | Developers Environment

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Virtualization
- Physical & Virtual Infrastructure | App Hosting

Network-enabled Applications

Principles

Insights & Experiences

Automation & Assurance

Security & Compliance

Cloud-enabled | Software-delivered
Cloud Enabled Networking

Cloud Connected
Simplicity | Speed

Cloud Edge
IaaS Scale | Flexibility

Cloud Delivered
Innovation | Insights

Cloud Connected
Single Management Pane in Cloud

Cloud Edge
Hybrid Cloud
AWS | Rackspace | Azure | Cisco Intercloud

Cloud Delivered
Plug & Play CMX

Cisco
Cisco live!
Cisco Digital Network Architecture

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Principles
Configuration Management Today

jafrazie$ ssh admin@172.27.230.76
admin@172.27.230.76's password:
cho# conf t
Enter configuration commands, one per line. End with CNTL/Z.
cho(config)#

Task Oriented  Human Friendly  Easy To Replay  No Special Tools

- Software Unfriendly
- Syntax/format changes
- No Common Data Model
- No Error Reporting
Open Device Programmability

Data Model
- Configuration
- Operational
  - Standard
  - Device Specific

Device Features
- Interface
- BGP
- QoS
- ACL
- …

Set

Get

Automate

Other vendors

RESTCONF
NETCONF
gRPC

Open Device Programmability

Physical and Virtual Network Infrastructure
Embracing Tools

- DevOps Orchestration
- Automation
- Monitoring/Analytics
Cisco Digital Network Architecture

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**Principles**

**Insights & Experiences**

**Automation & Assurance**

**Security & Compliance**
Digital Network Architecture – Vision

Service Definition & Orchestration

Enterprise Controller (Policy Determination)

Telemetry  Intent

Enterprise Fabric

WAN VNFs  Campus VNFs  DC VNFs  Cloud VNFs

Network Function Virtualization

WAN/Branch  Campus  Data Center

Internet

APIs

UNI

UNI
Common Policy and Orchestration – Vision

Service Definition & Orchestration

Enterprise Controller (Policy Determination)

Enterprise Fabric

Network Function Virtualization

Service Chaining

Localized or network-wide
Cisco Digital Network Architecture

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What’s New: Cisco DNA Innovations

**APIC-EM Automation Platform**
- Completely New Platform
- Available Now
- Base Automation: **Plug and Play**
- Available Now
  - Cloud version Controlled Availability, May 2016
- Policy Services: **I WAN App & EasyQoS**
  - Available Now | March 2016, respectively

**Enterprise NFV**
- Branch Service Virtualization
- Controlled Availability, March 2016

**CMX Cloud**
- Presence Analytics and Connect
- Available Now in US, April 2016 for ROW

Available on DNA-Ready Infrastructure through Cisco ONE Software
The Cisco DNA Customer Journey Starts Now

- **Base Automation**: Immediate value to existing network
- **Policy Services**: Active control for critical use cases: Network, Collaboration
- **Advanced Security**: Network as a Sensor and Enforcer
- **Complete Software Control**: End-to-end policy-based automation
- **Digital Services**: Support lines of business: analytics, IoT

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Cisco ONE Foundation  
Cisco ONE Adv. Applications  
Cisco ONE ELA
Automation: Plug and Play

Cloud-Based Plug and Play

- Order
- Plug in and Cloud Provision
- Controller-Based Management

Eliminates

- Staging
- Truck Roll

“Plug and play means no more IT engineers in the field – faster time to market and dramatically lowered costs.”
Policy Service: IWAN Automation

Optimal Branch Experience
Made Easy

Simple Workflows
- Zero-Touch Rollout
- Set Application Policy
- Gain Visibility and Tune
- Point and Click Troubleshoot

IWAN Momentum
200+ deployments running up to 2500 sites

Faster deployments
85%

“IWAN automation eliminates tedious configuration tasks for advanced networking features. I can configure IWAN with just 10 GUI clicks.”

Cisco ONE Foundation
Available Now

Transport-Independent
Intelligent Path Control
Application Optimization
Highly Secure Connectivity

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Policy Service: EasyQoS

Select from Predefined Policies
Automated Deployment of QoS config
Optimized for Any Infrastructure

Dynamically Mark Voice/Video

Enhance Collaboration Experience

300% Reduction in voice jitter
50% Video quality improves

Improved Application Experience with No Operator Intervention

“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.”

Cisco ONE Foundation
March 2016 General Availability in Cisco ONE May 2016
New: APIC-EM QoS Automation - Easy QoS

Applications can ALSO interact with APIC-EM via Northbound APIs, informing the network of application-specific and dynamic QoS requirements.

Network Operators express high-level business-intent to APIC-EM EasyQoS.

Southbound APIs translate business-intent to platform-specific configurations as they are needed.
Security: StealthWatch and ISE

Extend Security Everywhere

Wi-Fi  Core  WAN  Cloud

Network as a Sensor:
Real-time situational awareness and rapid threat detection everywhere

Network as an Enforcer:
Software-defined segmentation with TrustSec® for assurance and compliance

Rapid Threat Containment

- Quickly detect and stop threats
- Scales to handle dramatic threat increase

“...The network touches every element of the digital enterprise – every business process, device, customer, employee – and therefore has the unique ability to detect, analyze, and prevent new forms of attack by flagging unusual network behavior.”
Cisco’s approach to network functions virtualization (NFV) delivers the elasticity to invoke innovative capabilities in an optimal way – whenever, wherever, and with whatever capacity they are required.
Digital Services: CMX Cloud

Customer Insights and Engagement

Data on Storefront
Conversion
Frictionless
Guest Onboarding

Presence Analytics
Zone-based location analytics

Connect
Drag-and-drop customizable portal on demand

“CMX Cloud has helped us quickly gain business insights, so we can enhance the shopper experience at Santana Row with easy Wi-Fi onboarding, increased customer data, and improved customer engagement.”
Cisco ONE Simplifies DNA Software Purchasing

1. Select Software Capabilities
   - Cisco ONE™ Foundation
   - Advanced Application
   - Advanced Security

2. Select Platform
   - Physical | Virtual
   - Wireless | Switching | Routing

3. Select Purchasing Model
   - Traditional
   - Subscription
   - Enterprise Agreement
Helping You on the Journey

**Educate**
- Technology Tracks
- Learning Paths
- DevNet Zone
- Roadshows and Pop-up Events

**Enable**
- DevNet membership
  - 350,000+
- Getting Started and API Reference Guides
- Sample Applications
- Community and Pay-for Developer Support
- Sample Applications

**Integrate**
- 300+ Network Partners and Growing
- 1500+ Solutions
- 250+ Compatible Network Solutions
- Cisco® Professional Services
  - 2500+ Partners Strong
Begin Your Digital Journey Today

ARE YOU READY:
To automate network operations?
Save on WAN transport?
Enable richer collaboration experiences?
Gain business insights?
Deliver personalized customer experiences?
Detect and remediate threats rapidly?
To virtualize your branch?

Cisco Digital Network Architecture
Leaning Forward....
DNA based Campus Evolution

**Services**
- Mobility
  - Seamless roaming
  - Elastic WLC
- Collaboration
  - Quality of experience (QoE)
  - Voice/Video performance
- Security
  - Identity, NAC, Encryption
  - Device Onboarding

**Orchestration and Policy**

**Infrastructure**
- Endpoints
- Branch

**Endpoints**
- Mobility
- Collaboration
- Security
What We Are Announcing

Cisco Digital Network Architecture
Open, Software-driven, Service-centric
Virtualization | Automation | Analytics | Cloud

APIC-EM
Automation Platform
Plug and Play | IWAN | Easy QoS

Enterprise NFV
Infra Software | VNF | Orchestration

CMX Cloud
Presence Analytics | Connect
Digital Transformation is Moving IT to the Boardroom

- UPS
  - My Choice
  - Delivery Control
  - Personalized Service

- Boeing
  - Workforce Efficiency
  - WIP Inventory and Part Tracking

- Starbucks
  - Apps
  - Order Ahead
  - Skip the Line

- Louis Vuitton
  - Customer Experience
  - Physical and Virtual RFID Content

- American Express
  - Personalized Service
  - Through Mobile
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