Global vision.
Local knowledge.

Cisco Connect 2019
Serbia, 19th March 2019
Cisco Connect 2019 Enterprise Networking
DNA Center Unlock Your Infrastructure

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CCIE, CISSP
Agenda

It’s not a NETWORK problem…
I CAN PROVE IT
Traditional Legacy Architectures

**EXPENSIVE**
- Hardware-centric
- Fixed capacity

**POORLY INTEGRATED**
- Conflicting policies and configurations
- Inflexible and static
- Risk from accidental interactions and vulnerabilities

**DIFFICULT TO SUPPORT**
- Discrete device-by-device configurations
- Complex management silos
- Require slow truck rolls for changes

**CONNECTIVITY-CENTRIC**
- Fragmented, incomplete user experience
- Not application-centric

**INFLEXIBLE**
- Tightly controlled, client server model
- Historical vs predictive management

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New era of Networking - Intuitiveness
Need for Intent-Based Networking

- **Mobility**: Mobile device traffic will be 66% of total IP traffic by 2020.
- **IoT**: 26 billion networked devices and connections will exist by 2020.
- **Cloud**: 93% of organizations will use multiple clouds by 2019.
- **Security**: 100 days Industry average to detect a common threat.

Cisco Digital Network Architecture

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Journey to Intent-Based Networking

Increased IT Agility

Platforms

Systems

Products

DNA Center

Intent-based Infrastructure

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Journey to Intent-Based Networking

Centralized Management
- Zero touch deployment
- Day 0 and Day 2 provisioning
- Layer 2 routed access
- Software Image Management
- Discovery, Inventory, Topology

Automation
- Advanced Secured Segmentation
- SDA
- SD-Access capable*
- Flexible network segmentation
- Application Policy
- Cisco DNA service for Bonjour
- Third party app hosting
- PnP
- LAN Automation
- Embedded Event Manager

Assurance & Analytics
- Network security analytics
- User/device context
- Global insights, trends
- Compliance, custom reports
- Switch 360 & wired client 360
- SD-Access & Switch insights
- Application health, application 360, performance (loss, latency, jitter)
- Guided remediation
- Health Dashboard – Network, client, application
- Switch & Wired client health monitoring
- Full Flexible NetFlow

Security
- Stealthwatch
- ISE Base+ISE Plus
- ETA
- Rapid Threat Contain
- ETA capable*
- Rapid threat contain*

Cisco DNA Premier
Cisco DNA Advantage
Cisco DNA Essentials

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DNA Center - Central NMS

Cisco DNA Center appliance

Complete network management system
- Single pane of glass for all devices
- End-to-end health information in real time
- Granular visibility
- Simplified workflows

Automation for provisioning
- Zero-touch deployment
- Device lifecycle management
- Policy enforcement

Analytics for assurance
- Verify intent of network settings
- Proactively resolve issues
- Reduce time spent troubleshooting

Platform for extensibility
- Integrate APIs with third-party solutions
- Integrate and customize ServiceNow
- Evolve operational tools and processes

物理和虚拟基础设施

Cisco and third party

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Platform Capabilities - APIs, Adapters & SDK

IT and Network System Process

Intent APIs
- Assurance
- Path Trace
- Command Runner
- Template Programmer

X-Domain Integration
- Network Inventory / Discovery
- Topology
- Plug-n-Play
- Software Image Management (SWIM)

3rd Party SDKs
Map 3rd Party Network Devices to Data Model
Level 1 Operations support:
Discovery, Inventory, Topology, Availability, Command Runner

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Aligning Network to Business Intent

Before

IT and Business Applications

How to ensure SAP and Salesforce.com have priority and quarter end?

Human middleware

OK, maybe these configs. will work - hope for the best!!

CLI, scripts

Infrastructure

After

Modern Applications

Business Intent: SAP and Salesforce.com are Business Relevant; SLA confirmed.

Scale

Business Intent

From “human middleware” to “IT-to-business mediator”
What is IT Assurance?

The guarantee that the infrastructure is doing what you intended it to do

Continuous verification
Configurations, changes, routing, security, services, VMs, compliance, audits
Successful IT rollouts

Insights and visibility
Visibility, context, historical insights, prediction
Reduced downtime, increased user productivity

Corrective actions
Guided remediation, automated updates, system optimization
IT productivity
From Network Data à Business Insights

Unified Network Telemetry
Contextual Data

Correlation
Complex Event Processing

Issues
Insights

Guided Remediation - Now

Auto Fix It - Future

Syslog
Traceroute
Router
AAA
Wireless
Netflow
DHCP
Switch
Telnet
DNS
CLI
SNMP
OID
IPSLA
Ping

Actionable Insights

Client Onboarding
- Association failures
- Authentication failures
- IP address failures

Client RF Experience
- Sticky client, Ping pong
- Coverage Hole
- Client Capacity

App Experience
- Throughput analysis
- App Performance - Packet Loss, Latency and Jitter
- DNS Issues

Network Device
- CPU, Mem utilization
- Crash, AP Join Failure, Flapping AP
- Power supply failure
- Radio Utilization

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Context - Key Factor in Complex Networks

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Netflow  AVC  DDI  ISE/Radius  Topology  CMX, Cisco DNA Center  Device
DNA Assurance Architecture

Customer Datacenter
- DNA Center
- DNA Automation
- Network Control Platform
- Network Data Platform

Cloud Based ML Engine
- DNA Cloud Analytics
- DNA Assurance
- Assurance UI

Feedback
- Data

Protocols & APIs (WSA, gRPC, SNMP, NetFlow, Syslog, Location, CLI, ...)

Customer Network
- Office Site
- Network Services DC

Network Control Points
- Metrics, Events, Config, ...
- Control, Notifications, ...

SSH

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Automation & Assurance Working Together

Cisco DNA Center

Automation

Telemetry, alerts, violations

Network inventory, topology, and configuration

Assurance and Analytics

Network and telemetry configuration

Streaming telemetry & network data
Wireless Assurance Architecture

Enable Assurance across all deployments
Aironet Stream Telemetry Architecture

DNAC 1.2.5

New*
gRPC/gNMI

WSA/JWT

AP WSA/JWT

AP2/3/4800K

- HTTP 2.0/gRPC based
- Anomaly Event, RF Stat, PCAP, Spectrum
- Scheduled and Automated

ME, WLC3504/5520/8540

- Supported from AireOS 8.5
- Real-Time (2sec.) client event
- ME 8.8 to support DNAC

Cisco Active Sensor AP1800S

- HTTPS for Automation and reporting
- PnP-based Provisioning
- Fully Managed by DNAC

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WiFi Sensor Anywhere Intelligence

Test Your Network Anywhere at Any time at Real-world Client Level

Aironet 1800S Active Sensor

- 2x2 with 2 spatial streams
- Multiple powering options
  - PoE Power
  - USB Type "C" power
  - Direct AC Power Plug
- Integrated BLE
- Ultra compact form factor

AP as a Sensor (1800/2800/3800/4800)

Purpose-built Hardware for Analytics
In-line monitoring to DNA for analytics and insights while serving clients

SLA Dashboard  Onboarding & Services Tests  Configure Tests Remotely  Global Issue Creation  Dynamic Sensor Test Trigger
WSA Architecture Overview

• WSA is a streaming telemetry service that runs on new WLC with the AireOS 8.5+

• WSA posts model-driven telemetry data over HTTPS to DNA Center

• The server receives the data for further processing, analytics, or visualization within Assurance
Overall Health Summary View

- Hierarchical Site View
  - Per Site
  - Per Building
- Geo map with Health Score per Site
- Health Score is percentage of good device/client
- Client Health Score and Network Health Score summary
- Recent Top 10 Global Issues
Client 360

- Shows Details on specific client
- Timeseries metric chart of the client health score
- Individual Client issues
- Onboarding Event Viewer
- Application Experience
  - Using Router - App Health derived from Network Delay, App Delay, Packet Loss
- Path Trace Tool for Troubleshooting
- RF and Usage Details
Client Health Drill Down - OnBoarding

- Break down view of Assoc. time, AAA time, DHCP time,
- Per Server View on AAA & DHCP
- Select any sub-section will show client lists in selected category
- Display Applied Filter on top of list
- Show Onboarding performance of each client
DNA-CMX Integration Feature

- Accessible via [DESIGN][Network Hierarchy] <Floor Map>
- Display All of connected Clients locations

Client Location, Client Density heatmap

Display Connected Client Health Score

Client Location Playback

Any Changes in Floor Map will be automatically sync’d with CMX Map, vice versa

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Use Case: Poor Wireless Experience Whiteboard Flow

Traditional Network Management

- Perform Analysis?
- Replicate Issue?
- Conduct Site Visit?
- Time Travel Capability
- Network Sensor Capability

How long does it take to ...

> min

Digital Ready Network Management

- Perform Analysis? <
- Replicate Issue? <
- Conduct Site Visit? <
- Time Travel Capability <
- Network Sensor Capability <

< min

Success Metrics

- Reduced time to replicate and troubleshoot wireless issues
- Reduced wireless downtime
- Reduction in on site visits by solving remotely

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Use Case: Software Image Management Whiteboard Flow

Traditional Network Management vs. Digital Ready Network Management

How long does it take...

- Identify “golden” image
- Deploy New Software Images
- Perform Network Updates
- Ensure Software Consistency

> min

< min

Success Metrics

- Maintain Network and Security Compliance
- Reduce the time react to PSIRT and bugs
- Reduce network downtime and change windows times

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Business Critical Applications Assurance

Table with the top N (filterable) applications:
- Name
- Health
- User count
- Business class / Traffic class
- Usage / Average Throughput
- Perf (Loss, Latency, App Delay)

Health of Business Relevant Apps overtime

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Client Application QoE

Selected client

Application issues

Click on issue for details
1. Install DNAC

If sites have been created already, you can skip to run discovery and add devices to sites.

Set up device credentials in DNAC

Run discovery (ping sweep or CDP)

Inventory collection

Create site hierarchy (area, building, floor, and maps)

These tasks run in the background

Automatically push device manageability config from DNAC
Assess telemetry quotient to adjust

Assign devices to site/building/floor

Device ready for Assurance
## API Catalog

**Platform**

### North America

#### Version 1.12.0 - Released 8/31/2018

- **Overview**
- **Manage**
- **Developer Toolkit**
- **Runtime Dashboard**

### APIs

#### Networks

<table>
<thead>
<tr>
<th>Method</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GET</td>
<td>getPhysicalTopology</td>
<td>This method is used to obtain the raw physical topology and filter based on node type</td>
</tr>
<tr>
<td>GET</td>
<td>getL3Topology</td>
<td>This method is used to obtain Layer 3 device topology by routing protocol type</td>
</tr>
<tr>
<td>GET</td>
<td>getSiteTopology</td>
<td>This method is used to obtain the site topology</td>
</tr>
<tr>
<td>GET</td>
<td>getStrNames</td>
<td>This method is used to obtain the list of vlan names</td>
</tr>
<tr>
<td>GET</td>
<td>getL2Topology</td>
<td>This method is used to obtain the Layer 2 topology by vlan ID</td>
</tr>
<tr>
<td>GET</td>
<td>NetworkHealth</td>
<td>Network Devices and their health by category</td>
</tr>
</tbody>
</table>

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DNA Center Platform - Login

§ A Session Token is required for DNA Center Intent REST API calls
1) Use the POST /auth/token API Call to generate token
2) Copy ticket and add to X-Auth-Token Header
3) Use in subsequent API calls

§ Intent REST APIs use the JSON format for exchange of data between the controller and the REST application (API consumer)

§ Typical Developer Sequence is
− Explore via DNA Center Platform GUI or DevNet
− Prototype in Chrome/POSTMAN
− Script (Python, Perl, …)
− Integrate

Step 1: Request service token

Step 2: API response with token information

Step 3: Add ticket to the X-Auth-Token header

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It’s not a NETWORK problem... I CAN PROVE IT

DN C Offers
FREE
Cisco DNA Center Appliance when ordering $300K+ (List Price in USD)
of Any Cisco DNA subscription

TWO Cisco DNA Accelerators
and TWO FREE Ask the Expert sessions

How to Order Guide: cs.co/enpromotions

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Free DNA-C Tips & Tricks

• Eligible SKUs include **only** Cisco DNA subscriptions
  - Any Tier (Essentials, Advantage and Premier)
  - Any Term (3, 5, 7 years)
  - Any Technology (switching, wireless and routing - excludes cloud-based (SDWAN) Cisco DNA subscriptions since physical appliance is not required)

• Eligible SKUs do **not** include hardware (e.g., C9300-48U-A)

• Eligible SKUs can be **anywhere** in the quote
  - It is not required to select Cisco DNA subscriptions under FREE-DNAC-OFFER
  - Cisco DNA subscriptions selected under hardware SKUs will count towards minimum $300K threshold
Partner Program - DNA Starter Kit Bundle

Cisco DNA Center Appliance
3504 WLAN Controller
ISE Virtual Appliance

Two 802.11ac Wave 2 APs / Sensors
Two Catalyst 9300s

Optional Advanced Services Quick Start Services

Stacks with SeedIT ([www.cisco.com/go/seedIT](http://www.cisco.com/go/seedIT)) for first-time customers


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Partner Program - Cisco DNA Starter Kit

1. Add “SDA-W-LABKIT” or “SDA-WW-LABKIT” to BoM in CCW
   - Add Cisco DNA Center Appliance DN1-HW-APL or DN2-HW-APL (required)
   - Add 2 Cat9K Switches (required in SDA-W-LABKIT) with 3Y or more Cisco DNA Premier subscriptions
   - Add 2 AP3802 (required in SDA-WW-LABKIT) with 3Y or more Cisco DNA Premier subscriptions
   - Add WLC3504 (required in SDA-WW-LABKIT)
   - Add optional components, as desired (optional)
   - Validate in CCW

2. Push estimate to full quote
   - Register for SeedIT for first-time customers. SeedIT discount applies to the first unit only.
By Cisco: Popunite anketu, preuzmite poklon na pultu „Informacije” i učestvujte u izvlačenju nagrada na zatvaranju konferencije

By Ingram: Predajte kontakt podatke na Ingram Micro štandu, prisustvujte sesiji „Never Stop Learning” u 15h i osvojite FREE DCII trening + ostale zanimljive nagrade
Sponzori

Platinum sponzor:

Zlatni sponzor:

Srebrni sponzor:

Learning partner:

Fast Lane
Realize the Promise of Technology