

TOMORROW starts here.



Cisco *live!*

The Evolution of your Enterprise Networking Strategy and Architecture

BRKARC-2667

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Distinguished Consulting Engineer
Product Management Architecture Team
Enterprise Networking Group

Our Vision and Strategy



Vision

Change the way the world works, lives, plays, and learns

Strategy

Solve our customers' most important business challenges by delivering intelligent networks and technology architectures built on integrated products, services, and software platforms

Innovation when and where it counts...



Market
Transitions

Innovation

Customer
Driven



We Are Entering the Age of the Internet of Everything

The Network Is the Platform to Connect the Previously Unconnected

99%
of "things" are unconnected

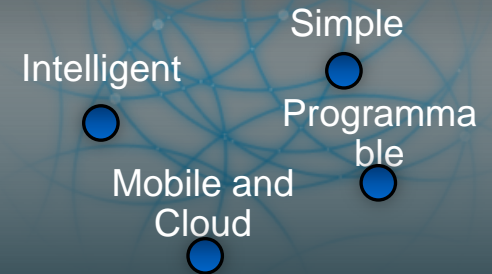


Device Growth
2.5/Person
BYOD

Traffic Growth
4x
Transition to Cloud*

Mobility
Wi-Fi 50%
of Traffic (Video over Mobile Devices)*

The Network Has to Change



*Cisco VNI Study 2012

Embracing Change, Enabling Business Agility

Applications Are Changing

Type
Consumption
Delivery

78%

the network is more critical to delivering applications than a year ago

The Network Needs to Support Change

- App intelligence → User, device, location
- Application delivery → Mobile, cloud
- Adaptive → Open, programmable
- **Simplicity**



Today's IT Model – Heavy on Network Operations



80–90%

Network Operations



10–20%

Enabling Innovation

0s

10s

100s

1,000s

10,000s

IoE Scale

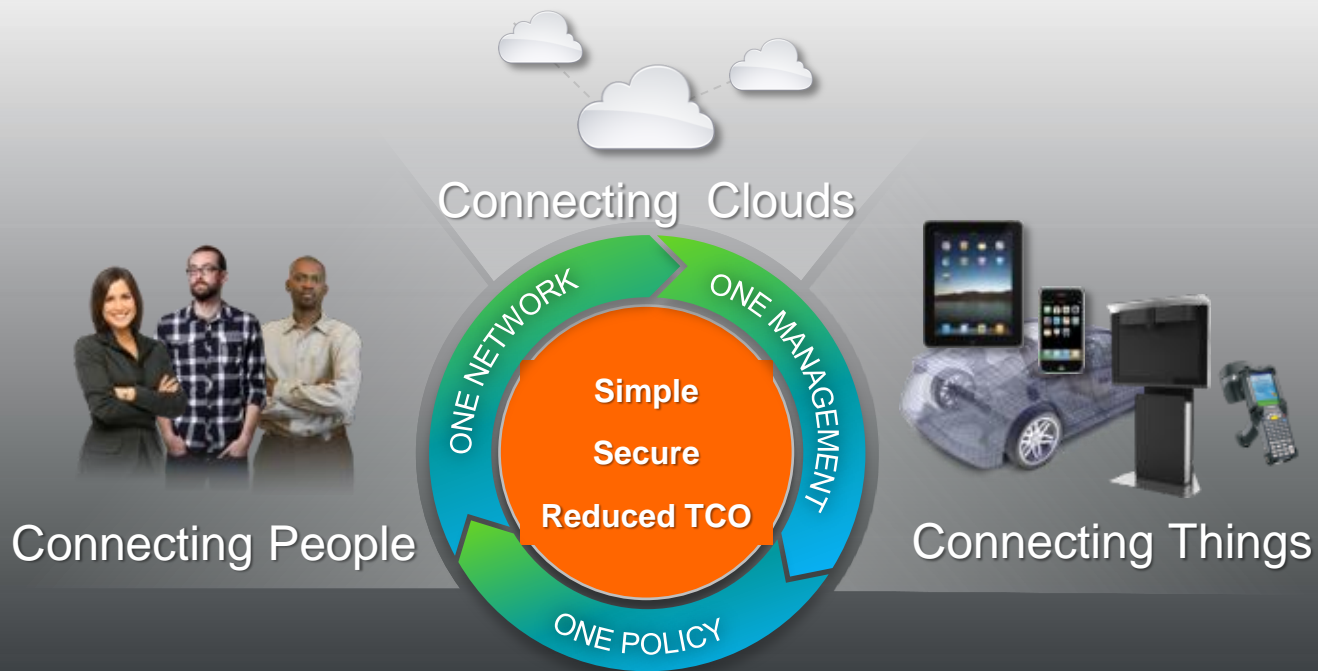
Complex
and Tedious

Difficult to Provision
Applications

Difficult to
Troubleshoot

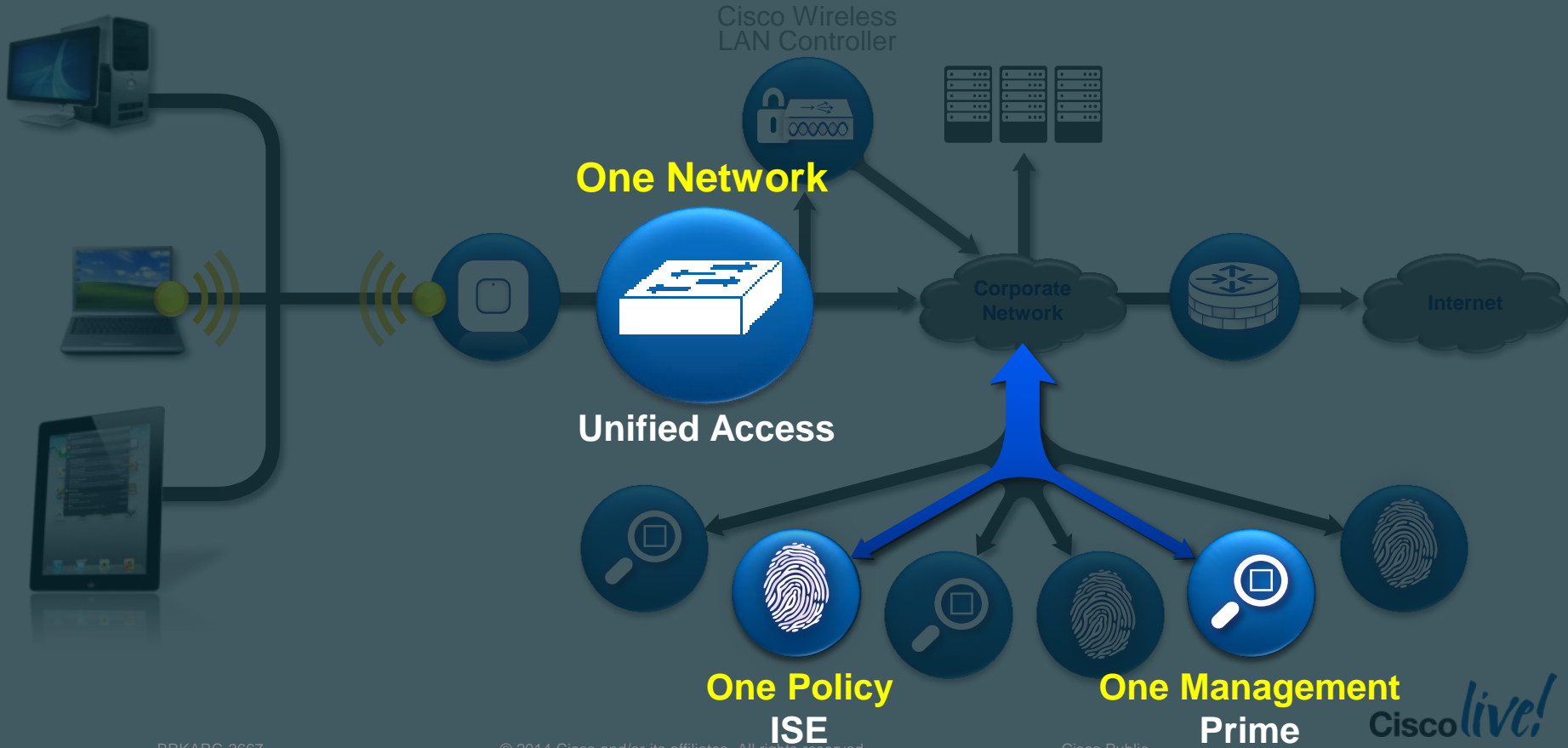
Slow Deployment
of Services

Leveraging the Architecture to Deliver Solutions



Cisco ONE Enterprise Networks Architecture

One Network with Unified Access



Unified Wired / Wireless Access



Single platform for wired and wireless

Common IOS, same administration point, one release



Network wide **visibility** for faster troubleshooting

Wired and wireless traffic visible at every hop



Consistent security and Quality of Service **control**

Hierarchical bandwidth management and distributed policy enforcement



Maximum **resiliency** with fast stateful recovery

Layered network high availability design with stateful switchover

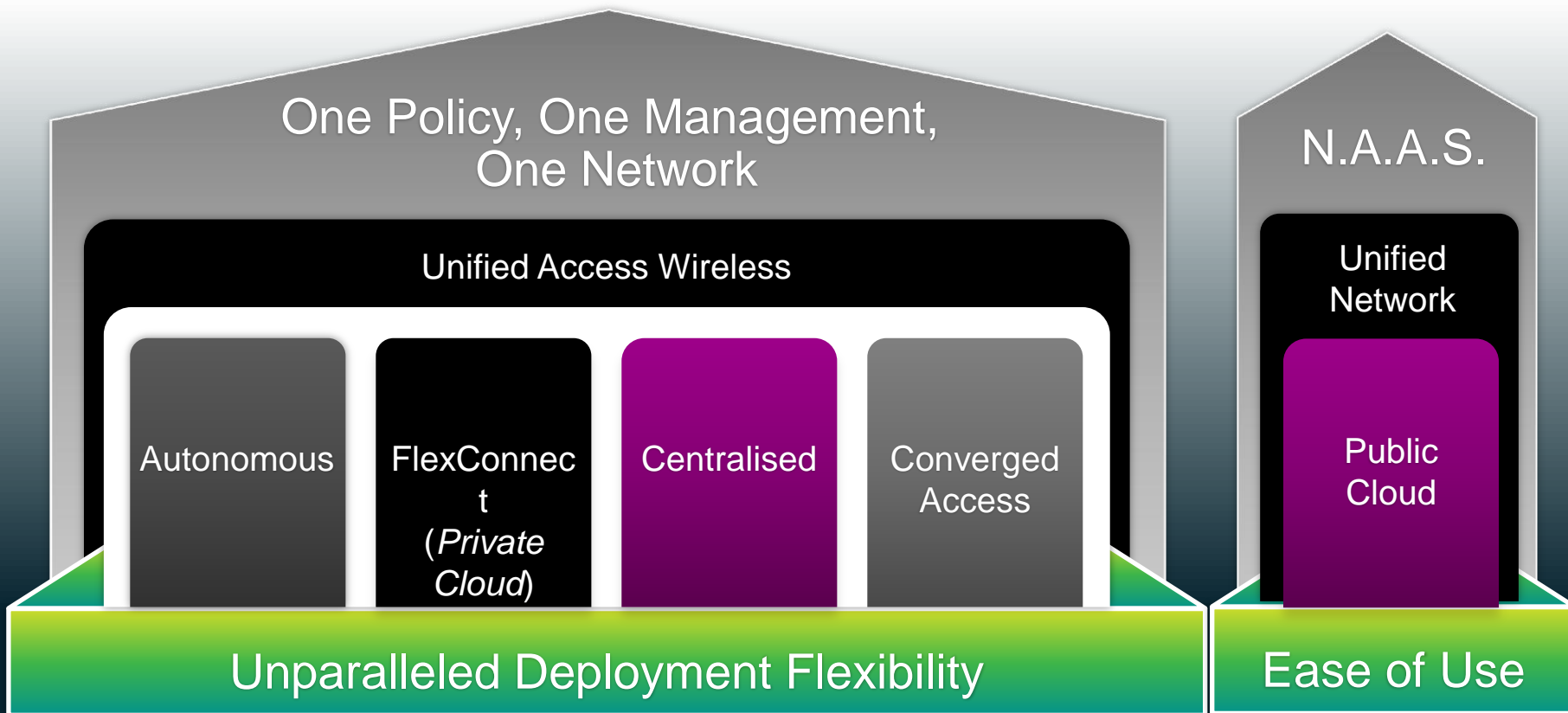


Scale with distributed wired and wireless data plane

480G stack bandwidth; 40G wireless / switch; efficient multicast; 802.11ac fully ready

Unified Access - One Policy | One Management | One Network

Unified Access – One of a Suite of Options

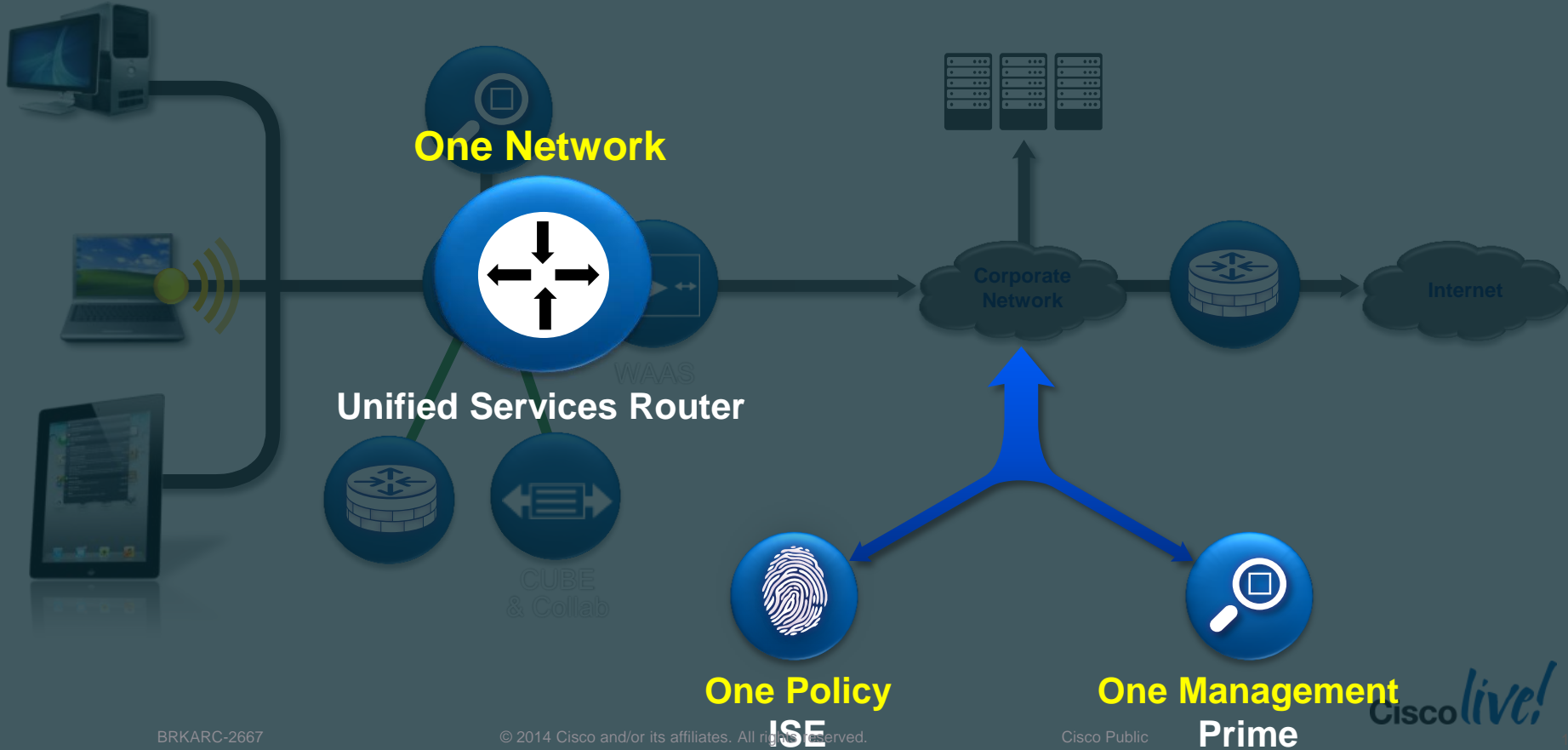


- Personalised Experiences
- Indoor Location Services
- Location Analytics



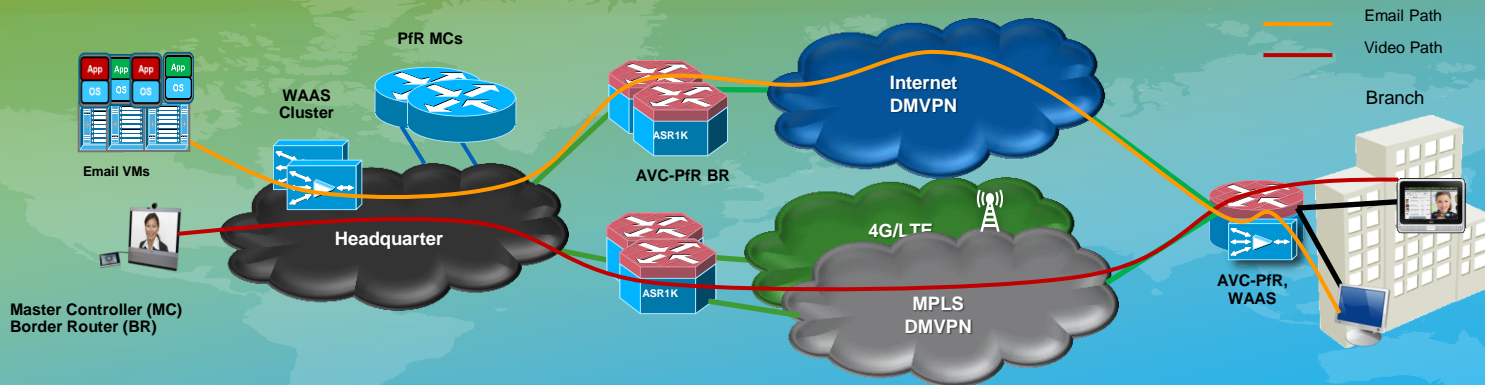
Creating Connected Mobile Experiences

One Network with Unified Services



Intelligent WAN (iWAN) Solution

Optimised Connectivity over any Transport



Transport Independent

- **DMVPN IPsec** overlay design
- Consistent operational model
- Simple transport migrations
- Scalable and Modular design



Intelligent Path Control

- **Performance Routing (PfR)** full utilisation of all bandwidth
- Application best path based on delay, loss, jitter and path preference
- Improved network availability



Secure Connectivity

- **Suite-B certified IPsec encryption**
- **ASA & IOS Firewall/IPS** comprehensive threat defence
- **Cloud Web Security (CWS)** for direct Internet Access



Application Optimisation

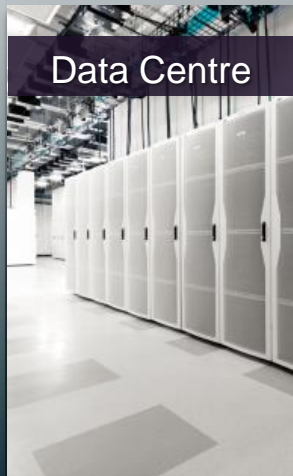
- **Application Visibility & Control (AVC)**
- **WAAS** Application Acceleration and bandwidth savings

New Opportunities with the Internet of Things

Information Technology (IT)

Operational
Technology (OT)

Data Centre



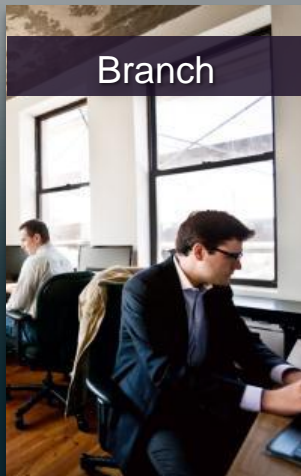
**Speed Shifts
Virtualisation**

Campus



**Speed Shifts
Access Growing Overall
Shift to Mobility**

Branch

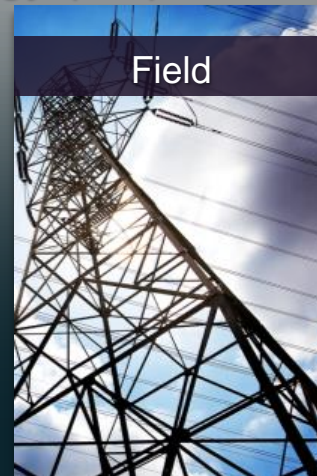


Plant



**Increasing Demand for Switching
\$14.4 Trillion Marketplace**

Field



Technology Transitions Create New Opportunities

MANUFACTURING



**TRANSPORTATION +
LOGISTICS**



DEFENCE



ENERGY/UTILITIES



Real-Time

Scale

Big Data/Analytics

Security

**GOVERNMENT/SMART
CITIES**



HEALTHCARE



RETAIL

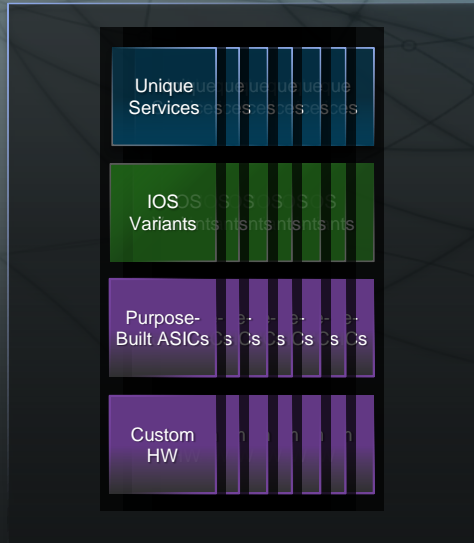


FINANCE



EN Architecture Transformation

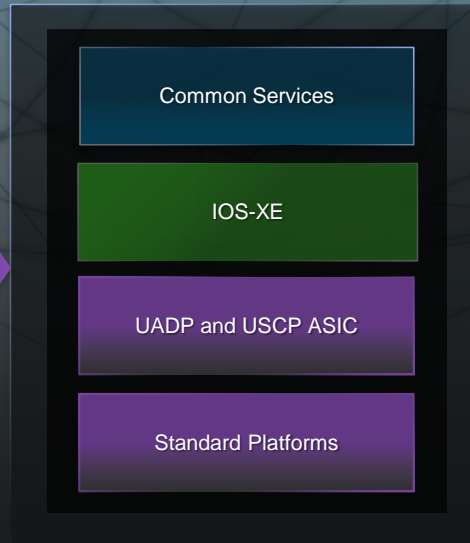
Many Purpose-Built Architectures



SWITCHING,
ROUTING, WIRELESS

Yesterday

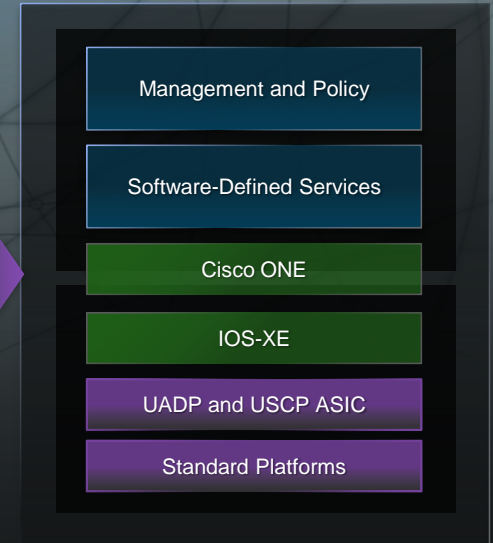
Multiple Products on
Common Architecture



SIMPLE, SECURE,
REDUCED TCO

Today

Cisco ONE Architecture



AGILE SOFTWARE MODEL

Tomorrow

Cisco *live!*

Cisco ONE Enterprise Networks Architecture

NETWORK
APPLICATION
LAYER

Cisco
Prime

Cisco
ISE

Cloud
Service
s

Security
Service
s

Mobility
Service
s

Application
Services

NETWORK
CONTROL
LAYER

Cisco ONE Controller (Network Services APIs)

Discovery

Topology

....

QoS

Location

NETWORK
ELEMENT
LAYER

Device API – OnePK, OpenFlow, CLI

Cisco Network Operating Systems (Enterprise, Data Centre, Service Provider)

ASIC
DATA PLANE

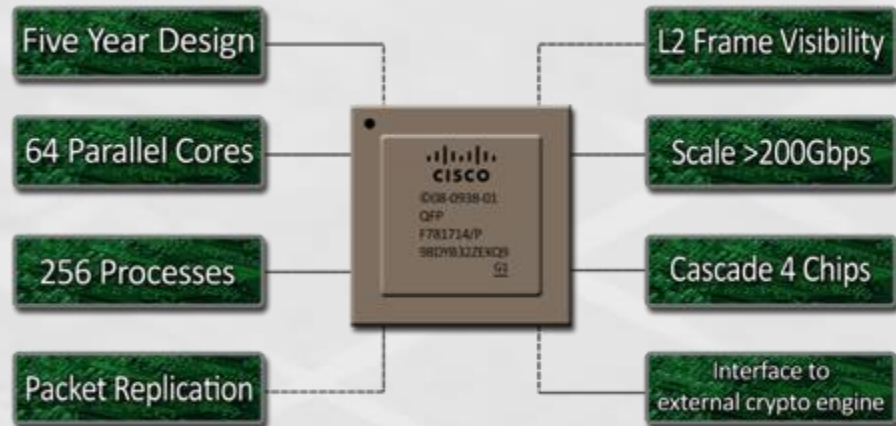


SOFTWARE
DATA PLANE



QUANTUM FLOW PROCESSOR (QFP)

- High Performance
- Programmable
- Feature Rich
- Price/Performance
- Longevity/Flexibility



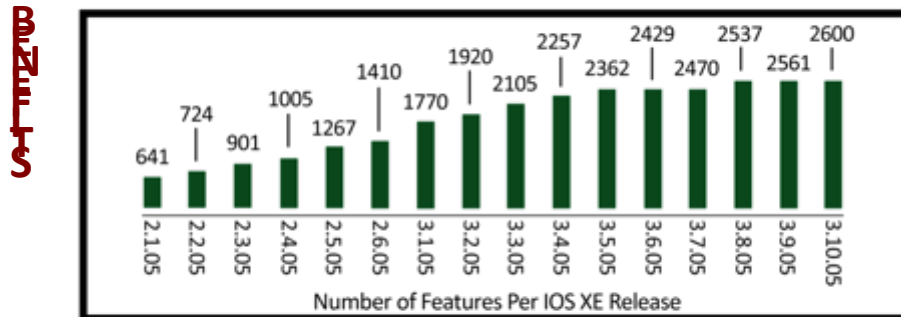
Overview – Design Goals and Capabilities

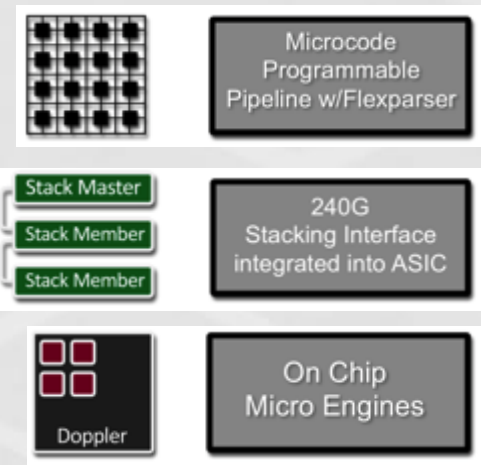
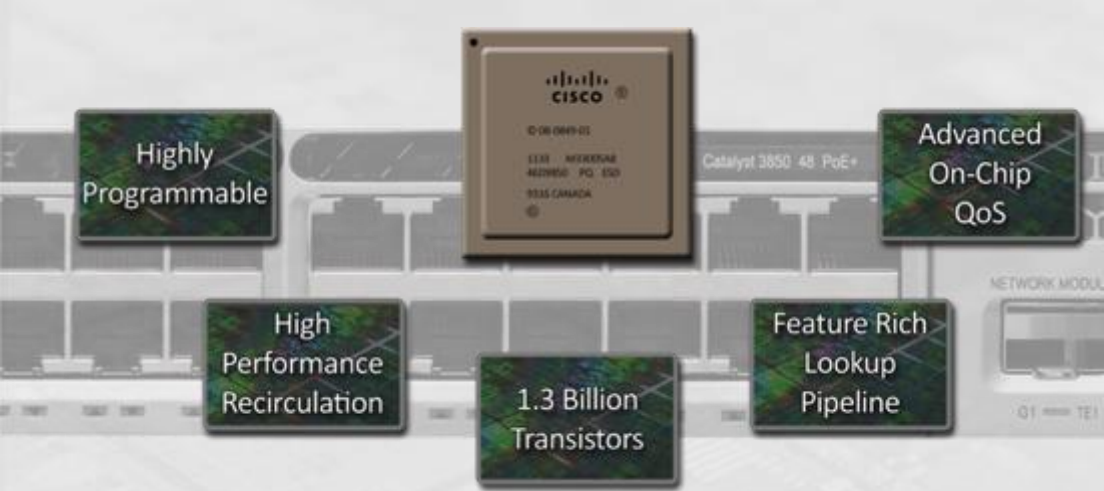
Details – Silicon Innovations for Routing

100% Cisco-developed Routing Silicon

Quantum Flow Processor (QFP)

Feature Velocity, Performance, and Scale





Overview – Design Goals and Capabilities

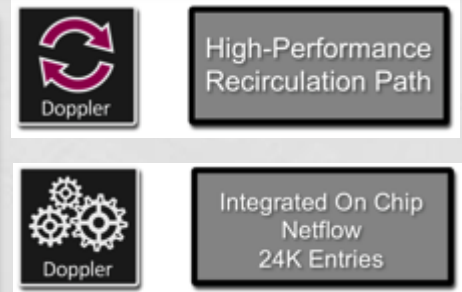
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100% Cisco-developed Switching Silicon

**Unified Access
Data Plane (UADP)**

BENEFITS

- Features and Flexibility
- Performance
- Scalability



**Programmable Switching
with Performance**

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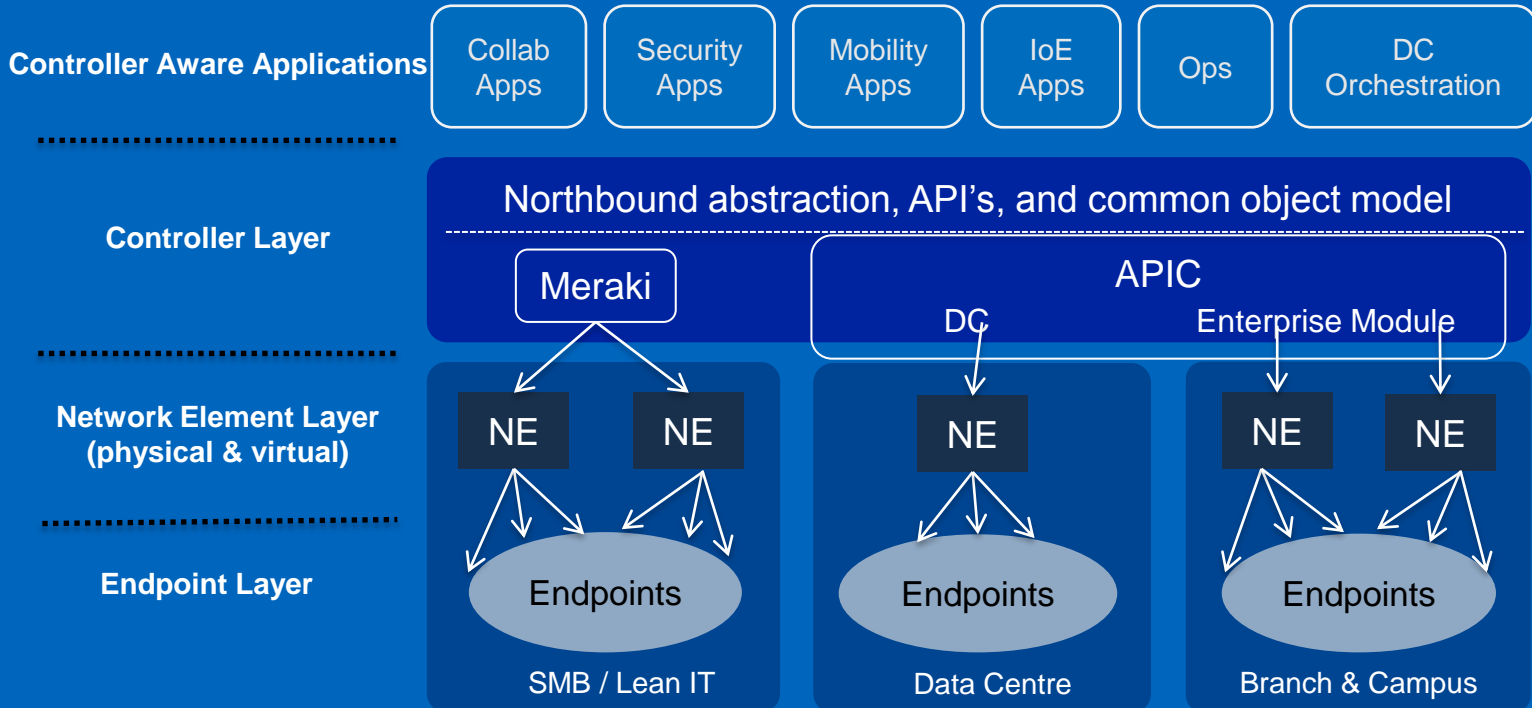
ASIC
DATA PLANE



SOFTWARE
DATA PLANE

Enterprise Infrastructure Architecture

- Layered architecture
- Controller layer (with potentially multiple controllers)



APIC - EM Design Points

Reduce Network Complexity

Low Risk adoption of SDN

Product with minimal to no programming requirement

Start with small set of solvable problems

Enterprise Scale for real life production network use



DE Shaw & Co

FedEx

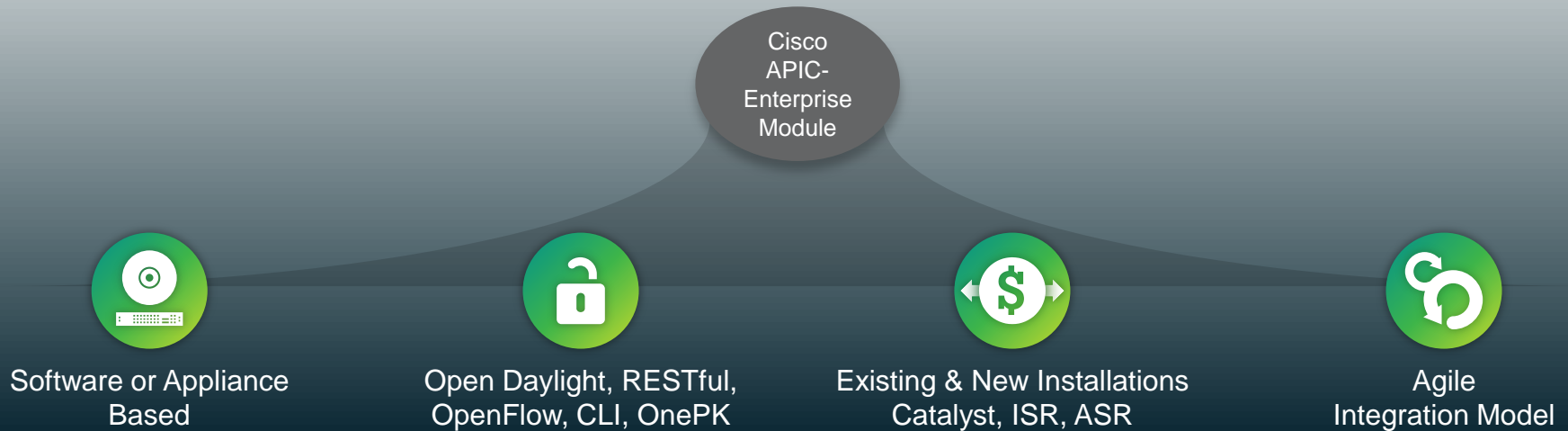


Bank

pwc

What's New: Cisco APIC – Enterprise Module

Automation and Exposing Network Intelligence



2QCY14 FCS, Base Software & Base Apps Included in SmartNet, Premium & Partner Apps Priced

Enterprise Module

Initial Deployment Scenarios



Security Automation

Network-Wide Rapid Threat Detection
and Mitigation (Sourcefire)

ACL Management Automation



QoS Provisioning

Easy QoS

Follow Me QoS

Compliance Assurance



IWAN: Path Optimisation

Automated Performance Routing
(PfR) Configuration

Automated WAN Policy Compliance
Assurance

Solving the Most Pressing, Complex and Tedious IT Problems

Cisco – APIC-EM:

Automatic Threat Detection and Mitigation



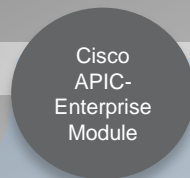
Network Wide Security Deployed Rapidly

REMEDIATION ACTION



Defence Centre

Cisco APIC
Enterprise Module



UPDATE



THREAT DETECTED



Building the Partner Ecosystem



Radware

Threat Detection &
Mitigation



Glue Networks

Cloud Hosted WAN
Management



Citrix

VDI & Load
Balancing



ActionPacked

Network
Performance
Management

More Partners are in Pipeline

Cisco SDN for Enterprise Networks



Agility



Simplicity



Investment
Protection

Policy and Administration

Across DC, Campus,
and Branch

Expose Network
Intelligence

Greenfield and
Brownfield Deployment



What questions do you have?

How to get Engaged...

- Customer Adoption Team (CAT)
 - Steering Committee (10-15 Deeply Engaged Customers)
 - Community of Interest (50-75 Interested in helping us shape)
 - EFT in April

ENG Solution Adoption

ENG + Field Adoption Team

Solution Analysis

What is expected when, and what can we build with that ...

PoC Lab Build-Out

PoC Lab Analysis and Write-Up

Evangelise

Customer Steering and Adoption

Solution Analysis

What is expected when, and what can we build with that ...

Alpha/Beta/EFT

1st Deployments

Evangelise

What is a Customer Adoption Team?

Goal

Ensure solutions we build meet customer expectations when delivered

Approach

- **Partnership** between Development Engineering and our Customers to define, evolve, and deliver the solution closing gaps between expected and actual capabilities
- **Speed** Customer Adoption to enable customer success *fast*

Principles

- Develop a sense of **ownership** via input into development decisions
- Avoid “We **thought it would do X** when it only does Z”
- Avoid Cisco **guessing** at how customers will use the solution
- Engage customer from **Alpha** through EFT → Early Successful Deployments
- Customers helps **evangelise** the Solution throughout, eg case studies, Cisco Live, customer forums

Team

- CAT Steering Committee = core set of 5-10 customers
- CAT Community of Interest = ~50 participating customers
- CAT Cisco team of Product Managers, TMEs, Dev’t Engineers

Cisco *live!*

What's in it For You as a Customer?

- Products that meet expectations and solve challenges *at launch*
- Faster technology adoption with lower risk & more efficient roll-out
- Ongoing relationships with Cisco engineering – intimacy with our team
- Influence Cisco direction and product/solution roadmap
- Motivate customer's IT team – networking is cool, peer interaction

What Do We Expect From Participants

Steering Committee

- Hands-on time with engineering, eg POC in the lab
- Document key learnings from POC and early deployment
- Guide development prioritisation of feature/functionality enhancements
- Leverage Col for validation of findings & recommendations
- Regular meeting, eg monthly

Community of Interest

- Alpha/Beta/EFT deployments
- Try out early config guides, best practices, etc and provide feedback
- Availability for small group feedback sessions, polling & surveys
- Participation in virtual general sessions, scheduled and *ad hoc*

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Q & A

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Thank You



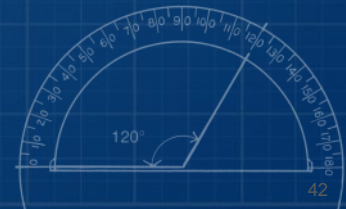
Backup

Network Element Architecture



Major Capabilities

- Highly Scalable Platforms
- Simplified Management
- Consistent Network Services
- Highly resilient
- Physical, Virtual, and Stackable platforms
- Virtual Containers for network services



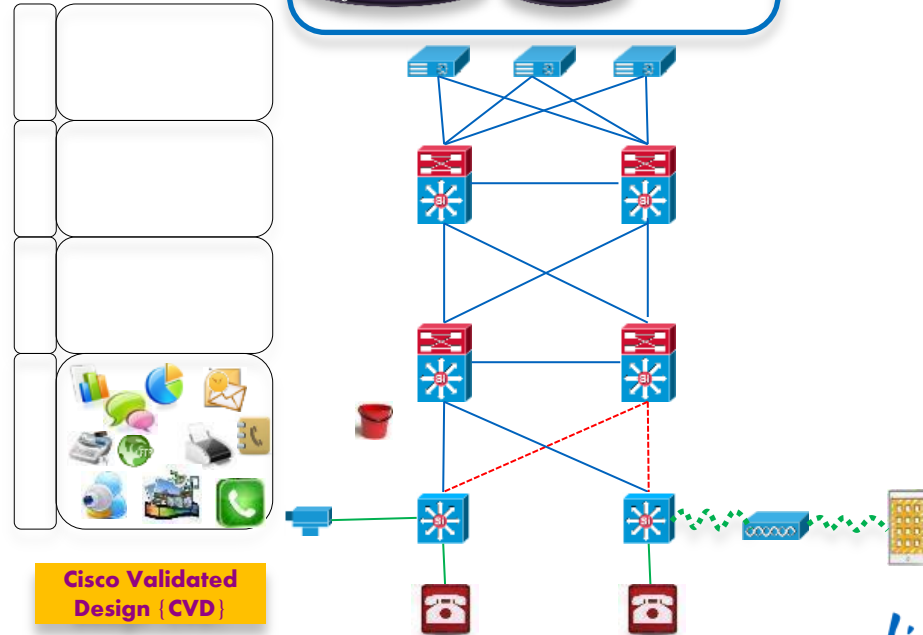
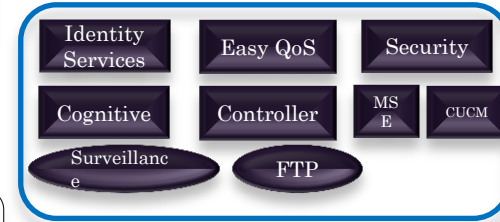
Use Case: Traffic Prioritisation

One Click QoS Policy Enforcement (Easy QoS)

- Enterprise applications are automatically classified and given right class of service based on cisco validated design guidelines and principles.
- QoS policies are applied at a system level with a single click of a button, improving application performance and saving valuable time/resources

QoS Status: Enabled

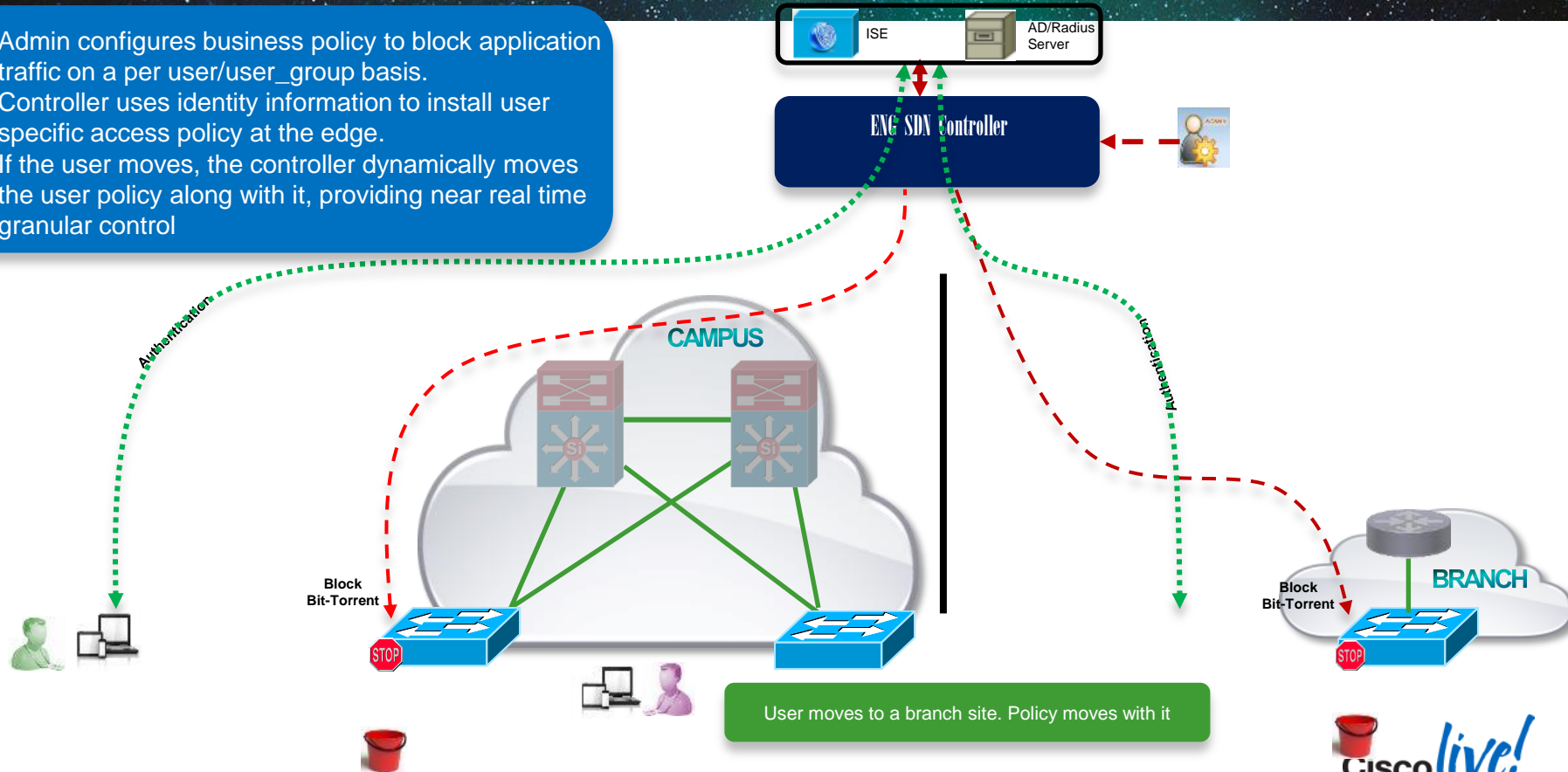
Disable Easy QoS Enable Easy QoS



Use Case: Granular Control

Per User Per Application Access Policy Enforcement

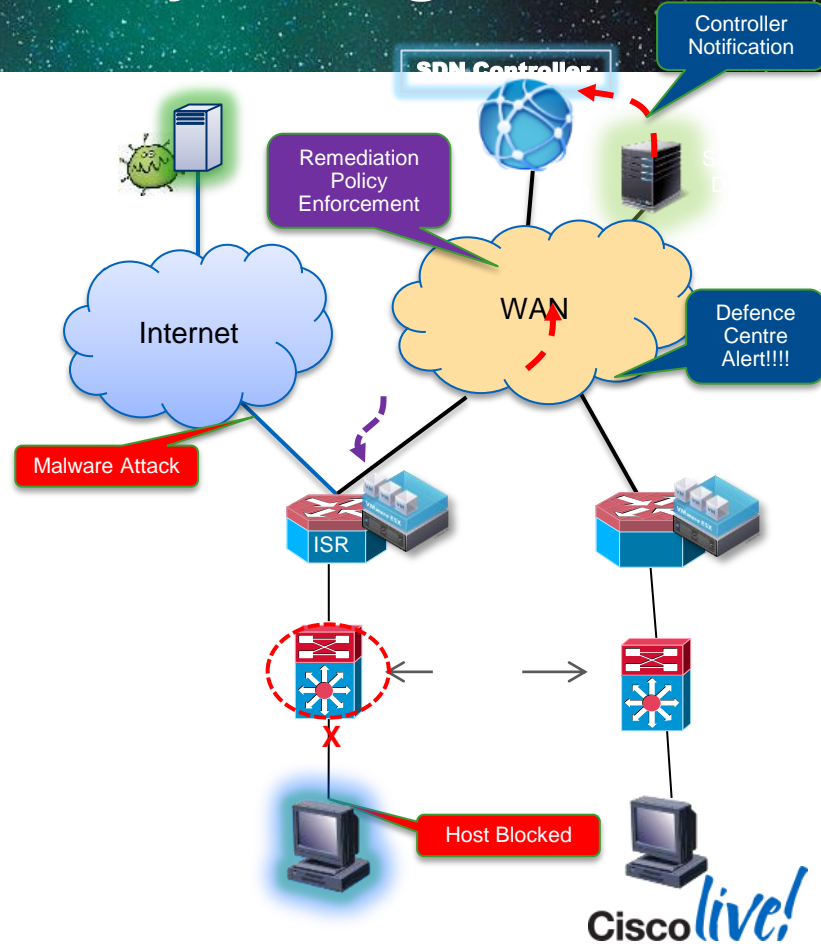
- Admin configures business policy to block application traffic on a per user/user_group basis.
- Controller uses identity information to install user specific access policy at the edge.
- If the user moves, the controller dynamically moves the user policy along with it, providing near real time granular control



Use Case: Next Generation Security Management

Sourcefire and EN Controller

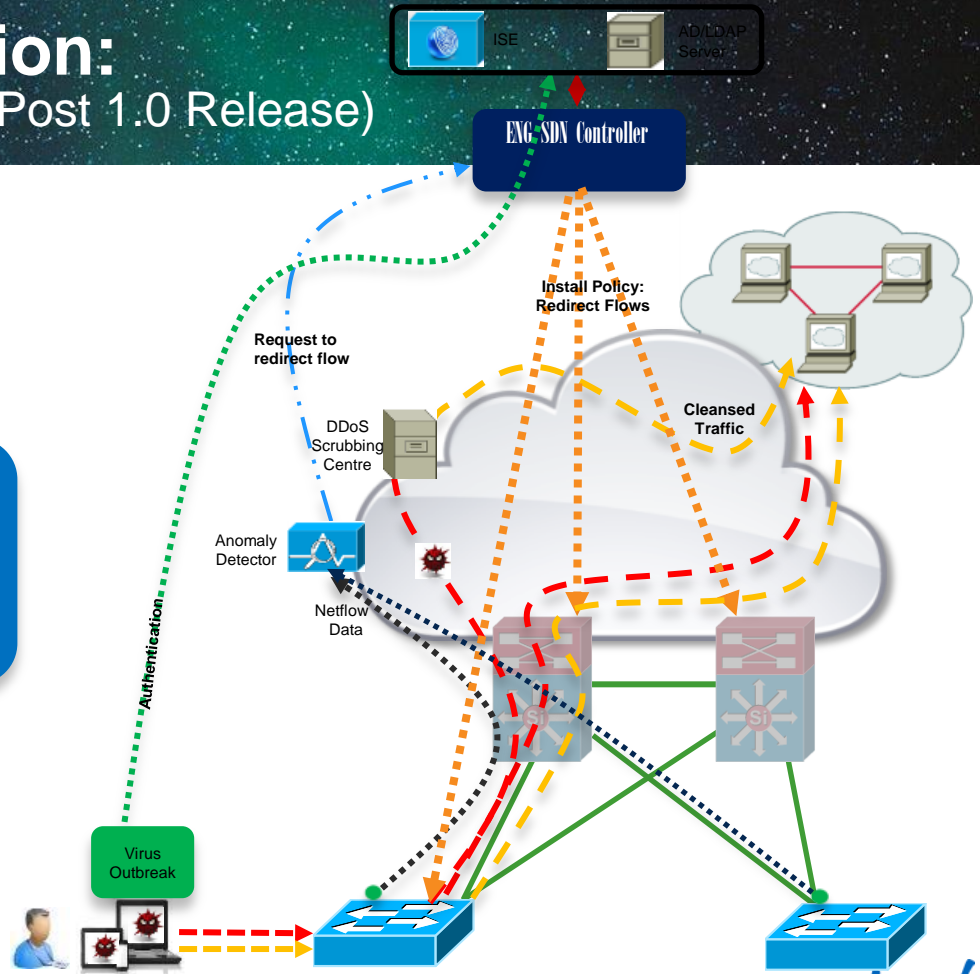
- Host downloads Malware Infection from Internet
- Sourcefire Sensor detects threat and Alerts the Defence Centre (DC)
- DC instructs controller to block infected host
- Controller installs policy on the access switch to quarantine host



Use Case: DDoS Protection: Per User Network Traffic Redirection (Post 1.0 Release)



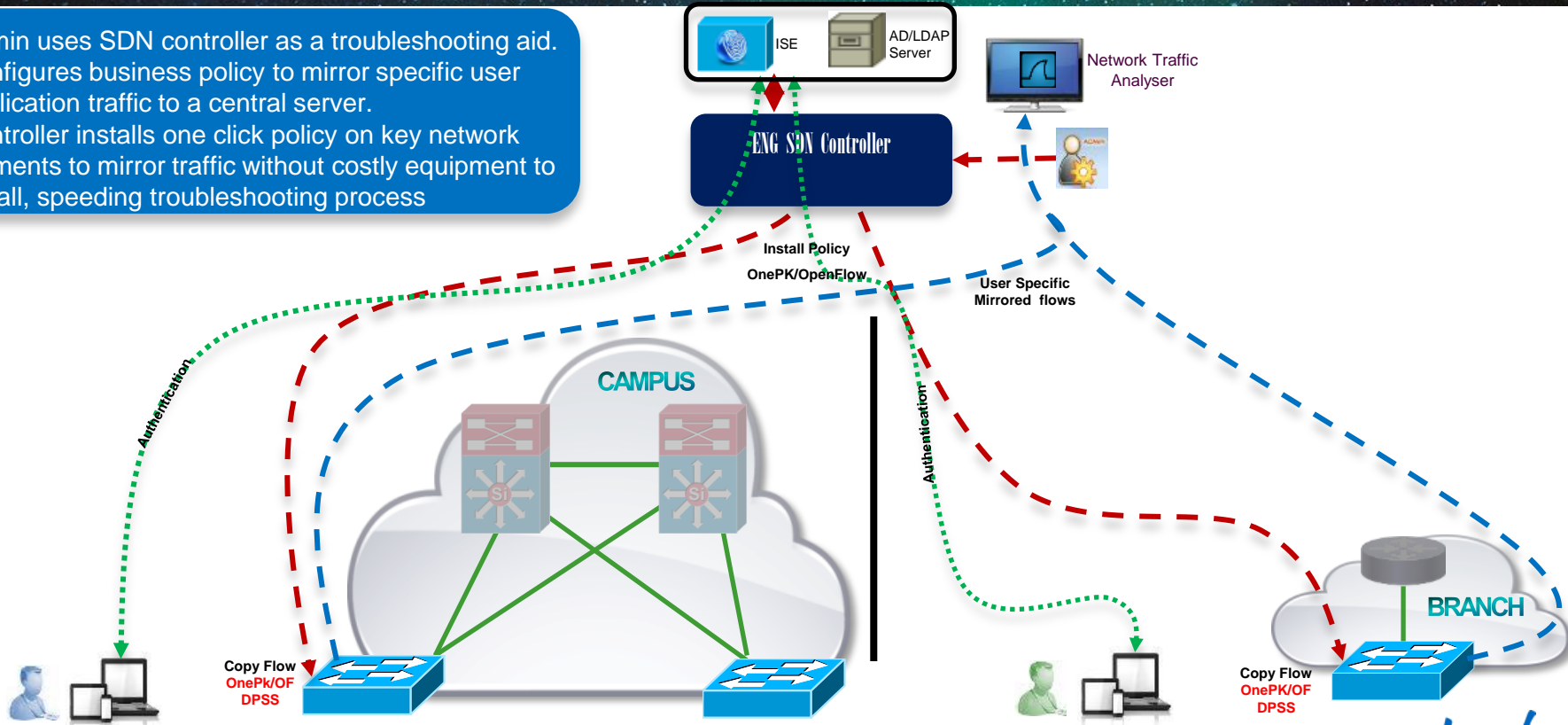
- Anomaly detector monitors the network.
- On detecting DDoS attack, the detector requests the controller to redirect the flow from a specific user to a scrubbing centre.
- Controller configures policy at the edge, redirecting flow for traffic cleansing.



Use Case: Traffic Monitoring

Per User Per Application Network Traffic Tapping (Post 1.0 Release)

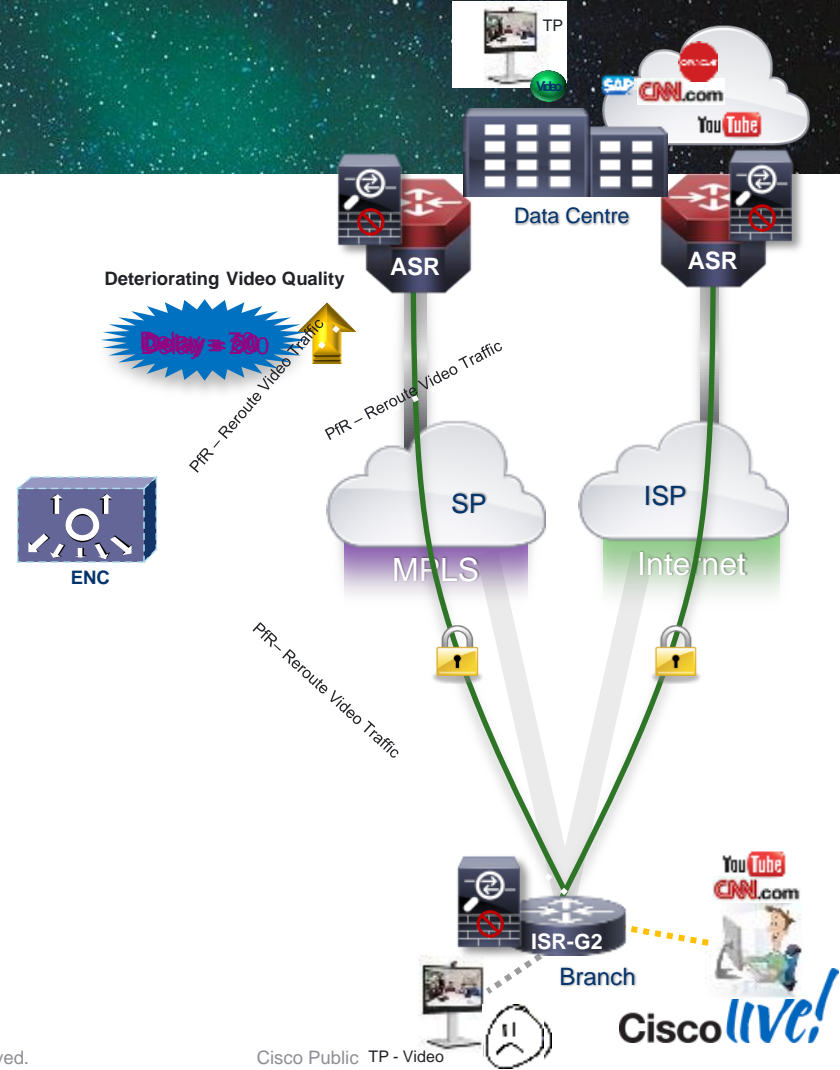
- Admin uses SDN controller as a troubleshooting aid.
- Configures business policy to mirror specific user application traffic to a central server.
- Controller installs one click policy on key network elements to mirror traffic without costly equipment to install, speeding troubleshooting process



Use Case: Smart Routing

Automated Provisioning of Routing Paths

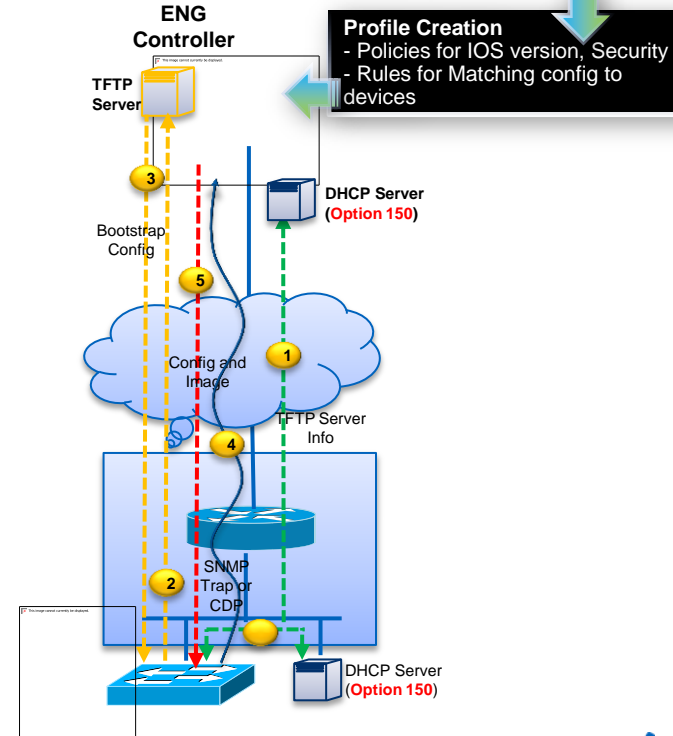
- TP forwarded over MPLS and Youtube over Internet
- Delay goes up on MPLS circuits, deteriorating Video quality
- Performance monitoring App instructs controller to reroute Video traffic over better path
- Appropriate QoS policies are also provisioned to ensure



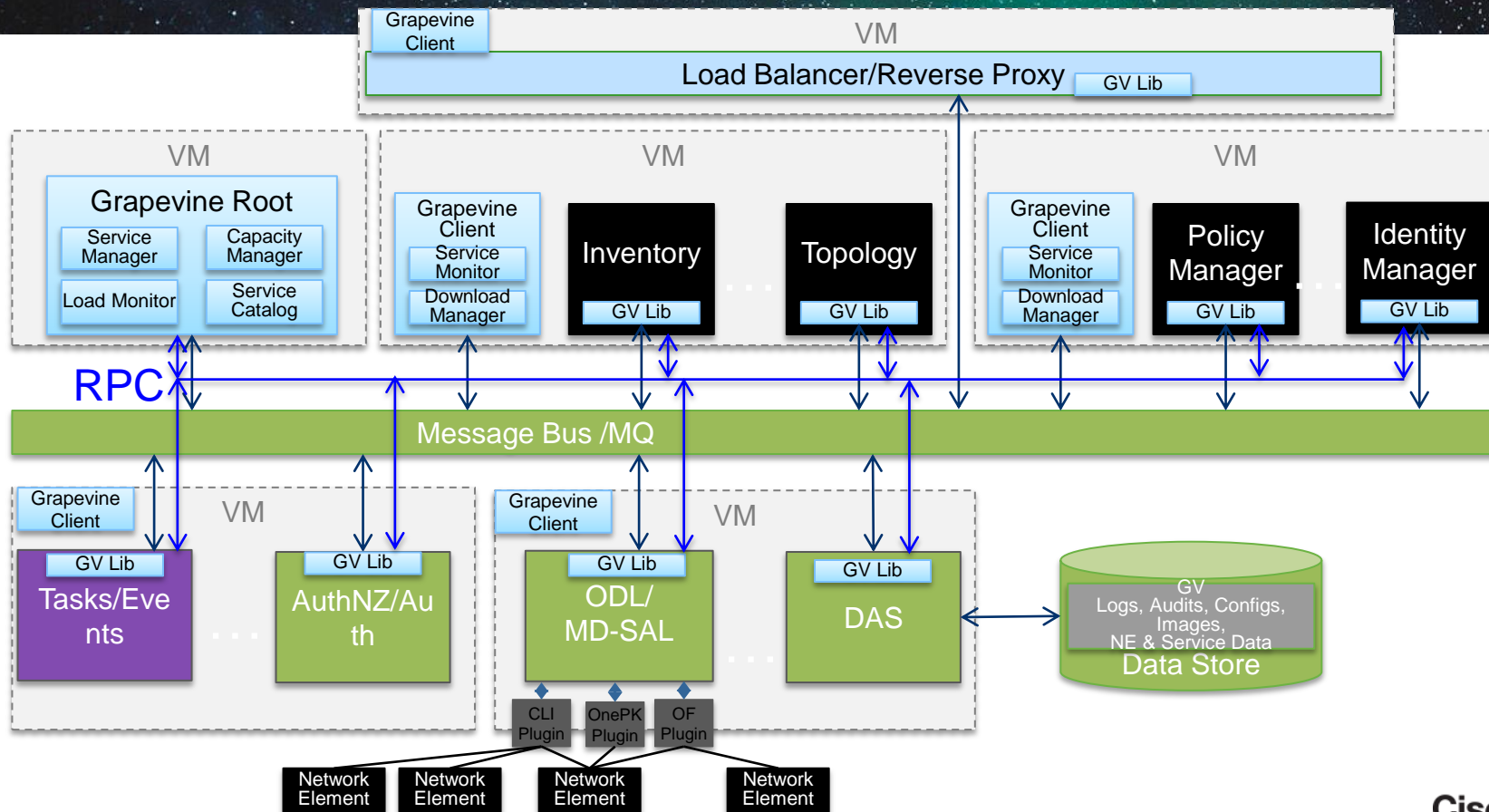
Use Case: Zero Touch Deployment (ZTD)

Automated Provisioning and Deployment

- Remote configuration and deployment of newly discovered IP enabled devices by the controller anywhere in the network
- User defined device profiles with desired configuration, image and matching rules (i.e PID, Serial No, Connected to Device and Connected to port) for accurate classification
- Supports local TFTP for initial bootstrapping of devices
- Discovery via CDP and SNMP Traps to quickly locate devices under deployment
- Discovered devices are automatically contacted by controller via SSH to push desired config and images files and bring the devices to required standards



Service Architecture Detail



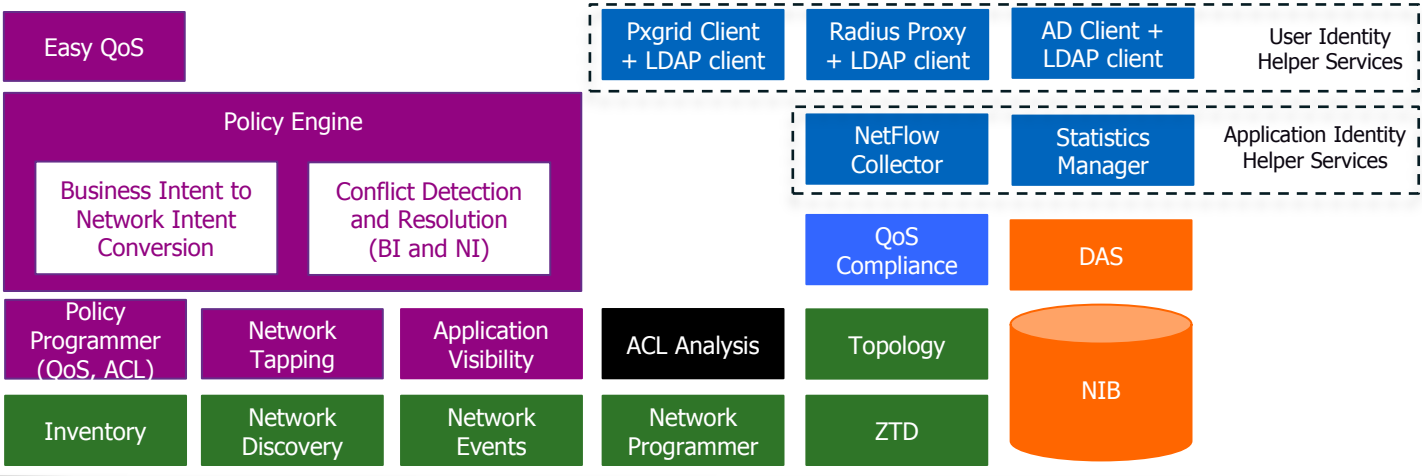
APIC - Enterprise Module 1.0: Services and Apps

- Basic Services
- Policy Creation Services
- Policy Helper Services
- Policy Analysis Services
- Network Information Base
- Legacy Support Services

Apps



ENC Services



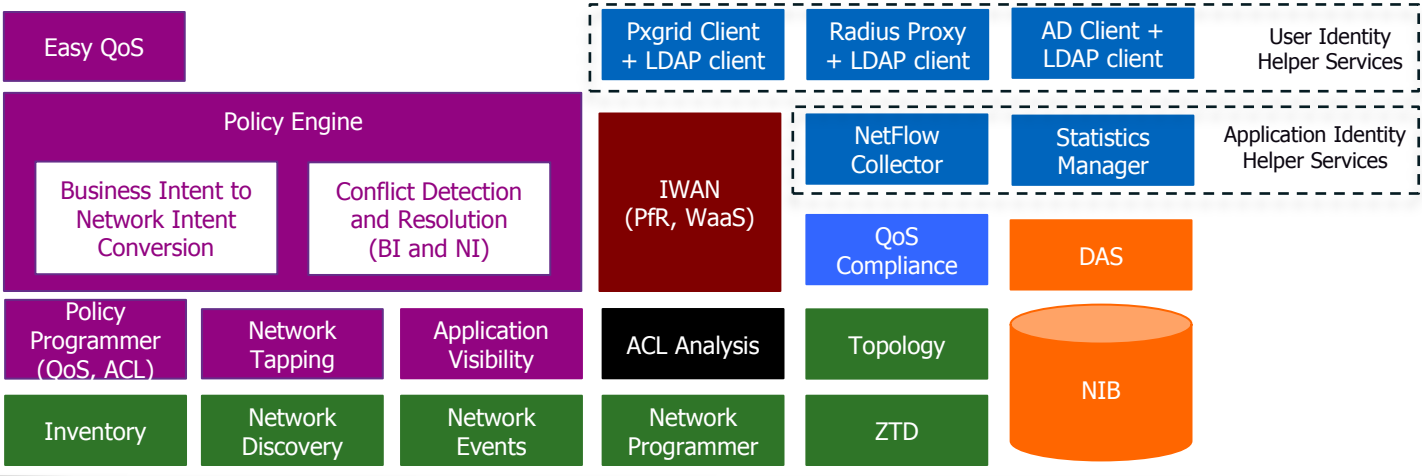
APIC – Enterprise Module: IWAN

- Basic Services
- Policy Creation Services
- Policy Helper Services
- Policy Analysis Services
- Network Information Base
- Legacy Support Services
- IWAN Services

Apps



ENC Services





CISCO™