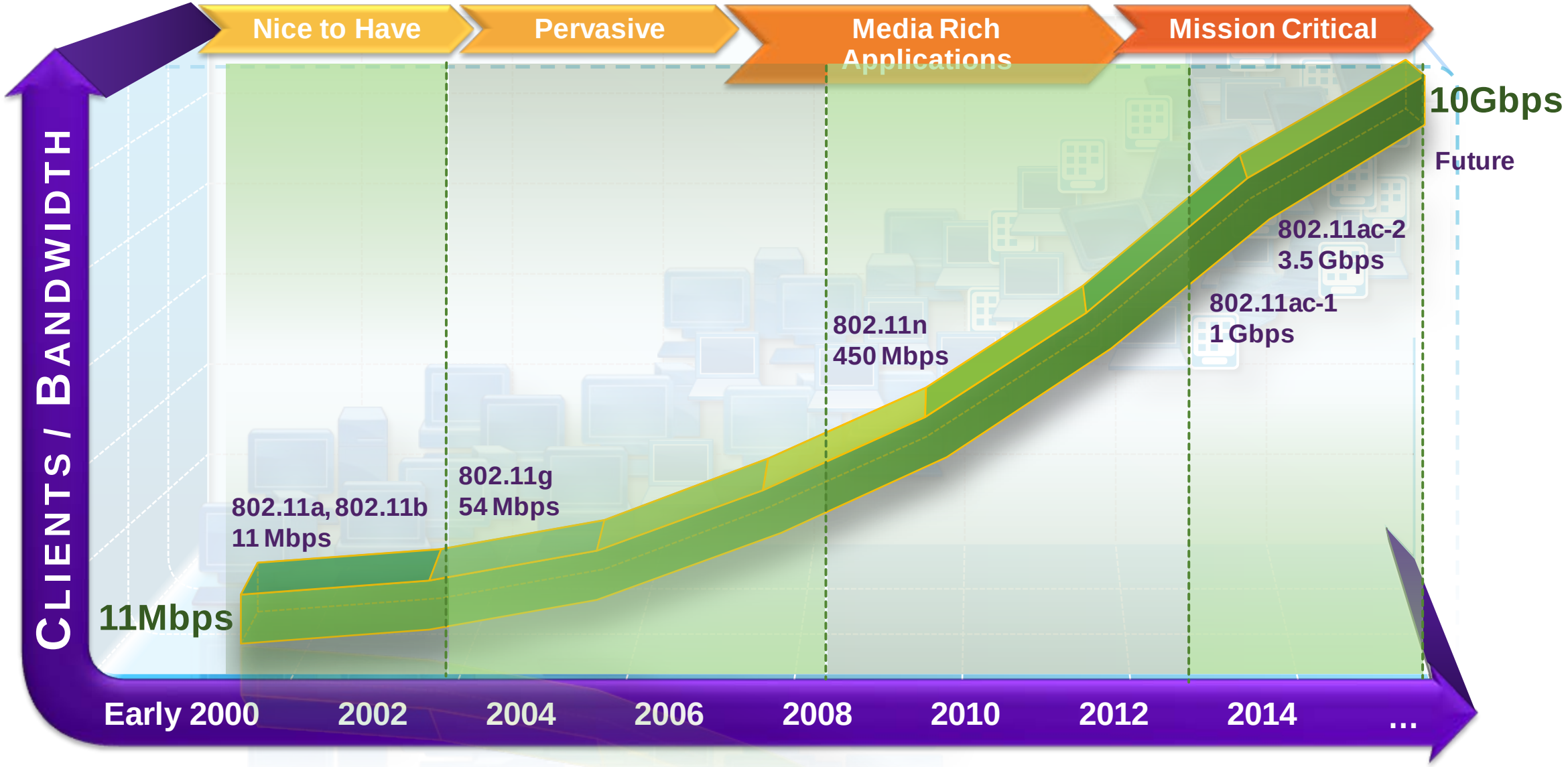
Cisco's Unified Access:

Revolutionizing the Wireless World

Bader Alotaibi

Wireless Standards – Past, Present, and Future



IT Top of Mind

1. How do I manage complexity to reduce costs?
2. Can I offer secure, mission critical wired/wireless access services?
3. Am I investing in an architecture future-proofed for scale?

Is Your Network Ready?

Cisco Strategy for Converged Access

CISCO UNIFIED ACCESS EVOLUTION


LAN


Wireless


Security

Policy Enforcement


Wired Policies


Wireless Policies


Guest / VPN Policies

Management and Troubleshooting


LAN Mgmt.


Wireless Mgmt.


Identity Mgmt.

Access Infrastructure


Access Switch


Access Switch


Wireless Controller


Access Point


Access Point

End-User Devices

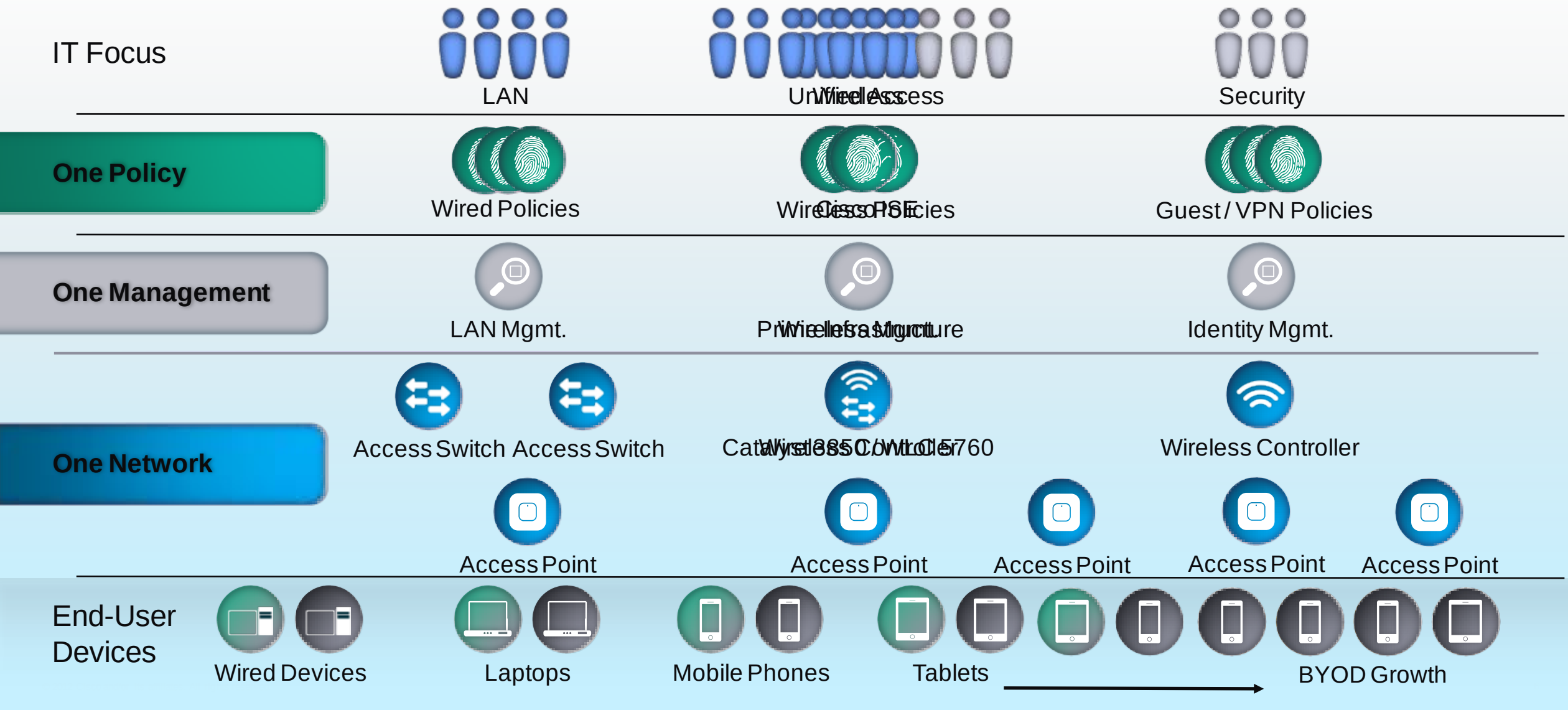

Wired Devices


Laptops


Mobile Phones

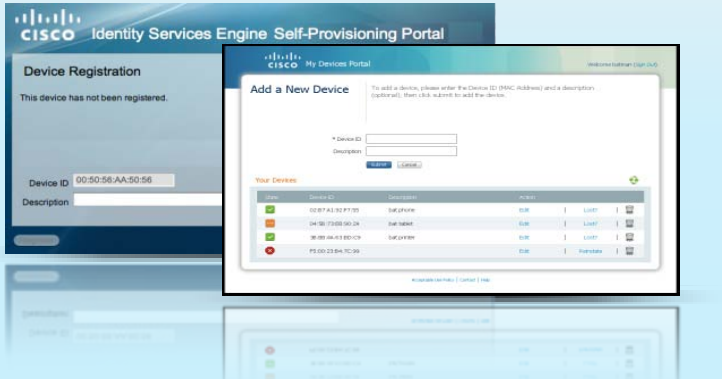

Tablets → BYOD Growth

CISCO UNIFIED ACCESS EVOLUTION



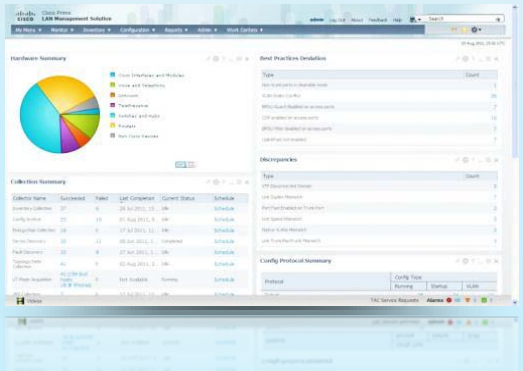
CISCO UNIFIED ACCESS PILLARS

Identity Services Engine (ISE)



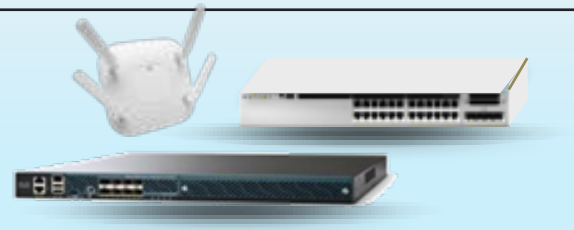
- Self-provisioning portal – My Devices
- Secure Group Access (SGA) - simplified role-based access control and enforcement based on context, avoids manual ACL/VLAN configs

Prime Management



- One application for Cisco Prime Infrastructure 1.2 – wired/wireless
- Application Visibility and Control (AVC), visualizing application flow for wired and wireless

Wired and Wireless Network



- Consistent functionality across wired and wireless
  - Context Aware Access – Secure Groups Access (TrustSec/SGA)
  - Sub-second Stateful SwitchOver (SSO)
  - Application Visibility and Control (AVC)

One Policy → **One Management** → **One Network**

One Policy and One Management

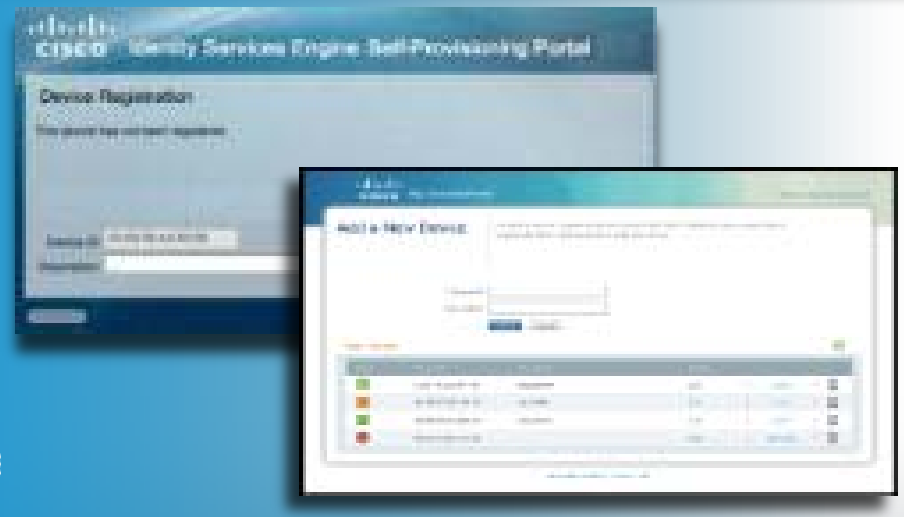
Identity Services Engine (ISE) 1.2

Good

airwatch

MobileIron

ZENPRISE

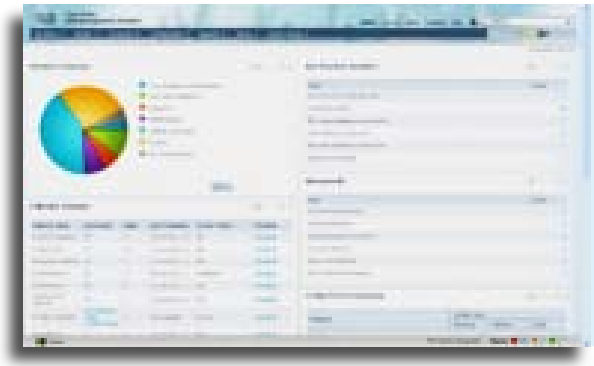


3rd Party MDM Integration

Industry's first real-time device feed service via cloud

Automatic Policy Compliance Check

Prime Infrastructure 2.0



CUSTOMER PROFILE

Robert Brown

DEVICES: laptop, iPhone, iPad

APPS: email, Twitter, SharePoint, Skype, Words with Friends, Shazam, IM, Pandora

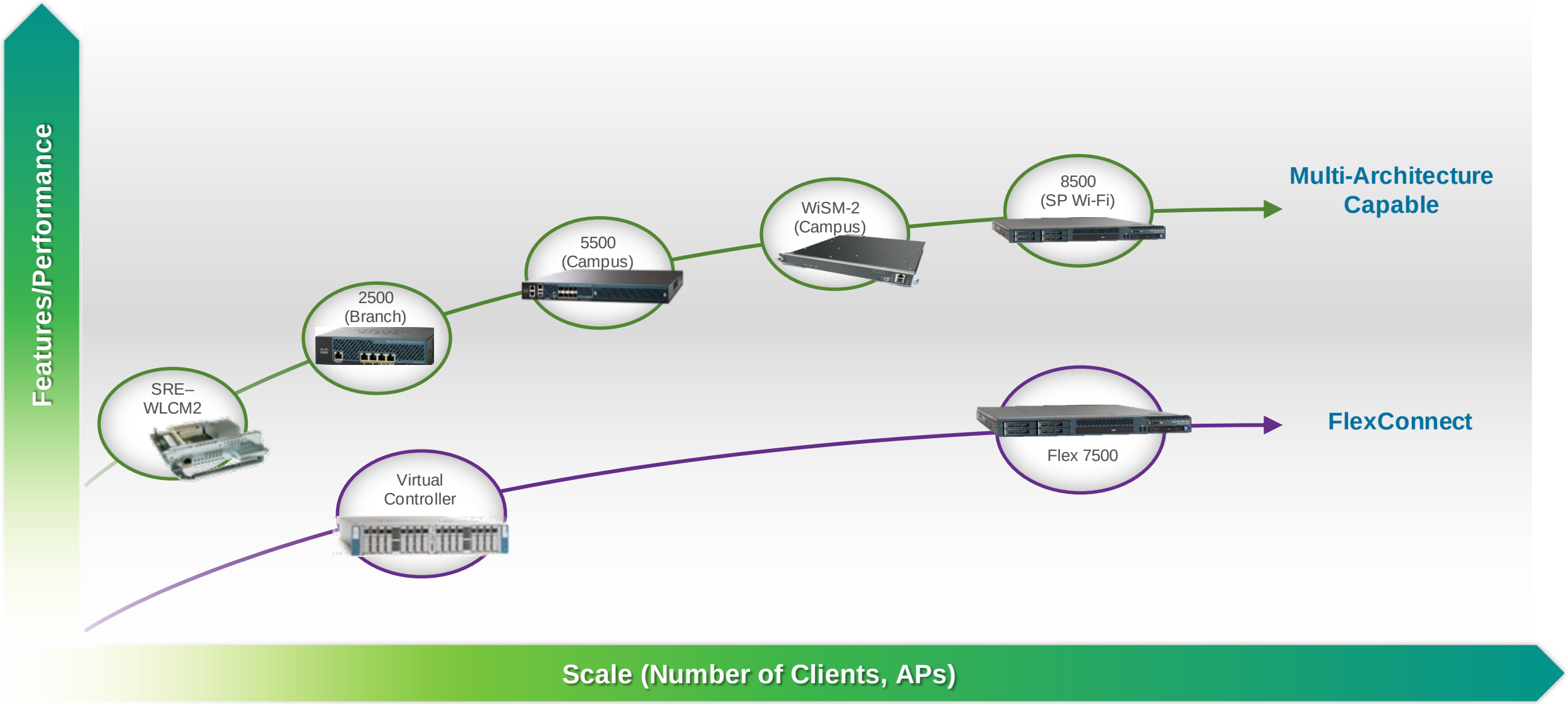
360° Experience: across applications, services and end-users

Best Practices and New Automated Workflows

Day One Support for Catalyst 3850, 5760 Controllers and Next Gen 802.11n APs

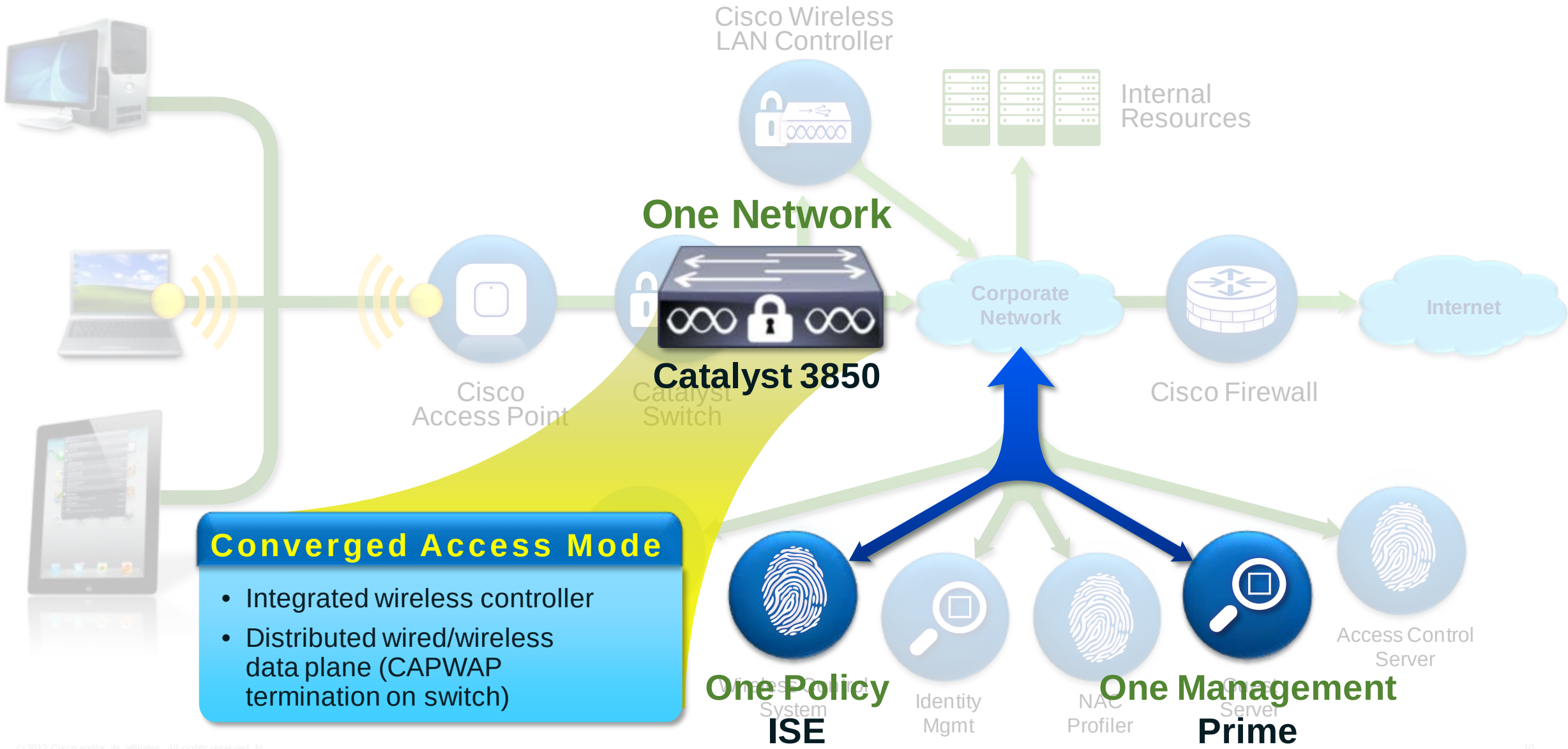
ONE POLICY → **ONE MANAGEMENT**

Controller Product Portfolio



Roadmap is highly confidential and reflects current plan. Subject to change without notice

One Network with Converged Access



Converged Wired-Wireless Access

Cisco Catalyst 3850 Switch

480G W/Stacking

WIRED

WIRELESS

Powered by New Programmable ASIC

High Performance
Wireless to Wired conversion in ASIC

Industry's Most Scalable Access Platform
6X Performance vs. Current Generation

Rich Feature Set
StackPower, AVC, FNF, Granular QoS

25+ Years of IOS Excellence—Now on Wireless

Single Platform for Wired and Wireless

20+ Years of IOS Richness – Now on Wireless

WIRELESS

Features:

- 802.11n
- CleanAir
- VideoStream
- Radio Resource Management (RRM)
- Wireless Intrusion Prevention System (WiPS)
- 802.11ac Ready

Benefits

- Built on **Unified Access Data Plane (UADP) ASIC** – Cisco's Innovative Flexparser ASIC technology
- Eliminates operational complexity
- Single Operating System for wired and wireless

WIRED

Features:

- Stacking
- Stackpower
- Trustsec*/Identity
- AVC/Medianet*
- Flexible Netflow
- Granular QoS
- Smart Operations
- EnergyWise*

Note: All features may not be available on new platforms at introduction. Features marked with * are expected to be added within 12-18 months

NEW Catalyst 3850 Switch (Target FCS Jan 2013)

Wireless CAPWAP Termination

Up to 50 APs/2000 clients per stack, and 40G per switch

480 Gbps Stacking Bandwidth

Up to 2000 Clients per Stack

Full POE+

FRU Fans, Power Supplies

Stackpower

Granular QoS/Flexible NetFlow

SGT/SGACL*

40 Gbps Uplink Bandwidth

Line Rate on All Ports

* Roadmap

Built on Cisco's Innovative "UADP" ASIC

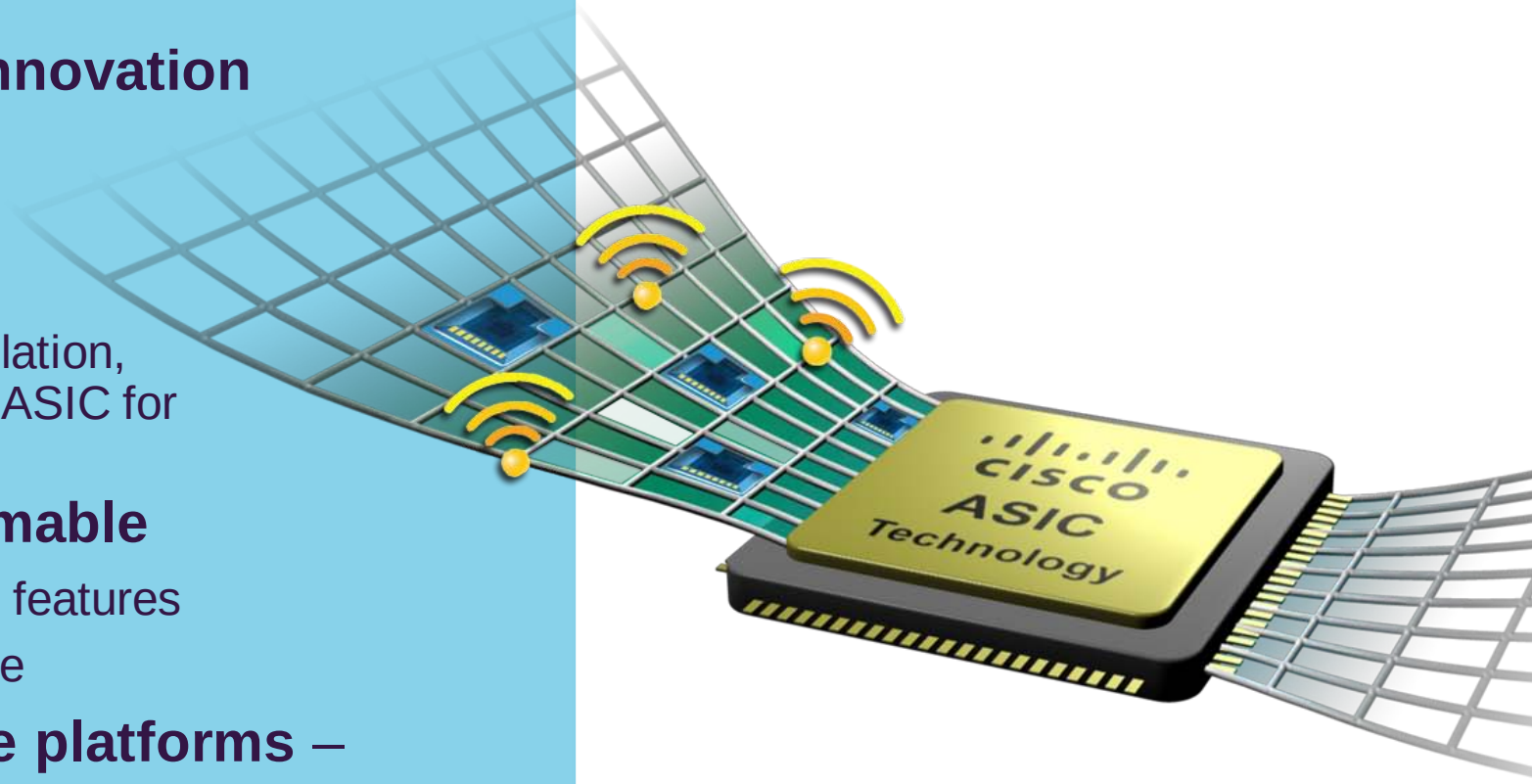
Catalyst 3750-X and Catalyst 3850

Features	Catalyst 3750-X	Catalyst 3850
Stacking	64 Gbps	480 Gbps
IOS Wireless Controller	No	Yes
Queues per Port	4	8
QOS Model	MLS	MQC
Uplinks	2 x 10 Gbps	4 x 10 Gbps
Buffers	6MB/48 port model	12MB/48 port model
Stackpower	Yes	Yes
Native Flexible Netflow Support	No	Yes
Multi-Core CPU for Hosted Services	No	Yes
Flash Size	64 Mb	2 Gb
Operating System	IOS on 15.0 release train	IOS-XE on 15.0 release train

UADP ASIC in Catalyst 3850 Enables Convergence

Built on UADP

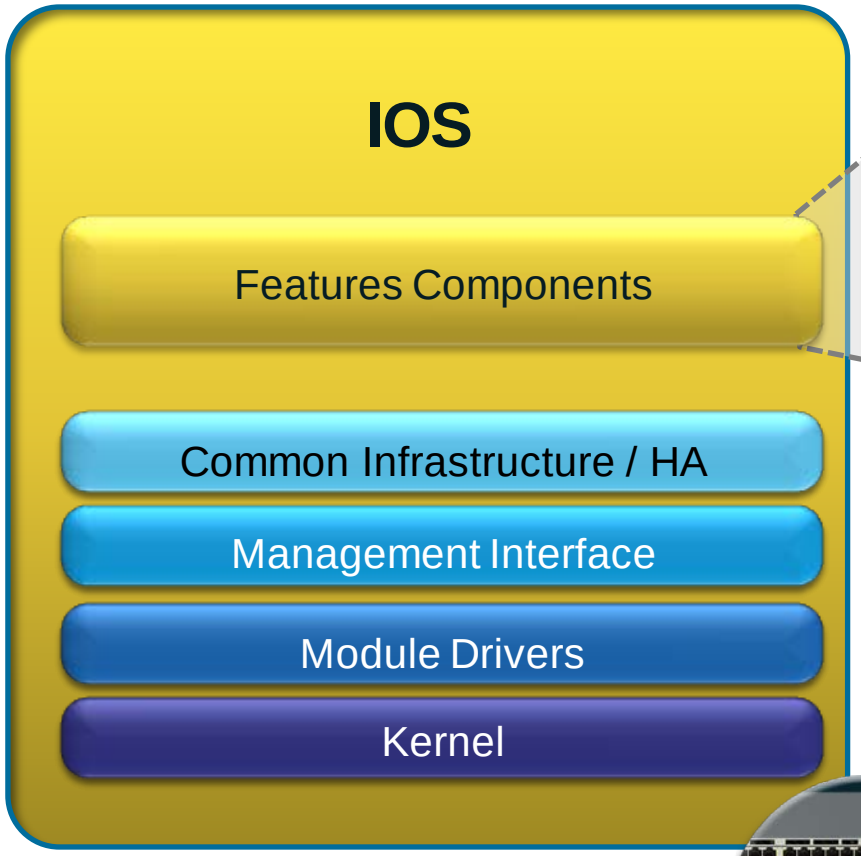
- **Unified Access Data Plane**
- **Unique and powerful Cisco innovation**
  - Hardware performance with software flexibility
- **Optimized Performance**
  - CAPWAP encapsulation/de-capsulation, Flexible Netflow, QoS happens in ASIC for line rate performance
- **Future Proofed and Programmable**
  - Flexparser enables new software features (like SDN) over the product lifetime
- **UADP is used across multiple platforms** – Catalyst 3850, Sup 8E, WLC5760

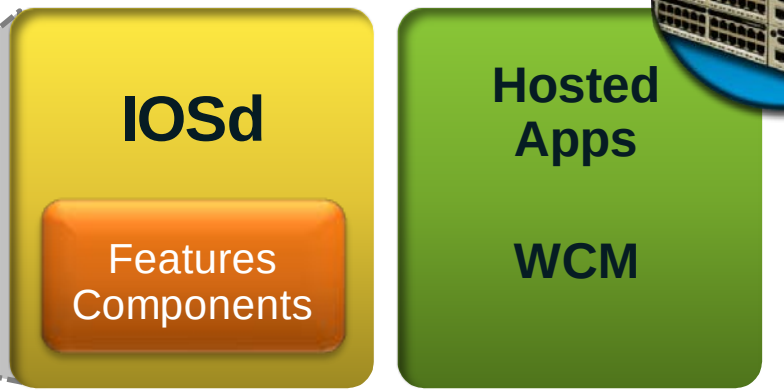


IOS XE Evolution

IOS-XE

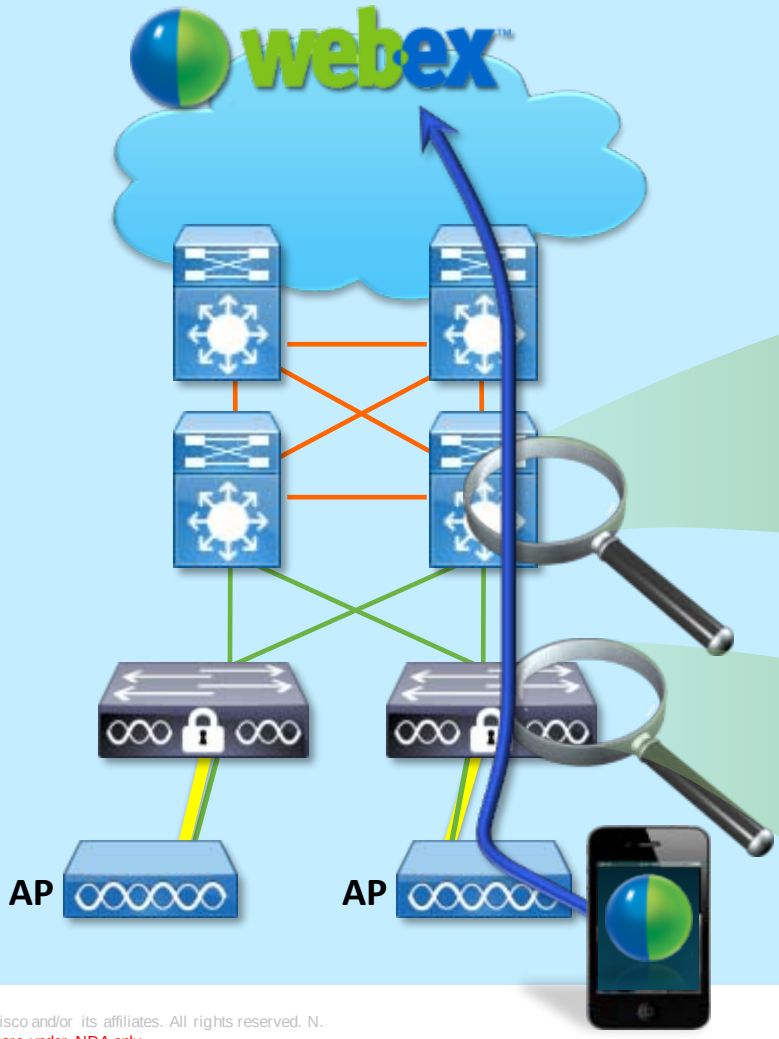
- Modern IOS to enable multi-core CPU
- Easy customer migration
- While maintaining IOS functionality and look and feel
- Allow hosted applications like Wireshark





Network Wide Visibility for Faster Troubleshooting

Converged Access Deployment



Employee joins webex call on iPhone

Employee iPhone connected

Benefits

- **Track applications at every hop**
  - CAPWAP Tunnel terminated at the access switch
- **Root cause issues quickly**

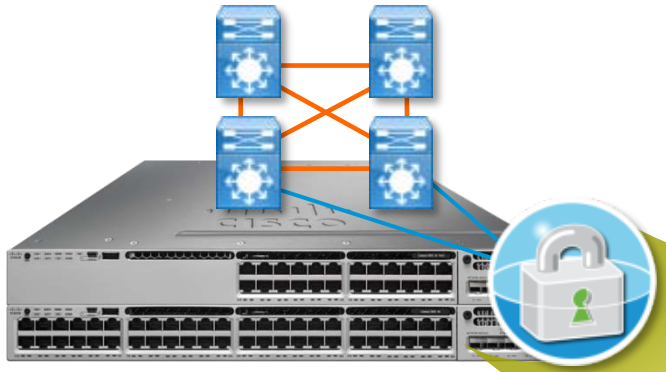
- **App level visibility –** Flexible Netflow, Wireshark*
- **Media Troubleshooting** – Medianet*

Device Identification
- Device Profiling*

AP CAPWAP Tunnel

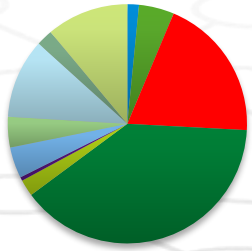
* - Software Roadmap - within 12-18 months after FCS

Flexible NetFlow for Converged Access

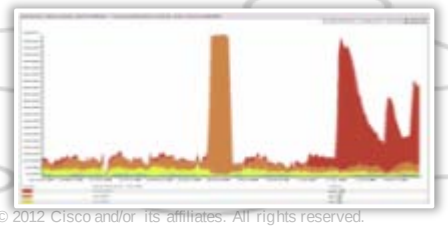


Complete Visibility into Wired +Wireless Traffic at the Access

Understand Bandwidth consumption by various devices and applications

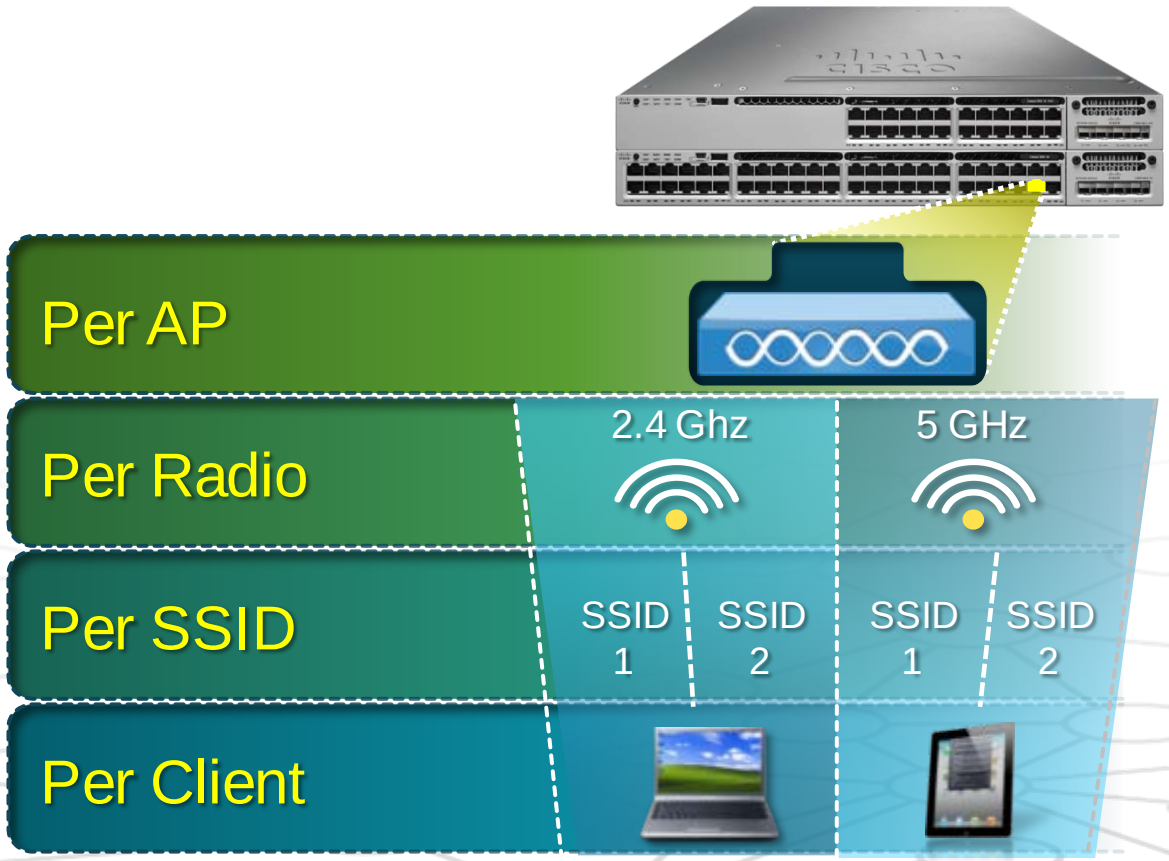


Detect Anomaly in Traffic flows



- **FNF for the first time on Wireless**
- **Consistent Configuration for Wired+Wireless**
  - Single flow monitor can be applied to wired ports and SSID
- **Natively available in the UADP ASIC**
  - No additional hardware required
- **Can monitor East-West (peer-to-peer) and North-South flows**
  - 48k flows on the 48 port model.
- **0$ Collector SKUs available at FCS**
  - Actively working with PAM and 3rd party collector vendors for supporting key and non-key fields

Granular QoS for Converged Access



MQC based CLI

- Alignment with 4500E series
- Class-based Queuing, Policing, Shaping, Marking

New QOS features

- Hierarchical Bandwidth Management (HBM) – Per AP-Radio-SSID-Client upstream and downstream
- Approximate Fair Drop (AFD) – Fair sharing of bandwidth
- Per-user-per-application-level policing and marking in SW roadmap

QOS by the numbers

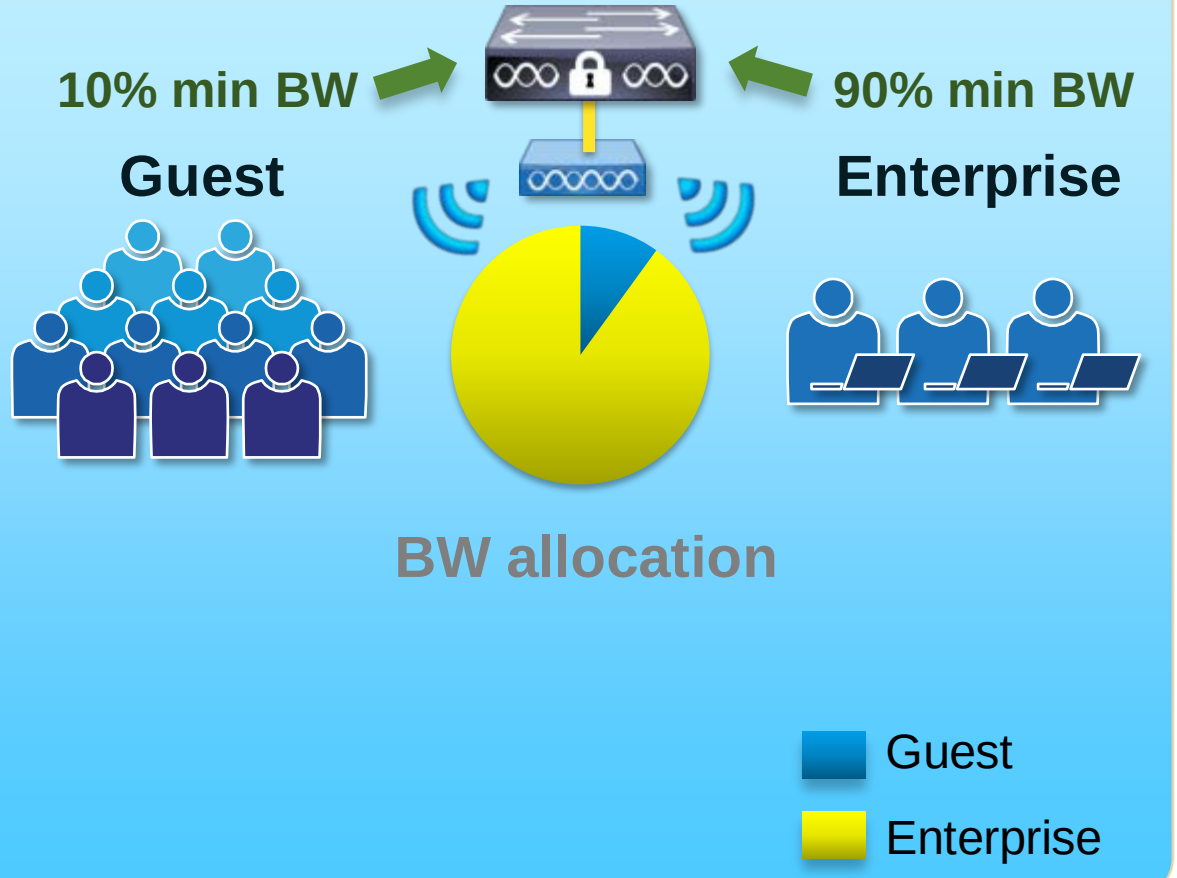
- Queues/port for Wired traffic : 8 (Up to 2P6Q3T queuing capabilities)
- Queues/port for Wireless traffic : 4
- Buffers - 12 MB/48 port model
- 2000 Aggregate & 48k Microflow Policers

*Software roadmap – within 18 months after FCS

Hierarchical Bandwidth Management

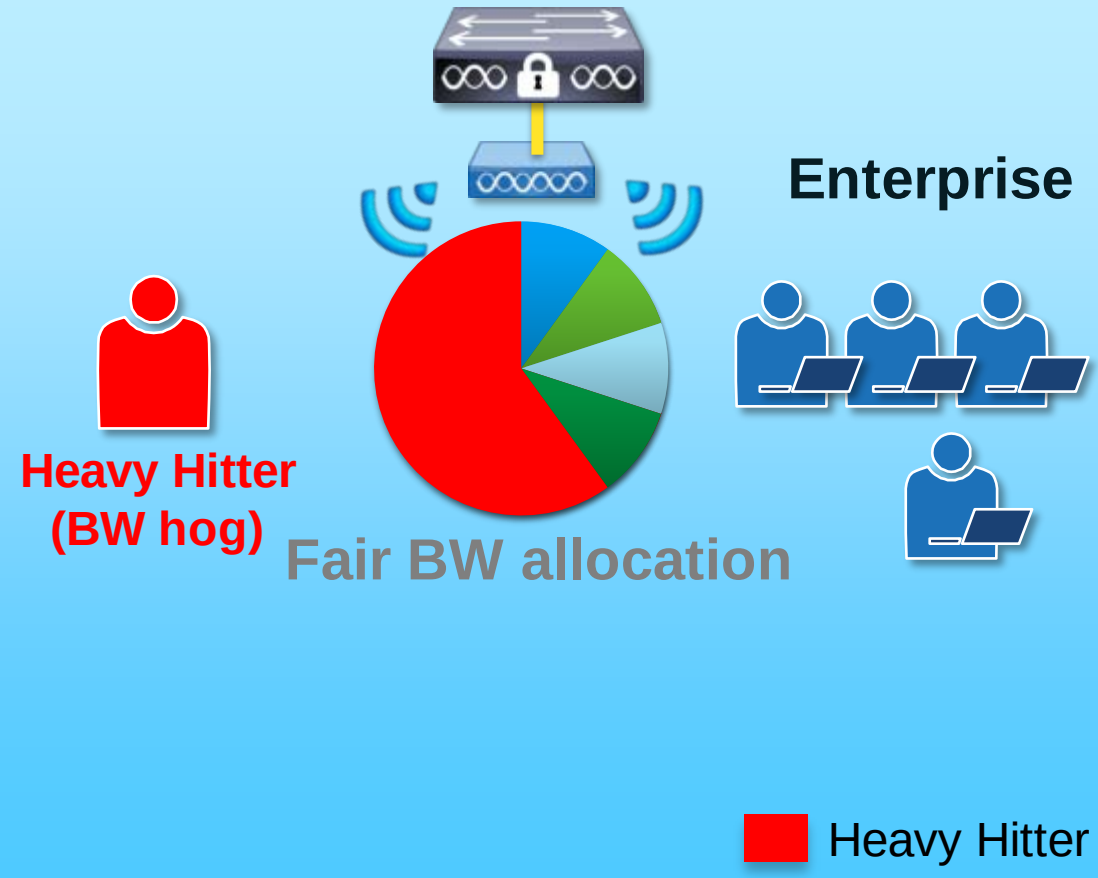
per SSID Bandwidth

Converged Access
Deterministic SSID bandwidth



Fair Sharing

Usage based fair bandwidth allocation



Proof: Consistent QoS, FNF, ACL Configs on Wired-Wireless

```
wlan Reaper 2 Reaper
client vlan 15
ip flow monitor v4 input
ip flow monitor v4out output
security wpa akm psk set-key ascii 0 skunkworks
service-policy input ingress-ssid
service-policy output egress-ssid
service-policy client in ingress-wireless-client
service-policy client out egress-wireless-client
ip access-group restrict_access
```

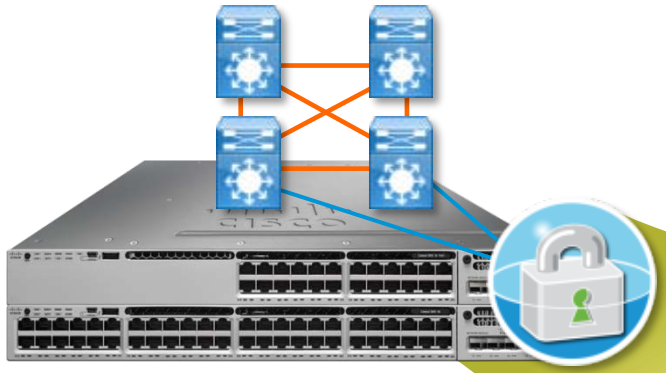
Flexible NetFlow defined for wired and wireless

QoS application on SSID for ingress/egress. Same can be used on a physical port as well

QoS application for clients on SSID for ingress/egress

IP Access-group application on SSID

Security – For Converged Access

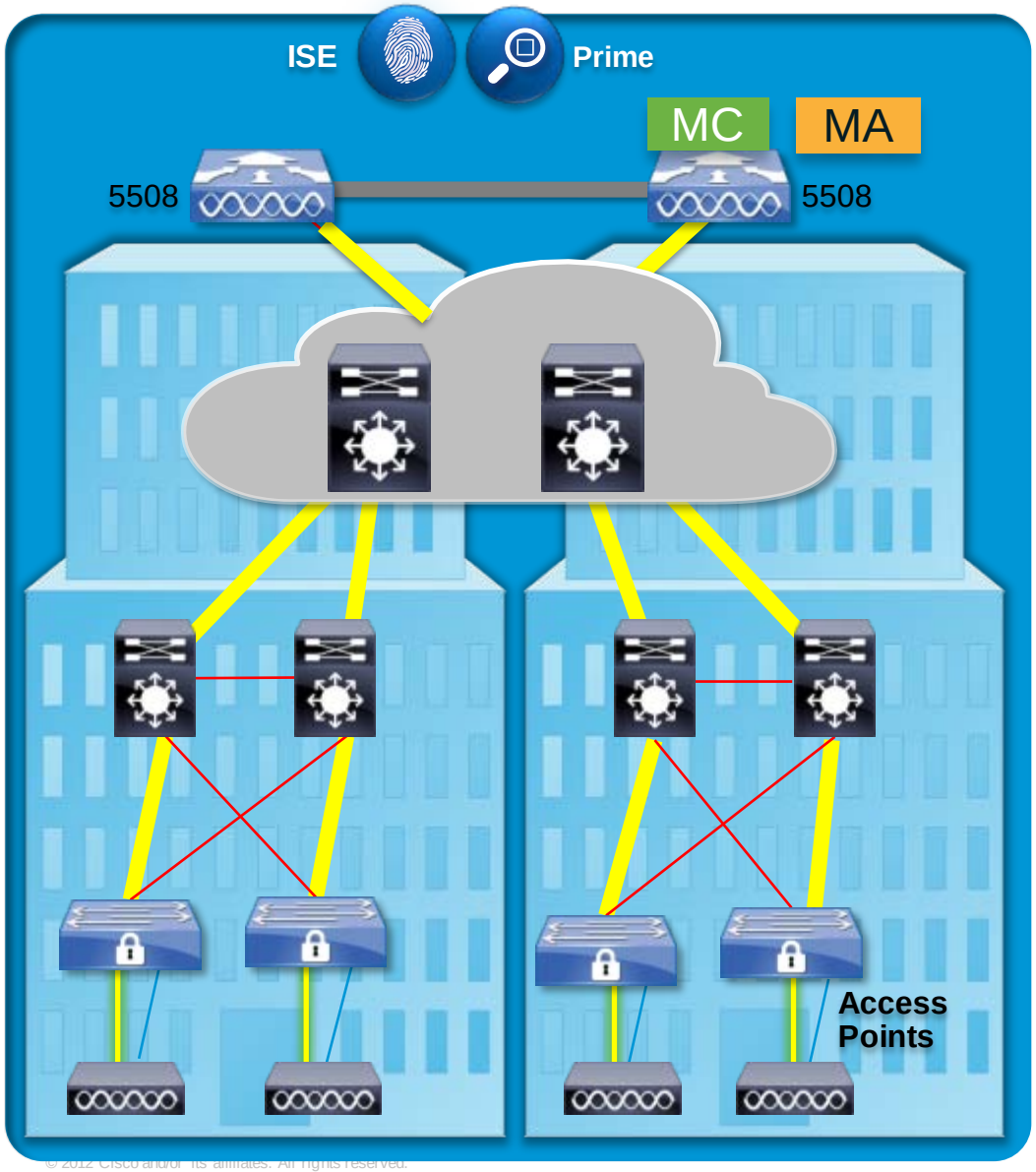


Session Aware Networking

- **Single Point of Policy Enforcement for Wired and Wireless:**
  - Session based access – simplifies on-boarding and policy application
  - Wired – Port based 802.1x authentication, Web auth, MAB. Flex-auth support available for wired.
  - Wireless – 802.1x, MAB, Web Auth
- **Wireless Intrusion Prevention System (WiPS) for protection against wireless attacks**
  - Supports integration with MSE
- **Control Plane Protection (Static configuration at FCS)**
- **Roadmap for other Trustsec features –** Device Sensor, MACSec, SGA (12 – 18 months after FCS)

Understanding Current Deployment Model

The Wireless LAN Controller



Known Deployment Model

- **Wireless is an Overlay Network**
- **Software components within the WLC today:**

- **Mobility Agent (MA) is responsible for:**
  - AP CAPWAP termination
  - Maintaining client database
  - Policy enforcement

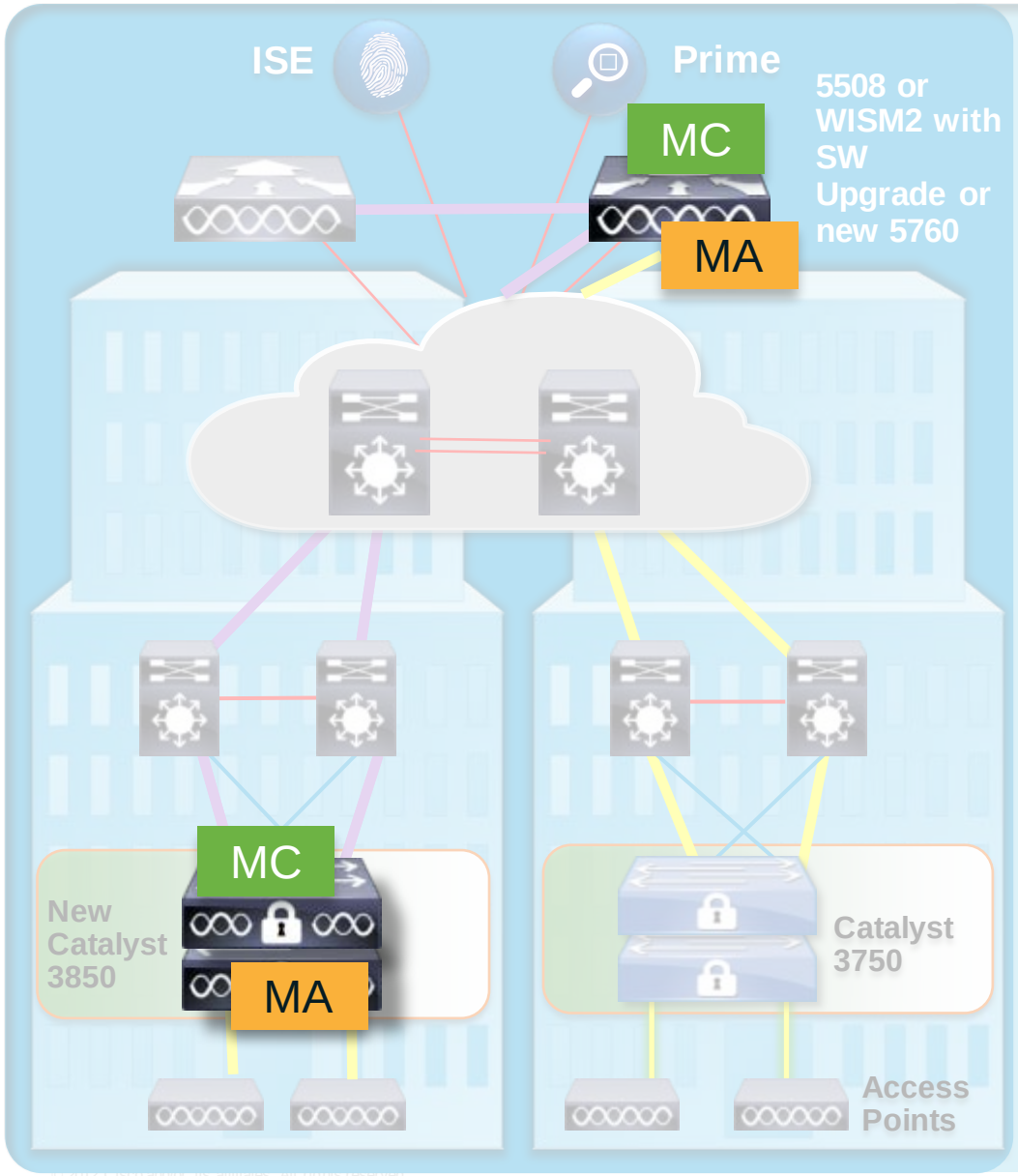
- **Mobility Controller (MC) is responsible for:**
  - Client Mobility
  - Radio Resource Management (RRM)
  - WiPS, Spectrum Management

Inter--Controller EoIP/CAPWAP tunnel

AP-Contoller CAPWAP tunnel

Better Scale and Bandwidth with Converged Access

Separation of MA and MC

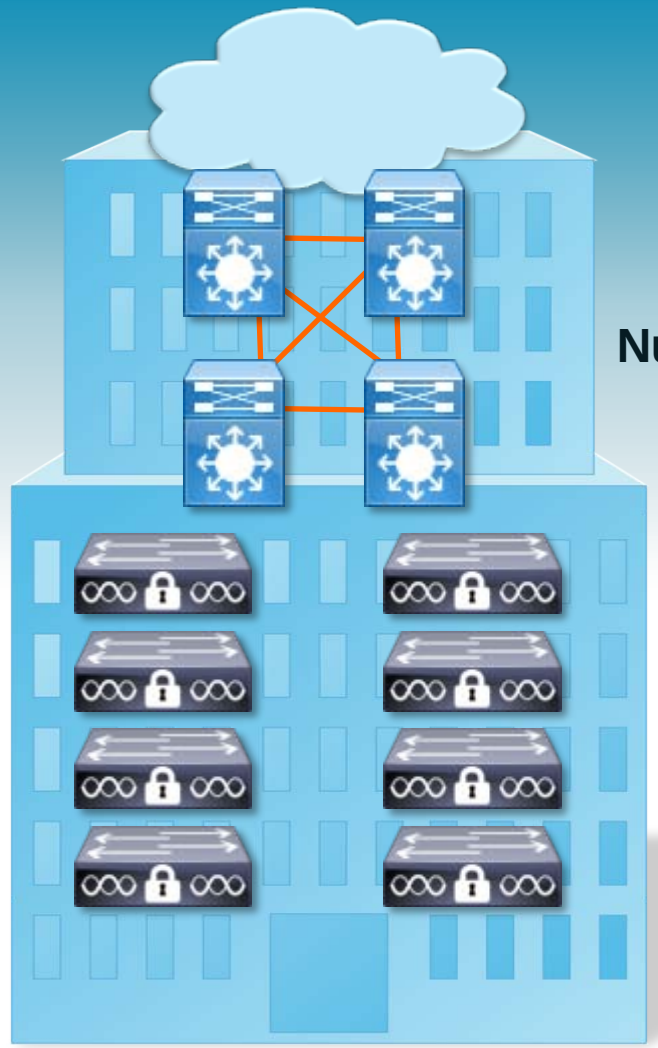


- Traditional Controllers continue to play MA and MC
- Catalyst 3850 can play the role of both MA and MC
  - Valid for Branch and small-medium campus type deployments
- Moving the MA only to the Catalyst 3850 (typically in large campus) helps with:
  - Improved Scalability – larger mobility domains
  - Increased wireless bandwidth
  - Uniform wired/wireless policy enforcement

AP Capwap Tunnels Mobility Tunnels

Increased Wireless Bandwidth with Converged Access

Campus (3840 users)



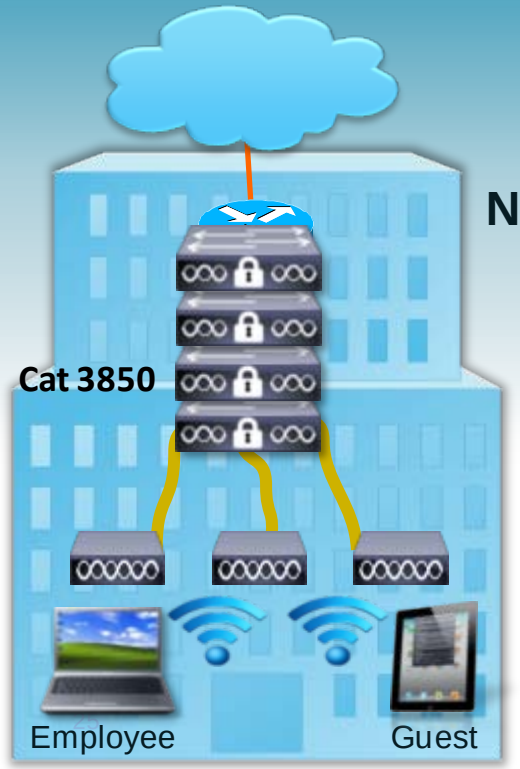
Number of Switches: 80

Total Wireless Bandwidth (Tbps)

0.0 Tbps

40G on Every Switch

Small Campus or Branch (192 users)



Number of Switches: 4

Total Wireless Bandwidth (Gbps)

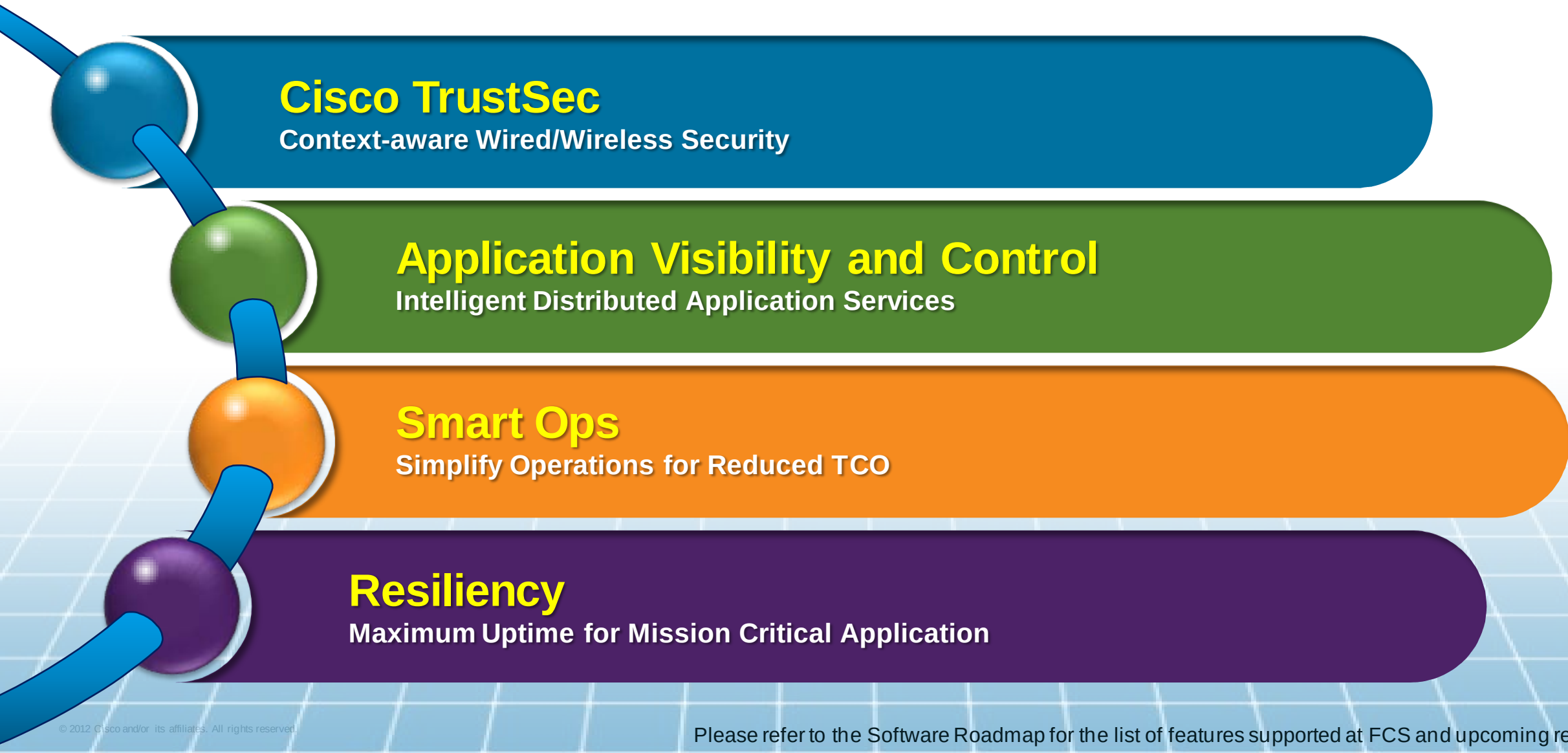
000 Gbps

40G on Every Switch

Future Proofing your Network for 802.11ac and beyond

Distributed Intelligent Services with Catalyst 3850

Catalyst 3850 Distributed Services



Please refer to the Software Roadmap for the list of features supported at FCS and upcoming releases

TrustSec Radically Simplify BYOD Deployment

Across the Entire Lifecycle

Automatically Identify Devices
With Device Sensors, Cisco Identity Service Engine

Centralize Policy Definition
With Cisco ISE – Define policy for access, authentication and more

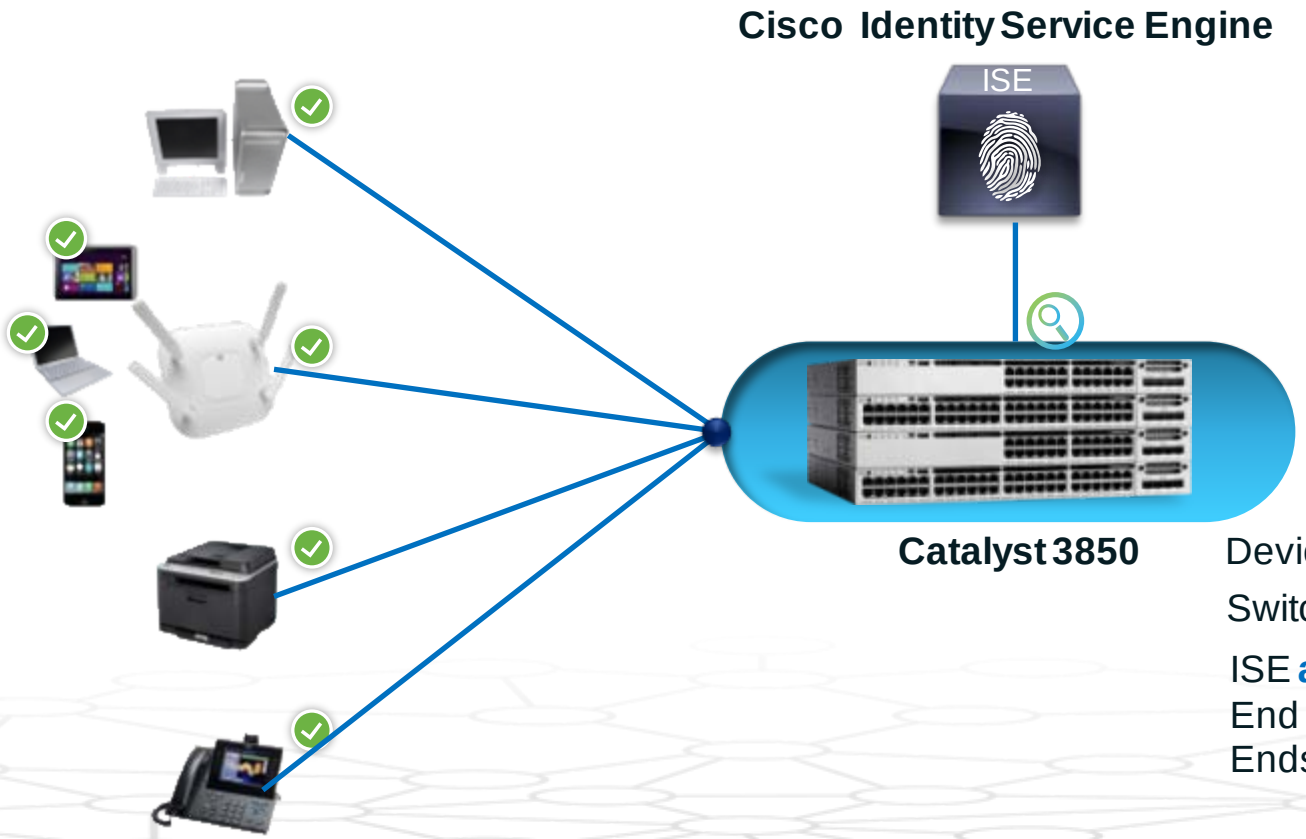
Scale Personalized Policy Enforcement
With Security Group Tags, Secure Group Access Control Lists

Please refer to the Software Roadmap for the list of features supported at FCS and upcoming releases

Use Case: Radically Simplify BYOD Deployment …1

Across the Entire Lifecycle: Automatically Identify Devices

Identify **Centralize Policy** **Enforce**



Device Sensor* automatically **identifies end points**

Switch sends Device Sensor information to ISE

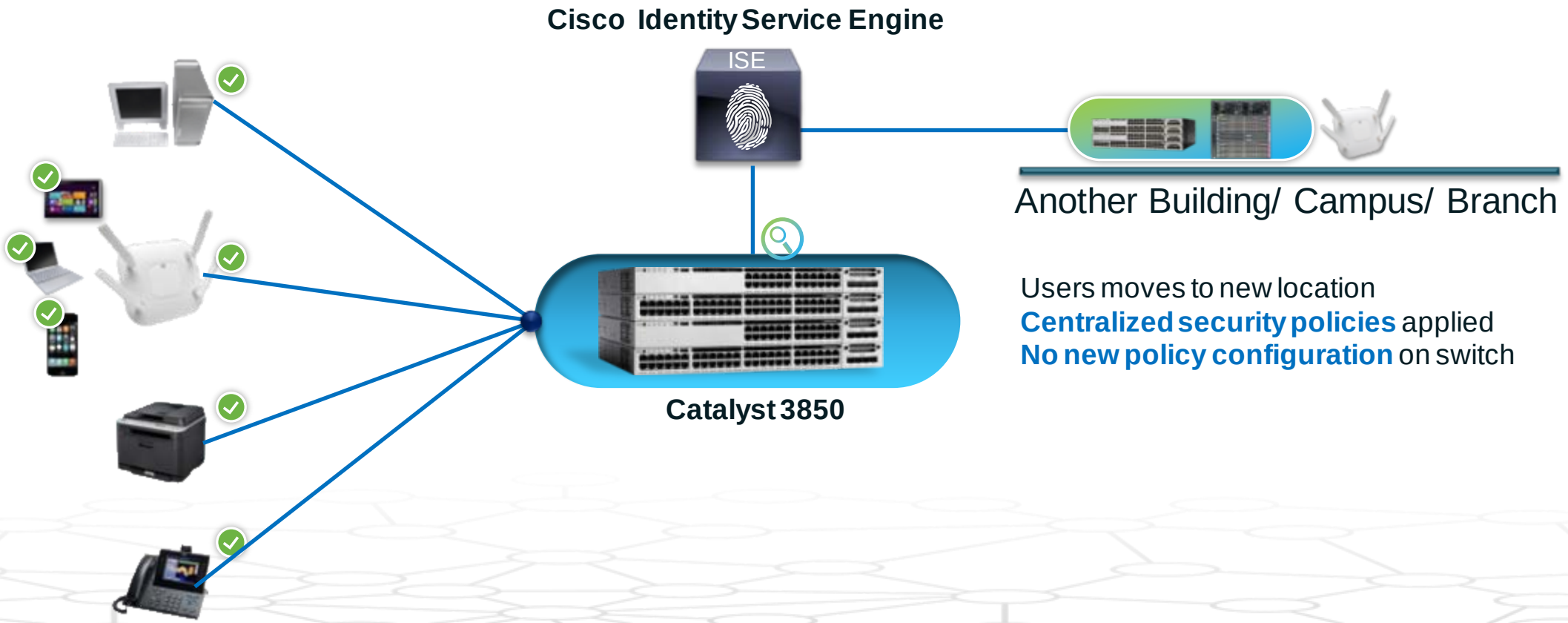
ISE **authenticates** ends points and **applies security policies**
End Points assigned to **appropriate VLANs** automatically
Ends Points assigned **appropriate QoS** automatically

Please refer to the Software Roadmap for the list of features supported at FCS and upcoming releases

Use Case: Radically Simplify BYOD Deployment …2

Across the Entire Lifecycle: Centralize Policy Definition

Identify **Centralize Policy** **Enforce**



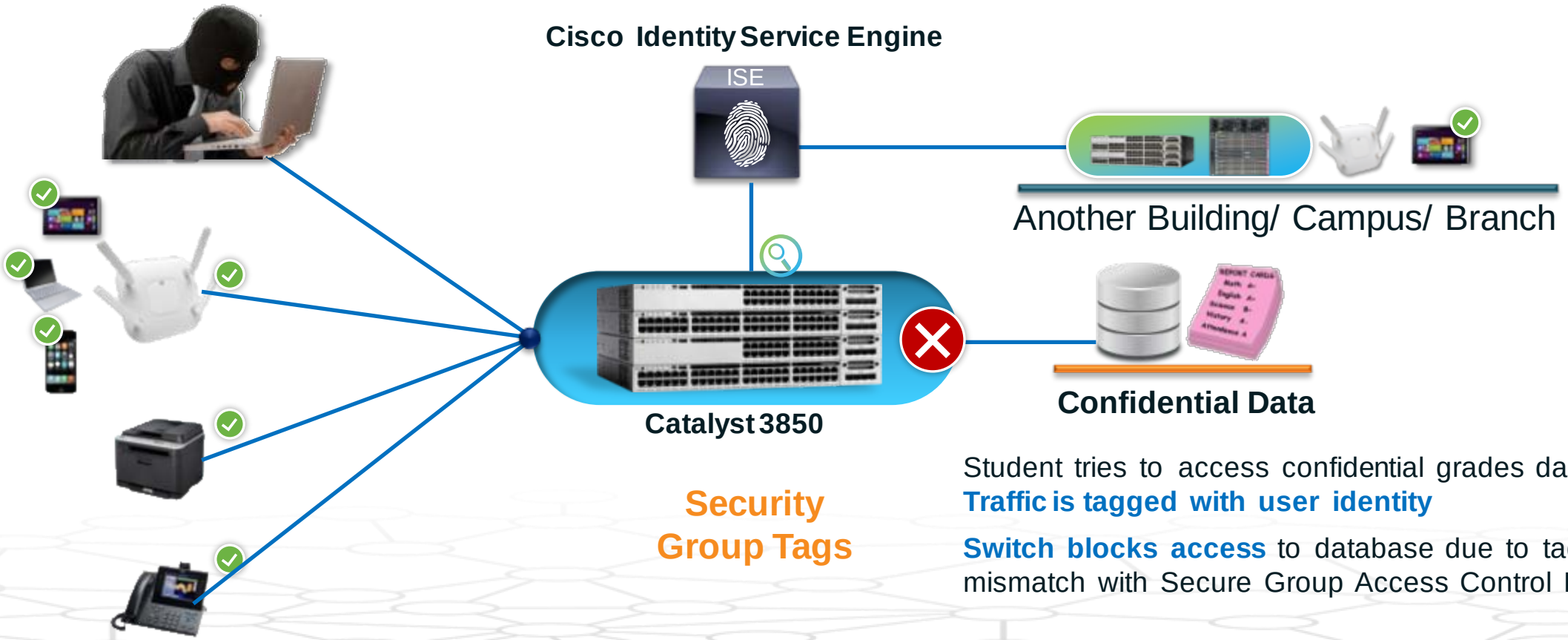
Users moves to new location
Centralized security policies applied
No new policy configuration on switch

Please refer to the Software Roadmap for the list of features supported at FCS and upcoming releases

Use Case: Radically Simplify BYOD Deployment …3

Across the Entire Lifecycle: Role Based Security Enforcements

Identify **Centralize Policy** **Enforce**

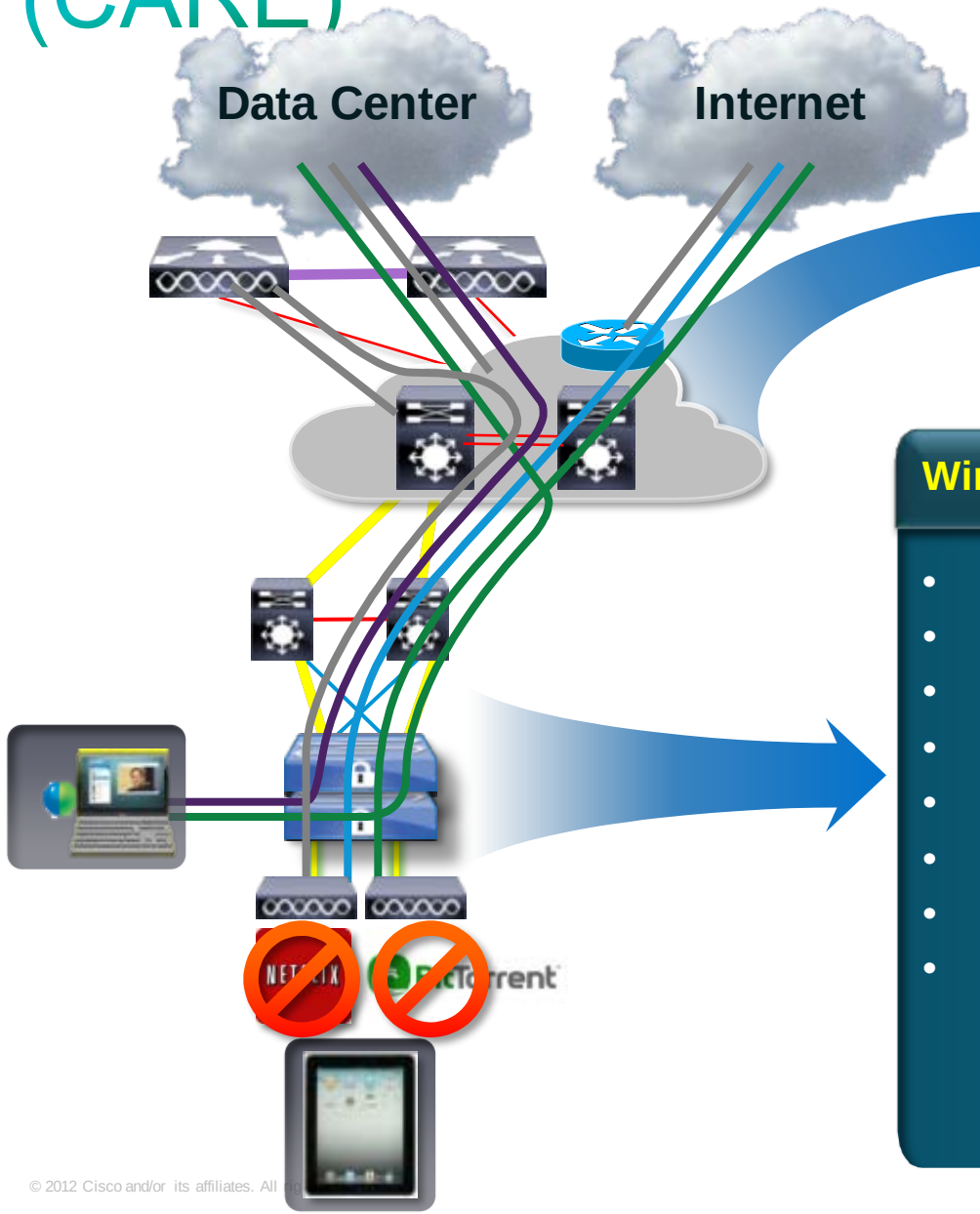


Student tries to access confidential grades database
Traffic is tagged with user identity

Switch blocks access to database due to tag mismatch with Secure Group Access Control List

Please refer to the Software Roadmap for the list of features supported at FCS and upcoming releases

Collaboration Application Recognition Engine (CARE)



Internet Applications- L7

- Applications such as YouTube, Netflix, BitTorrent (P2P), etc. will be blocked at the edge

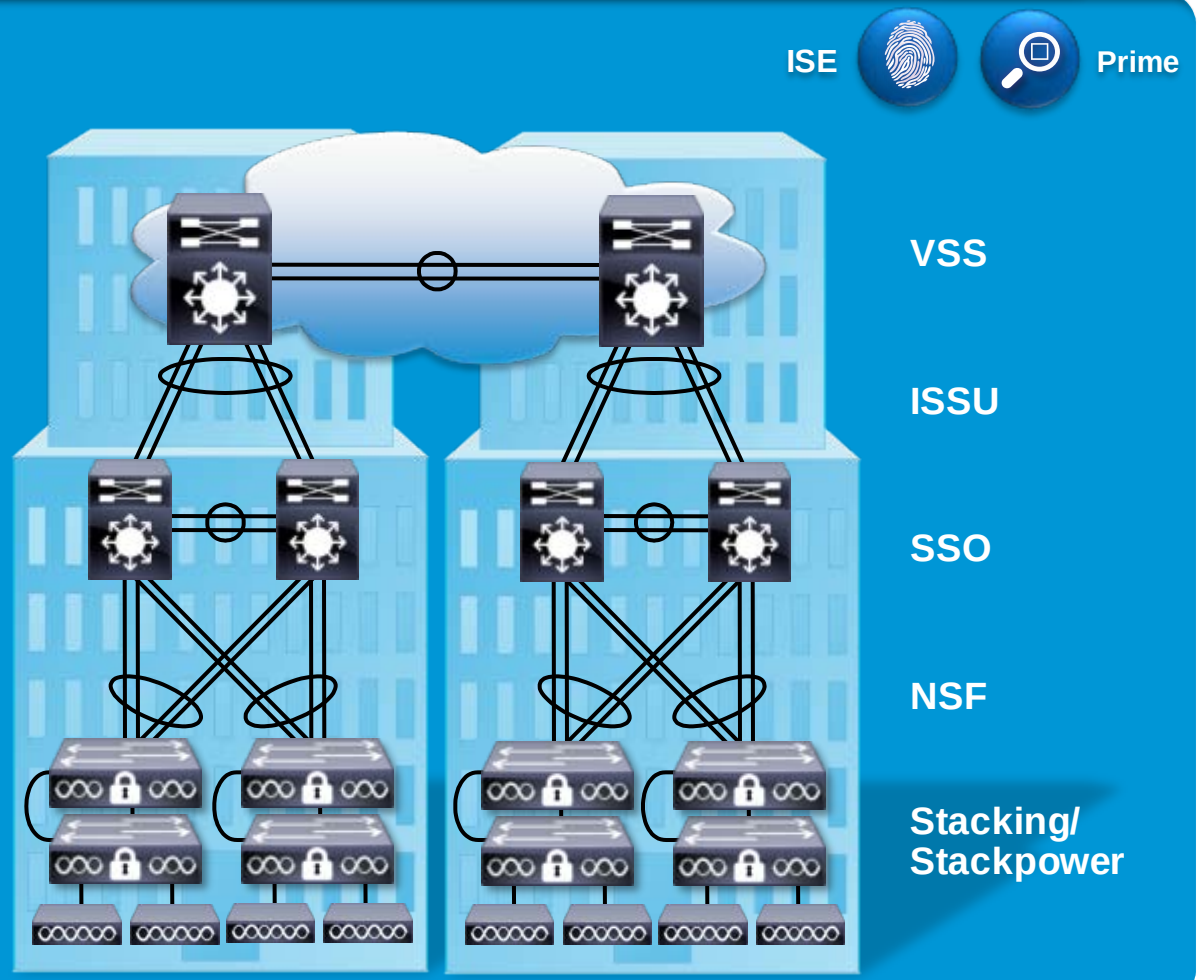
Wired/Wireless Recognition

- Identify Voice/Video Traffic – Wired/Wireless (MSI and DPI)
- Marking/Enforcement with QoS
- Export to FnF – App ID, Device ID, and User ID in IPFIX, v9 format
- Produce Metadata
- CLI Statistics (Top Talkers – Application, User, App/User)
- Controller GUI Statistics
- Cisco Prime Infra/Assurance Support
- Supported Applications
  - Cisco Phone, Telepresence, Digital Media Player, Jabber/Move, IPTV, Skype, RTP, Webex, IP Surveillance, SIP, SCCP, H.323, RTSP, MS Lync 2007/2010

Please refer to the Software Roadmap for the list of features supported at FCS and upcoming releases

Maximum Resiliency with Stateful Recovery

Converged Access Deployment



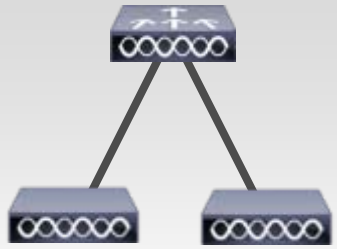
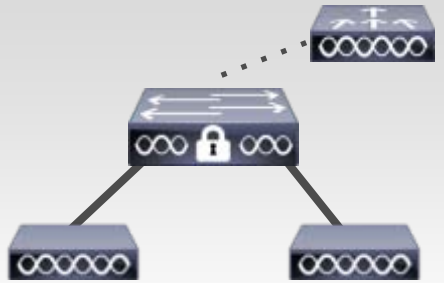
Benefits

- Sub-Second AP Stateful failover (no SSID outage)
- Rich resiliency features available across switch and controller
- Works seamlessly with Cisco's Resiliency Best Practices

Proven Cisco Resiliency Design across wired and wireless

Wireless Deployment Options

Unified Access—Wireless Deployment Modes

	Autonomous	FlexConnect	Centralized	Converged Access
				
	Standalone APs	Traffic Distributed at AP	Traffic Centralized at Controller	Traffic Distributed at Switch

New

Target Positioning	Small Wireless Network	Branch	Campus	Branch and Campus
Purchase Decision	Wireless only	Wireless only	Wireless only	Wired and Wireless
Benefits	• Simple and cost-effective for small networks	• Highly scalable for large number of remote branches • Simple wireless operations with DC hosted controller	• Simplified operations with centralized control for Wireless • Wireless Traffic visibility at the controller	• Wired and Wireless common operations • One Enforcement Point • One OS (IOS) • Traffic visibility at every network layer • Performance optimized for 11ac
Key Considerations	• Limited RRM, no Rogue detection	• L2 roaming only • WAN BW and latency requirements	• System throughput	• Catalyst 3850 in the access layer

Unified Access—Wireless Deployment Modes

Highly Differentiated Value Across All Deployment Models

New

	Autonomous	FlexConnect	Centralized	Converged-Access
Best of Breed RF	✓	✓	✓	✓
One Policy—ISE	✓	✓	✓	✓
One Management—Prime	✓	✓	✓	✓
Sub-Second Failover		✓	✓	✓
Advanced Features, Highly Scalable		✓	✓	✓
Application Visibility and Control*			✓	✓
TrustSec/SGA			✓	✓
One Operating System LAN and WLAN			✓★	✓
Network Wide Traffic Visibility				✓
Common Policy Enforcement for LAN and WLAN				✓

* Roadmap

★ With WLC5760

Best-in-Class Unified Access Products

WLC 5760
- 60 Gbps wireless throughput
- Up to 1000 Aps
- Up to 12000 Clients

Differentiating Capabilities at FCS

- **Optimized for 802.11ac deployments**
- **Distributed forwarding & services**
- **Catalyst 3850 or 802.11n G2 Access Points**
- **Common IOS Operating System and Feature**
- **Granular QoS**
- **IOS-based ACLs**
- **EEM / TCL Scripting, Secure Copy**
- **Flexible Netflow v9**
- **Multiple LAG**
- **Right-To-Use license model**

Catalyst 3850
- 40 Gbps wireless throughput
- Up to 50 APs per Switch / Stack
- Up to 2000 Clients per Stack

Within 9 months of FCS, enterprise campus feature parity with existing controllers
(AP SSO with WLC5760, ISE 1.2, AVC with G2 802.11n APs, full featured device GUI)

OEAP, FlexConnect, Mesh, and outdoor AP support planned for 1HCY14

Wireless Controller 5760 Platform Overview

- **CAPWAP termination and DTLS in Hardware**
- **60G wireless capacity per appliance**
- **1000 APs and 12000 clients/appliance**
- **Converged and Centralized mode**
- **IPv6 addressing on interfaces, IPv6 ACLs**
- **Right-to-use licensing scheme for AP scale**
- **Supports IOS-XE:**
  - Flexible Netflow v9
  - Advanced QoS
  - Downloadable ACL
  - Multiple LAG
  - Secure Shell, TCL Script/EEM

Best-in-Class Wireless Controller

Cisco WLC 5760

Centralized, or Converged Access Deployment Modes

Up to 1000 Access Points

First IOS-Based Wireless LAN Controller

Up to 12,000 Concurrent Clients

AP Stateful Failover*

6x 1/10G SFP+ uplinks with LAG

SGT/SGACL*

Granular QOS/Flexible NetFlow

60 Gbps Wireless Bandwidth

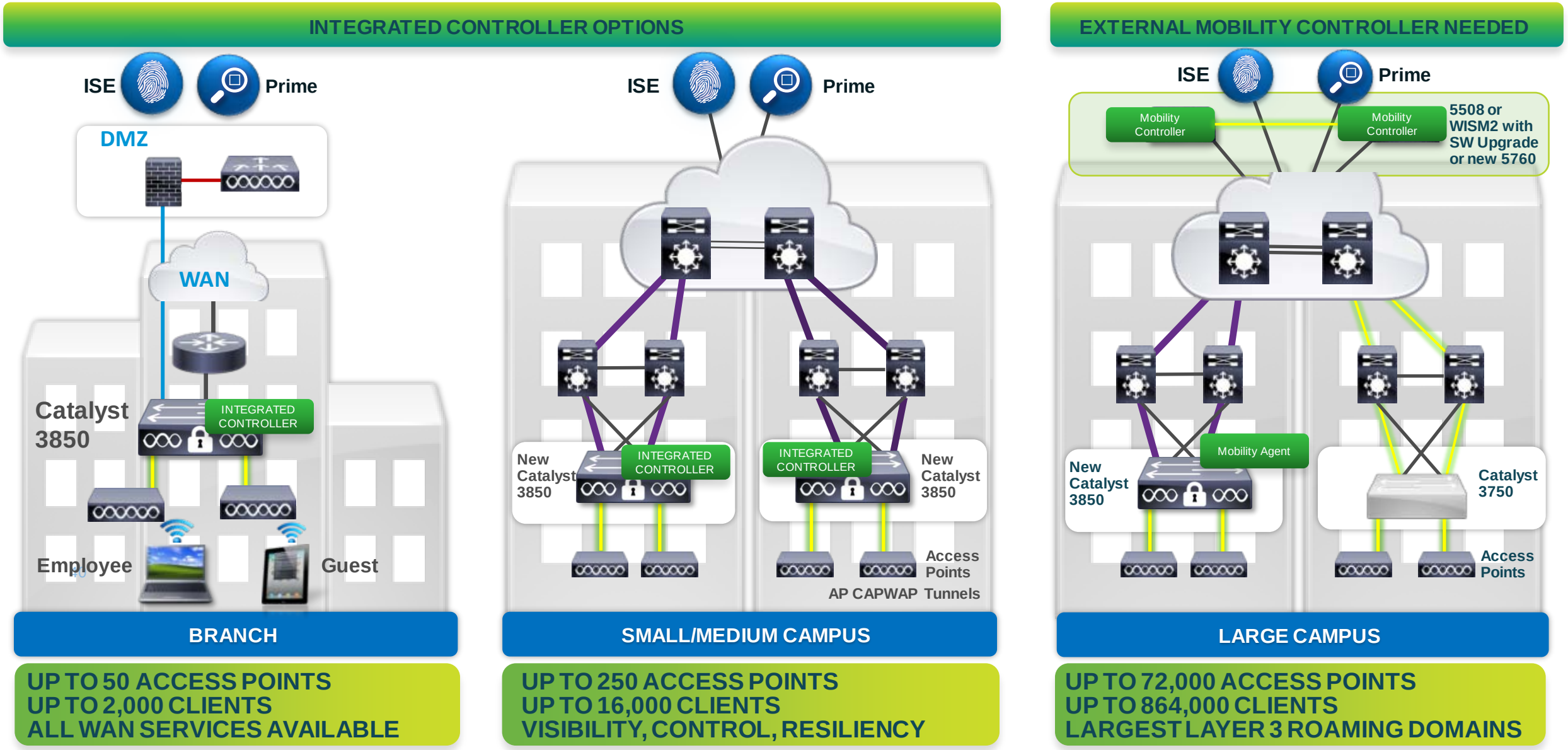
FRU Fans

FRU Power Supplies

* Roadmap

Built on Cisco's Innovative "UADP" ASIC

Converged Access Deployment Mode - Three Use Cases

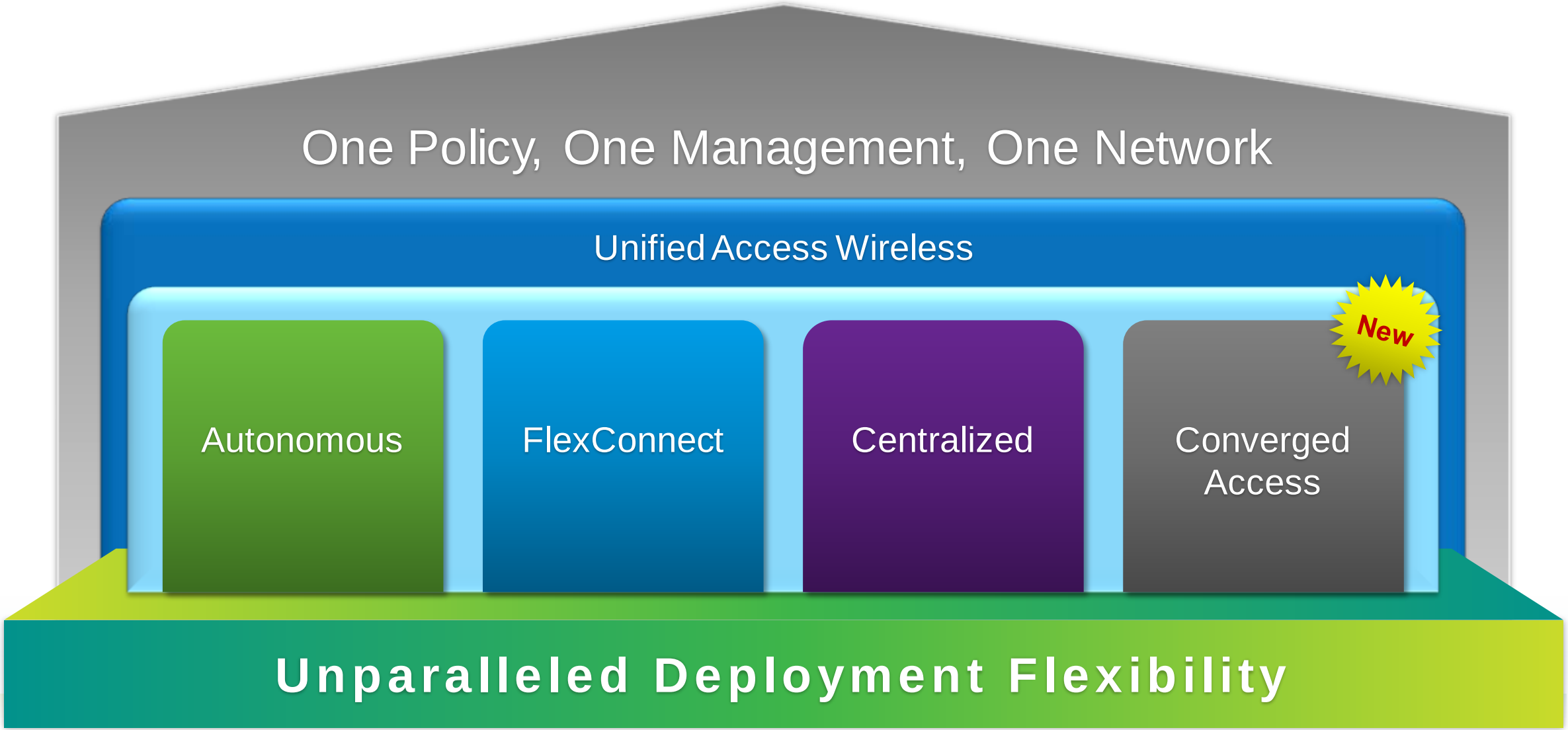


Capwap Tunnel

Standard Ethernet, No Tunnels

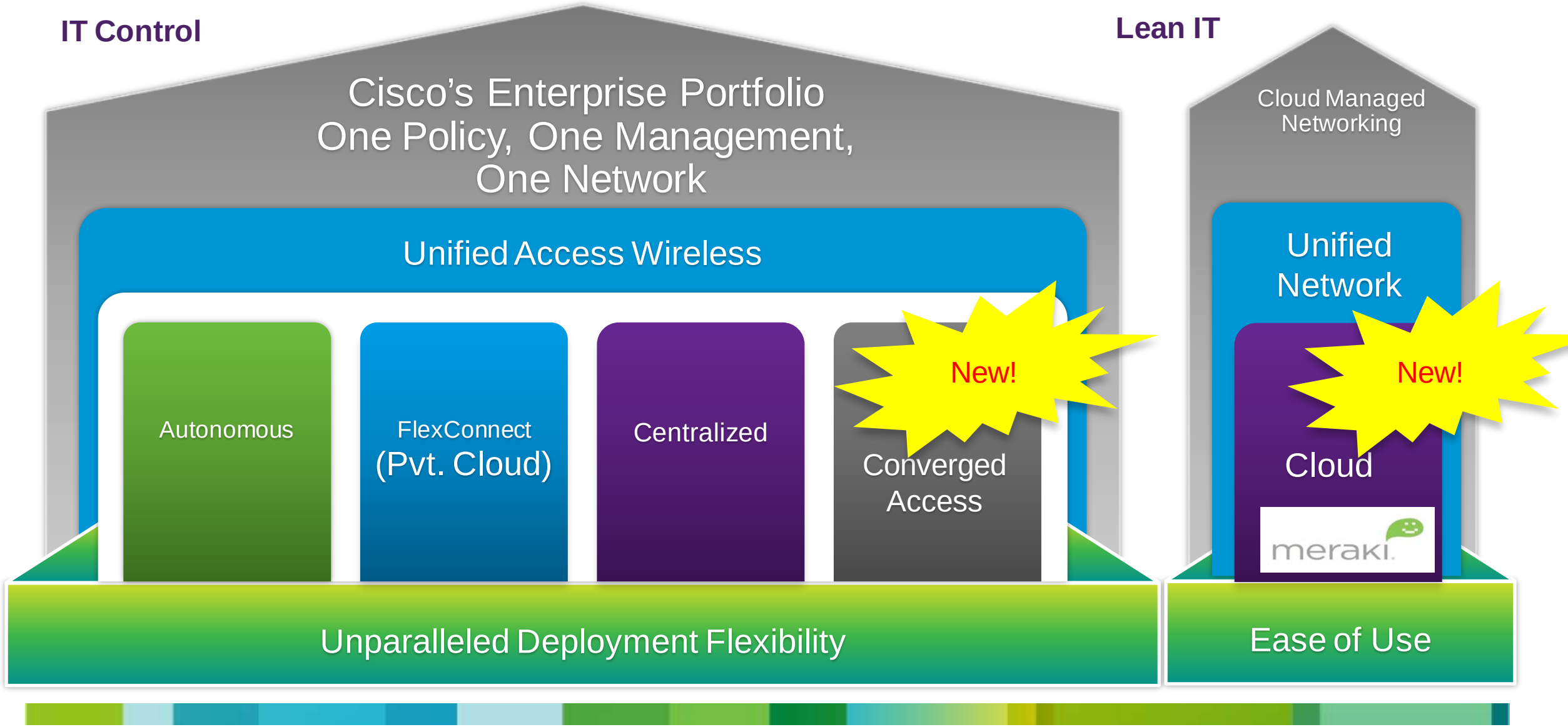
Guest Tunnel from Switch to DMZ Controller

Cisco One Network: Wireless Deployment Modes



Meraki Is Now Part of Cisco

Offers Aligned to Market Need



Cisco Welcomes Meraki
A World Class Team

More than 330 employees

Headquartered in San Francisco, with offices in New York, London, and Mexico

The Meraki team was founded by members of MIT's Laboratory for Computer Science

Employees will be joining Cisco's **Enterprise Networking Business Unit** (WNBU) lead by Sujai Hajela, VP/GM WNBU.

Cisco and Meraki Delivering Differentiated Value

Cisco

- Market-leading networking solutions: routing, switching, wireless
- Intelligent, secure solutions and services across the network, DC and Collaboration
- Global strength in developed countries

Cisco + Meraki

- Networking solutions across customer segments
- Customer choice and flexibility: on-premise and cloud
- Capabilities to address large & fast growing market
- Strong global presence and reach
- Differentiated customer value, any-to-any connectivity

Meraki

- Leader in cloud networking
- Architecture built from the ground up around cloud
- Solutions that are easy to deploy and manage
- Strength in the mid-market
- High growth, software based business model

Meraki: Recognized for Innovation

Trusted in over 18,000 customer networks

Education, professional services, healthcare, retail, government, industrial & manufacturing, hospitality.

QUEST SOFTWARE

Sony/ATV MUSIC PUBLISHING

Westfield

UNIVERSITY of VIRGINIA

Applebee's

BURGER KING

Gartner — VISIONARY, MAGIC QUADRANT FOR WIRED AND WIRELESS LAN

TECHWORLD — WINNER, MOBILITY AND WIRELESS PRODUCT OF THE YEAR

WORLD ECONOMIC FORUM — TECHNOLOGY PIONEER AWARD

NETWORK PRODUCTS GUIDE HOT COMPANIES 2011 — WINNER, BEST PRODUCT WIRELESS S

Building on the Success of Meraki Customers

Mid-Market

ZGF ZIMMER GUNSUL FRASCA ARCHITECTS LLP

Needham

FOSTER PEPPER PLLC

Bilzin Sumberg ATTORNEYS AT LAW

Nordson

dcm

Hospitality

CARAVELLE HOTEL

Holiday Inn

Comfort INN & SUITES

Sandman HOTELS | INNS | SUITES

VICEROY Hotels and Resorts

ACCOR

Saggezze BEACH RESORT Monterey Bay

Radisson

K-12

ALVIN Independent School District

STAUNTON City Schools

Rainbow Schools Reaching minds. Touching hearts.

EXETER

LPSD LLOYDMINSTER PUBLIC SCHOOL DIVISION

Regis High School

Retail

DESIGN WITHIN REACH

piggly wiggly

BURGER KING

UNITED COLORS OF BENETTON.

Caribou COFFEE

STERLING Auto Body

REEDS Jewelers

STARBUCKS COFFEE

Westfield

Meraki: 100% cloud managed network edge

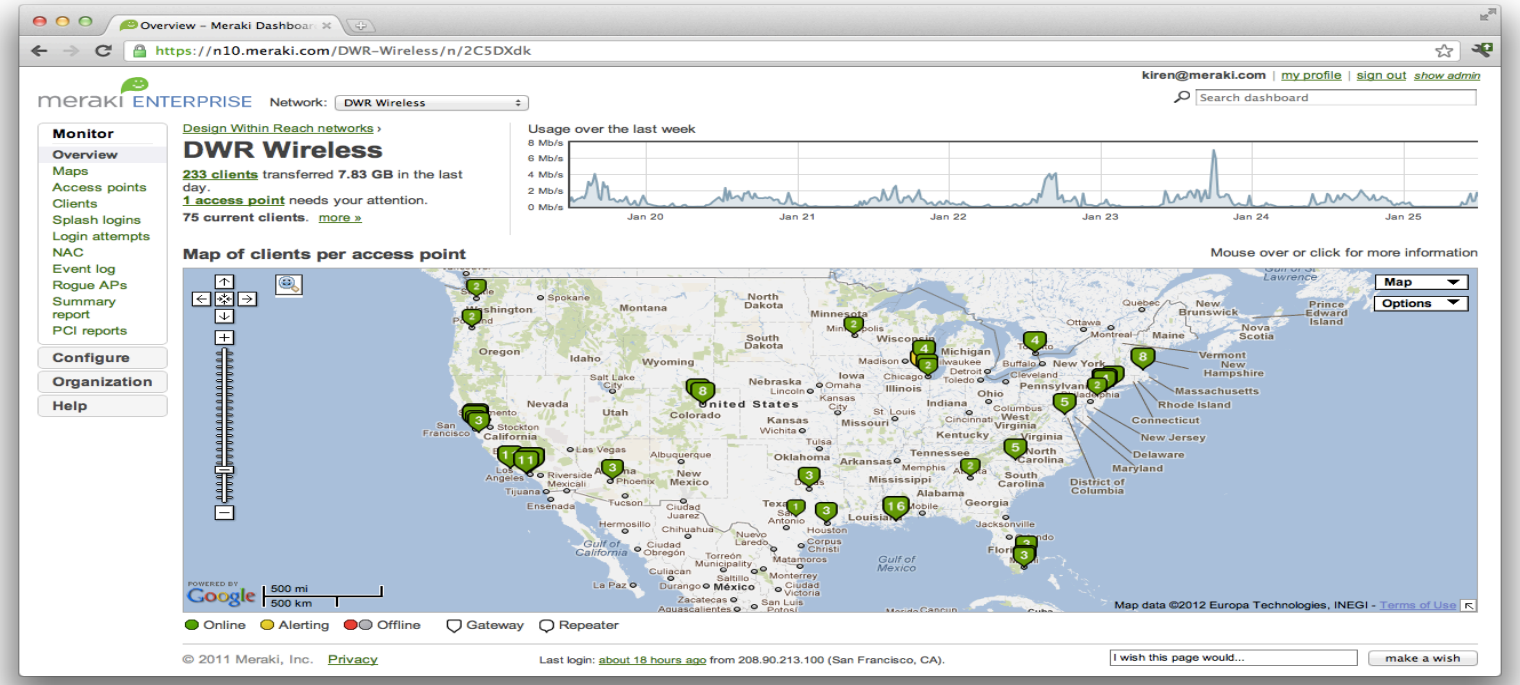
Meraki MX
Security Appliances

Meraki MS
Ethernet Switches

Meraki MR
Wireless LAN

Meraki SM
Mobile Device Management

Centralized management



"Meraki provides the security, capacity, and management we need in a premium retail environment"

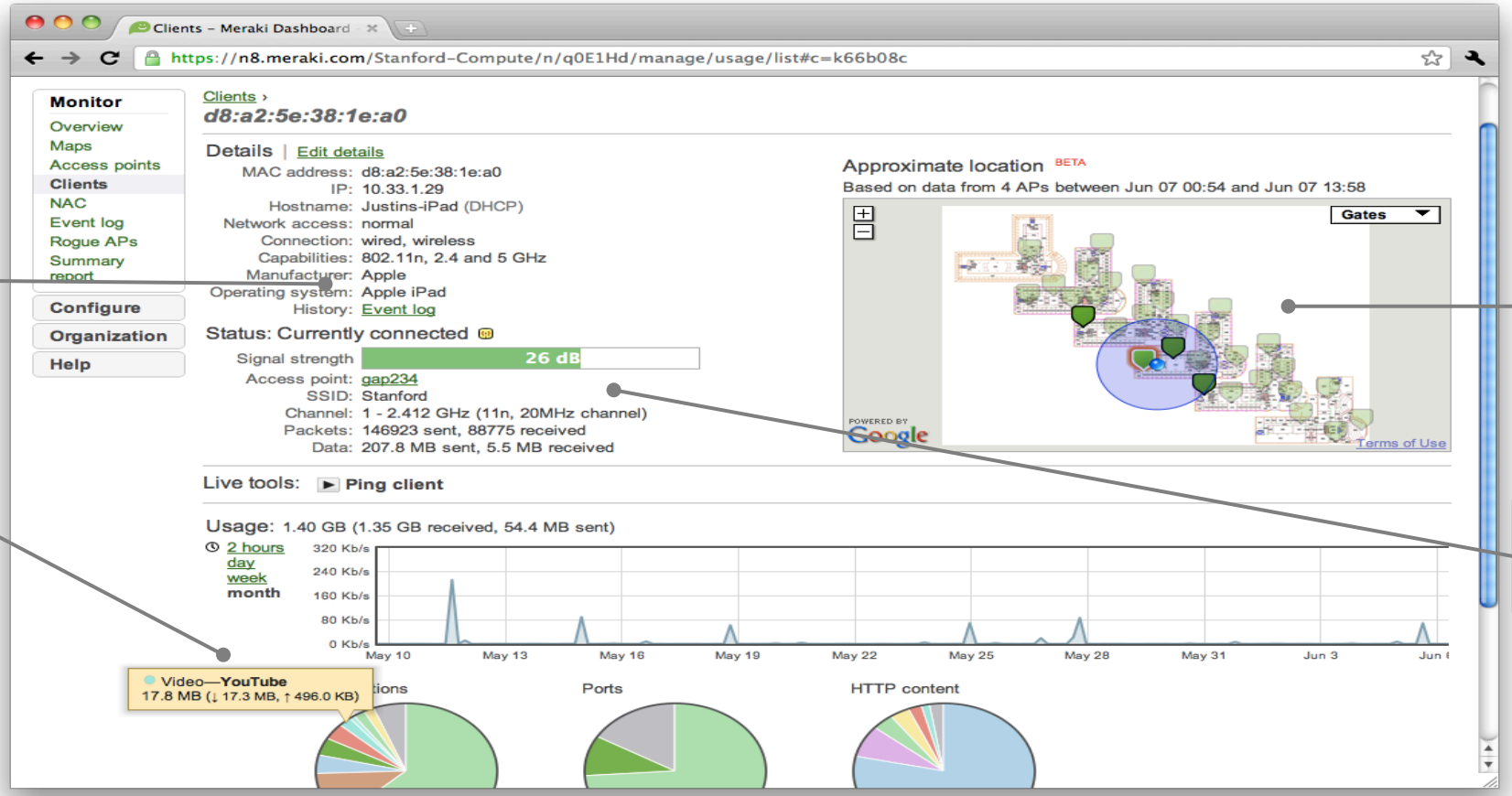
Roger Mueller, Director of IT, Design within Reach

- Self-provisioning for rapid deployment
- Scalable network-wide monitoring and management tools
- Integrated wireless, LAN, and WAN management
- Seamless over-the-web firmware upgrades

Intuitive management

User fingerprints

Application QoS

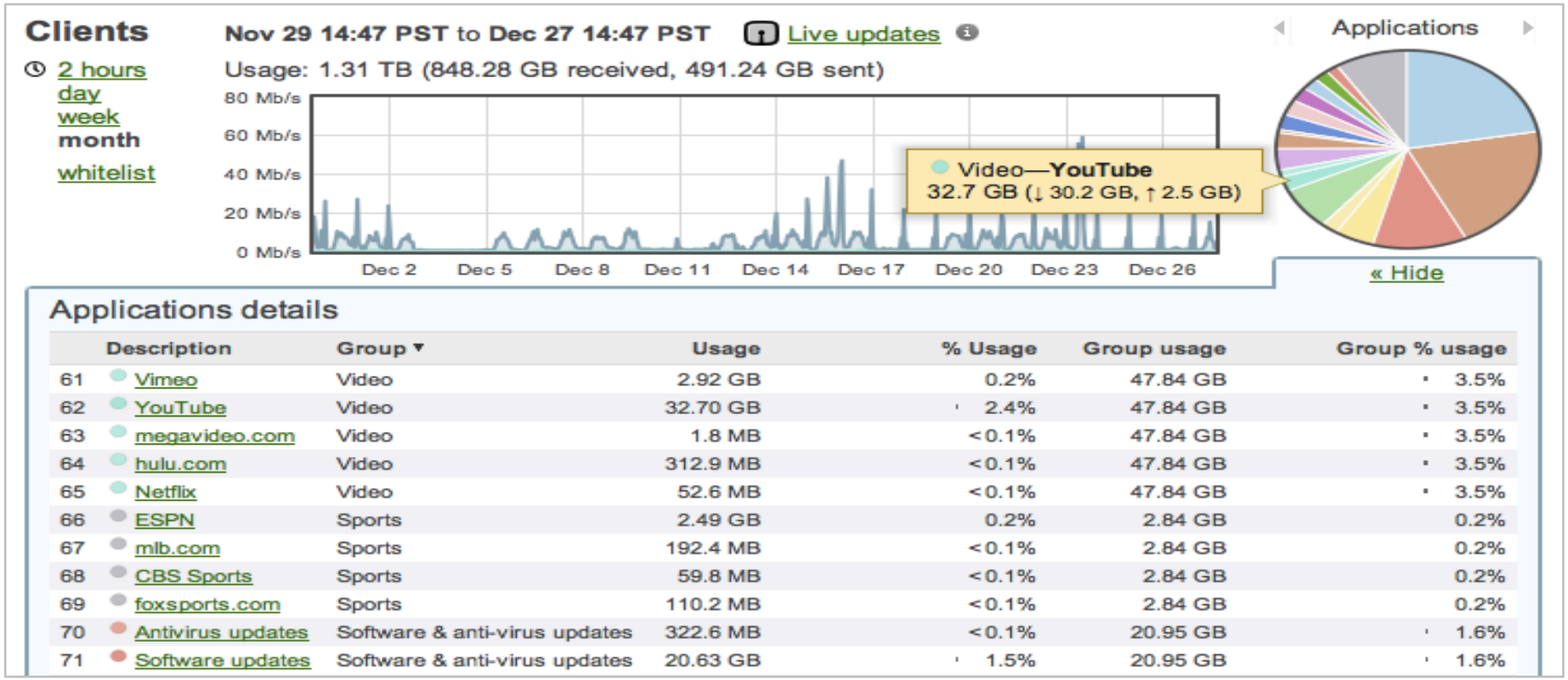


Client location

Real-time control

No training or new staff

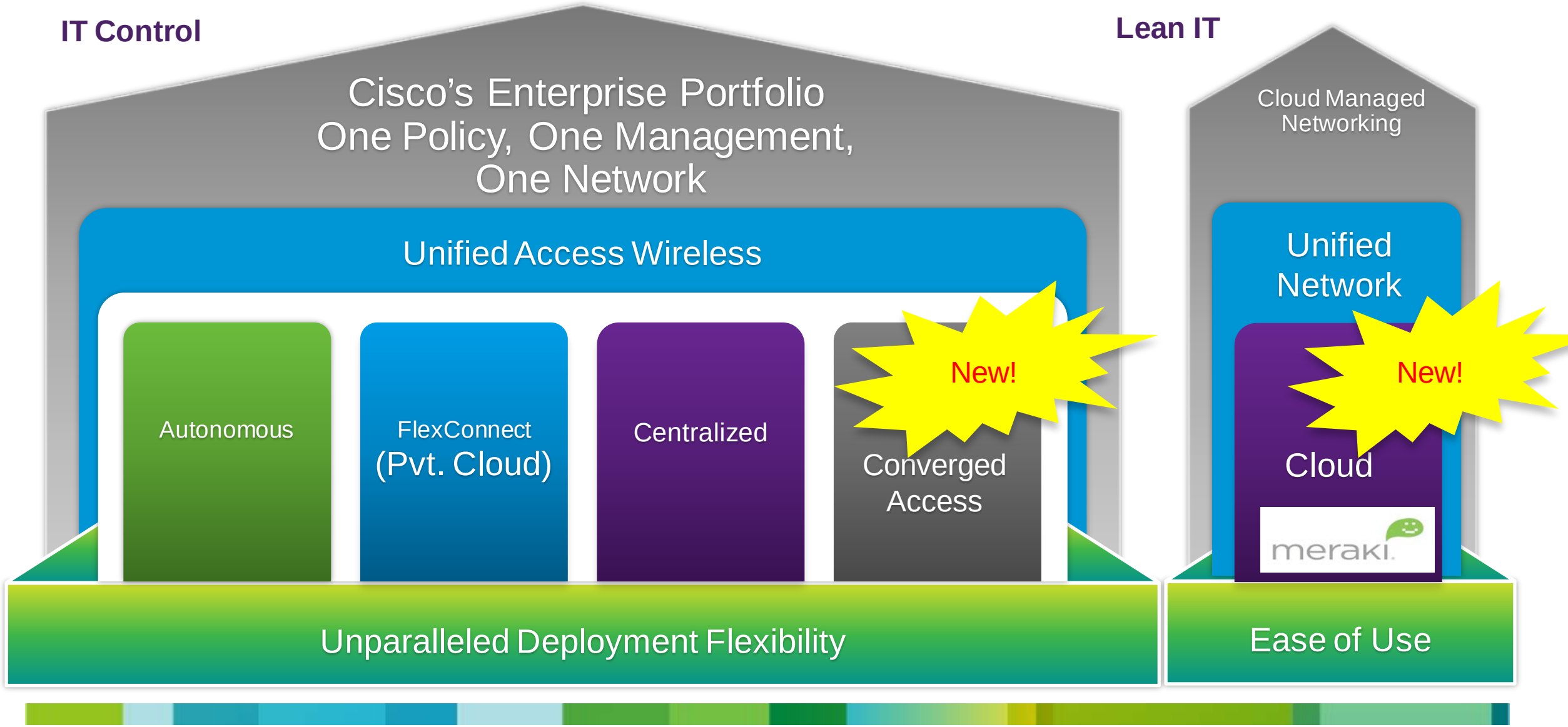
Complete visibility and control



	Description	Group	Usage	% Usage	Group usage	Group % usage
61	Vimeo	Video	2.92 GB	0.2%	47.84 GB	3.5%
62	YouTube	Video	32.70 GB	2.4%	47.84 GB	3.5%
63	megavideo.com	Video	1.8 MB	<0.1%	47.84 GB	3.5%
64	hulu.com	Video	312.9 MB	<0.1%	47.84 GB	3.5%
65	Netflix	Video	52.6 MB	<0.1%	47.84 GB	3.5%
66	ESPN	Sports	2.49 GB	0.2%	2.84 GB	0.2%
67	mlb.com	Sports	192.4 MB	<0.1%	2.84 GB	0.2%
68	CBS Sports	Sports	59.8 MB	<0.1%	2.84 GB	0.2%
69	foxsports.com	Sports	110.2 MB	<0.1%	2.84 GB	0.2%
70	Antivirus updates	Software & anti-virus updates	322.6 MB	<0.1%	20.95 GB	1.6%
71	Software updates	Software & anti-virus updates	20.63 GB	1.5%	20.95 GB	1.6%

Centrally manage devices, users, and applications

Offers Aligned to Market Need



Summary

Cisco's Unified Access Strategy

One Policy
One Management
One Network

IT Top of Mind

- Manage complexity and reduce costs?
- Offer secure, mission critical services?
- Future proofed for scale?

Converged Access

- Distributed wired/wireless data plane with new Cisco Catalyst 3850
- Benefits of single platform, visibility, control, resiliency, and scale

Thank you.