Inteligentní a/nebo virtuální access/agregace v metropolitních sítích

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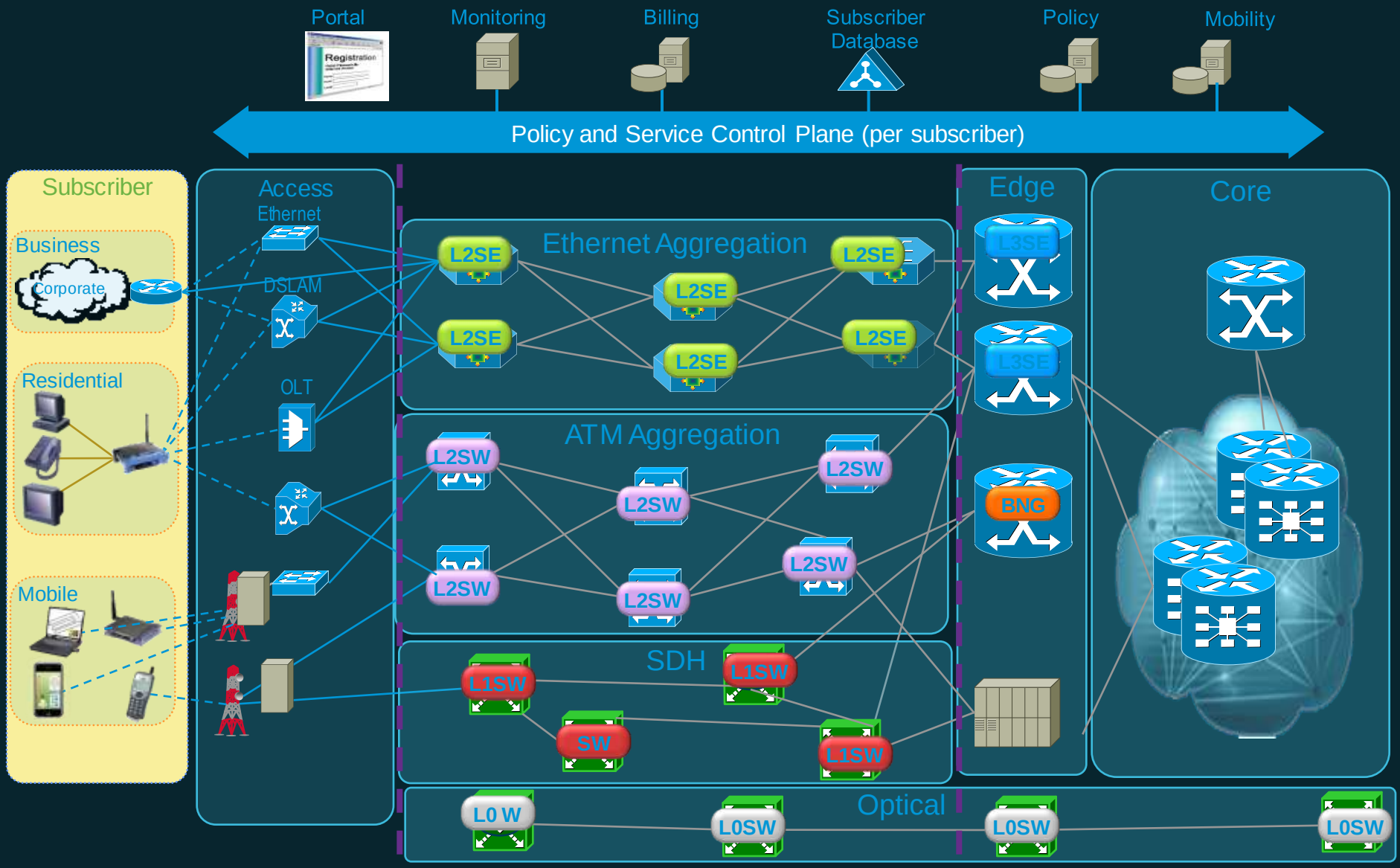
21. června 2011

SP networks today and going forward

Evolution to MPLS Ethernet



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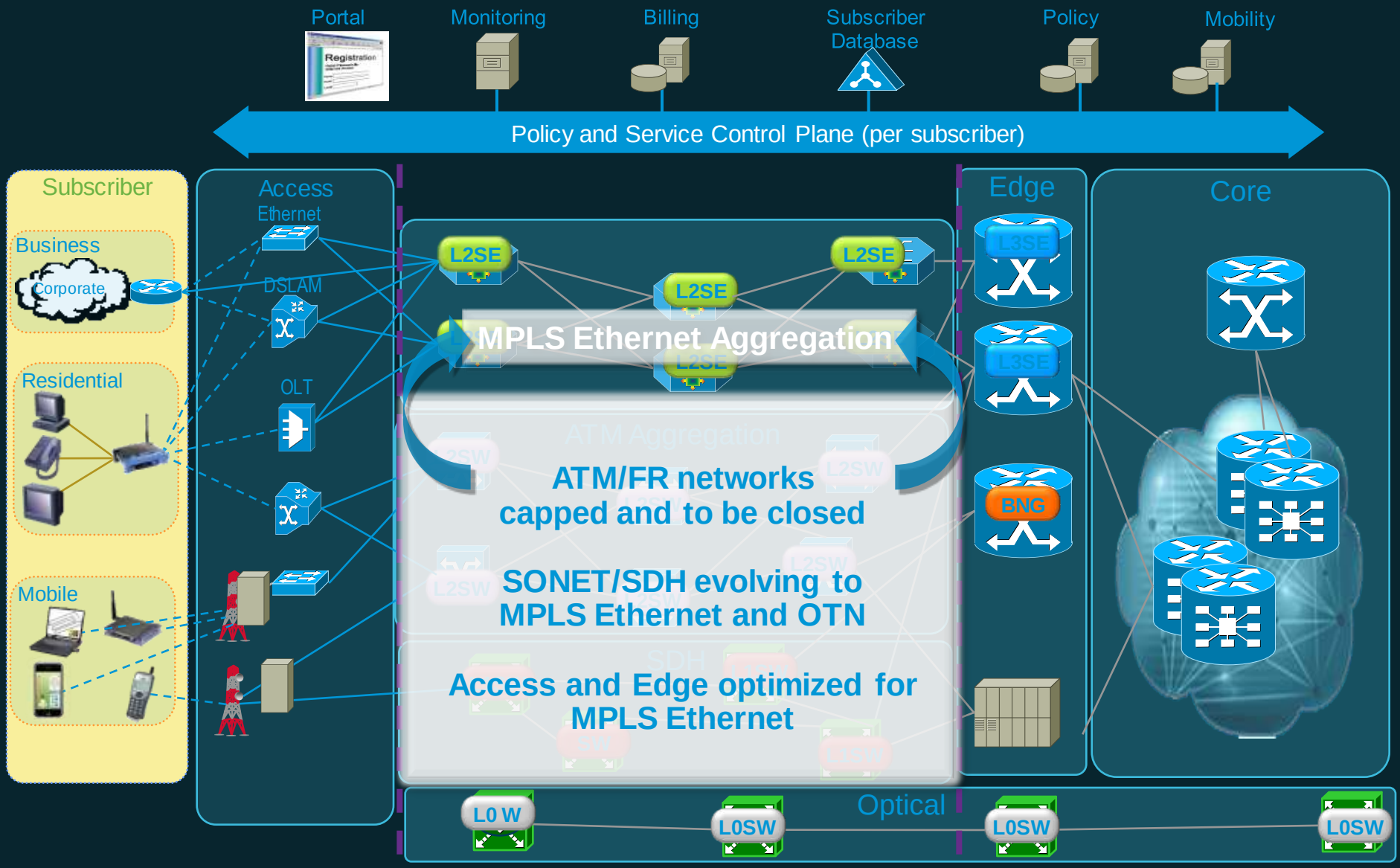
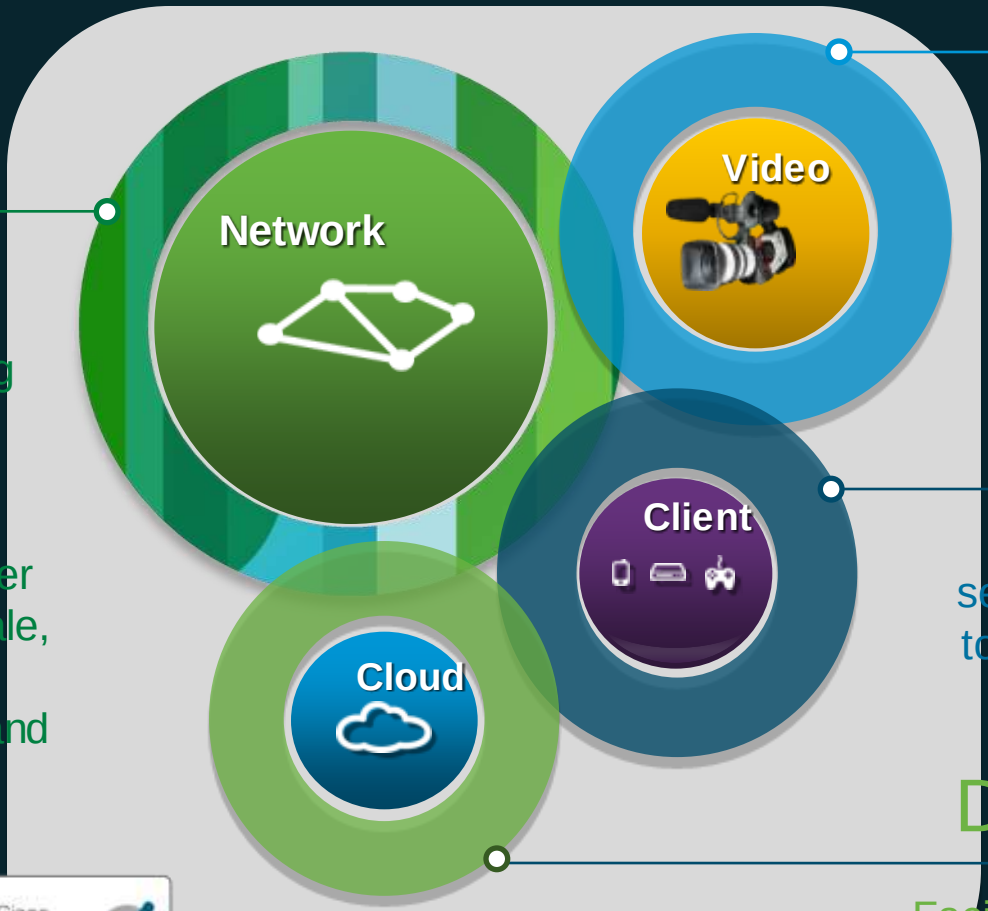


Cisco NGN Areas of Focus

IP/MPLS

Continued leadership in IP/MPLS routing and switching enhanced with simplified operations, lower cost, higher scale, improved Management, and security



Video

Optimized for highest Quality Transport

Mobility

Integrated seamlessly for end to end functionality at lowest cost

Data Center

Facilitating new virtual environments and architectures

Cisco Validated Design

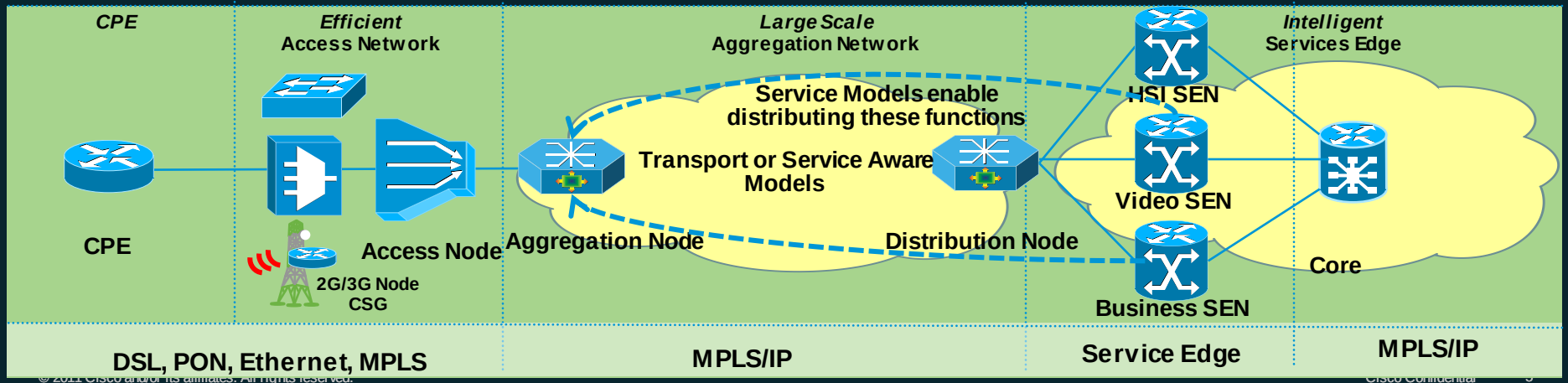
Building flexible networks that can adapt to changing demands over time without need for forklift upgrades or radical operational changes

NGN 1.8 Architecture Components

Network Access, Network Management, Service Management, OAM Subsystems

ANA 3.7.2, VIN-ANA BAC3.5 TR-69, CNS-CE 3.0, NAS: CAR, CNR, Cisco Netflow Collector

CPEs	Access Nodes	Aggregation Node	Distribution Node	Edge Nodes	Core Network
DSL: • Res: WAG-310G • Bus: ISR x900 15.1(1)T Ethernet: • Res: Genexis ONT + WAG-310G • Bus: ISR x900 15.1(1)T, ME3400E 12.2(54)SE, ASR1K IOS XE 3.2 PON: • Res, Bus: Wave 7 PON ONTs	CO/RO ADSL2+, VDS • Zyxel, ALU ISAM 7302 Remote Office FTTX: • ME3400E 12.2(55)SE, • ME3600X 12.2(52)SE, Central Office FTTX: •4500/SUP6E/48x100-BX 12.2(54)SG Central Office PON: • Wave7 G-PON OLT Mobile RAN Access: • MWR2941 3.3.1, ETX204 • Ceragon IP10 uWave	Cisco 7609S • RSP-720 • ES+, SIP-400, CEoPS SPA, Metronome SPA • Software: 15.1(2)S Cisco ASR-9000 • RO 10GE, 1GE, mix • Software: XR 4.0.1 ME3800X • Software 12.2(52)SE	Cisco 7609S • RSP-720 • ES+, SIP-400, CEoPS SPA, 4xSTM1 ATM SPA, Metronome SPA • Software: 15.1(2)S Cisco ASR-9000 • RO 10GE, SIP700 • Software: XR 4.0.1	HSI SEN: Cisco ASR-1k • IOS-XE 3.2 • RP2/ESP40, SPA-10Gv2 Video SEN: Cisco 7609S • RSP-720, ES+ • 15.0(1)SR Business SEN: ASR9k • RO 10GEs, SIP700/TDM • XR 4.0.1, 4.1.1	CRS-3/1 (Core Node) • IOS-XR, 4.0.1 • MSC/FP/140G/40G, 100GE, 10GE ASR1K (Route Reflector) • IOS-XE 3.2 • RP2

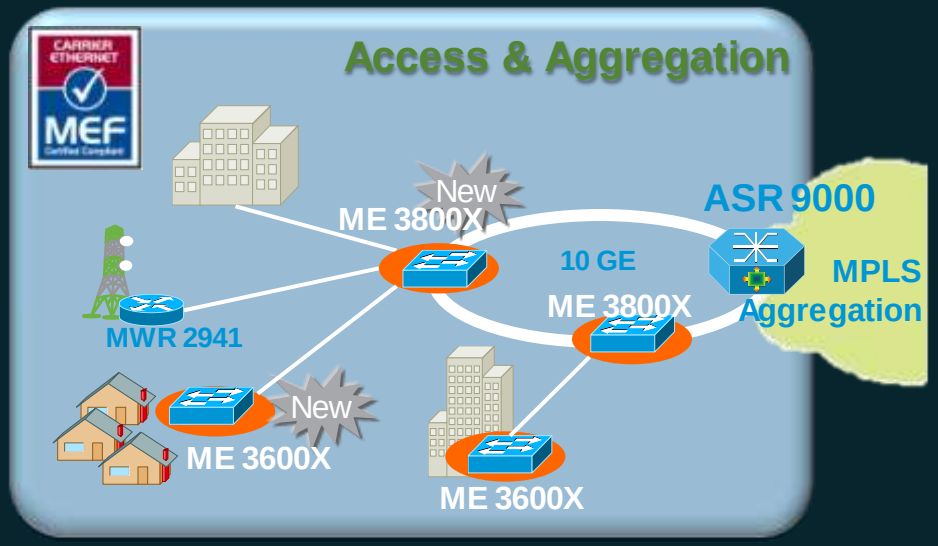


Introducing ME3600X / 3800X
Flexible Service Delivery at 10G

Carrier Ethernet Switch Routers:

- **Cisco ME 3800X**

- **Cisco ME 3600X (Copper & Fiber)**



Green — **Small Footprint – Low Power**
Cost efficient -Small Form Factor– Low Wattage per Gbps

Increases Scale — **Service Scale - Performance**
Carrier Ethernet ASIC – EVC – 802.1ah

Enhanced QoS — **Enhanced Subscriber Experience**
Video - Mobile applications

Extensive Carrier Ethernet Features
Reduce Total Cost of Ownership – Improved Customer Experience

Cisco ME 3800X Carrier Ethernet Switch Router

ME 3800X – 24FS-M

24GE SFP port

Two 10GE SFP+ ports

Key Applications

Broadband aggregation

Pre-aggregation for mobile applications

Metro Ethernet aggregation

Converged, full-featured aggregation platform

- Designed for small aggregation and remote CO locations
- Compact form factor (1RU)
- Low power consumption
- High Service Scale
- Carrier Ethernet feature set

Scalability of ME-3600X vs ME-3800X:

Feature	Scale Number	
	ME-3600X	ME-3800X
MAC table	8k/16K	32K-256K
Maximum VLANs per port	1K	4K
VLAN Mapping	4K	512-16K
IGMPv2/v3 Snooping	1K	4K
IPv4 Routes	20K	1K-32K
IPv6 Routes	10K	500-16K
Multicast Groups	1K	512-4K
Bridge Domains	4K	2K-8K
EoMPLS Tunnels	0/512	0/16K
MPLS VPN	0/128	0/2K
EFP	4K	4K/16K
Layer 3 interfaces	1K	4K
ACL entries	1500	4K-16K

Cisco ME 3600X Ethernet Access Switches
Expanding the portfolio with Multi Services

End of CY11

ME 3600X – 24CX-M

24GE + two 10GE or 8GE + four 10GE
16 T1/E1, 4 OC3

Key Applications

Multi Service Access (TDM + Ethernet)
10GE Business Services
Deployment in harsh environment
Small Mobile Pre-aggregation

Multi Services Access Platform

NEW compared to 24-FS versions

- Temperature -40 +65C
- NOW with TDM capabilities (T1/E1)
- Enhanced Timing: 1588-2008
- Flexible Ethernet Interface Configs
  24GE + Two 10GE
  Or
  8GE + Four 10GE
- 10GE XFP Optics
  Support WAN-PHY and Long Reach

Cisco Carrier Ethernet ASIC

Cisco innovation

Statistics Collection

HA: Fast Failure Detection

Service Scale

H-QoS

Purposely build for the Carrier Ethernet

Hardware Ready for

MPLS-TP

802.1ad - 802.1ah

VPLS

Hardware Acceleration

Line Rate performances (88Gbps, 65Mpps)

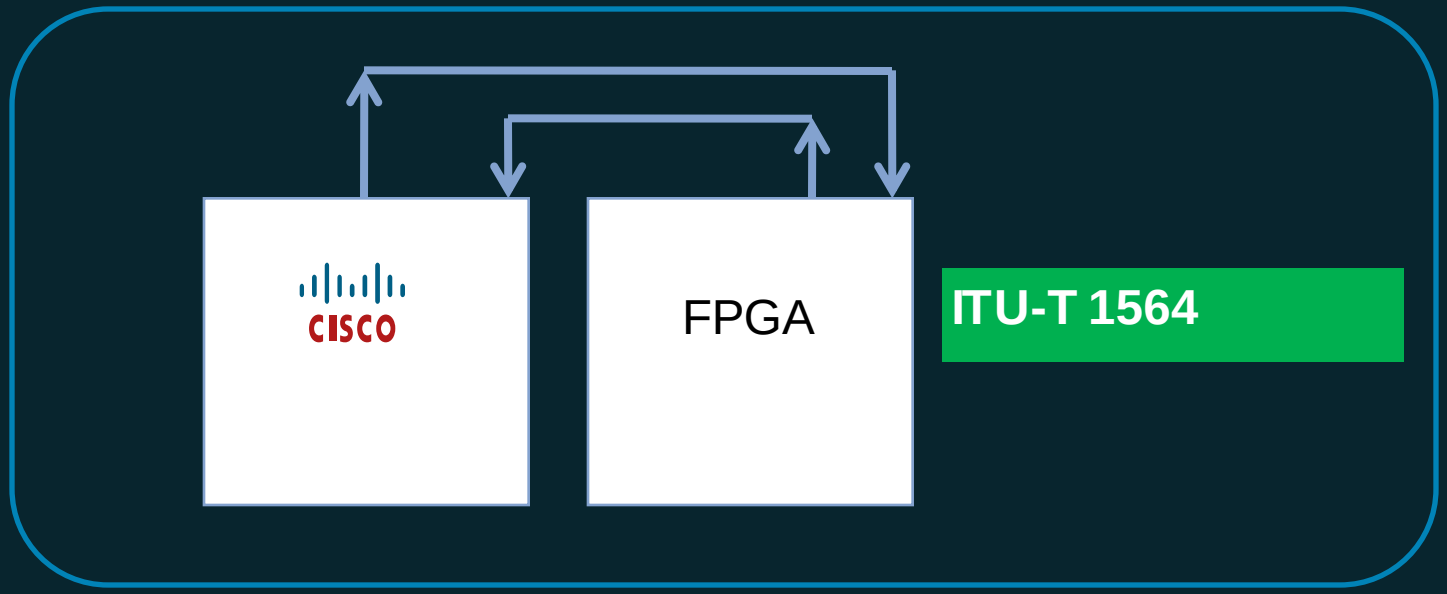
Low Latency

Low jitter

Available on all Ports:
MPLS, H-QoS

Most comprehensive CE feature set in an ASIC

FPGA
Architectural flexibility



- Field Programmable ASIC
- Enhance system with flexible processor
  - Hardware assist for OAMs
  - Higher level services

ME3800X/ME3600X KEY HIGHLIGHTS

- Jumbo Frame 9800 for L2/L3 on 10/100/1000/10000
- Fast Link Failure Detection - Copper & Fiber (Hardware Support)
- DOM on SFP & SFP+
- IP/MPLS Fast Convergence
- TE/FRR & BFD for L3 Fast Convergence
- REP with Edge No Neighbor for L2 Sub second convergence

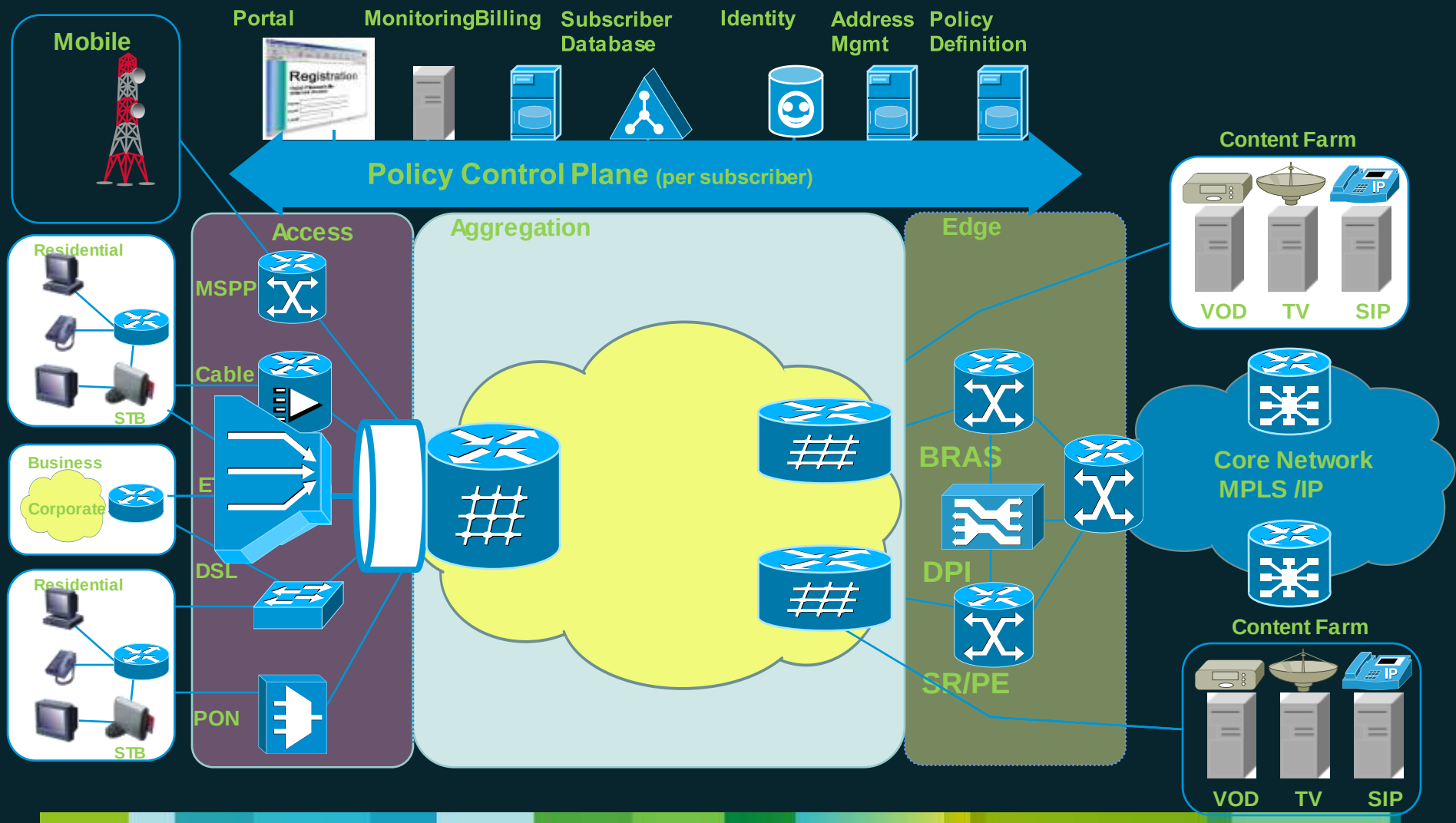
ME3800X/ME3600X KEY HIGHLIGHTS

- Multiple Split Horizon Group
- Rich Carrier Ethernet Features Roadmap
- ISSU (Dual Core Processor) [Hardware capable)
- Discreet Power Messages to differentiate unit failure vs power input failure

ME3800X/ME3600X KEY HIGHLIGHTS

- Pay as you grow
- 10 Gig License upgrade does not require service interruption
- MEF Certified 9 &14
- Scalability

Converged Edge Network - Requirements



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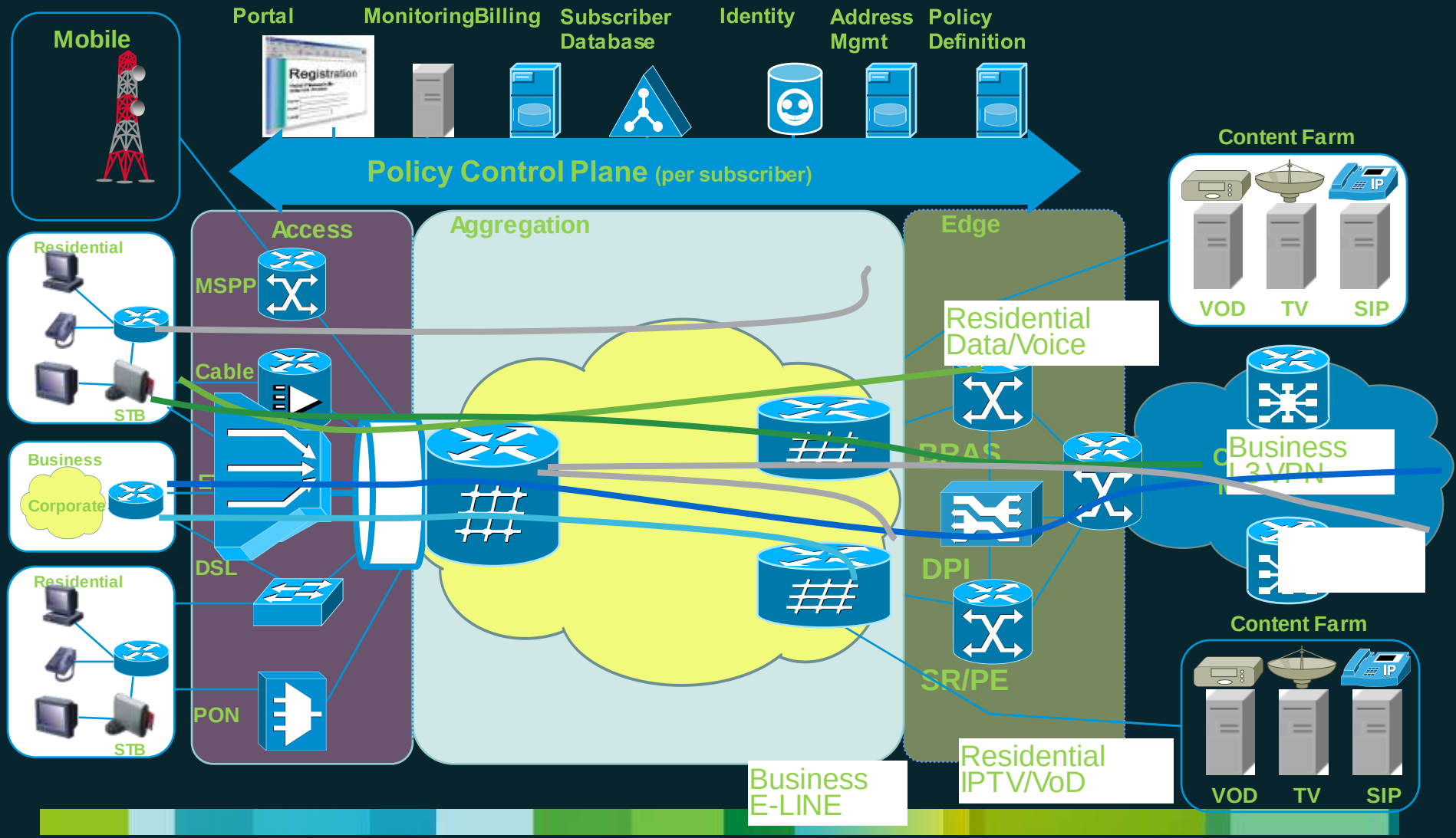

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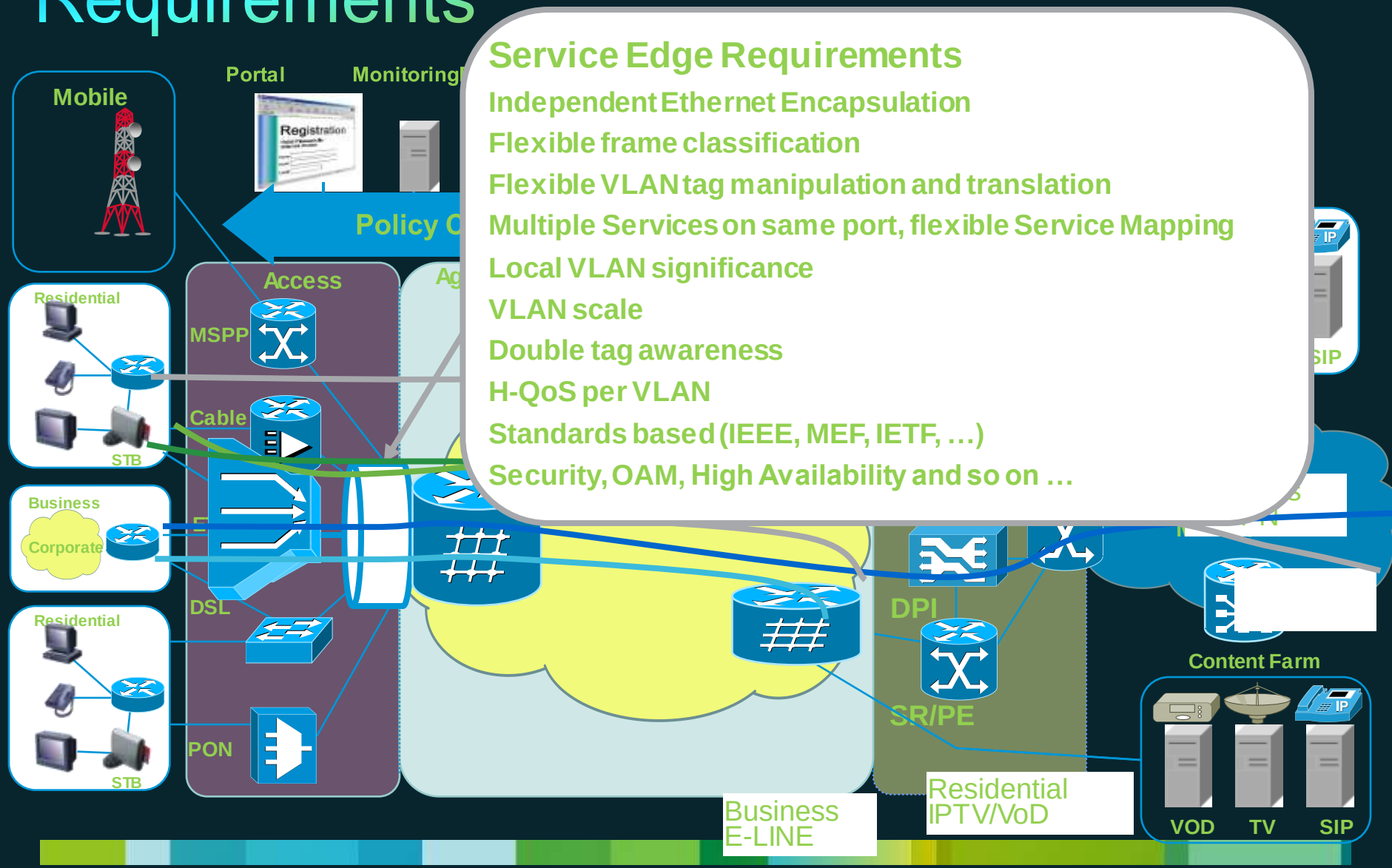


What Is Cisco's EVC Framework?

- Cisco Ethernet Virtual Circuit (EVC) is the next-generation cross-platform Carrier Ethernet Software Infrastructure
- Addresses Flexible Ethernet Edge requirements
- Supports service convergence over Ethernet
- Complies with MEF, IEEE, IETF standards
- Supported in IOS and IOS XR
- Supported on ASR 9000, Cisco 7600, ME3800X/ME3600X

Simplify The Network
Evolution to Cisco ASR 9000 System

- 1996:
  Cisco released Tag Switching, which became MPLS and forever changed Internet architecture.
- 1998:
  Cisco introduces the 12000 core router.
- 2004:
  Cisco launched the CRS-1, establishing the benchmark for "core" routing, and in 2010 raised the bar with the CRS-3.
- 2008:
  Cisco reinvents the edge with ASR 1000 and 9000 routers.
- 2009:
  Cisco acquires Starent and redefines the mobility landscape with the ASR 5000.
- 2011:
  At CES, Cisco introduces Videoscape, a new way to experience video.
- **2011, June 7th:**
  Cisco announced a better, simpler way to build the next-generation Internet, setting a new industry standard for the network "edge."

ASR 9000 System with *nV* (Network Virtualization)
One system to support many services

Before: *nV* Technology

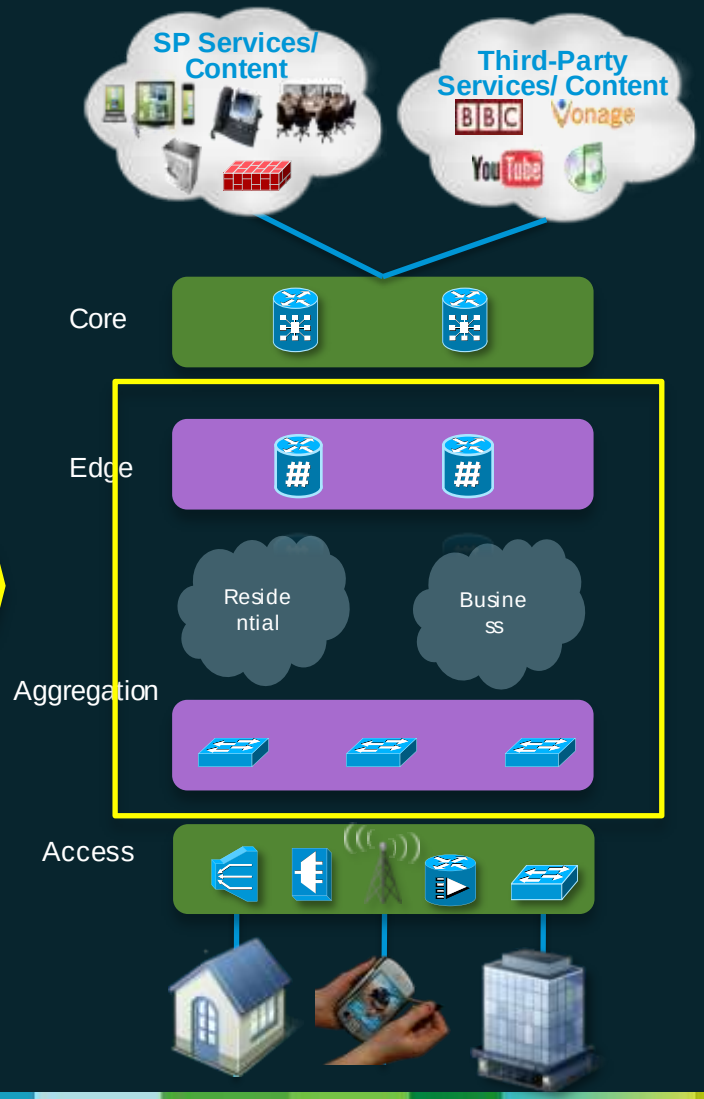
Each device managed separately.

Inconsistent features between edge and aggregation.

Siloed service domains.

Inconsistent service outages upon device failure.

Port scale limited to chassis.



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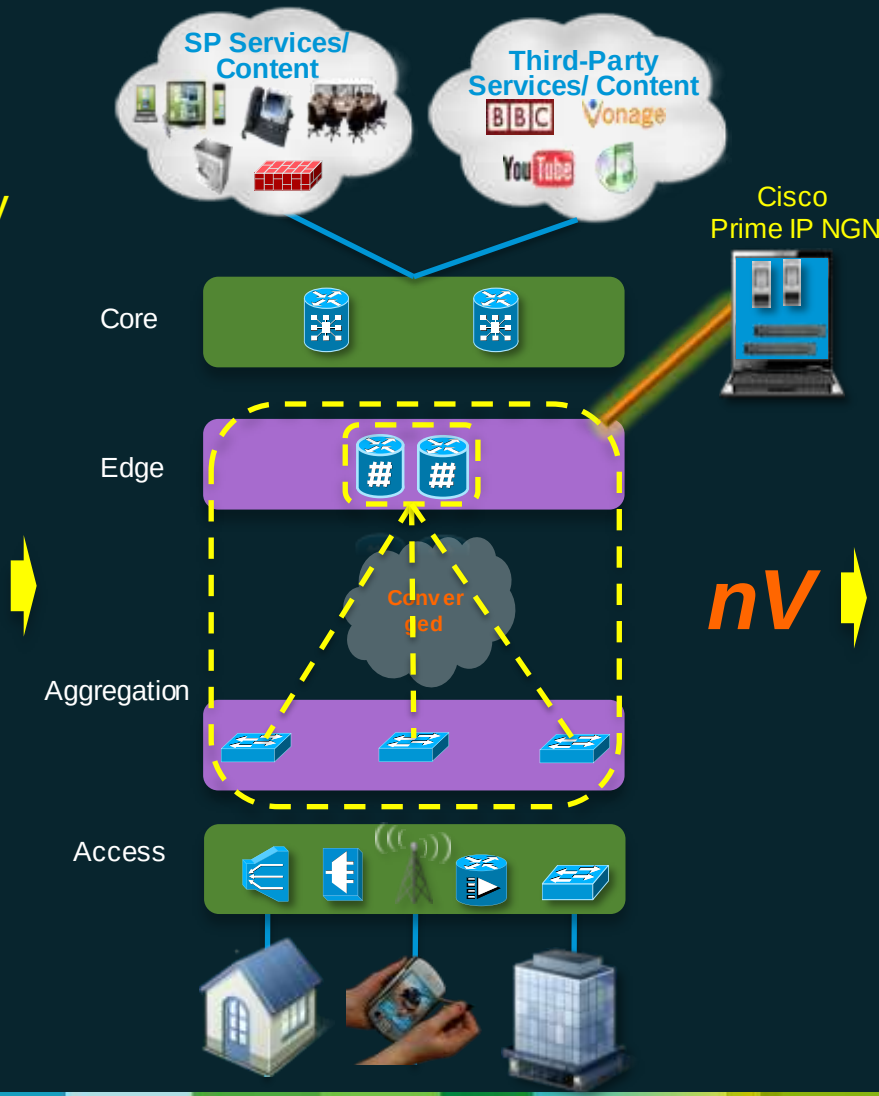


After: ***nV*** **Technology**

Edge and aggregation managed as one virtual system through Cisco Prime IP NGN.

Single release vehicle offering feature consistency.

Offers up to 71% reduction in OPEX over 6 years vs competitors.

Reduced protocol complexity between edge and aggregation

Up to 84,480 GE ports managed through a single virtual system

Simplify the Network—What is New?
Introducing Cisco ASR 9000 System & *nV* technology

ASR 9000 System NEW

ASR 9922 NEW

ASR 9010

ASR 9006

NEW ASR 9000v

SP Benefits

Multi-Dimensional Scale

Simplify Operations

Service Velocity

Single 96 Tb IPv6 System

36x More Capacity than the Closest Competitive Platform

Introducing *nV* (Network Virtualization) Technology
Simplify the network

ASR 9000 System

Edge

ASR 9922 /
9010 / 9006

Introducing *nV* (Network Virtualization) Technology
Simplify the network

ASR 9000 System

Edge

ASR 9922 /
9010 / 9006

Services

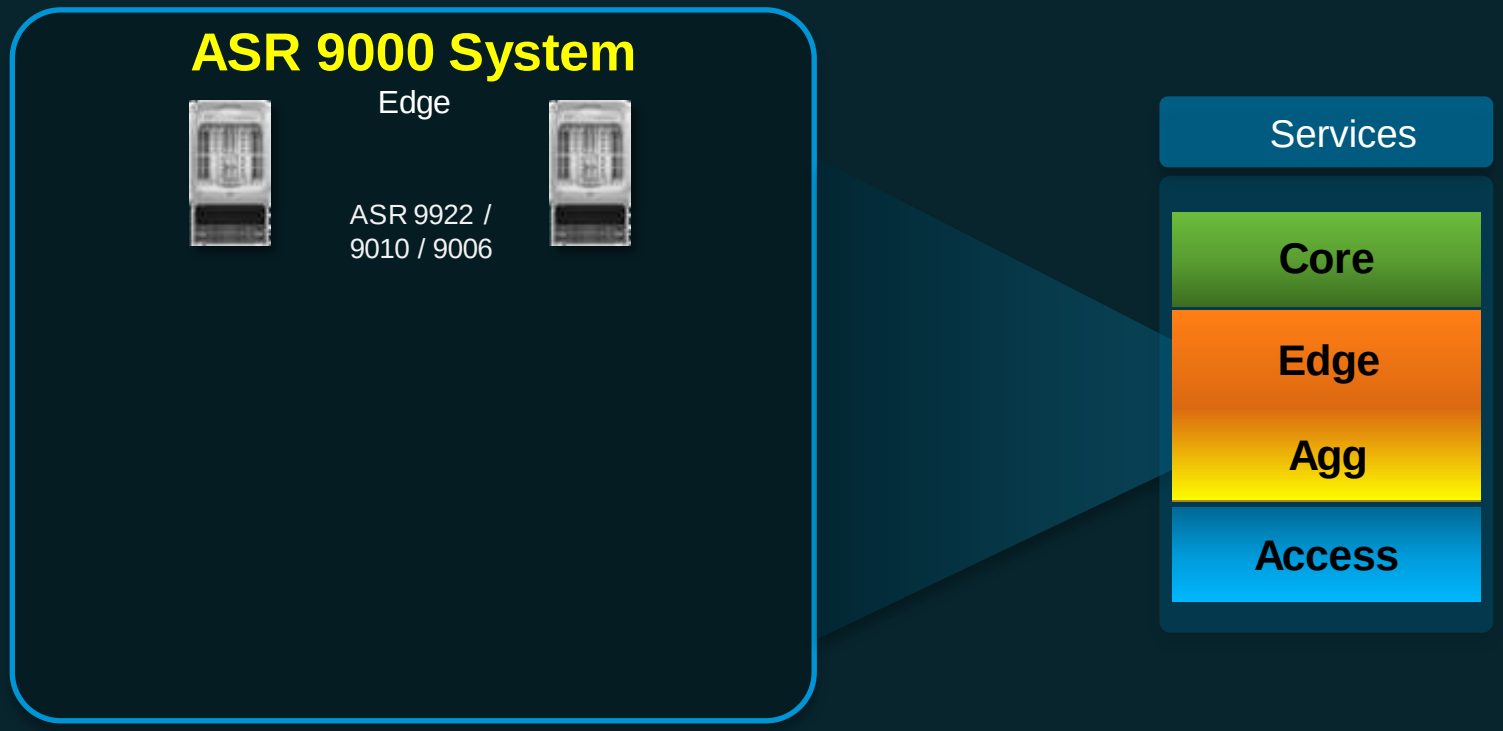
Core

Edge

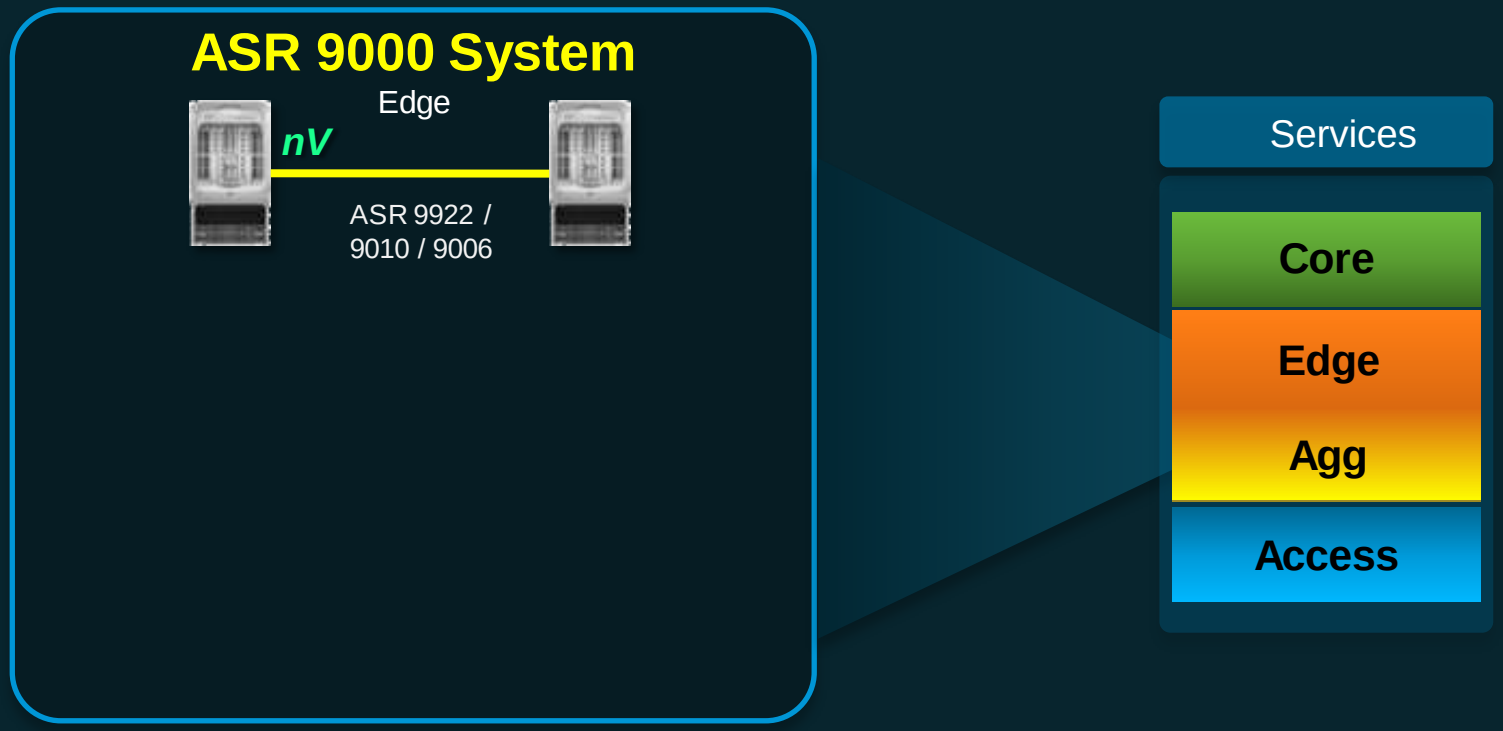
Agg

Access

Introducing *nV* (Network Virtualization) Technology
Simplify the network



Introducing *nV* (Network Virtualization) Technology
Simplify the network



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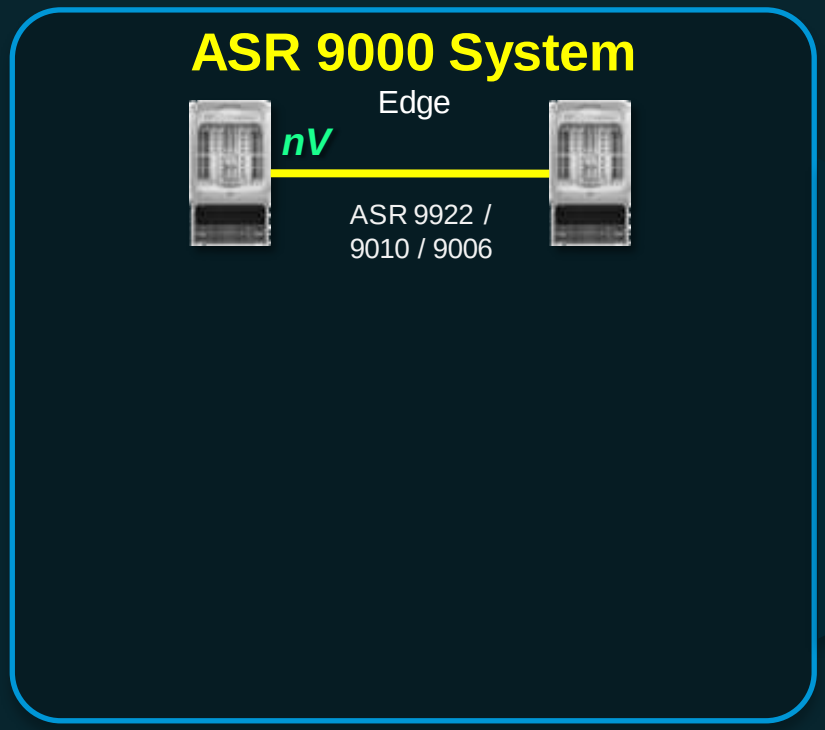
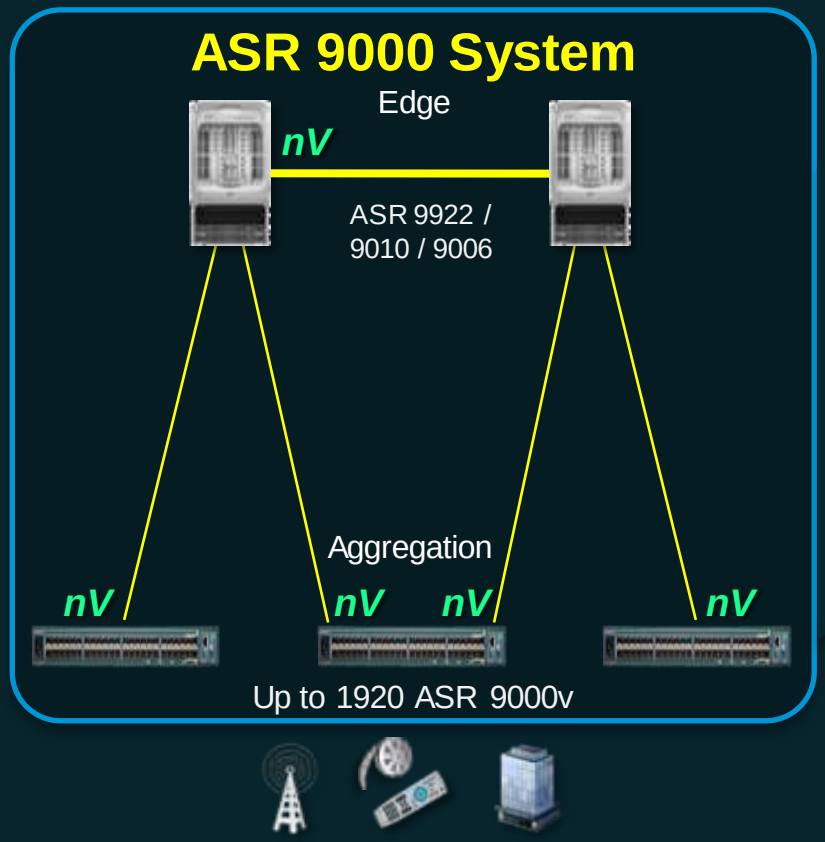


Virtualized Control Plane
Virtualized Management Entity

Scalability & Resiliency
Simplicity

Introducing *nV* (Network Virtualization) Technology
Simplify the network



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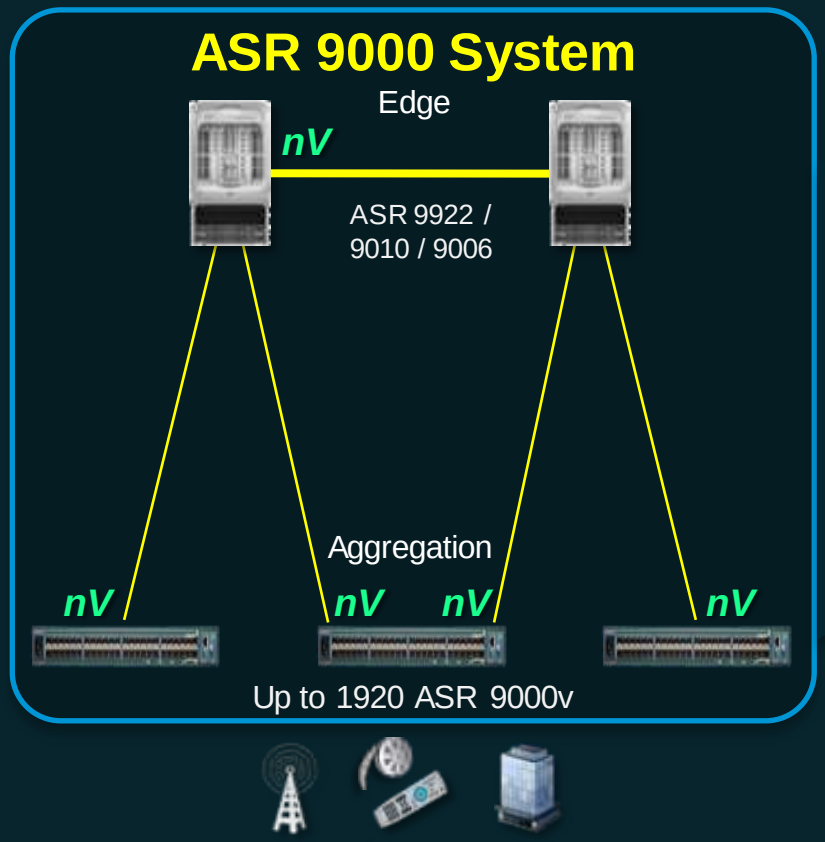
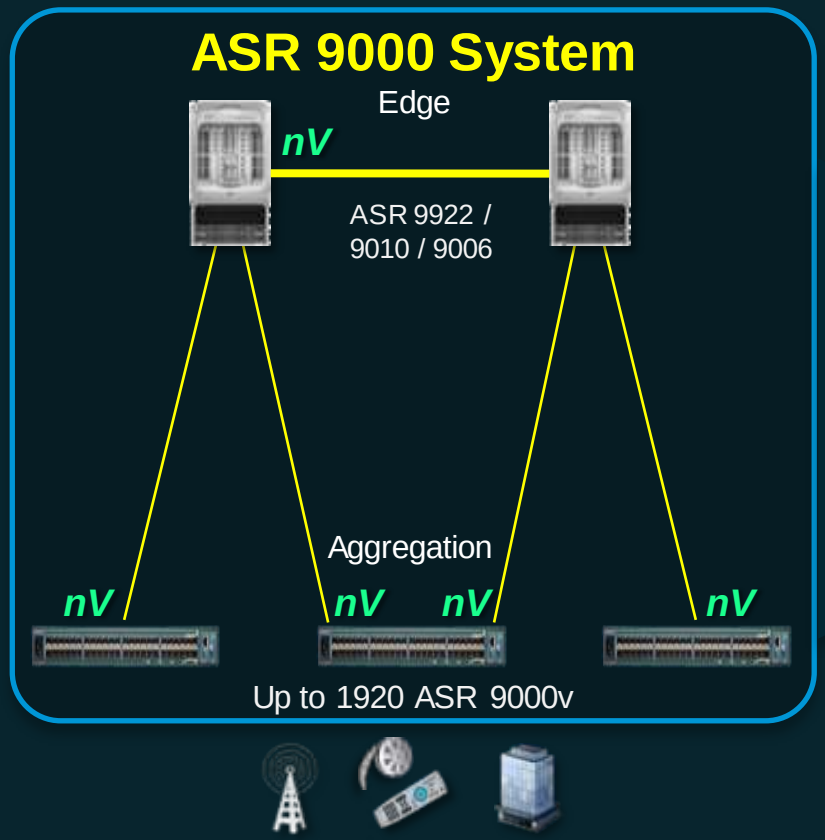


Virtualized Control Plane — **Scalability & Resiliency**
Virtualized Management Entity — **Simplicity**

Virtualized Switching Fabric — **Scalability**
Virtualized Common Features — **Service Velocity**
Virtualized Management Entity — **Simplicity**

Introducing *nV* (Network Virtualization) Technology
Simplify the network



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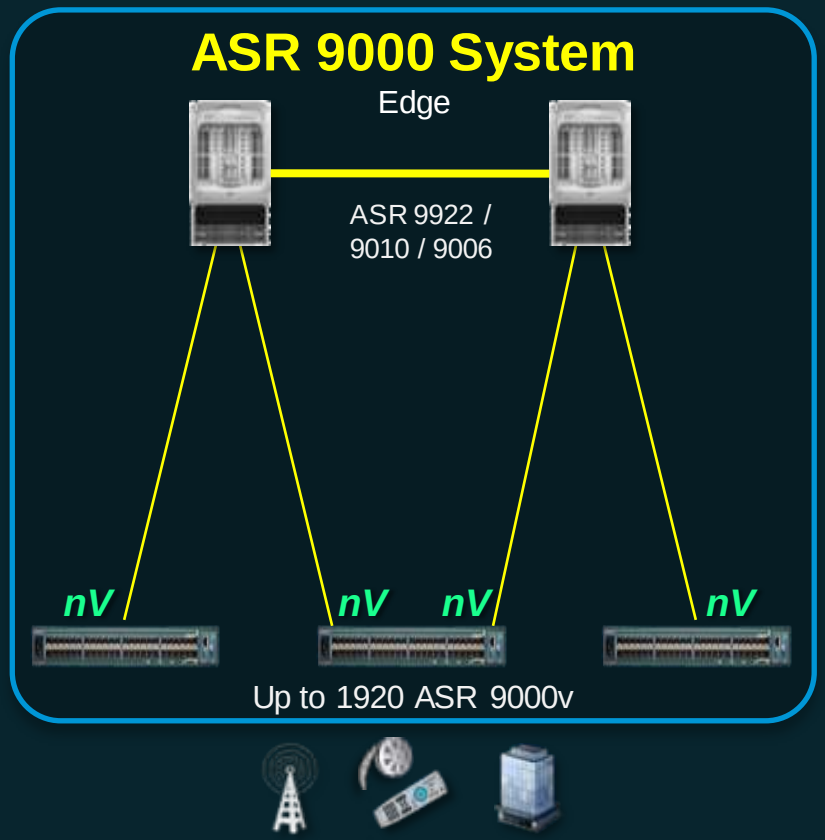
Expand any Cisco ASR 9000 to a System with
a ***Simple Upgrade***

Simplify IPv6 Transition

nV Technology accelerates CGv6 transition



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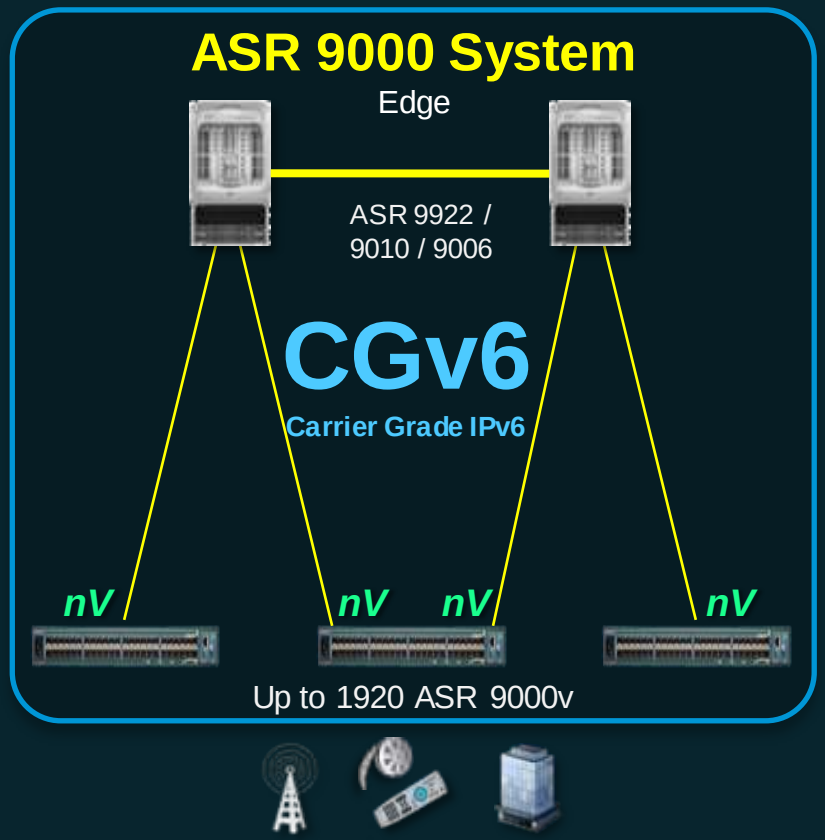

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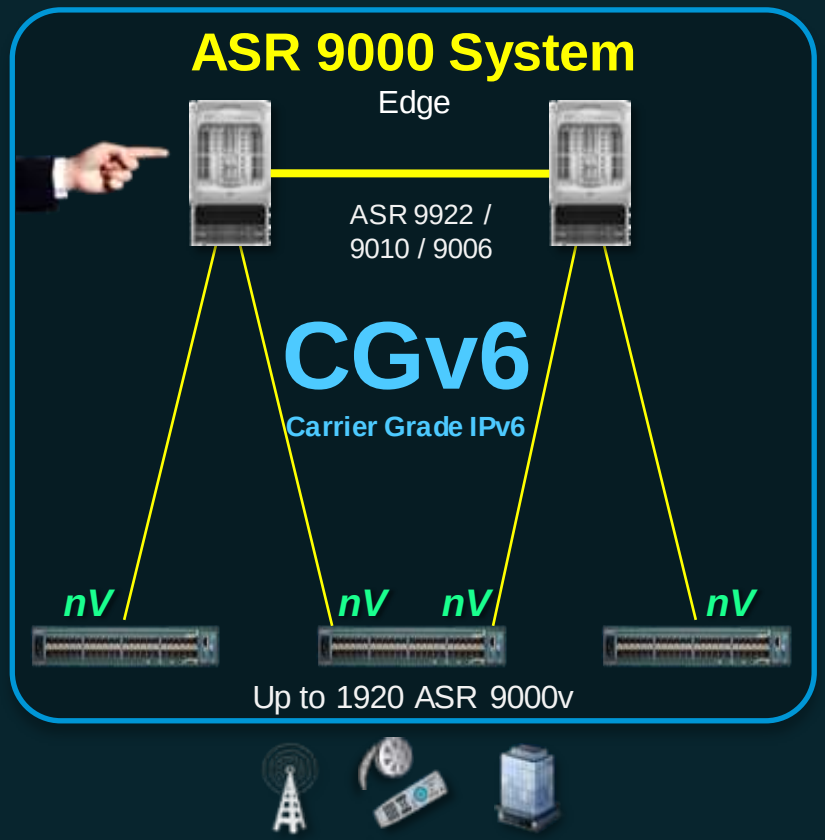

Simplify

Single touch-point for 1000s of devices

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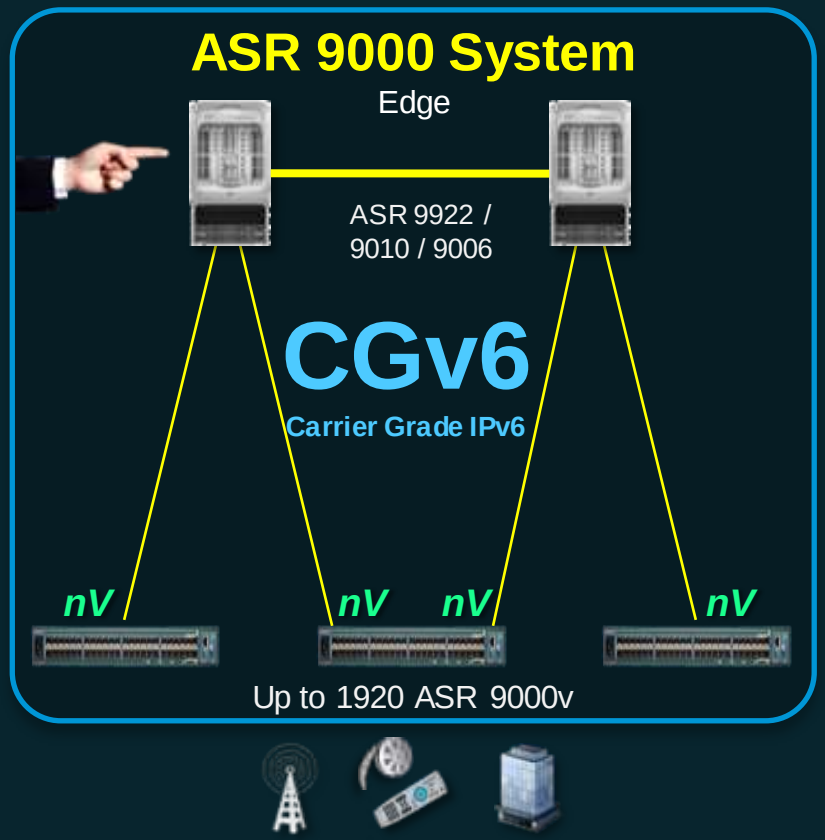

Simplify

Single touch-point for 1000s of devices

Complete Lifecycle

Preserve IPv4 investment

Prepare to co-exist IPv4 & IPv6

Prosper to full IPv6

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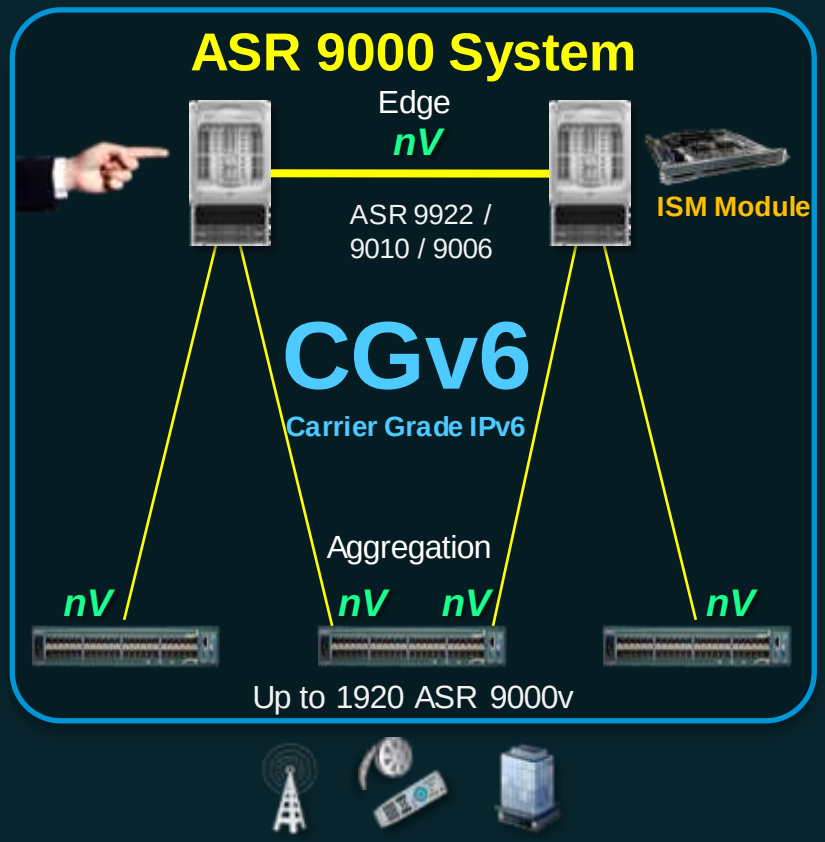

Simplify

Single touch-point for 1000s of devices

Complete Lifecycle

Preserve IPv4 investment

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Prosper to full IPv6

Scale

Hardware-accelerated by ISM module

ISM = Integrated Services Module

Simplify the Operations

Reduce the lifecycle OPEX up to 70% by ***nV*** technology

Acquisition
Engineering
Integration

Qualify ASR 9000 System only <u>once</u>

Train your staff only <u>once</u>

For current & future needs

Simplify the Operations

Reduce the lifecycle OPEX up to 70% by ***nV*** technology

Acquisition
Engineering
Integration

Install
Commission

ASR 9000 System

Simple cookie-cutter ASR 9000v install & connect

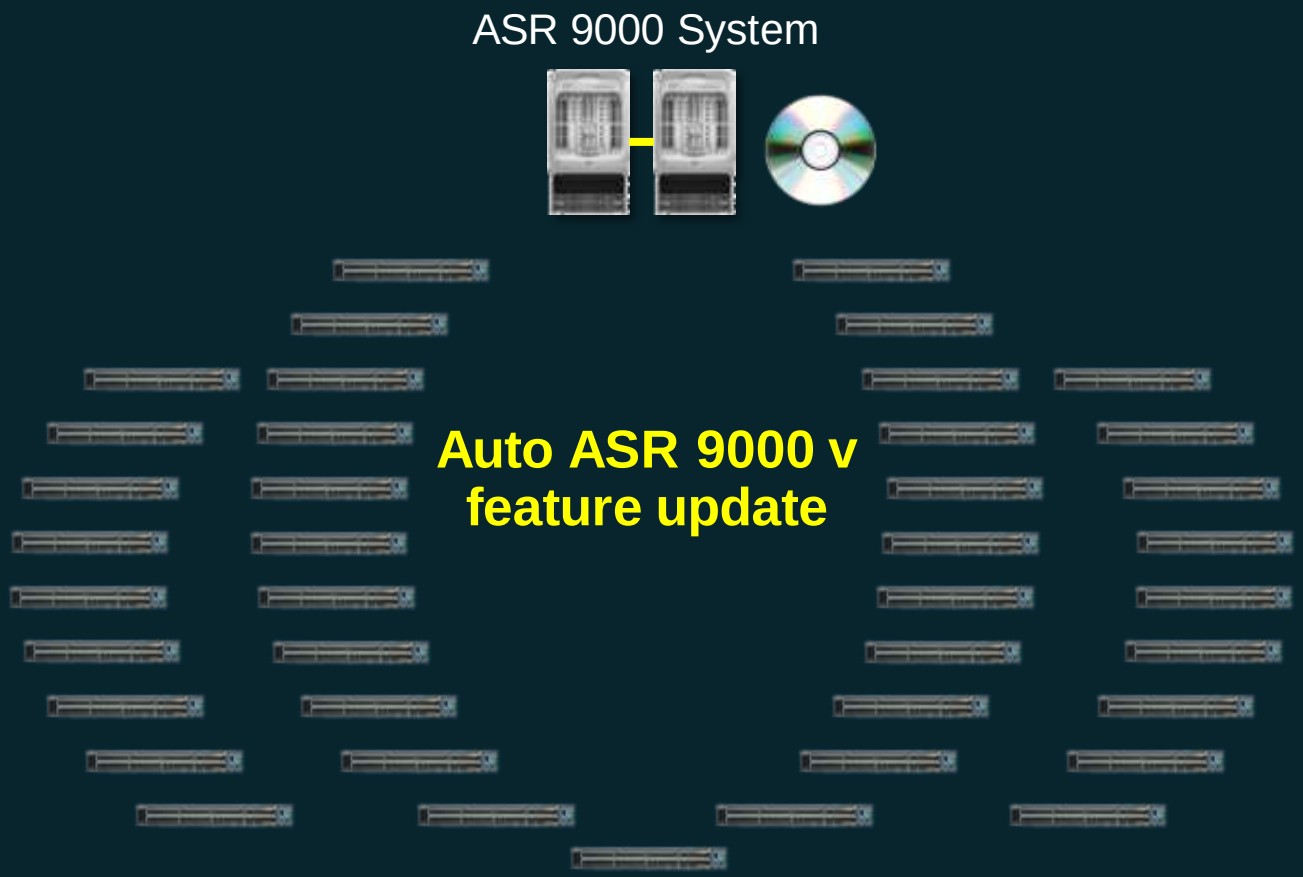
Simplify the Operations

Reduce the lifecycle OPEX up to 70% by ***nV*** technology

Acquisition
Engineering
Integration

Install
Commission

Software
Maintenance



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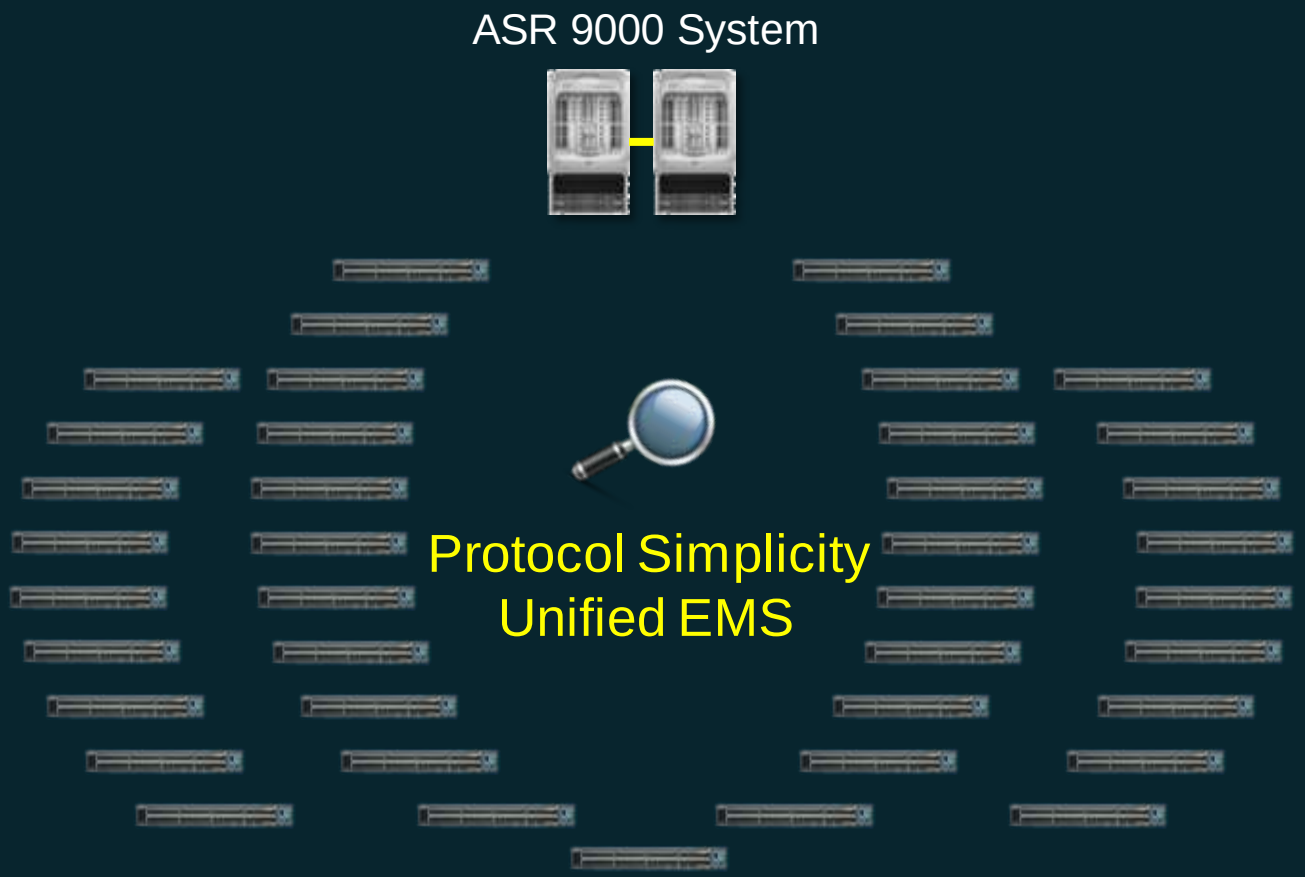
Reduce the lifecycle OPEX up to 70% by ***nV*** technology

- Acquisition Engineering Integration
- Install Commission
- Software Maintenance
- Trouble-shooting



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ASR 9000 System

Up to

70%

OPEX Savings over nearest competitor *

* Reference ACG report, Includes power, cooling & space savings also

Simplify the Operations

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- Acquisition Engineering Integration
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ASR 9000 System

Up to

70%

OPEX Savings over nearest competitor *

System pays for itself within a year

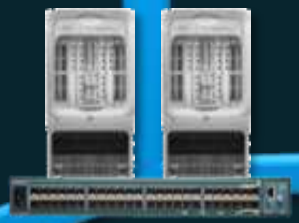
* Reference ACG report, Includes power, cooling & space savings also

Multi-dimension Scalability

Ready to Grow in Any Dimension with ASR 9000 System

System

- 96Tb Capacity
- Carrier Grade IPv6
- Single Control Plane
- Distributed & Modular OS
- Redundancy
  (Control & data plane, fabric, link & more)



Ports

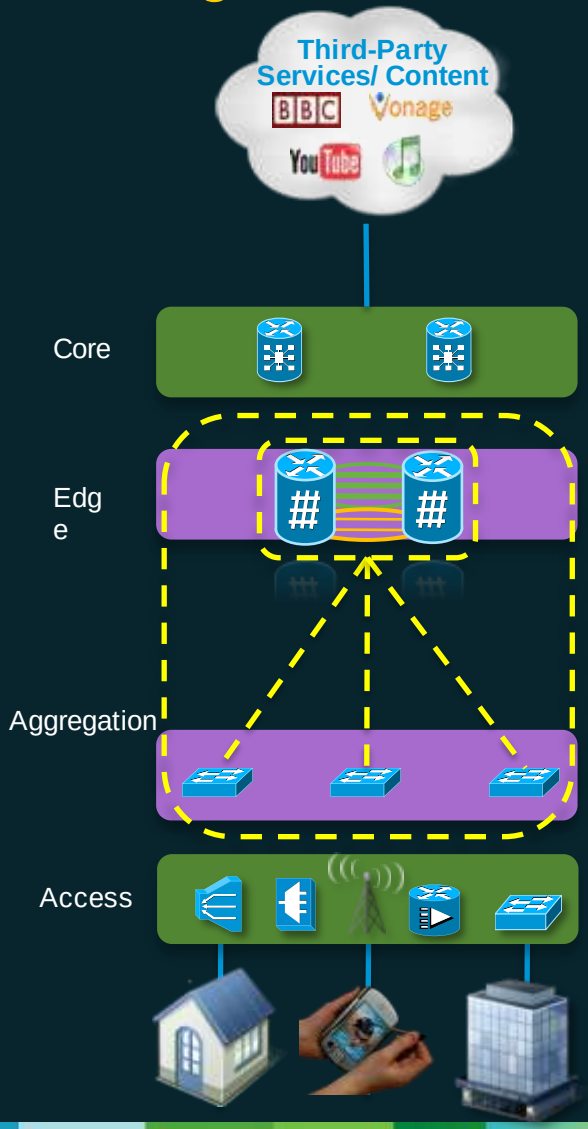
Up to **1,920** ASR 9000v
Up to **84,480** GE Ports
Up to **1,920** 10GE Ports
Up to **480** 100GE Ports

Services

Virtualized features across business & residential for video, mobile & cloud services

ASR 9000 Virtual System with *nV* Technology

Self protected, self managed ASR 9000 virtualized system



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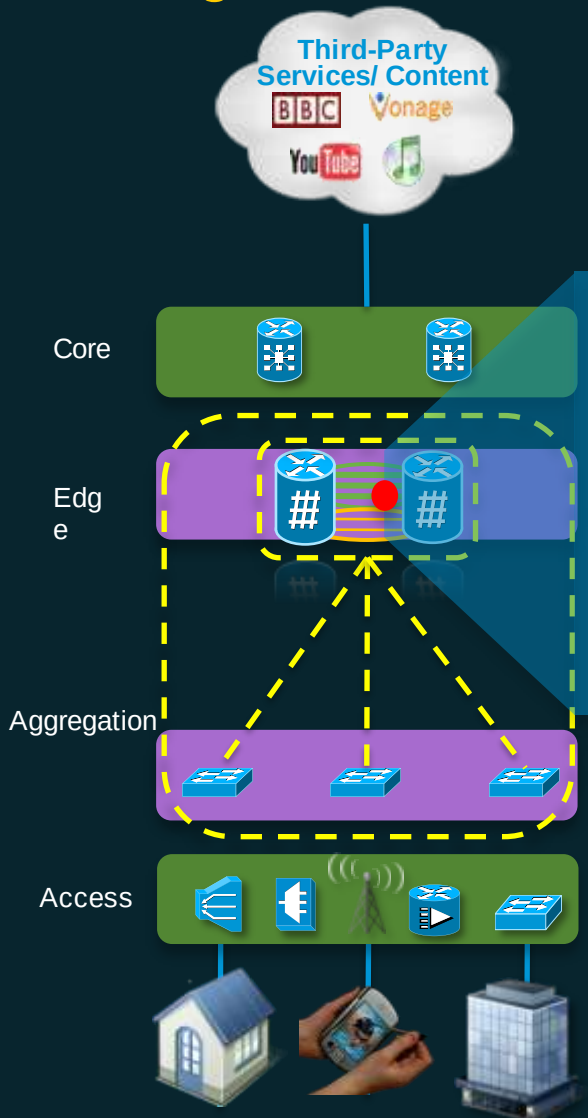
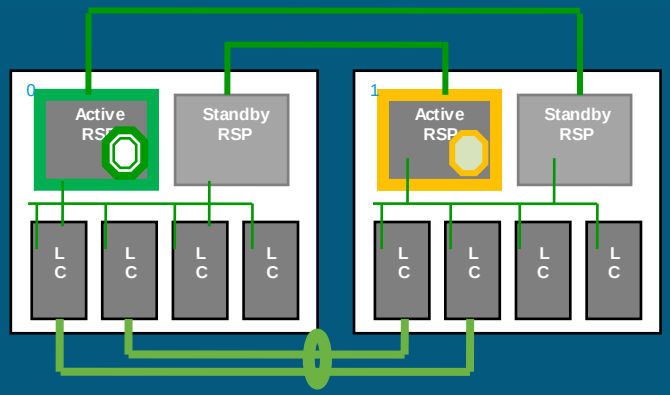


Virtualized Control & Data Plane Inter-chassis Connections



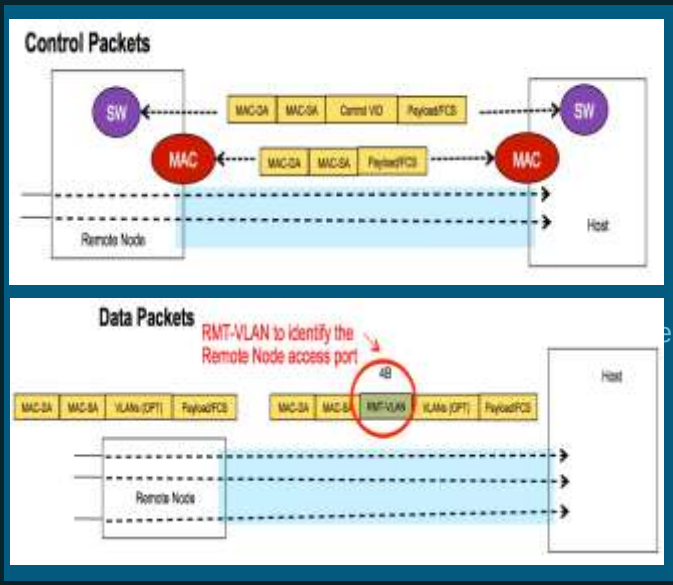
Virtualized control plane achieved via EOBC between RSP's provides hitless outage upon node failure.

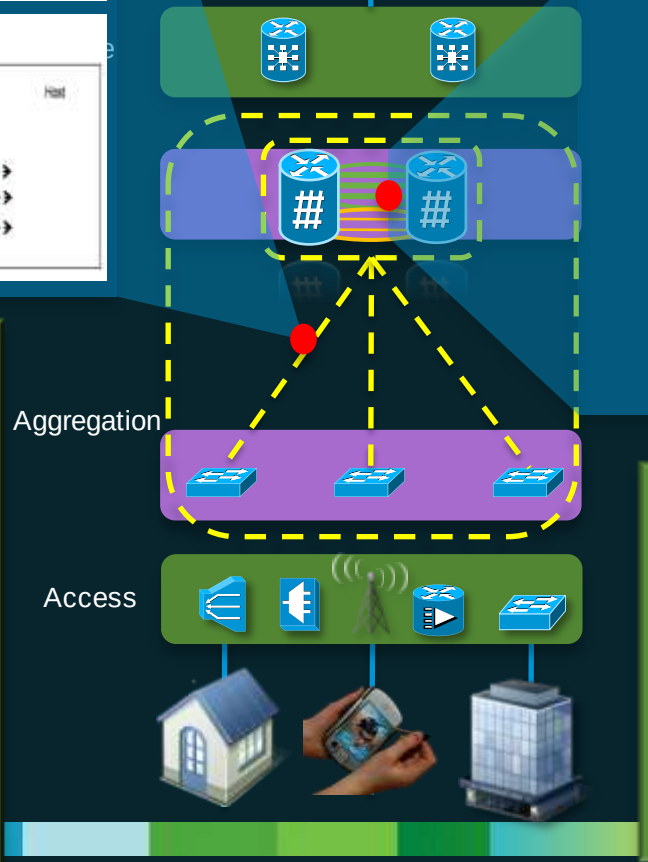
Virtualized data plane achieved through linecard inter-chassis connections.

A self-protected virtual chassis is created doubling the system capacity.

ASR 9000 Virtual System with *nV* Technology

Self protected, self managed ASR 9000 virtualized system





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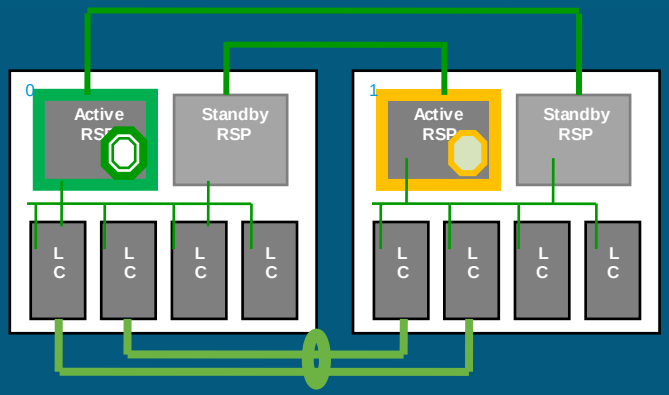

Remote nodes are viewed as linecards and remote platforms are discovered automatically.

Remote platforms are provisioned by the host.

Software images for remote nodes can be upgraded automatically and features are in sync.

A self-managed access is created allowing scale to be decoupled from a single platform.

Virtualized control plane achieved via EOBC between RSP's provides hitless outage upon node failure.

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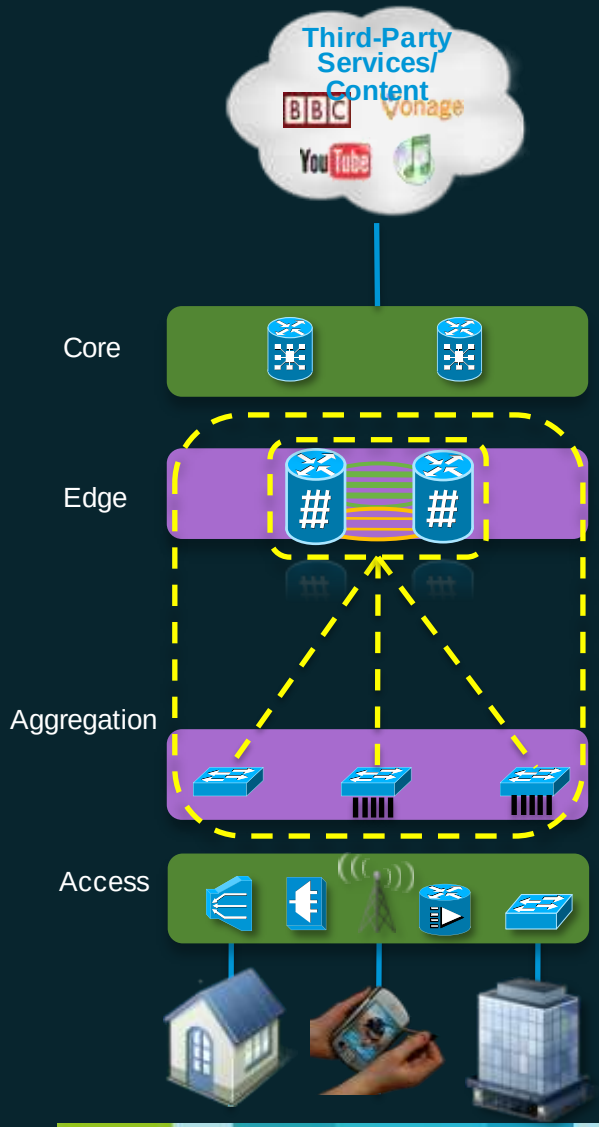
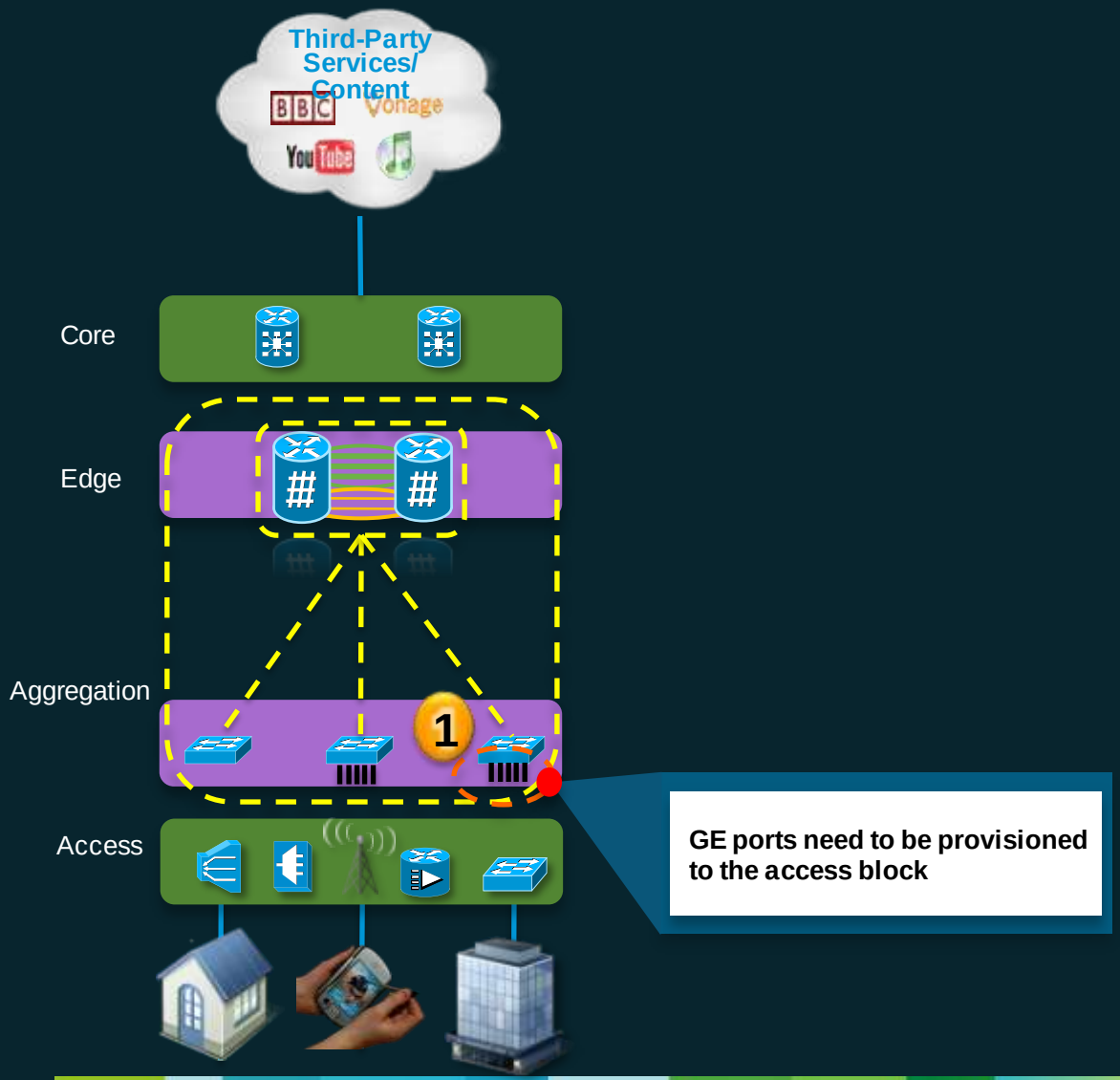
A self-protected virtual chassis is created doubling the system capacity.

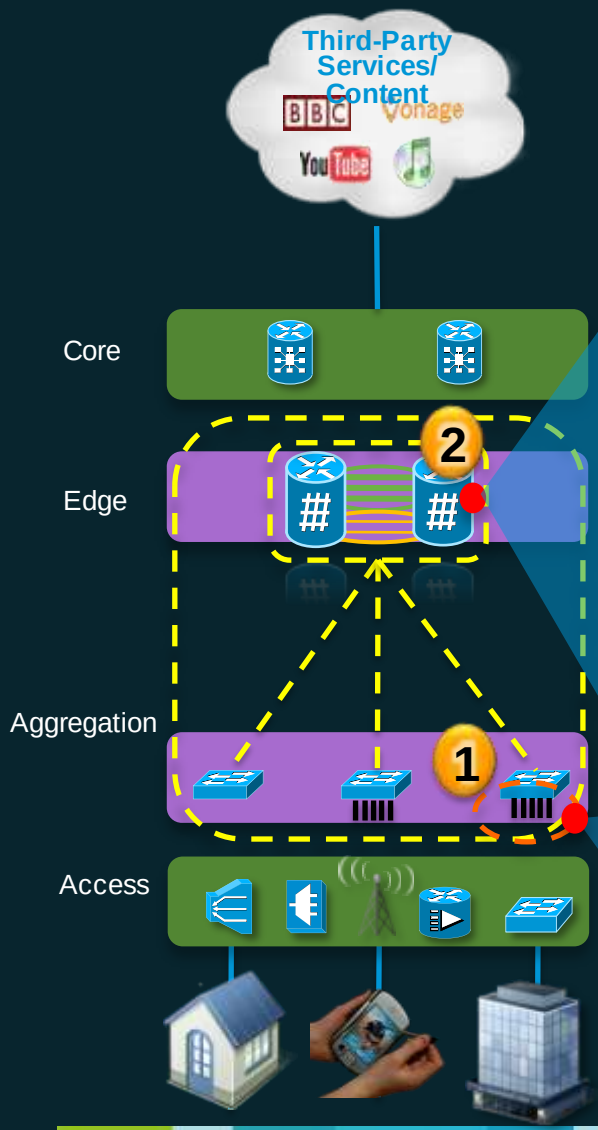
nV Technology in Action
Host CLI Configuration Example



nV Technology in Action
Host CLI Configuration Example



nV Technology in Action
Host CLI Configuration Example



Host CLI Example Configuration for Remote Node

```
!
Interface remoteEthernet 0/0/0/1/100/0/0/1
        Ipv4 address …….
!
Interface remoteEthernet 0/0/0/1/100/0/0/2.1
        Ipv4 address ….
        Encapsulation dot1q 201
        Rewrite ingress tag ……
!
```

CLI uses 8 values

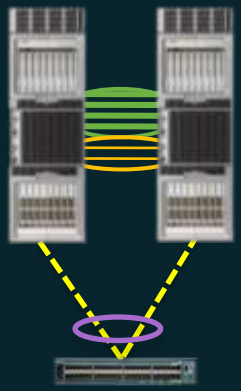
- First 4 define the remote uplink location
- Second 4 define the remote node itself

GE ports need to be provisioned to the access block

Simplify Multi-dimension Scale
ASR 9000 System deployment options

Deployment Scenario #1:
ASR 9922
ASR 9000v bundled

Deployment Scenario #2:
ASR 9922
ASR 9000v bundled



Single adjacency over link bundle

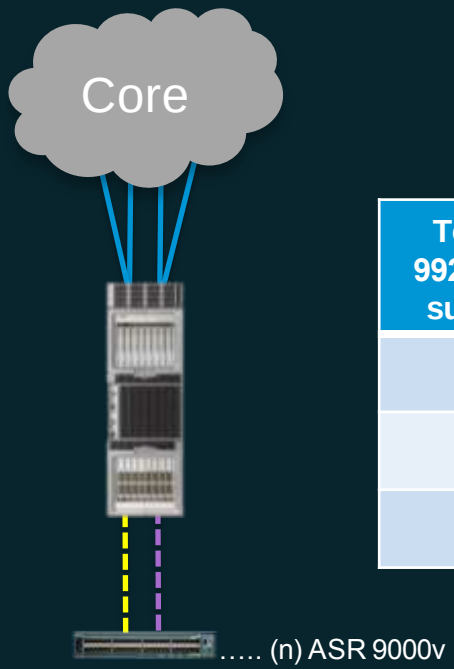
Traffic load balanced over link bundle

Link bundle remains up when link or node fails

Different Deployment Scenario's depending on your desired outcome

Simplify Multi-dimension Scale
Example #1

Deployment Scenario #1:
ASR 9922
ASR 9000v Single Homed



Assumptions

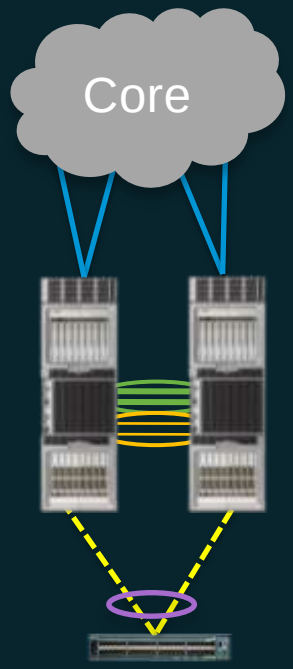
20 linecard slots usable on the ASR 9922
2 slots reserved = 2x100GE for uplink connectivity
18 slots reserved = 24x10GE connecting ASR 9000v

Total ASR 9922 10GE's supported	ASR 9000v Connectivity	Link Protection	ASR 9000v Oversubscription	ASR 9000v's Supported	ASR 9000v GE's Supported
432	1x10GE	No	4:1	432	19,008
432	2x10GE	Yes	2:1	216	9,504
432	4x10GE	Yes	1:1	108	4,752

Different Deployment Scenario's depending on your desired outcome

Simplify Multi-dimension Scale
Example #2

Deployment Scenario #2:
ASR 9922
ASR 9000v bundled



Assumptions

20 linecard slots usable on the ASR 9922
2 slots reserved = 2x100GE for uplink connectivity
2 slots reserved = 2x100GE for inter-chassis data plane connectivity
16 slots reserved = 24x10GE connecting ASR 9000v

Total ASR 9922 10GE's supported	ASR 9000v Connectivity	Link Protection	ASR 9000v Oversubscription	ASR 9000v's Supported	ASR 9000v GE's Supported
768	2x10GE	Yes	2:1	384	16,896
768	4x10GE	Yes	1:1	192	8,448

Different Deployment Scenario's depending on your desired outcome

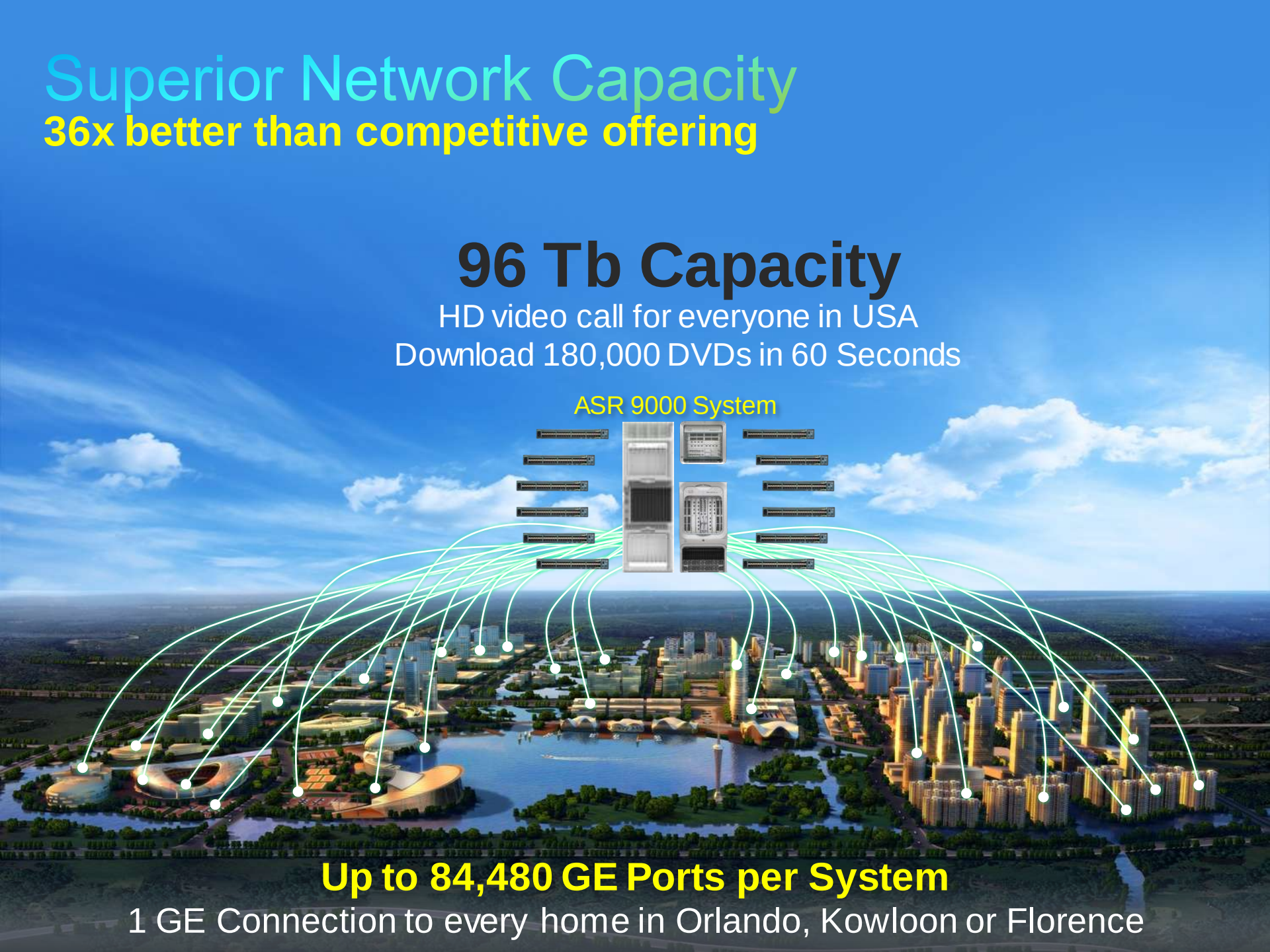
Superior Network Capacity

36x better than competitive offering

96 Tb Capacity

HD video call for everyone in USA

Download 180,000 DVDs in 60 Seconds



Up to 84,480 GE Ports per System

1 GE Connection to every home in Orlando, Kowloon or Florence

One System, Many Service

Cisco ASR 9000 System

Converge Video, Mobile & Cloud Services

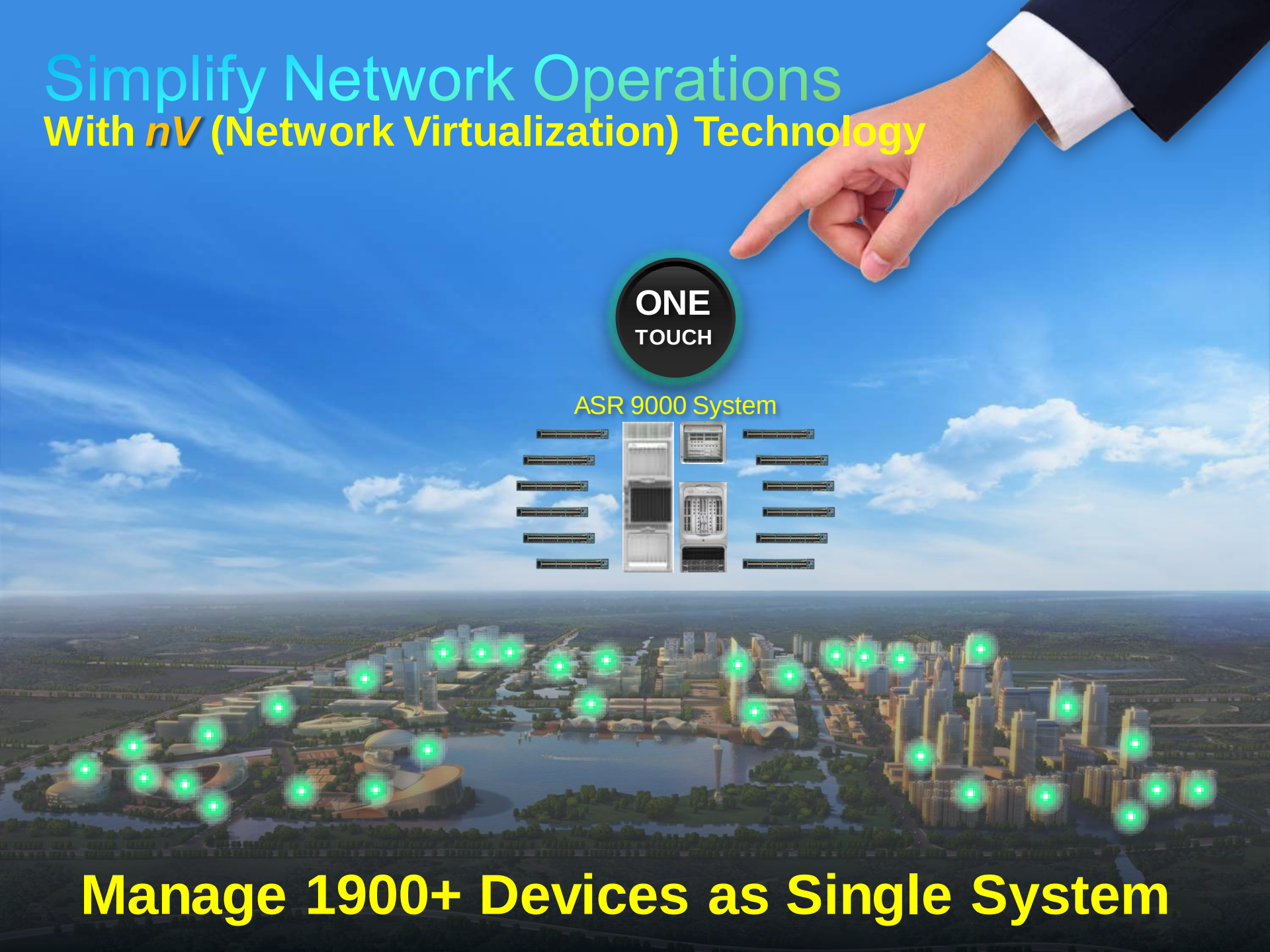
One System, Many Service

Cisco ASR 9000 System

Converge Video, Mobile & Cloud Services

Simplify Network Operations

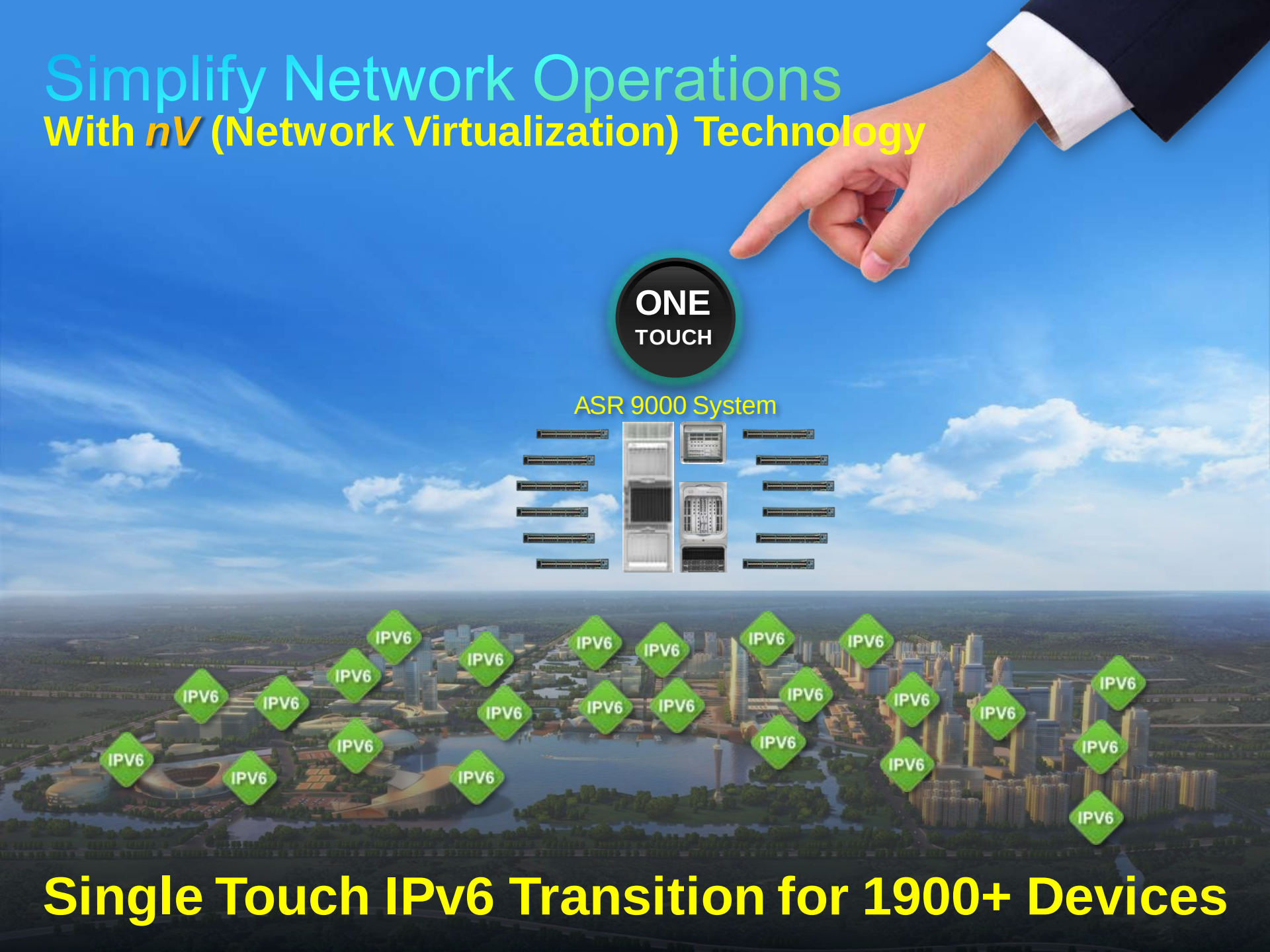
With *nV* (Network Virtualization) Technology



Manage 1900+ Devices as Single System

Simplify Network Operations

With *nV* (Network Virtualization) Technology



Single Touch IPv6 Transition for 1900+ Devices

Simplify Network Operations

With *nV* (Network Virtualization) Technology

Single Touch Software Upgrade for 1900+ Devices

Q2 SP Seminář – 22.6.2011, Praha

- Jak stavět cloud služby
- Podpora mobilních sítí 3G na směrovačích ISR a využití u poskytovatelů služeb
- IPv6 aktuality – novinky ve standardizačním procesu, porovnání přechodových scénářů
- Dynamic Ethernet Services Activation (DESA)
- Inovace v IOS XR 4.1, parita s IOS trainy, příklady nových aplikací na ASR9000 a roadmapy
- Cisco podpůrné nástroje: DocWiki, Support Wiki, TAC eskalace

Otázky ..?

Nashledanou