4G: Convergence, Openness for Excellence and Opportunity

4G…Not Just for Mobility

- This next generation of mobility networks will have over the air throughput speeds that will approach those of wireless /WiFi and wireline networks (+50 Mbps)

- 4G has come to be a universal term describing multi-service, multi-access networks

- Interest, compliance and interoperability beyond the 3G Partnership Programs and actually driven more by ETSI and TISPAN

- Integrated standards efforts for mobility/wireless <u>and</u> wireline

    backhaul and transport,

    multi-access devices

    signaling across network elements for successful call admission and control,

    policy and QoS for transport
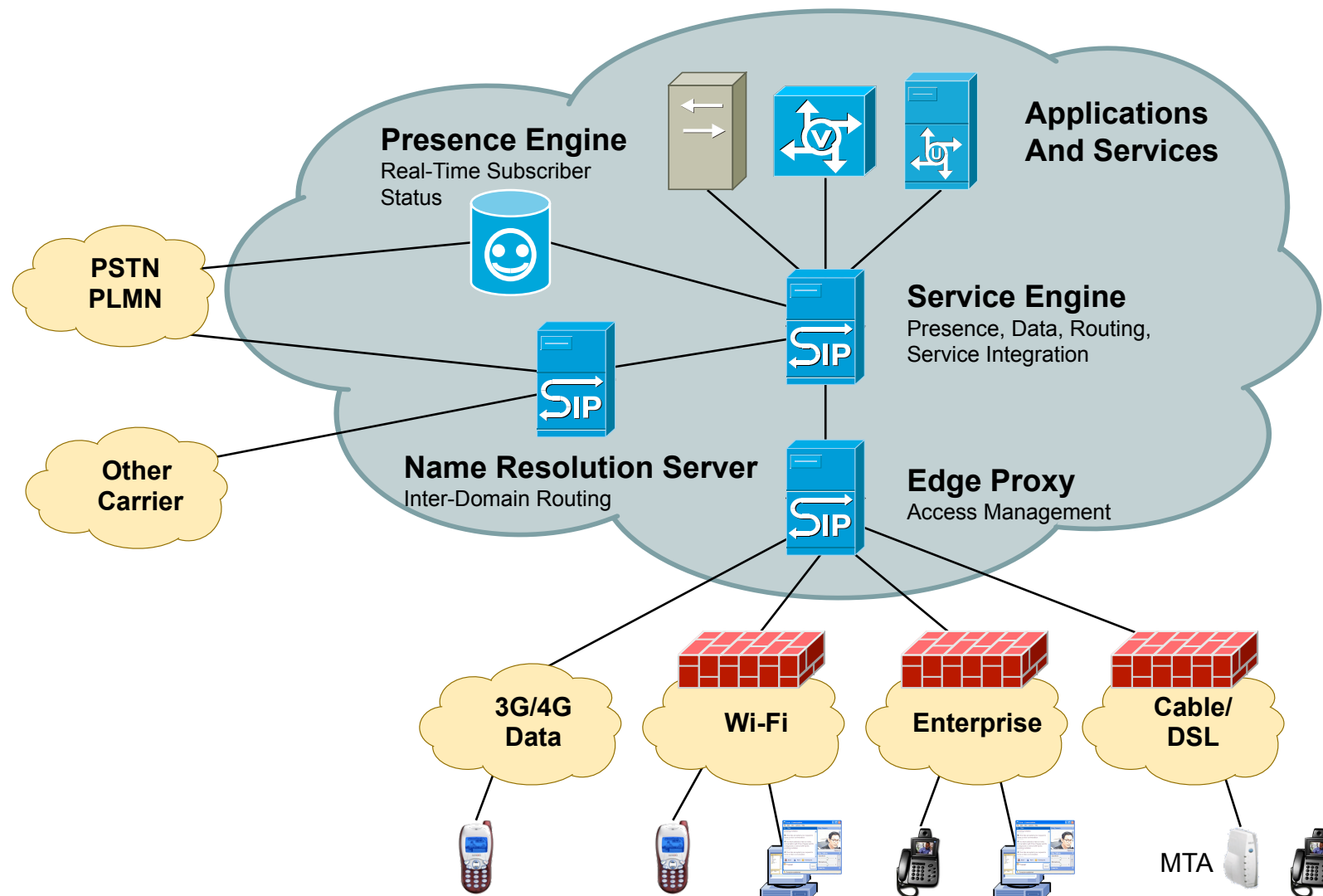
4G Geopolitical Network Ideologies

- 4G radio access technologies focused on improving spectral efficiencies for higher data throughput/performance

- 4G networks must support multiple services including voice, video and data

- Devices will contain multiple access technologies – 3G, 4G, WiFi to deliver an ever increasing set of applications

4G networks will be Converged and Open

4G Network Vision:
Open and Converged ➡ Flat Networks

Presence Engine
Real-Time Subscriber
Status

**Applications
And Services**

PSTN
PLMN

Service Engine
Presence, Data, Routing,
Service Integration

Other
Carrier

Name Resolution Server
Inter-Domain Routing

Edge Proxy
Access Management

3G/4G
Data

Wi-Fi

Enterprise

Cable/
DSL

MTA

Issues Being Addressed by 4G

Introduction of New Applications

Layered atop flexible Call-Control Infrastructure

Open interface between Call-Control and Applications

Fast Integration with existing services

Access to Applications

Tailored to the Customer / Carrier

Carrier controls provisioning / access

Carrier, not application provider, "owns" the customer

Facilitation of 3rd-Party Arrangements

Presence Enablement

Service Delivery according to Customer Situation
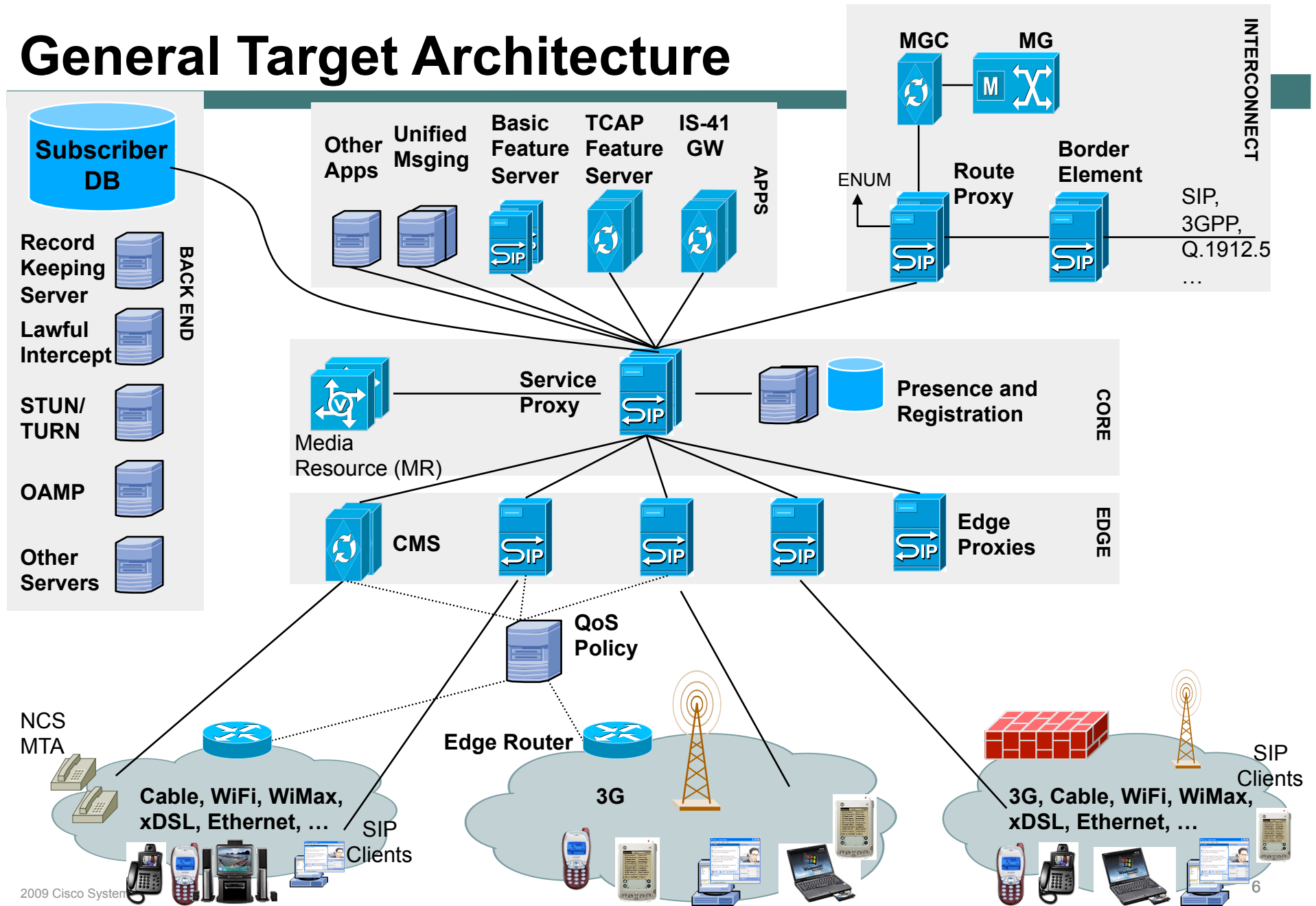
Services Cognizant of Device Capabilities

Convergence

Access-Independent Applications

Common service management core supporting multiple access networks

Policy-Based Management of User Devices and Network Resources

User-Specific, Application Specific

Access Sessions, Transient Sessions, Transactions

Denial: Policing, Threats, Bandwidth Limitations

Facilitation: Shaping, Prioritization, Feature Requirements/Performance Based Needs
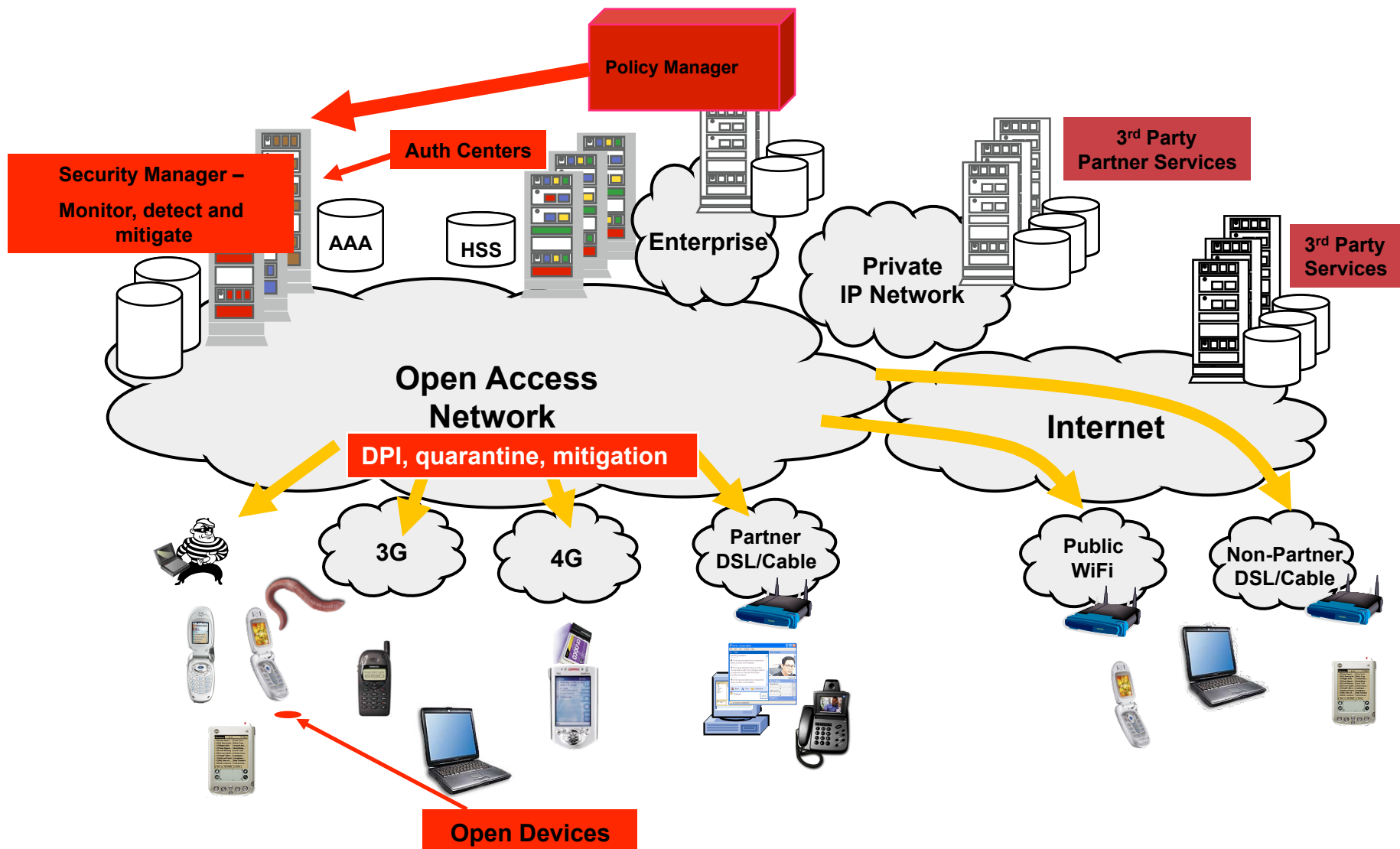
General Target Architecture

Subscriber DB

BACK END
- Record Keeping Server
- Lawful Intercept
- STUN/TURN
- OAMP
- Other Servers

APPS
- Other Apps
- Unified Msging
- Basic Feature Server
- TCAP Feature Server
- IS-41 GW

INTERCONNECT
- MGC
- MG
- ENUM
- Route Proxy
- Border Element
- SIP, 3GPP, Q.1912.5 …

CORE
- Media Resource (MR)
- Service Proxy
- Presence and Registration

EDGE
- CMS
- Edge Proxies

QoS Policy

NCS MTA

Edge Router

Cable, WiFi, WiMax, xDSL, Ethernet, …

SIP Clients

3G

3G, Cable, WiFi, WiMax, xDSL, Ethernet, …

SIP Clients

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4G Network Commonalities

- Orthogonal Frequency Division Modulation (OFDM) for radio access

- IP transport from the radio to the core for multiple services including voice, video, data for consumer and enterprise

- Multi-service edge for support of 3G/4G RAN, WiFi, Cable/DSL

- Policy/QoS necessary to maxmize user experience over varying bandwidths

- Security procedures and enforcement necessary to protect network resources and as appropriate for specific enterprise and consumer requirements

- Core will need to efficiently route data while providing tiered classes of service

4G Networks: Open Access with Security Enabled

Policy Manager

Auth Centers

Security Manager –
Monitor, detect and mitigate

3rd Party Partner Services

AAA

HSS

Enterprise

Private IP Network

3rd Party Services

Open Access Network

Internet

DPI, quarantine, mitigation

3G

4G

Partner DSL/Cable

Public WiFi

Non-Partner DSL/Cable

Open Devices

Target Architecture Key Messages

- Flexible, IP-enabled, services rich network foundation

- Access network independent, facilitate network convergence

- Focus on ease of new application and service introduction

Target Architecture Key Capabilities

Cisco.com

- **Architecture Requirements and Capabilities:**

  Multi-Access: 3G/4G, WiFi, cable, xDSL, … Mobility and seamless service

  Multimedia: Voice, video, text, IM, pictures, ...

  Client Heterogeneity: Hard/soft, multiple media types, differing capabilities, UI, ...

  QoS Enabled: Leverage and control access network QoS where available, couple with service layer

  Multi-Application: Multi-vendor, standard interface, application composition,

  Unified Data Model: Single sign-on, common data model, data provisioned centrally

  Scalable: Multiple sites, distributed components, linear scalability through statelessness

  Secure: Fraud and DoS protection, user identity and privacy, anti-spam

  Presence-Enabled: Shared across applications, multi-source, centralized policy and control

Summary

- Increased throughput and bandwidth for mobility and IP end -to-end provide the basis for converged networks across access technologies

- 4G will bring increased opportunity for uniform services regardless of device used to access

- Applications will be able to take advantage of voice, video and data capabilities within a network offering greater services to consumers and enterprises

- Networks will see an increase in traffic and will most likely be more distributed

- Control points will be localized to manage unique services for home, office and public usage scenarios