Enterprise Campus & Branch Networks

Matt Davy *– Indiana University – Chief Network Architect*

Steve Brar *– Hewlett-Packard– Global Product Marketing Manager*

Speakers Introduction

Matt Davy *– Indiana University – Chief Network Architect*
mpd@iu.edu

- Lead architect for enterprise network with 120,000+ users, 100,000+ Ethernet ports and 5,000+ wireless access points
- Executive Director of InCNTRE
  - SDN Interop Lab
  - Network Research
  - Internships/Training
- 16 years of experience designing & operating large Service Provider & Enterprise networks

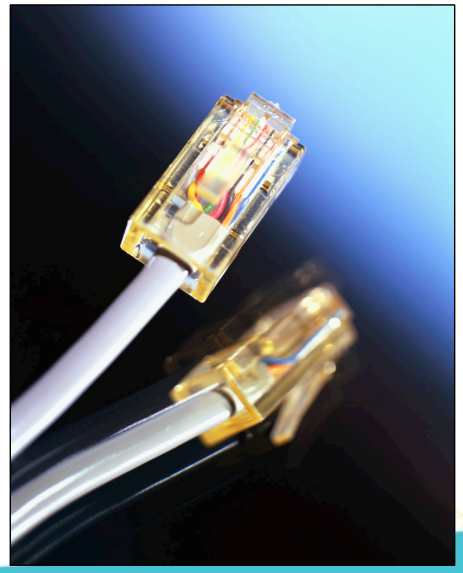
Steve Brar *– Hewlett-Packard – Global Product Marketing Manager*
steve.brar@hp.com

- Product marketing lead for modular campus & data center switching platforms including HP 12500, 10500, 7500, 8200 & 5400 series
- Product management & software engineering background
- Hewlett-Packard – HP Networking
  - ✓ #2 Enterprise Networking Vendor
  - ✓ OpenFlow support on 16 commercially available platforms

Session Objectives

Enterprise Campus Networks

- ***Understand*** trends & challenges
- ***Learn*** how SDN & OpenFlow fit in the enterprise network
- ***Discuss*** example use cases & benefits



Why OpenFlow in the Campus?

- Isn't OpenFlow only relevant in research, service provider & data center networks?

  NO

- Shares benefits of SP, DC use cases
- Can address some challenges facing the campus
- Large Market Opportunity

Video & Mobility are Transforming Business Communication

Up to

10X

Increase in network capacity required to support new wave of business video applications

INCREASE IN BANDWIDTH REQUIREMENTS

At least

50 Billion

Devices will connect to wireless networks by the year 2020

UNIFIED WIRED AND WIRELESS CAMPUS NETWORKS, AND IT CONSUMERIZATION

More than

25%

Of all daily business communications will be video or multi-media communications by 2013

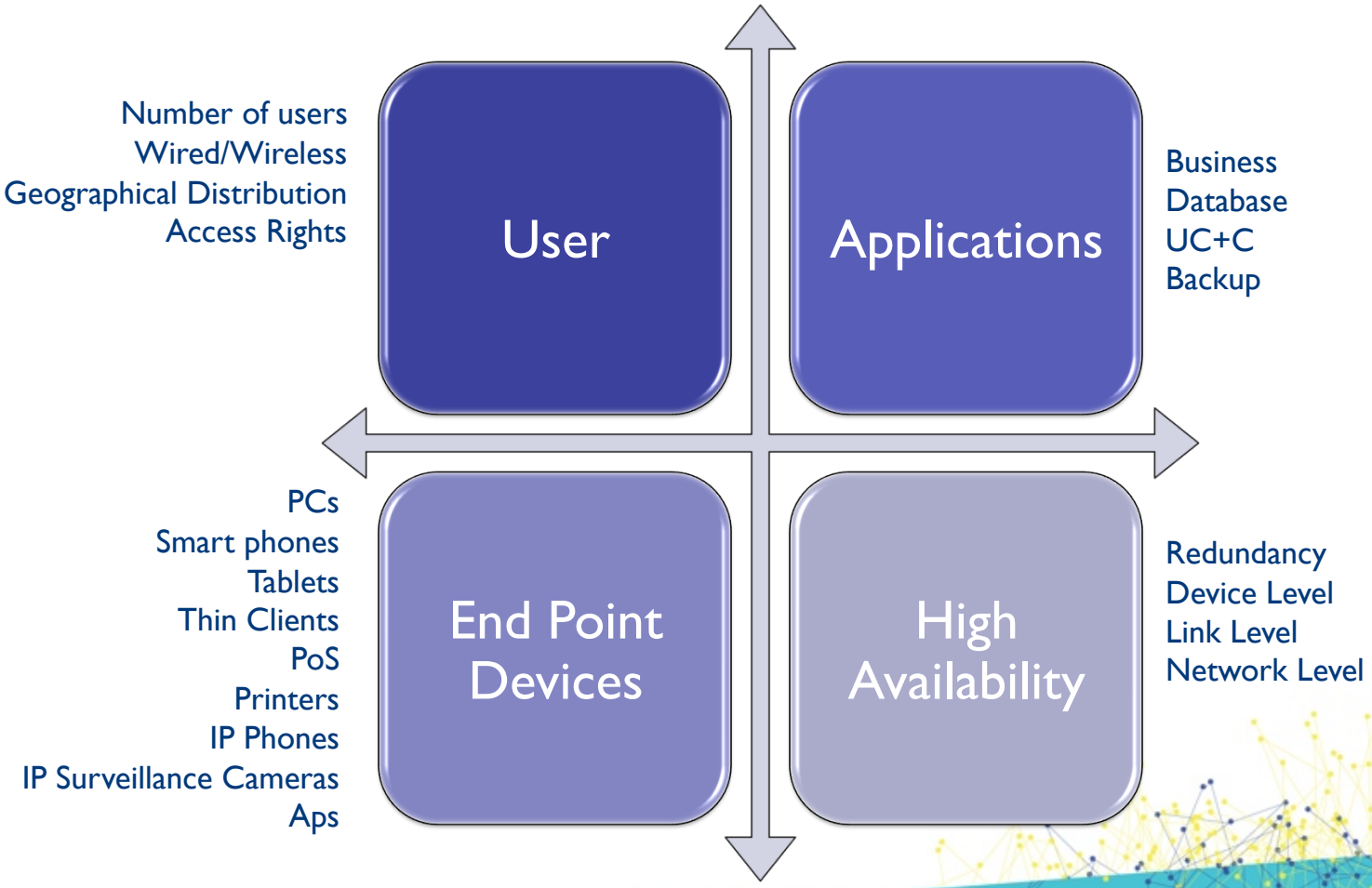
COLLABORATION, TRAINING, AND PRODUCTIVITY

Gartner G00207476: Emerging Technology Analysis
Gartner G00175764: Key Issues for Communications Strategies, 2010

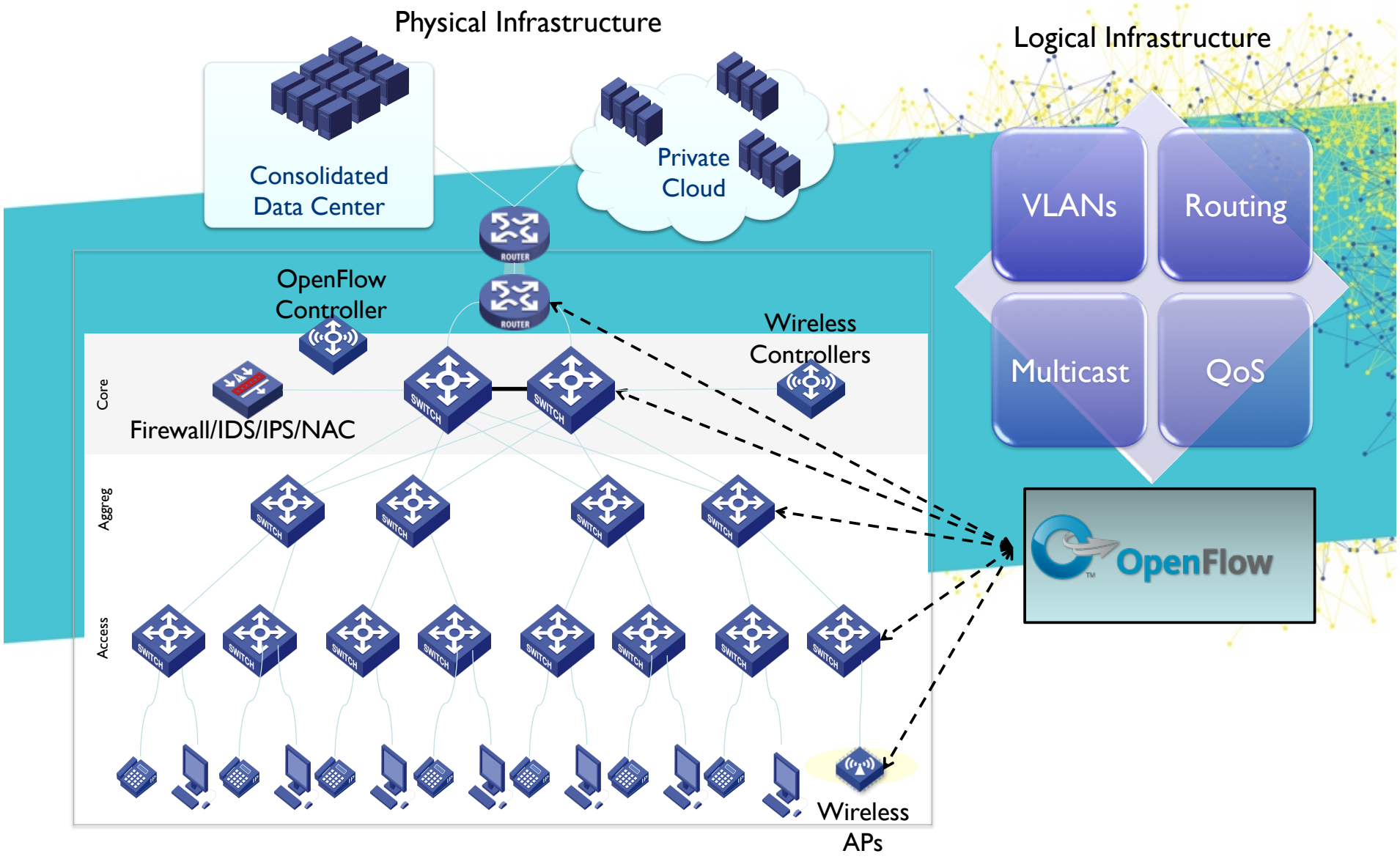
At the Breaking Point

- Unpredictable performance
  - Inconsistent user experience limits productivity (wired/ wireless/branch)
- Swivel-chair IT management
  - Non-integrated network management tools breed inefficiency and is error prone
- Limited agility
  - Legacy network architectures architectures are inflexible and inhibit scale
- Privacy, availability, and security
  - Difficulty maintaining compliance, availability of services

General Requirements



Enterprise Campus Networks



SDN & OpenFlow Use Cases

Enterprise Campus Networks

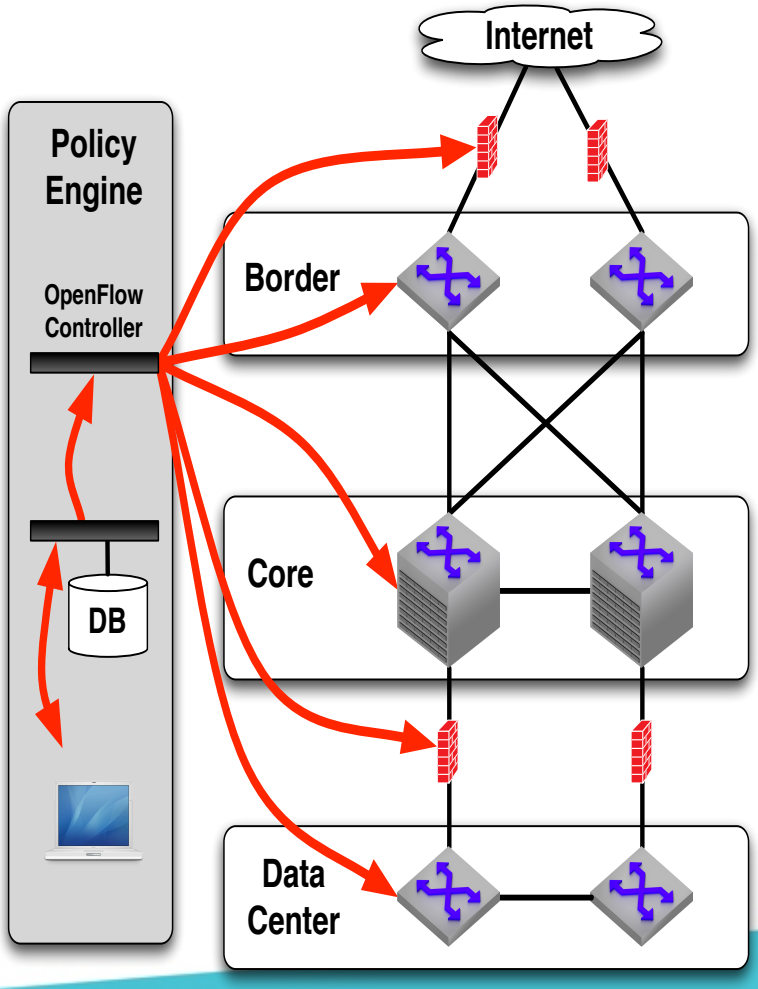
- ***Management Simplification***
  - *Network Virtualization*
  - *Benefit: Reduced complexity, cost, increased control & visibility*
- ***Network Security***
  - *More granular, consistent policy enforcement, unified access*
  - *Benefit: Improved security*
- ***Application Driven Networks***
  - *Dynamic resource allocation*
  - *Benefits: Improved user/app experience, better resource utilization*

Large University Campus Network

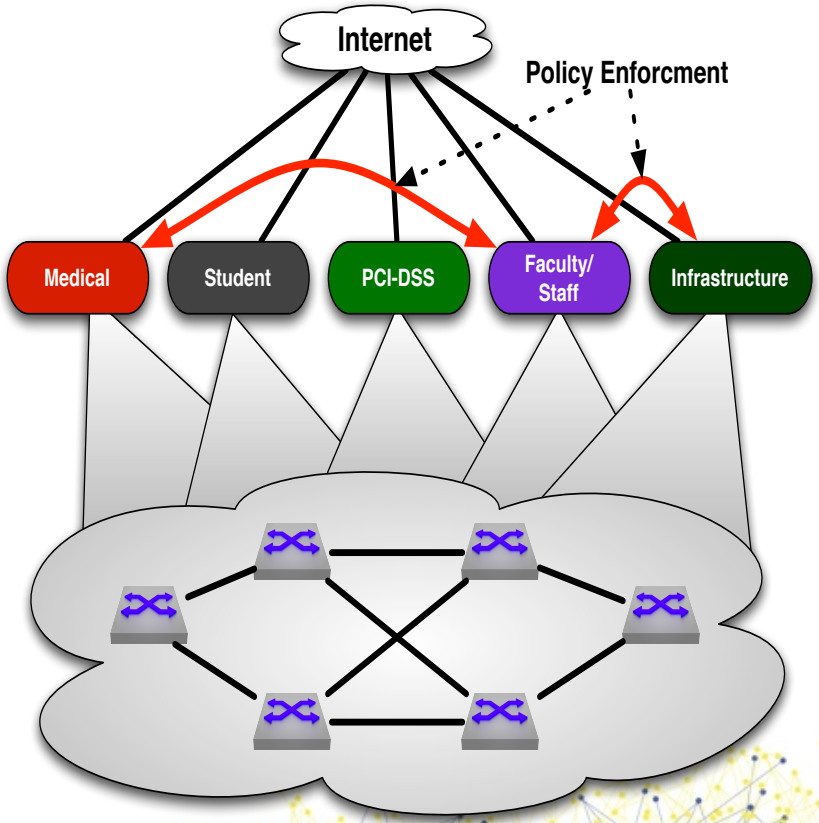
- 120,000 users (>95% BYOD)
- 1,000's of switches/ APs
- Massive diversity
- Compliance Requirements
- Mission to support cutting-edge technologies
- Federated operations
- Moving to shared infrastructure

Use-Case: Management Simplification

Security Policy Distribution

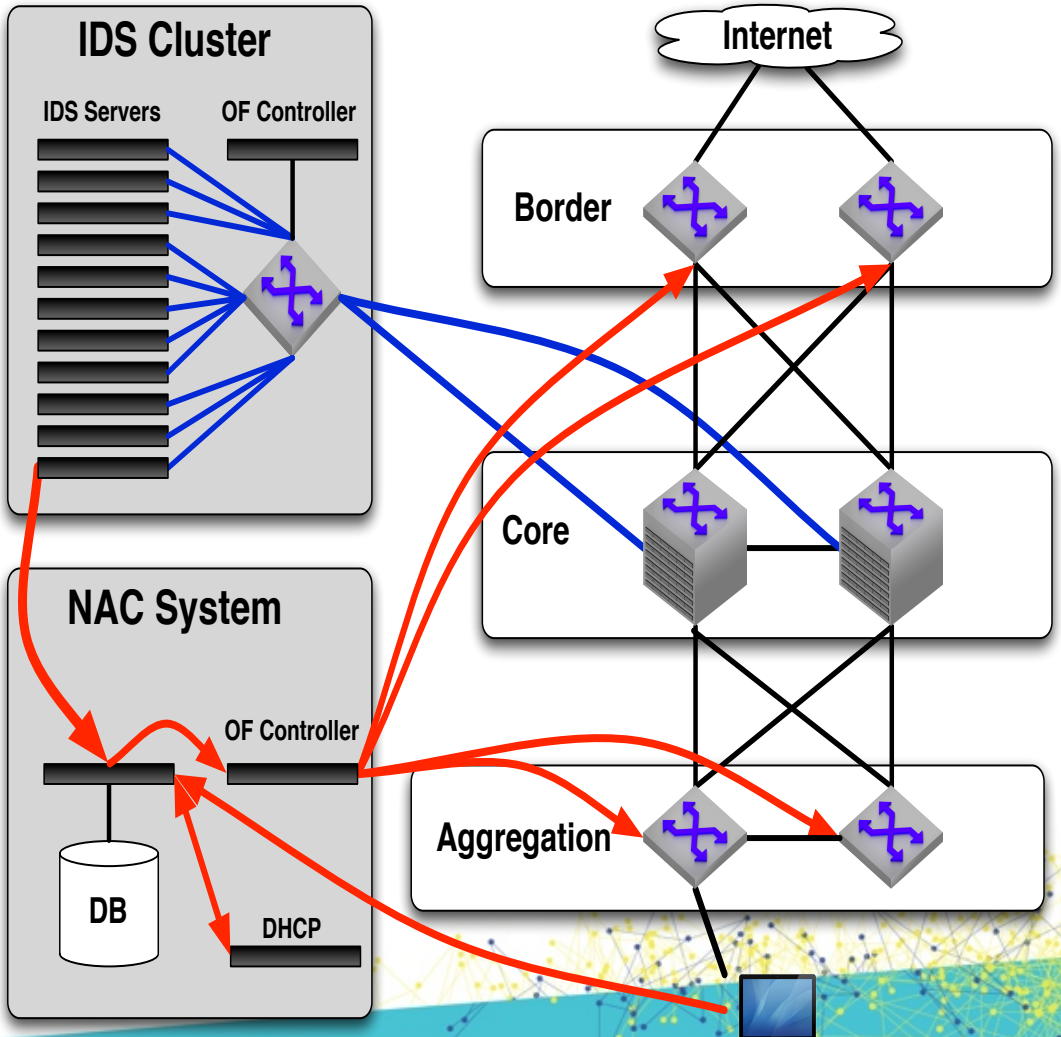


Network Virtualization



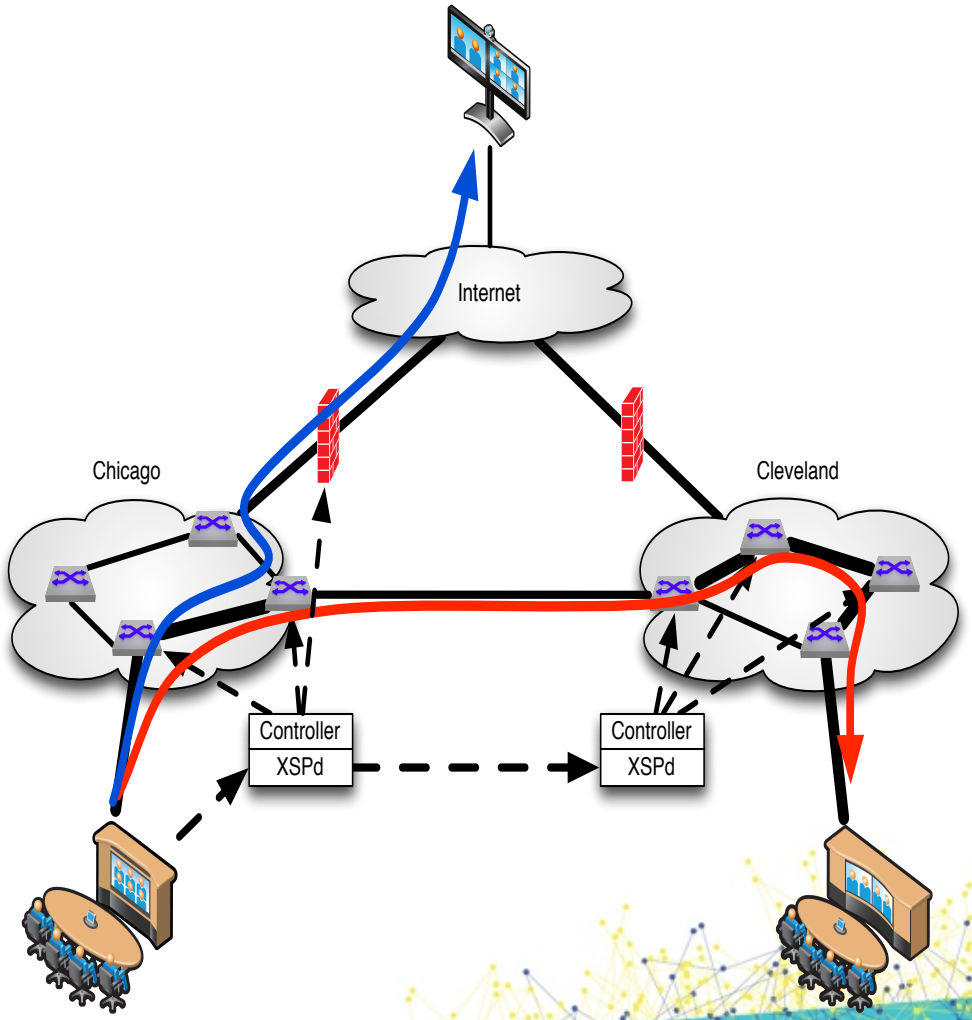
Use-Case: Network Security (IDS +NAC)

- Existing "Home-Grown" NAC Solution
- IDS via Snort/NetFlow
- Web Services API
- Response via DHCP/BGP
- Add: OpenFlow Load-Balancer for TOR
- Add: Enhanced Response capabilities via OpenFlow
- Dynamic flow mirroring, fine-grained filtering, & more



Use-Case: Application Driven Networks

- Apps w/demanding network requirements (e.g. high-def video)
- Request services from network (bw, fw rules, redundancy, etc)
- Query network instead of guessing (bw,, latency, etc)
- eXtensible Session Protocol (XSP)
- XSP signals OpenFlow Controller to provision the network



Q & A

Thank You