

Evolved Campus Core: An EVPN Framework for Campus Networks

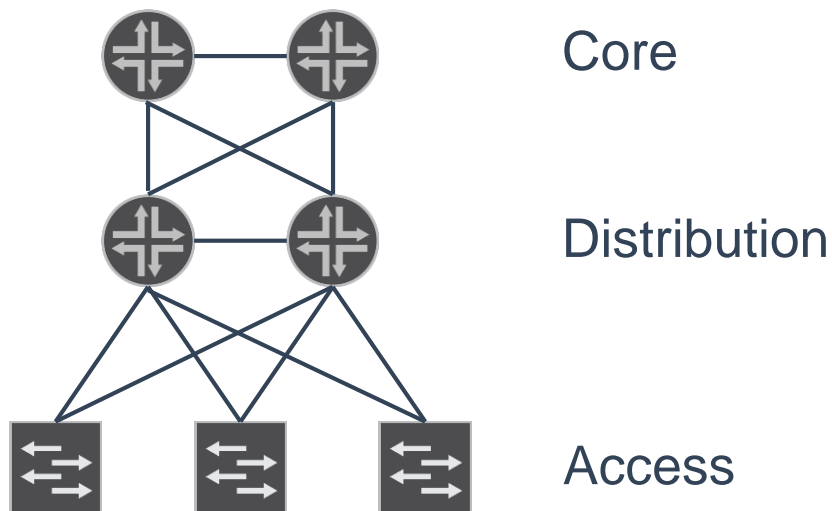
Vincent Celindro – JNCIE #69 / CCIE #8630

LEGAL DISCLAIMER

This statement of direction sets forth Juniper Networks' current intention and is subject to change at any time without notice. No purchases are contingent upon Juniper Networks delivering any feature or functionality depicted in this presentation.

This presentation contains proprietary roadmap information and should not be discussed or shared without a signed non-disclosure agreement (NDA).

Legacy 3-Tier Architecture



Circa – Late 90's - 2017 ???

Cisco SRND

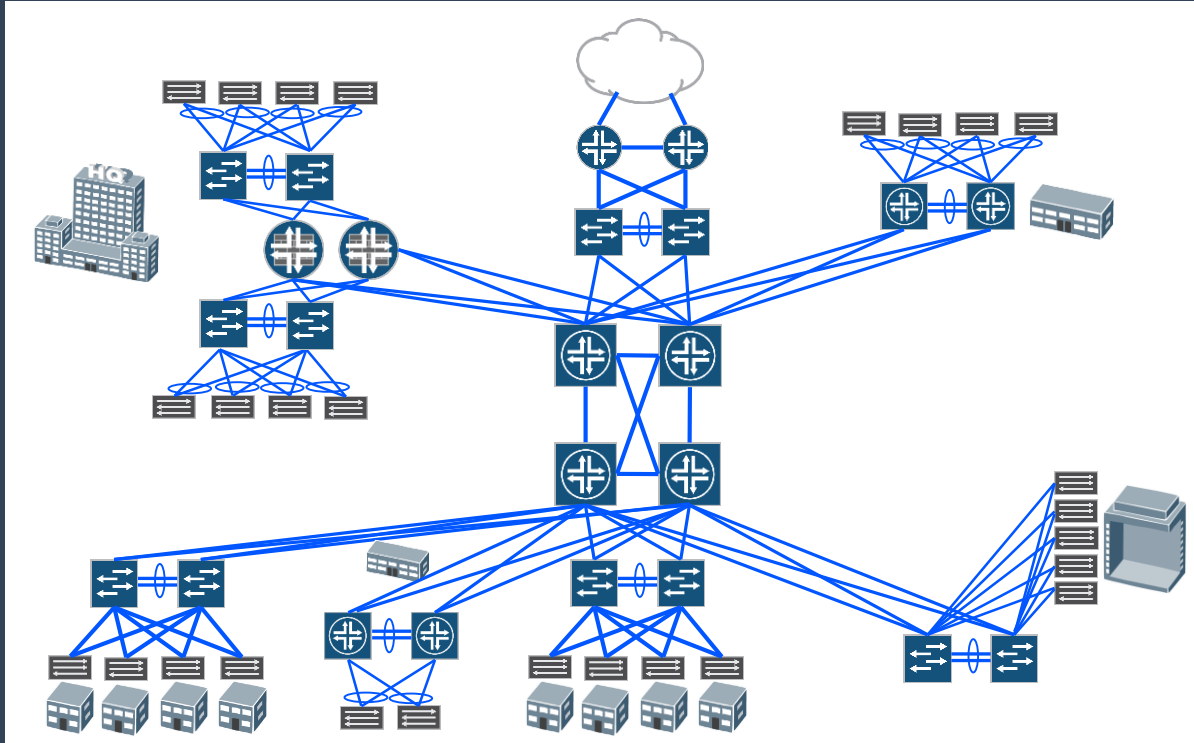
Cat 6500

Brocade MLX/XMR

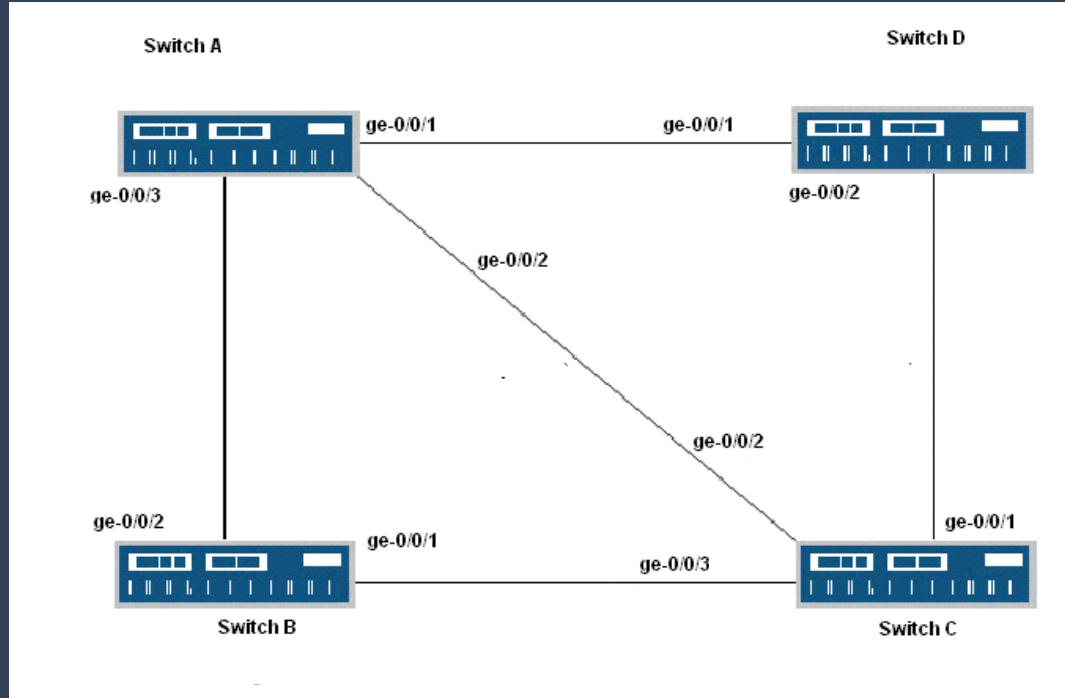
Juniper 8200

How many networks are still running architectures like this?

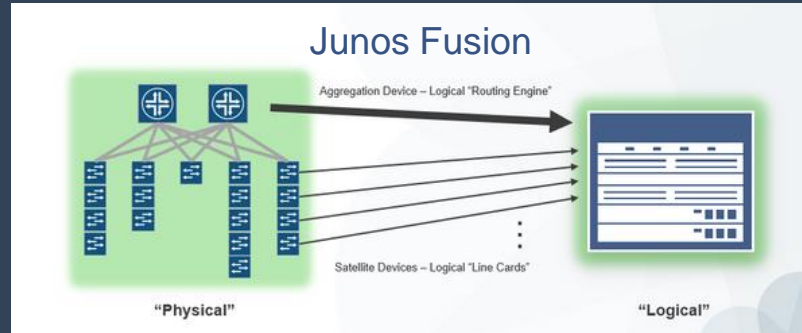
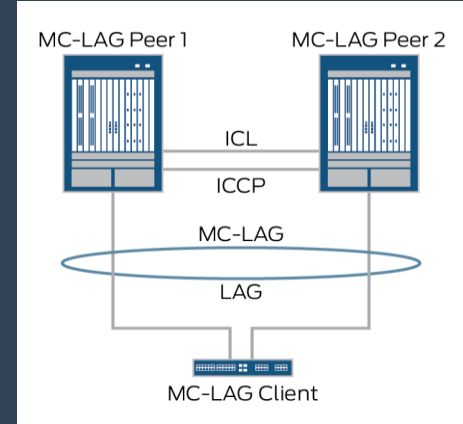
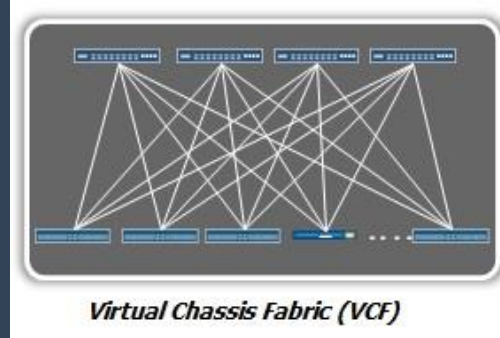
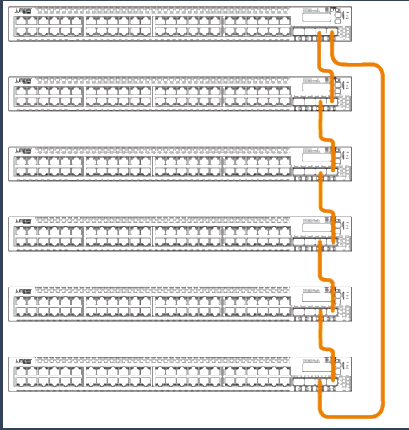
Typical Campus Network



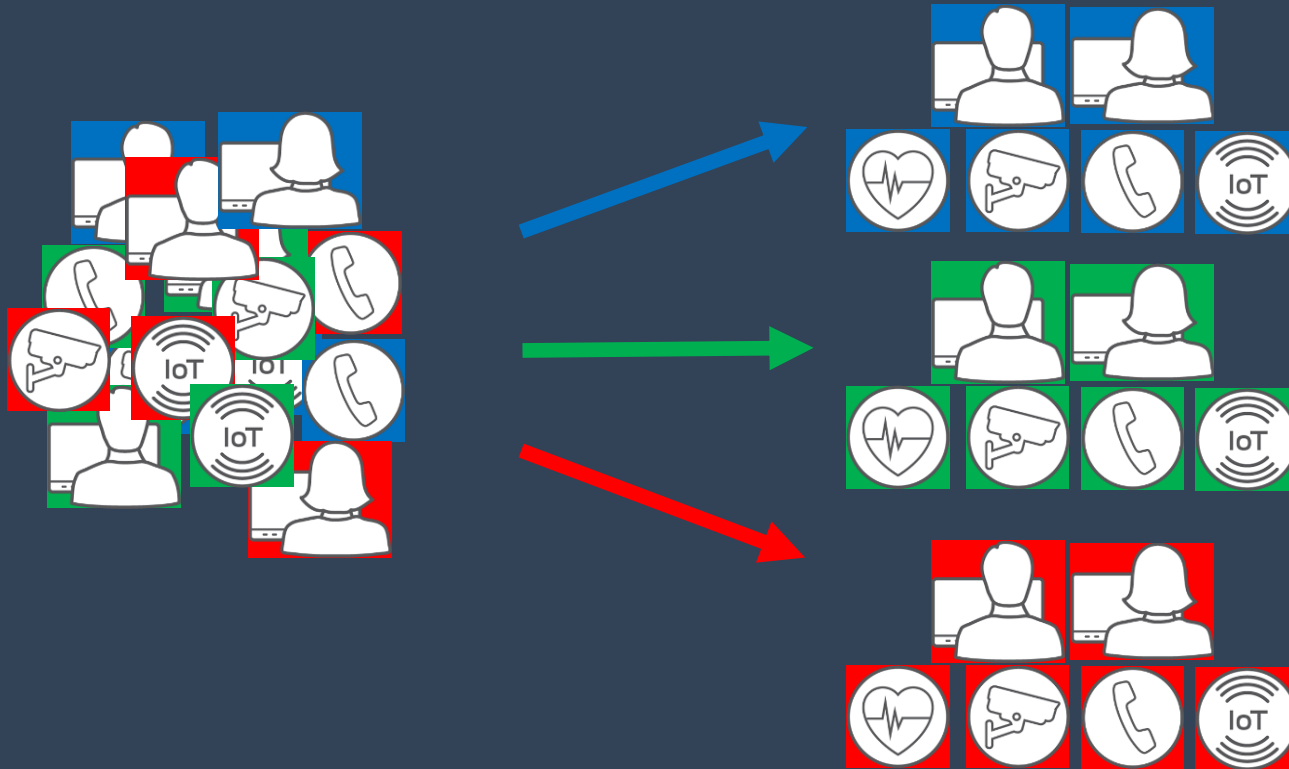
Redundancy – Spanning Tree



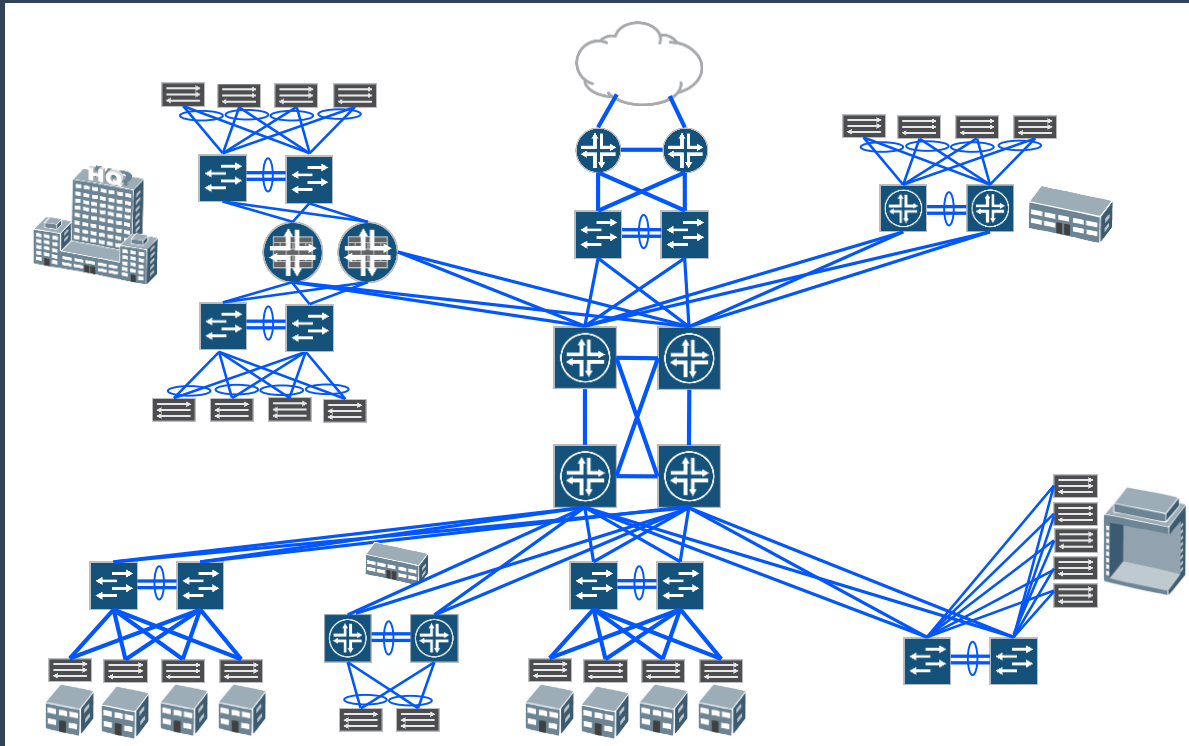
Spanning Layer 2 – Still Flood and Learn - Loops



Segmentation



Typical Campus Network



Redundancy

Spanning Tree

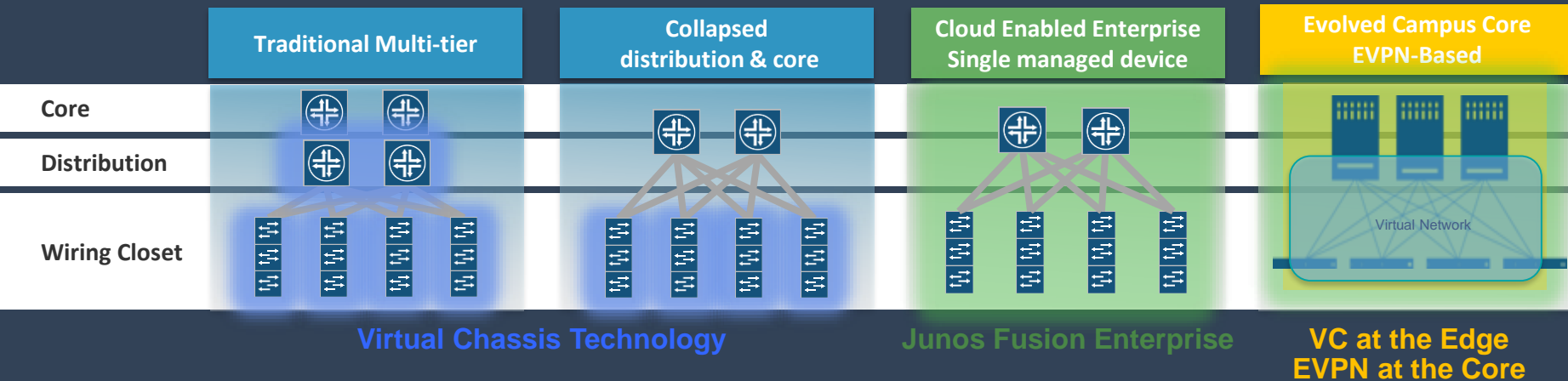
Flood and Learn

Users

Layer 2 Adjacency

Segmentation

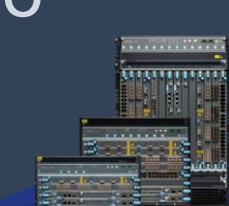
Campus Deployments



Common building blocks
JUNOS: One common operating system for all deployments

Campus Portfolio

Campus Core/Distribution



EX9200 Series



MX Series



QFX10K Series
QFX 5110

Campus Access



EX2300



EX3400



EX4300

* Roadmap

1G Access

PoE/PoE+

10/40G Uplinks

2.5/5/10G Access*

100G Uplink*

95W PoE*

Campus Security



SRX 3XX / SRX 550



SRX1500



SRX4K

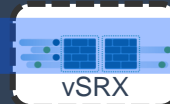
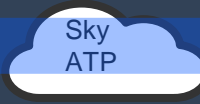


SRX5K

SDSN



Security Director



ECC – Evolved Campus Core

And
HERE.

MACHINE LEARNING

BIG DATA

INTERNET OF THINGS

DIGITAL COHESION

AUTOMATION

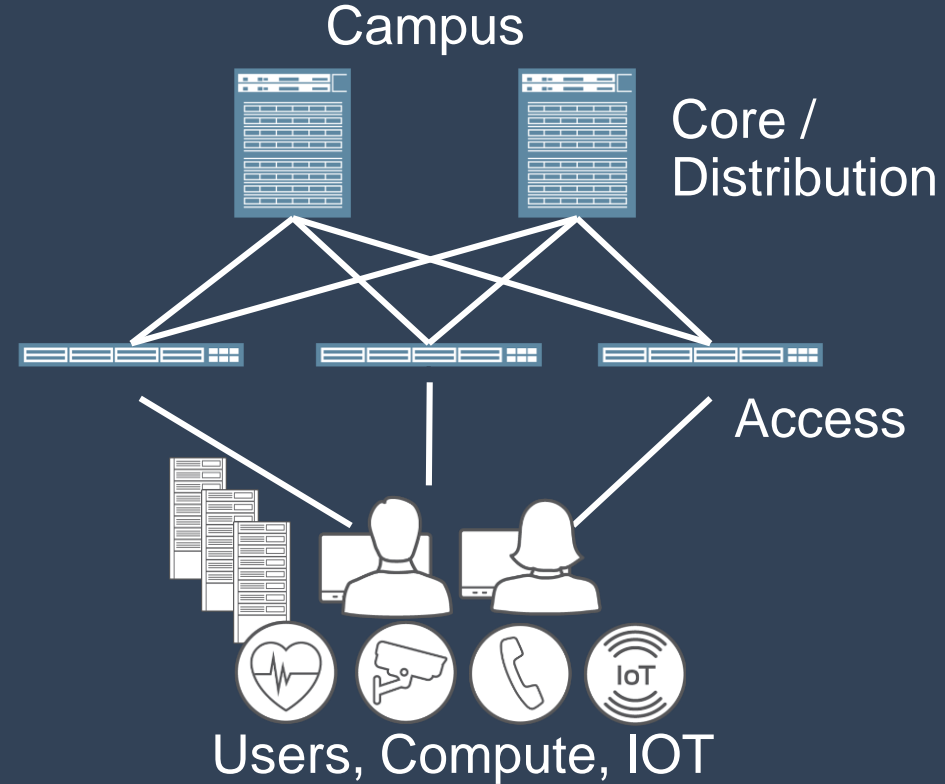
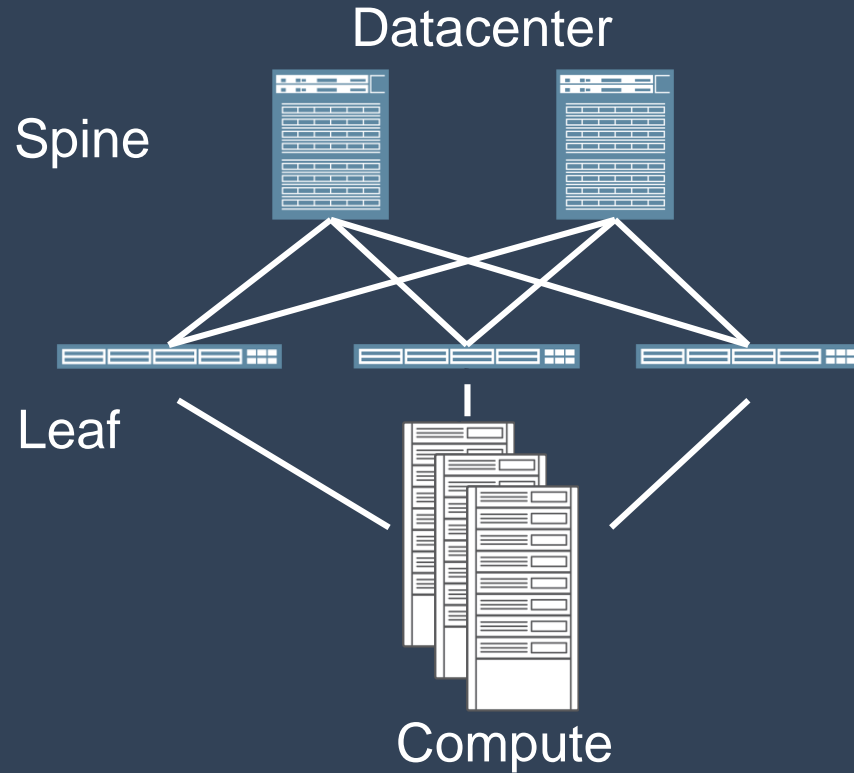
SECURITY

And here.

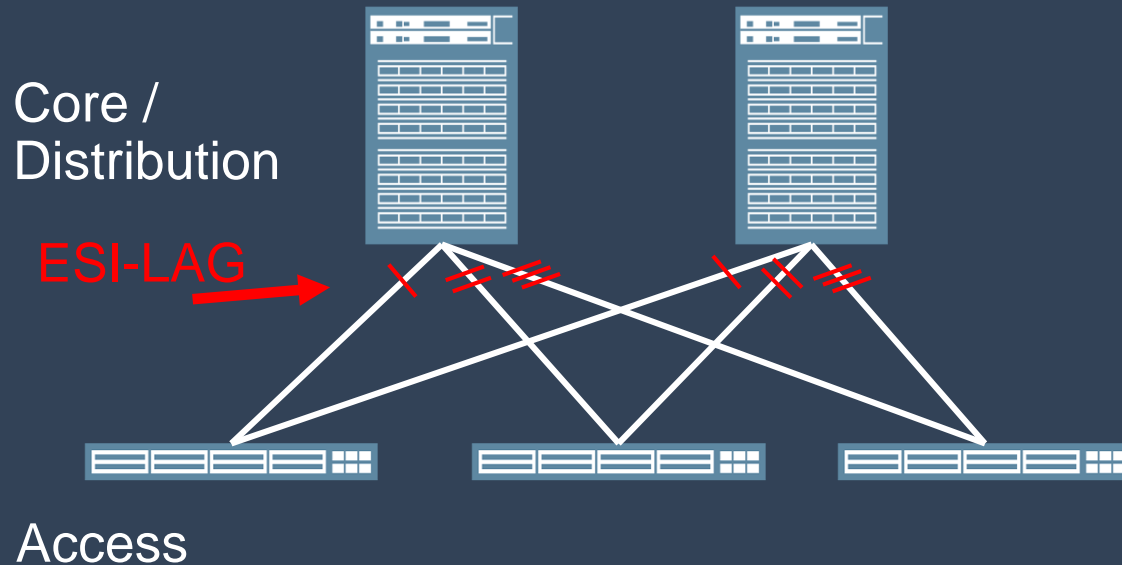
BUILD MORE THAN A NETWORK.™

NXTWORK 2017
JUNIPER CUSTOMER SUMMIT

EVPN



EVPN/VXLAN in the Campus



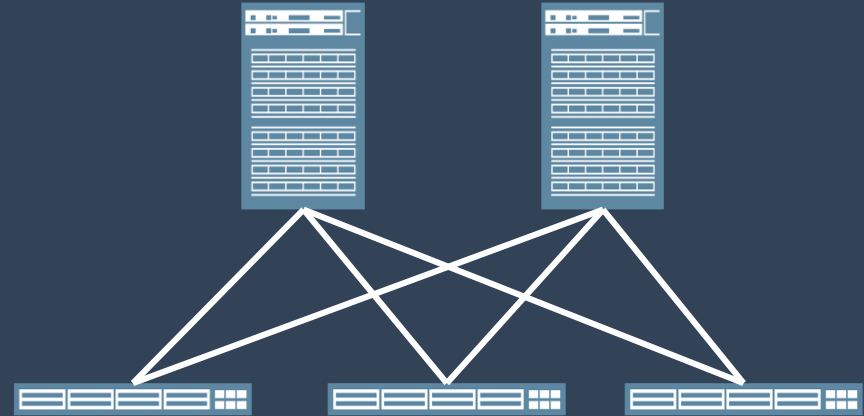
Standards Based
Large Industry Adoption
Minimized Fault Domain
Easy to Scale

EVPN - Control/Forwarding
Brown Field
Operational Advantages

ECC (Evolved Campus Core) – Five Key Concepts

- 1) Underlay
- 2) Overlay - EVPN/VXLAN
- 3) VRF Segmentation
- 4) ESI-LAG
- 5) Anycast Gateway

Underlay

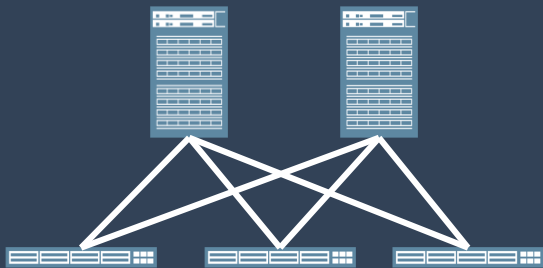


Underlay - Config

- OSPF
- ISIS
- BGP

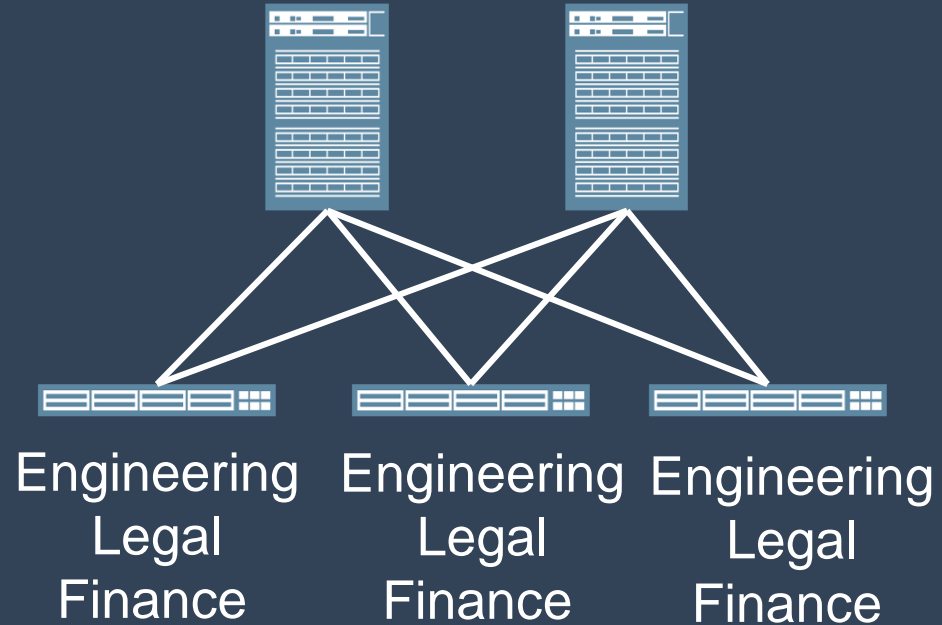
*All that is needed is loopback reachability

```
protocols {  
  ospf {  
    area 0.0.0.0 {  
      interface et-0/0/32.0;  
      interface xe-0/0/0:0.0;  
      interface xe-0/0/0:1.0;  
      interface lo0.0;  
    }  
  }  
}
```



Overlay – EVPN/VXLAN

WEB
APP
DB



Overlay – EVPN Config

```
protocols {  
  evpn {  
    encapsulation vxlan;  
    default-gateway do-not-advertise;  
    extended-vni-list all;  
  }  
}
```

```
protocols {  
  bgp {  
    group RR-OVERLAY {  
      type internal;  
      local-address 10.0.3.2;  
      family inet {  
        any;  
      }  
      family inet-vpn {  
        any;  
      }  
      family evpn {  
        signaling;  
      }  
      multipath;  
      neighbor 10.0.3.3;  
    }  
  }  
}
```

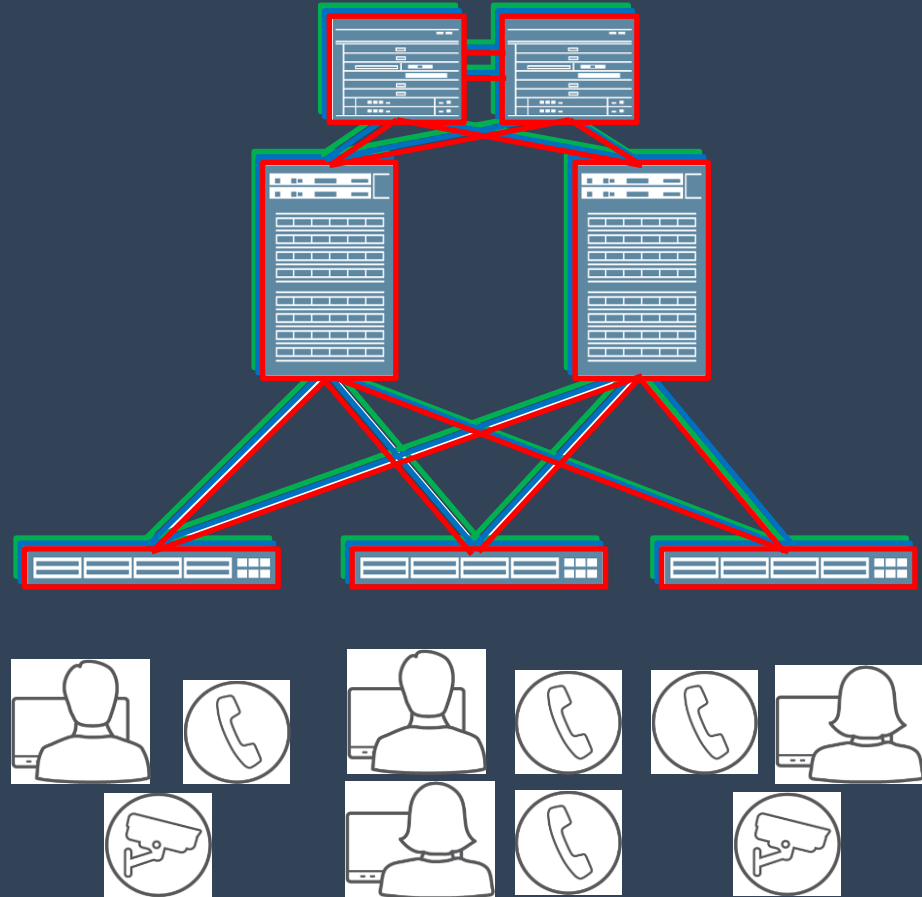
Overlay – VXLAN Config

```
switch-options {  
  vtep-source-interface lo0.0;  
  route-distinguisher 10.0.3.2:1;  
  vrf-import EVPN_VRF_IMPORT;  
  vrf-target {  
    target:10:1;  
    auto;  
  }  
}
```

```
vlan {  
  VXLAN100 {  
    vlan-id 100;  
    l3-interface irb.100;  
    vxlan {  
      vni 5100;  
    }  
  }  
  VXLAN200 {  
    vlan-id 200;  
    l3-interface irb.200;  
    vxlan {  
      vni 5200;  
    }  
  }  
}
```

VRF Segmentation

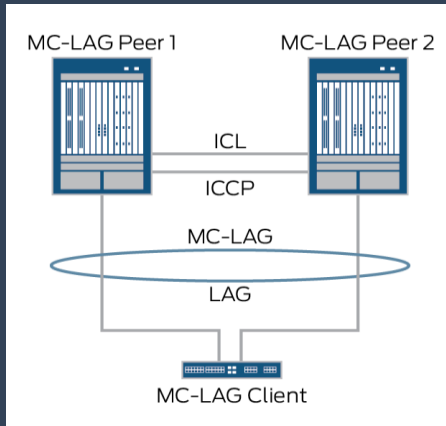
WEB/APP/DB



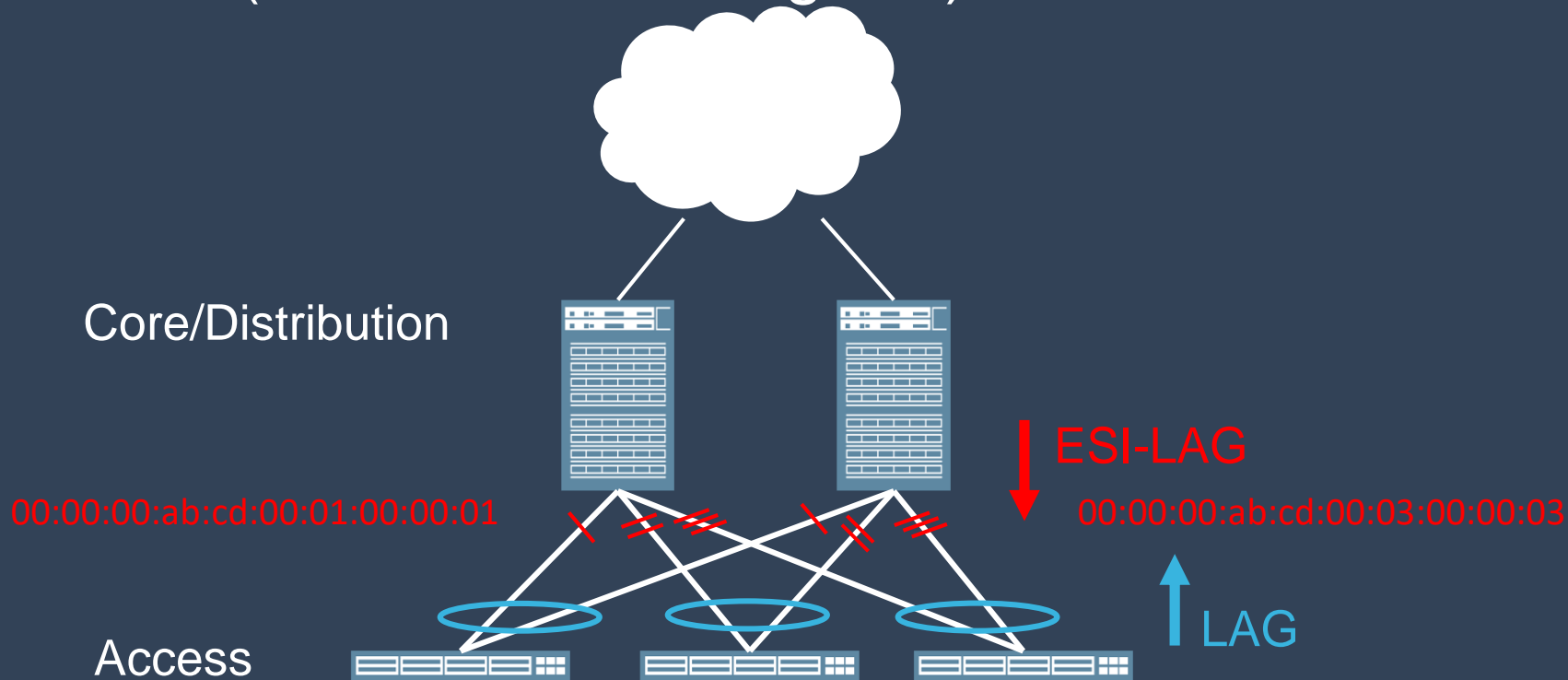
VRF Segmentation - Config

```
routing-instances {  
  RI_FACULTY {  
    instance-type vrf;  
    interface irb.100;  
    interface irb.200;  
    route-distinguisher 10.0.3.2:101;  
    vrf-target {  
      target:10:1;  
      auto;  
    }  
    routing-options {  
      auto-export;  
    }  
  }  
}
```

ESI-LAG (EVPN Multihoming A/A)



ESI-LAG (EVPN Multihoming A/A)

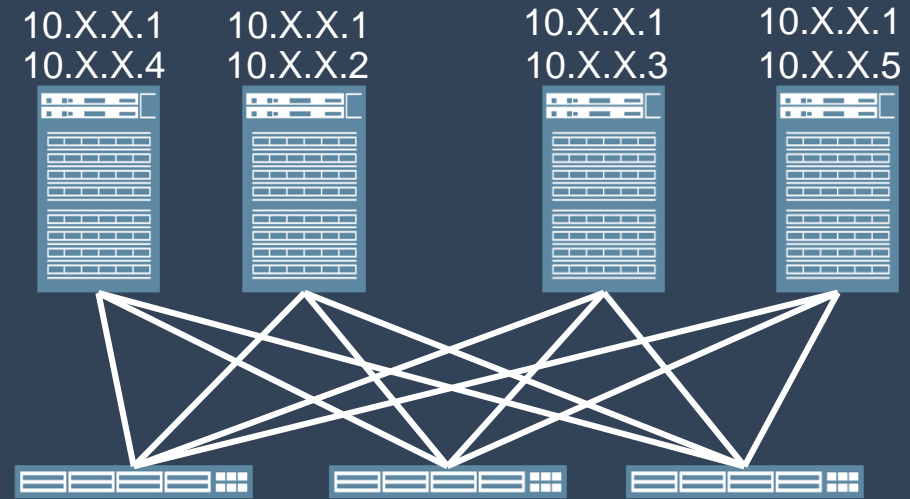
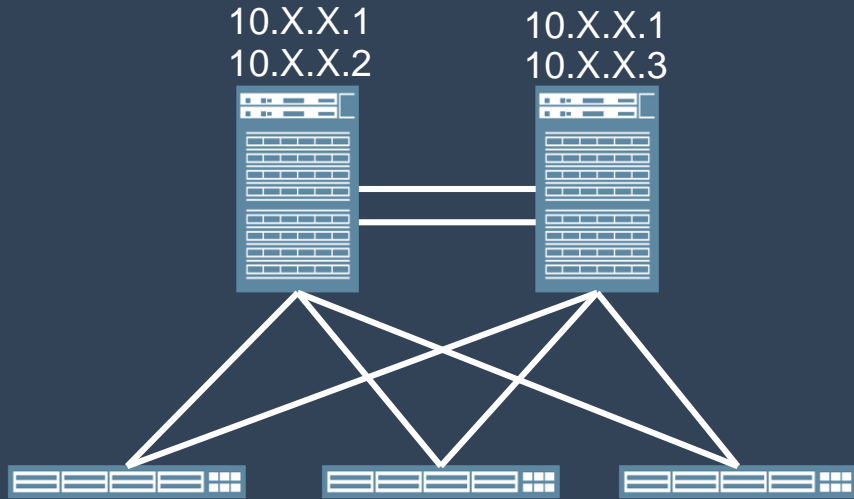


ESI-LAG - Config

```
ae1 {  
  mtu 9192;  
  esi {  
    00:00:00:ab:cd:00:01:00:00:01;  
    all-active;  
  }  
  aggregated-ether-options {  
    lacp {  
      active;  
      system-id  
        00:11:00:00:00:01;  
    }  
  }  
  ...  
}
```

```
unit 0 {  
  family ethernet-switching {  
    interface-mode trunk;  
    vlan {  
      members [ VXLAN100 VXLAN 200];  
    }  
  }  
}
```


Anycast Gateway



Anycast Gateway - Config

```
interfaces {  
  irb {  
    unit 100 {  
      family inet {  
        address 10.1.1.2/24 {  
          virtual-gateway-address 10.1.1.1;  
        }  
      }  
    }  
  }  
}
```

```
protocols  
{  
  evpn  
  {  
    default gateway do-not-advertise  
    ...  
  }  
}
```

NXT Steps - How Do I move to an ECC Architecture

is here.

FUTURE

MACHINE LEARNING

BIG DATA

INTERNET OF THINGS

DIGITAL COHESION

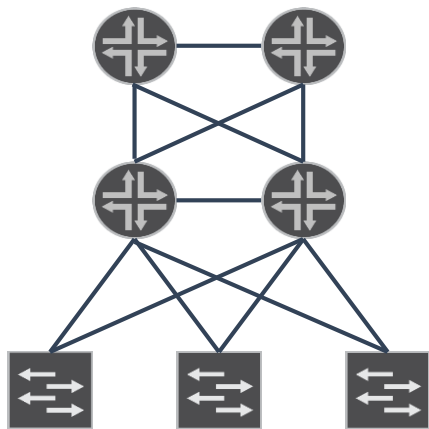
AUTOMATION

SECURITY

BUILD MORE THAN A NETWORK.™

NXTWORK 2017
JUNIPER CUSTOMER SUMMIT

Physical



Core

Distribution

Access



Hardware & Software



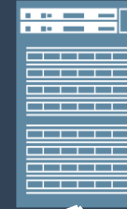
MX Series



EX 9200 Series



QFX 10k Series
QFX 5110

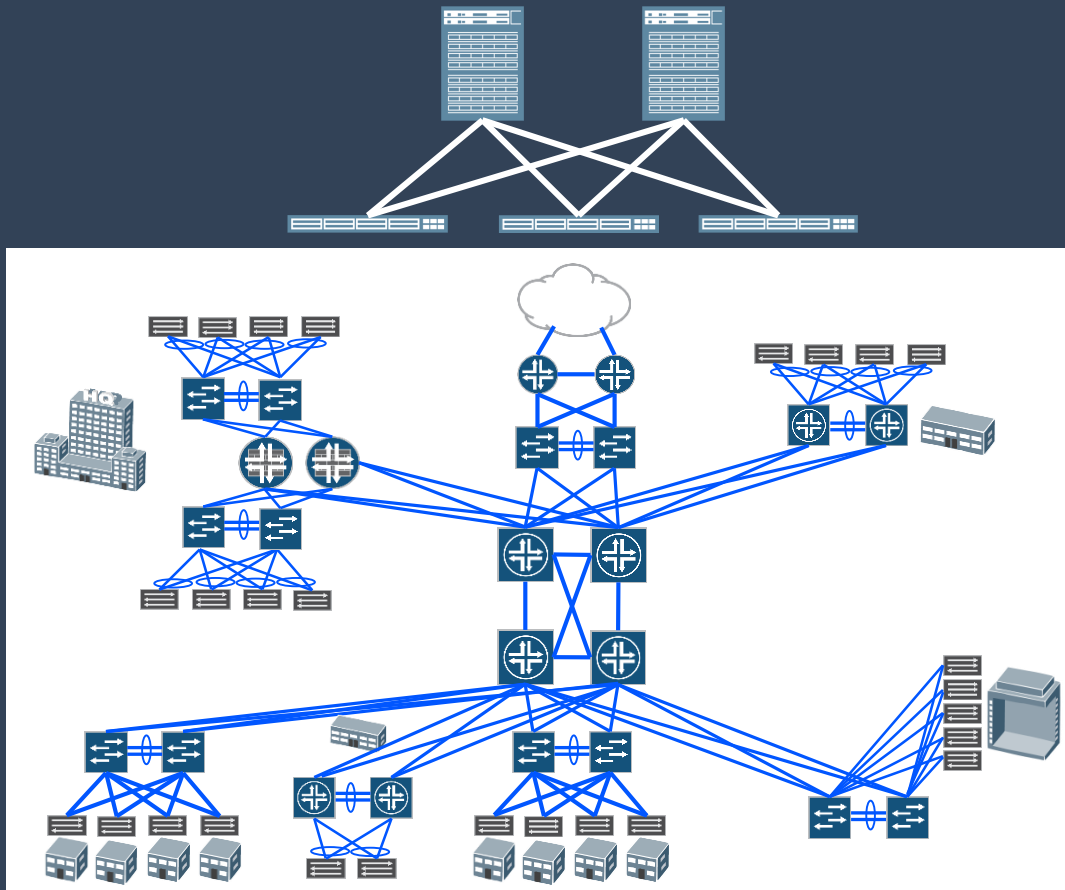


Juniper EX, VC, VCF, Fusion
Vendor X – LAG/LACP/VLANS



ECC Configuration

- 1) Underlay
- 2) Overlay - EVPN/VXLAN
- 3) VRF Segmentation
- 4) ESI-LAG
- 5) Anycast Gateway



ECC (Evolved Campus Core) - Takeaways



- Why ECC
 - Redundancy – eliminate spanning tree
 - Users – L2 adjacency / segmentation
- ECC Concepts
 - Underlay
 - Overlay - EVPN/VXLAN
 - VRF Segmentation
 - ESI-LAG
 - Anycast Gateway
- Migration
 - Physical
 - EVPN/VXLAN Core HW/SW
 - Enable ECC

An aerial night view of a city skyline, likely Chicago, with a network of glowing white lines and nodes overlaid on the image. The lines connect various points across the city, suggesting a global or regional network. The city lights are visible in the background, and the sky is a deep blue with some clouds. A semi-transparent dark blue rectangle is positioned on the left side of the image, containing the text 'Q&A'.

Q&A

Thank you

Vcelindro@juniper.net
Network /R/evolutionist



@VincentCelindro