Evolved Campus Core: An EVPN Framework for Campus Networks

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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

Traditional Multi-tier

Collapsed distribution & core

Cloud Enabled Enterprise Single managed device

Evolved Campus Core EVPN-Based

Virtual Chassis Technology

Junos Fusion Enterprise

VC at the Edge EVPN at the Core

Common building blocks
JUNOS: One common operating system for all deployments
ECC – Evolved Campus Core
EVPN

Datacenter

Spine

Leaf

Compute

Campus

Core / Distribution

Access

Users, Compute, IOT
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
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;
  }
}

vlans {
  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

Dev
Test
Prod
VRF Segmentation - Config

```plaintext
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

```plaintext
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
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
Thank you

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