



# Next-generation fabric

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# DC Network Architecture Evolution

- The following chart summarizes the latest innovations in the DC network architecture:



Spanning-  
Tree

MLAG (VSS,  
VPC)

Fabric  
(FabricPath,  
TRILL)

Dynamic  
Fabric  
Automation

- DC Fabric = well integrated best in class Overlays and Underlays
- DC Fabrics optimally combine L2 and L3 overlay services

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Application  
Centric  
Infrastructure

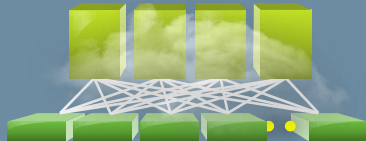
- DC Fabric = well integrated best in class Overlays and Underlays
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# Dynamic Fabric Automation (DFA) Architecture

## Innovative Building Blocks

Bundled functions are modular and simplified for scale and automation

Optimized  
Network



Virtual Fabrics



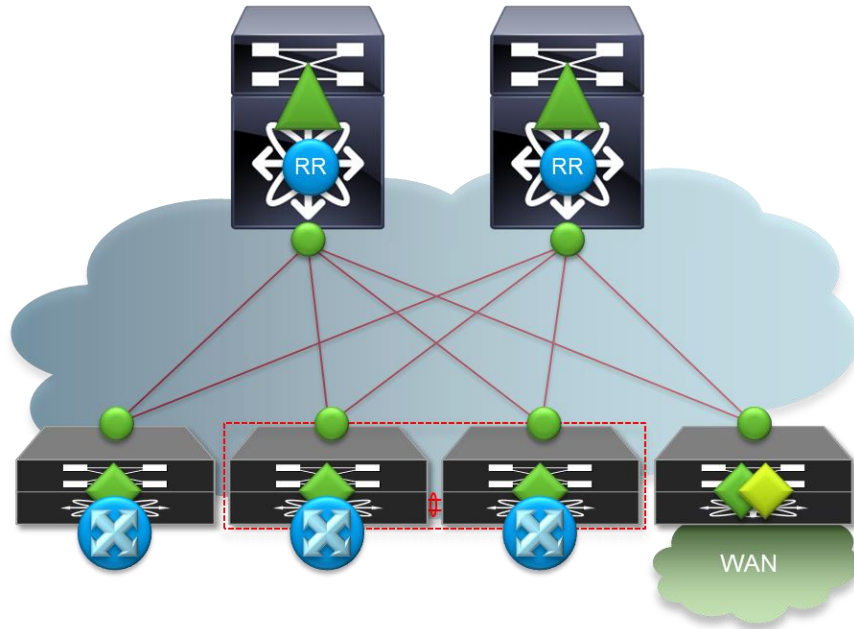
Fabric  
Management



Workload  
Automation



# Connecting Switches for DFA



- Distributed Gateway exists on all DFA-Leaf where VLAN/Segment-ID is active
- There are different DFA Forwarding Modes for the Distributed Gateway:
  - **Proxy-Gateway (Enhanced Forwarding)**
    - Leverages proxy-ARP
    - Intra- and Inter-Subnet forwarding based on Routing
    - Contain floods and failure domains to the Leaf
  - **Anycast-Gateway (Traditional Forwarding)**
    - Intra-Subnet forwarding based on FabricPath
    - Layer-2 lookup is performed at the leaf
    - Data-plane based conversational learning for endpoints MAC addresses
    - ARP is flooded across the fabric

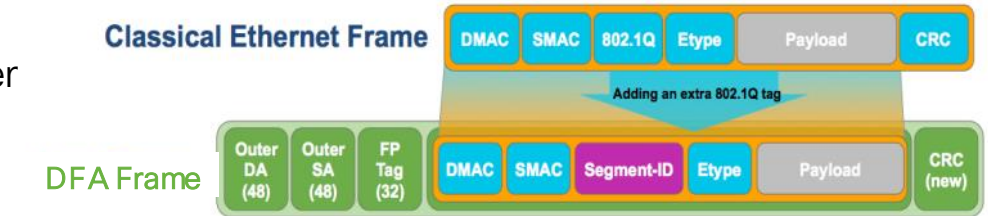
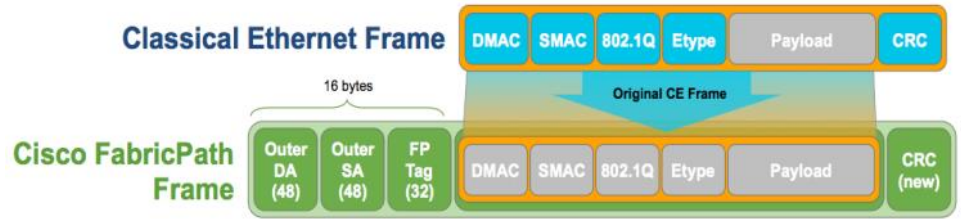
▲ = DFA-Spine    ◆ = DFA-Leaf    ◆ = DFA-BorderLeaf    ● = Fabric Interface    RR = DFA Route-Reflector    ⊗ = Distributed Gateway

# Virtual Fabrics

## Introducing Segment-ID Support

- Traditionally VLAN space is expressed over 12 bits (802.1Q tag)
  - Limits the maximum number of segments in a datacenter to 4096 VLANs
- The Segment-ID solution consists in using a double 802.1Q tag for a total address space of 24 bits, allowing for the support of ~16M L2 segment
- Segment-ID is added/removed by the DFA Leaf nodes and is part of the Layer-2 Header
- DFA Spines usually forward traffic based on FabricPath Switch-ID values, but can prune multi-destination traffic by parsing the segment-ID field
  - Segment-ID is hardware-based innovation offered by DFA leaf and spine nodes

### FabricPath Frame Format



### Integrated Fabric Frame Format



# Key takeaways

- Today's networks do not address the problems of some organizations, like agility and flexibility
- Virtual overlays are not a real answer to those problems
- Only optimizing the infrastructure the real root cause can be addressed
- Cisco is offering two approaches:
  - Dynamic Fabric Automation (evolving the current architecture)
  - Application Centric Infrastructure (new architecture)

Thank you.

