Cisco ACI – Disaster Recovery Solution

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Agenda

• Introduction to Cisco Application Centric Infrastructure – Cisco ACI
• Cisco ACI Stretched Fabric
• Cisco ACI Dual Fabric
• Conclusion
Introduction to Cisco ACI
Application components and tiers
Current Network Definitions of Application
Developers  Infrastructure Team

Applications

VLANs
Subnets
Ports
ACLs
Cisco ACI Logical Object Model
Cisco ACI Endpoint Groups

• EPGs act as a container for collections of applications, or application components and tiers that can be used to apply forwarding and policy logic.
Cisco ACI Contracts

• Contracts allow for both simple and complex definition of how a given EPG communicates with other EPGs dependent on the requirements of a given environment.
Cisco ACI Application Network Profiles

- Application Network Profiles are the instantiation of a complete application on the network.

**Application Network Profile**

![Diagram of EPGs](image_url)
Cisco ACI elements

SPINE
Nexus 9000

LEAF
Nexus 9000

APIC Cluster
Cisco ACI Stretched Fabric
Cisco ACI Stretched Fabric Design

Inter-Pod Network

Primary Site

Secondary Site
Site-to-Site Connectivity Options

ACI stretched fabric site-to-site connectivity options include:

• Dark Fiber (up to 40km)
• Dense Wavelength Division Multiplexing (up to 800km)
• Ethernet over MPLS (EoMPLS) pseudowire (up to 800km)
Inter-Pod Network

• Not managed by the APIC
• Inter-Pod Network topology can be arbitrary, not mandatory to connect all spines
• Main Requirements:
  o 40G/100G interfaces to connect to the spine nodes
  o DHCP Relay to enable spine/leaf nodes discovery across Pods
  o OSPF to peer with the spine nodes and learn VTEP reachability
  o Increased MTU support to handle VXLAN encapsulated traffic
  o QoS (to prioritise intra APIC cluster communication)
Failure Scenarios
Single Link Failure between Sites

Inter-Pod Network

Primary Site

Secondary Site
Loss of a Single APIC Controller

Primary Site

Secondary Site

Inter-Pod Network
More than three APICs in a cluster?

- The Data Base is distributed as active + 2 backup instances (shards) for every attribute
APIC Failure
Design Considerations

Additional APIC will increase the system scale (today up to 5 nodes supported) but does not add more redundancy.

APIC will allow read-only access to the DB when only one node remains active (standard DB quorum).

There is a max supported distance between database (APIC) nodes – 800km.

NOT RECOMMENDED: failure of site 1 may cause irreparable loss of data for some shards and inconsistent behaviour for others.
Split Fabric

Primary Site

Secondary Site
Data Centre Failure

Primary Site

Secondary Site

Inter-Pod Network
Cisco ACI Dual Fabric
Cisco ACI Dual Fabric Design

Primary Site

Secondary Site
Site-to-Site Connectivity Options

ACI Dual Fabric Site-to-Site connectivity options include:

- vPC over dark fiber
- vPC over DWDM
- VXLAN or OTV
Dual Fabric Layer 2 connectivity

**Primary Site**

**Secondary Site**

Layer 2 DCI
(vPC, VXLAN, OTV)
Dual Fabric Layer 3 connectivity

Layer 3 DCI (eBGP)
Dual Fabric Future Connectivity

Primary Site

Secondary Site

Multi-Site Network
Cisco UCS Director

"Like music...there's an appropriate timing and order of operations when provisioning infrastructure..."
Cisco UCS Director ACI integration
Operational task automation within Cisco ACI Fabric
Endpoint Automation complementing Cisco ACI
Integration in a Dual Fabric Design
Conclusion

• Cisco ACI offers two different DR approaches:
  o **Stretched Fabric -> Multi-Pod Design**
    - Single APIC Cluster for multiple DCs
    - In event of >1 APIC Controller failure, you no longer can configure (read-only APIC mode)
  o **Dual Fabric -> Multi-Site Design**
    - One APIC Cluster per Site
    - Establish policy orchestration between sites for true Active/Active implementation

Business needs define which approach to implement!
Thank you!