FIREFLY

Intent Based Networking - ACI Elite

THE ACI ELITE SERIES

The ACI Elite Series is a series of expert-led 4-hour deep-dive sessions with hands-on lab practice. We cover different topics each week, so you can choose the ones that apply to you.

WHO SHOULD ATTEND

This ACI Elite Series will provide value for anyone deploying or operating an ACI fabric. However some topics will be more relevant to specific audiences

- Sessions 1, 7, 8, 9, 10, 12, 13, and 14 are more focused for Architects or Engineers doing design work
- Sessions 2, 3, 4, 5, 6, and 11 are more focused for operations teams

FEATURES

- Live Instructor-led virtual training with hands-on lab practice
- Deep-dive into ACI through 14 self contained,

  4-hour sessions
- Runs weekly
- No prior ACI knowledge needed
- For people that need real-world training on ACI
- First class instructors

BENEFITS

- Easy to consume 4-hour chunks allow the student to digest contents and ask questions each week
- Modular approach allows students to consume the topics more relevant to their job function and deployment
- Driven by real world scenarios and requirements
- Delivered by an expert on the topic
- After attending this class you will have the required knowledge to deploy and operate an ACI fabric

LEARNING OBJECTIVES

- Describe ACI components and policy model
- Explain ACI packet forwarding
- Describe ACI fabric configuration
- Describe ACI logical constructs
- Explain how ACI uses contracts to allow for secure communication between endpoints
- Explain how ACI connects to other switched and routed networks
- Explain how to troubleshoot an ACI fabric
- Describe Multi-site and Multi-pod solutions, and how they fit in a multi-DC/multi-cloud design

Session 1
ACI Overview

Lecture

- What is ACI
- ACI's benefits
- Overview of Switch and APIC models
- APIC Architecture Fabric bring up process
- ACI Object Model
- ACI MGMT
  - RBAC
  - Syslog
  - SNMP
  - Upgrade Process
  - BGP Policy

Labs

- Instructor demo GUI Overview
- Instructor demo Intro to cli
- Creating Users and assign Permissions
- Software Upgrades Syslog, SNMP and config rollbacks

Audience

Architects or Engineers doing design work

Duration

4 hours

Session 2 Fabric Forwarding

Lecture

- VxLan refresher
- Understanding Bridge Domains

  > Bridge Domain as a layer 2 boundary

  > Difference between Vlans and Bridge Domains

  > Bridge Domain configuration knobs

    + Limit Learning to IP subnet

  > Encapsulation and multicast group

- Coop

  > Oracles and Citizens

  > Endpoint tables

  > Lookup process

- Layer2 and Layer3 forwarding

  > ARP handling packet walk
  > L2 packet walk
  > L3 packet walk
  > BUM traffic packet walk
  > VxLan Encapsulations
    + Intro to Fd_Vlans and BD_Vlans
    + VRF encapsulation
  > EP move and bounce entries
  > Rogue endpoint detection
  > Silent hosts
  > Endpoint table vs Mac and Routing Table

Labs

- Intro to endpoint reachability troubleshooting

  > Understanding show endpoint command

  > Validate coop entries (GUI and CLI)

  > Using Iping, Elam and Ftriage (App not CLI)

Audience

Operations teams

Duration

4 hours

Session 3 Fabric Configuration Part 1

Lecture

Overview of interface configurations

> Physical and VMM domains
  overview
+ Deployment immediacy (VMM)
+ Resolution immediacy (VMM)
> VLAN Pools
+ Static and Dynamic Pools
+ Base encap value
> AEPs
+ Used as a way to tie VLANs to
  an Interface
+ Used to define EPG
  membership
> Policy Groups
> Interface Profiles

Overview of switch configurations

> VPC in ACI
> Switch
  Profiles

VLANs in the ACI world

> PI, HW, Access Encap, BD and FD
> Physical Domain, AEP and VLAN Pool
  relationship to FD_VLAN and VxLAN encap

Labs

- Create a physical Domain to connect
  endpoints to the ACI Fabric

  > Create VLAN Pool and AEP

- Create a VMM domain to connect endpoints to the
  ACI fabric

  > Create VLAN Pool and AEP
  > Create VMM integration

- Create VPCs explicit protection groups
- Create Interface Profiles and Policy Groups
- Create Switch Profiles
- Understanding the output

  > Show VLAN brief
  > Show VLAN extended
  > Show system internal eltmc info
    VLAN brief (vsh_lc shell)

Audience

Operations teams

Duration

4 hours

Session 4 Fabric Configuration Part 2

Lecture

- Overview of interface configurations

  > Physical and VMM domains
    overview
  + Deployment immediacy (VMM)
  + Resolution immediacy (VMM)
  > VLAN Pools
  + Static and Dynamic Pools
  + Base encap value
  > AEPs
  + Used as a way to tie VLANs to an
    Interface
  + Used to define EPG
    membership
  > Policy Groups
  > Interface Profiles

- Overview of switch configurations

  > VPC in ACI
  > Switch
    Profiles

- VLANs in the ACI world

  > PI, HW, Access Encap, BD and FD
  > Physical Domain, AEP and VLAN Pool
    relationship to FD_VLAN and VxLAN encap

Labs

- Create a physical Domain to connect
  endpoints to the ACI Fabric

  > Create VLAN Pool and AEP

- Create a VMM domain to connect endpoints to
  the ACI fabric

  > Create VLAN Pool and AEP
  > Create VMM integration

- Create VPCs explicit protection groups
- Create Interface Profiles and Policy Groups
- Create Switch Profiles
- Understanding the output

  > Show VLAN brief
  > Show VLAN extended
  > Show system internal eltmc info VLAN
    brief (vsh_lc shell)

Audience

Operations teams

Duration

4 hours

Session 5 ACI Logical Constructs Part 1

Lecture

- Tenants
- VRFs
- Bridge Domains
- Application Profiles
- EPGs and Endpoint
- Security Groups

  > VMM and Physical Domains

- Intro to Contracts

Labs

- Create a tenant
- Create an Application Profile
- Create a set of EPGs and establish L2 and L3 connectivity between endpoints

  > Create required BDs, EPGs and Contracts

Audience

Operations teams

Duration

4 hours

Session 6 ACI Logical Constructs Part 2

Lecture

Tenants

VRFs

Bridge Domains

Application Profiles

EPGs and Endpoint

Security Groups

> VMM and Physical Domains

Intro to Contracts

Labs

Create a tenant

Create an Application Profile

Create a set of EPGs and establish L2 and L3 connectivity between endpoints

> Create required BDs, EPGs and Contracts

Audience

Operations teams

Duration

4 hours

Session 7 Contracts

Lecture

- Contract Scope
- Subjects
- Filters
    - > Directives (Log and Policy Compression)
- Verifying L2 and L3 permit and denies from the GUI Subject Labels
    - > Apply both ways and reverse filter ports
- EPG Labels
- Deny Contracts
    - > Taboo Contracts
    - > Regular contracts with Deny Filter
- VRF Enforced and Unenforced
- Preferred Group VZ_ANY
- Consumed contractinterfaces (Intro to leaking)

Labs

- > Enable EPG to EPG communication using Subject Labels and EPG Labels
- > Enable EPG to EPG communication using Preferred Group and VZ_Any VRF options
- > Block specific traffic using Taboo contracts and deny filters

Audience

Architects or Engineers doing design work

Duration

4 hours

Session 8 External Connectivity Part 1

Lecture

- Layer 2 Connectivity
    - > Understanding L2Outs
    - > Understanding VLANs on ACI
    - > Understanding EPG extensions
    - > Unicast Routing option on Bridge Domain for migration
    - > Dual homing Layer 2 connectivity
- Layer 3 Connectivity
    - > L3Out Building Blocks
    - > Single L3Outs with Multiple Node Profiles vs Multiple L3Outs with single Node Profile
    - + Traffic Shaping and traffic flow
- Layer 3 VPC
    - > Special configuration for HA L4-L7 Devices
- Understanding Subnet options for Ext-EPG
- Advertising routes
    - > Mapping L3Out to Bridge Domain
    - > Using Route Maps
- Shared L3Outs
    - > VRF Leaking overview and verification
    - > Shared L3Out on Common Tenant
    - > Shared L3Out on different tenants
- Transit Routing

Labs

- > Create a L2Out and consume a GW outside of ACI
- > Replicate the config using an EPG extension
- > Create a local L3Out
- > Create a Shared L3Out
- > Advertise routes not owned by ACI
- > Configure an L3out to be preferred over other L3Outs

Audience

Architects or Engineers doing design work

Duration

4 hours

Session 9 External Connectivity Part 2

Lecture

- Layer 2 Connectivity
  - > Understanding L2Outs
  - > Understanding VLANs on ACI
  - > Understanding EPG extensions
  - > Unicast Routing option on Bridge Domain for migration
  - > Dual homing Layer 2 connectivity
- Layer 3 Connectivity
  - > L3Out Building Blocks
  - > Single L3Outs with Multiple Node Profiles vs Multiple L3Outs with single Node Profile
  - + Traffic Shaping and traffic flow

- Layer 3 VPC
  - > Special configuration for HA L4-L7 Devices
- Understanding Subnet options for Ext-EPG Advertising routes
  - > Mapping L3Out to Bridge Domain
  - > Using Route Maps
- Shared L3Outs
  - > VRF Leaking overview and verification
  - > Shared L3Out on Common Tenant
  - > Shared L3Out on different tenants
- Transit Routing

Labs

- > Create a L2Out and consume a GW outside of ACI
- > Replicate the config using an EPG extension
- > Create a local L3Out
- > Create a Shared L3Out
- > Advertise routes not owned by ACI
- > Configure an L3out to be preferred over other L3Outs

Audience

Architects or Engineers doing design work

Duration

4 hours

Session 10 Deployment Models and DevOps

Lecture

- NamingConvention
- App Centric and Network Centric
  - > EPG to Bridge Domain to VLAN and Subnet relationship
  - > Generic VLAN/Subnet to App Driven VLAN/Subnet
- Whitelisting, Blacklisting, and Graylisting
- Benefits and Drawbacks
- Intro to Automation
  - > Moquery
  - > API inspector and postman
  - > Python
  - + Cobra SDK

Labs

- > Recreating our lab topology thru Python and Postman

Audience

Architects or Engineers doing design work

Duration

4 hours

FIREFLY

Session 11 Advanced Troubleshooting

Lecture

- Different CLI shells
- Common troubleshooting commands
- Structure to ACI troubleshooting
- Elam and fTriage CLI
- Understanding how to use show zoning rule
- Common faults and mistakes
  - > L3Out debugging in the ACI world

Labs

> Use the discussed tools to troubleshoot connectivity issues between endpoints connected to the ACI fabric and end-points connected via L3Out

Audience

Operations teams

Duration

4 hours

Session 12 Multi-site and Multi-pod Part 1

Lecture

- Active/Active, HA, Metro, and DR
  - > What it means
  - > How to choose the correct fit based on business requirements
- Multi-pod
  - > Components
  - > Requirements
  - > Fabric forwarding between Pods
- Multi-site
  - > Components
  - > Requirements
  - > Fabric forwarding between sites
  - > Stretched vs non-stretched
  - > Understanding Schema
  - > Intersite L3Outs
  - > Azure and AWS

Labs

- Verifying a Multi-pod deployment
- Deploying Tenants using MSO
  - > Configure App Profile and EPGs from MSO
  - > Create Local and Stretched Bridge Domains

Audience

Architects or Engineers doing design work

Duration

4 hours

Session 13 Multi-site and Multi-pod Part 2

Lecture

- Active/Active, HA, Metro, and DR
- > What it means
- > How to choose the correct fit based on business requirements
- Multi-pod
- > Components
- > Requirements
- > Fabric forwarding between Pods
- Multi-site
    - > Components
    - > Requirements
    - > Fabric forwarding between sites
    - > Stretched vs non-stretched
    - > Understanding Schema
    - > Intersite L3Outs
    - > Azure and AWS

Labs

- Verifying a Multi-pod deployment
- Deploying Tenants using MSO
    - > Configure App Profile and EPGs from MSO
    - > Create Local and Stretched Bridge Domains

Audience

Architects or Engineers doing design work

Duration

4 hours

Session 14 Design and Migration Considerations

Lecture

- Integrating ACI to legacy environments
- Migration Steps
- Migration considerations
- FW Considerations
    - > Where do we place the GWs?
    - > Designing based on Zones
    - > To Service Graph or not to Service Graph
    - > DMZ inside of ACI vs DMZ outside
    - > Understanding inbound and outbound traffic flow for multi DC solutions
    - > Multi-cloud considerations
- LB considerations
    - > Single or Multi-hop
    - > GSLB/GTM requirements for multi DC solutions

Labs

- > Create a DMZ structure inside of ACI connecting to FWs and LBs
- > Test Connectivity from the outside world

Audience

Architects or Engineers doing design work

Duration

4 hours