

Data Center Automation Using Juniper Apstra (APSTRA)

COURSE OVERVIEW

This five-day course provides students with the foundational knowledge required to manage data center networks with Juniper Apstra software. This class will provide attendees with the knowledge to operate and manage Juniper Apstra software. Attendees will be given a background on modern data center design and intent-based networking concepts.

COURSE LEVEL

Intermediate

AUDIENCE

The primary audience for this course includes:

- Networking architects and operators, system engineers, DevOps professionals, IT professionals
- Individuals responsible for configuring, monitoring, and troubleshooting modern spine-and-leaf data centers of any size, leveraging any networking vendor hardware or operating system

PREREQUISITES

The course prerequisites include:

- Basic knowledge of networking and data center designs
- Understanding of Clos IP fabric
- Understanding of routing protocol design, configuration, and performance
- Knowledge of overlay and underlay routing designs
- Basic knowledge of automation design and workflows
- Knowledge of network device configuration via CLI
- Knowledge of BGP – recommended but not required
- Completion of the *Introduction to Juniper Data Center Networking (IJDC)* course or equivalent knowledge

RELATED JUNIPER PRODUCTS

- Juniper Apstra
- QFX Series

RELATED CERTIFICATION

JNCIS-DC

The course covers the Juniper Apstra architecture and its data center reference architecture including the designing, building, deploying, and automation of a three-stage IP fabric with Virtual Extensible LAN (VXLAN) overlay. The course goes on to cover navigation of the Juniper Apstra UI including creating resources, designs, templates, and instantiating blueprints (a running network). After teaching you to use Juniper Apstra to build a running data center, the course reviews the operational tools for managing a system with Juniper Apstra including basic troubleshooting, global and blueprint UI walkthroughs, role-based access control, drain mode, adding and removing nodes from a fabric, rolling back an entire network (Time Voyager), creating on-box and off-box agents, configuring security policies, connectivity templates, querying the graph database, and performing intent-based analytics (IBA).

Through demonstrations and hands-on labs, students will gain experience in configuring and monitoring an IP fabric using Juniper Apstra. This course is based on Juniper Apstra Release 4.0.1.

OBJECTIVES

After successfully completing this course, you should be able to:

- Describe what is meant by intent-based networking.
- Describe the Juniper Apstra architecture.
- Navigate the global Juniper Apstra UI.
- Configure role-based access control.
- Describe an IP fabric architecture.
- Explain VXLAN functions and operations.
- Describe Ethernet VPN (EVPN) routing and bridging.
- Describe the Juniper Apstra data center reference design.
- Describe IP fabric usage in the data center reference design.
- Describe host connectivity in the data center reference design.
- Describe the life cycle of the management of devices using Juniper Apstra.
- Create and use system agents to manage devices.
- Configure resources.
- Configure tags.
- Describe basic device abstractions used by Apstra.
- Describe logical devices.
- Describe device profiles.
- Describe interface maps.
- Configure a rack type.
- Configure templates.
- Build and deploy a blueprint.
- Navigate the blueprint UI.
- Perform basic fabric device operations and troubleshooting.
- Configure and apply property sets and configlets.
- Configure connectivity templates.
- Describe the multitenancy capabilities of Juniper Apstra.

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OBJECTIVES (contd.)

- Describe the purpose of root cause identification.
- Create and manage security policies.
- Describe the security policy functionality and terminology.
- Describe the security policy workflow.
- Describe the security policy conflict resolution.
- Describe management of security policies.
- Create a device profile.
- Create a logical device.
- Create an interface map.
- Add a spine and a rack to an existing blueprint.
- Add a generic system to an existing blueprint.
- Use the Graph Explorer to traverse the graph datastore.
- Describe the function of an IBA probe.
- Create an IBA probe.
- Configure logging to a remote syslog server.
- Describe how Apstra integrates with vCenter.
- Describe how Apstra can enable a DCI.

COURSE CONTENTS

DAY 1

1 Course Introduction

2 Intent-Based Networking

- What do we mean by intent?
- Where is Juniper Apstra positioned?

3 Juniper Apstra Overview

- Juniper Apstra server
- Juniper Apstra device agents

4 Apstra UI Walkthrough

- Navigate the global Apstra UI

Lab 1: Apstra UI Walkthrough

5 Role-Based Access Control

- Configure users, roles, and providers to enable local and remote authentication

Lab 2: Configuring RBAC

6 IP Fabric Architecture

- IP fabric options including collapsed (spineless), three-stage, and five-stage fabrics
- IP fabric routing strategy
- EBGp fabric
- IP fabric best practices

7 VXLAN Overview

- VPN terminology—control planes and data planes
- VXLAN broadcast domains
- VXLAN control plane evolution
- VXLAN fundamentals
- Hardware VTEPs and software VTEPs

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COURSE CONTENTS (contd.)

DAY 2

8 EVPN Protocol

- Overview of the EVPN protocol in a VXLAN environment
- Route targets (policy)
- Route distinguishers
- EVPN route types and usage
- Edge routing using Type 2 routes
- Edge routing using Type 5 routes

9 Data Center Reference Design

- Overview of using rack types to design your network
- Overview of using templates to design your network
- Host connectivity options
- Life-cycle management (design, build, deploy, validate)

10 Device Management

- Device profiles as a hardware compatibility list
- Install off-box agents
- Install on-box agents
- Perform ZTP

Lab 3: Managing Devices

11 Resources

- Create IP, VNI, and ASN Pools

12 Tags

- Create Tags

Lab 4: Configuring Resources and Tags

13 Logical Devices, Device Profiles, and Interface Maps

- Describe Logical Devices
- Describe Device Profiles
- Describe Interface Maps

Lab 5: Logical Devices, Device Profiles, and Interface Maps

14 Design: Racks

- Create Custom Rack Types

15 Design: Templates

- Create Custom Templates

COURSE CONTENTS (contd.)

DAY 3

16 Build and Deploy: Blueprints

- Build and deploy a blueprint

Lab 6: Design, Build, and Deploy a Blueprint

17 Navigating the Blueprint UI

- Navigate the tabs—Dashboard, Analytics, Staged, Uncommitted, Active, and Time Voyager
- Describe layered views of the staged and active networks
- IBA probe versus service anomalies

18 Basic Blueprint Operation

- Use the Active tab to determine the status of a blueprint
- Select a node to see neighbors, links, headroom, telemetry, device, properties, tags, and virtual settings
- Query the blueprint (MAC, ARP, and VM)
- Find by tags
- Troubleshooting example
- Make changes to your blueprint
- Revert changes
- Use Time Voyager

Lab 7: Navigating and Operating a Blueprint

19 Property Sets and Configlets

- Configure Property Sets
- Configure and Deploy Configlets

20 Connectivity Templates

- Connectivity templates overview
- Example: Enable a BGP session between border leaf and external router

21 Virtual Networks

- Configure overlay virtual networks

Lab 8: Configuring Configlets, Connectivity Templates, and Virtual Networks

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COURSE CONTENTS (contd.)

DAY 4

22 Root Cause Identification

- Explain and enable RCI

23 Security Policies

- Describe security policy functionality and terminology
- Describe the security policy workflow
- Use conflict resolution

Lab 9: Configuring Root Cause Identification and Security Policies

24 Creating Device Profiles

- Create a custom device profile

25 Creating Logical Devices

- Create a custom logical device

26 Creating Interface Maps

- Create a custom interface map

27 Post-Deployment: Adding a Spine and a Rack

- Add a spine and a rack to an existing blueprint

28 Post-Deployment: Adding a Generic System

- Get familiar with global versus embedded rack types
- Add a generic system to an existing blueprint

Lab 10: Working with Interface Maps, Racks, and Generic Systems

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COURSE CONTENTS (contd.)

DAY 5

29 Graph Database

- Use Graph Explorer to visually inspect a blueprint's graph and its schema
- Use the Graph Explorer to learn to query the graph database

30 Intent-Based Analytics—Overview

- Describe the basics of an IBA probe

31 Create an IBA Probe

- Create a predefined IBA probe
- Create a new IBA probe

32 Syslog

- Configure and Monitor logging to a remote syslog server

33 VMware vCenter Integration

- Integrate Apstra with vCenter

Lab 11: Configuring IBA Probes, Syslog, and vCenter Integration

34 Data Center Interconnect

- Describe a L2 DCI
- Describe a L3 DCI

Lab 12: Configuring DCI

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