Juniper® Validated Design

JVD Solution Overview: Collapsed Data Center Fabric with Juniper Apstra and Access Switches

Executive Summary

Data center operators must deliver and maintain network infrastructures at various network scale sizes. What do you do when you need a network smaller than the prescribed "small network" design but don't need a full 3-stage design? The *Collapsed Data Center Fabric with Juniper Apstra and Access Switches* is a Juniper Validated Design Extension (JVDE) which builds upon the *Collapsed Data Center Fabric with Juniper Apstra* JVD to add access switches and multiply the port count. This approach provides data center operators with the ability to deploy port counts rivalling a 3-stage network in situations where performance can be traded for cost efficiency.

Solution Overview

The *Collapsed Data Center Fabric with Juniper Apstra and Access Switches* extends a collapsed fabric by about one rack of usable, high-availability ports. The base collapsed fabric combines the spine, leaf, and border leaf functionality into just two switches. This JVD extension provides step-by-step guidance on deploying added access switches to support as many access switch pairs as there are high-availability ports in the base collapsed fabric. As with all Juniper data center JVDs, this solution follows best practices as determined by Juniper's subject matter experts, including Juniper support teams. Figure 1 diagrams the recommended setup.
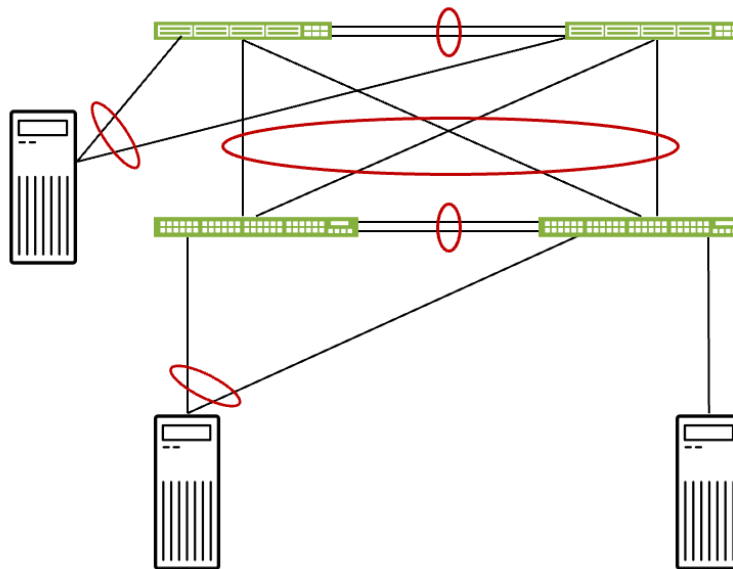

Figure 1: Collapsed DC Fabric with Juniper Apstra and Access Switches

This JVD provides you with a well-characterized approach to adding access switches to expand the number of servers supported by a collapsed fabric. Advanced JVD testing combined with widespread adoption simplifies troubleshooting and shortens the support cycle, leading to a more stable data center fabric and reduced operational costs.

The underlying JVD on which this extension is built consists of an ERB-based network architecture, with spine, leaf, and border leaf switches collapsed into a two-switch, high-availability configuration. Juniper Apstra is used for automation and network management. All hardware components and software versions are tested extensively with both simulated and real-world traffic.

Benefits

Repeatability—prescriptive designs, where all JVD customers benefit from lessons from worldwide deployments.

Reliability—integrated best practice designs tested with real-world traffic and described with measured results.

Velocity—streamlined deployment with step-by-step guidance, automation, and prebuilt integrations.
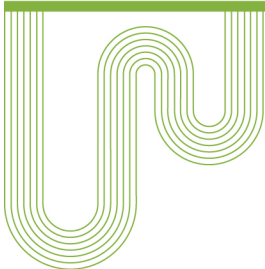
Solution Components

The *Collapsed Data Center Fabric with Juniper Apstra and Access Switches* provides guidance on deploying EX4400-48MP switches as an access layer connected to a *Collapsed Data Center Fabric with Juniper Apstra* JVD-based deployment. The underlying JVD uses Juniper Apstra version 4.2.1 and Junos OS Release 22.2 R3-S3 software components and supports multiple Juniper switches in the collapsed spine role.

About Juniper Validated Designs

JVDs represent a cross-functional collaboration between Juniper's top subject matter experts, including product teams, solutions architects, support, development, and testing. The goal of the JVD program is to develop well-characterized, multidimensional solutions that reduce the complexity and support burden of networking teams. Network designs selected for validation are based on industry standards and target the most common use cases with practical, economical designs that are fully tested and supported.

Juniper data center JVDs are customer-driven. Network designs in frequent use by customers are identified and then undergo use case and best practice analysis based on end-to-end validation testing. Juniper fully characterizes and quantifies the design in the Juniper JVD Labs with extensive testing by multiple teams. Once Juniper builds the physical infrastructure required to support the JVD, the design undergoes rigorous validation to prove solution viability, with test results provided in JVD test reports. Throughout the validation process, our engineers engage with software developers to quickly address any found issues, and ongoing regression testing confirms functionality, performance, reliability, and security in new software versions.

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