

# JUNIPER APSTRA

In the CTO Advisor Hybrid Infrastructure

# PROOF OF CONCEPT

*Sponsored by Juniper Networks*

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# Juniper Apstra

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# Executive Summary

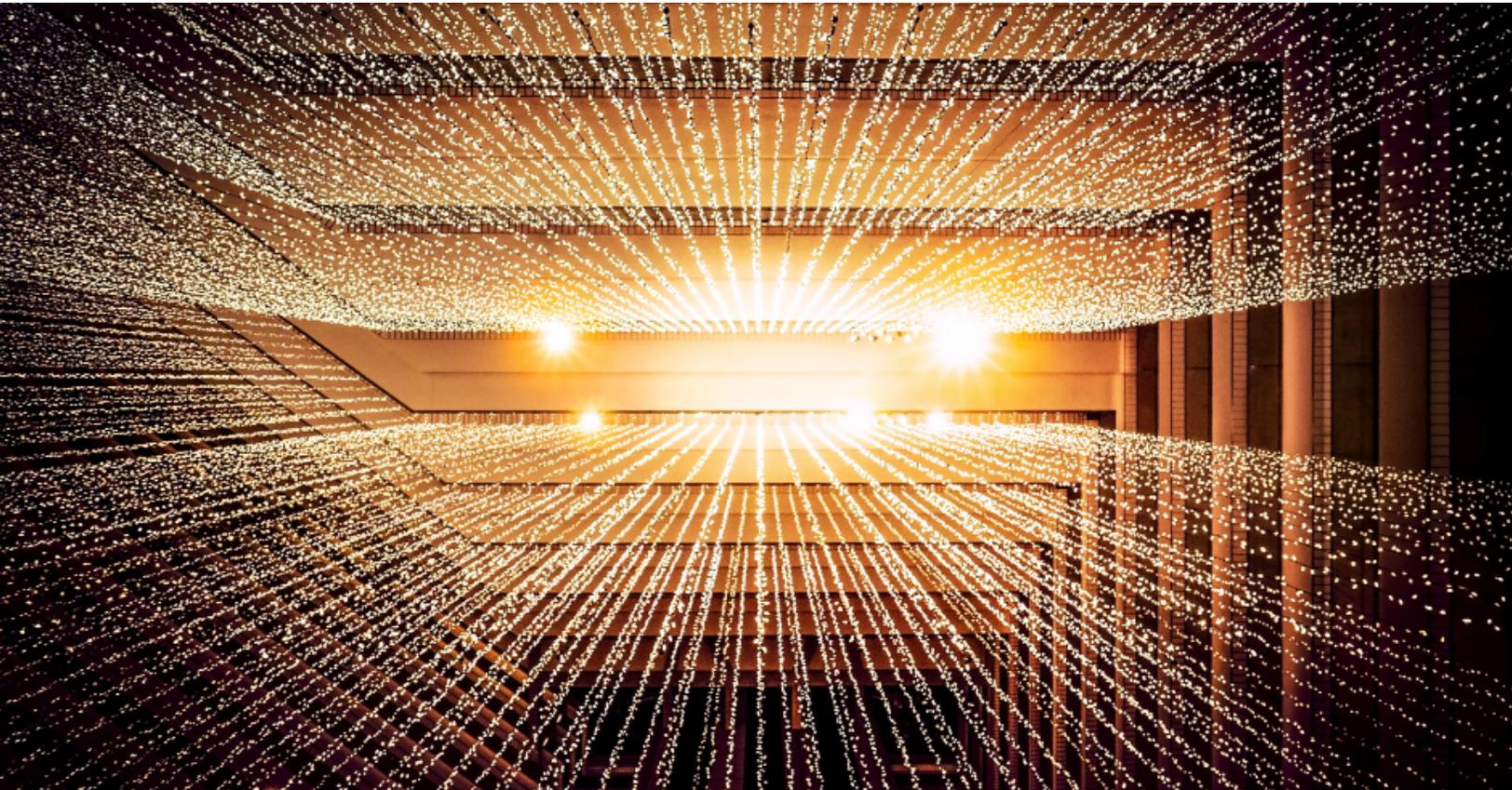
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The effort has led our team to request that we engage Juniper in continuing the use of Apstra beyond the boundaries of this project. As we face many of the same supply chain, and resource constraints as our end-user customers, we find Apstra among the best options for supporting a cloud-native scale network design without relying on a hardware solution from a single vendor. While the learning curve to get our engineers up to speed with Juniper Apstra took some time, we found that Apstra met the requirements of the CTO Advisor implementing and maintaining EVPN/VXLAN within the CTO Advisor Hybrid Infrastructure.



*Apstra is like having eyes in the data center at all times. It has really helped us as we work remotely.*

*– Mike Pazarena, AVP,  
Senior Network Engineer  
at First Bank*



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# Claims Tested

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We witnessed a trend of large enterprises wanting to build cloud-like capabilities in the private data center. However, analyst Tim Crawford shared that enterprises' CIOs struggle to source and retain talent with the skill to create a cloud-native data center. Additionally, [research](#) from AI6z (Andreessen Horowitz) strengthens and validates the financial argument for a hybrid infrastructure approach. However, IT leaders struggle to implement staffing governance that meets the needs of cloud-native infrastructures while maintaining traditional virtualized data center infrastructures.

To effectively deploy and manage this shift in the enterprise, customers are turning to automation and orchestration tools such as Juniper Apstra to ensure network architects successfully deliver net-new cloud network capabilities. To validate this premise, the CTO Advisor (CTOA) team implemented and tested the operational features of Juniper Apstra 4.0.1.

The research approach tests the following outcomes expressed during CTOA engagements.

- Support in moving to a Site Reliability Engineer (SRE) operating model
- Reduce Mean Time to Resolution (MTTR)
- Support for Audits and Compliance
- Reduce risk associated with supply-chain disruptions

## CLAIMS

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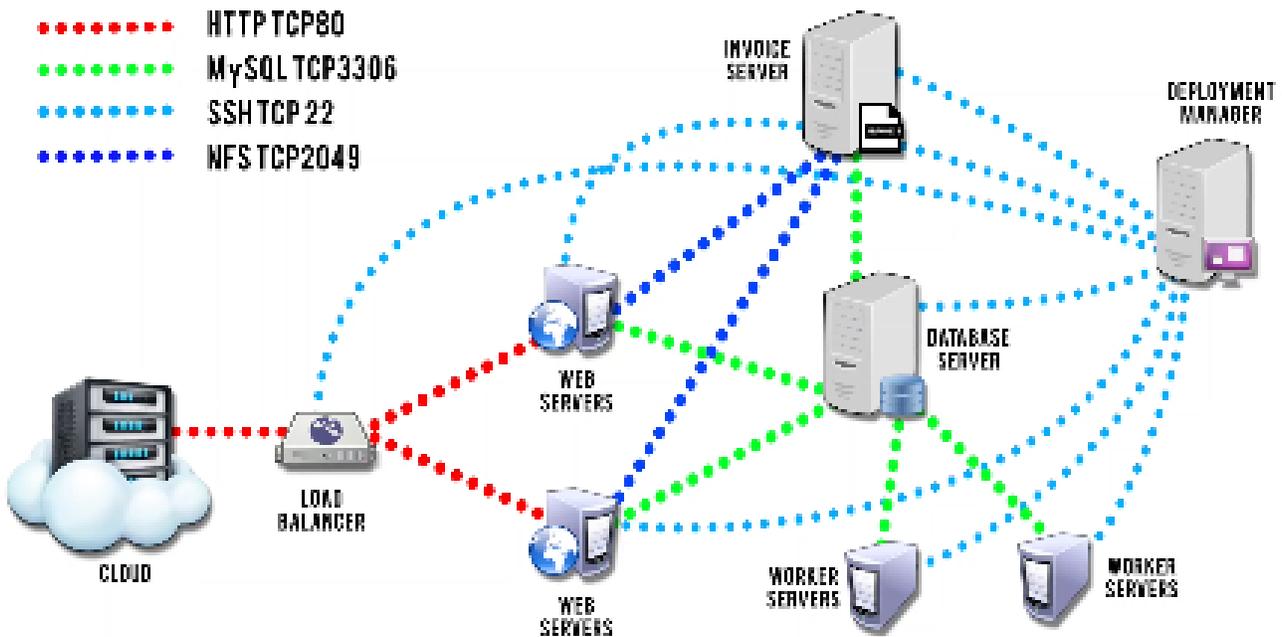
- 1 Increases compliance adherence and brings new staff up to speed quickly due to continuous automated documentation
- 2 Improves cross-team collaboration/visibility with VMware integration
- 3 Quickly tracks down misconfigurations that can impact the business
- 4 Analytics and telemetry help achieve faster MTTR and enable simplified capacity planning
- 5 Reacts fast to new business needs placed on the data center

# The CTO Advisor Hybrid Infrastructure

- 3-Node Dell PowerEdge 730Xd VMware vSAN Cluster
- 128GB RAM per node
- Dual Gen 1 Xeon Gold Processors
- 10Gbps Network
- Hybrid Storage (Single SSD and 3-HDD)
- 10Gbps Arista Network
- vSphere 6.7u3

The upgraded server pod has the following physical components:

- 3-Node HPE Gen 10 Proliant DL360 VMware vSAN Cluster
- 96GB RAM per node
- Single Gen 2 Xeon Gold Processors
- Intel 800-series Ethernet Adaptors
- All-Flash storage
- 6- Juniper QFX 10002 Switches
- 4- Cisco Nexus 92168 Switches (for a test of cross-vendor compatibility)



# Test Approach and Results

The CTOA receives a list of product capabilities from the partnering vendor in sponsored proof of concepts (PoCs). Then, the CTOA data center team designs a functional test plan based on the vendor's stated product capabilities against existing CTO Advisor Hybrid Infrastructure (CTOAH) operations.

The CTOA uses a qualitative testing methodology that looks at the level of effort needed to realize the vendor's claim. Therefore, the test is more than simply a pass-fail and provides a fuller view of the partner's marketing claims.

Many organizations are moving to a Site Reliability Engineer (SRE) support model. However, CTOA research shows that organizations are at differing levels of maturity on this journey. Our recent experience shows the SRE role is functionally divided across several teams. Therefore, orchestration platforms should integrate with existing data center platforms to enable SRE-like operational functionality. The team designed the test strategy for integrating Juniper Apstra in the CTOAH with this developing lens.

For this test, Juniper put forth five product

marketing claims for Apstra. Below are the product claims and our approach to testing each claim.

**Criteria:** A common challenge our analysts encounter when implementing automation is the cultural transition from manual deployments. Integrating processes to avoid compliance escapes is a constant battle. Beyond testing for basic logging and integration with a configuration management database (CMDB), the team focused on common scenarios whereby a change may occur via automation or an existing manual process and how exceptions get handled and documented.

**Results –** We view configuration management as one of the strengths of the Apstra platform. The platform alerts to escapes. Organizations looking to migrate to an automation platform could benefit from Juniper's approach. While the system doesn't prevent manual configuration, exceptions are logged and may only clear the error after making the configuration change via the orchestration tool.

CLAIM

01

*Increases compliance adherence and brings new staff up to speed quickly due to continuous automated documentation.*

“

*The Apstra solution was complete. It included all components required for configuration management and zero-touch provisioning.*

*– Energy Company Engineer*



CLAIM

02

*Improves cross-team collaboration/visibility with VM-ware integration.*

**Criteria:** A well-designed orchestration tool should allow for the function of SRE to gather enough data to implement and troubleshoot a distributed data center design. VMware is the most common virtualization platform, and Apstra claims to provide an end-to-end view of the underlay from the virtualization admin's perspective.

**Results** – While not a tool for configuring VMware vSphere networking, Apstra proved to be a capable tool in the SRE's toolbox. Configuration of the Virtual Distributed Switch (VDS) remains one of the most challenging tasks for a virtual administrator. Our engineers used the self-service portal to validate the VDS configuration without contacting a network architect. The self-service capability resulted in reduced deployment time for our VDS implementation.

“

*The main driver for network automation was people... There are fewer and fewer experienced network engineers, and the obvious way to mitigate the scarcity is to deploy automation to the highest extent possible.*

*– Ernest Altbart, IT architect at Raiffeisen Informatik*

CLAIM

03

Quickly tracks down misconfigurations that can impact the business.

50% reduction in time spent managing the data center network

“

*We designed the network fabric using Apstra's blueprints before we had our switches onsite,” says Mike Pazarena, AVP – Senior Network Engineer at First Bank. “We had a fully operational network from the moment we plugged in the switches.*

*– First Bank*

**Criteria:** Going back to the original premise of the research, enterprise customers want to have similar agility and scale of public cloud in the private data center. A deterrence to the goal is reducing the Meantime to Resolution (MTTR) for relatively simple network misconfigurations. Due to the integrated nature of cloud-native infrastructure, misconfigurations lead to application performance issues. Therefore, a successful data center orchestration tool must provide performance insight to enable resolution by a tiger team or SRE.

**Results –** Using Apstra, our engineers could quickly identify typical performance and availability issues caused by misconfigured MTU settings, missing links, bandwidth used per host, and missing virtual networks on the fabric. These everyday actions typically require a “tiger” team to coordinate the settings between the virtual hosts and network fabric.

CLAIM

04

Analytics and telemetry help achieve faster MTTR and enable simplified capacity planning.

**Criteria:** There's little question to the value of telemetry data in supporting a modern data center infrastructure. However, the amount of data coming from the network will overwhelm some of the best performance engineers. As an organization's SRE practice matures, a network orchestration tool must provide insights for health and performance.

**Results –** Apstra provides telemetry at scale. To mimic the benefit of data centers with terabits of bandwidth and traffic, we created a storage network with mismatched hosts. Two hosts connect at 100 Gbps; one additional host connects at 10 Gbps. During load testing, we were able to identify bandwidth constraints under load.

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*Juniper Apstra provides a single point of management across different infrastructure vendors, giving us the freedom to innovate and not lock us in.*

*– Darko Petrovic, Principal Engineer, Advania Iceland*

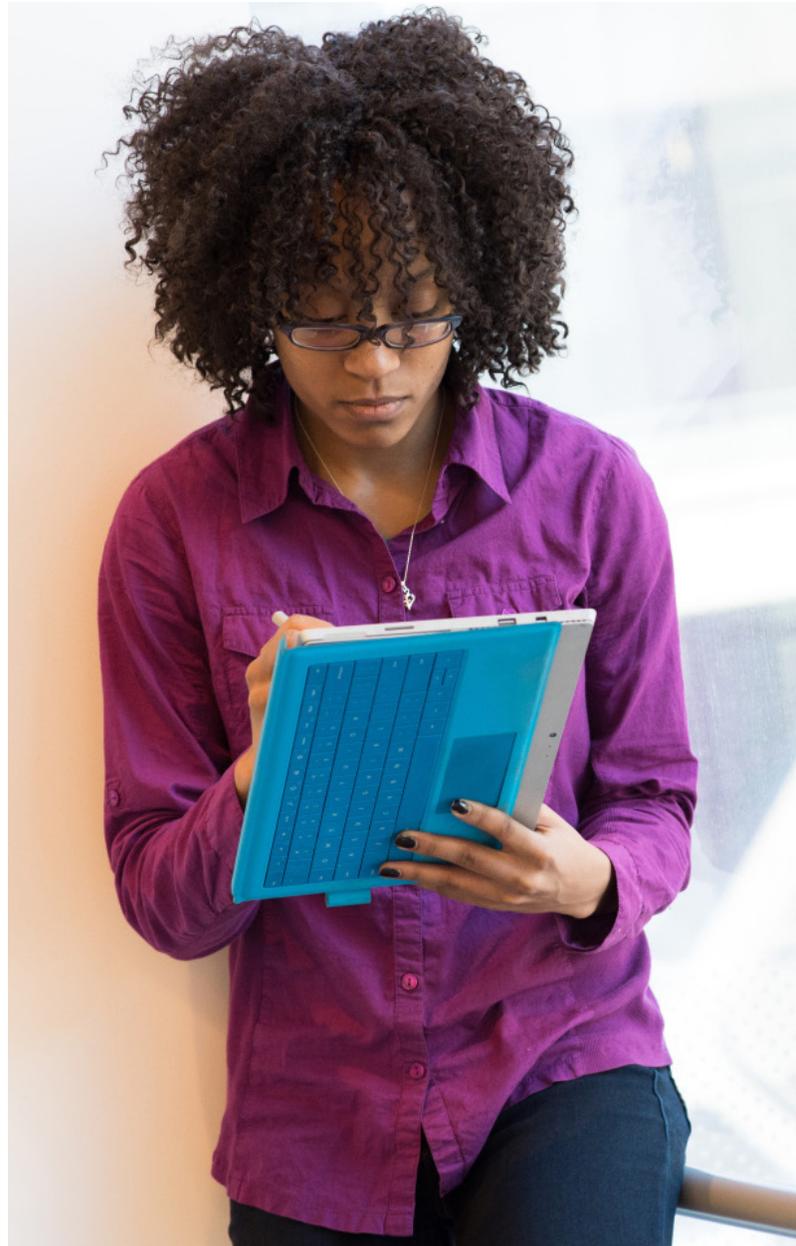
**Criteria:** Our engagements show that lift-and-shift to the public cloud enables agility. Quickly standing up new regions or reallocating resources from one region to another in a private data center allows IT teams to react to business needs quickly. With the ongoing challenges of the supply chain, the CTOA team developed a test to deploy a standard intent-based network to a hardware platform other than the QFX provided by Juniper.

**Results –** With hardware lead times of up to 9 months for new equipment, the CTOA team acquired pre-owned Cisco Nexus 9200 Series switches. After attending 8 hours of Apstra training, our engineer with an entry-level professional certification successfully deployed a basic configuration via Apstra.

“

*A [software (sw)] controller based around open standards, as in the case of Apstra, does not tie us into a specific product line from a specific vendor. So, we end up with purchasing decisions based around the fundamental requirements rather than what can the sw support today.*

*– Energy Company  
Network Architect*



# Conclusion

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**Apstra is a re-imagining of network abstraction. Without prior knowledge of the platform, the CTOA team assumed the experience might mimic data center virtualization solutions such as VMware vSphere. However, Apstra isn't comparable to a data center abstraction tool. Furthermore, it isn't accurate to compare Apstra to Ansible as Apstra is much more than configuration management.**

The CTO Advisor team had little knowledge about deploying and managing an EVPN/VXLAN network. Additionally, given we had to deploy a Juniper network underlay, we were concerned about meeting the PoC deadline of 3-months. After a day of training, our team completed the PoC within weeks.

The switching out of physical networks proved immaterial.

The team recognized Apstra will indirectly alleviate supply chain issues. The Apstra Blueprint becomes the foundation of a customer's network fabric. As a result, we updated our operations to align to the abstraction.

Once we adopted the abstracted frame-set, the benefits mimic many of the benefits experienced in Apstra customer testimonials. As a result, we've now changed our requirements for the physical underlay to the potential use of Apstra.

We highly recommend engineers and architects take the Apstra training before making a purchasing decision or investment in a proof of concept. Like any infrastructure as code project, the commitment is substantial, and the benefits are many.

