JUNIPER APSTRA

Realize reliable and consistent operations with multivendor intent-based networking from Day 0 to Day 2 and beyond

Challenge

Most data center solutions are complex, with a misguided focus on only short-sighted benefits. This complexity impedes consistent and reliable operations in the long term, resulting in slow time to market, poor customer experience, and costly downtime.

Solution

A data center fabric management solution that enables reliable and consistent operations for Day 0, Day 1, Day 2, and beyond—across vendors.

Benefits

- **320% ROI** *with a payback period of less than 6 months*
- *Intent-based networking for complete life-cycle management—all with a few clicks, starting from Day 0 through Day 2*
- *Greater speed, superior quality of service through reliability*
- *Accelerated time to value and reduced MTTR*
- *Flexibility and choice with multivendor support*
- *Secured network with traffic segmentation and policy assurance*
- *Changes made to your network quickly and accurately the first time*

Digital transformation is sweeping across industries at an unprecedented rate. For businesses to gain an advantage over the competition and catch this massive wave of opportunity, IT teams must deliver services faster while ensuring superior customer experiences. Focusing on speed, however, is not enough.

IT teams need to build and maintain reliable data center operations for long-term success while maintaining continuity and availability. The network and people supporting it need to be agile and flexible enough to meet evolving business needs, respond to unpredictable external events, accommodate distributed architectures, and defend against pervasive threats.

There is absolutely no lack of solutions in the industry, but most of them are too complex to realize value in a reasonable timeframe. This results in organizations being unable to grow and innovate at the speed of the market. Juniper® Apstra software addresses these pervasive market needs with a vendor-agnostic, intent-based, and flexible solution that delivers reliable and simplified data center operations at the click of a button.

> *"Advania needed a new shared infrastructure for its outsourcing business and automation of the data center was a critical requirement. 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

Challenges

Designing, deploying, and operating a data center network is no mean feat. Higher volumes of data traffic, more distributed applications and users, and fewer resources are among the trends that leave networking teams scrambling to keep up with day-to-day demands. In a modern data center network, Ops teams must focus on business outcomes and the experience delivered to both network operators and users.

Solution Brief

Need for speed: Global events have drastically accelerated digitization. With the increasing number of activities going online, businesses need to act quickly to gain or retain market share. To support business goals, data center operators need to set up services fast. But focusing on speed alone is not sustainable, as minor misconfigurations may prove costly.

Supply chain constraints and vendor lock-in: All tech companies are facing the challenges of supply chain disruption. The recent pandemic has proven the disadvantages of vendor lock-in through supply chain issues, which cause delays in projects and disrupt business profitability. Even if supply chain issues are resolved, most industry solutions are proprietary, locking customers out of choosing hardware based on their best interest.

Complex operations: Data center operations and management solutions remain extraordinarily complex, and they often require learning new software and techniques with steep learning curves. Once trained, a network team's productivity is heavily impacted when senior operators leave the team. Hiring and training new talent requires time and resources, which slows down the pace of innovation. The situation worsens when there is a talent shortage.

Solution

Juniper, relentlessly focusing on engineering simplicity, takes a refined approach to modern data center operations with Juniper Apstra, by delivering:

1. **Intent-based networking (IBN):** Apstra is the first to pioneer the intent-based networking approach. Customers can achieve complete peace of mind by taking advantage of IBN for life-cycle management, from Day 0 to Day 2 plus, all in one single management platform. Apstra ensures the network is set up correctly, and continuously validates against the intent with accurate policy assurance across all vendors' infrastructures.

2. **Speed through reliability**: Apstra accelerates time to deployment reliably and consistently and reduces mean time to resolution (MTTR) by leveraging a blueprints-based prescriptive approach. Reference designs provide flexibility and simplicity to rapidly meet today's unpredictable landscape and evolving business requirements.

3. **Flexibility and choice with multivendor support:** Organizations can avoid vendor lock-in and reduce risks from supply chain uncertainties and skills shortages by removing dependency on a specific set of vendors. This freedom accelerates time to value using logical designs. Additionally, teams no longer need to spend time training staff through steep learning curves. Also, an abstraction layer across all modern data center vendors (see support list) increases productivity.

> Juniper Professional Services provides Apstra Automated Deployment and Migration Services to address next-generation data center networks, utilizing highly validated data center fabric reference designs, as well as highly flexible Juniper Apstra Freeform reference designs.

Features and Benefits

Intent-Based Network Design and Operations

Intent-based data center automation increases application reliability, simplifies deployment and operations, and dramatically reduces costs for enterprises, cloud service providers, and telco data centers. By automating network deployment and operations from Day 0 to Day 2 and beyond with validated and repeatable designs and error-proof operational workflows, Apstra delivers on the vision of a complete, end-to-end data center solution for any vendor, any topology, and any data center. Apstra's advanced assurance capabilities understand the business intent, set up the network, and ensure it runs reliably. If brownouts or deviations occur, Apstra alerts the operator before business is impacted.

Self-Documentation and Single Source of Truth

Apstra tracks all intent and context-rich operational network state information, such as network moves, additions, and changes in a single source of truth (SSOT) database. The software then continuously validates and assures network operations and policies. As a result, IT teams can implement changes confidently and accelerate time to market. Network operators can also troubleshoot more efficiently by having all the network information available at their fingertips.

Life-Cycle Management

Often network designers and operators work in silos resulting in network outages. Apstra removes these silos and provides a seamless Day 0/Day 1/Day 2 operations and applications experience by enabling IT teams to plan, design, deploy, and operate the entire network in a single management platform. With Apstra, customers have achieved 90% improved time to delivery, 70% faster MTTR, along with 320% ROI and complete payback of their investments in less than 6 months.

Support for All Modern Network Platforms

Apstra's intent-based networking platform provides an abstraction layer across vendors, so organizations can grow and innovate without the constraints of hardware platforms. Using this approach, logical devices appear in the Apstra user interface as abstractions of physical devices and are vendor agnostic. Vendor-specific mappings are added using interface maps, which simplifies the ability to design and execute changes faster.

Access List Policies Assurance

Oftentimes when multiple policies are applied within, the same fabric policies may overlap, or policy configuration drifts may occur. Apstra automatically detects such conflicts and resolves them based on user settings such as "more specific first" or "more generic first." The policy-assurance capability in Apstra provides a robust mechanism that can automatically flag and resolve policy overlaps and drifts.

Advanced Telemetry—Intent-Based Analytics

Intent-based analytics (IBA) empowers network operators to eliminate network outages and gray failures simply. With IBA, network operators can quickly detect and prevent a range of service-level violations—including security breaches, performance degradations, and traffic imbalances. They can also quickly define expert-level rules and embed them into the network management system, ensuring that system checks are continuously running and updated immediately with any network changes.

Time Voyager

When changes are implemented by mistake, or deployment results are not as expected, Apstra provides a robust safeguard with Time Voyager. IT teams can roll back to any previous revision in a few clicks, without the complexities of manual configuration. Time Voyager maintains synchronized configuration between the Apstra server and devices and keeps disruption to a minimum level even when mistakes are made.

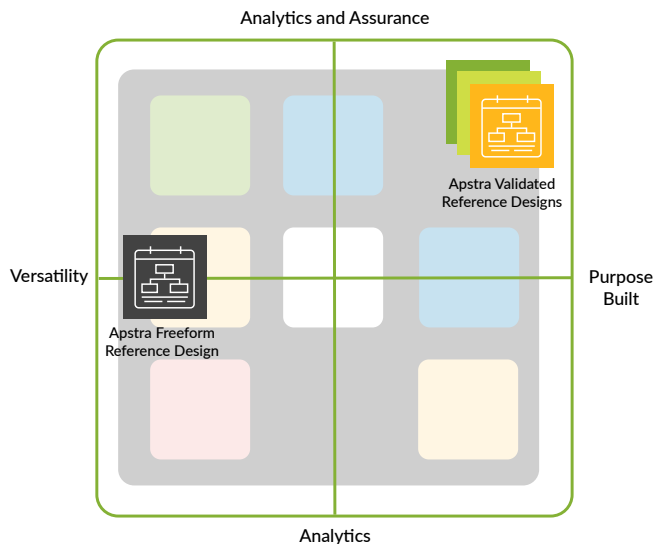### Flexibility—From Blueprints to Automation DIYers

Figure 1: Apstra reference designs offer flexibility for all types of users.

While the existing Apstra reference designs provide a curated experience for the operator with strong guardrails and powerful IBA, some organizations have unique deployment requirements demanding more flexibility and choice with certain protocols, features, and architectures. The latest Apstra release includes

Freeform—a new reference design—that delivers flexibility and choice allowing network admins to exert more influence over the network design of their choice. Apstra Freeform provides customers with versatility and control that resonates with automation DIYers and DevOps experts.

Use Cases

Reliable Day 0 Through Day 2+ Operations

Apstra provides a single management platform from which network operators can design, deploy, and operate data center networks. Customers can take advantage of the reference designs and templates to describe the business intent and technical objectives (i.e., set up resources to support new services), and Apstra converts them into essential policy and device-specific configurations. Pre-change analysis ensures changes are done correctly the first time, then Apstra continuously self-operates, self-adjusts, and self-corrects to assure compliance. Blueprints are used to collect all the information needed to operate the network based on the desired intent, and templates make it easy to create multiple blueprint designs with identical specifications. This allows network operators to set up new services quickly and reliably while making sure the network is consistent, secure, and resilient.

In addition, Apstra provides visibility into the entire network, and it processes volumes of raw data with analytical probes for root cause identification. Apstra also provides incident management, change management, and compliance and audit tracking, as well as maintenance-mode capabilities to shorten maintenance windows.

If any changes cause unexpected issues, the Time Voyager feature stores configuration history, making it easy to revert to a previous network state.

Multivendor Support and Device Management

Proprietary technologies are one of the main barriers impeding the progress of digital businesses. These technologies require intensive, specialized resource investments to ensure interoperability and consistency in the network. Apstra puts the power back in customers' hands by providing vendor-agnostic intent-based networking that supports a range of hardware and software vendors, including open standards-based offerings. This empowers network operators to design and manage different vendors with the ease of a single vendor (see list of supported vendors), and it translates into a massive reduction in OpEx and accelerated time to value.

Businesses benefit from investment protection without the need to learn new automation tools and can focus on delivering greater business success. Apstra gives customers the freedom to innovate and choose and replace vendors in their best interest, remove vendor dependency, and reduce risks from supply chain uncertainties and skill shortage.

In this approach, logical devices appear in the Apstra user interface as abstractions of physical devices and are vendor agnostic. Vendor-specific mappings are added using interface maps that simplify the ability to design and execute changes faster.

IBN from Core to Edge (Collapsed Fabric)

With augmented virtual activities, enterprise and service providers need to bring data processing closer to the end user to minimize application latency and improve reliability and user experience. This comes with the operational complexities of managing multiple edge data center sites while ensuring reliability and consistency. Apstra empowers enterprises, service providers, and cloud providers to expand the benefits of intent-based networking and assurance to the edge. With an Apstra collapsed fabric reference design, data centers can be scaled at runtime while maintaining consistent network policy and security with the option to expand to full Clos later. This approach provides for simplified and reliable management of the entire data center network, from core to edge.

Data Center Interconnect

As networks expand and applications require greater geographic diversity, several vendor-specific proprietary features have been introduced to address stretched Layer 2 domains and active/active topologies. Apstra supports an industry-standard Ethernet VPN–Virtual Extensible LAN (EVPN/VXLAN) overlay that extends Layer 2 application segments outside of the Apstra-managed topology. This allows architects to integrate multiple disparate computing centers for effective load balancing, legacy migration, disaster recovery, or resource sharing. With Apstra, DCI can be implemented using either over-the-top, gateways, or AS boundary router methods.

VMware Integrations

Apstra tightly integrates with VMware NSX-T and VMware vCenter to provide network operators visibility into virtual workloads and networks. Built-in validation speeds up the troubleshooting of virtual networking, port-group/fabric VLAN/ Link Aggregation Control Protocol (LACP) mismatch, and VM traffic issues. Remediation workflows help users resolve misconfiguration of VLANs faster by automatically suggesting the correct network fabric changes.

In other words, while the effect on the receiver is the same– not being able to correctly decode the received signal—the root cause for signal degradation is very different. The signal quality is impaired due to the noise that stems from active components like amplifiers rather than passive networking gear like fiber cable or connectors affecting the signal power. By combining insights into the composition of the signal quality, intelligent network automation solutions can infer the root cause. The built-in advanced algorithms and machine learning in Paragon Insights correlate these multiple data sources, establish operational benchmarks, identify outliers, and take corrective actions based on predefined KPIs.

Next Steps

To learn more about Apstra, please contact your Juniper account representative or go to www.juniper.net.

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.