

JUNIPER AND GLUWARE SIMPLIFY EVPN-VXLAN MANAGEMENT THROUGH AUTOMATION

Accelerating customer deployments and simplifying network management while modernizing multiservice campus and data center networks

Challenge

EVPN-VXLAN configuration and life-cycle management can get extremely complicated, especially when done manually. Automated solutions provide the flexibility required to adapt to each customer's specific.

Solution

Gluware Intelligent Network Automation, paired with Juniper Networks switching and routing platforms, delivers a flexible, feature-rich solution for automating standards-based edge-routed bridging and Juniper's specific centrally-routed bridging EVPN-VXLAN deployments.

Benefits

- Integrates pre- and post-checks, verifying that devices are in their intended configured state
- Simplifies moves, adds, and changes by understanding and managing how IP address, VLAN IDs, and VRFs are allocated
- Simplifies troubleshooting and auditing by supporting full logging and interaction with network devices during automated tasks and procedures

Working together, Juniper Networks and Gluware are delivering industry-leading network automation to safely and securely manage and operate multiservice, cloud-enabled campus and data center networks.

Gluware's unique approach to enterprise network configuration management brings the flexibility and built-in intelligence needed to handle the complexities and interdependent protocols of Ethernet VPN-Virtual Extensible LAN (EVPN-VXLAN) architecture. Using its Intent-Based Networking (IBN) technology with a declarative provisioning engine, Gluware ensures the desired state of the network is achieved with each configuration change across the EVPN fabric.

EVPN-VXLAN leverages current technologies in a new way to build Layer 2 tunnels or overlays over a Layer 3 network. However, initial deployments are often configured manually or with limited scripts. Configuration complexities related to the interdependent components across the fabric can become overwhelming to engineers as the network grows and the number of tunnels and VLANs scale. Manual network changes can take days or weeks, slowing down application deployment and resulting in mistakes that cause costly disruptions and outages.

Gluware Intelligent Network Automation enables enterprise customers to automate infrastructure changes like new spine or leaf nodes, along with day-to-day tasks like adding or removing VLANs or a class of service (CoS) from virtual tunnel endpoints (VTEPs). Gluware's EVPN-VXLAN reference design feature package, along with the Config Modeling application, can be easily customized to the design choices as well as to the implementation of any standard deployment—including Juniper's concurrent routing and bridging (CRB) architecture.

The Challenge

Network architects are faced with the daunting challenge of designing networks that support, and are optimized for, both legacy and new applications.

Legacy applications often run in the data center and require Layer 2 connectivity, while newer applications run in virtual machines, containers, and remote locations like campuses and clouds. EVPN-VXLAN has emerged as an open standards-based solution to offer the best of both worlds, using efficient and scalable L2 virtual network overlays running on top of the L3 network underlay.

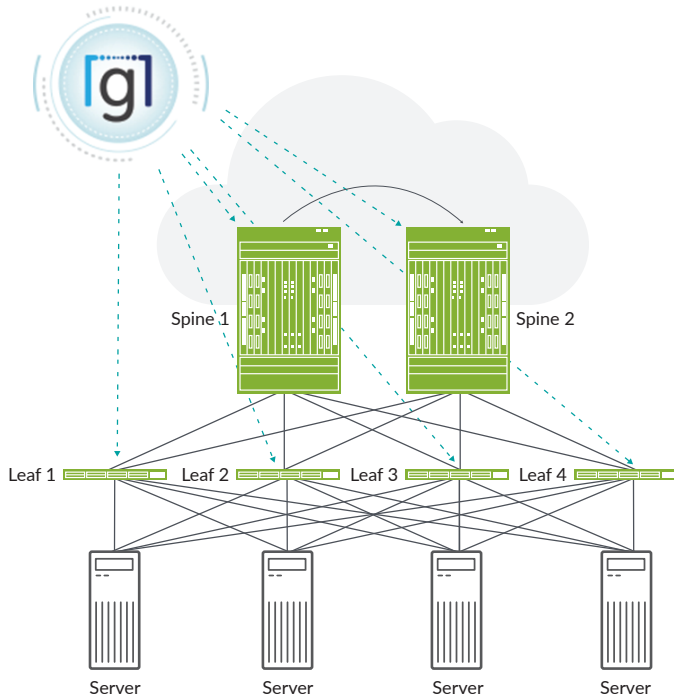


Figure 1: Gluware automating Juniper-based EVPN data center

The L2 virtual networks, known as overlays, allow policies to be applied to each path and support new and legacy application requirements. EVPN works with the L2 protocol VXLAN, which enables the creation of virtual overlays (or tunnels) to carry broadcast, unknown unicast, and multicast (BUM) traffic. While this technology has the ability to transform data center and campus networks, it also adds configuration and management complexity. Configuring and maintaining the underlay, overlay, and per-tunnel policies presents ongoing life-cycle management challenges.

The Juniper Networks-Gluware Automated EVPN-VXLAN Solution

Gluware Intelligent Network Automation complements Juniper Networks switching, routing, and security platforms powered by the Junos® operating system, simplifying the deployment and ongoing management of the EVPN-VXLAN architecture. For customers deploying Juniper’s fit-for-purpose data center portfolio, operational simplification can be enhanced using Gluware’s built-in intelligent automation and declarative provisioning to define complex network constructs and reliably implement changes at scale.

Juniper offers a holistic blueprint to build a data center network that spans different technology areas, multiple data center sites, and clouds—both physical and virtual. Acting as flexible building blocks for networks that scale from dozens

to thousands of ports, Juniper networking platforms with integrated security, working together with open ecosystem solutions, contribute to a comprehensive architecture that accelerates the deployment and delivery of applications within and across multiple sites and clouds.

Juniper Networks® QFX Series Switches are flexible, high-performance, low-latency, fixed and modular chassis L2 and L3 devices, optimized for spine-and-leaf environments. Packed with software features to support modern data center and campus architectures using EVPN-VXLAN on IP fabric underlays, QFX Series switches offer flexible, cost-effective, high-density interfaces for server-facing and intra-fabric connectivity from 1GbE up to 400GbE.

Customers can leverage Gluware’s Config Modeling application for EVPN-VXLAN to rapidly design and deploy their network using Juniper switches, routers, and firewalls. As a data model-based platform, Gluware defines the building blocks or constructs of the overlay, underlay, switch ports, and other specific items, including VLANs, VXLANs, virtual routing and forwarding tables (VRFs), switch virtual interfaces (SVIs), and integrated routing and bridging devices (IRBs). Gluware functionality tames the configuration complexity of EVPN-VXLAN by using a data model that centralizes all fabric data and ensures synchronization across the fabric when making a configuration change.

With Gluware, either the entire network architecture or specific individual components can be automated, based on customer needs. Gluware can also serve as the source of truth for addressing and assigning IP addresses, VLANs, Abstract Syntax Notation devices (ASNs), VRFs, and more. Leveraging the Gluware REST-based API, the platform can be fed data from an existing source, like an IP address management (IPAM) solution. Gluware simplifies tasks like adding new spine or leaf nodes, or more common day-to-day tasks like adding a VLAN to a VTEP.

Leverage the Gluware EVPN Domain Data Model to Automate from Day 0 to Day N:

- Add leaf devices
- Add spine devices
- Add tenant VRFs
- Add tenant VLANs
- Automatically update and synchronize all the devices in the fabric
- Let Gluware understand and manage the interdependency of each construct

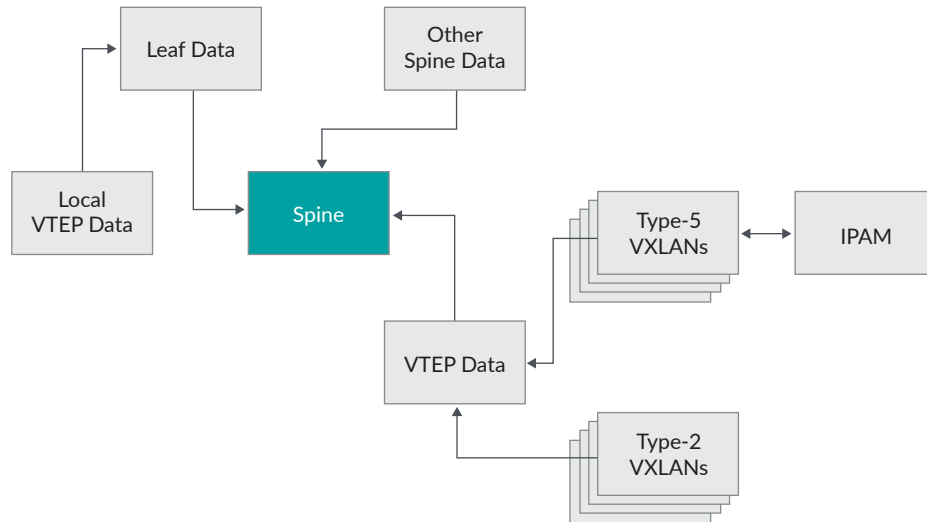


Figure 2: Example EVPN domain data model Gluware uses to automate Juniper CRB architecture

Features and Benefits

The Juniper EVPN-VXLAN architecture includes the following features:

- Open and evolvable:
 - Based on modern, open standards; no vendor lock-in
 - Offers efficient and scalable way to build and interconnect multiple data centers
 - Enables easy scale-out to support growth in east-west data center traffic
- High performance:
 - Provides low-latency, nonblocking, high-bandwidth connectivity across the network
 - Maintains well-separated failure domains
- Flexibility and scale:
 - Supports multiple architectures to bolster traffic flow and application needs
 - Enables workload mobility across the data center; workloads can be deployed anywhere
 - Enforces inherent network segmentation within and across data centers, enabling multitenancy
 - Integrates L2 and L3 connectivity for physical and virtual workloads with efficient control plane-based learning
- Built on industry-respected Junos OS
 - Designed for simplicity
 - Delivers physical and virtual routing, switching, and security solutions

Automating Juniper data center platforms with Gluware delivers the following features:

- Intent-based, data model-driven, and declarative Gluware automation ensures that each configuration change results in the intended state.
- Gluware provides an EVPN-VXLAN reference design that is flexible enough to be adapted to any implementation.
- Brownfield and greenfield deployments are supported, including the ability to automate without disrupting the existing network.
- Gluware can be fed external data and be run headless to implement network changes using a REST-based API.
- The Gluware application suite offers device inventory, configuration drift and audit, OS management, and workflows, in addition to intent-based configuration management.

Solution Components

The Juniper EVPN-VXLAN supported platforms include:

- Juniper Networks QFX Series Switches: Ideal for securing and automating your data center networks, QFX Series Switches build a strong foundation for flexible and high-performance EVPN-VXLAN fabrics that improve network reliability and agility.
- Juniper Networks EX Series Ethernet Switches: Cloud-grade switches designed for the converged enterprise branch, campus, and data center, EX Series switches address growing enterprise demands for high availability, unified communications, and virtualization.

- Juniper Networks MX Series Universal Routing Platforms: A robust portfolio of SDN-enabled routing platforms, the MX Series provides industry-leading system capacity, density, security, and performance with unparalleled longevity.

Gluware Intelligent Network Automation solutions include:

- The Gluware Control base package, including the Device Manager application
- The Gluware Config Modeling application
- An EVPN-VXLAN Reference Design feature package for the Config Modeling application
- Additional optional components that include Config Drift and Audit app, OS Manager app, and workflows

Key Benefits of the Juniper-Gluware Solution

Rapid onboarding:

- Rapid onboarding of current configurations includes policy-based management to standardize or enable new features.
- No new hardware or complex network redeployments are required.
- Intelligent, data model-driven platform enables edit once, cascade to many unique device types, instead of a static template-based approach.
- Network features can be defined with static CLI and support variables and conditionals.
- Device interface abstraction support simplifies platform replacement and upgrades when needed.

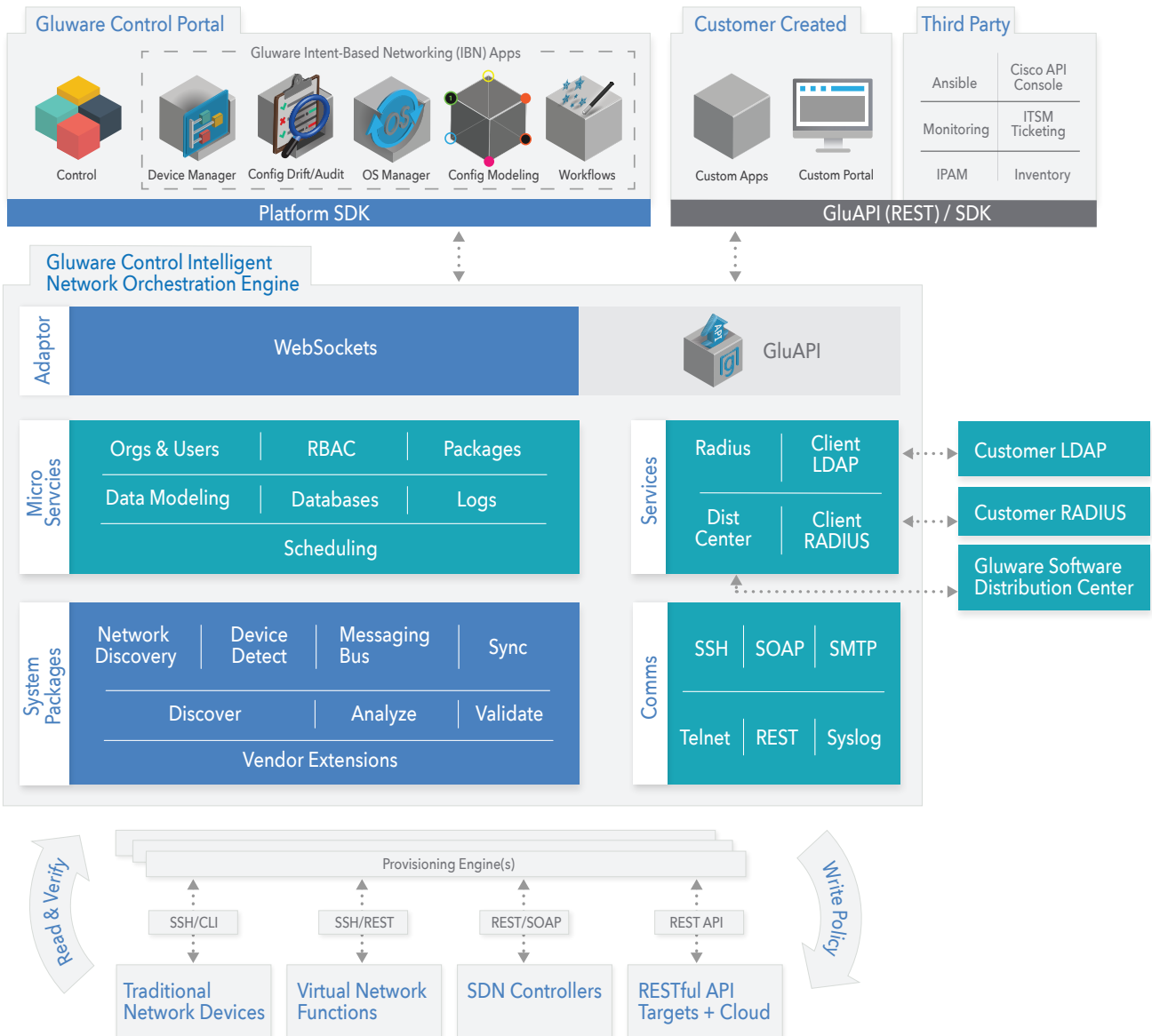


Figure 3: Gluware Intelligent Network Automation architecture

No programming required:

- Network engineers implement functionality themselves.
- Resource effectiveness reduces time to value.
- State assessments can be optionally integrated by defining “show” commands and RegEx for the output with an integrated RegEx editor.

Intent-based provisioning:

- Provisioning preview shows what commands will be created, ensuring network devices reach desired state.
- Detailed logging, including all CLI interactions, is provided.
- Changes can be scheduled to occur at specific times.

Optimized for brownfield:

- A modular template approach automates common features across hundreds or thousands of network nodes.
- Network feature policies are defined with native-vendor CLI, which network operators know, supporting static CLI, user input variables, or dynamically discovered variables.
- Existing configurations can be onboarded into network policy, leveraging the Gluware Intelligent Model Discovery workflow.

Summary—Simplify and Accelerate Juniper EVPN-VXLAN Deployments with Gluware

EVPN-VXLAN has emerged as the leading architecture for modernizing campus and data center networks, introducing new application flexibility while supporting legacy software. The interdependence of the protocols involved makes it a challenge to manage these applications manually as the network scales and the rate of changes to overlays and policies increase.

If you are designing a data center architecture and want to reduce complexity, increase business agility, and improve time to value, Juniper data center platforms—paired with Gluware Intelligent Network Automation—offer performance and scale along with operational simplicity to satisfy the needs of the business.

Next Steps

To learn more about Juniper with Gluware Intelligent Network Automation, please visit Juniper’s Solution Partner Page at www.juniper.net/us/en/partners/technology-alliances/data-center/.

About Gluware

In today’s world, it is a strategic imperative for global enterprise IT to prevent critical outages, enhance network security, and keep up with ever-changing business requirements through increased network agility. As the leader in Intelligent Network Automation, Gluware adds a powerful layer of intelligence to any existing or new enterprise network, with code-free apps that automate and orchestrate mission-critical network tasks at scale. Gluware’s patented Intent-Based Networking (IBN) technology is automating the networks of the world’s largest and most complex enterprises across a complex tapestry of vendors, technologies, infrastructure, and standards, helping to keep them “always on” while reducing the risk of human-induced errors or planning omissions. The Gluware Application Suite dramatically reduces an organization’s time to value and is deployed in the networks of Global 2000 enterprises including leaders across industries from Pharma to Finance.

Learn more at <http://www.gluware.com>.

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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