gluware®

Brownfield
Automation

> Network automation tools enable network operations staff to gain process and configuration agility, while ensuring compliance.
>
> —Gartner, Market Guide for Network Automation, March 2017

Introduction

Automation has been identified as a top priority to improve responsiveness to the business needs while also reducing errors, outages and security risks. Currently, on average, over 80% of network changes within enterprises are made manually which is slow and error prone. Enterprises are feeling the impact of this as they move to digitize their businesses. The challenge enterprises face is that their networks are made up of dozens of vendors and even more unique platforms which have been deployed over many years.
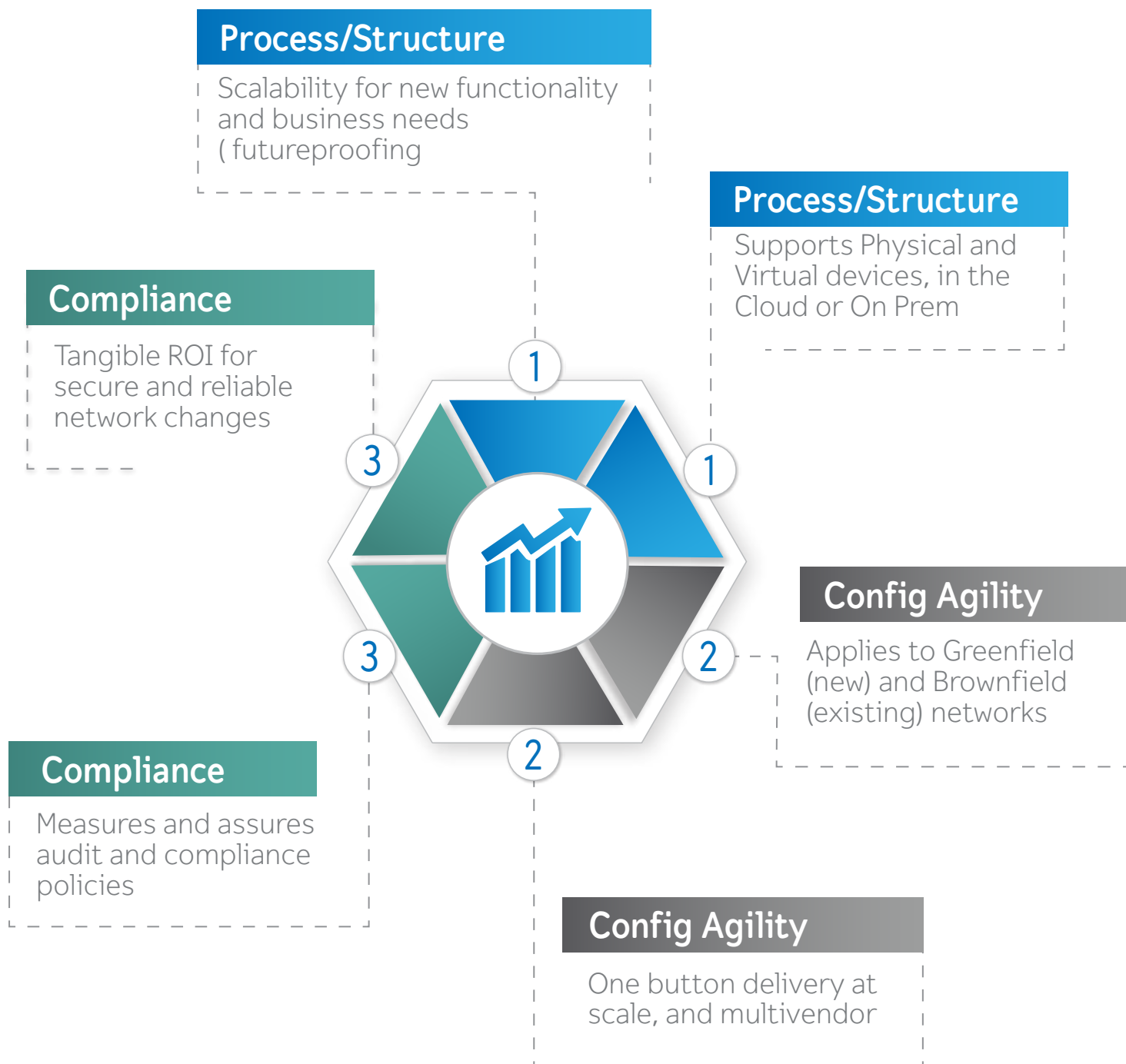
As public clouds are leveraged as much as possible they provide many automation tools to spin up and change services quickly. The legacy network infrastructure lacks this type of comprehensive management software to provision and update services across multiple vendors.

The traditional approach to automation usually comes in two flavors:

		Scripts	Vendor Management Tools
1	**Process/Structure**	• Programming process, not business or lifecycle focused • Immediate device/vendor specific fixes • Reusability/quality varies by individual	• Each vendor tool has a different focus and process • No Network wide consistency • Maintaining tools means lots of tool training/costs
2	**Config Agility**	• Most changes/updates are rewrites – one time use • Manual rollouts and manual errors are costly • Changes vary by device or vendor – nothing network wide	• Varies by vendor – new features, or no tool means manual changes • Typically very detailed feature management approach for different domains – routing, switching etc.
3	**Compliance**	• Discovery, Analysis, Validation structure in scripts require deep programming skills • No Audit mechanisms built in – push and pray • Outdated/late scripts violate Compliance	• Discovery, Analysis, Validation structure typically not included (script based back ends) • No Audit mechanisms built in – push and pray • Functionality gaps and Security issues leave IT waiting on vendor updates

For Stronger Businesses

Modernize Automation

Process/Structure

Scalability for new functionality and business needs (futureproofing

Process/Structure

Supports Physical and Virtual devices, in the Cloud or On Prem

Compliance

Tangible ROI for secure and reliable network changes

Config Agility

Applies to Greenfield (new) and Brownfield (existing) networks

Compliance

Measures and assures audit and compliance policies

Config Agility

One button delivery at scale, and multivendor

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Introduction to Gluware

Gluware has one purpose: to simplify the network. Gluware provides a Software as a Service (SaaS) to automate and orchestrate multi-vendor enterprise networks. Gluware first offered a solution for Software-Defined WAN (SD-WAN) and helped to define this emerging technology in the enterprise by automating the Cisco IWAN Architecture. With the progression of the Gluware Control platform and intent-based, network aware orchestration engine, Gluware expanded its solutions to multi-vendor LAN, WAN, Data- Center, Wireless and Security appliances. Working with customers, Gluware has identified the key pain point of automating the existing, brownfield, network infrastructure. The Gluware automation platform, Gluware Control, has evolved to support onboarding and automating networks in days, without requiring a programming skillset.

Gluware solutions addresses **3** **key areas**

Security and Compliance	Change Management & Cost Avoidance

Automation and Orchestration (A&O) of Network Configuration Management (CM)

|			
Automating Configurations	MONTHS	Manual	
	WEEKS	[g]	
Deploying on 100's/1000's of devices	WEEKS	Manual	
	MINUTES	[g]	
Network level consistency/ compliance (QoS policy, ACL...)	WEEKS	Manual	
	MINUTES	[g]	

Onboarding Your Network Features in Gluware

Gluware takes a modern approach to automating the enterprise by offering pre-built solutions as well as the ability to "onboard" the customers existing network features using Config Modeling for ongoing lifecycle management.

How Gluware Works

Gluware Control is a data-model driven platform leveraging an intent-based, network- aware orchestration engine. Using pre-built or configuration modeled solutions customers can configure and deploy at scale.

Data-Modeled Network Features

Network Devices

Feature Configuration and Assembly

Orchestration Engine
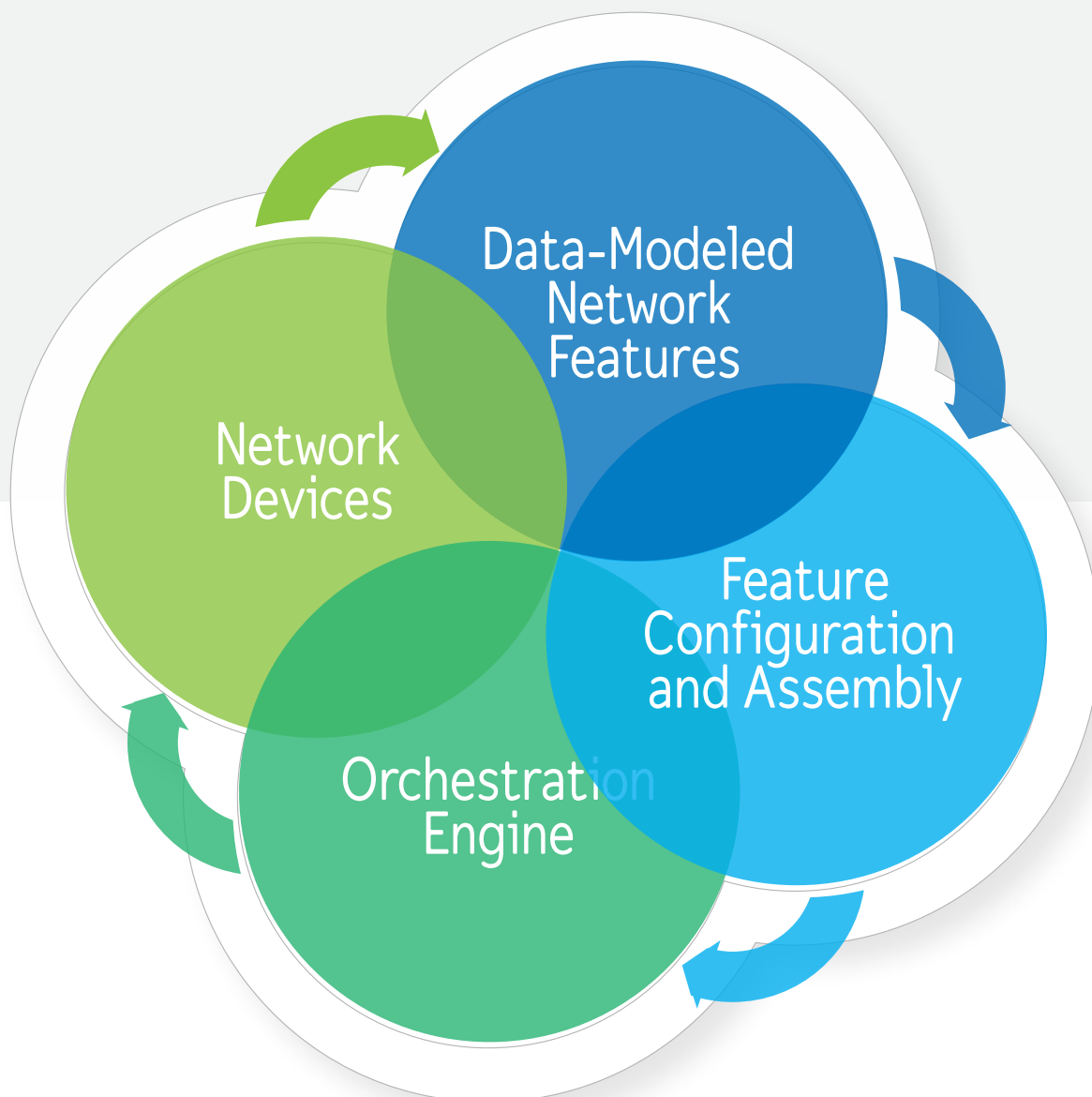
Network Features

Are either pre-built or on-boarded from current customer configurations. These network features are data-modeled and can be expressed as a high level "intent" or a lower-level specific vendor feature configuration depending on the need.

Feature Configuration

Features are configurable for initial deployment and ongoing management. Network features under Gluware management are grouped into an Assembly on which the orchestration engine will consume. Gluware provides a web-based user interface with simplified form-fill based configuration and wizard based guided workflows.

Orchestration Engine

The orchestration engine has been optimized to rapidly onboard new network features and vendors and is highly extensible. The engine has components to discover the current network state (on each node), perform a compare function to the desired state and perform a declarative provisioning to ensure the on-network configuration is in sync with the desired state. The engine dynamically converts the data-modeled network features back to the vendor-specific CLI or API during provisioning.
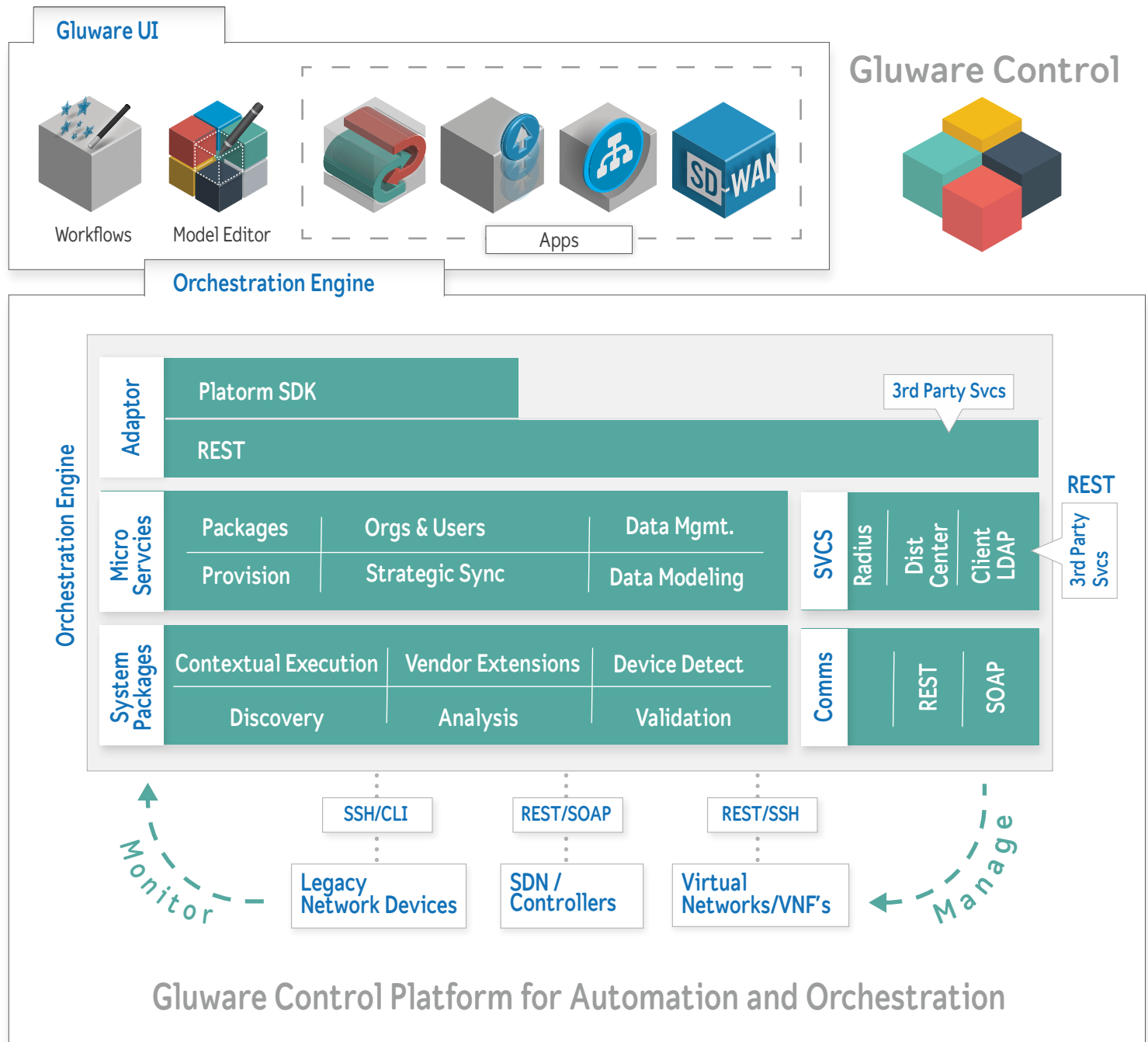
Each vendor onboarded (12 vendors, 16 platforms currently) has a plug-in adapter to "teach" the engine how to use its native CLI/API to communicate for discovery and provisioning activity.
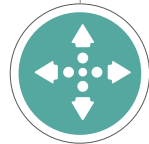
Network Devices

Are physical or virtual routers, switches, firewalls, load-balancers, Wireless LAN Controllers and more

Gluware Software Architecture

Gluware UI

Workflows

Model Editor

Apps

Gluware Control

Orchestration Engine

Adaptor
- Platorm SDK
- REST

3rd Party Svcs

Micro Servcies

Packages	Orgs & Users	Data Mgmt.
Provision	Strategic Sync	Data Modeling

SVCS

Radius	Dist Center	Client LDAP

REST

3rd Party Svcs

System Packages

Contextual Execution	Vendor Extensions	Device Detect
Discovery	Analysis	Validation

Comms

REST	SOAP

Monitor

Manage

SSH/CLI

REST/SOAP

REST/SSH

Legacy Network Devices

SDN / Controllers

Virtual Networks/VNF's

Gluware Control Platform for Automation and Orchestration

Built for IT operations, Gluware Control has a web based user-interface which can be consumed as a Software-as-a-Service (SaaS) from a public cloud or installed on the customer's premises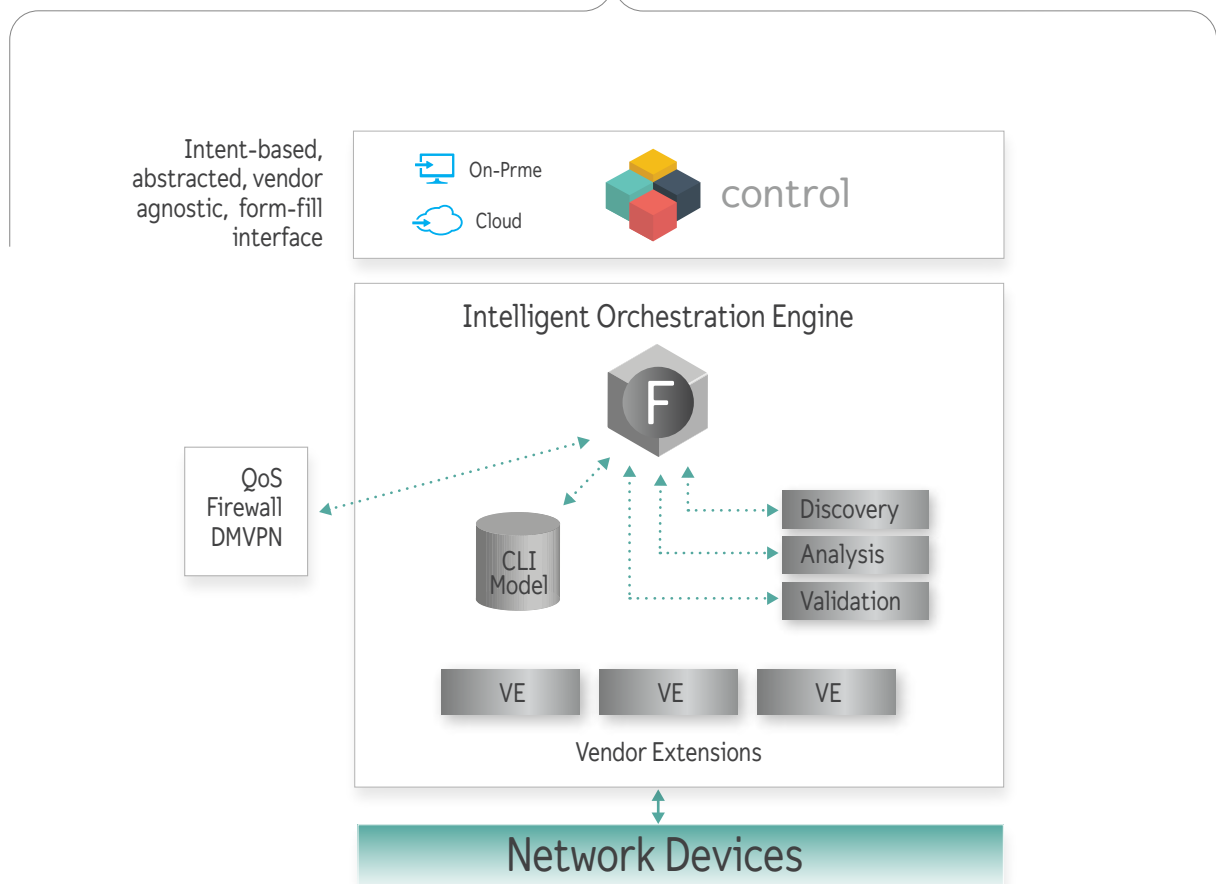. Gluware Control uses RESTful API calls to the Intelligent Orchestration Engine to configure and provision network "features". Users of Gluware Control select a package and then have simplified, abstracted, form-fill based configurations to execute provisioning for network solutions.

Gluware Advanced Modeling

Using Gluware's Model Editor, you can quickly onboard and validate enterprise network features like SD WAN and LAN Switching. When a feature is "onboarded" each of the engine components "learns" about the feature so that it can perform discovery, analysis and validation. The feature is also made up of JSON (JavaScript Object Notation) based data-models to expose as much, or as few, options to IT Operations as required for a configuration. Network features can then be easily configured and provisioned across hundreds or thousands of nodes concurrently.

To handle multi-vendor support, the Gluware engine is populated with Vendor Extensions for each vendor platform supported. These engines provide rules and logic to perform analysis, validation and discovery. The engine can then convert the data-model to the appropriate CLI (and semantic) that each vendor uses as well as read in current state of the features from the network nodes upon discovery. Gluware performs a declarative provisioning to ensure all required configuration is added and non-required configuration is removed aligning the running configuration with the modeled configuration. Gluware advanced modeling provides the flexibility to customize the level of feature abstraction from low level vendor specific up to high-level intent-based networking.

Intent-based, abstracted, vendor agnostic, form-fill interface

On-Prme

Cloud

control

Intelligent Orchestration Engine

F

QoS
Firewall
DMVPN

CLI
Model

Discovery

Analysis

Validation

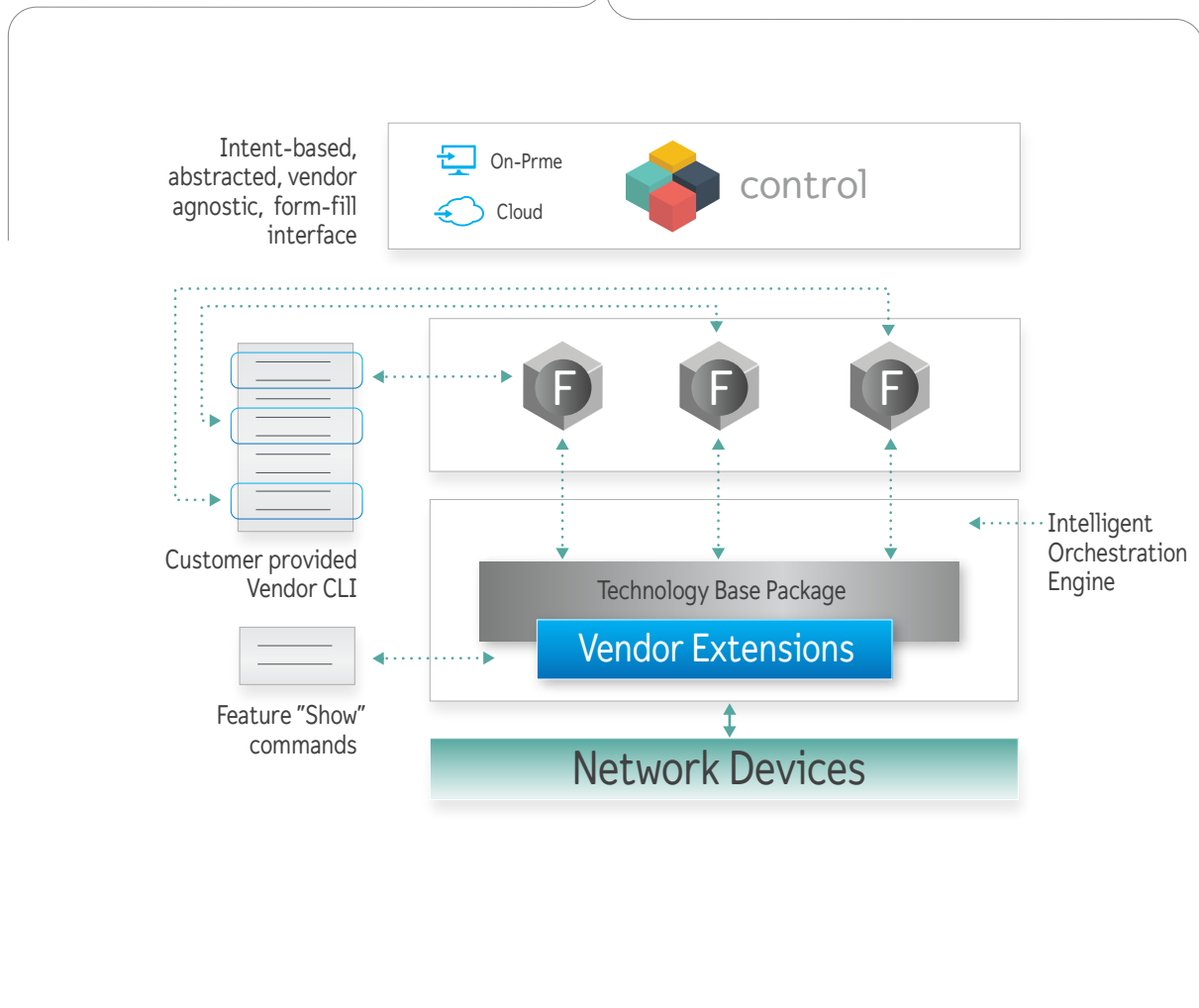VE

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Vendor Extensions

Network Devices

Config Modeling

Gluware Config Modeling, a new capability introduced in Gluware 3.0, enables an extremely rapid onboarding of vendor network features by leveraging the CLI and related "show"commands directly. Customers often already have the CLI for features they want automated, so this method is extremely useful to onboard existing features and leverage the deterministic Gluware Control engine to manage network features across hundreds or thousands of nodes. Config Modeling leverages a Technology Base Package (routing, switching, firewall, load-balancer, WAN optimizer, Wireless controller) and a vendor specific extension (VSE) as
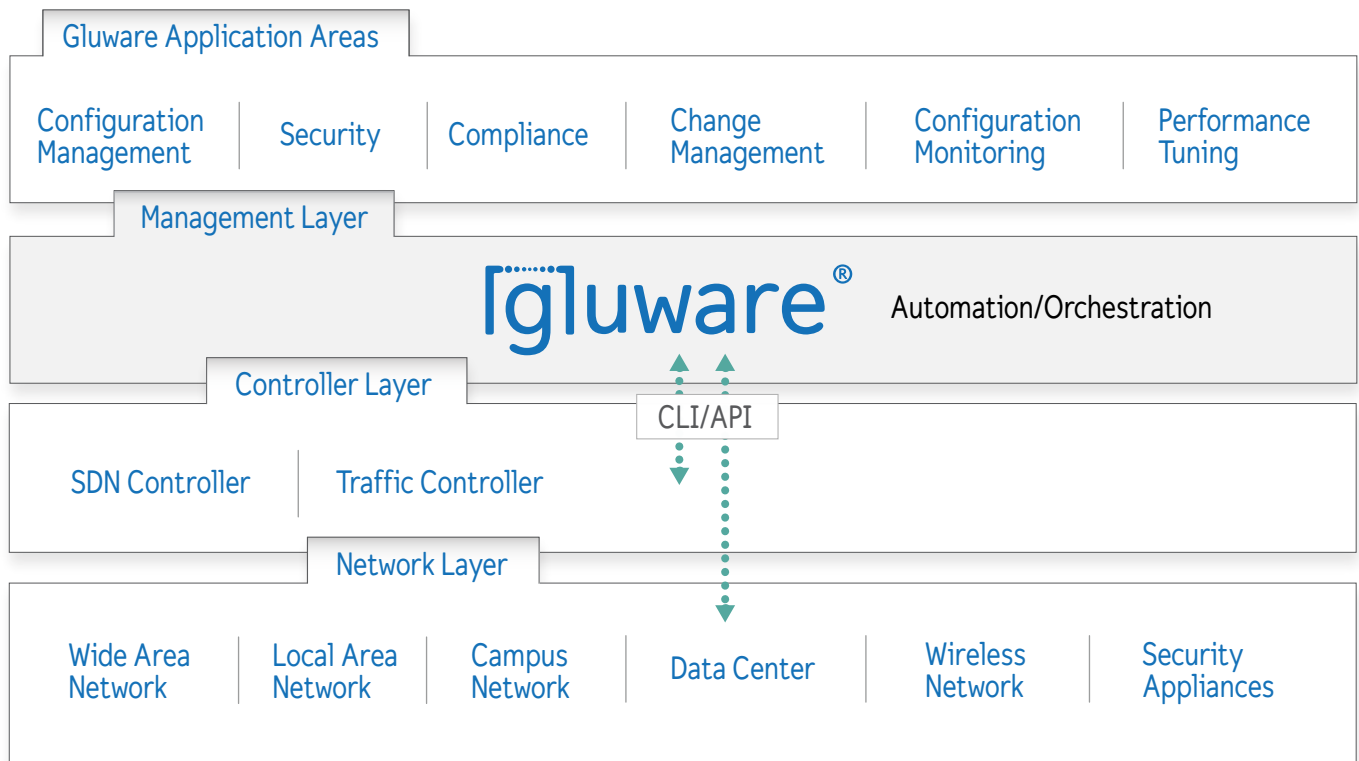
described previously. The customer can choose to expose native/raw CLI in the Gluware user-interface, or it can be data-modeled (using JSON) to create form-fill based user fields for data input for variables that will be changing over time.

Gluware enables customers to automate as many, or as few, network features as they want. If a network feature is not managed by Gluware it will be ignored in the configuration. Often, customers address their pain points first, like QoS, VLAN management, ACLs, SNMP or any network feature that is slowing down operations and affecting the business needs.

Intent-based, abstracted, vendor agnostic, form-fill interface

On-Prme

Cloud

control

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Customer provided Vendor CLI

Feature "Show" commands

Technology Base Package

Vendor Extensions

Intelligent Orchestration Engine

Network Devices

Gluware Application Areas Gluware Taxonomy Gluware is an extremely flexible platform to address many needs in automation and orchestration of the network infrastructure. Some example use-cases include

Gluware Application Areas

| Configuration Management | Security | Compliance | Change Management | Configuration Monitoring | Performance Tuning |

Management Layer

[gluware]®   Automation/Orchestration

Controller Layer

CLI/API

| SDN Controller | Traffic Controller |

Network Layer

| Wide Area Network | Local Area Network | Campus Network | Data Center | Wireless Network | Security Appliances |

Configuration Management

- Router features - Routing, tunneling, SNMP, QoS, AAA, Netflow, NTP, IP addressing, Radius, SYSLOG and many more

- Switch features - VLAN, QoS, SNMP, AAA, NTP and more

- Firewall features - Firewall rule management and more

- Load-balancer features - Servers, service group, virtual servers and more

- WAN Optimizer features - WAN Op rules and more

- Wireless Controller features - APs, VLANs, SSIDs and more

Security

- ACL management across multi-vendor
- Network isolation/lock-down
- User authentication methods (AAA, LDAP)
- Password management
- Public Key Infrastructure (PKI) and key management

Change Management

- Ability to provide automated and secure moves, adds, changes and deletes of the network along with zero-touch provisioning of new devices
- Ability to automate platform or vendor swap when performing upgrades, downgrades or changes in the network Configuration Monitoring

Compliance

- Ability to implement and maintain compliance configuration for various requirements including HIPAA, PCI, SOX and others
- With the Config Drift utility Gluware can audit the network and identify any configuration change which may require approval or documentation for compliance

Configuration Monitoring

- Ability to monitor each network node for unauthorized changes and remediate
- Using Config Drift able to audit and identify changes to network devices (across all vendors)

Performance Tuning

- Ability to simplify the process to change bandwidth or traffic shaping along with QoS parameters across all network nodes to achieve the desired performance, per application

Summary

Gluware Control is an extremely flexible and powerful automation and orchestration platform. Designed to automated your existing network, it can address your current pain points and grow with you to automate more network features and unique vendors over time. With the new Config Modeling capability, Gluware can automate network features rapidly, with virtually no learning curve for a network engineer. With the example use-cases provided, Gluware can enable a quick-win to get something automated and expand into other areas. Gluware provides an immediate ROI becoming a force multiplier for your IT organization with an average of 50:1 or more reduction in time and cost for network changes with 100% accuracy.

Manual

Reactive: Attention required at each node of network to manage and troubleshoot immediate needs.
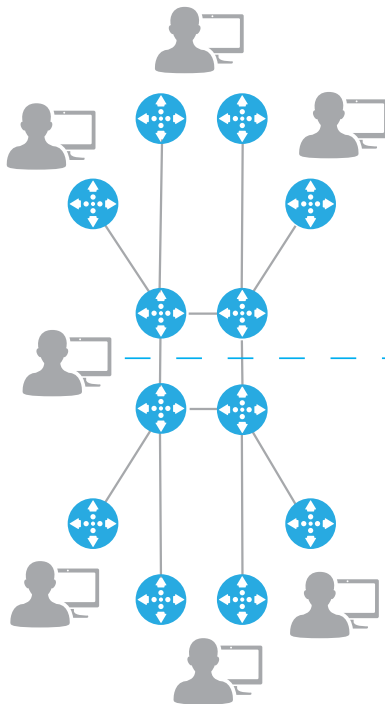
Automated with Gluware

Strategic: Attention can be diverted to other proactive, strategic business activities.