

VeloCloud™ SD-WAN Cloud Gateway Advantages

A look at how Cloud Gateways and AppNeta® monitoring ensure application performance for SaaS and IaaS

IN THIS DOCUMENT

We review the advantages of Gateways to optimize SaaS applications and real-time traffic, through their abilities to protect a branch's last-mile connectivity and aggregate the capacity of WAN circuits.

By using AppNeta to validate the deployment, the following results can be inferred:

- There is little to no user experience impact on SaaS applications such as Microsoft SharePoint or a file download from AWS S3, because VeloCloud SD-WAN provides consistent performance when traffic is served through cloud Gateways.
- In the event that there is packet loss or increased latency on the WAN, even with a single link the Edge can perform packet duplication and overcome the loss.
- When the Edge has more than one WAN link, it can aggregate the WAN throughput and use both links for web applications and other TCP-based traffic.

Similarly, AppNeta provides Global Monitoring Points (GMPs) and Global Monitoring Targets (GMTs) for monitoring purposes to support regionalized performance monitoring that compliments the Gateways. GMTs are AppNeta-maintained, highly available targets available across 30 regions that you can use for validating remote site Internet connectivity 24/7.

Introduction

VeloCloud™ SD-WAN is offered as a hosted solution in which Arista provides and manages VeloCloud Orchestrator and a globally distributed set of cloud-based VeloCloud SD-WAN Gateways as a service. This is the most common enterprise deployment where customers leverage cloud Gateways to optimize their SaaS traffic, such as Microsoft 365, and connect to IaaS platforms, such as AWS. The hosted solution provides all the SD-WAN benefits and leverages the network of cloud Gateways positioned globally to provide the branch VeloCloud Edges an on-ramp to the cloud.

The cloud Gateways have close proximity to SaaS applications. They enable branch Edges to use multiple WAN circuits to establish overlay tunnels to the cloud Gateways and forward SaaS traffic through them. The cloud Gateways provide link aggregation and Dynamic Multipath Optimization (DMPO) for SaaS traffic destined for the Internet. DMPO provides optimizations among Edges and gateways, providing continuous overlay monitoring, dynamic application steering, on-demand remediation, and application-aware overlay QoS.

AppNeta® Network Performance Monitoring

The AppNeta® solution validates and assures the end-to-end network overlay provided by VeloCloud SD-WAN, compares the underlying infrastructures, and adds application performance context. Using a mix of active and passive monitoring methodologies, AppNeta gives customers the end-user perspective of network and app performance. AppNeta TruPath uses a low-overhead packet train dispersion technology to send test traffic continuously over production networks to give real-time insight into end-to-end performance regardless of network ownership. By routing traffic through VeloCloud SD-WAN and separately through the underlay, AppNeta can provide infrastructure correlation, route information, transit ownership through BGP, and detailed root cause analysis for faster mean time to resolution (MTTR).

Points of Presence

VeloCloud SD-WAN incorporates a distributed network of cloud VeloCloud Gateways deployed at top-tier cloud data centers around the world. They include both IaaS points of presence (PoPs) and colocation facilities covering over 30 regions globally, with more than 3000 Gateways deployed. The Gateways are strategically placed near major cloud services and protect access from SD-WAN branches and data centers to cloud and SaaS applications. Cloud Gateways are hosted in locations with a concentration of SaaS and IaaS vendors and provide low-latency handoff to these services, increasing reliability for users consuming those services from the SD-WAN fabric.

The Gateways are offered as a managed cloud service. They serve as the overlay endpoint for VeloCloud Edges and will reliably forward cloud-bound user traffic. Although proximity to branches is secondary, the Gateway PoPs are typically less than 25 ms from last-mile ISPs. They enable Edges to aggregate the capacity of multiple links and maximize the effect of DMPO by protecting traffic from a branch all the way to the doorstep of SaaS and IaaS vendors.

Advantages of Cloud Gateways Beyond Performance

Besides the ability to protect cloud applications from the SD-WAN fabric, the globally distributed pool of cloud Gateways delivers several other advantages including architectural availability, ease of deployment, and a flexible yet scalable solution to deliver cloud services. Some of the additional capabilities and benefits, beyond performance, that the Gateways provide are shown in the following figure.



Figure 1: Cloud Gateway Capabilities and Benefits

HOW EDGES ARE ASSIGNED CLOUD GATEWAYS

Given that SaaS and other business-critical Internet traffic traverses the cloud VeloCloud Gateways from the VeloCloud SD-WAN branch, the cloud Gateways must be optimally assigned to the VeloCloud Edges to minimize the latency from the branches' Internet circuits to the cloud Gateways. When an Edge is provisioned and activated, it goes through the following sequence to be assigned primary and secondary cloud Gateways for forwarding cloud traffic:

1. Upon provisioning the Edge, the geolocation of the branch can be configured on the VeloCloud Orchestrator dashboard.
2. If the address is not configured, the Orchestrator will attempt to geolocate the Edge based on the Edge's public IP address.
3. Based on the Edge's geographical location, the Orchestrator assigns the closest cloud Gateway to the Edge as the primary Gateway and the second closest cloud Gateway as the secondary Gateway. The Edge uses the primary Gateway to forward and optimize SaaS traffic. In addition, two other Gateways elected for the enterprise are assigned to the Edge for route propagation and other control plane functions.
4. The Edge receives the cloud Gateway's information from the Orchestrator and establishes overlay tunnels to the four cloud Gateways.

Testing Topology and Methodology

Figure 2 provides an example deployment, where AppNeta Monitoring Points is used to generate synthetic network and application traffic to measure and compare the performance of user applications with SD-WAN and without SD-WAN. The Monitoring Points would be provisioned as virtual machines or containers and therefore observe the same underlying network connectivity to SaaS applications. The goal of using AppNeta in this context is to identify the end-to-end underlay performance, to provide root cause analysis for faster MTTR, and to validate web/API application performance.

AppNeta Monitoring Points and Testing

AppNeta Monitoring Points can provide a performance baseline by routing test traffic directly through any available underlay networks directly through the firewall. Additional testing from the same source can be sent through VeloCloud SD-WAN, which would choose the overlay and route the traffic through the VeloCloud Gateways necessary for the traffic to reach the intended app or destination. If and when degradation occurs and the VeloCloud SD-WAN overlay reroutes traffic, the underlay network performance can be compared to the performance of the overlay routing decision.

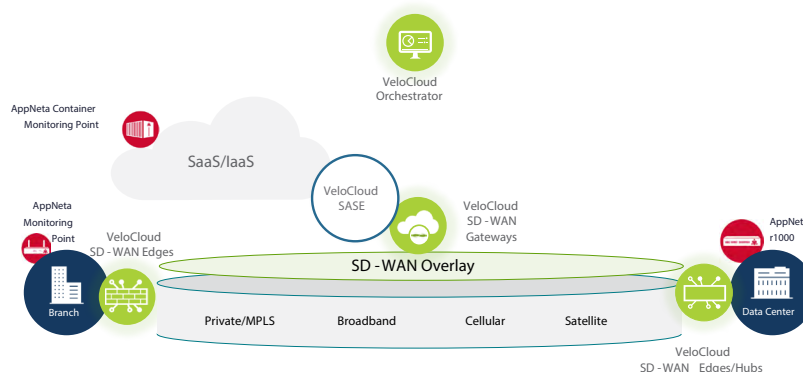


Figure 2: Testing Methodology: Monitoring Points for a VeloCloud SD-WAN Deployment

AppNeta is a SaaS platform that offers a variety of vantage points for enterprise network monitoring and application performance measurements. AppNeta offers the ability to deploy behind the firewall for the end-user perspective as well as target globally distributed PoPs for bidirectional views of network and application performance. The Monitoring Points, which include the hardware, container, virtual machine, and native deployment, can be pointed at business-critical applications to test availability, network performance, and application response. The testing can be used to monitor DNS resolution, browser response characteristics, detailed aspects of network routing and connectivity, and VoIP connection quality. Data collected over time by the AppNeta Monitoring Points are reported to a dashboard for visibility, monitoring, and alerting.

To monitor a VeloCloud deployment, Monitoring Points would be deployed in a network as shown in Figure 2 to represent vantage points from different scenarios.

The Monitoring Points can be configured to target SaaS applications or existing AppNeta Monitoring Points, including Global Monitoring Points and Targets, to collect network and application performance metrics. The Monitoring Points can be configured to target the same resources, but be routed over the underlay and the overlay to compare the Monitoring Points performance with and without SD-WAN in the path. Network, web, and voice visibility via multiple metrics are often the primary focus of enterprises seeking insight to understand how VeloCloud SD-WAN benefits user experience in production scenarios.

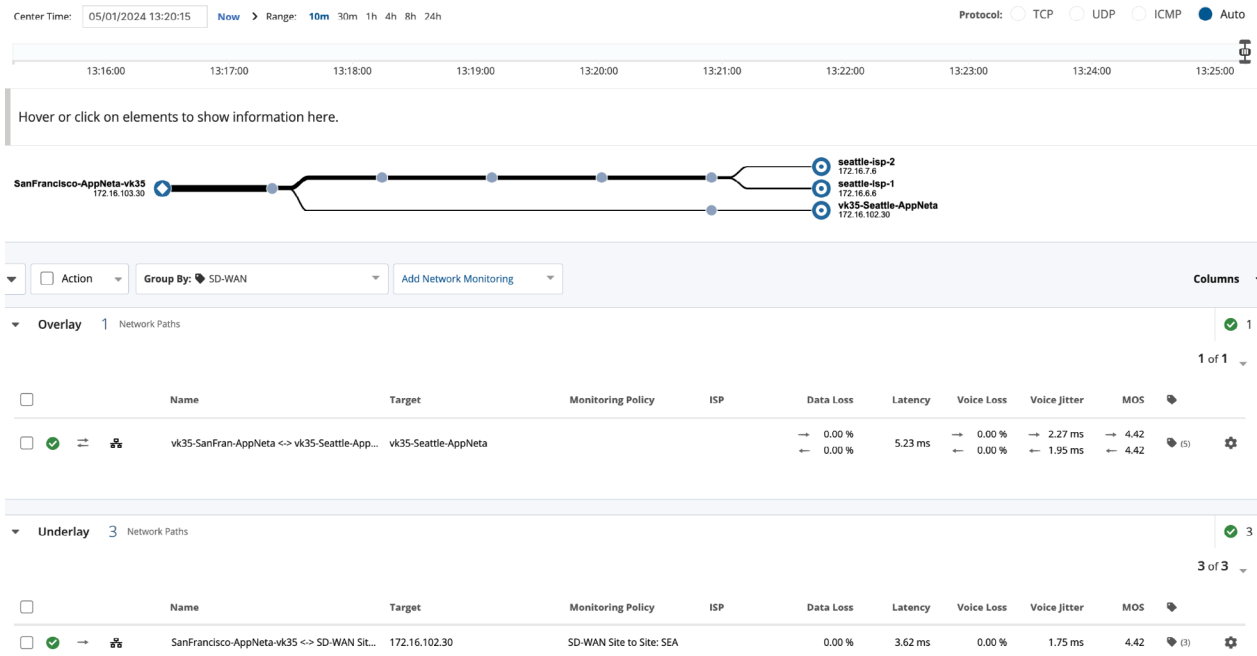


Figure 3: Route Comparison: Dual ISP Underlays and the SD-WAN Overlay with Metric Details Available for Drill-Down

Testing Topology and Methodology

In conclusion, this document explains the advantages of VeloCloud Gateways in optimizing SaaS applications and real-time traffic through their abilities to protect a branch's last-mile connectivity and aggregate the capacity of WAN circuits. The cloud Gateways offer consistent performance with an on-ramp to the cloud and enable SD-WAN branches to apply DMPO to remediate WAN degradations for both real-time and TCP-based applications.

VeloCloud SD-WAN mitigates WAN challenges with unique application-aware DMPO technologies and a globally distributed set of cloud Gateways to ensure consistent performance and an outstanding user experience for business-critical applications such as Microsoft 365 and public cloud services. The unique ability of DMPO to protect a branch's last mile connectivity and the solution's advanced cloud infrastructure enables organizations to gain simple-to-deploy, secure, high-performing WAN connectivity from branches to the cloud.

The AppNeta solution adds validation of VeloCloud SD-WAN deployments via network and application performance monitoring. The insight into the network underlay and application performance context allows network operations teams to isolate issues faster and prove the value of Arista technologies. Additionally, by baselining performance with AppNeta before changes, validating the underlay and overlay performance in production, and continuously monitoring from the end-user perspective, AppNeta can help prove to internal and external stakeholders of the advantages of VeloCloud Gateways.

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