# Starlink and Versa: Pioneering Global Digital Connectivity through Advanced Satellite Networks and Optimized SD-WAN Solutions

Satellite networks have emerged as pivotal infrastructure in today's age of pervasive, any-to-any connectivity, especially for areas underserved by traditional broadband. They promise global coverage, bridging digital divides that persist in remote and challenging terrains. Starlink, an ambitious venture by SpaceX, stands out in this domain by offering not just widespread coverage but also high-speed internet rivaling urban broadband connections. Its rapidly growing constellation of low-Earth orbit satellites ensures reduced latency and increased bandwidth, characteristics previously unattainable in satellite internet. Such advancements by Starlink mean that for the first time, businesses in even the most secluded areas can access reliable and fast internet.

Paired with Starlink, Versa offers businesses the tools to optimize, secure, and provide visibility across satellite connections. Its robust security features further ensure that the data traversing via satellite remains protected from potential threats. The combination of Starlink's revolutionary satellite connectivity with Versa's state-of-the-art SD-WAN solution presents a new era of global digital connectivity.
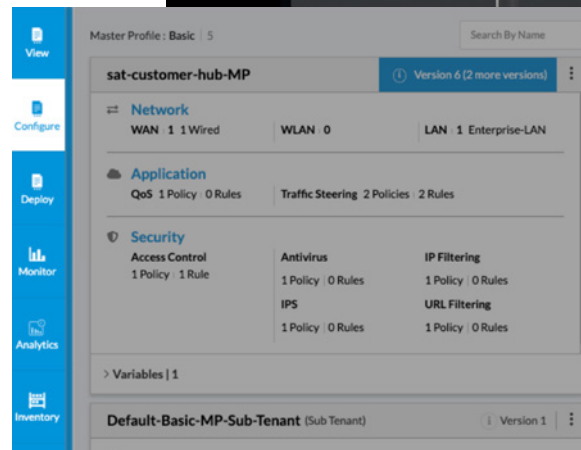
Key Use Cases

Maritime and Aviation

Satellite links are essential for long-range and mobile deployments like maritime and aviation since these vehicles move beyond the range of terrestrial radio technologies and require multiple communication networks. Large vessels, such as ships, necessitate distinct VPNs for varied purposes, and an ideal system should automatically select the optimal network path based on the vehicle's location.

Remote and Tactical

Despite the seeming ubiquity of the Internet, regions like remote islands, oil rigs, and many developing nations still lack access to standard connectivity methods due to low population density or challenging terrains. These areas, while relying on satellite networks, can greatly benefit from features like intelligent traffic steering and TCP optimization when utilizing multiple private networks over shared transport links.

Cellular Backhaul

Mobile networks require operators to install cells near users for effective wireless signals, but in remote locations lacking conventional connectivity, satellite links are used to connect cell sites. For cellular backhaul, multitenancy is crucial, necessitating a solution that swiftly and reliably establishes both L2VPNs and L3VPNs while isolating traffic from different mobile providers.

Key Features

Analytics and Monitoring
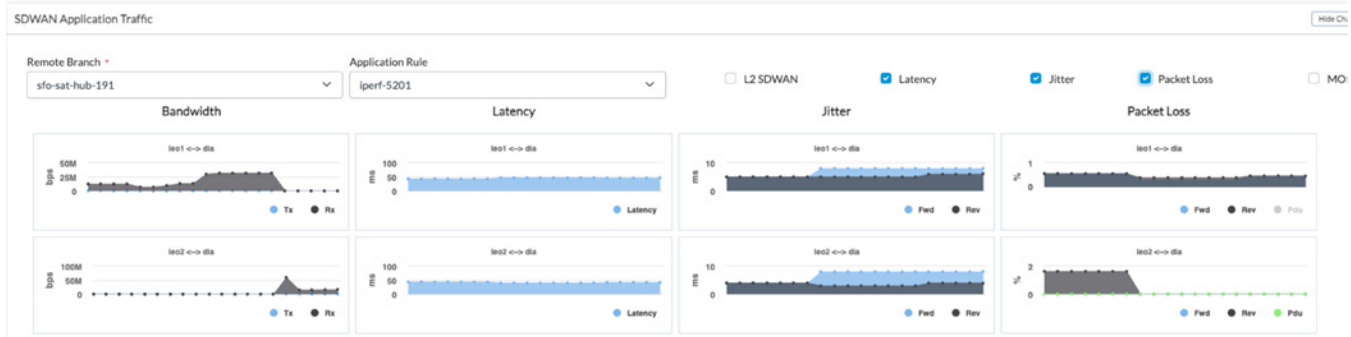
The system measures the attributes of SD-WAN traffic paths and can implement policies based on factors like jitter, latency, and packet loss to determine the optimal path for specific traffic. In hybrid environments, especially where fiber and satellite networks coexist, Starlink connections can be monitored to ensure automatic switching between transport networks for consistent connectivity.

Link Bonding in Hybrid Satellite Environments

Bond several satellite links, using Starlink connections in conjunction with MEO and GEO connections as backup, directing traffic based on sensitivity to latency and prioritizing critical applications during outages. Combine unidirectional traffic paths for bidirectional service, intelligently route specific applications, and load balance sessions across satellite links, ensuring efficient bandwidth utilization in various scenarios.
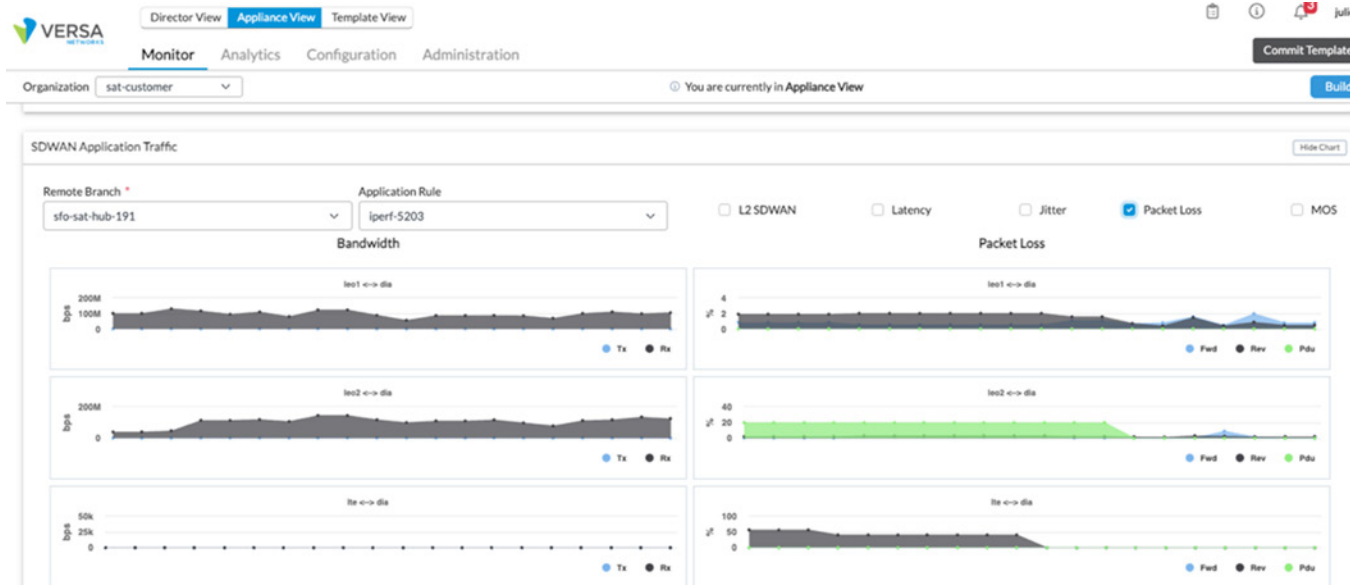
Forward Error Correction and Packet Replication
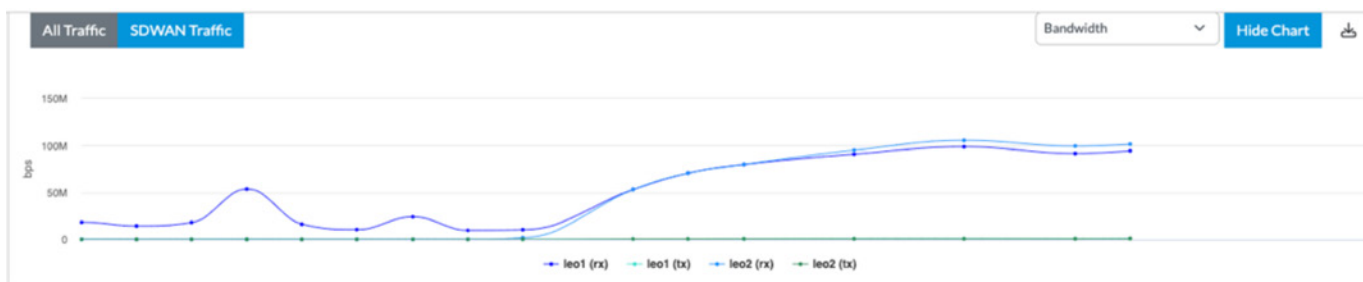
Forward error correction (FEC) and packet replication removes the need to re-transmit traffic that either has an error or has been dropped. It improves the end user's quality of experience, notably for sensitive applications that include voice traffic, collaboration tools and other mission-critical traffic. This capability has demonstrated the ability to improve performance by over threefold. Enterprises can apply FEC or packet replication to different flows using Versa's granular SD WAN rules (e.g. source, destination, applications).

Tunnel-less SD-WAN

By utilizing a tunnel-less SD-WAN approach, Versa Networks provides a solution that maximizes network throughput and efficiency. This method eliminates the overhead associated with traditional tunneling protocols, resulting in better overall network performance, often referred to as "More GoodPut."

Class of Service

Versa Networks offers advanced Class of Service (CoS) capabilities designed to optimize satellite network performance. These features ensure that critical applications receive the necessary bandwidth and priority, providing a seamless and efficient network experience.

- **Application Quality of Service (App-QoS) Capabilities:** Versa supports App-QoS to guarantee that essential applications operate smoothly and efficiently.
- **Hierarchical Class of Service (CoS):** With hierarchical CoS, Versa can prioritize network traffic based on various criteria, ensuring that the most important data is transmitted promptly.
- **Bandwidth Signaling Across the Network:** Versa employs sophisticated bandwidth signaling techniques to manage and allocate network resources effectively.
- **Granular CoS Implementation:** Versa offers granular CoS, allowing for detailed control and visibility over network traffic, tailored to individual devices, customers, or circuits.

WAN Optimization

Versa Networks' WAN optimization features are specifically designed to enhance the performance of satellite networks. These optimizations address common satellite network challenges such as latency and congestion, ensuring a smoother and more reliable network experience.

- **Native TCP Optimization:** Versa integrates advanced TCP optimization techniques like Hybla, BBR, Cubic, and New Reno to improve data transmission over satellite links.
- **Buffering and Congestion Control:** By implementing effective buffering and congestion control mechanisms, Versa helps maintain optimal network performance.
- **Split Connections to Overcome Latency Issues:** Versa's ability to split connections addresses the high latency often encountered in satellite networks, enhancing overall performance.
- **Integration with Specialized 3rd Party VNFs:** Versa supports advanced WAN optimization through the integration of specialized third-party Virtual Network Functions (VNFs) using Universal Customer Premises Equipment (uCPE), providing a highly flexible and efficient network solution.

Automation

Use Versa's REST API infrastructure to automatically adjust Satellite bandwidth based on telemetry, which is crucial due to bandwidth variations with mobile deployments' location or weather conditions. Additionally, using GPS to update the SD-WAN device's location to modify link or hub priorities.

Security

Integrate security features like Next Generation Firewall and Intrusion Prevention, optimizing power and space while simplifying logistics compared to using separate devices. Versa hardware can be introduced as a unified SD-WAN and security solution in new deployments or to replace existing security devices in ongoing implementations.

SLA Monitoring

Versa Networks' SLA Monitoring features are designed to optimize bandwidth consumption for Service Level Agreement (SLA) traffic, ultimately reducing operational costs. These capabilities ensure that network resources are used efficiently, aligning with predefined SLAs.

- **Adaptive SLA:** Versa's adaptive SLA capabilities adjust dynamically to reduce usage bills by optimizing bandwidth allocation based on real-time network conditions.
- **Path Policy Driven SLA Monitoring:** This feature enables SLA monitoring based on specific path policies, ensuring efficient resource use and cost reduction.
- **Data-Driven SLA Monitoring:** By leveraging data analytics, Versa's data-driven SLA monitoring optimizes network performance and minimizes usage costs.

Traffic Engineering

Versa Networks employs advanced traffic engineering techniques to manage network traffic efficiently and maintain high performance. These methods ensure that data flows smoothly across the network, meeting service quality standards.

- **End to End SLA Monitoring:** Comprehensive monitoring of SLAs from one end of the network to the other ensures consistent service quality and performance.
- **Header Compression:** This technique reduces the size of data headers, increasing the efficiency of data transmission.
- **Traffic Conditioning (FEC, Packet Replication):** Versa uses techniques like Forward Error Correction (FEC) and packet replication to enhance data reliability and reduce transmission errors.
- **SaaS Monitoring:** Monitoring Software as a Service (SaaS) applications ensures they perform optimally over the network.
- **Best Gateway Selection:** Versa intelligently selects the best gateway for data transmission, optimizing network performance.
- **Applications:** Advanced traffic engineering supports various applications, ensuring they operate efficiently and meet performance standards.

Core Anchoring

Versa Networks enhances the quality of voice and video services through core anchoring. This feature ensures that critical communication services maintain high quality, providing a reliable user experience.