



# **SD-WAN** *Virtual Overlays Over any Uplink*

WITH THE REVENUE EXTRACTION GATEWAY

There was a time, not so long ago, that enterprises with multiple locations had an expensive and daunting challenge in order to provide a unified network across all of their sites - such networks required physical copper cables connected to each location. As telecommunications companies invested in their physical infrastructure, enterprises happily moved away from owned copper to a telco provided service model. Further innovation by these large service providers enabled them to more efficiently run multiple virtual circuit overlays on top of their hub-and-spoke architecture of physical underlays to provide WAN connectivity to more and more data hungry institutions. As the world economy became more reliant on this data foundation, those who owned the copper held the majority of the power - and the profit.

With the development and growth of the global public internet, however, this data connectivity model was completely upended. The internet democratized data, allowing individuals, institutions, and enterprises to move data between any locations anywhere in the world with a simple IP connection. Competition drove innovation, and innovation drove rapid adoption. Competitive markets drove direct internet access (DIA) prices down significantly, and the public internet became the ultimate underlay infrastructure to deliver private multi-site enterprise wide area networks at a much more economical cost.

With the internet as the underlay infrastructure, network operators simply need to setup virtual circuits to connect geographically distributed locations. With a small number of sites, this configuration can certainly be handled manually, creating IP tunnels between sites. Connecting more than a few locations, however, introduces cost and complexity that requires intelligent automation for configuration, management and troubleshooting.

The rXg provides the intelligence necessary to automate the creation and management of software-defined wide area networks without adding any complexity to network operations. The rXg is a multi-services edge gateway that performs myriad critical network functions in a single, unified platform. It's effectively a resource multiplier, enabling network engineers to automate critical network operations - such as configuring complex SD-WAN infrastructure - all through a single management interface, with no additional hardware, software or personnel resources.



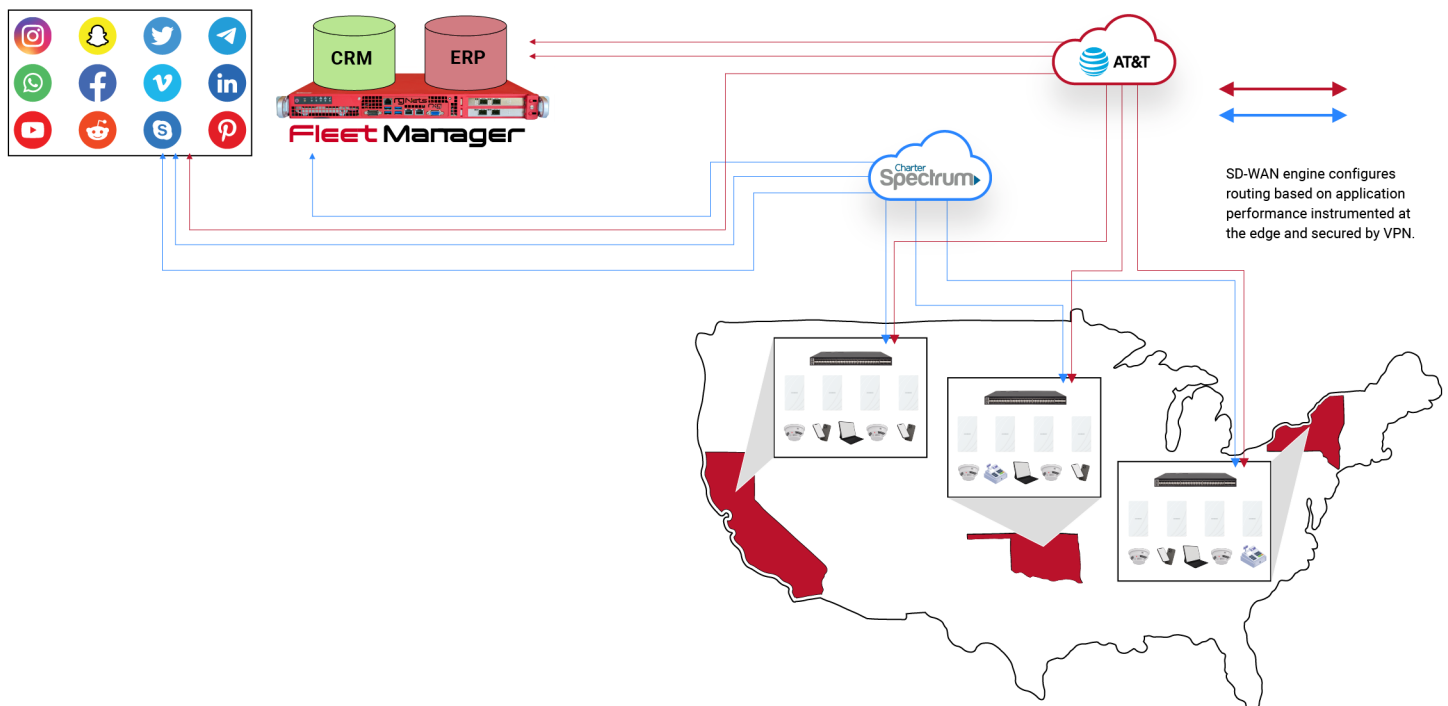


Uplink failover, aggregation, policy-based routing, carrier diversity and VPN are just a few of the critical features that can be performed with a few clicks in the rXg interface. And utilizing the multi-site automated configuration and deployment features in the centralized Fleet Manager tool, network operators can efficiently create configurations once and deploy to an unlimited number of geographically distributed rXgs to create high-performance, secure and reliable SD-WAN connections in minutes. What used to take many days and significant resources can now be done by an individual with a few keystrokes.

Here are three common use cases of this unique combination of technologies:

## DISTRIBUTED REVERSE CONNECTIVITY

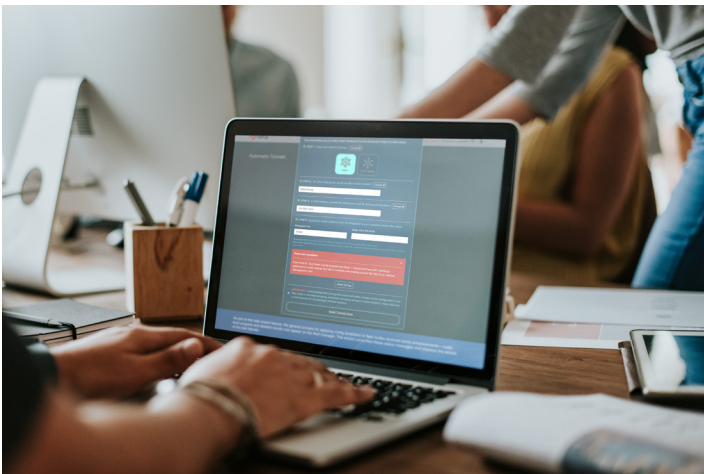
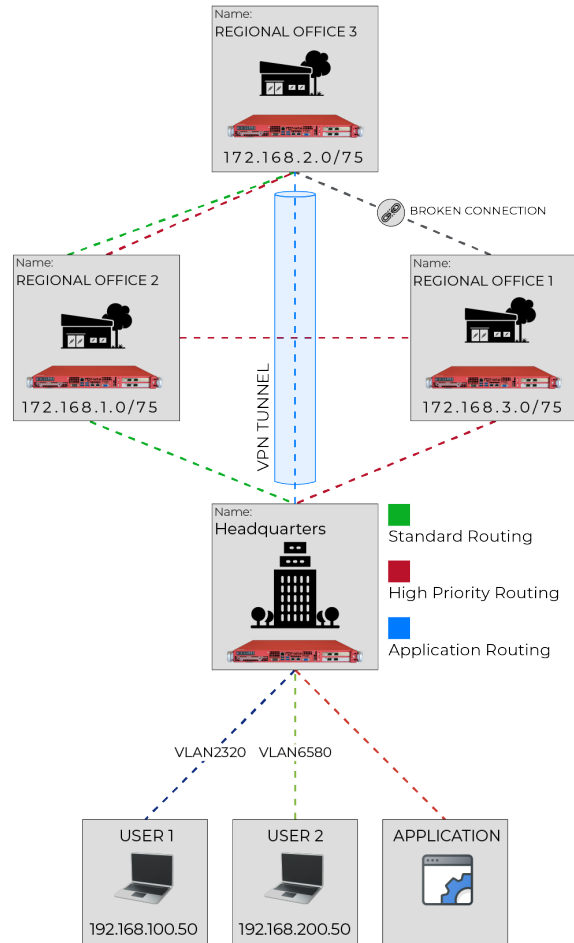
- One of the most common problems that plague distributed enterprise networks is the difficulty in obtaining remote access to LAN side devices. The ubiquitous deployment of NAT with DIA uplinks means that either the border gateways need to act as inbound proxies or VPNs must be established between the gateways and a central site.



- The Fleet Manager can automatically configure VPNs between itself and some or all rXgs in a multi-site network. The rXg supports OpenVPN, WireGuard and IPsec. Both OpenVPN and WireGuard simply and efficiently create tunnels that allow inbound traffic from the Fleet Manager even when NAT is present. As a result, network operators can deploy rXgs across the disparate sites, and each will automatically retrieve their pre-established configurations from the Fleet Manager, automatically establishing secure data tunnels and allowing network engineers to remotely gain access to LAN-connected devices. This instant WAN connectivity is accomplished without any resource intervention at the remote sites and can be fully deployed and managed by a centralized NOC staff.

## AUTOMATED FULL MESH CONNECTIVITY

- Traditionally, configuring virtual circuits that form a full mesh between many sites is unwieldy and inefficient, requiring coordinated resources at each site to provision and deploy assets required to complete the circuit. Troubleshooting, changes, additions - any modifications require intervention at each site.
- The RG Nets Fleet Manager eliminates the need for remote site manual interventions, and automatically distributes the most recent VPN configurations - in real time - to the entire network of rXGs. This enables virtual circuits to be established between any two nodes in a fully automated fashion with no intervention by any staff. If the IP configuration of a remote site changes, the Fleet Manager will automatically redistribute the updated configuration to all sites, and the mesh will seamlessly reconverge.



## DYNAMIC POLICY-BASED ROUTING

- An individual rXg can deliver link aggregation and failover, as well as application affinity and carrier diversity, to an unlimited number of physical uplinks. The Fleet Manager provides automation to build an unlimited number of virtual circuits between locations, services and individual rXGs on the global network. Network operators can configure and automate the deployment of rules that allow routing decisions based on criteria beyond the IP address providing greater flexibility and control over network traffic, optimizing the network for specific requirements or policies.

- For example, operators can assign specific applications to virtual circuits that are built on physical uplinks selected based on real-time performance telemetry. In this example, jitter can be continuously measured to ensure that a virtual circuit to which RTMP streams are affined is always built on the uplink which has the most stable connection to the video concentrator. The sophisticated edge capabilities of the rXg and the centralized control plane capabilities of the Fleet Manager provides automation to simplify the most complicated virtual circuit architectures imaginable.

## Conclusion

The sophisticated intelligent edge capabilities of the multi-services RG Nets Gateway provides the dynamic path selection and application awareness necessary to establish a secure, high-performance virtual overlay for distributed enterprise networks; coupled with the centralized management and advanced automation of the Fleet Manager, network operators can quickly and easily create a robust multi-site SD-WAN infrastructure without expending valuable human resources or deploying costly stand-alone hardware and software solutions.



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