Software Defined Networking

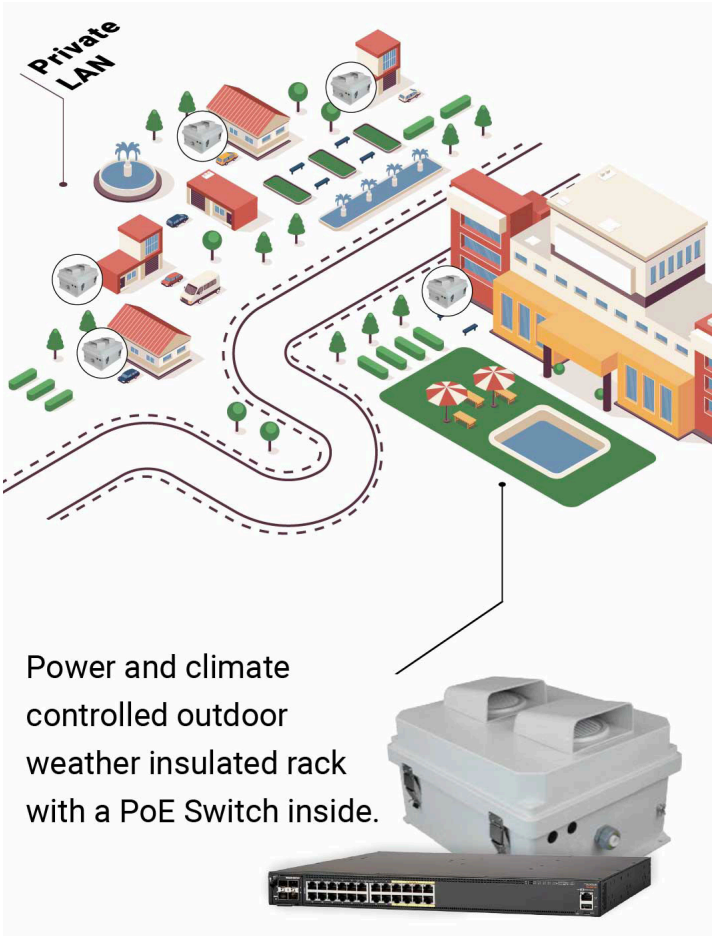
SD-LAN and SD-WAN for enterprise

WITH THE REVENUE EXTRACTION GATEWAY

rgNets

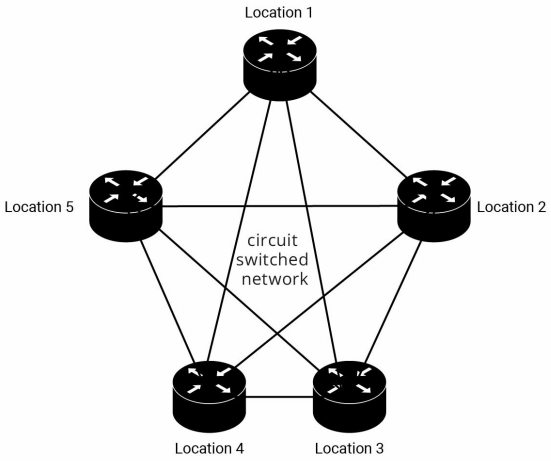
Distributed enterprises face unique challenges in establishing secure and reliable connectivity. Whether managing myriad branch offices, retail locations, or a remote workforce, the responsibility of managing the network across multiple sites often falls on a single IT department or professional. The goal is clear: maintain consistent network policies across the set of all end-users, and facilitate secure and reliable connections between sites, all of which should be configured, managed, and instrumented from a single place. For example, a retail chain may need to link the point-of-sale system at hundreds of stores to a central inventory system while simultaneously providing remote workers secure access to internal resources that are local to each site. Repeatedly achieving this connectivity in a cost efficient, reliable, and secure manner is a grand challenge.

In the past, enterprises relied on leased lines to provide them with dedicated, high-quality wide area network (WAN) connections, but these are expensive and lack flexibility. Multiprotocol Label Switching (MPLS) improved network traffic management and efficiency, but was still costly and posed its own management challenges.



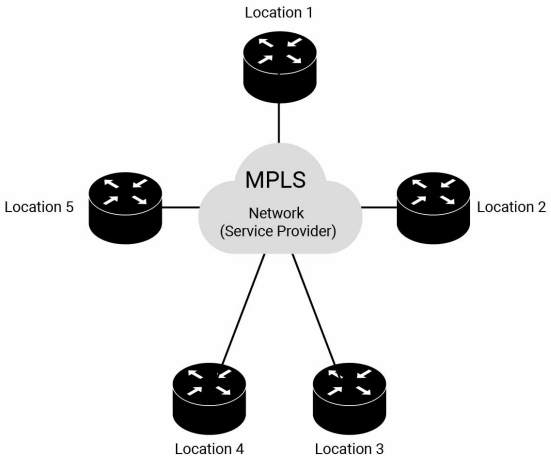
Power and climate controlled outdoor weather insulated rack with a PoE Switch inside.

Private network
(with leased lines)



Point to point leased line architecture to connect five locations.

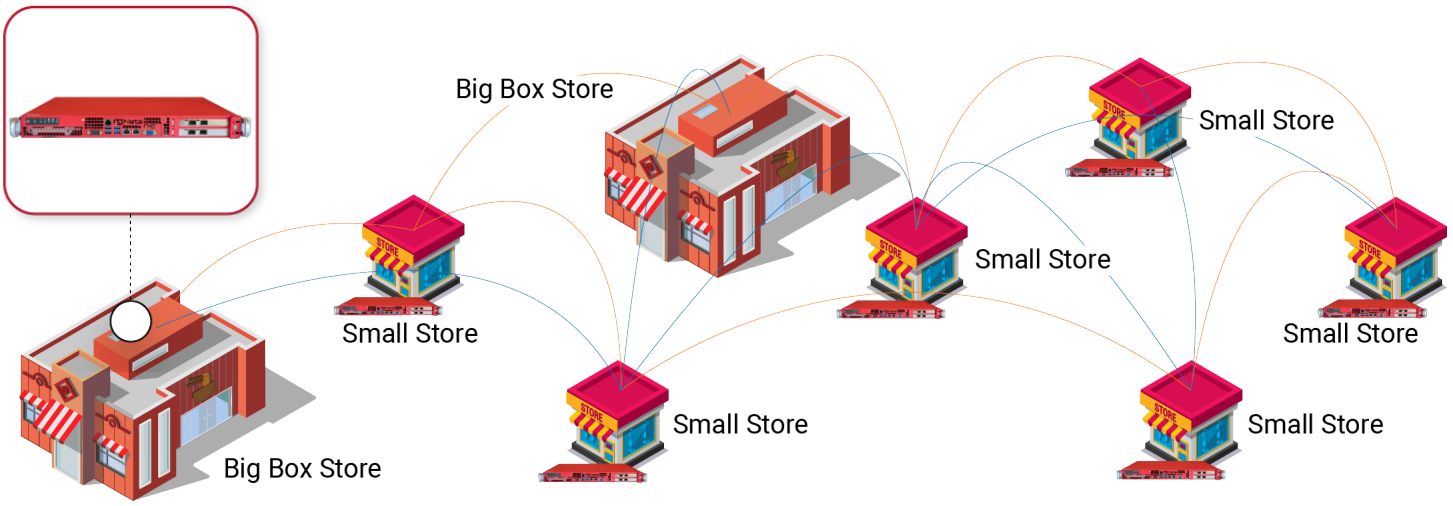
Private network
(with MPLS)

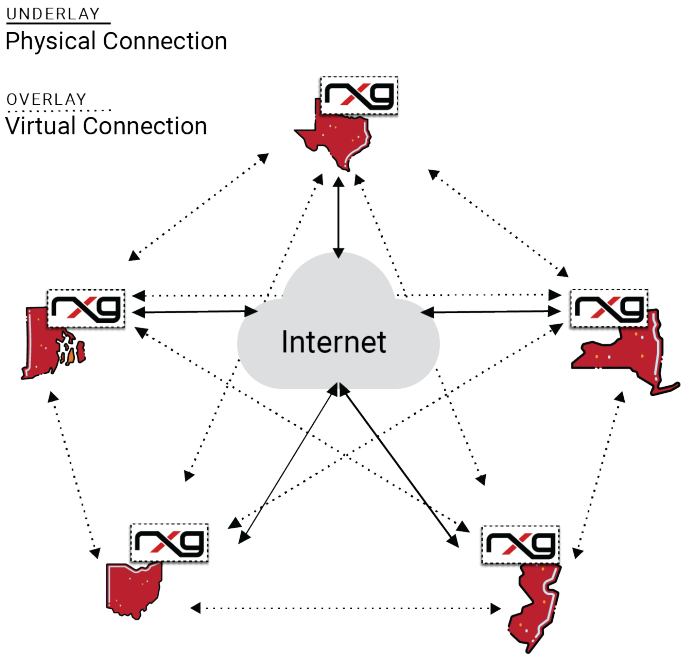


MPLS VPN Network architecture to connect five locations.

Similarly, high performance and feature-rich local area networking (LAN) technology is also extremely expensive and incredibly difficult to manage and maintain. Software-Defined Networking (SDN) has transformed the landscape, enabling cost-effective, flexible and rapid deployment.

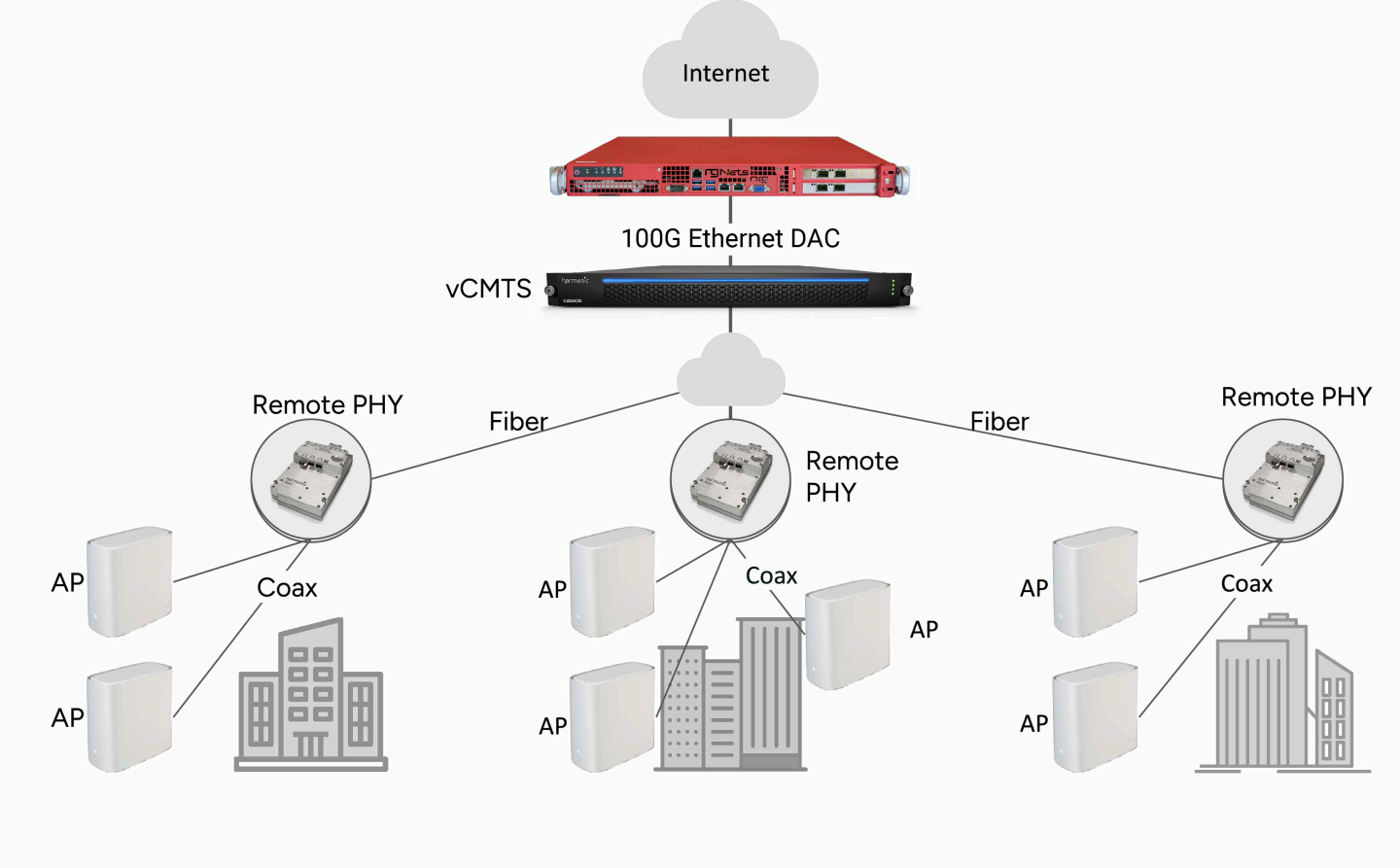
SDN is defined as the use of an overlay network leveraging tunneling protocols on top of one or more physical connections. On the WAN, tunneling over one or more Dedicated Internet Access (DIA) uplinks is how we describe Software-Defined Wide Area Networking (SD-WAN). On the LAN, tunneling through a variety of infrastructures with bare bones L3 connectivity in order to deliver numerous micro segmented, L2 stretched, virtual service networks, is how we describe Software-Defined Local Area Networking (SD-LAN). In the simplest case, the goal is to have global enforcement of total control, clear communication, and complete cognizance, regardless of physical location, even in the face of a changing physical network topology. SD-WAN and SD-LAN are two software-defined networking patterns that can achieve this goal. The rXg provides robust support for both SD-WAN and SD-LAN deployments.





In the SD-WAN pattern, edge gateways deployed at each remote site are physically connected to one or more DIA uplinks. A central control plane management system establishes a software-defined overlay mesh data plane, allowing for traffic to be efficiently and reliably routed between sites and enabling failover mechanisms for DIA uplinks. Application performance is measured across each DIA uplink, and traffic affined to the most performant link on a per-application basis. The rXg SD-WAN solution is cost-effective, resilient, and agile. Public Internet-bound access is efficiently routed as local break-out at the network's edge, maximizing performance and minimizing cost. Policy enforcement is fully distributed, while control is centralized in the Fleet Manager, ensuring high performance as well as cost-effective, consistent application of rules across the network, irrespective of location.

In the SD-LAN pattern, access equipment and remote end-users initiate tunnels to a single site, establishing a software-defined data plane for centralized forwarding. This approach can be implemented with the router and default gateway for access equipment serving as the physical layer Network Interface Devices (NIDs). Alternatively this approach can be implemented in software on the end-user equipment. In either case, split routing of traffic may be enabled or disabled as the operator desires.



Furthermore, the rXg supports a variety of access equipment options, regardless of tunneling capabilities. This flexible, vendor-neutral approach to the management plane enables sites to make the most cost-effective locally-available choices of equipment and uplinks. One site may use switches from manufacturer X and wireless access points from manufacturer Y, while another site may use switches from manufacturer Z with wireless access points from manufacturer X. When deployed with service providers we often see the rXg SD-LAN overlays leveraging non-Ethernet technologies such as DOCSIS, PON, and DSL. The rXg and Fleet Manager construct the network overlay while simultaneously providing a single management plane across disparate locations, unifying the entire network regardless of how the physical layer underlay is delivered.

The integrated control plane facilities of the rXg make it an ideal hub for managing this kind of software-defined network. The built-in policy enforcement engine, alongside seamless virtual machine and container service chaining, consolidate the network policy requirements into a cost-efficient, agile, and fully-automated solution. Enterprises can leverage the rXg's strong emphasis on vendor neutrality here as well, deploying different vendors across locations while enjoying the advantages of a seamlessly integrated automated management plane.

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