



9 Best Practices for Delivering Managed Services Successfully

Critical Capabilities to Deliver for Delivering Performance, Security, and Customer Experience

(With a Scalable Pricing Model that Makes you More Money)

A Must-Read for CSPs, MSPs and ISPs



Dropped or degraded connections to cloud-based applications damage your brand and recurring revenue.

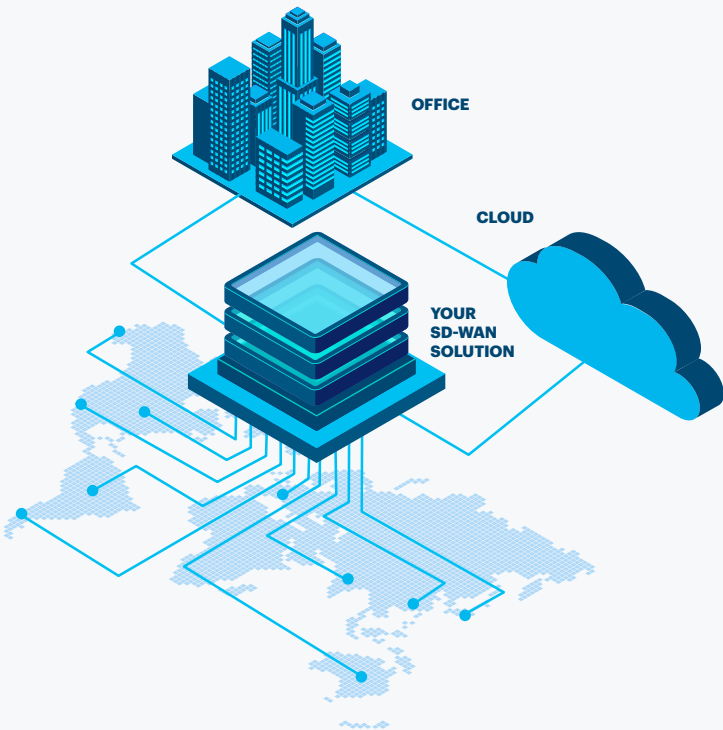
As a Service Provider, you deliver applications that are critical to your customers' operations. And when they can't reach those applications, they want answers.



Regardless of who supplies your clients' internet connection, you'll have to diagnose the source of dropped sessions, or poor performance, when connectivity issues arise. Spikes in latency or packet loss create a poor experience for end users relying on your hosted applications, remote desktop sessions, or hosted telephony solutions. Involving 3rd party connectivity providers in diagnosing the root cause of customer issues can be time-consuming and a source of customer dissatisfaction.

This problem is compounded when your clients operate across multiple geographies. Involving multiple connectivity providers in troubleshooting simply increases your time to resolution.

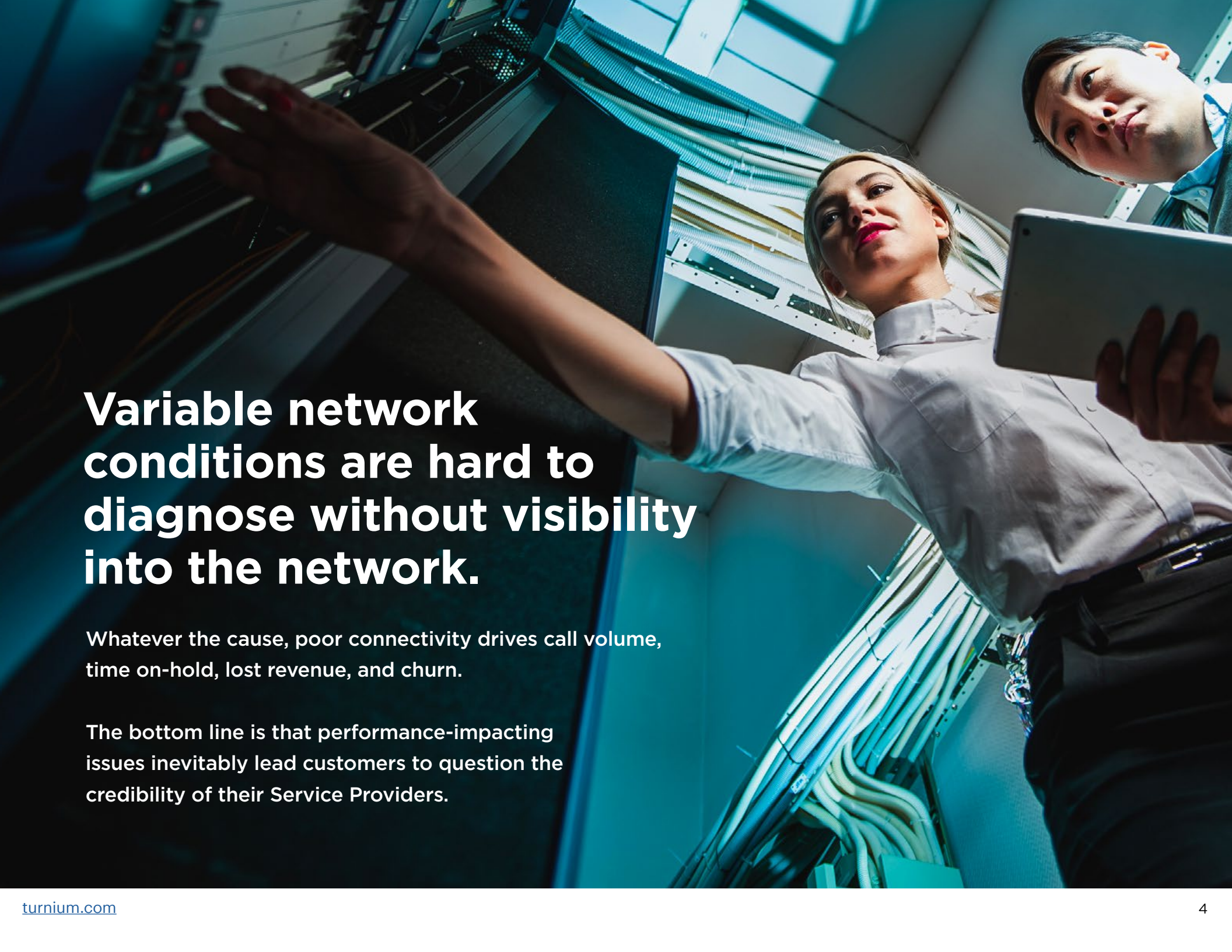
As a Service Provider, you deliver applications that are critical to your customers' operations. And when they can't reach those applications or those applications perform poorly, customers want answers.



SD-WAN is a better solution.

Software-defined wide area networking gives Service Providers the ability to offer customers a new managed solution; generating additional monthly recurring revenue while increasing customer satisfaction.

SPs who deploy SD-WAN can offer their customers a managed network-as-service solution, providing a managed, reliable “on-ramp” to their hosted applications, and eliminating the issues that arise when clients source (and often cheap out on) their own connectivity.

A low-angle, upward-looking shot of two IT professionals in a server room. A woman with blonde hair, wearing a white button-down shirt, is reaching her right arm into an open server rack. She is looking up at the equipment with a focused expression. To her right, a man with dark hair, wearing a blue button-down shirt, is looking down at a tablet computer he is holding. The server racks are filled with various cables and components, and the lighting is a cool, blueish-white. The overall composition suggests a technical environment where network issues are being diagnosed.

Variable network conditions are hard to diagnose without visibility into the network.

Whatever the cause, poor connectivity drives call volume, time on-hold, lost revenue, and churn.

The bottom line is that performance-impacting issues inevitably lead customers to question the credibility of their Service Providers.

**DELIVER HIGH PERFORMING NETWORKS.
WITH THE BEST SECURITY AVAILABLE TODAY.
AND MAKE MORE MONEY.**

STEP 1

Deploy SD-WAN to deliver a virtual network that is carrier agnostic.

Using SD-WAN to build a virtual network over top of physical infrastructure provided by multiple carriers allows you to abstract managed virtual network service delivery from the underlying carrier infrastructure.

SD-WAN frees you from the service, capability, pricing, and infrastructure constraints of carriers. It enables you, as a Service Provider, to build an optimized virtualized network on top of multiple carriers, control that infrastructure end-to-end and manage and control delivery and service levels for your customers.

Critical SD-WAN capabilities you should look for are:

Efficient Link Aggregation: Link aggregation combines the bandwidth of multiple circuits of any type, including fiber, coax, copper, fixed wireless or LTE, into a single virtual tunnel. Look for SD-WAN vendors who will commit to delivering virtual tunnel with a minimum guarantee of 90% efficiency.

Aggregating multiple circuits from diverse carriers allows Cloud and Managed Service Providers to deliver a virtual connection or multi-site network with dramatically increased uptime and performance. When an SD-WAN platform enables a site to use multiple circuits simultaneously, a single failed or underperforming circuit won't require manual intervention or involve long delays while waiting for backup circuits to activate. Using multiple circuits from multiple carriers with multiple transmission type can facilitate 99.999% uptime.

TCP Proxy: TCP proxy is a performance-enhancing server that greatly increases throughput in some circumstances. It is helpful when bonding or creating a tunnel from diverse types of internet connections (such as ADSL with cable) or when a connection has high jitter or varying bandwidth. The TCP congestion control algorithm defines the behavior of proxied TCP connections.

Hybrid Layer 2 and Layer 3 Private Wide Area Networks: Look for ability to integrate a Layer 3 OTT (“over-the-top”) network with Layer 2 networks (such as MPLS networks). The SD-WAN platform should deliver Layer 3 traffic to Service Provider or end-customer networking for transport over Layer 2 Ethernet or MPLS circuits, ensuring the deployment accommodates specific requirements, but also builds in a potential migration to a 100% SD-WAN network.

Customer-provided Circuits: The ability to integrate customer-supplied circuits, whether Layer 2 MPLS/Ethernet or broadband internet, into an SD-WAN platform ensures you deliver optimal managed solutions. Customers are often able to buy circuits cheaper than an MSP or ISP can achieve on their wholesale programs.

Allowing customers to reduce their costs (and be billed directly) lets you to do what you do best — provide a managed service and earn monthly recurring revenue!!

STEP 2

Deploy the virtual network platform on white-box hardware.

As a Service Provider, you shouldn't need to purchase proprietary core network and customer premise equipment (CPE) hardware. Using existing computing and storage in your own data centers and sourcing your own CPE or edge hardware dramatically reduces costs and allows you to keep your brand front and center for customers.

Partner with an SD-WAN provider that allows you to customize hardware by working directly with manufacturers to meet specific deployment use-cases. White-box solutions also enable you to have off-board LTE modems, instead of relying on USB LTE.

Connecting an off-board LTE modem through ethernet or having an internal LTE modem with a long antenna extension cable allows you to place the antenna where you can get reliable reception. This is important as most customer data rooms/closets are not particularly suitable for solid LTE.

STEP 3

Integrate your virtual networking platform with existing Operational and Business Support Systems.

Look for SD-WAN software with open architecture that enables you(or your clients) to integrate SD-WAN into existing network management, reporting and alert systems. An open architecture gives you the ability to integrate other applications you provide, including next-gen firewalls, WAN optimizers and other customer-preferred applications, into your offering.

When combined with white-box hardware, open architecture provides the ability to deploy applications at the customer-edge. Having applications such as next-gen firewalls resident on the same SD-WAN edge device simplifies network deployments and provides you with value-added managed services.

An open API should facilitate the integration of SD-WAN into operational systems for reporting and billing, provision and control the SD-WAN platform from external applications, and ensure it communicates with other applications.

STEP 4

Automatically load balance packets across multiple circuits per site with bandwidth adaptation.

Not all branch offices or business sites are created equally from a bandwidth or cost-profile perspective. The ability to load balance packets across multiple circuits gives you cost and performance flexibility and minimizes concerns about the impacts of circuit latency, packet loss or flapping. Packet balancing is also more elegant than deploying forward-error correction, which many stream-based SD-WAN platforms provide.

- The SD-WAN software on the CPE manages packet distribution across multiple circuits based on user-selectable algorithms. As the single data stream from the LAN is managed at a packet-level, the software can proactively change how each circuit in the SD-WAN tunnel is used and remove underperforming circuits to provide superior performance, stability, efficiency and uptime. The software should also dynamically add circuits back into the tunnel once performance thresholds return to normal.
- Packet-based balancing combined with link aggregation and sub-second same-IP failover will deliver highly reliable connectivity and continuous end-user access to remote applications, cloud services and the internet, all supporting session and business continuity.
- In addition to optimizing circuit utilization and reliability, packet-based balancing provides security at an architectural level. Transmitting complete flows across an individual circuit makes data interception easier, whereas packet-distribution requires all circuits to be compromised, making interception much more difficult.
- Dynamically adapting tunnel bandwidth to reflect actual circuit performance enables the SD-WAN platform to manage the customer experience for consistency. The SD-WAN platform should be able to adjust download and upload speeds of each circuit in the virtual tunnel to offset increases in circuit latency or packet loss, as well as to dynamically remove and re-add circuits to the tunnel if circuits flap or exceeds customer-defined thresholds for packet loss. This helps ensure that latency and packet loss remain as low as possible on every circuit in the tunnel and maintains performance of both latency-sensitive and bulk applications.



The Downfalls of Forward Error Correction (“FEC”)

Many SD-WAN platforms focus on balancing data flows, forcing the vendor to deploy technologies like Forward Error Correction (FEC) to compensate for the variable quality of internet circuits. FEC is commonly used to improve the quality of IP telephone calls.

FEC compensates for packet loss or jitter on broadband internet circuits by duplicating voice packets over every circuit available. Instead of sending packets over the best circuits, FEC floods all circuits with multiple sets of packets with the hope that eventually all the required packets will reach the other end.

A solution that detects the quality of circuits in the SD-WAN tunnel and balances traffic across them all provides a more efficient network, especially when wireless circuits are used.

STEP 5

Ensure you can conduct self-service network moves-adds-and-changes.

Ensure you have the ability to conduct self-service network MACD (moves/adds/changes/deletions), so you can manage sites as needed. Being able to add, change, or move sites easily through a couple clicks frees expensive network admins and professional services staff from routine tasks and gets them working on more critical and valuable projects.

Service Providers that are looking to maximize customer experience, maximize brand differentiation and set themselves up to acquire, grow and retain customers need to have control over core SD-WAN nodes as well as the customer edge nodes. When you have direct access to SD-WAN core nodes, you can control routing groups, manage IP address allocations, determine intra-or-inter-data center failover and manage and control your entire SD-WAN infrastructure.

When you control the entire SD-WAN infrastructure, your networking and support teams have full visibility to the end-to-end performance of the network. Actions can be taken proactively to deliver on your SLA. Customer questions and issues can be diagnosed without escalating to 3rd parties because you have visibility to the entire data path between customer sites, data centers, cloud facilities, and users.

Tasks such as configuring dynamic routing, failover and setting up new customer sites should be self-service through a GUI. When office staff can set up new customer sites or make changes to existing configurations, you're meeting or exceeding customer expectations on turnaround time more easily.

Equally important, a management GUI that allows your end customers to have "view-only" access, or to control some aspects of their networks, helps you give customers even better service. Co-management and customer self-support reduces the number of tickets you handle and reduces your cost while improving customer visibility and satisfaction.

STEP 6

Deliver fast, seamless circuit failover to ensure voice, video and other sessions remain active.

Customers demand 100% uptime. If you're using load balancing, circuit multiplexing, or VPN solutions, it is difficult to ensure that end-users don't lose sessions if a circuit fails. SD-WAN platforms that aggregate multiple circuits together to create a single virtual tunnel with same-IP-failover between each circuit in the tunnel deliver on customer expectations for reliable, session-protected connectivity.

Some customers also need the option to failover to a wireless circuit. In this instance, make sure you can designate a circuit as Failover to keep it in hot-standby and be sure that the SD-WAN platform continually tests the Failover circuit with heartbeat traffic to ensure it is ready to receive traffic immediately. Traffic should switch to the Failover circuit if the tunnel or primary circuit fails completely.

It's common to use LTE, 4G, or 5G as a Failover circuit. In this instance, be sure the amount of traffic the SD-WAN platform sends as heartbeat can be adjusted to minimize costs to the end-customer. These capabilities ensure that a site's connectivity is continuous and that all session-based applications remain active. From an end-user perspective, telephone calls or video calls will remain connected when circuits fail, delivering business continuity and customer satisfaction.

STEP 7

Deploy dynamic QoS to prioritize critical application traffic.

Obviously, you'll want to ensure voice and other key business applications are prioritized over bulk traffic to optimize the cloud experience. Look for an SD-WAN platform that provides Dynamic QoS, so Quality of Service (QoS) is provided without permanently reserving bandwidth QoS classes.

Dynamic Quality of Service Engine: Make sure the QoS engine is pre-configured with QoS classes (Real-time, Interactive, Routine and Bulk) to facilitate simple deployment. Also be sure that the SDWAN platform supports creating unique, additional classes at a per-customer level to support unique requirements.

STEP 8

Secure your data and communications, even over Internet circuits, without deploying VPN.

Another benefit of SD-WAN is that it delivers the same benefits as a site-to-site VPN without requiring time-consuming initial programming and manual reconfiguration when making changes. SD-WAN allows you to deploy a virtual network in which networking new sites, securing the data flows, and providing multiple levels of industry standard encryption is automated. Make sure that encryption provides:

Perfect forward secrecy with all ciphers. This ensures encrypted traffic cannot be decrypted at a later time if the private key is compromised.

Multiple Ciphers. AES128 and AES256 are required. Ensure data is encrypted between the site and the network using standard protocols, such as DTLS 1.2 protocol. DTLS is based on SSL/TLS, and is defined in RFC 4347 and RFC 6347.

Note that some CPU can accelerate encryption, so this is worthwhile looking for. Sometimes there's an operating system dependency and a 64-bit operating system is required.

As a side note, another benefit of link aggregation and per-packet link load balancing is that, by using multiple circuits at each site with packet distribution, a physical level of security is delivered as well. In this scenario, packet intercepts are much less likely to succeed as they involve capturing packets from multiple circuits and multiple carriers.

STEP 9

A scalable pricing model with unlimited core nodes.

The whole point of an SD-WAN platform is that it powers your business to grow. Service Providers can use SD-WAN to provide “Network-as-a- Service” to customers looking to benefit from virtual networks, or the Service Provider can bundle it with their voice or hosted applications as a reliable service-delivery on-ramp that enables them to control their customer experience.

Some other factors to consider for business growth are:

Licensing Model: If you can, find a platform that gives you unlimited and no-charge licensing for core network nodes. Licensing costs obviously affect your profitability; if adding new customers or expanding to new data centers comes with a significant license cost, that will limit your growth. Ensure you can scale horizontally in an affordable and simple fashion. Look for flexible licensing arrangements that allow you to deploy additional nodes within a data center at no cost.

Multi-Tenancy (Part 1): Part of many MSP business models is bringing new channels to market. Smaller MSPs or VARs may lack the infrastructure to run services and applications. Having an SD-WAN platform you can multitenant and carve of VAR-branded interfaces and end-customer spaces will help you put a wholesale or channel model into play, which allows you to grow when other people do the selling for you!

STEP 9

A scalable pricing model with unlimited core nodes. *(cont'd)*

Multi-Tenancy (Part 2): The second part of multi-tenancy you should consider is finding an SD-WAN platform that allows you to put multiple customers on the same core nodes. This enables you to get greater customer density and avoid a situation where each customer requires their own instance (or worse yet, their own dedicated appliance in your data center). A virtualized, multi-tenanted core deployment facilitates efficient use of processing, storage and network resources and also means that infrastructure grows at a slower rate than your revenue.

Dual-stack IPv4 and IPv6 Support: Accommodate legacy networks while future-proofing Service Provider investments. While IPv6 has relatively limited usage, Internet of Things (IoT) deployments will require the large addressing space that IPv6 provides. As you grow into IoT deployments, having a platform that supports both IPv4 and IPv6 is critical.

Self-Management: Check if your SD-WAN provider can deliver a portal with delegated administration rights that you can provide to selected customers, giving them the ability to view and manage at least some of their network attributes. This gives customers who have the skills and need for self-service the ability to control, manage and view their own networks, reducing your support costs and enabling customers to make changes whenever they need.

We look forward to hearing from you.

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