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White Paper

UCaaS Connectivity Options in the New Age: Best Practices

Today's IT stacks are cloud-first, taking advantage of the many benefits of SaaS applications, while answering the increasing needs for agility, mobility, and improved productivity. However, the move to cloud applications has not changed expectations of first-rate user and customer experience. There is still little room for problematic applications, with businesses and users unlikely to put up with poor quality, performance, or experience.

The move to cloud-first applies to communications and collaboration. Companies are moving from traditional premises-based telephony and communication solutions and looking to consolidate their multi-system, multi-vendor environments to unified, cloud-based solutions—unified communications as a service (UCaaS).

This trend has necessitated a parallel conversation about modernizing network infrastructure and finding the "ideal" wide-area network (WAN) connectivity option. This white paper evaluates common Enterprise connectivity options for UCaaS and puts forth RingCentral's recommendations.
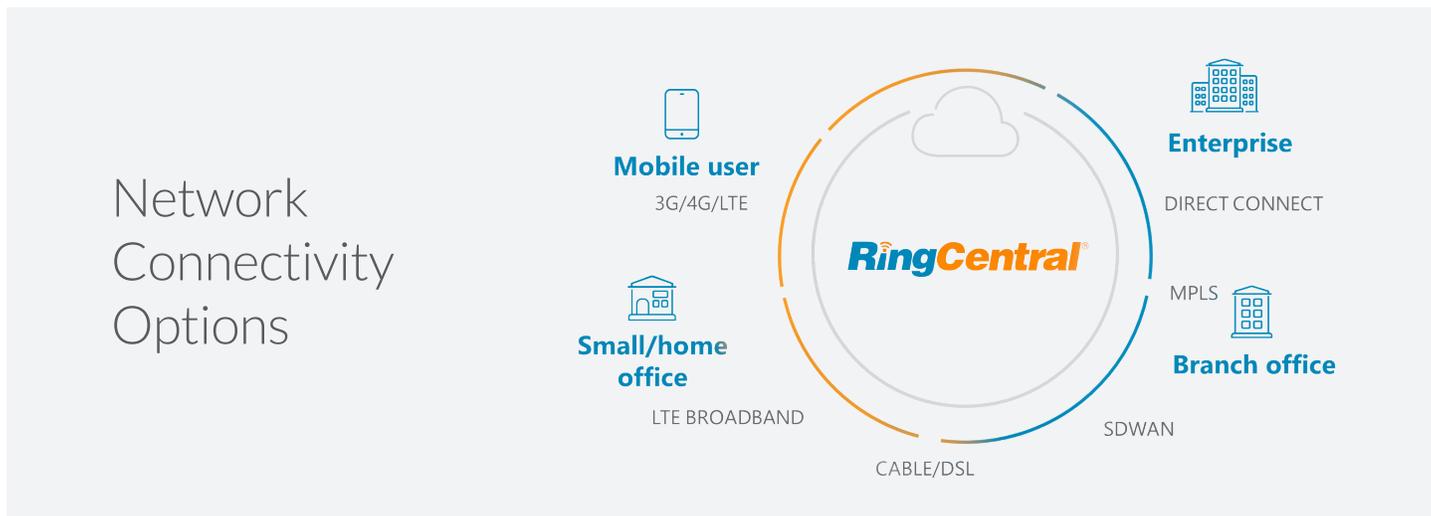
Background

Legacy connectivity methods and WAN architectures followed a hub-and-spoke topology, with the assumption that nearly all network traffic from branch locations (spokes) would be routed via an enterprise's headquarters ("HQ" or the hub). This topology was logical when application architectures were predictably monolithic and client/server. In virtually all such scenarios, applications were hosted on servers that lived in data centers at the HQ. Network engineers optimized WAN connectivity from branch offices for this architecture, and virtual private networks (VPNs), whether IPSec or MPLS, routed nearly all traffic back to HQ—even traffic destined for the internet.

As businesses move applications from their HQ hub to the cloud, old network traffic patterns are less often hub-and-spoke, with employees (including those at branch offices) frequently accessing applications directly in the clouds where they are hosted (the "as-a-service" model). Employees working on the go are another factor that calls for reviewing network needs and evaluating how users connect to the systems they use daily.

Adoption of latency-sensitive voice, real-time video, and collaboration solutions place new requirements on an organization's WAN. Traditional WAN architectures are ill suited for such traffic patterns.

Networking and connectivity decisions are business specific and require a deep understanding of an organization's operational and business priorities. The best choice for connectivity should be driven by careful evaluation of business needs, balancing bandwidth, reliability, costs, and so on. Similarly, the best cloud applications, UCaaS included, need to ensure that they will work well with any type of WAN.

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Network
Connectivity
Options

Mobile user
3G/4G/LTE

Enterprise
DIRECT CONNECT

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MPLS

**Small/home
office**

Branch office

LTE BROADBAND

SDWAN

CABLE/DSL

Connectivity option #1: Multi-Protocol Label Switching (MPLS)

Traditional networks are designed for packets to hop from router to router until they reach their destination, with each router "reading through" the header and then referring to the routing table to figure where the packet needs to go next.

Multi-Protocol Label Switching (MPLS) is a technique for optimizing packet routes via predetermined paths to the destination on a virtual private network. Packet paths can be defined and traffic flow is directed based on prepended "labels." MPLS offers enterprises more control of their networks, with the ability to control traffic routing, prioritize services (for example, direct voice and video traffic to low-latency routes across the network) and prevent network delays and congestion.

MPLS has long been considered the linchpin for an organization's network and the default answer for global, distributed enterprises looking for a reliable solution with the right mix of flexibility, scalability, and control. It is also considered more secure than traditional IP networks.

That said, MPLS is an expensive mechanism to implement and maintain, relying heavily on service providers. Media- and content-heavy traffic can further drive up bandwidth costs. MPLS, bandwidth availability, and pricing also vary across geographies. As companies expand their global footprints, costs multiply and organizations must usually contend with a tricky mix of MPLS providers, their regional partners, and point-to-point links for full coverage.

The RingCentral connection:

An organization can have its MPLS service provider add RingCentral to the company's MPLS network. Dedicated, direct connections and links are built by incorporating our data centers as nodes into existing MPLS mesh. This results in the highest possible quality and best performance.

Net takeaway:

For organizations prioritizing network control over cost, MPLS is a great choice, albeit an expensive one. Specific business, quality, and performance needs continue to make MPLS a popular option.

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Connectivity option #2: Software-Defined Wide Area Networking (SD-WAN)

SD-WAN, based on Software-Defined Networking (SDN) principles, addresses shortcomings in WAN architectures by splitting the functionality of traditional WAN routers into separate logical functions. On the one hand, network appliances (often virtual appliances) at branch sites forward packets from the branch to destinations on the internet. On the other hand, the SD-WAN provider's cloud functions as a controller, configuring the branch appliances with routes based on defined application-level policies, customer business rules, and/or available network bandwidth. SD-WAN creates an overlay network on top of virtually any transport and as a consequence achieves many of the same technical objectives as MPLS, but at a fraction of the cost. SD-WAN topologies optimize available bandwidth by prioritizing latency-sensitive application traffic (e.g., VoIP or video conferencing) over less-sensitive applications (e.g., file transfers or email), offering better experience and quality of service to end users.

Bandwidth optimization, coupled with the ability to centrally manage and make network changes dynamically, programmatically, and automatically lowers overhead and management costs significantly. Because organizations can implement SD-WAN on top of any transport, common broadband connections (DSL or cable) become viable enterprise WAN options, at least for branch sites. As a consequence, SD-WAN enables organizations to reduce their dependence on MPLS service providers, further driving down costs. But as with any service, round-the-clock quality monitoring, well-defined performance metrics, and financially backed SLAs need to be in place to reap potential benefits. SD-WANs also require path redundancy (i.e., multiple broadband links) to be effective, and this might be infeasible for branch sites in remote or rural locations.

The RingCentral connection:

For organizations that prefer to connect via SD-WAN, RingCentral can share a list of ports to help create a RingCentral-specific VoIP profile that simplifies their service provider's prioritizing efforts. Certain SD-WAN vendors may offer RingCentral-specific application profiles to streamline provisioning.

Net takeaway:

SD-WAN is a great alternative to MPLS: easier and less expensive to manage, yet sophisticated enough to meet enterprise network requirements. Networking performance can be similar (if not equal) to MPLS, but not all SD-WANs are created equal. Select an SD-WAN provider that provides application profiles predefined and optimized for UCaaS. This will simplify deployment and administration greatly.

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Other connectivity options: broadband and mobile

Broadband (DSL, cable, LTE, etc.) continues to be the most affordable option for WAN connectivity. For organizations of any size, it can also be the most effective. In fact, in certain remote branch locations, a single broadband vendor might be the only option. Increasingly, businesses are relying on broadband to run voice, video, and other communications and collaboration solutions "over the top" (OTT).

Aside from the lower recurring costs (compared to MPLS and SD-WAN), broadband connectivity requires no complex infrastructure or specialized personnel to keep these solutions up and running.

This simplicity also has its drawbacks, however. Unlike MPLS and SD-WAN, simple broadband connectivity offers no advanced network quality of service techniques to ensure priority for real-time cloud applications such as UCaaS. This puts increased importance on the ability of the UCaaS provider to ensure the highest possible voice quality with advanced techniques built in to the application itself.

Because nearly all users today are mobile and on the go, **3G/4G/LTE** is probably the most common connectivity method for enterprises. As with broadband, mobile is relatively inexpensive (costs are usage-based and data-plan dependent), does not require any special system management, and is easier to use. The downsides to mobile connections are clear: poor cellular coverage and spotty reception commonly affect voice quality adversely.

The RingCentral connection:

Broadband is the most common connectivity method for RingCentral customers. To consistently deliver the highest quality voice, RingCentral employs a number of innovations to optimize the use of available bandwidth and to adapt to changing network conditions. This includes advanced audio codecs for ensuring high-quality voice, such as the wideband G.722 codec and the modern Opus Interactive codec, which can adapt to changing network conditions.

RingCentral also has direct peering relationships with over 200 ISPs and 45 leading carriers around the world, minimizing the latency for end users, regardless from where in the world they connect.

Net takeaway:

Broadband/OTT is an effective, inexpensive connectivity option allowing enterprises and end users to connect in ways most convenient to them. Although QoS is not guaranteed on the public internet, RingCentral's investment in technology and infrastructure enables the highest quality voice—even over standard broadband. In fact, RingCentral backs up its voice quality with an available service level agreement (SLA) of 3.8 MOS.

RingCentral: delivering the highest voice quality

RingCentral has a history of innovation and a proven track record of investment to ensure customers and end users enjoy the highest-quality HD voice. To back this goal, RingCentral offers SLAs for both availability (99.999% uptime) as well as voice quality (minimum MOS score of 3.8), irrespective of the mode of network connection.

Additionally, RingCentral invests in other areas to ensure the best end-user experience:

Global private backbone

RingCentral was born in the cloud. Maximizing quality over any connection, including OTT and mobile, is a foundational principle of product and infrastructure architecture.

RingCentral data centers—in close, physical proximity to the world's top 20 internet exchange points—are co-located with all the major US telecommunications carriers to ensure the fastest response times and interconnect services possible. The geographic diversity of our locations acts as an additional safeguard, minimizing our risk of loss and service interruption due to natural disasters and other catastrophic situations.

Our platform is our own, purpose-built to perform as a highly redundant, reliable, and secure global communications network. This is an important distinction, contrasting with leased lines or outsourced service delivery.

We've established our own backbone and developed our own peering relationships to provide enterprise-grade reliability and quality of service. This allows us to interconnect directly with service providers, whether telcos or internet service providers. Direct peering (ASN to ASN) with over 200+ ISPs globally enables RingCentral to route around congested points of the network.

RingCentral Network Operations Center (NOC)

Our NOC teams and dedicated engineering resources focus relentlessly on delivering quality of service with smart call routing and 24/7/365 quality metrics monitoring across all modes of communications. We conduct a full MOS score of every call and capture all relevant real-time data. Advanced analytics is then run on this data to ensure optimal performance, and routing metrics are adjusted to optimize for QoS, as needed. We build and maintain our own Host Media Processors and are consistently building technology around call improvement for any network conditions.
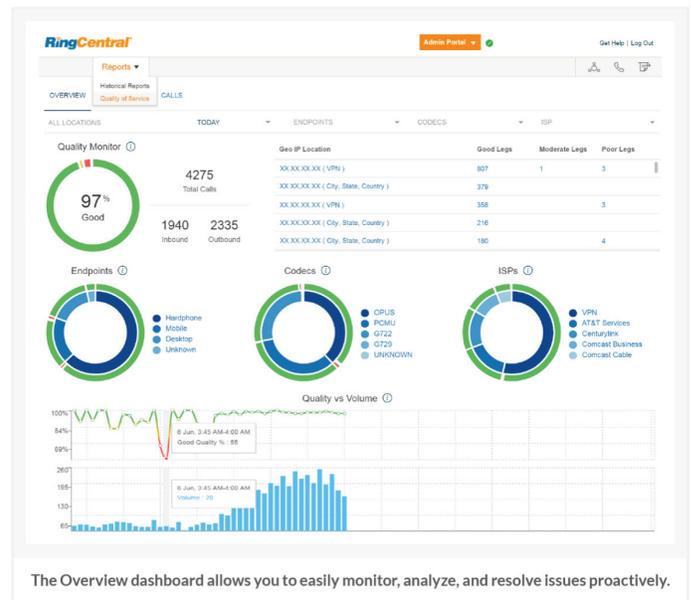
HD media

To consistently deliver the highest HD quality possible, RingCentral employs the advanced Opus Interactive codec, as well as the wideband G.722 codec.

HD voice with Opus codec is enabled by default on RingCentral apps, providing a better user experience with more clarity in HD voice, especially in limited bandwidth environments.

QoS analytics

RingCentral Quality of Service Analytics gives administrators access to key operational QoS metrics in near real time to monitor the global voice quality and to diagnose call quality issues impacting users.

Our powerful reporting dashboard monitors voice quality and call volume at an aggregate organizational level. Administrators can also drill down into specific calls to identify specific call-quality information, including packet delay, jitter, and packet loss. This provides end-to-end visibility into network conditions, from one caller to RingCentral to the other caller and back. With this information, administrators can isolate potential problems affecting call quality for accurate resolution.

The Overview dashboard allows you to easily monitor, analyze, and resolve issues proactively.

Quality of Service Analytics can help administrators understand:

- Overall quality of voice calls
- Trends across regions, offices, and network providers
- User experience for a particular group of users
- Patterns in call quality over the course of a day due to overall call volume
- How codecs perform against varying network issues

Professional Services

Our Professional Services staff can help you set up, integrate, tailor, and extend your RingCentral service to meet specific business needs. Our site-preparedness and QoS guidelines help to get you up and running quickly by ensuring your network environment is properly configured to utilize our platform. As part of this exercise, we help conduct bandwidth analysis, make router and firewall recommendations, and assist with traffic prioritization efforts.

Getting started

For more information on network connectivity, cloud communications and collaboration, and RingCentral's commitment to voice quality, visit ringcentral.com.

About RingCentral

RingCentral, Inc. (NYSE:RNG) is a leading provider of global enterprise cloud communications and collaboration solutions. More flexible and cost-effective than legacy on-premises systems, RingCentral empowers today's mobile and distributed workforce to communicate, collaborate, and connect from anywhere, on any device. RingCentral unifies voice, video, team messaging and collaboration, conferencing, online meetings, and integrated contact center solutions. RingCentral's open platform integrates with leading business apps and enables customers to easily customize business workflows. RingCentral is headquartered in Belmont, California, and has offices around the world.

Contact RingCentral Partner Support:
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