Enable Enterprise-Grade Unified Communication Experience With Cloud-Delivered WAN
Technical Whitepaper

“Lack of WAN bandwidth, reliability, and QoS configuration are the top concerns for network ability to provide the needed quality for UC application.”

– InformationWeek State of Unified Communications 2014'

Growth Of Unified Communication in Enterprise

With today’s distributed workforces, enterprises are increasing their reliance on Unified Communication (UC) solution to enable collaboration among employees and reduce travel cost. In the recent InformationWeek survey, 70% of enterprises already deploy or plan to deploy Unified Communications in the next 24 months. However, delivering combination of real time voice, video, and data is bandwidth intensive and requires complex network configuration to ensure the delivery of these time sensitive applications. Enterprises often find themselves in situation where the branch bandwidth is insufficient or the aging infrastructure cannot support the UC rollout. Expensive WAN upgrade can delay the rollout or make the business case of deploying UC unattainable.

WAN Bandwidth Challenge and The Broadband Alternatives

Ease of access to broadband Internet such as cable, DSL, or 4G provides options to enterprises to consider using broadband Internet to augment the currently limited WAN bandwidth to deliver UC application. However, broadband Internet may, at times, experience congestion, which results in increased latency, packet loss, and jitter. These conditions can cause interruption to time sensitive applications such as voice and video and degrade the Quality of Experience (QoE) demanded by the end users.

VeloCloud Cloud-Delivered WAN Enables Enterprise-grade UC

The VeloCloud solution is deployed into environments which contain multiple links—any combination of broadband, cellular, and private WAN. The solution consists of an Edge device, which terminates multiple WAN links, private or public, the global network of cloud gateways, and the Orchestrator which manages the solution. The solution simplifies the rollout of UC by providing ease of network configuration to support UC applications and monitoring of key network characteristics that affect UC performance. VeloCloud Dynamic Multi-Path Optimization provides dynamic application steering and on-demand link conditioning to deliver high quality of UC experience over any type of connectivity - broadband or hybrid WAN. VeloCloud makes use of several features to enable enterprise-grade UC:

**Application Recognition and Smart Business Policies**

Built-in deep-packet inspection (DPI) identifies voice and video media traffic (RTP and RTCP) and signaling. Smart defaults provide necessary bandwidth management, traffic steering, and link conditioning without any complex configuration typically required by traditional WAN.

**Dynamic Application Steering**

By constantly monitoring all available link conditions and bandwidth, VeloCloud can steer latency and loss sensitive voice and video media traffic during sessions on a packet by packet basis around links having high latency and/or packet loss.

**On Demand Link Conditioning**

When necessary, VeloCloud applies link conditioning techniques which include enabling Forward Error Correction (FEC) to provide up to full packet replication to mitigate loss and jitter buffer to reduce jitter introduced by broadband and hybrid networks.

**Automatic Recognition and Prioritization of Realtime Voice and Video**

Built-in DPI and device fingerprinting identify the end device, e.g. phone as well as all the actual application traffic generated by the device, e.g. RTP, SIP. The classification information is used to determine how to handle the application traffic flows including QoS, application steering and link conditioning policy.

![Figure 1: Device and application identification](image)

![Figure 2: Smart Default policy](image)

Smart Default provides out-of-the-box configuration to categorize RTP, RTCP, and signaling traffic as business collaboration and assign high priority treatment to the application traffic flows.
High Quality Voice and Video Experience With Dynamic Multi-path Optimization

The photos below compare the video call experience while the WAN is experiencing approximately 5% packet loss and 30 ms of jitter. VeloCloud Dynamic Multi-path Optimization corrects packet loss on demand by enabling Forward Error Correction (FEC) to provide up to full packet replication to mitigate packet loss. VeloCloud also activates jitter buffering when necessary to reduce the effect of jitter introduced by broadband Internet and Hybrid WAN.

![Figure 3: Video call without VeloCloud](image1)

![Figure 4: Video call with VeloCloud](image2)

The chart below compares the VoIP MOS score (codec G.722) while the WAN is experiencing congestion resulting in packet loss between 5-10%. Without VeloCloud, the call quality severely degrades for the whole duration of the congestion. With VeloCloud, the call quality is maintained because the network can react quickly to the congestion by steering the voice and video traffic away from the congestion, as well as correcting packet loss and jitter.

![Figure 5: VoIP MOS without and with VeloCloud](image3)
Eliminate Dropped Calls with Dynamic Multi-path Optimization

Both end users and phones do not tolerate poor call quality. Users may decide to hang up. Phones that detect network conditions that cannot meet the expected quality may also disconnect the call. VeloCloud Dynamic Multi-path Optimization constantly monitors link characteristics including bandwidth, loss, latency, and jitter, and steer the application traffic flows susceptible to such degradation away from the links having degradation, while maintaining the voice and video call integrity.

Simplify Monitoring and Troubleshooting with Cloud-based Management

VeloCloud Orchestrator provides a single pane of glass for provisioning, managing, and monitoring the solution. It provides historical and real time link performance as well as reports actions applied and results achieved.
**Summary**

VeloCloud provides a Cloud-Delivered WAN solution which enables enterprises to roll out and support Unified Communications without the cost and complexity of a traditional WAN. Enterprises can enjoy the benefit of a simple yet powerful management platform providing insight into the underlying WAN conditions and application usage, while their WAN can dynamically react to provide the best possible experience for Unified Communication applications.

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**About VeloCloud**

VeloCloud, a cloud networking services company, simplifies branch networking by transforming ordinary broadband links into the fast, resilient and secure connections needed by today’s distributed enterprises. VeloCloud is the first to provide all three elements needed to achieve a cloud-delivered WAN: cloud networking, virtualized services and enterprise-grade Internet. VeloCloud has its headquarters in Los Altos, Calif., with a development center in Chennai, India. The venture-backed company—whose management hails from companies such as Aerohive, Cisco, Citrix, HP, VMware and Webvan—recently announced a $21 million funding round with investors NEA, Venrock and The Fabric. For more information, visit www.velocloud.com and follow the company on Twitter@velocloud.