VIAVI
TeraVM
Testing Telepresence with TeraVM

TeraVM™ emulates stateful Telepresence endpoints, which are used to assess a network's suitability to host collaborative meetings and also to determine the meeting capacity limitations.

Telepresence is a widely deployed technology which uses a rich video, audio and data experience to improve collaboration between online meeting participants in geographically dispersed locations. The challenge faced when preparing to deploy Telepresence is how to accurately assess the performance of the underlying network to host collaborative meetings from a number of remote sites. A further complexity is how to accurately measure performance and functionality without deploying expensive hardware or large numbers of soft clients to each site.

TeraVM is chosen by service providers and network equipment manufacturers to test Telepresence meeting places because it's a virtual solution which can be easily deployed and distributed. A further benefit of TeraVM is the ability to emulate the leading vendor's Telepresence endpoints which include room encoders and/or software based PC clients. As an integrated solution TeraVM provides detailed performance analysis on the control signaling and the media, which includes analysis of each and every video and audio stream associated with the meeting. TeraVM is used to join live or scheduled meetings in which TeraVM impersonates the speaker, enabling analysis of Telepresence voice detection functionality. Other meeting functionality which can be assessed using TeraVM includes call hold and call mute.

Features

- Emulate 3rd party Telepresence endpoints: Cisco CTS series, Cisco Movi, Cisco Jabber, Tandberg E, EX, C series
- Supports TIP (Telepresence Interoperability Protocol)
- Participate in actual live meetings
- Impersonate a live speaker with varied speaker loudness
- Test call functions (e.g. call mute and call hold) live during the meeting
- Input auxiliary feeds such as presentation files per emulated meeting participant
- Register with 3rd party meeting and scheduling servers
- Configure call media per endpoint: frame rate, bitrate, audio codec
- Video and audio quality analysis per emulated meeting participant
- Dynamic call control during live tests on a per emulated participant basis
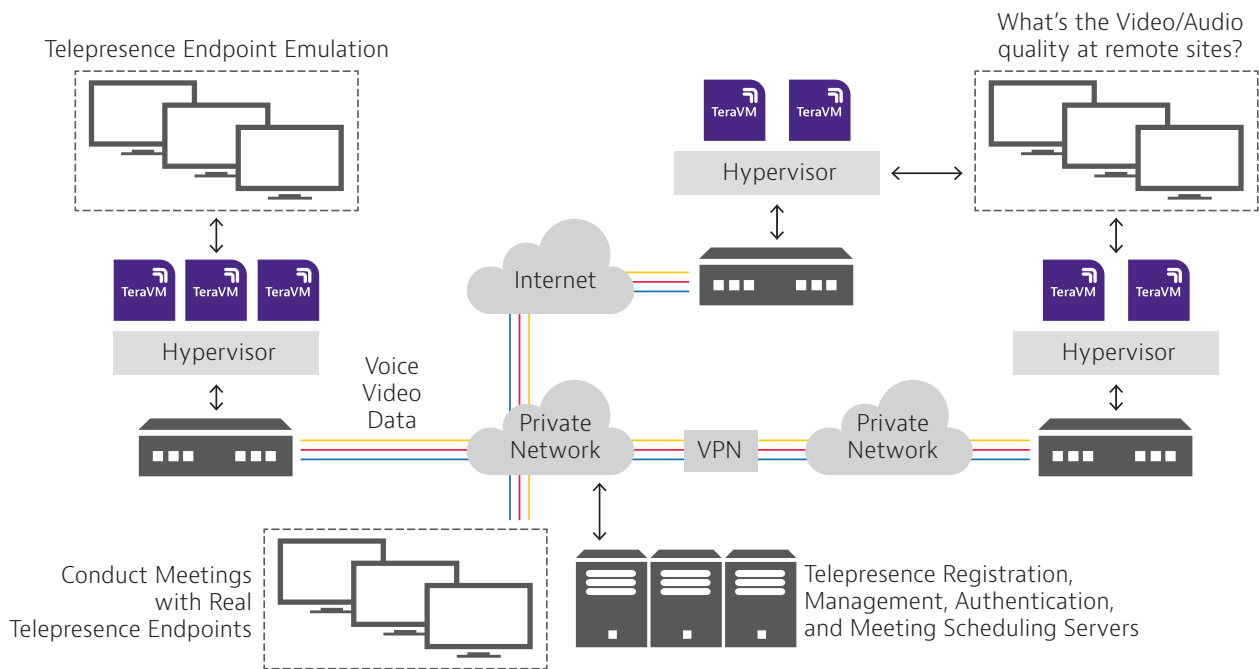
Figure 1: Example TeraVM deployment

Example Test Scenario

If a service provider is rolling out a "walk in" Telepresence service, in order to scale the service the provider must be able to quickly test and select locations that have the optimum network performance required for high quality Telepresence meetings. TeraVM is an ideal solution to test and select service locations because of the following attributes:

· Virtual solution: no transportation of physical equipment, same day roll-out and test

· Endpoint variation: test Telepresence hardware and/or software clients (e.g. Jabber)

· Concurrent site testing: test a number of remote sites concurrently in real time

· Content assessment: test with standard definition and high definition (HD) content

· Meeting control/management: assess access to the centralized servers

Functionality	
TeraVM Telepresence	Emulate 3rd party Telepresence endpoints (encoder and/or soft clients)
	Interoperate with 3rd party management systems: registration, scheduling, authentication and management servers
	Supports Telepresence Interoperability Protocol (TIP)
Analysis per endpoint	Analysis on each and every media stream on a per emulated endpoint or per meeting basis
	Analysis of both the signaling and media flows
	Subjective quality scoring or Mean Opinion Scores (MOS) for both video and audio streams
Meeting room functionality	Test call hold and call mute functionality
	Test voice detection and floor control, impersonate speakers with varied loudness
	Test auxiliary services including file sharing

For telepresence TeraVM measures over 50 metrics. Below are a few example metrics:

- QMVIdeo MOS
- QMAudio MOS
- RTP Video Frame Jitter
- Buffer Overrun/Underrun
- Call Time Ringing

- Time to First Media FrameOut of Sequence packets
- Endpoint Registration Success
- SIP Control Message Rates
- RTCP Packet Rates

Features	
General	Real-time isolation of problem flows
Data	TCP / UDP
	HTTP (headers, substitution, attachments)
	SMTP / POP3 (incl. file attachments)
	FTP (Passive/Active), P2P applications, DNS
Address	MAC, VxLAN
	DHCP, PPPoE (IPv4 & IPv6)
	Dual Stack (6RD, DS Lite)
Ethernet switch	VLAN and double VLAN Tagging (Q-Q)
	ACL, 802.1p, DSCP
Replay	Replay large PCAP files - TCP, UDP and raw data playback
	Amplify and dynamically substitute data into PCAP files
Video	Multicast: IGMP v1/v2/v3 & MLD v1/v2
	Automatic Multicast Tunelling (AMT)
	Video on Demand (RTSP)
	Adaptive Bit Rate Video (HLS, HDS, Smooth)
	Video conferencing
Secure VPN	SSL/TLS/DTLS, IPSec (IKE v1/v2)
	Cisco AnyConnect SSL VPN Client, Cisco AnyConnect IPsec VPN Client
	Juniper Pulse, Juniper Network Connect
	802.1x EAP-MD5
Securiy attack mitigation	Spam / Viruses / DDoS
Voice	VoIP: SIP & RTP (secure & unsecure), H.323
	Dual Hosted UACs, SIP Trunking
	Voice & Video quality metric (MOS)
LTE/4G	GTP tunnel support
SLA	TWAMP
Automation	CLI, Perl, TCL, XML, Java API

VIAVI Solutions

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