

VIAVI TeraVM

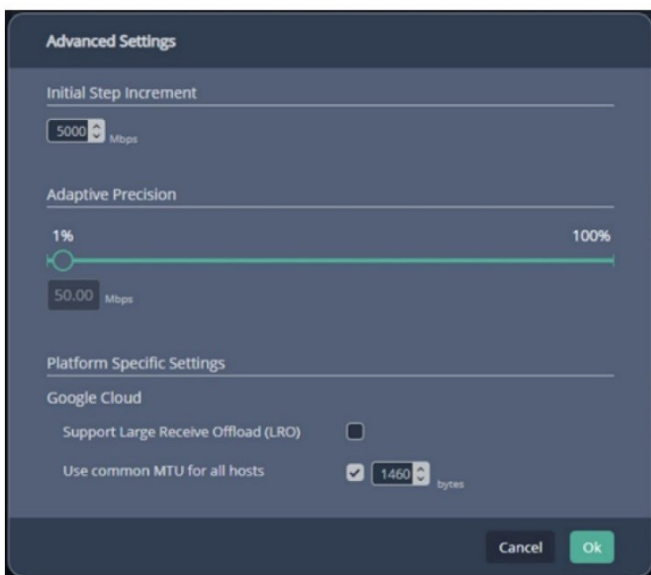
Google Platform Support for TeraVM

TeraVM is a software based L2–7 test tool running on Cisco UCS and in the Cloud (Amazon, Google, Azure, Openstack, etc.), delivering a fully virtualized application emulation and security validation solution to test and secure devices, networks and their services.

What is Google Cloud?

Google Cloud is a public cloud platform capable of running apps, hosting sites and storing data. infrastructure.

- TeraVM™ now supported on Google Platform
- TeraVM Classic can now be deployed in the Google Cloud Platform.



What Google Cloud Support means:

- **Flexibility:** Perform testing in the cloud as opposed to being tied to the lab. Access from anywhere with just an internet connection.
- **Match the SUT environment:** with many customers now deploying their products in a cloud environment you can match their testing requirements by deploying in the same environment.
- **Reduce dependency on HW:** cloud-based testing reduces the dependency on test hardware thereby reducing costs of space, maintenance and HW
- **Access anytime:** test resources can be accessed any time any day with cloud platform support freeing up test schedules.
- **Lower Operation costs:** Cloud platform testing very often uses a pay-as-you-use option making testing cycles more economical by only paying for the test HW resources when testing is ongoing
- **Elastically scale compute power:** Scale up the HW processing power as and when needed for higher capacity testing easily
- **Supports Agile development:** With Cloud based test tools the latest updates are stored in one place allowing disparate test teams confidence in the knowledge that they are accessing the latest version of SW.

Application Support

General

- System utilization reports (Location, User, Testbed, Licenses in use, Usage stats)
- License check-in default timer

Adaptive Engine

- Dynamically and Automatically find the maximum capacity of Devices Under Test
- Same test profile can be used for multiple platforms
- Faster setup, faster testing, faster results

Network Interface Support

- Support for 1/10/40 Gbps I/O

Data

- Jumbo Frame support with max MTU/Segment configurable
- TeraFlowUDP Out-of-Sequence Statistics
- TCP/UDP, Teraflow, Ookla speed test
- HTTP/HTTPS
- HTTP 2.0
- SMTP/POP3 (incl. file attachments)
- FTP (Passive/Active), P2P applications, DNS
- FTP client session count limit
- DNS client (w/ HTTP/S applications incl. IP address resolution)
- DNS Server

Address Assignment

- Configurable MAC
- DHCP, PPPoE (IPv4 and IPv6)
- Dual Stack (6RD, DS Lite)

Ethernet Switch

- VLAN Tagging (up to 8 concurrent tags)
- ACL, 802.1p, DSCP75

Data Center

- VxLAN, GRE, SR-IOV

Automation

- REST, CLI, Perl, TCL, XML, Java API
- Python, Jython
- Cisco LaasNG, Qualisystems (CloudShell), Luxoft Software Defined Lab (SDL), Openstack, Cisco pyATS

Replay Application Repository

- Intelligent UDP and stateful TCP Replay: Ability to dynamically change content
- Replay large PCAP files: TCP, UDP and raw data playback
- IP Replay: multiple TCP/UDP streams
- Amplify and dynamically substitute data into PCAP files

Video

- CMTS, CDN, Multicast: IGMP v1/v2/v3 and MLD v1/v2
- Automatic Multicast Tunneling (AMT)
- Video on Demand (VoD)
- Adaptive Bit Rate (HLS, HDS, MPEG-DASH, Smooth)
- Video conferencing, WebEx, Telepresence
- HTTP based video

Voice

- Secure VoIP and WebEx calls in HTML5 UI
- Dual-Stack VoIP Gateway emulation
- Cisco CUCM, CUBE
- VoIP: SIP and RTP (secure and unsecure), SMS

- VoIP client scaling with auto generated unique AKA authentication request per client
- VoLTE Emergency calls support
- Dual Hosted UACs, SIP Trunking
- Voice and Video quality metric (MOS simultaneously supported)
- EVS codec support, various bit rates, silence suppression
- G.711 Support for SID – RFC3889
- SIP Updates for IMS incl. PANI information
- MCPTT group calls (incl. KPI support)

Secure Access / VPN

- SSLv2/3, TLSv1.0/1/2/3 and DTLSv1.0/2
- TLS Client-side Cipher Suite Selection
- Dynamic IPv6 Assignment for AnyConnect VPN Client
- Clientless VPN (SSL/TLS/DTLS), IPSec (IKEv1/ v2 (DH groups 31 and 32)), Generic remote access, CSFR support
- VPN Clients: Cisco AnyConnect, Fortinet, Juniper, Pulse Secure, F5, Huawei, AT&T SSLT
- Cisco Umbrella
- SAML, SSO, Active Directory based login
- 802.1x EAP-MD5, EAP and PEAP with MS CHAPv2 Authentication
- 802.1X Accounting Start and Stop Records
- Site to Site VPN – IPV6/V4
- Additional security to limit access to public IP address assigned to TeraVM in public cloud environments
- Cisco AnyConnect ECDSA, EdDSA Cert authentication
- PPTP VPN Client and Server supported

Security

- 40,000+ Malware attacks and Cybersecurity threats, updated monthly
- Spam/Viruses/DDoS/Malware
- Malware Application Profiles
- DDoS attack applications:
 - Flood: SYN, Reflective SYN, Reset, UDP, Ping, ARP
 - Attacks: Teardrop; UDP Fragmentation; Configurable Rates, Start and Stop
 - Spoof Mac addressing
- Cybersecurity Database w/proven exploits
- Good and Bad mixed traffic flows
- Statefully scale Cisco specific threats
- Ability to use 3rd party threat libraries
- Ability to turn on/off Extended Master Secret (RFC 7627) support flag to test Cisco FTD, ASA and other security solutions
- Support for TLS 1.3, TLS 1.2 simultaneously on Client and Server
- Configurable TLS record size

- TCP delayed ack (timer based)
- HTTP Strict Transport Security (HSTS) header support
- TLS SNI support incl. unique certificate per FQDN

SLA Monitoring

- TWAMP-RFC 5357, PING-RFC 792
- Cisco Netflow Records/Exporter emulation at scale

Mobility – 5G, 4G, 3G, 2G

- Core and RAN: 3GPP Rel.8, 10, 11, 13, 15
- vRAN emulation:
 - 5G-NR, 4G-EUTRAN, 3G-UTRAN, 2G-GERAN at 1,000s of RANs
- Core Emulation:
 - 5G (NSA and SA), 4G-LTE, 3G, 2G with Mobility at millions of UEs and Bearers
- 5G, 4G, 3G, 2G Core interface testing
- Error Injection over 5G-N2 (AMF), 4G-S1 (MME)
- Encrypted RAN load for SecGW
- GTP tunnel support; GTPv2 (4G) S11/S5; GTPv1 (3G) Gn (4G) S1-U

- VoLTE (secure/unsecure), ViLTE
- ePDG Wifi Offload (EoGRE)
- VoWiFi (functional testing)

Internet of Things (IoT)

- Client emulation
- CoAP-RFC 7252
- NIDD over SCEF, S11-U, S1-U
- SCEF Emulation Including Protocol Relay

Platform Support

- Google Cloud Support
- Oracle OCI
- Containerized TeraVM (docker)

Hypervisors

- VMware ESXi
- KVM Ubuntu
- Amazon AWS
- Microsoft Azure
- KVM Redhat
- Openstack

NetSecOPEN Tests **NetSecOPEN**

- NetSecOPEN Test Suite

Specific Test Coverage

TeraVM includes Cisco specific endpoint emulation and real time measurements

- Dynamic IPv6 Assignment for AnyConnect VPN Client
- Cisco AnyConnect SSL VPN Client
- Cisco AnyConnect IPsec IKEv1/IKEv2 VPN Client
- Cisco NetFlow Records, NetFlow Exporter Emulation
- Cisco Identity Services Engine (ISE) with 802.aX client
- Cisco Umbrella
- Captive Portal testing
- Cisco TelePresence
- Captive Portal testing
- Cisco TelePresence
- Cisco WebEx
- Cisco Phones
- Cisco Video Clients
- Cisco DNA Center
- Mobile phones for Security Gateway
- IoT Device



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