TeraVM is a software based L2–7 test tool running on standard x86 server and in the Cloud (Amazon, Azure, Openstack etc.), delivering a fully virtualized application emulation and security validation solution to test and secure devices, networks and their services.

**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
- PCAPNG format support for troubleshooting TLS flows
- Faster setup, faster testing, faster results
- Distributed multi-cloud deployment support

**Network Interface Support**
- Support for 1/10/40/100 Gbps I/O

**Data**
- Jumbo Frame support with max MTU/Segment configurable
- TeraFlow/UDP Out-of-Sequence Statistics, reverse flow support
- Latency/TCP RTT distribution view with bucket configuration
- TeraFlow TCP/UDP, Ookla Speed Test, VR/Gaming (with Burst Profile)
- CCDF plotting of TWAMP One Way Delay metric and per packet latency reporting
- HTTP, HTTPS, HTTP 2.0 ALPN, HTTP/3, HTTP over QUIC (per stream bitrate control and statistics)
- HTTP with SAML 2.0 authentication (IdP emulation)
- 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, DSCP
- Enable path MTU discovery

**Data Center**
- VXLAN, GRE, SR-IOV

**Automation**
- REST, CLI, Perl, TCL, XML, Java API
- Python, Jython
- Cisco LaasNG, Qualysystems (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 (w/ DHCP): 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
- H.265 codec support

**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
VoIP with EVS (Enhanced Voice Services)
AKA authentication request per client
VoLTE Emergency calls support

**Voice (continued)**

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 including PANI information
MCPTT group calls (including KPI support)
MCPTT Client and Application Server Emulation

**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
802.1x EAP-MD5, EAP and PEAP with MS-CHAPv2 Authentication
RADIUS client EAP-TLS/EAP-FAST support with configurable custom AVPs
802.1X Accounting Start and Stop Records
Scalable Site to Site VPN - IPv6/V4
Additional security to limit access to public IP address assigned to TeraVM
in public cloud environments
IKE/IPSec VPN with PPK (RFC8784)
HTTPS SAML Authentication - Zero Trust Network validation at Scale
PPTP VPN Client and Server supported
Cisco AnyConnect SSL and Cisco AnyConnect IPsec VPN Clients
Cisco Umbrella SWG, session resumption
Cisco AnyConnect for Secure Firewall Cloud Native (SFCN)
Cisco AnyConnect SAML 2.0 authentication, SSQ, AD based login
Cisco AnyConnect for VTK, Meraki with SAML
Cisco AnyConnect STRAP (Session Token Re-Use Anchor Protocol)
Cisco Umbrella Chromebook Client emulation
Cisco AnyConnect SSL and IKE certificate based authentication with
multiple user provided ECDSA EdDSA certificates
PaloAlto GlobalProtect VPN client emulation

**Security**

40,000+ Malware attacks and Cybersecurity threats, updated monthly
Spam / Viruses / DDoS / Malware
Malware Application Profiles
TCP CUBIC congestion control

DDoS attack applications:
- Flood: SYN, Reflective SYN, Reset, UDP, Ping, ARP
- Attacks: Teardrop, UDP Fragmentation; Configurable Rates, Start and Stop
- Spoof Mac addressing

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 12 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
Chained certificates for HTTP server

**SLA Monitoring**

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

**Internet of Things (IoT)**

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

**Cloud Platform Support**

Amazon AWS
Google Cloud (GCP)
Oracle Cloud (OCI)
Microsoft Azure
Alibaba Cloud

**Hypervisors**

VMware ESXi
KVM Ubuntu
KVM Redhat
Citrix Xenserver
Hyper-V
Openstack

**Kubernetes Cloud Platforms (Containerized TeraVM)**

Google GKE
Amazon EKS

**NetSecOPEN Tests**

NetSecOPEN Test Suite