VIAVI

NetSecOPEN™ on TeraVM™

With our market leading, fully virtualized security test tool TeraVM, VIAVI delivers the full suite of NetSecOPEN test cases.

What is TeraVM?

TeraVM is a software based L2-7 test tool running on off the shelf hardware & in the Cloud (Amazon AWS, Azure, Google Cloud, Oracle OCI etc.) to test security devices, networks and services at scale.

What is NetSecOPEN?

NetSecOpen is a non-profit, membership driven organization that provides open and transparent testing standards for Network Security Device Performance. NetSecOpen defines a suite of standards that can be used for the evaluation and/or certification of network security protocols.

NetSecOpen Compliant Test Suite

In the market leading easy to use web GUI, TeraVM delivered NetSecOPEN compliant test cases following these criteria:

- Page Size: various page sizes were defined
- IPV4 and IPv6 Hosts: hosts that use IPv4 or IPv6
- Traffic Flow: TCP connection, perform 10 HTTP GET transactions of different page sizes
- Test Phases: default values for test phases are defined.

NetSecOPEN Test Case List

HTTP Throughput Test – measure throughput of HTTP transactions varying the HTTP response object size

HTTP CC – determine the maximum number of concurrent TCP connections that the DUT sustains when using HTTP traffic

HTTP CPS – using HTTP traffic determine the maximum sustainable TCP connection establishment rate supported by the DUT for different load conditions

HTTP Transaction Latency - using HTTP traffic determine the average transaction latency of the DUT

HTTPS Throughput Test - measure throughput of HTTPS transactions varying the HTTPS response object size

HTTPS CC - determine the maximum number of concurrent TCP connections that the DUT sustains when using HTTPS traffic
**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 1/10/40/100 GE ports

**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 Multiple streams/Multiplexing support
- SMTP / POP3 (incl. file attachments)
- FTP (Passive/Active), P2P applications, DNS
- FTP client session count limit

- DNS client (with HTTP/S applications) incl. host name into IP address resolution
- DNS Server

**Address Assignment**
- Configurable MAC
- DHCP, PPPoE (IPv4 & IPv6)
- Dual Stack (6RD, DS Lite)

**Ethernet Switch**
- VLAN Tagging (up to 8 concurrent tags)
- ACL, 802.1p, DSCP

**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 & stateful TCP Replay: Ability to dynamically change content
- Replay large PCAP files: TCP, UDP and raw data playback

**Note:** there are 20+ additional variants of these 9 tests.

**Watch video of the TeraVM web GUI at:**
https://bcove.video/31BXNAi
• IP Replay: multiple TCP/UDP streams
• Amplify and dynamically sub data into PCAP

Video
• CMTS, CDN, Multicast: IGMP v1/v2/v3 & 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 & WebEx calls in HTML5 UI
• Dual-Stack VoIP Gateway emulation
• Cisco CUCM, CUBE
• VoIP: SIP & RTP (secure & unsecure), SMS
• VoIP with EVS (Enhanced Voice Services)
• VoIP client scaling with auto generated unique AKA authentication per client
• VoLTE Emergency calls support
• Dual Hosted UACs, SIP Trunking
• Voice & 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), Generic remote access
• VPN clients: Cisco AnyConnect, Fortinet, Juniper Pulse, Juniper Network Connect, F5, Huawei, AT&T SSLT
• Cisco Umbrella
• SAML, SSO, Active Directory based login
• 802.1x EAP-MD5, EAP & PEAP with MS CHAPv2 Authentication
• 802.1X Accounting Start and Stop Records
• Site to Site VPN – IPV6/V4
• Additional security to limit access to publicIP address assigned to TeraVM in publiccloud environments
• PPTP VPN Client & Server supported

Security
• 40,000+ Malware attacks & 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
• Good and Bad mixed traffic flows
• Statefully scale Cisco specific threats
• Ability to use 3rd party threat libraries
• Ability to turn on /off Extended MasterSecret (RFC 7627) support flag to test CiscoFTD, ASA and other security solutions
• Support for TLS1.3, TLS1.2 simultaneously on Client & Server
• TLS SNI Support incl. unique certificate perFQDN

SLA Monitoring
• TWAMP-RFC 5357, PING
• 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 @ 1,000s of RANs
- Core Emulation:
  - 5G (NSA & SA), 4G-LTE, 3G, 2G with Mobility @ 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
- Oracle OCI
- Containerized TeraVM (docker)

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

Specific Test Coverage
TeraVM includes Cisco 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 802.1X

Client
- Cisco AnyConnect ECDSA, EdDSA Cert authentication
- Cisco Umbrella
- Captive Portal testing
- Cisco TelePresence
- Cisco Video Clients
- Cisco WebEx
- Cisco Phones
- Mobile phones for Security Gateway
- IoT Device