TeraVM Security

TeraVM Security is an endpoint emulation platform for validating secure access and application services at high scale - such as VPN, ZTNA, voice, video, and multicast clients. It provides per endpoint emulation, control, and reporting with automation, and is deployable on standard x86 servers and in cloud environments (OpenStack, GCP, AWS, Azure, Alibaba Cloud, and more).

Application Support

AI Enablement
MCP Server for Test Bed Management
TestGen Agent - AI Assisted Test Creation
AI Powered Knowledge Agent on CPU
Site to Site IKEv2 VPN Testing
Scalable Site-to-Site VPN – IPv4/IPv6 (100,000+ Tunnels/ Subnets)
IKE fragmentation configurability
PFS, IKE and IPSec Rekeying
NAT traversal detection and support
Dead Peer Detection includes a parameter to specify the timer interval.
Debug Tools include Unencrypted Packet Capture of IPSec tunneled traffic
RFC 7427 IKEv2 with ECDSA
RFC 8420 IKEv2 with EdDSA
Authentication using pre-shared keys (PSK) for IKE clients
Post Quantum Preshared key (PPK) RFC8784 with ETSI 014 API for fetching keys
Post Quantum Cryptography and QKD
IKE/IPSec VPN with Post Quantum Cryptography (PQC) ML-KEMS FIPS-203, RFC9370, RFC9242 with 8 rounds of Key exchange
IKE/IPSec VPN with pre-standard PQC KEMs with configurable transform IDs
IKE/IPSec VPN with Post Quantum Preshared Key (PPK) (RFC8784)
TLS PQC RFC10024 HTTPS with PQC ML-KEM FIPS-203
TLS PQC FIPS-204, FIPS-205 Certificate testing
QKD Key Management System Test with ETSI 014 APIs with IKEv2 Initiator and Responder emulation
Testing with PQC and non-PQC clients in the same test
Testing for failover and fallback mechanisms
Ability to send real world traffic (HTTPS/SaaS/DNS) including TLS PQC flows inside PQC VPN sessions at scale and measure latency KPIs
Provides comprehensive real-world benchmarking with PQC & uncover performance limitations at scale of the IKEv2 gateway

Prisma Access Agent – MASQUE ZTNA Client Emulation
Prisma Access Agent (PAA) HTTP/3 MASQUE client emulation to validate MASQUE proxy at scale
MASQUE tunnels carrying HTTPS, FTPS, SMTPS, POP3S and UDP Applications flows
Prisma Access Agent - VPN Client Emulation
Prisma Access Agent VPN client emulation (100,000+ Tunnels)connecting to Prisma Access SASE cloud gateways
Prisma Access Agent VPN Client emulation with EPM Command Support over WebSocket (CMD 50 Download Logs, CMD 70 Remote Shell)
Prisma Access Agent VPN Client emulation for Independent EPM microservice testing (gateway config, authentication, agent services)
Configurable HIP Report over WebSockets for EPM
PaloAlto GlobalProtect VPN Client Emulation
Global Protect VPN client emulation (IPv4/IPv6 headends ; SAML 2.0, Certificate Only, and Certificate + Password auth; NGPA protocol)
Global Protect VPN emulation with IKEv2 Quantum Safe PPK (Post-Quantum Pre-shared Key) support
Global Protect VPN emulation with IKEv2 PQ-KEM Additional Key Exchange with FIPS-203 KEMs and PQ-TLS
App Acceleration Testing – with SaaS Application Profiles inside GP VPN Tunnels
DLP Testing ; Emulating Malwares, CVEs inside GP VPN sessions
Configurable HIP Report with HTTP POST for Gateway
Cisco Secure Connect – AnyConnect VPN Emulation
Cisco AnyConnect TLS/DTLS/IKEv2 VPN Clients with 100,000+ scale, Dynamic IPv4 and IPv6 tunnel assignment
Cisco AnyConnect SAML 2.0 authentication, SAML with LoginBroker ,SSO, AD based login
Cisco AnyConnect SSL and IKE certificate based authentication with multiple user-provided ECDSA / EdDSA certificates
Cisco AnyConnect for VTK, Meraki with SAML
Cisco AnyConnect NAT traversal detection and support

Cisco AnyConnect STRAP (Session Token Re-Use Anchor Protocol)
Cisco AnyConnect – FQDN/SNI via IKE_SA_INIT
Cisco AnyConnect Tunnel Group Selection, , SAML with VPN loadbalancing
Cisco AnyConnect for Secure Firewall Cloud Native (SFCN) including IKE redirects support
Cisco AnyConnect with PQC ML-KEM ciphers for IKEv2 tunnel mode with rekeying
Cisco Umbrella SWG, session resumption
Cisco Umbrella Chromebook Client emulation
Cisco Secure Connect MASQUE ZTA Client Emulation
Cisco Secure Access Client with MASQUE sessions emulation at scale
MASQUE tunnels carrying HTTPS, FTPS, SMTPS, POP3S and UDP Applications flows
Cisco Secure Access Client – Universal /Hybrid ZTNA
Clientless ZTNA
HTTPS with SAML 2.0 Auth: Zero Trust network access (scale) and Captive Portal (SAML + Local)
Explicit Proxy / SWG client emulation validates SWG policy enforcement and URL filtering
Explicit Proxy SAML authentication – dynamically extracts and replays authentication tokens
Network Access Control and AAA
802.1x EAP-MD5, EAP and PEAP with MS-CHAPv2
RADIUS client EAP-TLS/EAP-FAST with configurable custom AVPs (10M+ Supplicants emulation)
Emulation of 10M UE Supplicants authenticating over RADIUS using 3GPP attributes IMEI,IMSI and IP address for N6 NGFW testing
802.1X Accounting Start and Stop Records
Configurable MAC; DHCP; PPPoE (IPv4 and IPv6)
Data
TLS with multi signature hash algorithm configuration and key share
Configurable TLS Client Hello size (up to 16KB) that span multiple TCP segments
HTTP GET/POST with unique file hash per transaction to stress test NGFW content inspection at scale
HTTP/HTTPS, HTTP/2 (ALPN), HTTP/3 over QUIC; per-stream bitrate control and statistics
TLS 1.3 and TLS 1.2 simultaneously on client and server; configurable TLS record size
TLS SNI support incl. unique certificate per FQDN; chained certificates for HTTP server
DNS Client with UDP/TCP/TLS (DoT)
DNS over HTTP (DoH); 1 million+ user-supplied DNS queries using random ports
DNS Server with configurable domain name mappings
SaaS Application Profiles
HTTP/1.1 WebSocket client and server emulation at scale with configurable payload, send interval and per-session connection and message statistics
PCAPNG format support for troubleshooting TLS flows
TCP CUBIC Congestion Control
L4S – TCP Prague Congestion Control
HTTP Strict Transport Security (HSTS) header support
Jumbo Frame support with configurable MTU/Segment
Path MTU discovery
VLAN Tagging (up to 8 concurrent tags)
ACL, 802.1p, DSCP marking
TeraFlowUDP Out-of-Sequence Statistics, reverse flow support
TeraFlow TCP/UDP; Ookla Speed Test; VR/Gaming with Burst Profile
TCP delayed ACK (timer based)
SMTP/POP3 (incl. file attachments)
FTP (Passive/Active), P2P applications; FTP client session count limit
Cisco Netflow Records/Exporter emulation at scale with user configurable and varying fields v9 and v10(IPFIX)
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 Streaming)
Video conferencing, WebEx, Telepresence; HTTP-based video; H.265 codec support
Video quality metric per end point (MOS, simultaneous)
Voice
Secure VoIP and WebEx calls
Dual-Stack VoIP Gateway emulation; CUBE; SIP Trunking; Dual Hosted UACs
VoIP: SIP and RTP (secure and unsecure), SMS; auto-generated unique client scaling
EVS, AWR
Voice quality metric per end point (MOS, simultaneous)
G.711 SID support – RFC 3889
MCPTT group calls (including KPI support)
MCPTT Client and Application Server Emulation

Statistics and Reporting
Per flow measurements - per Session , per IP endpoint statistics
Latency/TCP RTT distribution view with bucket configuration
Percentile reporting for latency statistics
CCDF plotting of TWAMP One Way Delay metric and per-packet latency reporting
TWAMP – RFC 5357; PING – RFC 792
Replay Application Repository
Intelligent UDP and stateful TCP Replay with dynamic content substitution
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
Deployment Environments
Cloud: Amazon AWS, Google GCP, Microsoft Azure, Oracle OCI, Alibaba Cloud, OpenStack
Hypervisors: VMware ESXi, KVM (Ubuntu / RedHat)
Containers / Kubernetes – Google GKE, Amazon EKS
Tunnelling overlays: VxLAN, GRE; SR-IOV NIC passthrough
Distributed multi-cloud deployment support
Automation
REST API for test management, real-time monitoring, and data export
CLI, Perl, TCL, XML, Java API; Python, Jython
QualiSystems (CloudShell), Luxoft SDL, OpenStack integration
Cisco LaasNG, Cisco pyATS
Platform and Management
System utilization reports and license management (Location, User, Testbed, usage stats, check-in timer)
Adaptive Engine – Automatically find maximum capacity of Devices Under Test
Same test profile usable across multiple platforms
1/10/25/40/100/200 Gbps I/O support

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