VulcanManager

Layer 4-7 Management Software

Xena VulcanManager is a user-friendly application for managing Xena's Vulcan traffic generation and analysis test solutions.

It is used for application emulation, performance verification, load testing, analysis and characterization of Ethernet equipment and network infrastructure.

Core Functions

Xena VulcanManager is a Windows-based application for managing Xena's extreme-performance Vulcan L4-7 test platform. It is used for stateful end-to-end testing of network devices such as firewalls, SSL/TLS proxies, switches, routers, NAT routers, bandwidth shapers, and more.

VulcanManager is suitable for characterizing network baseline performance for TCP. This is done by measuring connection establishment and teardown rates, number of concurrent connections/transactions, packet forwarding rate at large numbers of connections and identify performance bottlenecks.

With Xena's TLS 1.2 support, users can do TLS performance testing e.g. handshakes per second, TLS throughput, concurrent TLS connections, etc., with different cipher suites and certificate key sizes on a DUT that decrypts traffic on one side and encrypts on the other.

With VulcanAppMix, the platform allows users to run realistic application traffic mixes for performance verification of content-aware networks and application-aware network devices. This is extremely useful when verifying the performance of network security devices with application-awareness, such as next-generation firewalls, IPD, etc., in both network pre-production and post-production phases of enterprises. VulcanManager also allow users to replay their own captured traffic and scale up to millions of connections.

VulcanManager supports ad-hoc test execution and remote management of test equipment located in multiple locations. Xena also offers an open scripting API (ValkyrieCLI) for automated testing.

Application Emulation

VulcanManager lets you create complex traffic scenarios via VulcanAppMix which is a library containing hundreds of pcaps files of real-world applications. This makes it easy to verify the performance of application-aware networks and devices. With VulcanAppMix's pre-defined library, different traffic mixes can be loaded and customized for various network environments, etc. enterprise environment and financial institutions.

TLS Performance Testing

With VulcanManager you can select TLS as a layer above TCP to carry out performance testing. With different TLS ciphers suites and various key sizes from TLS certificates, you can test TLS performance such as TLS handshakes per second, concurrent TLS connections, TLS throughput, TLS alerts, etc.

Top Features

- Wire-speed stateful TCP connection, traffic generation and analysis
- TLS performance testing with different cipher suites and certificates
- Application emulation with real-world application traffic mixes enabled by VulcanAppMix
- Replay captured traffic at scale
- Configuration and tuning of Ethernet, IP and TCP header fields for advanced traffic scenarios
- Extensive live stats and test reports
- Configurable allocation of processing resources to Ethernet test ports
- Wire-speed traffic capture
- Switched and routed network topologies, NAT support
- Export packet capture to industry standard pcap/Wireshark

Easy to configure and use, Xena's native TLS lets you test a device that acts in TLS proxy mode, where the device decrypts traffic on one side and encrypts on the other.

TCP Traffic Generation

VulcanManager makes it easy to customize TCP connections by modifying the MAC/IP/TCP headers to create variations in the generated packets.

Traffic rates are specified as a percentage of line rate, frames per second or bit-rate, and traffic generation is controlled by a load profile specifying the speed with which connections are established and terminated.

The TCP payload can be automatically generated (random, incrementing) or customized by the user via a graphical payload editor. Payloads can also be loaded from file.

Stateful Payload Replay

VulcanManager lets users replay their own captured network traffic on the test networks and devices. The replay is done on the Layer-4 payload level and parameters of the layers below are configurable. The replayed traffic can be scaled up to millions of connections for extreme performance verification. Users can define how to duplicate the captured connections/transactions, i.e. with unique

MAC and IP addresses.

Generic Load Testing

Using VulcanManager, you can quickly generate millions of TCP flows with specified load profiles and configurable IP/TCP/Payload parameters. Real time statistics and test reports provide an overview of the system or device characteristics.
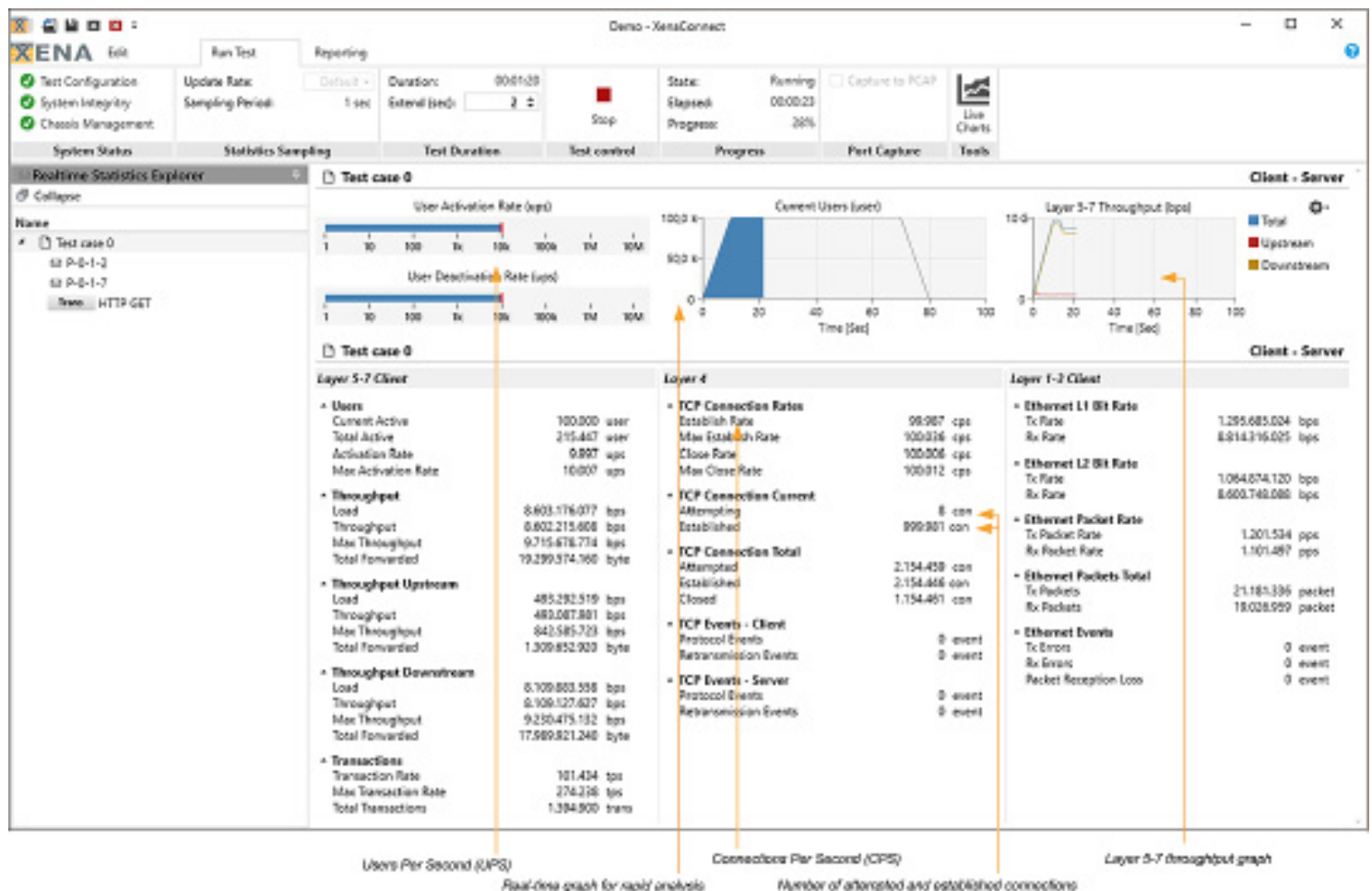
Multi-user and Port Reservation

VulcanManager supports multi-user environments at the level of per port reservation. Packet Engines (PE's) can be reserved and allocated individually, depending on the test scenario, for full operational flexibility and performance.

Report Generation

VulcanManager includes a report generation function that makes it easy to document results as attractive, simple-to-view PDFs.

API Scripting Made Easy

ValkyrieCLI is a text-based Command Line Interface (CLI) API that makes test automation easy to script from any scripting environment that supports TCP/IP.

Users Per Second (UPS)

Real-time graph for rapid analysis

Connections Per Second (CPS)

Number of attempted and established connections

Layer 5-7 throughput graph

Functional Specifications

Application Emulation

Protocol-oriented
- Stand-alone application-layer protocol traffic, e.g. HTTP/S, IMAP, MQTT, SMB, FTP, FIX, etc.

Application-oriented
- Application traffic with various protocols, e.g. email, web browser, IoT, etc.

Application Mixes
- Application traffic mixes for different network environments
- Enterprise mix
- Web mix
- Finance mix
- Data center mix

TLS Performance Testing
- Cipher encryption, 128-bit and 256-bit AES, in the CBC and GCM modes, ChaCha20, 3DES, and RC4.
- Forward secrecy, both DHE and ECDHE
- Asymmetric cipher suites on the client and server sides
- Customizable cipher suites preference list
- Certificate key sizes from 1KB to 8KB
- Maximum TLS record size of 16KB
- 1.2 million TLS concurrent connections, 14K TLS connections per second

Traffic Replay

- Replay captured traffic from industry-standard pcap files
- Scale up connections to millions
- Configurable traffic composition
- Up to 50 pcap files upload per port
- Up to 1024 connections per pcap, and 2M TCP segments in pcap per port
- Up to 200 concurrent replay scenarios
- Average upload pcap size: 1GB

TCP Connection Generation

TCP Applications
- Open/close – for CPS and CC testing
- Bulk data transfer – for emulation of raw TCP network traffic

TCP Application Behavior
- Upload (client -> server)
- Download (server -> client)
- Bidirectional (server <-> client)

Basic L4+ Emulation
- Custom HTTP header
- Request/response protocol exchange with custom payload

TCP Payload
- Finite / Infinite lengths
- Custom/increment/random

Bandwidth Specification
- Per test scenarios
- Loads specified in percent of line rate

TCP Options and configuration
- MSS, window scale, window size

MAC/IP/TCP Configuration
- Ethernet address
- VLAN ID/Priority
- IP address (src/dst)
- IP DS/ECN
- TCP port (src/dst)

Control Protocols
- ARP reply from hosts
- ARP request for hosts/GW's
- ICMP Echo replies from hosts

Per Port Statistics
- Runtime and post-run stats
- Packets/bytes (Rx/Tx), packet/byte rates (Rx/Tx), FCS errors
- Packet checksum errors (IP + TCP)
- Protocol counters (IP, TCP, ARP, ICMP)

Per Test Scenario Statistics
- Runtime and post-run stats
- TCP state counters
- TCP state rates
- Total Rx/Tx packets/bytes
- TCP Retransmissions counters
- Packet size distribution
- Histograms
- Connection establishment/ teardown times (max/min/avg)

Network Topologies
- Switched and routed networks
- NAT routing
- TCP Proxy

System Requirements:
- CPU: Intel Core i5
- RAM: 4 GB
- Required hard disk space: 175 MB
- Screen Size: 1280x768
- Operating System: Windows 7 SP1, (Windows Server 2012 SP2 Standard) - Updated

Recommended:
- CPU: Intel Core i7
- RAM: 8 GB
- Required hard disk space: 175 MB
- Screen Size: 1280x768
- Operating System: Windows 10, (Windows Server 2016 Standard) - Updated

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