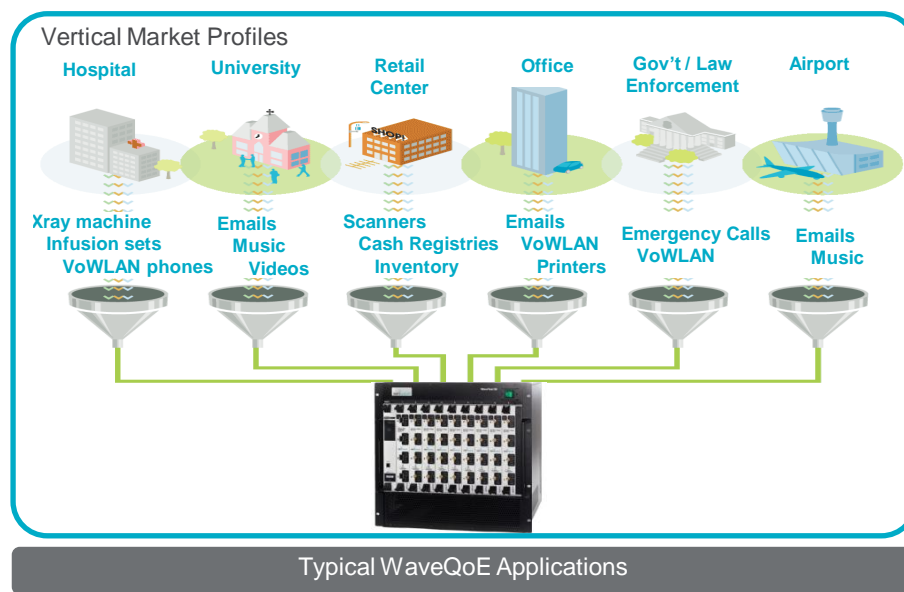


WaveQoE™ - End User Quality of Experience Test

WaveQoE - End User QoE Test - offers network developers, QA engineers, installers and IT staff the capability to accurately determine how well business applications will perform in different usage situations, such as education, retail, corporate office, hospital and carrier networks. Application performance metrics provide the means for determining whether the system measures up to desired quality levels. These metrics precisely quantify the results, define a Service Level Agreement (SLA) in terms of quality thresholds, and compare actual measured test results to the desired SLA's.

WaveQoE is designed for testing of edge network devices such as access routers, gateways, security-enabled switches, application accelerators and WAN accelerators.

Using WaveQoE, it is easy to model real-world deployment scenarios and study the end-users' actual quality-of-experience. Creating "what if" scenarios to effectively plan for changes or added services, makes this an ideal solution for network managers, service providers and network equipment vendors



Benefits

- One system autonomous test solution for converged wired and wireless networks
- Ready to use traffic models representing virtually all LAN and WLAN network applications with their associated user mix and behavior characteristics
- Create unique usage models to fit a particular network behavior
- Effectively ensure the performance of critical applications before rolling them out on the production network
- Establish an application certification process for different wired and wireless network deployments
- Discover equipment design flaws affecting application performance early in the development cycle
- Reproduce intermittent performance problems in the lab to ease troubleshooting and improve service levels
- Identify and fix security holes in network deployments exposed by complex interaction of different client and application security schemes
- Dramatically reduce test and support costs, and increase test/debug/fix cycle efficiency thereby improving time-to-market

Test Description

WaveQoE accurately replicates the complex interaction of clients, servers and traffic profiles in wired and wireless LAN's. By creating usage profiles and traffic mixtures that were found to be representative in various network environments, the test measures and reports key application layer metrics that affect end-user Quality of Experience (QoE). The networks replicated include: health-care, education, airports, warehouses, hospitality, retail, hot spots, and service provider managed services.

Test Results & Metrics

- The WaveQoE test provides both real-time results and final test results and metrics. These results can be exported in a comma separated value (.CSV) file format or HTML to facilitate results analysis and reporting.
- Automatically generated PDF test reports provide executive summaries, including comprehensive graphs, a description of the test, the significance of the results, and detailed results for drill-down analysis
- Results include metrics directly affecting the user experience, such as:
 - VoIP MOS scores, Video MDI scores, HTTP/FTP Goodput levels, FTP file transfer times, etc.
 - Total intended load, offered load and achieved load
 - Percentage of traffic flows of traffic types that satisfied the SLA
 - Percentage of clients of each client type that satisfied the SLA

CLIENT CONTROL

- 802.3 link speed / 802.11 PHY data rate
- VLAN tag / WMM QoS
- Security schemes
- MAC address (auto/manual)
- IP address (DHCP/static)
- For wireless clients
 - Transmit power level and frame error ratio
 - WMM admission control

TRAFFIC CONTROL

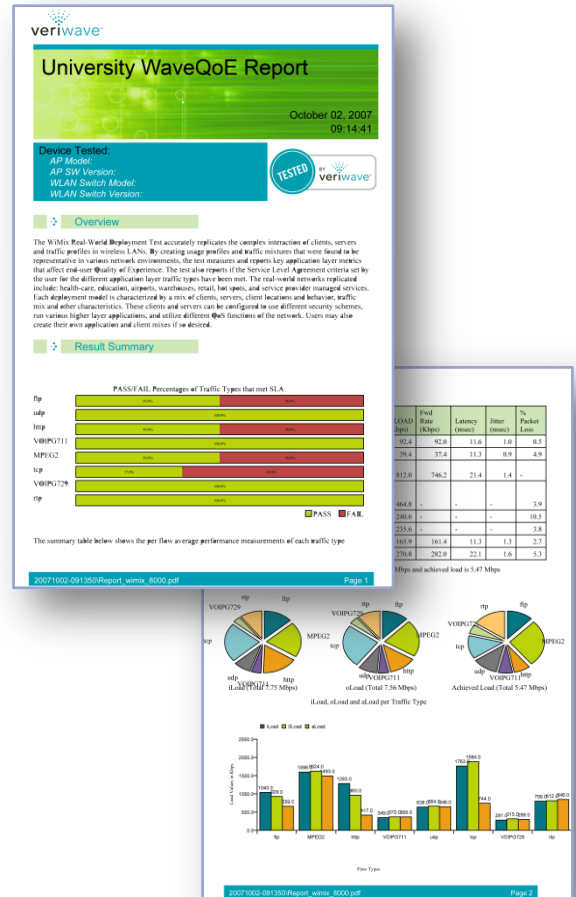
- Distinct SLA threshold per traffic type
- Source server
- Traffic load
- Traffic flow rate
- Traffic direction
- User priority per 802.11e/802.1D
- Multicast video/voice
- HTTP (1.0, 1.1): GET, POST
- SIP signaling (enable/disable)
- VoIP codec types – G.711, G.729, G.723
- MPEG-2 transport stream
- FTP: USERNAME, PASSWORD, GET, PUT, file size
- TCP, UDP

TEST CONTROL

- WaveQoE vertical deployment model
 - Enterprise
 - Health care
 - Warehouse
 - Education
 - Service provider
 - Hot Spot
- Client or traffic-based WaveQoE view
 - Number of clients per gateway, router port, or Access Point
 - Client type
 - Traffic type
 - Percentage of specific types of clients in mix
- Test duration (hours, minutes and seconds)
- Traffic-based WaveQoE view:
 - Client type
 - Traffic level per gateway, router port, or Access Point
 - Traffic type
 - Percentage of specific types of clients in mix

SERVER CONTROL

- 802.3 link speed
- VLAN ID
- MAC address (auto/manual)
- IP address (DHCP/static)



Minimum Requirements

VeriWave Test System	1 x VeriWave WaveTest 90™ or WaveTest 20™ system <ul style="list-style-type: none"> • For Ethernet Only: <ul style="list-style-type: none"> ◦ 2 x VeriWave Gig-E ports (WBE1104) • For Ethernet and WLAN: <ul style="list-style-type: none"> ◦ 1 x VeriWave Gig-E port (WBE1101) ◦ 1 x VeriWave WLAN port (WBW1101 or WBW2000)
VeriWave Software	VeriWave L4-L7 Stateful Client Generation Package
Host Computer	<ul style="list-style-type: none"> • X86-based PC with 1GHz processor and 256MB RAM • Windows XP SP2, or Linux (2.6 or higher kernel level)