Net.Audit monitoring system

the Path to Excellence

ALBEDO Telecom Net. Audit is a quality monitoring system at the IP layer, which measures the parameters that manage QoS of Multiplay applications. It is also a solution that can verify SLA and identify causes of quality degradation.

Everyone is aware Telecom Operators have finally adopted IP based infrastructure, a fact that has dramatically increased the importance of QoS parameters of the Internet Protocol now extended across the whole network.

Applications such as Voice over IP, IP Television, High Speed Internet or Video on Demand require specific end-to-end performance measurements to deliver a satisfactory level of quality.

Performance requirements are well understood, however several key contributors are often beyond the network service providers control such as customer LAN, application gateways, terminals, hosts and servers that now need to be addressed.

Service providers and users can now verify the network performance levels by installing the Net.Audit to have a guarantee of the performance or to identify the causes that undermine the new generation of Triple/ Quadruple / Multiplay applications.

QoS in IP Networks

The ALBEDO Telecom probes can predict the ability of a Carrier IP network to support any particular service in advance by discovering the actual level of quality while analyzing potential degradation sources.

"In-Service and One-Way measurements of QoS by means of active probes for SLA monitoring"

Operators and Professional users are deploying the Net.Audit for:

• **Network Certification** at the IP layer and independently of the infrastructure.

• **SLA compliance** of public IP accesses, Virtual Private Networks (VPNs) and Operators Internetworking.

• **Multiplay Capability** confirms the ability of the network to support services such as VoIP, IPTV or critical data.

• **QoS Evaluation** according to the international standards and identifying the potential degradation sources.

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Network Health Check

Whether you are implementing a major change of your IP infrastructure, or just want to get your existing environment analysed, ALBEDO Telecom can help provide detailed analysis of the Quality of Service and Bandwidth Performance of your IP network. Thereafter, it will be easier for you to plan ahead and concentrate on your business while we help to optimise your network, which is typically a number of internal LANs connected by external operated WANs.

Network Class (ITU-T rec. Y.1541)								
	0	1	2	3	4	5	6	7
IPTD	100 ms	400 ms	100 ms	400 ms	1 s	U	100 ms	400 ms
IPDV	50 ms	50 ms	U	U	U	U	50 ms	
IPLR	1x10E-3					U	1x10E-5	
IPER	1x10E-4					U	1x10E-6	
IPRR	Undefined						1x10E-6	

Service Level Agreements

Today's networks require consistent controls and maintenance to ensure reliable service delivery and confirm that Service Level Agreements (SLA) with third parties is met.

We have been specifically trained to evaluate your network equipment, software and standards compliance to identify any potential issues that may affect performance. This work confirms that each part of your network complies with the standards and of your SLA.
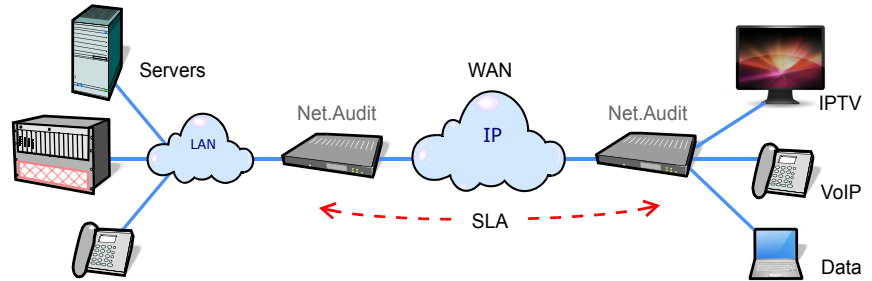
Quality Auditing

Did you know that even the most challenging network problems may often be solved without an on-site visit? The Net.Audit will work alone and transparently to identify the issues of the WAN operated by your telecom provider. This is a quick and easy way to check that your network is behaving as expected.
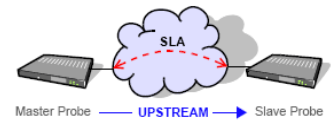
Telecom Service Certification

Application performance does not only depend on its hardware and software quality, it is also a combination of other elements like network nodes, which depends on how the MetroLAN has been configured to supply you a customized service. Furthermore, most of the IP networks were designed to transport data, which is a completely different issue from delivering voice or video services in real time.

The AT-1541 can automatically analyse over a pre-set period of time e.g. one week, key parameters such as throughput and latency that affect performance of all the applications and, in particular, those that are time sensitive. This analysis will point out the weakest links of your system and provide instructions for improvement. Our engineers will collaborate with your staff and provide your organisation with a comprehensive report
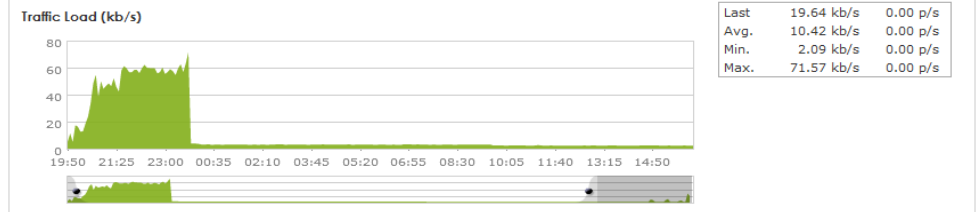
Servers
WAN
IPTV
LAN
Net.Audit
IP
Net.Audit
VoIP
SLA
Data

Association data
Master demo01
Slave demo05
Period Day
Direction Upstream
Period 2010-06-22 - 2010-06-23

Master Probe — UPSTREAM → Slave Probe
SLA

One-way Delay Statistics

Delay (ms)

One-way Delay	
IPTD	1,892.45 ms
Median	2,067.36 ms
Min.	29.26 ms
Max.	19,403.57 ms

Delay Variation	
IPDV	19,374.31 ms
Std. Deviation	5,000.31 ms

Delay Variation (ms)

Delay Distribution (ms)

Upstream

Traffic Load (kb/s)

Last	19.64 kb/s	0.00 p/s
Avg.	10.42 kb/s	0.00 p/s
Min.	2.09 kb/s	0.00 p/s
Max.	71.57 kb/s	0.00 p/s

Downstream

Traffic Load (kb/s)

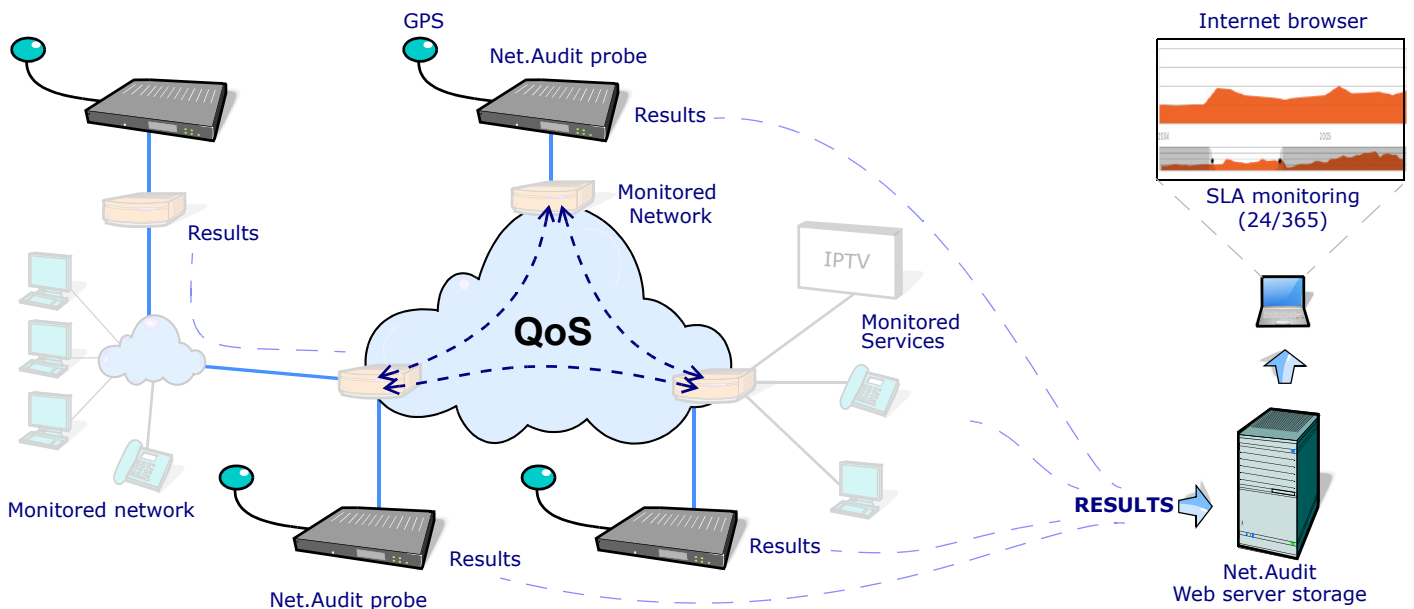| Last	431.80 kb/s	0.00 p/s
Avg.	17.54 kb/s	0.00 p/s
Min.	1.60 kb/s	0.00 p/s
Max.	572.92 kb/s	0.00 p/s
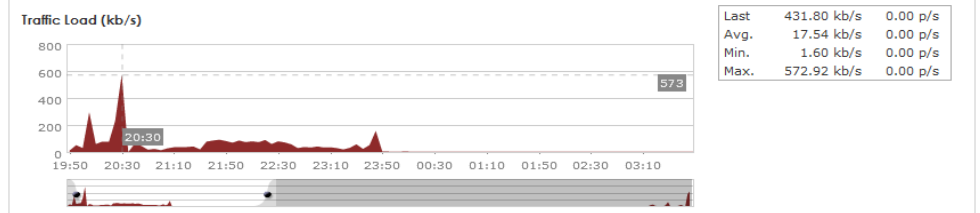
Applications

Triple Play Feasibility

Large scale deployment of converged services over IP today is not just high speed Internet, but now the main stream in Telecoms including Voice, Video and Television. However, IP networks are not always able to transport every type of technology as each application has specific Quality and Bandwidth requirements.

VoIP pre-qualification

The effectiveness of mass VoIP deployments not only depends on the terminals, but also on the transport network. Resource management, serialization of traffic, congestion control and many other factors determine QoS parameters such as delay and jitter, which are the main reasons for degradation of VoIP Mean Opinion Scores (MOS).

Using the Net.Audit and the right methodology of analysis, we can examine the parameters of capacity, quality and latency that affect the new VoIP network, therefore determining the success or failure. Through this analysis it is possible to identify weaknesses in advance before the installation of servers, terminals and gateways.

Quality of Service in VPNs

The Net.Audit probes permanently monitor the VPN links to verify that all services (including low latency) do not suffer any serious degradation. Service providers and customers may formalize thei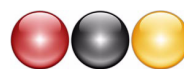r commitment on quality in SLAs that describe by means of parameters the level of QoS and Bandwidth. The Net.Audit probes permanently monitor the VPN links to verify that all services, including low latency services, do not suffer degradation.

Internet Access Monitoring

Use of IP for transporting voice and video, besides traditional data, is increasingly prevalent for both business networks and residential users.

Quality between Operators

It is common for telecom operators to interconnect with other operators to provide service to subscribers that are beyond the coverage of their own network. The Albedo Telecom SL.Audit service arbitrates between a carrier or service provider to identify who is responsible for any degradation. Thanks to this feature, it is possible to ensure that the end customer has sufficient guarantees of quality regardless of their service, whether delivered over homogeneous or heterogeneous network paths.

FEATURES

- Based on RFC4656/OWAMP
- In-Service measurements
- One-Way results: Delay, Jitter, Loss, Error, Reordering, Availability, Bandwidth
- Up / downstream occupancy
- Synchronized GPS / NTP
- Active Probes
- Min. Overhead: 0.008 kbit/s
- Programmable packet size
- Programmable QoS and Bandwidth objectives
- Pass / Fail indication
- VLAN support
- Compatible with MPLS
- Mail and CSV reports

APPLICATIONS

- SLA definitions
- SLA verification
- Network Certification
- Network QoS Auditing
- VoIP pre qualification
- IP Troubleshooting

BENEFITS

- Distributed measurements
- Independent of routers
- Milliseconds accuracy
- Remote Configuration
- Multipoint-multipoint
- Centralized via SSH
- Web server
- https remote access
- End-to-end test
- Overcomes NAT walls

System Set Up

Synchronization	• Using the Network Time Protocol (NTP) • Using the Global Positioning System (GPS) • Using external synchronization signal
General	• Mode of operation: open, approved, encrypted • Alerts/programed events sent by system e-mail and GSM • Measuring cycle: 10s, 60s, 300s
Traffic Test	• Number of test packets during a measurement cycle • DSCP configuration • Statistical distribution of test traffic: deterministic, and poisson
Quality Objectives	• IPTD: IP Packet Transfer Delay (ITU-T rec. Y.1540) • IPDV: IP Packet Delay Variation (ITU-T rec. Y.1540) • IPLR: IP Packet Loss Ratio (ITU-T rec. Y.1540) • IPER: IP Packet Error Ratio (ITU-T rec. Y.1540) • IPRR: IP Packet Reordering Ratio (ITU-T rec. Y.1540) • Network Availability (ITU-T rec. Y.1540)
Management	• Centralized via SSH • Web browser • Remote Configuration • Remote setup/modification of Quality objectives
Test Setup	• Programmable test packet frequency from 1 second to 1 minute • Programmable test packet size from 64 to 1518 bytes • Programmable test packet DSCP
Topology	• Point to Point • Point to Multipoint • Multipoint to Multipoint
Architecture	• LAN, MAN, WAN support • VLAN support • Compatible with MPLS based e-Line, E-LAN, e-Three

Measurements

Delay	• Delay histogram time line and end to end IP (RFC 2678 One way delay) • IPTD (average delay) with pass / fail indication • IPDV (99.9% quantile 0%) with pass / fail indication • Standard deviation of delay • Quantile 1%, 50% (median) and 99% • Graphs and statistics separate upstream and downstream channel
Packet loss	• Schedule packet losses • IPER indications IPLR and PASS / FAIL • Parameters of statistical distribution of errors: "loss period" and "loss distance" (RFC 3357) • IPRR according ITU-T rec. Y.1540 • Network Availability according ITU-T rec. Y.1540
Bandwidth	• Schedule upstream and downstream occupancy (kbit/s) • Occupations ascending and descending high, low and middle (kbit/s)
SLA	• Programmable IP layer QoS objectives • Programmable IP layer Bandwidth objectives
Other	• Synchronization error estimation • Traffic classes ITU-T Y.1541 target computer and wait • Availability (ITU-T 1540)
Results	• Graphs and statistics • Separate upstream and downstream results • Web browser application • Pass / Fail indication • Mail and csv reports • Long term measurements and results: daily / weekly / monthly / year

Design

Technology	• Based on RFC 4656 One-Way Active Measurement Protocol (OWAMP) • Min. Overhead: 0.008 kbit/s (test packet size: 64 Bytes, 1 packet/min.) • Max. Overhead: 12.144 kbit/s (test packet size: 1,518 Bytes, 1 packet/sec.)
GUI	• GUI based secure web server installed on your computer • Configuration and remote measurement using SNMP protocol • Management console port (RS-232)
Ergonomics	• Status information through built-in LCD screen to your computer • 2 x Ethernet 10/100BASE-T (RJ-45), RS-232 (console)
Models and Options	• 10/100 Mbit/s, 10/100/1000 Mbit/s, 1/10 Gbit/s Interface • Internal / External bandwidth traffic taps

Probes in the System

Probe	Enabled	Tests	Status	Sync Source	User	SLA	Results
atsl01	Yes	8	Sync	-	jcolomer	❌	Details
demo01	Yes	4	Sync	-	dpatil	✅	Details
demo03	No	1	-	-	gsanchez		
demo04	Yes	1	-	-			Details
mumbai01	Yes	1	Sync	-	dpatil	❌	Details
demo08	Yes	1	Sync	-	gdavis		Details

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