implementing next generation
IT and communications solutions

Service Assurance for Digital Video
and IP-based Multiplay Networks

iTVSense Probe M-301/M-304
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iTVSense M3xx Probes appliances deliver exceptional performance and accuracy for the most demanding IPTV and 3-Play service monitoring tasks. Deployed to the IPTV headend, these probes can analyze up to 1000 channels (including up to 400 HD channels) simultaneously, providing complete service assurance even for the broadest IPTV channel offerings with a single and small form factor device.

Benefits

With a measurement capacity of 7000 Mbits/sec (supporting analysis for 600+400 SD and HD channels for IPTV, or 10000 simultaneous VoIP calls, or TCP and UDP Internet traffic of similar bandwidth), the M3xx probes are versatile measurement devices for multiple application scenarios, e.g.

- As full-service assurance probes in IPTV headends with more than 500 channels.
- As a monitoring probe for massive unicast (VoD, trick-play etc.) traffic.
- At strategic locations in the providers core network
- In network aggregation points, i.e. on switch/router ports for monitoring backbone and aggregation routing and switching.
- At VoIP softswitch systems, analyzing and verifying the call control and data transmission functions

All this functions are delivered by a small 1U high rack-mounted device, with a moderate, 60W power rating.

Operation modes

iTVSense probes may be operated under central control by an iTVSense server, or in stand-alone mode, controlled primarily from the Web GUI.

Centralized Operation

Operated under central control, the probe communicates with the iTVSense server environment for:

- Downloading measurement configuration as defined on the server.
- Serving the iTVSense performance recording server with periodic minute-resolution data.
- Serving the iTVSense GUI with 1-second resolution data for on-demand queries.
- Forwarding probe-generated alarms to be stored, analyzed, correlated, and eventually presented on the server GUI, or forwarded to umbrella managers.
- Storage of probe-generated data captures on the server.
- Generic system health monitoring and probe firmware upgrades provided by the server.

To make centralized operation and control possible, probes support several options to provide firewall-transparent access from the management server. These include L2TP, Cisco VPN or TR-69 type notification based access from the central server.
Quality Service Assurance for IPTV and Digital Video Services

Standalone Mode and Web GUI

Probes in stand-alone mode are mostly operated through the Probe Web GUI, a sophisticated, dynamic and bandwidth-economic web application with the following main functions:

- Probe status overview: identification, system and network status, probe alarms, and measurements overview.
- Detailed measurement charts with
  - Selectable measurements and metrics
  - Selectable time resolution (1 secs - 4 hours)
  - Interactive zoom functions
  - Related alarms indicated on measurement charts.
- Setup screens for
  - Measurement settings
  - Alarm thresholds defined through profiles assigned to channels or streams.
  - Boot and network setting, including
    - full VLAN support on either interfaces,
    - VPN links to make probe accessible from other, firewall-separated networks
    - backup mobile links through USB dongles
  - Technology specific setups, like IPTV channel definitions, Internet test server lists and/or
- Additional Network and Diagnostic tools like
  - Selective or generic mode packet capture: captured data is uploaded to a network server in PCAP format. Selective captures only include single channels or directions, while generic mode includes all network data, with custom filter definitions supported.
  - DNS, NTP, Ping, HTTP, FTTP availability tests
  - Probe ecosystem diagnostics.

M-301 is an 1U high rackmount device

Technology Specific Features and Usage

iTVSense Probes used in IPTV

In an IPTV service environment, Probes provide the following main features:

- Measurement of up to 1000 channels or VoD streams (including SD and HD media of various encodings) simultaneously
- Seconds-resolution metrics and minute-based aggregates of metrics like bitrate, packet loss, RFC 4445 MDI DF (delay factor), and MLR (media loss rate, a.k.a. „CC error“), PCR jitters and errors, and No Signal errors.
- 60 seconds resolution data storage for up to 540 hours and seconds-level storage for up to 72 hours.
Service Quality Assurance for IPTV and Digital Video Services

- Alarm definition based on measured values. In addition to being displayed on the probe Web GUI, alarms may alert triggers:
  - syslog/snmp alerts sent to external systems (escalation)
  - automatic data capture enabled for the alarm period

iTVSense Probes Used for VoIP

VoIP measurement functions include:

- Active and passive VoIP testing
- SIP-based VoIP call initiation and termination.
- Measurement of success rate, and call quality
- Measurements provide objective metrics (RTT, loss, jitter, data and encoding errors, etc.) and subjective Mean Opinion based scores (MOS)

iTVSense Probes Used for Internet services

Internet access measurements: availability, utilization, average/maximum RTT
- Basic internet service availability tests for DHCP, DNS, NTP, etc.
- Scheduled, periodic download/upload rate tests against selected servers.
  - These probes can also act as a target for tests initiated from other probes.
- Website and online service availability tests, including tests for simulated multi-step http/https transactions (like online shopping including catalog, registration/login/logout shopping cart, ordering, payment, etc.)

Specifications

Network interfaces

- 2x SFP+ sockets for up to 10Gbps SFP+ modules (M-304)
- 1x SFP+ socket for up to 10Gbps SFP+ module (M-301)
- 2x1 Gbps copper Ethernet interfaces
- 1x100 Mbps interface for ILO management
- USB 2.0 port for mobile data dongles (optional)
  - These USB ports are also available for extended storage

Monitored data

- Network UDP stream packet rate, byte rate, packet loss rate and various jitter metrics
- MPEG Transport Stream packet rates, jitter, packet loss, counter and encapsulation errors. Metrics are provided both as an aggregate and also by individual Mpeg streams (video, audio, control).
- RFC 4445 Media Delivery Index (MDI).
- Multicast join times and zapping time.
- Encoder alarm events
- IPTV server operation, network traffic and stream processing (via SNMP)
- VCAS Server network traffic and stream processing (via SNMP)
- Middleware and VoD service operation, resources and response time, server/OS/Database health.
- VoIP call control and data flow metrics and synthetized MoS and R factor calculations
- TCP and UDP downloads and uploads against dedicated target servers
- HTTP/FTP transfers from/to public Internet servers
- Simulated web transactions for testing interactive web services.
- ICMP and DNS availabilities and response times
- DHCP and Boot Image server availability and events

Physical and Environmental Characteristics:
- dimensions (550 x 600 x 31 mm)
- weight 9.5 kilograms
- power: 60 Watts (typ.)
- supply: 230 VAC (1 Amps max.)
- 48 VDC available as an option
- temperature: -10 – +35 degrees Celsius
- humidity: 90% max.