QT-200 Triple-Play Test Solution

NetComplete™ Service Assurance Solutions Portfolio

2007 FROST & SULLIVAN
Global Communications Test & Measurement Company of the Year Award

Key Features

- **Provides 24x7 sequential active monitoring of all IPTV channels, routine verification of one or more IPTV channels, and troubleshooting of MPEG-2 transport streams (TS)**
- **Tests VoIP with E-model or PesQ MOS score and ISP with ping, trace route, IPERF**
- **Provides direct access off the DSLAM or MSAN port, so no test access matrix (TAM) is required**
- **XML API interface facilitates integration with third-party OSSs**
- **Web-based user interface eliminates the need to install and manage end-user software**

Applications

- Sectionalizes problems for rapid fault isolation and repair with IP service-level testing
- Multiple services testing capabilities for data, IPTV, VoD, and VoIP

With the proliferation of IP services, service providers worldwide need a cost-effective method for measuring and maintaining quality across their triple-play voice, video, and data service offerings. The driving forces behind this requirement are the customer's expectation of cheaper, higher quality, managed services coupled with the service provider's expectations to reduce operational costs, maximize revenue, and increase customer retention, while deploying a more complex network architecture. JDSU has addressed both of these sets of expectations with the introduction of the QT-200, a cost-effective, carrier-grade, scalable, xDSL & Triple-Play probe.

Powerful, active, and continuous quality of service (QoS) and quality or experience (QoE) monitoring and analysis capabilities, coupled with flexible on-demand and scheduled testing capabilities, enables the QT-200 to bring service providers an unparalleled view of the end user's experience. Employing these combined capabilities, service providers can leverage operational synergies between service degradation identification, problem isolation, troubleshooting, and problem resolution. The QT-200 empowers service providers with the ability to confidently guarantee service level performance and increase customer loyalty while reducing operational costs.

An integral component of the JDSU NetComplete Service Assurance Solutions portfolio, the QT-200 addresses the needs of service providers worldwide using an affordable distributed approach. The QT-200 delivers the total solution for service turn-up verification, fault isolation, troubleshooting, and active performance monitoring in a single device.

Making Triple-Play Services Profitable

The QT-200 xDSL & Triple-Play probe, offers service providers the ability to troubleshoot customer or network problems and pre-qualify copper loops, increasing the number of potential subscribers. Furthermore, the QT-200 provides higher layer service testing, which enables the deployment of triple-play services while reducing overall maintenance costs.

Deploying the QT-200 near the Digital Subscriber Line Access Multiplexer (DSLAM) or Multi-Service Access Node (MSAN) lets users perform testing toward the triple-play network (Figure 1) to rapidly sectionalize problems and reduce mean time to repair (MTTR). Multiple services testing capabilities for data, Internet protocol television (IPTV), video on demand (VoD), and voice over IP (VoIP) networks, plus features that include a small 1 RU high footprint and a Web-based user interface, contribute to ensuring profitability for triple-play services.

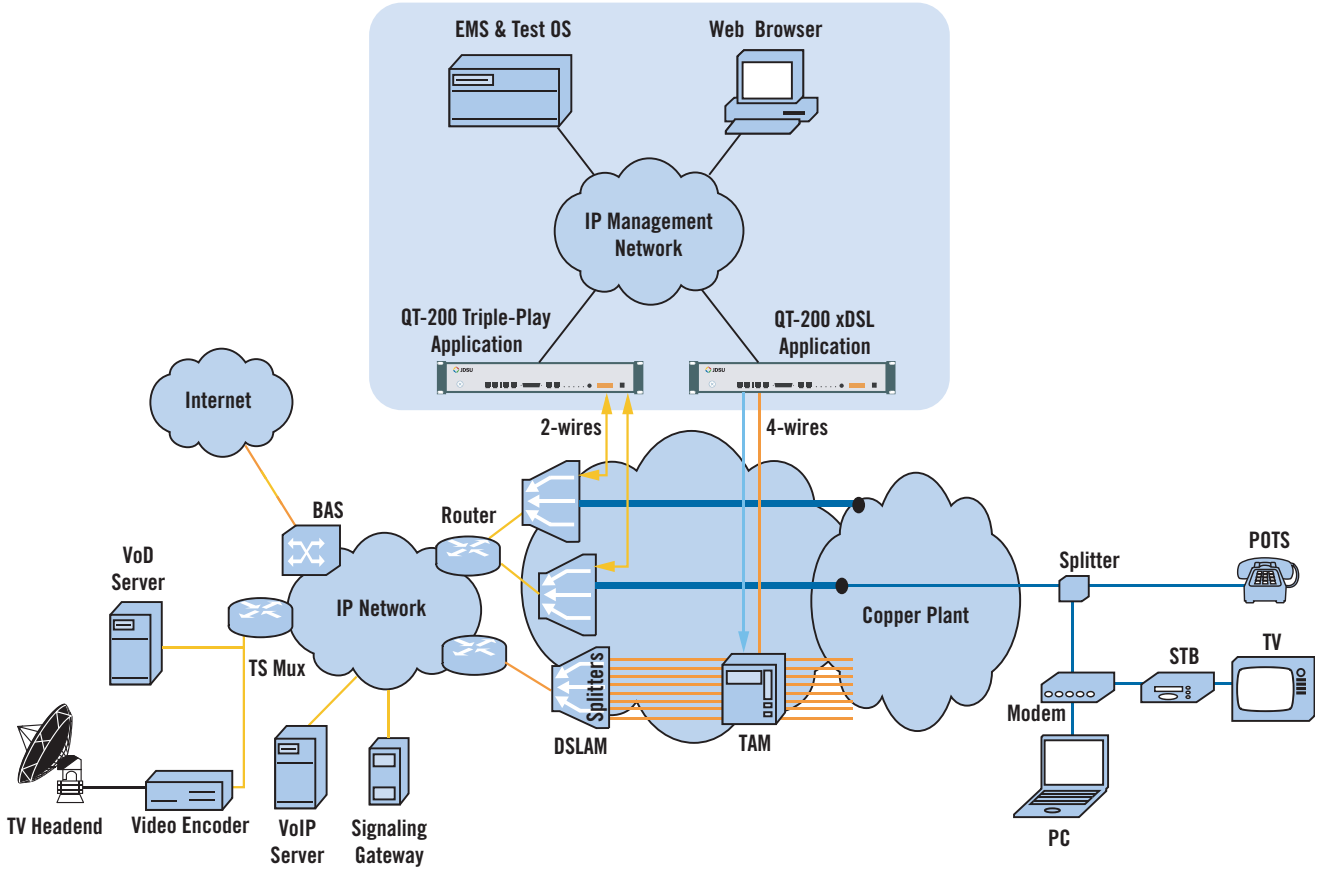

Figure 1 Performing "look-in" testing of a triple-play network.

Proactive Monitoring and Testing

The JDSU QT-200 Triple-Play Test Solution is capable of proactive monitoring, troubleshooting, and reactive on-demand testing. These functions can be initiated using the JDSU NetComplete Test Management Software or an existing test operation support system (OSS). NetComplete provides technicians with data storage and results display capabilities and can report the results to a southbound interface of an external OSS. Proactive supervision and continual service monitoring provide technicians with the ability to trigger immediate corrective actions to minimize the flood of complaints at the network operation center (NOC), avoiding increased customer churn.

Testing into the Network

JDSU is acutely aware of the service provider's need to rapidly sectionalize and identify problems. By taking advantage of the location of the QT-200 probe at the edge of the network, technicians can test into the network, verifying proper asynchronous transfer mode (ATM) transport, Point-to-Point Protocol (PPP) negotiation, and IP connectivity out to the public Internet. Technicians can also test into the network and verify several IPTV channels sequentially by emulating the end user's set top box (STB).

In addition, technicians can initiate synthetic active call campaigns to proactively monitor the network, ensuring high QoS. This advanced functionality allows for the placement of multiple QT-200 units at several key points in the network to originate and answer VoIP calls at user-defined intervals. Test results, including full quality analysis, are provided in order to verify that the service is both available and has acceptable quality. If problems are encountered, reactive on-demand testing lets service providers drill down and sectionalize the problem, allowing for rapid fault isolation and troubleshooting.

The JDSU QT-200 triple-play test solution provides definitive information regarding the location of the reported problem and allows for rapid and correct trouble ticket routing and technician dispatching, resulting in reduced MTTR and improved customer satisfaction.

The JDSU NetComplete portfolio provides a comprehensive Service Assurance Solution—including industry-leading test probes, software, and systems—that support worldwide communications providers delivering next-generation network and fixed mobile convergence (FMC) services. NetComplete provides best-in-class business solutions, so service providers can effectively manage the entire life cycle for quality voice, video, data, and wireless services.

QT-200 Triple-Play Test Solution Measurements

IPTV and VoD applications

Video service verification–
MPEG-2 TS over UDP/RTP/UTStarcom's RollingSream™ protocol
Set top box (STB) emulation
IGMP V2/V3 and RTSP protocols
ADSL layer
- DSL bit rate
- SNR

Multiple VP/VC support (video, voice, PPP)
ATM F4/F5 AOM cells
Video service according to ETSI TR 101 290
Measurements performed
- Latency of the "channel changing" on IPTV
- Measurement for each PID present
  - Video bit rate (min/max/avg)
  - Audio bit rate (min/max/avg)
  - Data bit rate (min/max/avg)
- IP TS statistics
  - Synchronization frame errors
  - Errored packets (PDUs)
  - Continuity counter errors
  - Packet jitter
- Measurement of the MPEG-2 TS Program Clock Reference (PCR) jitter for verification that the critical timing reference data is being received properly
- Measurement of the MPEG-2 TS packet loss for continuity errors
- PAT, PID, and PMT errors
- Verification of the broadcast service name in the MPEG-2 TS
- MDI Media Loss Rate and MDI Delay Factor
- RTP loss distance errors and RTP loss period errors

Alarm management
- Detailed results are available in XML format, displayed by NetComplete or an operator OSS after on-demand testing
- During background test, the system reports SNMP alarm trap in the following circumstances
  - DSL service has failed or is defective
  - Video channel is not found (black screen)
  - IGMPv2 request is unsuccessful
  - MPEG-2 TS continuity error exceeds user threshold
  - MPEG-2 TS PCR jitter exceeds user threshold
  - MPEG-2 TS rate exceeds user threshold
  - The service name is unexpected (when provided).
  - Detailed results are periodically pushed to a server and reported in csv file.
  - Intermediate results are displayed by NetComplete NGT

On user demand, capture a sample of a TV channel's video data in .pcap format.

Data application

Verification of connectivity to the DSLAM ATU-C
Verification of interoperability with the DSLAMs
ADSL, ADSL2+ layer
- Up/down connect rate
- Max up/down rate
- Up/down noise margin
- Up/down transmitter power
- Remote equipment vendor/model
- Training time
- Up/down attenuation
- Up/down CRC errors

G.SHDSL layer
- Minimum connect rate: 192 to 2320 kbps
- SNR
- Transmitter power
- Remote equipment vendor/model
- Training time
- Local/remote CRC errors
- Receiver gain
- Local/remote errored seconds

ATM layer
- VPI/VCI
- AAL1, AAL5
- Encapsulation (VC-MUX, LLC-SNAP)
- PPP encapsulation (PPPoA, PPPoE)
- Cell count TX/RX
- ATM loopback (F4/F5 segment and ETE)

PPP layer
- User login
- Password
- Chap authentication
- Pap authentication
- Local IP address, IP netmask, DNS address, remote IP address

IP layer
- Protocol to be tested
- Message count TX/RX
- Response time (min/max/avg in ms)
- IP-ICMP
- IP-HTTP
- Trace route
- IPERF, as slave or master, for throughput

VoIP application

Pre-scanned voice samples
Call generation configurable input parameters
SIP 2.0 signaling (RFC 3268, RFC 4028)
Phone number or alias of calling QT-200
CODECs (G.711)
RTP/RTCP protocols
PESQ LQO MOS score
MOS score and R-factor from E-model

QT-200 xDSL & Triple-Play Probe

Mechanical dimensions
- Width: 440 mm (17.32 in) compatible ETSI and ANSI rack [515 mm (20.28 in) between fixing screws]
- Height: 44.5 mm (1.75 in)
- Depth: 235 mm (9.25 in)
- Weight: 5 kg (11 lbs)

Power supply specifications
The QT-200 is powered from one or two -48 V DC supply input ports that operate from a nominal supply voltage of -48 V DC
- Range: 35 to 60 VDC
- Power consumption: <20 W

Regulatory compliance
- CE (ETS 300 386 v1.3.1 and EN 60950)

DSL standards
- ADSL over POTS - ITU-T G.992.1 (Annex A)
- G.SHDSL - ITU-T G.991.2 (G.SHDSL)
- ADSL2+ over POTS - ITU-T G.992.5 (Annex A)
- ADSL2+ over ISDN - ITU-T G.992.5 (Annex B)

Ordering Information

Please contact your local JDSU sales office for more information about the JDSU NetComplete Service Assurance Solutions.

Test & Measurement Regional Sales

NORTH AMERICA
TOLL FREE: 1 866 228 3762
FAX: +1 301 353 9216

LATIN AMERICA
TEL: +1 954 688 5660
FAX: +1 954 345 4668

ASIA PACIFIC
TEL: +852 2892 0990
FAX: +852 2892 0770

EMEA
TEL: +49 7121 86 2222
FAX: +49 7121 86 1222

www.jdsu.com/test