Technology to quickly identify and solve problems in today’s complex Triple Play networks
The Triple Play Analyzer (TPA) software application allows network professionals to troubleshoot, monitor, analyze, maintain and optimize real-time voice, data, and video services over next generation IP networks. The TPA is part of the Agilent Network Analysis and Troubleshooting Solutions and provides a top level dashboard view that shows the performance of IPTV, VoD, VoIP and broadband data applications in a single window with the ability to drill down and view extensive Quality of Experience (QoE) measurements for the select services.

When analyzing a converged triple play network, it is critical to deploy a single solution capable of analyzing voice, video and data services simultaneously to get an accurate representation of the overall quality of experience achieved by the end user. QoE is not solely a function of network bandwidth, voice and video transport stream metrics and/or traffic characteristics, but rather how all features and services interact with each other from the end-user’s perspective.

The Triple Play Analyzer provides the crucial measurements needed for all service types to accurately and passively measure the end-user’s QoE. The included protocol and network analysis features, with support for over 500 protocols, allows you to perform deep packet troubleshooting and analysis for each service type, or to select flows to identify the root cause of service degradations.

The Triple Play Analyzer main view shows overall network performance and distributions of voice, video and data services.
Agilent Triple Play Analyzer Overview

Key Applications

Built on Agilent’s award winning protocol analysis and troubleshooting platforms, the TPA solution provides in-depth passive analysis and troubleshooting for all aspects of a triple play service in real-time. The extensive data analysis capabilities coupled with real-time signaling and QoE measurements for Voice Video and Data make the TPA solution ideal for:

- R&D engineers
- System test and integration labs
- Tier 2 and 3 field technicians and engineers
- Equipment designers
- Deployment trials
- Operational monitoring
- Service verification
- Installation and maintenance

Key Features

- Powerful real-time monitoring, analysis and troubleshooting solution for next generation IPv4 or IPv6 Voice, Video and Data networks
- "One box complete Triple Play solution" eliminates the need to purchase additional test tools
- Extensive analysis features with expert systems and drill down to connections and decodes for root cause analysis
- Line rate capture and filtering up to 2Gbps
- Triple Play Dashboard service overview
- Passive QoE metrics and MOS scores for Voice and Video
- Record and/or listen to live voice traffic
- Real-time playback of IPTV multicast or Video/TV on demand streams in real-time with audio
- Comprehensive MPEG transport stream analysis:
  - ETSI TR 101 290 events and measurements with Configurable thresholds and events
  - Bandwidth utilization and bitrates
  - MPEG-2 TS over UDP or RTP/UDP
  - PCR jitter and accuracy
  - PID monitoring and analysis
  - PSI table reconstructions and analysis
  - RFC 4445 MDI metrics
  - Real-time transport stream decodes
- Configurable alarms, events, thresholds and logs for voice, video and data streams
- Passive IPTV channel change and VoD command analysis
- Real-time integrated LAN / WAN / ATM / MPLS analysis
- Support SPTS, MPTS, 188 byte and 204 byte payloads
- Automatically discovers IPTV, VoIP and VoD streams
- Jitter, packet loss and delay measurements
- Support for over 500 unique protocols
Network Analysis and Troubleshooting Solutions

The Triple Play Analyzer (TPA) is one of the key software applications in Agilent’s Network Analysis and Troubleshooting Solutions, which are built on the Distributed Network Analyzer (DNA) hardware platform. The scaleable DNA architecture provides the foundation for advanced protocol analysis, monitoring and troubleshooting in fixed wireline and mobile networks. The DNA hardware platform brings greater power for collecting and analyzing real-time data over multiple technologies such as Ethernet, ATM, POS, Frame, Relay, IPv4, IPv6, MPLS, VoIP, IPTV, HSDPA, HSUPA, UMTS, CDMA 2000, GPRS, etc.

The TPA runs on a Windows PC as a client for any of the Distributed Network Analyzer hardware platforms and this architecture makes the Triple Play Analyzer an ideal solution for dispatched or distributed analysis. The TPA can also be used as a standalone application using the NDIS adapter on a Windows PC.

Combine the Triple Play Analyzer and DNA hardware platform with Signaling Analyzer software for mobile network testing, or with Network Analyzer software for fixed network testing.

The TPA includes the Network Analyzer software for advanced network diagnostics and protocol decoding. By coupling the DNA hardware with the Triple Play Analyzer and Network Analyzer software applications you have a powerful wireline solution for complete triple play analysis, troubleshooting and monitoring. Similarly, use the system in conjunction with Signaling Analyzer software to create an advanced mobile network analysis solution for 2, 2.5 and 3G technologies.
Triple Play Analyzer Solution Components

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Triple Play Analyzer Components

Included Software

**J6900A-001 Triple Play Analyzer Base Software**

The Agilent J6900A Triple Play Analyzer (TPA) is the most complete analysis and troubleshooting tool for network equipment manufacturers and communication service providers, who develop, install, monitor and troubleshoot voice, video and data applications. The base software provides a real-time dashboard that allows users to quickly and easily see the performance and traffic distributions of all triple play services. It provides detailed drill down into each service type with the optional licenses and includes the Network Analyzer software for detailed network analysis and protocol decodes to drill to root cause once impairments are detected.

**J6840A Network Analyzer Software**

A single-use license key for the Network Analyzer Software is included with the Triple Play Analyzer and is auto-licensed on the DNA PRO platform. The analyzer is a full protocol analyzer for LAN and WAN networks and provides the data and analysis necessary to quickly and easily drill to root cause and solve problems in complex triple play networks. The software performs the following functions:

- Network measurements and protocol analysis for LAN and WAN environments.
- Network traffic acquisition and analysis using DNA platforms or NDIS interfaces on a local PC.
- Measure network utilization, error activity, protocol and individual connection statistics.
- Perform expert guided network analysis and obtain comprehensive network statistics.
- Analyze transport metrics for triple play applications
- Decode 500+ protocols across all seven layers including all major IPTV, VoD and VoIP protocols.

For more details on the Network Analyzer software, please consult the Network Analyzer Technical Overview document (P/N 5988-4231EN).

Protocol decodes of MPEG and triple play protocols allows for detailed diagnostics and root cause analysis in the Network Analyzer software.
Add-on Licenses

**J6900A-002 Triple Play Analyzer Video QoE Measurements**
The Video Quality of Experience (QoE) measurements provide simple and precise diagnostics of media transport and Quality of Service (QoS) metrics through non-intrusive measurements, including a video quality measurement technology to accurately predict Mean Opinion Scores (MOS) for IPTV and VoD streams. This powerful option offers the most advanced video service quality analysis and troubleshooting capabilities for media transport, IPTV and VoD signaling.

Key Video QoE measurements include:
- Auto-detection and analysis of MPEG-2 TS Video streams over RTP and UDP
- ETSI TR 101 290 MPEG transport stream priority events and analysis
- RFC 4445 Media Delivery Index scores for constant and variable bit rate streams
- Non-intrusive video quality analysis using predictive MOS technology for passive voice clarity MOS scoring
- Precise measurements of IP network performance and RTP statistics such as jitter, loss and delay for Video services
- Video analysis on MPLS and IPv6 networks
- Live decoding and viewing of video streams with audio
- Passive channel zap analysis for IPTV multicast streams and RTSP command response times for unicast VoD streams

**J6900A-003 Triple Play Analyzer Voice QoE Measurements**
The Voice Quality of Experience (QoE) measurements provide simple and precise diagnostics of VoIP Quality of Service (QoS) metrics through non-intrusive measurements, including voice quality measurement technology to accurately predict Mean Opinion Scores (MOS). This powerful option offers the most advanced VoIP service quality troubleshooting capabilities available and includes a license for the Telephony Network Analyzer for detailed drill down and root cause analysis.

Key VoIP QoE measurements include:
- Non-intrusive voice quality analysis using predictive MOS technology for passive voice clarity scores
- Auto-detection and analysis of VoIP streams
- Precise measurements of IP network performance and RTP statistics such as jitter, loss and delay for VoIP services
- VoIP analysis on MPLS and IPv6 networks
- Simple analysis that exposes the impairments to voice quality
- Support for audio play out and recording

**J6900A-004 Triple Play Analyzer MSTV License**
MSTV licensees may purchase this license to activate MSTV support in the Triple Play Analyzer and decode support in the Network Analyzer. This license provides advanced analysis of MSTV signaling protocols and media transport metrics.
**J6844A Telephony Network Analyzer**

The Telephony Network Analyzer (TNA) simplifies and expedites the resolution of quality and signaling problems in IP telephony networks. It provides simple and precise diagnostics of VoIP Quality of Service (QoS) through non-intrusive measurements, including new voice quality measurement technology known as predictive Mean Opinion Scores (MOS). A single TNA license is included with each J6900A-002 for expanded VoIP analysis and troubleshooting as part of the included Network Analyzer software.

For more details of this product, please consult the Telephony Network Analyzer Technical Overview (P/N 5988-7901EN)

**J6766A MPLS Analysis**

The Network Analyzer captures and decodes MPLS signaling and data protocols in real time and at full line rate. The analyzer can diagnose and decode MPLS accordingly with RFC2547bis among other MPLS standards.

In real-time, the Network Analyzer creates a table of Label Switched Paths (LSPs) present in the network and measures the vital statistics of the VPN. It also creates graphics for quick visualization of VoIP and Video over MPLS performance on the network to indicate performance and trouble spots for a specific label-switch path or VPN.

The J6766A MPLS Analysis software keeps track of the different class priorities in an MPLS network specified by the EXP/QoS bits. In addition, the measurement analyzes the MPLS payload and detects the DiffServ priorities of the IP packet transported by an MPLS frame.

![MPLS Class of Service and IP DSCP correlation](image-url)
Data Acquisition Platforms

For detailed information on the DNA Hardware Platforms, please consult
- Network Analysis and Troubleshooting
  DNA Family Technical Overview  P/N 5989-5455EN
- DNA Data Sheet  P/N 5988-4176EN

J6803B DNA PRO

The J6803B DNA PRO offers the most advanced feature set in the DNA portfolio. Locally or remotely control the analyzer from a PC. The analyzer includes an embedded PC controller and may run the client server software locally. The hardware includes a removable hard disk drive. The use model of the DNA PRO is as a portable analyzer for local or remote troubleshooting.

J6801B DNA

The J6801B DNA is a small form factor system that does not include an integrated PC. It is designed to be deployed throughout the triple play network at key aggregation points. One or more DNAs can be added to create multi-port systems. Like the DNA PRO, the DNA includes an acquisition system capable of full line rate capture and accommodates a hot-swappable LIM. Under this configuration, the J6900A Triple Play Analyzer Software runs on a PC and connects to a DNA via the client server to acquire data from the network under test.
**Personal Computer**

The Triple Play Analyzer software may be installed on a PC and use the NDIS interface to capture and analyze triple play information or may use the DNA hardware platforms to acquire the data from the network under test.

The PC requirements for the Triple Play Analyzer software are:
- Operating systems: Windows 2000, Windows XP Professional SP2
- 10/100/1000 Mbps PCI Express NIC
- Processor speed: 3GHz or equivalent (dual core suggested)
- Memory (RAM): 2GB
- Disk space: 110 MB 7200 rpm
- Display: XVGA video adapter, 1024x768
Triple Play Analyzer Software Detailed Specifications

Capabilities of the Triple Play Analyzer Software, particularly when used with the Distributed Network Analyzer (DNA) hardware platforms.

Flexible and Unified Approach with Network Analyzer software lets you:
- Test over LAN and WAN interfaces with identical network and higher-layer measurement features and user experience
- Analyze MPLS for troubleshooting the converged networks.
- Analyze with specialized line rate capture DNA hardware and off-the-shelf NDIS PC-Card NICs
- Solve network and transport problems quickly and effectively
- Anticipate network problems using performance statistics, vitals and QoE measurements
- Obtain thorough information with comprehensive network statistics
- Decode 500+ protocols across all seven layers
- Test in IPv6 (or mixed IPv6 and IPv4) environments
- Navigate easily with the graphical user interface
- Run all the powerful measurements of the Triple Play Analyzer and Network Analyzer, including the Expert Analyzer, post process using Triple Play Analyzer or Network Analyzer Software off-line analysis modes

Logging

Measurement logging is available to store test results, thresholds and events to a file. You can select logging for all the specific measurements from a common dialog box. Data is stored into one file that can easily be opened by other Agilent or third party applications.

In addition, the logging mechanism allows continuous logging of statistics in circular files which can be retrieved by an external system (such as an OSS).
Triple Play Analyzer Dashboard:

The Agilent J6900A Triple Play Analyzer (TPA) dashboard automatically detects triple play services and transforms the data into meaningful diagnostic and QoS information. Constantly monitoring the traffic on your network the dashboard provides a top level view of the triple play services and allows users to quickly view the performance of the entire service. As quality issues arise the user can easily drill from the dashboard into the specific service to perform in-depth analysis and measurements. It does this for each protocol stack (including IPv6); all in real time as events actually occur. The dashboard is broken into five sections to provide the relevant top level triple play service statistics:

Data Section
- Provides graphs and tables for Ethernet and TCP/IP utilizations, statistics and events

Video Section
- Provides graphs and tables for video media bit throughput and PCR jitter
- Detects multicast and unicast video streams

RTP transport and VoIP Section
- Provides graphs and tables for RTP media transport jitter for voice and video
- Provides MOS scores for voice calls
- Detects VoIP streams and associated RTCP streams

Protocol Distribution Graphs
- Provides network protocol utilization distributions for the top triple play protocols to give an overview of the types of traffic being carried

Service Distribution Graphs
- Breaks down the individual services by their utilization on the network to give an overview of the load for each service on the network

Main view
**Triple Play Analyzer Video QoE measurements:**

The Agilent J6900A-002 Triple Play Analyzer (TPA) Video QoE measurements provide real-time analysis of MPEG-2 transport streams and QoE metrics for multicast IPTV streams and unicast VoD streams. MPTS and SPTS streams are automatically detected and analyzed. The measurement decodes the PMT table and provides relevant statistics for the corresponding PIDs and transport streams. The QoE view also allows users to watch and listen to streams of interest in real-time.

Key features and measurements include:

- Support for 188byte and 204byte TS over UDP or RTP/UDP
- PCR Jitter measurements
- ETSI TR 101 290 first and second priority events
  - TS Sync loss error, Sync byte errors, Transport errors
  - CAT error, CRC Error, CAT CRC errors, PSI errors
  - PSI CRC errors, Late PSI errors, PCR error,
  - PCR accuracy error, Continuity counter errors, PID dropout errors
- PSI and PCR rates
- Auto discovery and Breakdown of VoD and IPTV streams
- Bitrates and utilization per PID and ES
- Min/max/average RFC4445 MDI:DF and MDI:LR for constant and variable bit rate streams
- Watch and listen to MPEG-2, H264, MPEG-4 and other installed CODECs in real-time
- Listen to selectable audio tracks
- Track configurable viewers streams
- Configurable alarms, thresholds and monitoring
- Packet loss and Duplicate packet counts
- Objective Video MOS scores
- Support for streams over IPv6 and MPLS
- User configurable graphs
- RTP jitter, packet loss and delay transport metrics in RTP view
Triple Play Analyzer Voice QoE measurements:
The Agilent J900A-003 Triple Play Analyzer (TPA) Voice QoE measurements provide real-time analysis of RTP streams for voice and video. The Voice Quality of Experience (QoE) measurements provide simple and precise diagnostics of VoIP Quality of Service (QoS) metrics through non-intrusive measurements, including a voice quality measurement technology to accurately predict Mean Opinion Scores (MOS). This powerful option offers the most advanced VoIP service quality troubleshooting capabilities available and includes a license for the Telephony Network Analyzer for detailed drill down and root cause analysis.

Key features and measurements include:
- Non-intrusive voice quality analysis using predictive MOS technology for passive voice clarity MOS scoring
- Auto-detection and analysis of VoIP streams
- Precise measurements of IP network performance and RTP statistics such as jitter, loss and delay for VoIP services
- VoIP analysis on MPLS and IPv6 networks
- Support for real-time audio play out and recording
  - G.711, G.279 and AMR CODECs
- Min/max/average RTP jitter and packet loss
- Stream ID and play load identification
- Packet and byte counts
- Traffic utilization statistics
- G.107 R-Factor scores
- Configurable alarms, thresholds and monitoring
- Capture data and save to disk on user definable events
- User configurable graphs
Triple Play Analyzer Video Signaling View:

IPTV services present new challenges for channel and video control that can severely impact QoE even when video transport is good. The Agilent J6900A-002 Triple Play Analyzer (TPA) Video QoE measurements include real-time analysis of IPTV and VoD signaling. The TPA passively calculates IGMP channel change times using the most accurate method available based on when a Set Top Box is first able to decode video.

Key features and measurements include:

- Zap performance and Histogram graphs of channel zap and RTSP response times to ensure consistent service and QoE
- Ladder diagram of signaling messages
- Min/max/average Join and leave rates
- failed joins and leaves
- Min/max/average zap and response times
- Select and view statistics by individual subscribers
Triple Play Analyzer Data View:

The data measurement provides a high-level overview of the data performance and provides a quick drill down for more detailed analysis such as current and maximum utilization in real-time and provides current, average, minimum and peak data in tabular format for the following parameters:

Key features and measurements include:

- **Ethernet**
  - Throughput
  - Percent bandwidth

- **TCP/IP**
  - IP Throughput
  - IP Percent bandwidth
  - IP Packet size
  - IP Packets
  - IP Broadcasts
  - IP Multicasts
  - IP Fragments
  - IP Low TTL
  - IP Routing packets
  - ICMP Redirects
  - ICMP Unreachable
  - TCP Low Window
  - TCP Reset connections
  - SNMP Get/Set
  - SNMP Trap
  - DNS packets
  - ARP packets

- **Extensive Protocol Analysis**

![Network Protocols Data View](image)

### Network Protocol Use statistics

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Current</th>
<th>Avg</th>
<th>Max</th>
<th>Min</th>
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</thead>
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<tr>
<td>% Bandwidth</td>
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<tr>
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<td>TCP Reset connections</td>
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On-Line Information

For more information on TPA solutions, please visit:
www.agilent.com/find/TPA

For more information on Network Analyzer Software applications, please visit:
www.agilent.com/comms/networkanalyzer

For more information on DNA platform, please visit:
www.agilent.com/find/dna

For more information on Signaling Analyzer Software applications, please visit:
www.agilent.com/find/sart

Related Literature

Network Analysis and Troubleshooting Solutions 5989-5455EN
Distributed Network Analyzer Platform

Distributed Network Analyzer Data Sheet 5988-4176EN

Signaling Analyzer Technical Overview 5989-0347EN

DNA Brochure 5989-3956EN

Signaling Analyzer Brochure 5989-4484EN

Mobile GSM GPRS UMTS R5 Poster 5989-4490EN

Protocol Communications Poster 5989-5245EN
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