IPTV Service Assurance

Access and In- home Network Troubleshooting and Dispatch Solution

stratum™ by tollgrade

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Introduction

As service providers look to ramp up the deployment of IPTV services to increase revenues and compete with alternative cable and telecom operators, the importance of delivering a reliable but cost effective quality of service to the consumer becomes paramount if they wish to attract and retain customers. The key to achieving this with a complex service such as IPTV is through the introduction of a comprehensive test system solution, which can enable improved trouble diagnosis and resolution, a greater level of automation and more effective customer service business processes encompassing provisioning, field repair and call center operations.

Tollgrade's Stratum IPTV SA (IPTV Service Assurance) platform is an access and in-home network service assurance testing solution for IPTV, which supports Tier 1 customer service call centers and field repair operations in the support of IPTV customers. IPTV SA provides real time on-demand Quality of Experience (QoE) testing as well as proactive monitoring of the access and customer premises network. Monitoring is provided per subscriber, per channel, which facilitates a more accurate fault diagnosis and dispatch capability. IPTV SA supports an automated, accurate dispatch statement for more effective repair handling by customer service and avoids unnecessary and costly dispatches to the field and thus reduced operational expenditures.

Applications

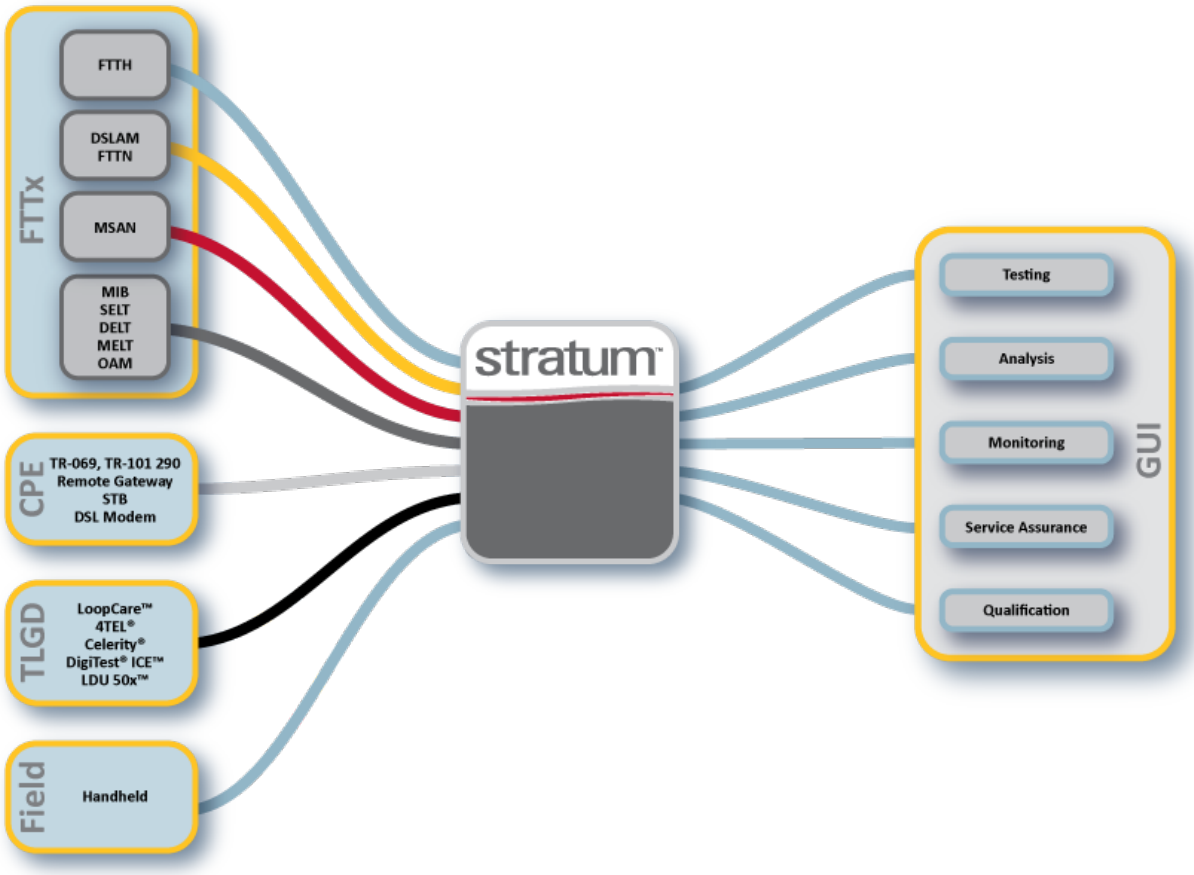
- IPTV service provisioning
- Installation and service certification
- Remote troubleshooting of video service impairments
- In-service monitoring of video quality for proactive maintenance

Benefits

- **Improve installation and provisioning time**
  - Certify network and in home wiring during pre-installation
- **Improve service reliability**
  - Confirm service stability with 'soak' test
- **Reduce OPEX**
  - Improve fault location, identification, and dispatch accuracy for efficient dispatch of service technicians to the field

The Stratum Platform

Stratum utilizes embedded diagnostics capabilities of multi-vendor next generation network elements combined with measurements from software and hardware probes in access and in-home networks, feeding an expert system for accurate fault identification, isolation and dispatch analysis for the access and in-home network. Its modular software design provides operators the flexibility to implement the whole system or only the tests they currently need to support their network architecture. Stratum has diagnostic interfaces to a variety of Customer Premises Equipment (CPE), access, and aggregation element types such as Set Top Boxes (STBs), Digital Subscriber Line Access Multiplexers (DSLAMs), Multi-Service Access Nodes (MSANs), and Optical Line Termination (OLT) devices. Stratum provides a modern SOAP/XML API for integration with service provider Operations Support Systems (OSS), trouble ticketing, and middleware systems. This allows for flow-through operations and automated pre-qualification of triple play services as well as localized fault dispatch reporting and automated monitoring capabilities. Stratum also provides a web-based GUI interface. Both the web GUI and the SOAP/XML API support 'test by telephone number' via a local line record data cache feature.



Managing Customer Quality of Experience

IPTV SA is a software probe that monitors the incoming signal at the STB and provides quality of experience and transaction (e.g. channel zapping) measurements, as well as STB configuration and status. STB data is analyzed per CPE, per channel, and by neighborhood or region to help diagnose and segment service failures and view the quality of the IPTV service delivered **from the customers' perspective.**

IPTV SA provides continuous video service quality monitoring for new service provisioning and capturing intermittent service impairments. Activating a stable video service ensures a positive initial customer experience. IPTV SA utilizes an embedded STB software agent that is used for live video service monitoring. This provides 24/7 monitoring and thresholds on critical metrics can be set to provide alarms before the customer's service is impaired. Technicians at the central office can proactively repair the video without affecting the customer, which leads to a reduced number of service calls. On the rare occasion that customers do see impairments, the analyzed information that Stratum IPTV SA provides reduces the mean-time-to-repair for intermittent impairments.

Stratum analyzes the cause of the video impairment to identify the fault location as: within the CPE (STB, modem, remote gateway); inside wiring; or in the access network segments. The repair technician is dispatched only when needed, so that service truck rolls are initiated only when necessary, thus minimizing operational expenditures and leading to greater customer retention.

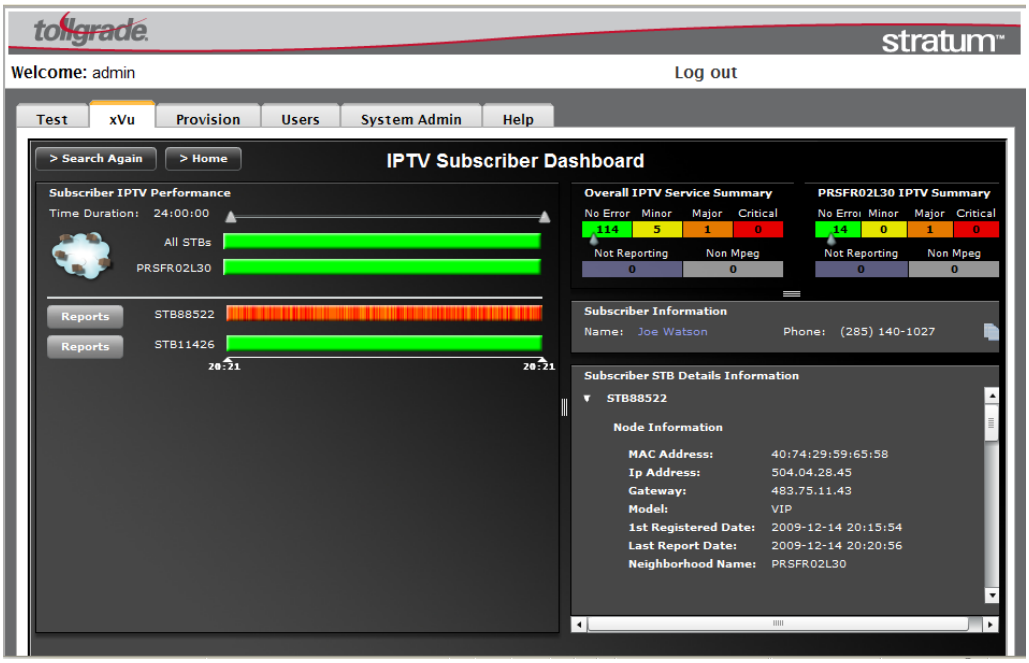
The xVu TV Care™ client provides key performance indicators and events at the STB, which are aggregated for analysis by a central management server.

SupportVu, a web-based GUI provides the following benefits and features:

- Constantly monitor and record the customer experience to confirm detection of transient issues and accelerate diagnosis
- Objectively assess the consumer experience in real time
- Proactively detect faults and isolate customer problems
- Eliminate the need for customers to describe complex audio or video impairments to the service representative
- Simplify activation process with verification of the installation with the ability to extend to a customer self-installation program

NetworkVu is an optional application which provides service performance views by neighborhood, region, channel, head end, and more. It has the following benefits and features:

- Extend the traditional "network-centric" monitoring to include 'real time' service monitoring of the customer experience
- Proactively isolate service-affecting issues; HD vs. SD channels, region vs. neighborhood vs. city, cable vs. loop, home network vs. individual set-top box, etc.
- Collect, record and analyze "transient" errors, with short-term trending reports
- Ensure quality deployment by shortening trial cycles with focused diagnostics to monitor the impact of upgrades and configuration changes
- Quickly and simply integrate with existing probes, EMS, and OSS/BSS using web services or SNMP technologies
- Generate and forward actionable alarms to escalation systems via XML, SNMP or SMTP
- Fix network element configuration issues (e.g.: DSL Port Settings, DHCP, STB reboots, channel profiles)



Performance Objectives

STB Agent

Service Performance:
- TR-101.290 Priority 1
  - (Packet loss, packet delay, jitter)
- Channel change performance
- Channel join failure
- VoD request performance
- Hard Disk status and usage
- Memory and CPU usage
- Hardware clock accuracy

Service Issues:
- Packet loss related issues (video pixelation, audio loss)
- IGMP channel tuning
- Buffer over/under run

STB Configuration:
- MAC address
- IP address
- IP gateway
- STB audio/video configuration

Service Lifecycle Events:
- STB reboots
- SW version changes
- STB audio/video configuration changes
- PVR recording events

Supported Configurations:
- VoD (RTSP)
- Live Broadcast Television (IGMP)
- MPEG-4 (H.264), VC-1, and MPEG-2
- DVR
- Supported OS Platforms: WinCE, Linux, PACE RiscOS, VxWorks, OS21

Agent Specifications:
- <1MB of memory
- 1.2 kb/s bandwidth
- <700 kB RAM

Agent for MS Mediaroom™

Service Performance:
- Receiver Streaming
- Receiver Drift
- Tuner Holes
- Tuner Fill
- Receiver Buffer Overruns
- Receiver Discontinuities
- Tuner Invalid SSRC
- Receiver Video Errors
- Receiver Video Under-runs
- Receiver Audio Errors
- Receiver Audio Under-runs
- Receiver ECM Errors
- Receiver DRM Errors
- Multicast channel, PVR, and VoD request performance

STB Configuration:
- MAC address
- GUID
- IP address
- IP gateway

Service Lifecycle Events:
- STB reboots
- Firmware version changes
- SW version changes

Agent for Cisco VQE™

Service Performance:
- Reporting/Non reporting status
- Interarrival jitter monitoring
- Packet repair monitoring
- Channel change monitoring

Service Issues:
- Packet loss counting
- Successful/failed packet repair attempts

STB Configuration:
- MAC address
- IP address
- IP gateway

Service Lifecycle Events:
- STB registration (reconnections/reboots)
- VQE version
- Hardware clock accuracy

For further information, please contact your local Tollgrade sales representative.

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