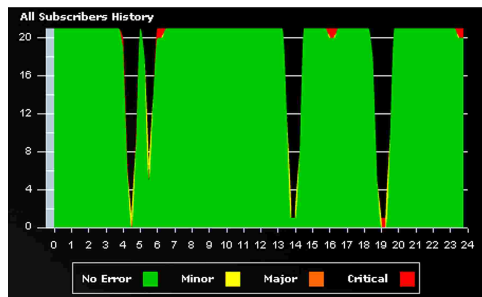## Advanced Trend Reporting

Advanced trend reporting through regular reporting allows correlating faults to customer retention. It enables the operator to optimize their network and capacity planning. Furthermore, it helps to find time-related network issues.

Help Desk

Having a quick response, user-friendly help desk application is vital. Constantly monitoring the consumer experience allows the help desk to isolate IPTV service delivery issues and validate objectively customer service delivery complaints. Besides, it correlates consumer experience to network performance. With Pixelmetrix DVAgent™, a detailed STB information query gives an in-depth view into the end users' setup.
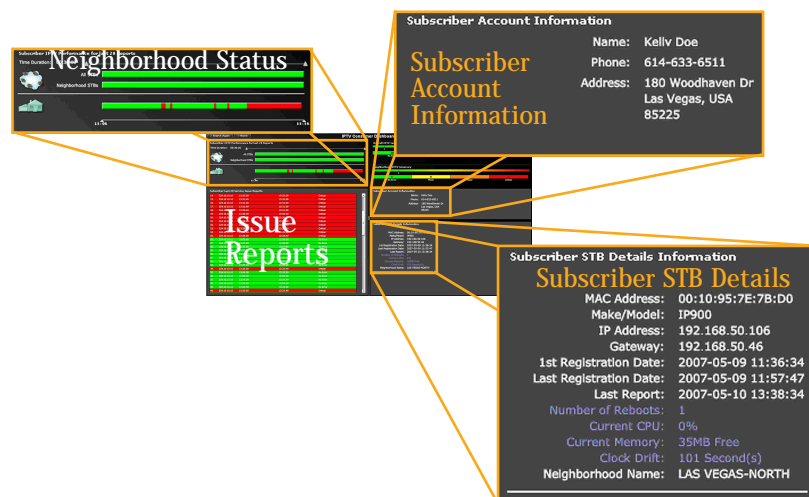

Features

- Complete RF, SDI and DVB Headend Monitoring
- Content Monitoring includes Freeze, Blackout and Audio Loss Detection
- Remote Site Monitoring and Troubleshooting
- True User Experience Monitoring (STB Agent)
- Open Architecture for OSS/BSS integration
- Strong Help Desk Solution
- Powerful and Flexible Reporting

Specifications

- EndGame™ core (IPTV Service Dashboard and Help Desk) is available for Unix, Linux and Windows based operating systems
- All DVStation family probes are supported
- Northbound Interface to OSS/NMS systems via SNMP
- DVAgent™ supported on STBs running VxWorks, WinCE, Linux O/S and other operating systems
- Help Desk integration via ODBC and supported on Oracle and MySQL
- ETSI TR101 290
- TR-069 & WT-135 Compliant

Distributor Contact

Pixelmetrix Corporation

The Americas
10097 Cleary Boulevard
Suite 114 Fort Lauderdale
Florida 33324 USA
Tel: +1 954 472 5445
Fax: +1 212 671 1549

Asia Pacific
31 Kaki Bukit Road 3
#07-03 Techlink
Singapore 417 818
Tel: +65 6547 4935
Fax: +65 6547 4945

Europe
Moosstrasse 6
CH 5443 Niederrohrdorf
Switzerland
Tel: +41 56641 0317
Fax: +41 56500 0161

www.pixelmetrix.com

Pixelmetrix
c o r p o r a t i o n

Spearheading the IP Evolution
service integrity
signal integrity
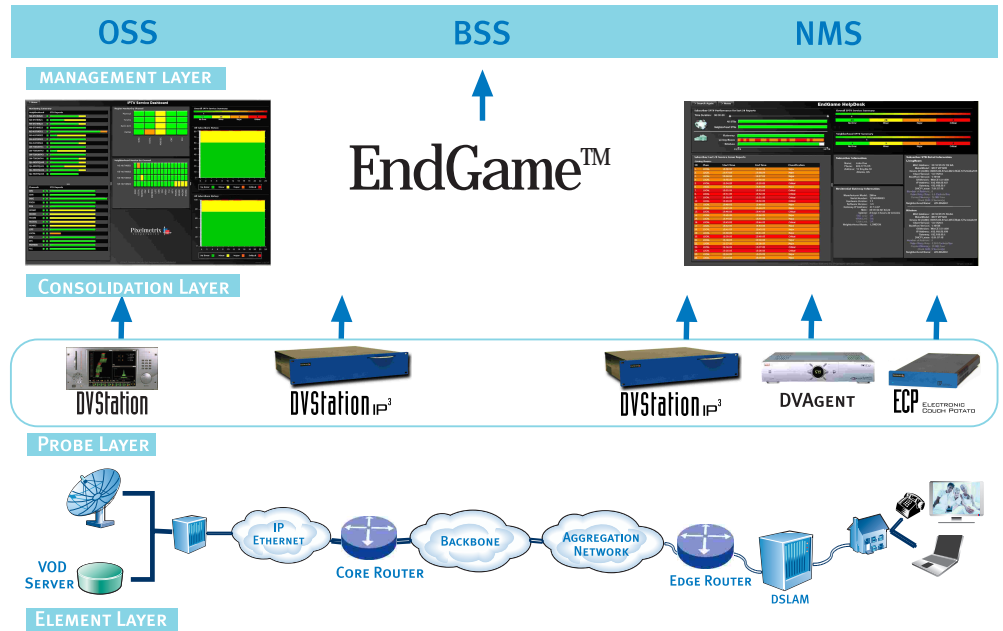## remote monitoring

IPTV Challenge: EndGame™

IPTV Challenge

The Internet has changed the world and the underlying IP network technology is probably the most deployed communication technology today. No wonder more and more classical communications applications such as telephony and now video delivery are being deployed on these IP networks. However, IP networks have not been designed with these applications in mind, and this brings some real challenges to the implementation and operation of IP-based Television and Video distribution. The standard for television quality is set high, and to reach consumer satisfaction with TV over DSL based solutions and elaborate quality assurance, monitoring and alarm systems are needed.

Today, even if operators are aware that they encounter quality issues, they struggle with detecting the root cause of the problem. Today's help desk for TV over DSL services is lacking the tools to truly assess the situation at a customer's site, and they face difficulties providing 'useful' help services. A powerful End-to-End quality monitoring solution is required to enable fast, customer-centric fault isolation and performance monitoring for proactive quality management. Pixelmetrix EndGame™ is the only solution that addresses all these requirements in an efficient, easy to integrate and flexible manner.

Network Performance for Video

Broadcast Video Requirement	10^{-11}
	10^{-10}
	10^{-9}
	10^{-8}
Typical Network Today?	10^{-7}
	10^{-6}
	10^{-5}
ITU-T Y.1541 Voice/Data	10^{-4}
	10^{-3}
	10^{-2}
	10^{-1}

OSS **BSS** **NMS**

MANAGEMENT LAYER

EndGame™

CONSOLIDATION LAYER

DVStation   DVStation IP³   DVStation IP³   DVAGENT   ECP ELECTRONIC COUCH POTATO

PROBE LAYER

VOD SERVER   IP ETHERNET   CORE ROUTER   BACKBONE   AGGREGATION NETWORK   EDGE ROUTER   DSLAM

ELEMENT LAYER

EndGame™

EndGame™ is Pixelmetrix End-to-End quality assurance architecture that provides QoS/QoE monitoring at all points along the content delivery chain: from the Headend, to the Network and to the End User (STB). The EndGame™ architecture aligns directly with current work underway within the ITU-T, which divides IPTV into multiple 'domains' and goes on to define what kind of monitoring is required within each domain. This makes EndGame™ the truly End-to-End monitoring architecture.

Via a server-based information and alarm consolidation suite, an effective, complete and easy to use End-to-End quality management solution is provided. Open interfacing with OSS/BSS as well as third party equipment provides flexibility and protects your investment. Pixelmetrix EndGame™ provides key performance indexes and also aggregates the information into useful customer and service-centric intelligence – making troubleshooting easy.

What happened? Is that a goal or a miss?

Pixelmetrix
corporation

Domain A — Domain B — Domain C — Domain D — Domain E
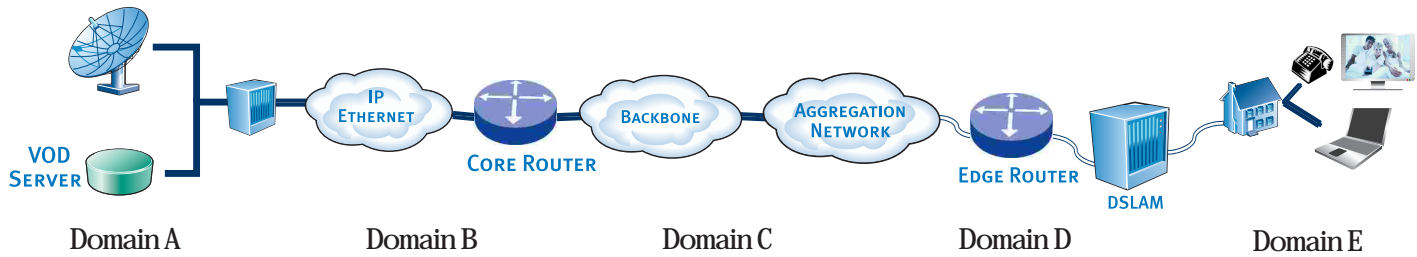
| Monitoring Parameter	Domain				
	A	B	C	D	E
RF Integrity	Yes				
Meta Data (Parental Control/EPG/Subtitles	Yes	Yes			
Packet Loss & Jitter	Yes*		Yes	Yes	Yes
Transport Stream (TR 101 290)	Priority 1, 2, 3	Priority 1, 2	Priority 1	Priority 1	Priority 1
Video/Audio Bandwidth	Yes	Yes	Yes	Yes	Yes
IGMP Join/Leave Time			No	Yes	Yes
Channel Zap Time			No	No	Yes
Channel Line-Up Verification	Yes	Yes	No	No	Yes
Available Bandwidth	No	No	Yes	Yes	Yes
Video Quality, Freeze, Blackout	Yes	Yes			Yes
Audio Quality, loss, Presence	Yes	Yes			Yes
Video On Demand Request Performance	No	No	No	No	Yes

*Applies to IP contribution only

EndGame™ Components

Headend Monitoring

DVStation is Pixelmetrix market leading digital satellite, terrestrial and digital video base band (SDI) monitoring platform. DVStation-IP[3] addresses all the needs at the IPTV headend. Installed and established in every major television distribution network all over the world, DVStation, with features such as On-air Content Validation (OCV), all-channel freeze, blackout and audio loss detection as well as full SNMP support, is the right choice for every IPTV headend monitoring. For further information, please refer to the DVStation and DVStation-IP[3] datasheets.

IP Backbone and Aggregation Network Surveillance

The DVStation-IP[3] is Pixelmetrix video over IP solution for Headend output assurance. It monitors and triggers alarms on Key Performance Indicators such as Media Delivery Index (MDI), ETSI TR 101 290 Transport stream checks as well as bandwidth by stream, for every stream on the network. The easy to use IP Commander™ user interface enables the operator to drill down into a particular stream, analyze and troubleshoot in detail. The remote service view and online content validation allow users to validate the correctness of content on the pipe.


Pixelmetrix
c o r p o r a t i o n
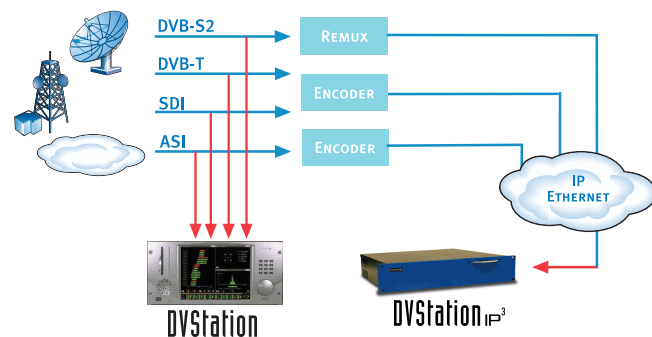
End User Monitoring

Constantly monitoring the consumer experience allows customer care to isolate IPTV service delivery issues before they are faced with dissatisfied customers. Residing in the Set Top Box (STB), the Pixelmetrix DVAgent™ provides a detailed query that gives an in-depth view into the end-user's experience, allowing problem validation before troubleshooting begins. With real-time measurements of the individual's quality of experience (QoE), problems are identified and finally resolved in the timeliest manner.

DVAgent™ monitors quality parameters such as ETSI TR101 290, STB CPU/Memory usage, Video/Audio impairments, EPG clock drifts and channel join times. Thanks to its very small footprint, DVAgent™ can be implemented into almost every STB. Reference implementations are available on Windows CE, VxWorks as well as Linux, and adaptation of DVAgent™ to a customer's STB is part of the offering.

DVAgent™

Monitoring within the Set Top Box Agent, the point closest to the eyes and ears of the viewer, is the best way to provide true end user monitoring. Occupying an ultra-small footprint, DVAgent™ is built upon the latest technologies enabling superior visibility with minimal resources.
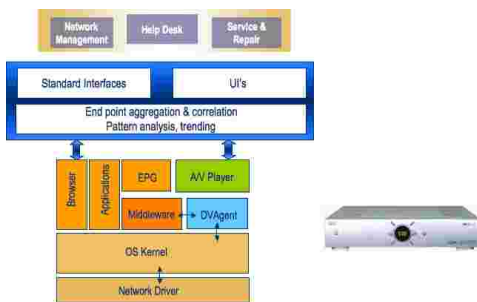
Intelligent Data Consolidation

A proficient, user-friendly customer care application is a must in today's complex service distribution ecosystem. In order to isolate the root of a problem, having performance data of different points network is a requirement. Most importantly, however, is to bring the data to a centralized point and interpret the data into useful service and customer-oriented information. The more intelligent the information representation and consolidation, the faster the response, rather than losing time interpreting data bits. Efficient Root Cause Analysis becomes a question of how information is presented, and is the base of fixing a problem the fastest way possible. Even more, good information representation allows proactive interference before quality at the end user is jeopardized.

The core of the EndGame™ solution consolidates monitored quality of experience data into customer-centric information. EndGame™ provides integration with operators' OSS/BSS, and therefore enables powerful customer-centric help desk integration. Objective validation of consumer service complaints becomes possible, resulting in a more professional and effective help desk. The consolidation of all subscribers' performance data allows putting customer service complaints into a larger network perspective and escalating a customer service issue in a much more focused manner. Unnecessary truck rolls are removed and customer satisfaction is raised.

Real-Time IPTV Service Dashboard

The service dashboard visualizes the running services on the network. A real-time IPTV service monitor gives you the opportunity to proactively isolate and detect faults. At a glance, the service view provides information on where in the network, whether at the headend, in a particular region or whether only a single end user is experiencing problems. The service view provides a one-view display of the program channel performance throughout the entire network. The timeline view gives immediate information on the persistence of the problem.

Without any interaction, operators can isolate the root cause of a problem on a Go/No-Go basis. If they want to do in-depth analysis of the problem, a simple click on the appropriate field in the graphical user interface provides access to the screen at the particular node.