Hands-On

Troubleshooting IPTV with WireShark

Course Description

This Hands-On course will enable attendees to upgrade their knowledge about how Video and Television is carried over IP in state-of-the art systems. At the end of the course attendees will better appreciate how reliable distribution systems using Quality of Service networks can be engineered and faults found using open source and freely available tools, in particular Wire Shark.

TV and video delivery systems increasingly run over networks based upon IP within TV head-ends as well as for delivery and distribution to customers over access networks. Engineers need an appreciation of how these services can be deployed reliably in redundant systems.

The course will comprise extensive Hands-On labs deploying learning by discovery techniques to reinforce practical field service skills.

The course will teach you how to analyze traffic running between networks and set top boxes, between switches and routers within distribution networks, multiplexer streams running between head ends and network management systems as well as locating the source of blocking, freezing and picture breakup.

Attendees will also analyze the protocol exchanges and experiment to identify how failures impact the service and how security attacks can be detected and defeated.

This class can also be customized to add additioanl Hands-On sessions monitoring and troubleshooting live services, upon request.

Students Will Learn

- **Install WireShark Protocol Analyzer Software**
- **Use Key Functions To Measure Delay, Bandwidth, Jitter And Packet Loss**
- **Analyze Protocol Exchanges Between IPTV And Video On Demand Systems**
- **Recognize And Fix Routing And Addressing Faults**
- **Identify The Impact Of Link Element Failure On Distribution Services**
- **Recognize And Troubleshoot Typical Faults Including Freeze Frames, Service Drops, Picture Blocking, Lost Channels, And Sound Loss**
- **Troubleshoot And Monitor Multicast Routing Protocols Function**
- **Monitor Service Quality And Select The Most Appropriate Quality Of Service Option**
- **And More...**

Target Audience

This course is aimed at Field Service technicians, Systems Engineers, Systems Specialists , Integrators, Developers, Designers, Customer Support and Systems Delivery Project Engineers who need to troubleshoot IPTV and related protocols Hands-On.

Course Outline

Module I: Protocol Analyzers

Functions of protocol analyzers

Selecting an analyzer

WireShark: History and evolution from Ethereal and TCP Dump

Downloading and installing the analyzer hands-on

Configuring the analyzer for field service use

Learning to Capture and save traffic hands-on

Using the analyzer to measure bandwidth and throughput

Hands-on Discovering which protocols are used

Module II: Ethernet, DSL and LAN Protocol Analysis

Layer 2 frames and their analysis

Layer 2 addressing and recognizing different address classes and equipment

Identifying IP address allocations over Layer 2 interfaces

DHCP and PPPoE

Spanning Tree Protocol

Hands-on troubleshooting Ethernet problems

Hands-on Using WireShark for WiFi Analysis

Module III: IP and Key Related Protocols

Analyzing IP header key fields

Using TTL to limit range of IPTV streams

IP fragmentation

Analyzing Differentiated Services Code Points and IP QoS

Mapping IP address to Ethernet Addresses with ARP

Hands-on Analyzing and Troubleshooting IP Functions

Module IV: Unicast Routing

OSPF Routing

BGP Routing

Analyzing Hello messages for delivering reachability information

Rerouting on failure

Reading routing tables

Editing routing tables using Route commands

Hands-on Troubleshooting routing errors in systems with multiple interfaces

Hands-on measuring Failure and recovery times

Module V: Multicast Routing

Multicast Addressing and selecting addresses

Identifying Link Local Multicast

Selecting Multicast Streams using Internet Group Management Protocol

Leaving streams

IGMPv3 for Head End Multiplexer stream selection

Hands-on analyzing IGMP

Multicasting between Layer 3 switches with Protocol Independent Multicast

Locating and reading Multicast Routing Tables

Hands-on troubleshooting Multicast Services

Module VI: Layer 4 Troubleshooting

Transmission Control Protocol (TCP) error detection and recovery

Measuring Retransmission delay

Identifying packet loss and recovery of Video on Demand

User Datagram protocol

Using RTP to overcome variations in delay

Hands-on Analysis of Video on Demand

Hands-on Analysis of Live TV to monitor quality

Module VII: Troubleshooting MPEG Transport Streams

How MPEG transport streams work

Recognizing I-Pictures, B-Pictures and P-Pictures

MPEG Clocks

Frame freezing caused by MPEG stream errors

Picture Blocking

Recognizing the source of blocking from Picture Quality

Hands-on Troubleshooting MPEG Streams

Hands-on reconstruction of a transport stream for QoS monitoring

Module VIII: Analyzing Management and support Protocols

Managing networks with SNMP

Hands-on using SNMP to recover MIB variables

Network Time Protocol

Hands-on Analyzing NTP operation

Delivery Method

Instructor-Led with Hands-On labs and numerous exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

4 Days