# Hands-On **IP Multicasting** for Multimedia Distribution Networks



#### **Course Description**

This Hands-On course provides an in-depth look how IP multicasting works, its advantages and limitations and how it can be deployed to provide effective services over a Next Generation converged network. It will demonstrate examples of multimedia service configurations in the class-room and identify practical problems and their solution. It will provide a detailed understanding for implementers, designers, managers and infrastructure engineers that need to plan, implement and use the new generation of networks and services.

The next generation of telecommunications networks will deliver broadband data and multimedia services to users. Integration with TV, music and radio distribution will become a reality provided mechanisms to provide multicast delivery are implemented. This technology allows a broadcasting station to send a single stream of packets into the network and have these delivered to the subscribing users. It provides therefore a scalable solution to the problem of transmitting IP Television and other services over next generation IP infrastructures

In order to make multicasting function effectively it is necessary to deploy routers and switches capable of supporting the appropriate protocols and to design and configure the network correctly. Core infrastructure, distribution nodes, access devices and client devices all must play their part in a working service.

#### **Students Will Learn**

- Describe The Basic Function Of Multicast IP
- Select The Appropriate Sparse Mode Or Dense Mode Options For Deployment
- Compare The Efficiency Of Routed And MPLS Switched Options For Qos Networks
- Implement Appropriate Addressing Mechanisms For Streams
- Provide Reliability By Deploying The Re-Routing With Protocol Independent Multicast
- Select Programme Streams Using Internet Group Management Protocol
- Engineer Traffic Loading
- Carry Real Time Multicast Services Over Real Time Transport Protocol And Real Time Streaming Protocol
- And Much More

#### **Prerequisites**

A solid understanding of IP and WAN technologies is required.

#### **Course Outline**

# Module I: Multicasting over IP: An Introduction Application user over Internet Access Increasing Demand for Multimedia applications Traffic patters for data and Multimedia Services TV and Music Distribution Sizing Traffic Demands for Unicast Transmission Services Converting Services to Multicast Transmission

#### Module II: Addressing and Identification For Multicast Streams

Internet Protocol Addressing Mechanisms Allocating Network and Subnetwork Identities Historic Address Classes A, B, C and D Classless Addressing Addressing for Multicast IP Streams Carrying Multicast over Link Access Ethernet and IEEE 802 Addressing Multicasting over 802 Networks

#### Module III: Routing for Multicast Delivery

Registering for Multicast Streams Defining the Roles of the Router, Client and Server Internet Group Management Protocol (IGMP) Multicasting at Layer 2 Routing Alternatives Compared - Distance Vector Multicast Routing Protocol (DVMRP) - Multicast Open Shortest Path First (MOSPF) Protocol-Independent Multicast (PIM)
PIM Dense Mode
PIM Sparse Mode
Reverse Path Forwarding

Defining a Rendezvous Point

#### Module IV: Practical Implementation Issues

Announcing Multicast Streams Query of Streams Required Bootstrap Router Considerations IGMP Snooping Automatic Rendezvous Point Allocation Controlling the Scope of Multicast

#### Module V: Multicasting Multimedia over Datagram Services

Internet Protocol Data Transfer TCP Operation Recovering Errors and Lost Packets Selective Retransmission UDP Operation: Fire and Forget Real-Time Transport Protocol Sequencing and Timestamps Encoding media Channels Real Time Stream Protocol MPEG encoding: Framing and clocking

## Module VI: Deploying QoS

Definition of QoS Delay requirements for likely multicast media Interactive vs Broadcast services Mechanisms for Requesting QoS Resource Reservation Protocol (RSVP) Integrated Services (IntServ) Parameters Diffserve and Differentiated Services Code points Weighted Fair Queuing QoS over MPLS

#### Module VII: Reliability Considerations for Multicast Services

Typical Stream Service Configurations Potential Failure Modes and their effect Overcoming Element Failures Hot Standby Routing Protocol Virtual Router Redundancy Protocol Delivering Streamer Reliability Duplicating Streamer Configuration Switchover Mechanisms Aggregation for reliable service

#### **Evaluation and Review**

#### **Delivery Method**

This course will include the following hands-on exercises and demonstrations-Multicasting video over LANs Multicasting Video over Wide Area Routed Connections Implementing Resilience to link failure using Ethernet Aggregation Analyzing Multicast Routing Protocols using WireShark Identify mechanisms for improving multicast real-time services

## **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**

2 Days