

## Course Description

This course teaches the functionality of Ethernet and Ethernet transport, as well as the standards, types of equipment, the provisioning process and various network architectures.

Having in-depth practical knowledge of Ethernet & GigE will help broadband professionals better understand the components and implementations of Ethernet technology from 10BaseT through 10GigE as well as the benefits of future enhancements.

This course instructs how to quickly and easily build, deploy, manage and troubleshoot Ethernet networks. It also details network architectures, protocols, frame formats, configuration and provisioning parameters. In addition, participants will discover important operating requirements and troubleshooting techniques and more.



## Students Will Learn

- **To Describe What Ethernet Is And How It Works**
- **The Diagram Ethernet Architectures (WAN, MAN And LAN)**
- **To Identify How Ethernet, Gige And 10gbe Fit In The Cable Network**
- **To Describe The Similarities Of Ethernet, Gige And 10gbe**
- **To Be Able Discuss The OSI Protocol Stack, Ethernet Protocol Stack And Ethernet Frame Formats**
- **To Explain Auto-Negotiation And The Function It Performs**
- **To Discuss The Provisioning Process For Ethernet In The MAN, WAN And LAN**
- **Be Able To Explain The Logic Behind The Troubleshooting Process**
- **Be Able To Troubleshoot Ethernet Transport Issues**
- **And More...**

## Target Audience

Technical operations managers advanced technical support personnel that work in the NOC, headend and field services mid to senior level data technicians and engineering managers

## Prerequisites

Basic understanding of Networking technologies.

## Course Outline

### Module 1: Introduction to Ethernet/Gigabit Ethernet

- Explain the development history of Ethernet
- List the components of a basic Ethernet network
- Describe the benefits of Ethernet technology

### Module 2: OSI Protocol and Ethernet Frames

- Describe the purpose for the OSI Model
- Explain two key elements for understanding each of the first four layers of the OSI model
- Explain what Ethernet is and how it fits into the OSI model
- Explain what a MAC address is
- Identify a VLAN frame

### Module 3: Ethernet Connectivity and Cabling

- Identify Ethernet equipment types
- Describe the types of cable and connectors used to connect Ethernet networks and equipment together
- Explain the benefits of using each type of equipment and connectors

### Module 4: Auto-negotiation

- Have a general understanding of auto-negotiation
- Explain where auto-negotiation happens within the OSI model
- Identify the differences of auto-negotiation between copper and fiber media types

## Module 5: Switched Ethernet Networks

Describe common types of Ethernet Switches including Store and Forward, Blocking, Layer 2, and Layer 3 Switches.  
Explain why Spanning Tree Protocol is required in Switched Ethernet Networks  
Identify different Routing Protocols that are commonly implemented on Layer 3 Switches and Routers.

## Module 6: Ethernet Test and Turn-up & Network Troubleshooting

Describe two key elements for understanding the first three layers of the OSI  
Identify Ethernet test equipment capable of testing at layers 1, 2 & 3 of the OSI model  
Perform throughput testing at all three layers  
Verify QoS measurements as well as packet loss and Jitter  
Perform RFC-2544 compliance testing at Layers 2 & 3  
Perform IP Throughput, Ping & Round Trip Delay at Layer 3

## Delivery Method

Instructor-Led with numerous Hands-On Labs and 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

2 Days