Hands-On

Gigabit Networks, VLANs & Wireless LANs

(Advanced Local Area Networks)

Course Description

This Hands-On course will discuss traditional Ethernet as it is evolving today and its future. Ethernet components and applications will be examined in detail including real time applications (VOIP) and VLANs. Wireless LANs, like Ethernet, are taking on a similar evolutionary path in providing greater speeds.

Students will engage in the building of the various types of Ethernet networks and manage them using a practical Hands-On approach by building and working on a live Local Area Network, Implementing and Configuring Todays Advanced LANs by

Building a Switched Network
Building a 802.11b wireless network infrastructure
Building a 10/100/1000 Mbps switched network
Configuring Ethernet Switches for Trunking
Configuring Ethernet Switches for VLANs
Interconnecting Ethernet switches using VLANs
Appling SNMP, RMON, MPLS to the Ethernet Network
View Ethernet Protocols using Protocol Analyzers
Testing & Troubleshooting Real-World Scenarios
And More

State-of-the-Art Live Labs will reinforce the subject materials. All the various concepts, techniques, terminology, conventions, and components of Todays Advanced Local Area Networks will be discussed with the focus on making the student more productive in his/her network environment Today.

Students Will Learn

- **Building a Switched Network**
- **Building a 802.11b wireless network infrastructure**
- **Building a 10/100/1000 Mbps switched network**
- **Configuring Ethernet Switches for Trunking**
- **Configuring Ethernet Switches for VLANs**
- **Interconnecting Ethernet switches using VLANs**
- **Appling SNMP, RMON, MPLS to the Ethernet Network**
- **View Ethernet Protocols using Protocol Analyzers**
- **Testing & Troubleshooting Real-World Scenarios**
- **And More**

Target Audience

Individuals who want a strong foundation in LAN technology, applications, and network management using a practical hands-on environment.

Prerequisites

To ensure your success, we recommend you first take our Basic Networking course.

Course Outline

I. Ethernet - The Early Stages and Its Evolution

* Shared networks
* Ethernet access: CSMA/CD
* Shared ethernet components
- Hubs and stacked hubs
- Intelligent hubs
* Varities of ethernet network interface cards and their features
* Ethernet - half and full duplex
* Ethernet evolves:
- 10/100/1000 speeds
- Switched ethernet
- Ethernet priority for real time application support
- Ethernet at 10 gigabits
* Ethernet applied in the production environment
* Other LANs - Token Ring and FDDI
    - Characteristics, implementation and applications
    - Why they didn't make it
    - Performance comparison between ethernet and token ring

    * Switched token ring

II. Ethernet Protocols

* Ethernet protocols and TCP/IP
* Ethernet physical addressing
* Ethernet layer 2 protocol header and trailer
* Ethernet encapsulation types
- DIX and IEEE
- SNAP
- 802.1 P and Q

* Viewing ethernet protocols through a protocol analyzer

III. Gigabit Ethernet And Beyond

* Media and access
* Gigabit ethernet protocols
* Gigabit applications
* Gigabit to the desktop
* Gigabit cable plant - cable and fiber types
* 10 gigabit ethernet - the future

  - The campus backbone
  - Metropolitan Area Networks (MAN)
  - Potential WAN alternative
  - High speed ethernet versus ATM

IV. Wireless LANs

* Wireless applications
* Wireless standards

  - 802.11
  - Bluetooth

* 802.11 speeds and distances
* 802.11 topology

  - Ad-hoc
  - Infrastructure

* 802.11 components

  - wireless network interface cards
  - ethernet bridges
  - USB bridges
  - Access Points (AP)
  - Enhanced Access Points
  - Access Points using both 802.11a, b, g, n

* 802.11 access method
* 802.11 radio technology using spread spectrum
* 802.11 security
* 802.11 enhancements

  - 802.11e for better QOS
  - 802.11a, b, g & n for greater speed and more

V. Switched Ethernet and VLANs

* Comparing hubs, ethernet switches and routers
    - Functionality and OSI layers
* Ethernet switching defined
    - Learning function
    - Handling of destination addresses
    - The broadcast address
* Ethernet switching in the client/server environment
* Spanning tree
    - When it is needed
    - Network application
* New evolved Spanning Tree Protocols
* SONET no longer needed?
* Integrated layer 2 and 3 switching
* Ethernet switch features
    - VLANs
    - Autosensing
    - Half-full duplex
    - Trunking
    - Priority for real time applications
    - Security options
* VLAN applications
* VLAN configuration and setup

VI. Ethernet Network Management

* The placement of network management intelligence
* SNMP managers and agents
* SNMP and RMON agents defined
* SNMP and RMON as applied to ethernet
* SNMP and RMON integrated in the switch
* Probes and their application
* Web based network management
    - Replace SNMP?
    - Advantages and disadvantages of Web based network management

Notes

Build a traditional LAN using components discussed in the lecture.
- Test network
- Stress the network with various traffic loads and observe performance and ethernet behavior.
- Troubleshoot network

View ethernet protocols in detail using a protocol analyzer

Build a 802.11 a, b, g, and or n wireless network infrastructure
- Interconnect wired and wireless networks together

Build a 10/100/1000 Mbps switched network
- Compare performance with previous ethernet hub network
- Introduction to Cisco IOS switches
- Command line and Web access
- Install gigabit switching

Increase switched network reliability by configuring the switches for spanning tree

View spanning tree protocols and their variables using a protocol analyzer

Configure ethernet switches for trunking

Configure ethernet switches for VLANs

Interconnect ethernet switches using VLANs and 802.1Q tags

Applying SNMP and RMON to the ethernet network
- Various SNMP and RMON tools will be used
- Integrated switch SNMP and RMON capabilities
- Applying protocol analyzers to a switched ethernet environment
- Web based network management

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

3 Days