

# Routers, Switches, and Hubs, Oh My!

Networking 101 - MacIT Session M225

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# Who Am I?

- Owner of MacTEK
- Member of Apple Consultants Network, Advisory Council Member
- ACTC 10.1, 10.2, 10.3

# The Basics

- What is a network?
- LAN, WAN, Thank you ...
- Peer To Peer



# Topology

- Bus - AppleTalk, 10Base 2 & 5
- Ring - Token Ring
- Star - Common Ethernet configuration
- Mesh

# Media - Cables

- Thick & Thin Coax 10Base 2 & 10Base5
- Cat 4, 5, 5e, 6 - Ethernet Cables
  - 10Base T
  - 100BaseT (Fast Ethernet)
  - 1000BaseT (Gigabit Ethernet)
- Fiber
- Wireless - the Media-less Media

# Connectivity Devices

NICs

Hubs

Switches

Routers

Bridges



# NIC

- Network Interface Card
- Transceiver

# Hub

- Basic Connectivity on network
- No Intelligence
- Unless absolutely necessary - Throw them away



# Switch

- Manages connectivity
- Whats A Router

# Bridge

Segments a network

# Modem

Modulator De Modulator



# Protocols

- TCP/IP
- AppleTalk
- Netbeui
- SMB
- DNS

# IPv4

- 4 Octets of number make up address scheme
- XXX.XXX.XXX.XXX
- Class A, B, C, D
- IPv6 - More

# DHCP

Dynamic Host Configuration Protocol



# The Almighty OSI Model

# Physical Layer

- Defines the physical structure of the network and its topology
- Hardware
- Topology
- Cable
- hub

# Data-link Layer

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- Addressing
- LLC - Logical Link Control
  - Error & Flow Controls
- NIC
- Bridge



# Network Layer

- Routing

# Transport Layer

- Error Checking
- Service Addressing
- Segmenting

# Session Layer

- Synchronization of data from applications on 2 devices



# Presentation Layer

- Graphics - JPG, GIF, TIFF
- Text & Data - ASCII
- Sound & video - MPG, Quicktime, MP3, MIDI

# Application Layer

# Hardware Tools To Get

- Cable Tester
- Tone Generator
- Crimper



# Software Tools in OS X

## - Apps

- System Preferences - Network Pane
- Internet Connect
- Network Utility

# Software Tools in OS X

## - CLI

- Terminal - But its a Mac?
- PING
- ARP
- NETSTAT
- NSLOOKUP & DIG
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# 3rd Party Software

- Etherpeek
- WhatRoute
- Intermapper
- Omnigraffle or Other Drawing Tool



# Best Practices

- Preventative Medicine
- Doing It Right The First Time

# Planning - What's That?

- Always budget for the best you can afford
- Its a bear to upgrade cable later
- Less Pain is good.

# Document

- Keep Notes - Passwords, IP#s, Server addresses
- Make a Network Map



Label - its no fun  
tracing a line in a  
crunch

# Organize

- Network Closets Gallery

# Cables

- You can roll your own or...
- Its always nice to have someone to blame.



# Equipment

- Avoid Off Brands
- Throw Away your Hubs

# Troubleshooting

- Check the Connections
- Tools - Give me a ping, one ping only....
- Router
- Protocols
- Go Back & Check the Connections

# Known & Little Known Router Secrets

- Common Router Passwords
  - Admin, Password, 1234 Default
  - Change the default password ASAP - But Document it



# Resources

- TCP/IP - O'Reilly
- Websites
  - Macfixit.com
- Lists
  - Mac Manager
  - OS X Server List
- Consultants - Apple Consultants Network