CompTIA A+ Core 2 Exam 220-1102

Lesson 14

Managing Windows Networking

Objectives

- Configure Windows networking
- Troubleshoot Windows networking
- Configure Windows security settings
- Manage Windows shares

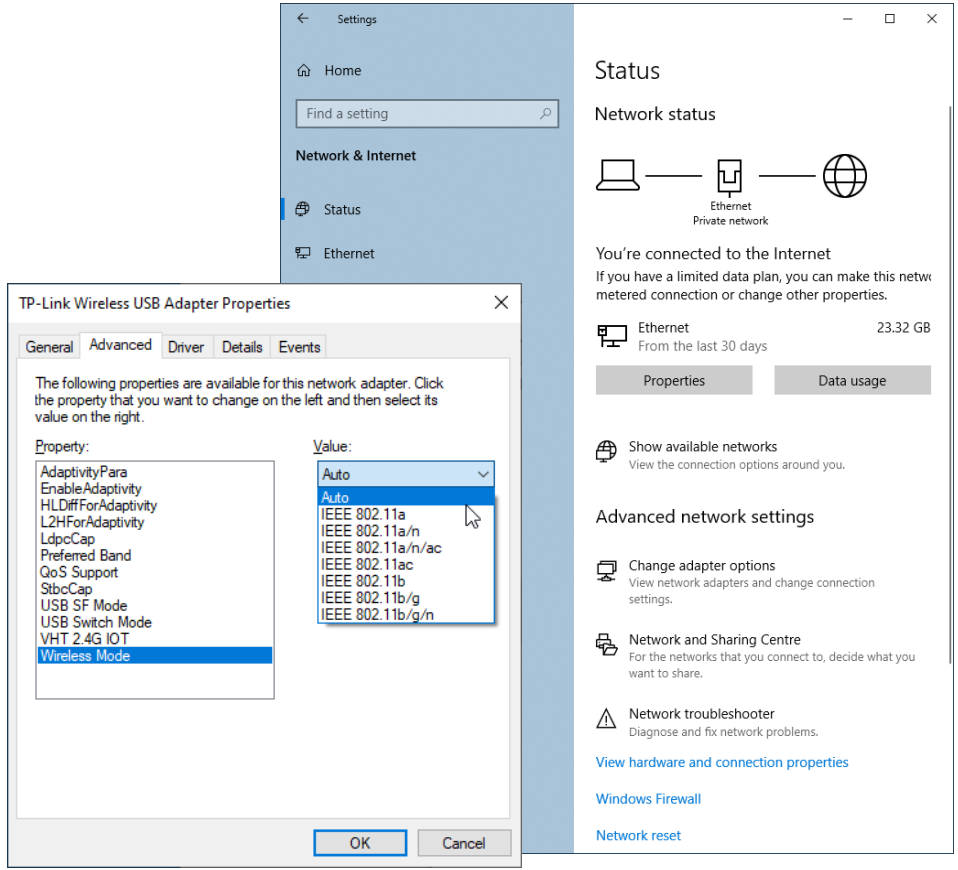
Lesson 14

Topic 14A

Configuring Windows Networking

Windows Network Connection Types

- Wired (Ethernet)
  - Device Manager properties
- Wireless
  - Network name/service set ID (SSID) list
  - Joining a non-broadcast network
  - Adapter properties
    - Standards support, transmit power, and roaming aggressiveness



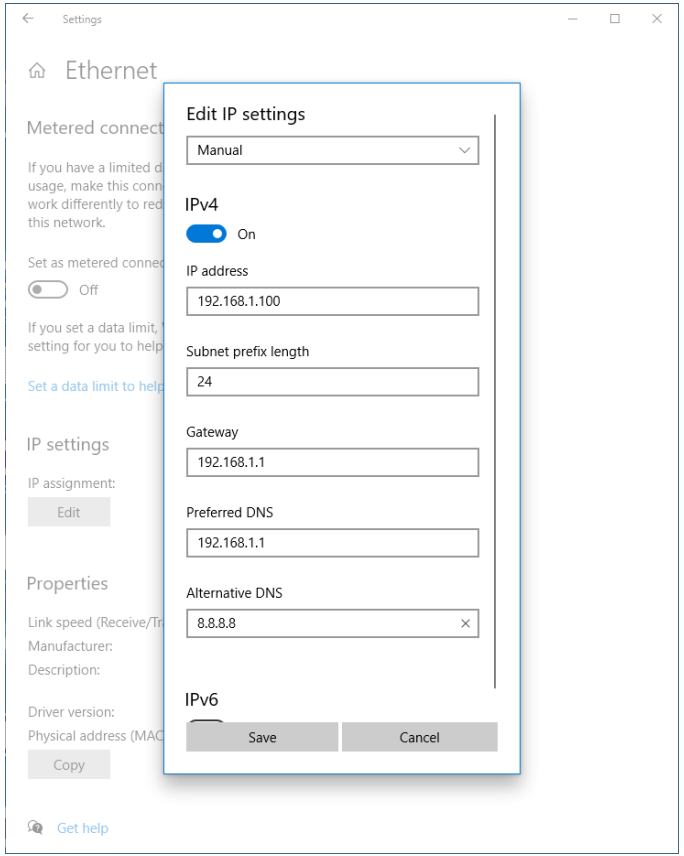
Screenshots courtesy of Microsoft

IP Addressing Schemes

- Internet Protocol (IP) addressing scheme
  - IPv4 address and subnet mask
  - IPv6 address and network prefix
- Default gateway
- Domain Name System (DNS) settings
- Static versus dynamic configuration

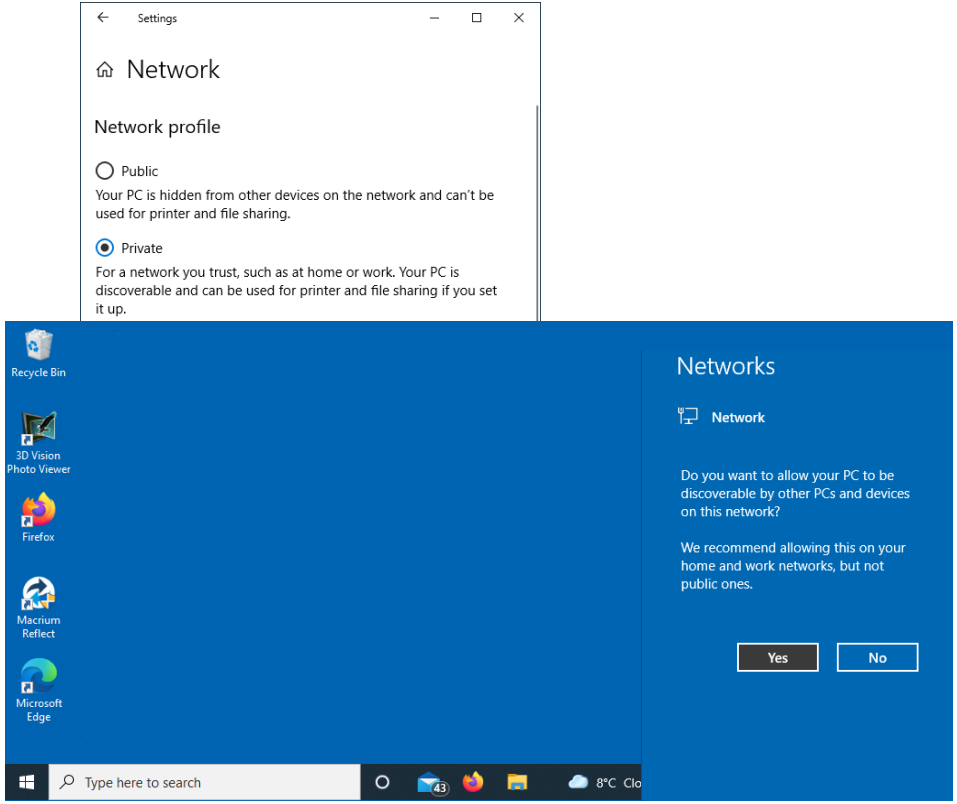
Windows Client Configuration

- Clients, protocols, and services
- IPv4 properties
  - Obtain an IP address automatically
  - Static configuration
  - Alternate configuration



Screenshot courtesy of Microsoft

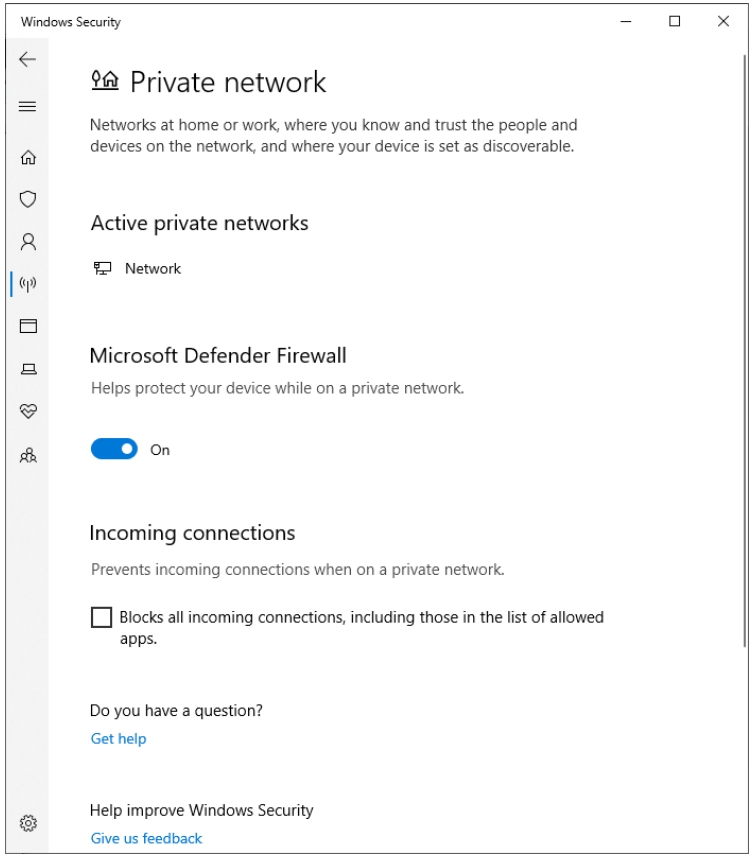
Network Location

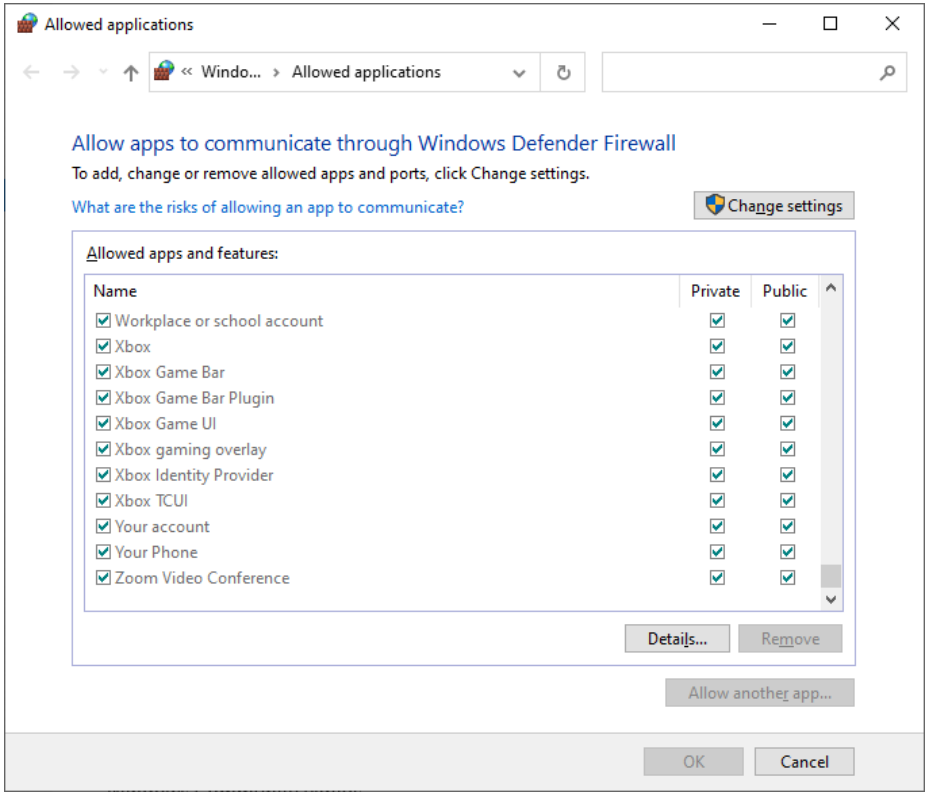


Screenshots courtesy of Microsoft

- Public versus private
- Network Location Awareness
- Controls whether host discovery and sharing is enabled
- Network navigation in File Explorer

Windows Defender Firewall Configuration

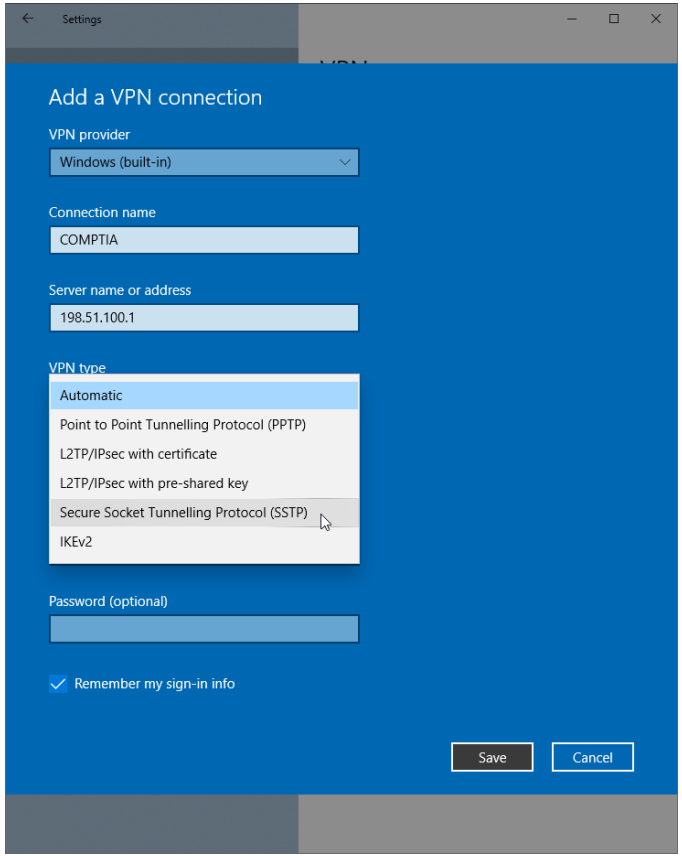




Screenshots courtesy of Microsoft

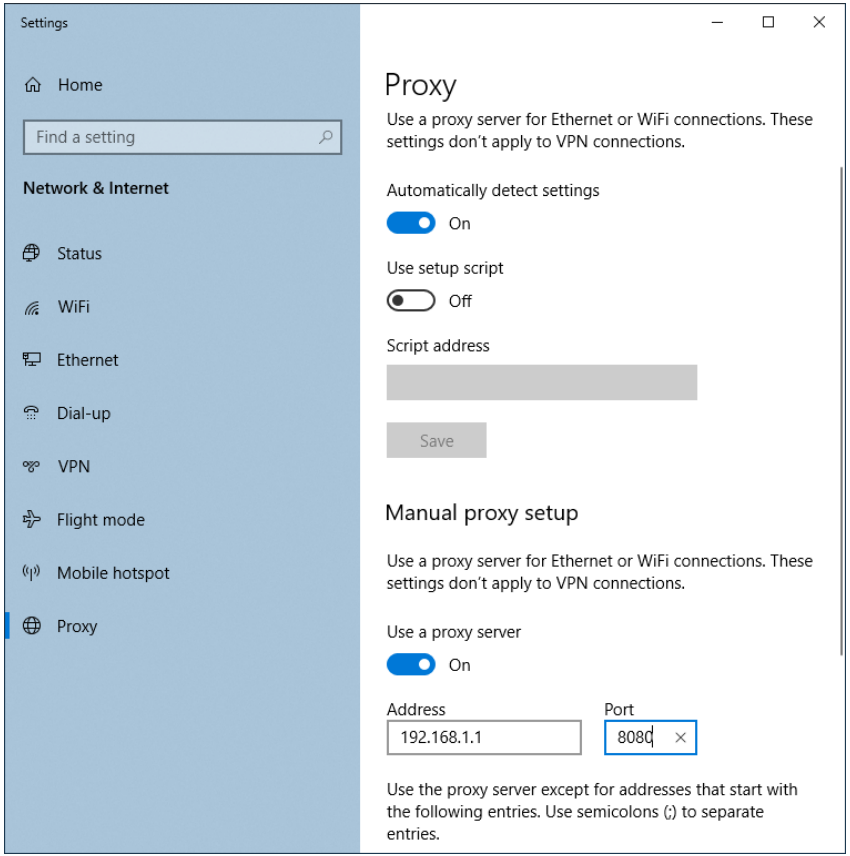
VPN and WWAN Connection Types

- Virtual private network (VPN)
  - Protocol support in Windows versus third-party clients
  - Remote network address
  - Connecting and disconnecting
- Wireless wide area network (WWAN)
  - Cellular adapter and SIM card
  - Metered connections and limitations



Screenshots courtesy of Microsoft

Proxy Settings



Screenshot courtesy of Microsoft

- Clients connect to Internet via server
  - Content filtering and security
  - Caching to improve performance
- Non-transparent configuration
  - Proxy server address
  - Port

Review Activity: Windows Networking

- Windows Network Connection Types
- IP Address Schemes
- Windows Client Configuration
- Network Location
- Windows Defender Firewall Configuration
- VPN and WWAN Connection Types
- Proxy Settings

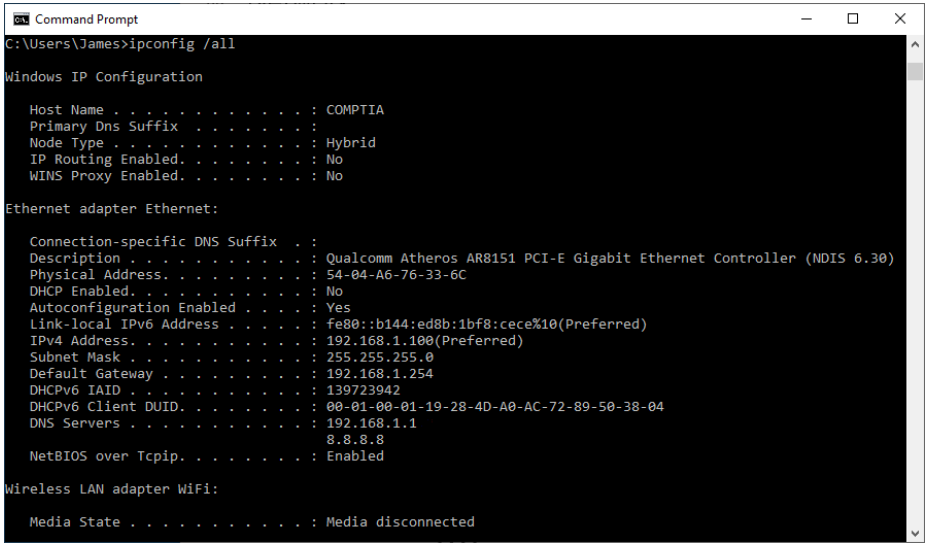
Lesson 14

Topic 14B

Troubleshooting Windows Networking

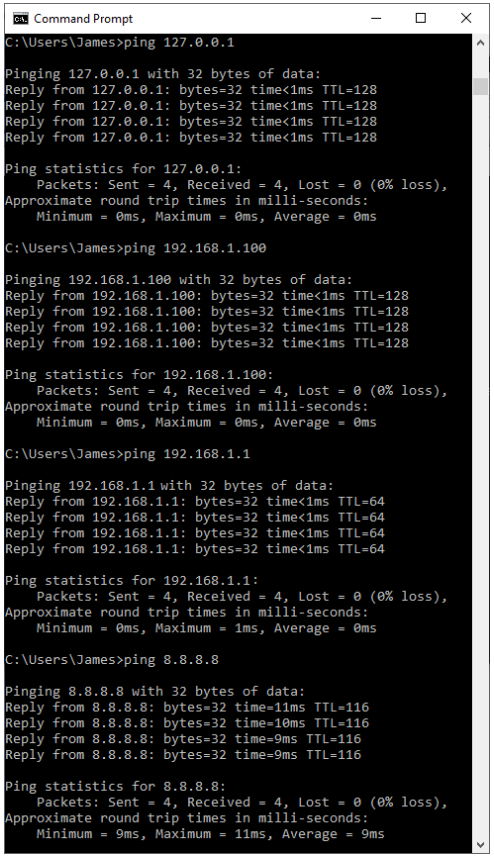
Troubleshoot IP Configuration

- Windows adapter error states
  - Limited connectivity versus No Internet
- ipconfig Command
  - Basic versus detailed (/all)
  - Manage DHCP (/release and /renew)
  - Manage DNS cache (/displaydns and /flushdns)
- hostname Command
- Network reset



Screenshots courtesy of Microsoft

Troubleshoot Local Network Connectivity

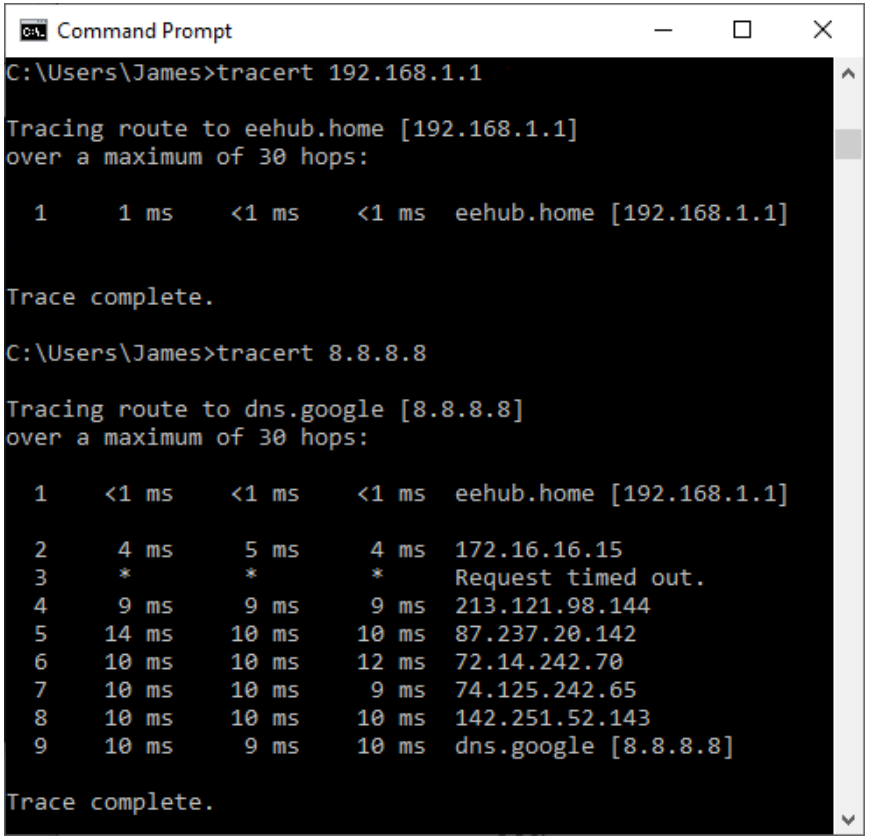


Screenshots courtesy of Microsoft

- ping to test connectivity with host
  - ping loopback and own IP
  - ping gateway
  - ping remote host
- Response types
  - Round-trip time (RTT) if responses received
  - Destination unreachable
  - No reply (request timed out)
- ping by name

Troubleshoot Remote Network Connectivity

- tracert
  - Path from gateway to remote hosts
  - Hop count
  - Router ingress interface
  - RTT
- pathing
  - Measure more accurate latency statistics



Screenshot courtesy of Microsoft

Troubleshoot Name Resolution

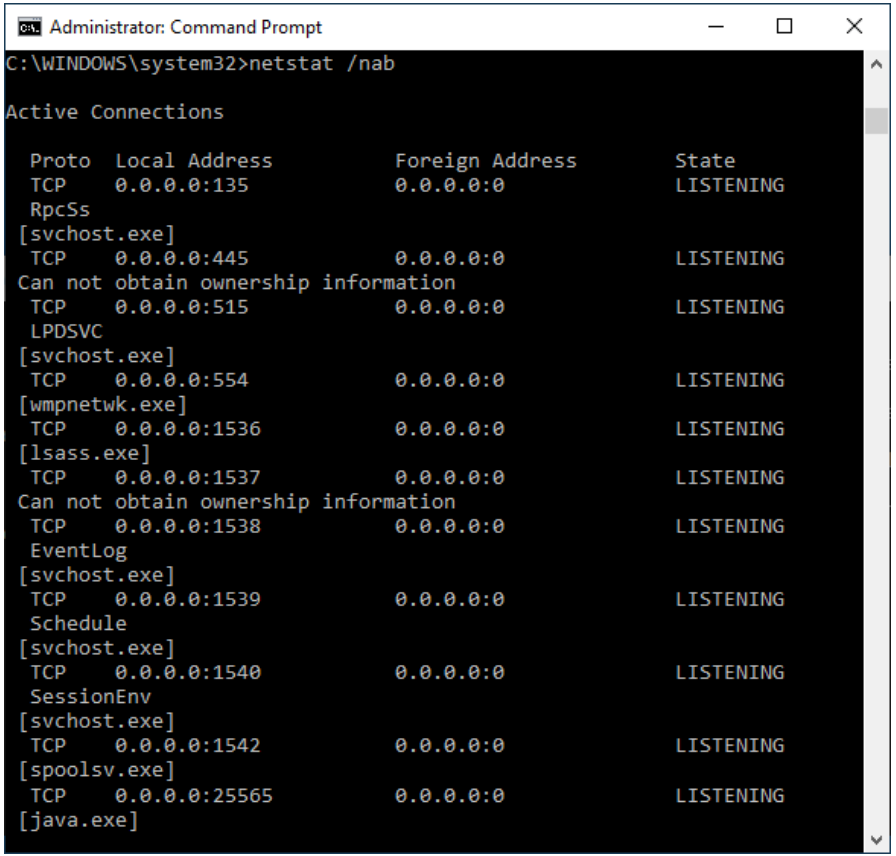
```
C:\Users\Admin>nslookup -type=mx comptia.org 8.8.8.8
Server:  dns.google
Address:  8.8.8.8

Non-authoritative answer:
comptia.org     MX preference = 10, mail exchanger = comptia-org.mail.protection.outlook.com

C:\Users\Admin>nslookup -type=ns comptia.org 8.8.8.8
Server:  dns.google
Address:  8.8.8.8

Non-authoritative answer:
comptia.org     nameserver = ns2.comptia.org
comptia.org     nameserver = ns1.comptia.org

C:\Users\Admin>nslookup -type=mx comptia.org ns1.comptia.org
Server:  UnKnown
Address:  209.117.62.56

comptia.org     MX preference = 10, mail exchanger = comptia-org.mail.protection.outlook.com

C:\Users\Admin>
```

Screenshot courtesy of Microsoft

- Troubleshooting beyond basic connectivity
  - Security, name resolution, and service availability
- Diagnose DNS issues with nslookup
  - Domain/host and record type to query
  - Server to use to perform queries

Troubleshoot Network Ports

- netstat
  - Report port status and connections
- Switches
  - -a to show all
  - -b and -o report process that opened the port
  - -n use numerical formats
  - -e and -s to report statistics



Screenshots courtesy of Microsoft

Review Activity: Windows Network Troubleshooting

- Troubleshoot IP Configuration
- Troubleshoot Local Network Connectivity
- Troubleshoot Remote Network Connectivity
- Troubleshoot Name Resolution
- Troubleshoot Network Ports

Lab Activity

- Assisted Lab: Configure Windows Networking
  - Diagnose and remediate a network connectivity issue

Lesson 14

Topic 14C

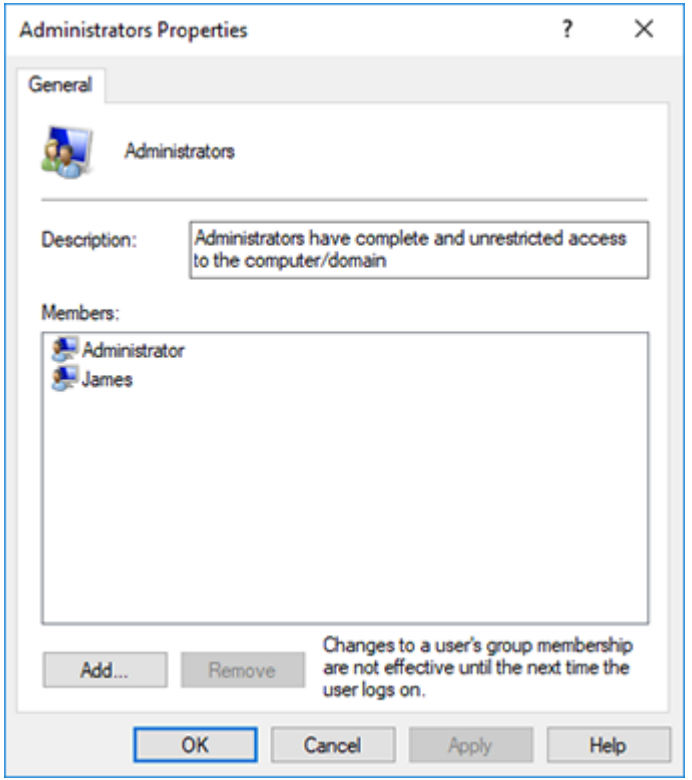
Configure Windows Security Settings

Logical Security Controls

- Security control types
  - Physical, procedural, logical
- Logical security
  - Access control system enforced by software
  - Authentication, authorization, and accounting
- Access control lists (ACLs)
  - Subjects receive permissions over resources (objects)
- Implicit deny
- Least privilege

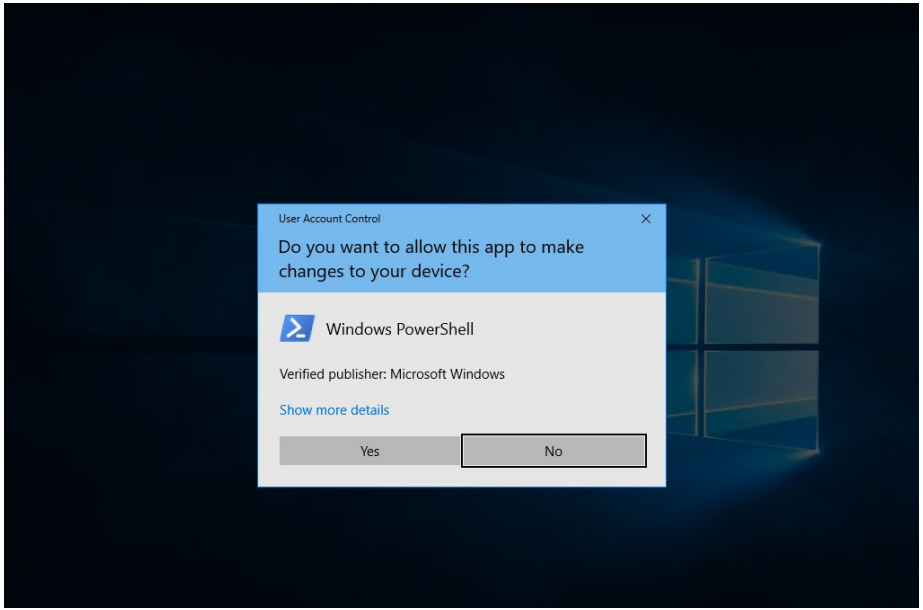
User and Group Accounts

- User accounts
  - Local versus Microsoft account
- Security groups
  - Administrator
  - Users (standard accounts)
  - Guests
  - Power users
- Managing user and group accounts
  - Local Users and Groups management console
  - net user Commands



Screenshot courtesy of Microsoft

User Account Control



Screenshot courtesy of Microsoft

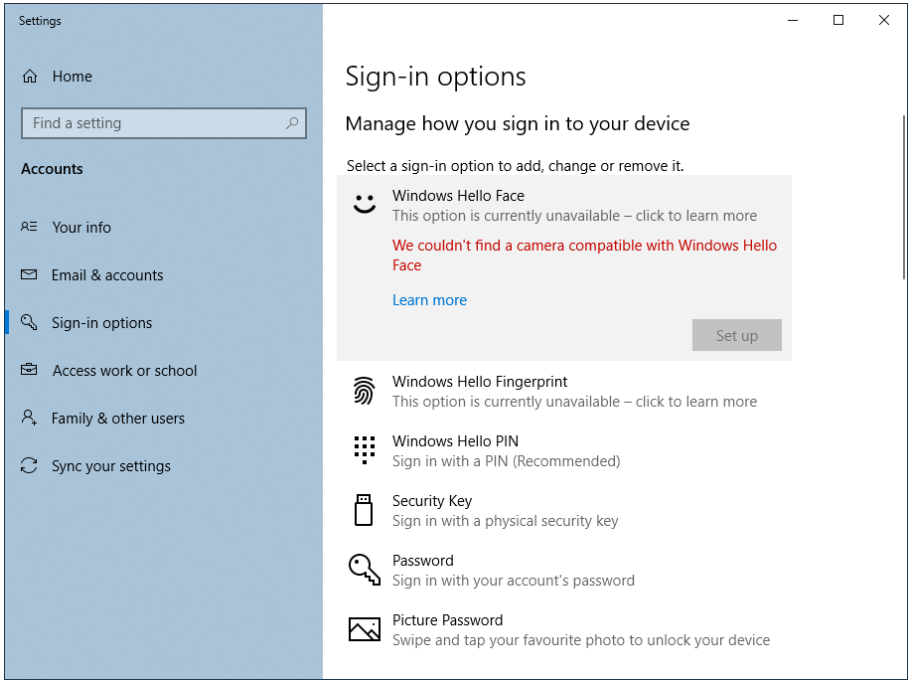
- Least privilege
  - Require consent even if user is administrator
  - Allow temporary escalation of privileges in standard user session
- Run as administrator
- UAC settings

Authentication Methods

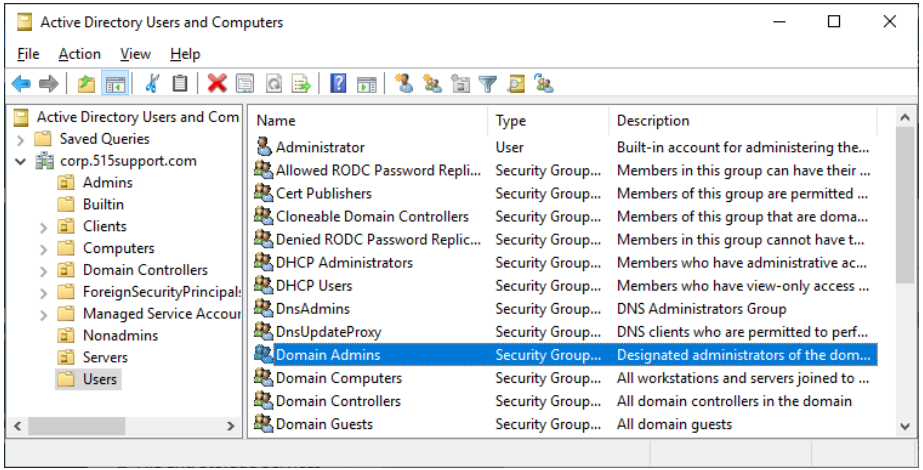
- Multifactor authentication (MFA)
- 2-step verification
  - Validate sign-in by sending a soft token to a registered account, device, or phone number
  - Email, short message service (SMS), voice call
- Authenticator application
- Hard token authentication

Windows Login Options

- Windows authentication
  - Local, network, and remote
- Username and password
- Windows Hello
  - Personal identification number (PIN)
  - Fingerprint
  - Facial recognition
- Single sign-on (SSO)
  - Kerberos authentication and authorization
  - Password-less SSO



Windows Domains and Active Directory

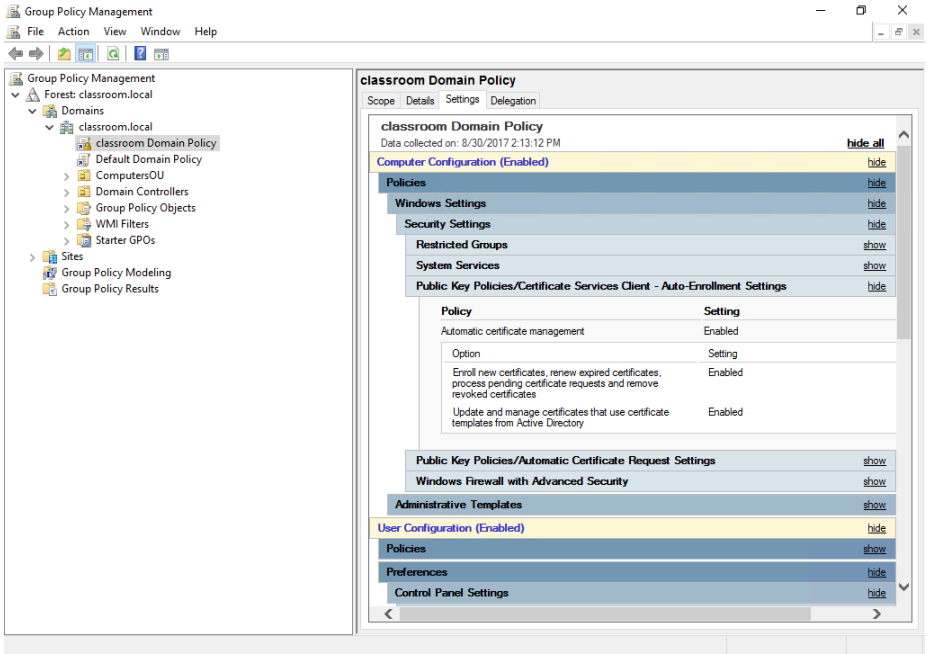


Screenshot courtesy of Microsoft

- Local security accounts versus Active Directory (AD) accounts
- Domain Controller (DC)
- Member server
  - Kerberos SSO
- Security groups
- Organizational units (OU)

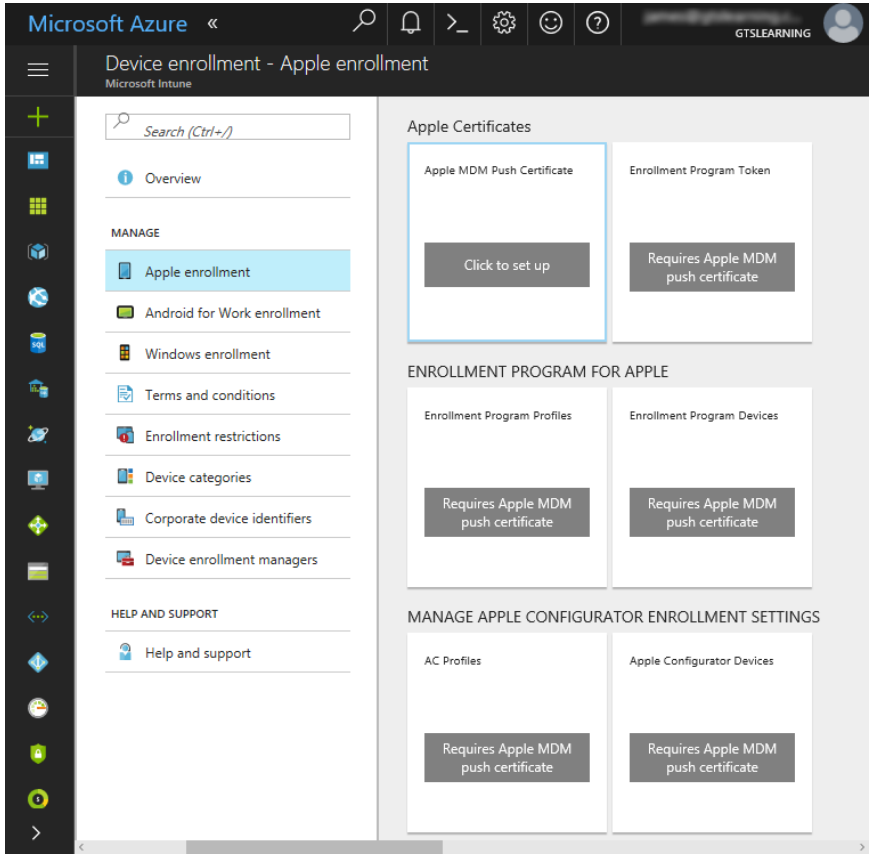
Group Policy and Login Scripts

- Group Policy Objects (GPOs)
  - Attach to domains and OUs
  - Apply to computer and user accounts
  - Administrative Templates
- Updating and monitoring policies
  - gpupdate
  - gpresult
- Login scripts



Screenshots courtesy of Microsoft

Mobile Device Management



Screenshot courtesy of Microsoft

- Register mobile devices when they connect to network
- Control use of apps and device features

Review Activity: Security Settings

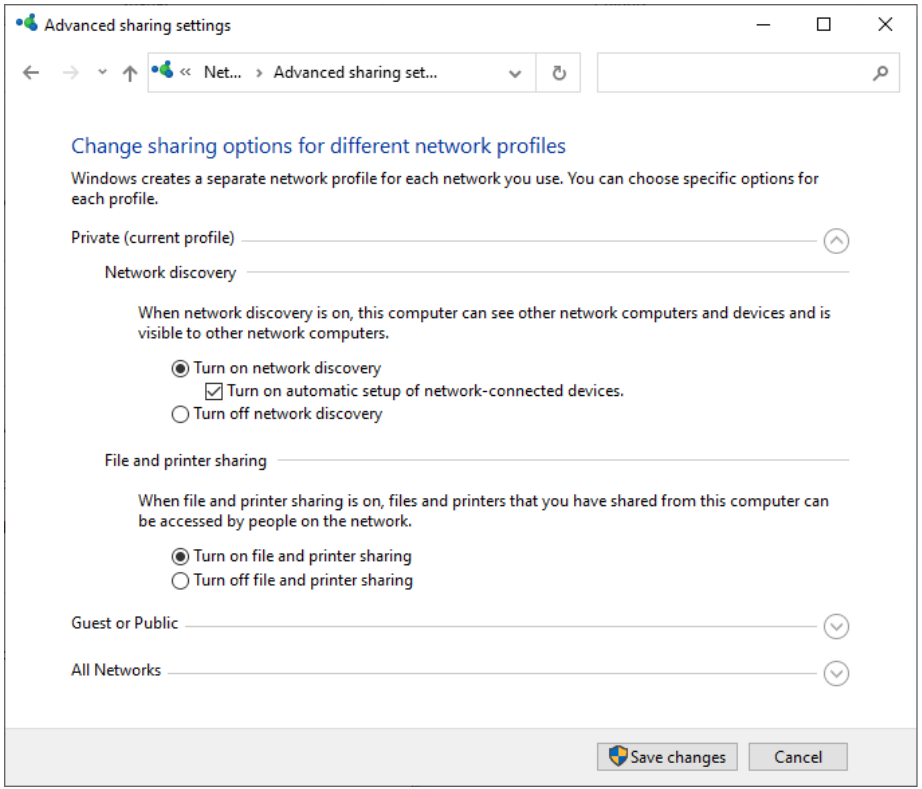
- Logical Security Controls
- User and Group Accounts
- User Account Control
- Authentication Methods
- Windows Login Options
- Windows Domains and Active Directory
- Group Policy and Login Scripts
- Mobile Device Management

Lesson 14

Topic 14D

Manage Windows Shares

Workgroup Setup

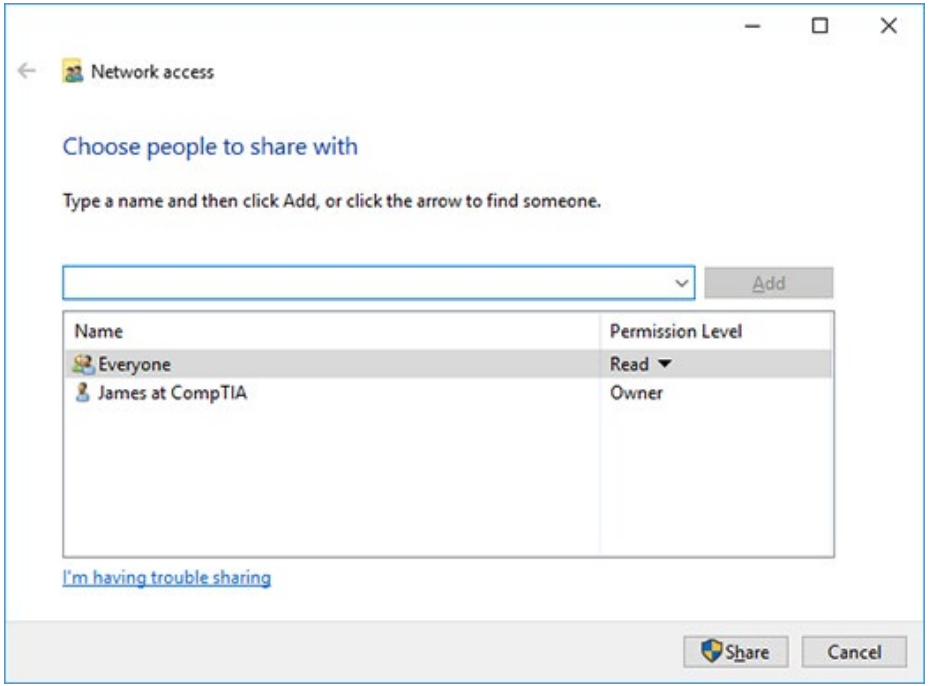


Screenshot courtesy of Microsoft

- Workgroup networking versus domain networking
  - Peer-to-peer versus centralized client/server models
- Network discovery and file sharing
  - Advanced sharing settings
  - Password-protected sharing

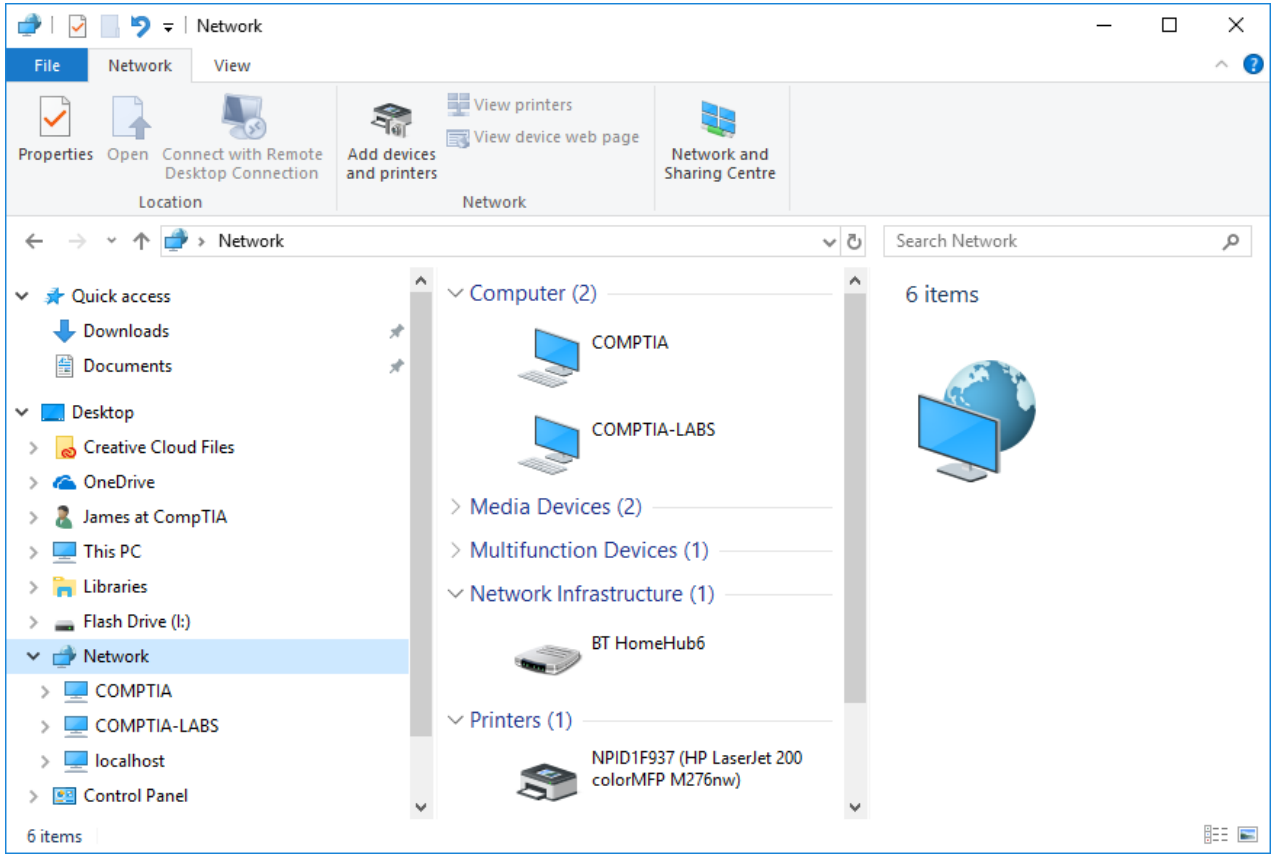
File Share Configuration

- Public folder sharing
- Custom shares
  - Read versus Read/write
- Administrative shares
  - C$
  - ADMIN$



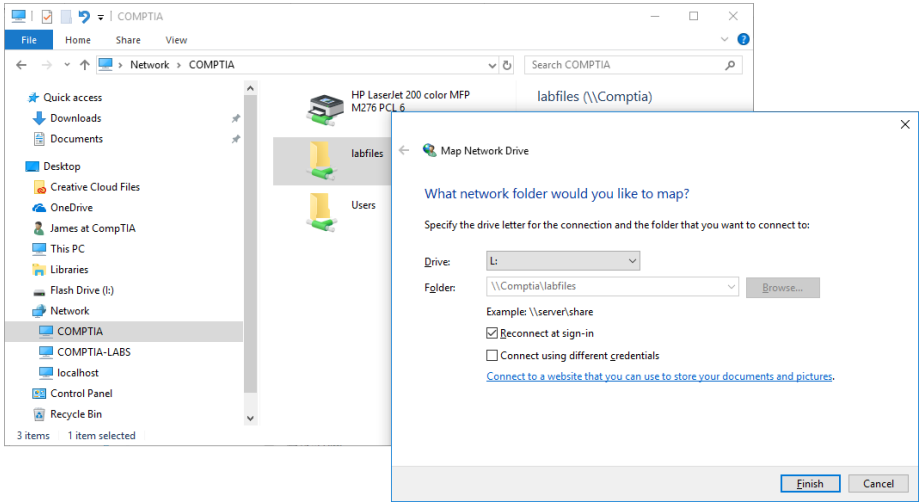
Screenshot courtesy of Microsoft

Network Browsing Mapping Drives (Slide 1 of 2)



Screenshot courtesy of Microsoft

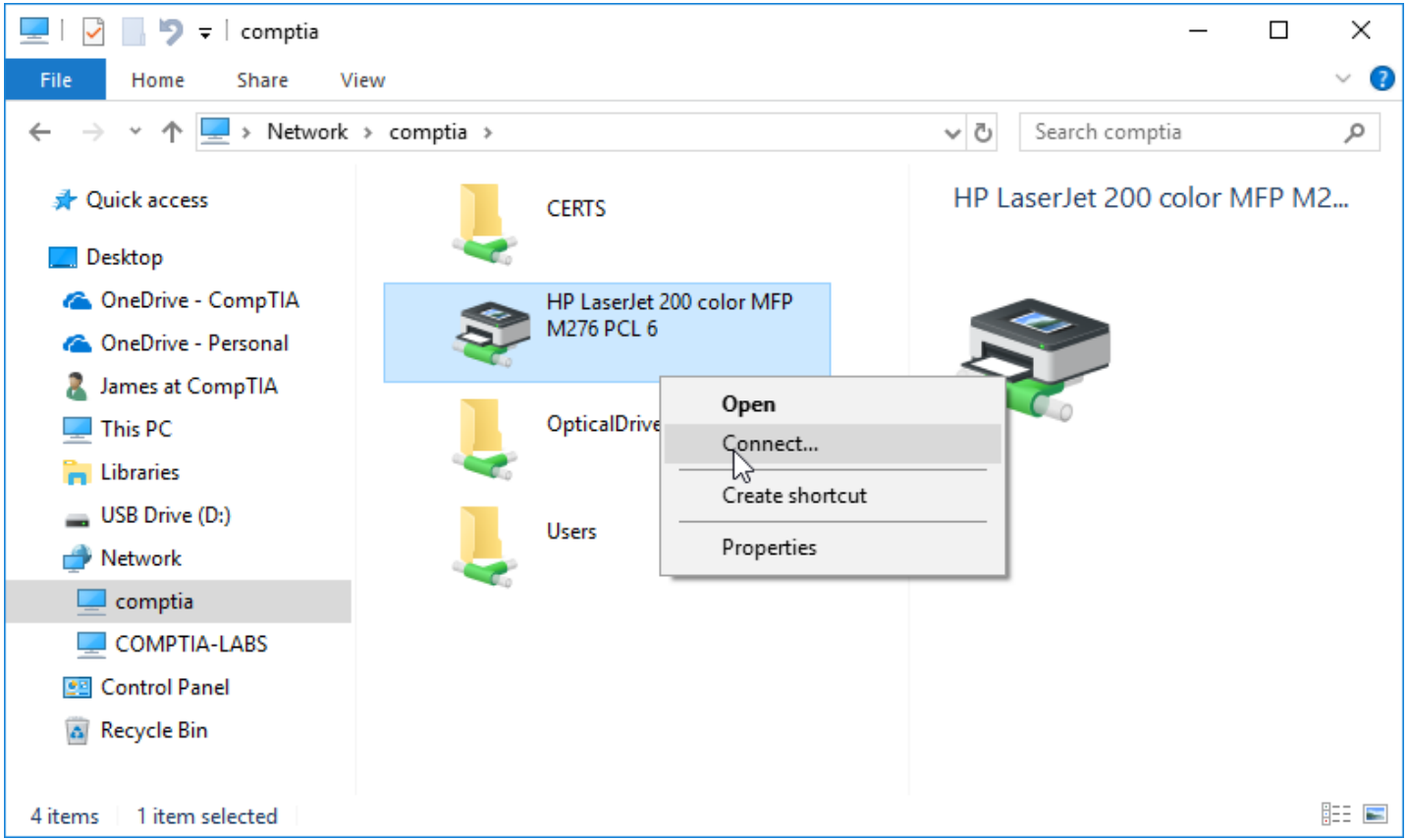
Network Browsing and Mapping Drives (Slide 2 of 2)



Screenshots courtesy of Microsoft

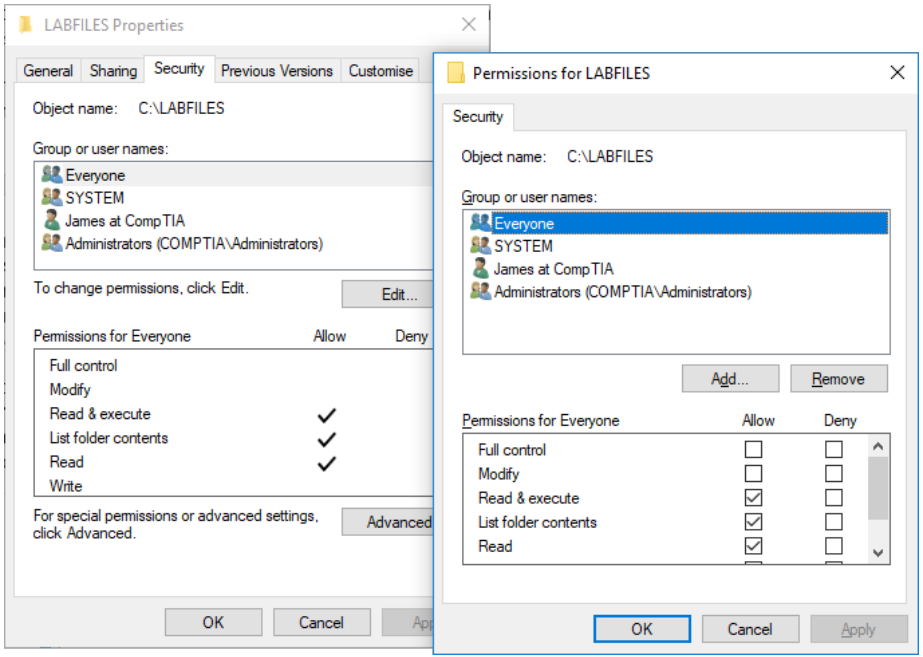
- Mapped drives
- net commands
  - net use X: \\Host\Share
  - net use X: /delete
  - net view

Printer Sharing



Screenshot courtesy of Microsoft

NTFS versus Share Permissions

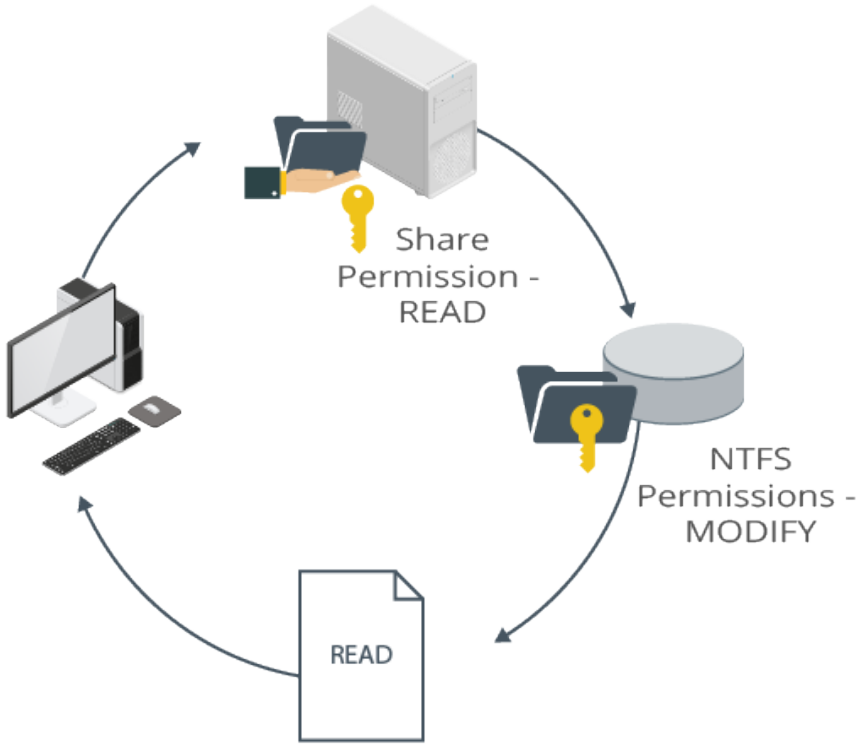


Screenshot courtesy of Microsoft

- Advantages of NTFS permissions over share permissions
- NTFS ACLs
  - Principal (user or group account)
  - Permissions (read/list/execute, write, modify, full control)
  - Allow versus deny
  - Effective permissions

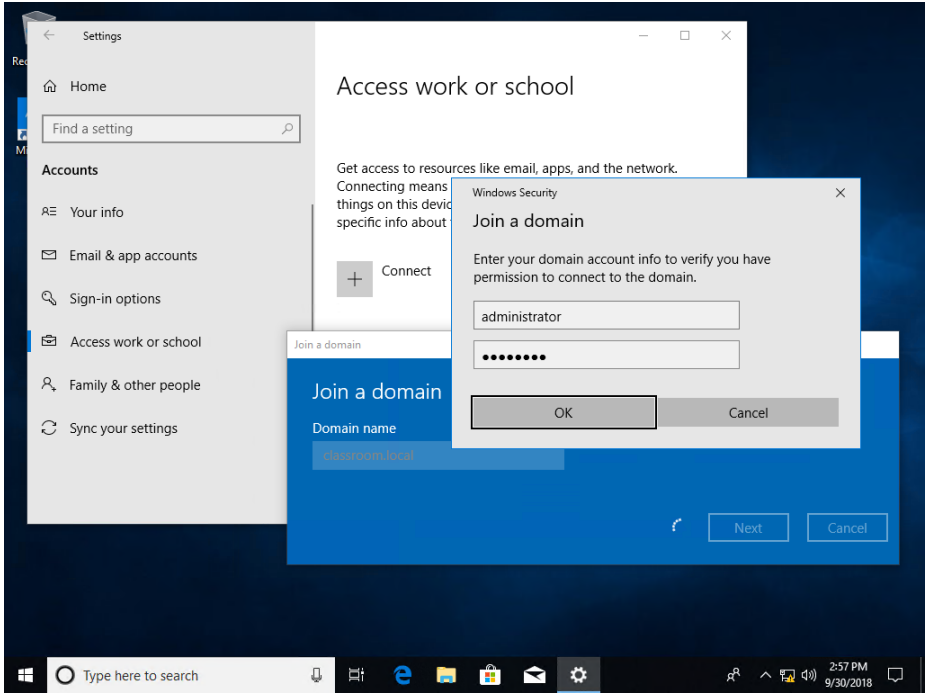
Permissions Inheritance

- NTFS permissions are inherited from parent (unless inheritance is disabled)
- Share and NTFS permissions inheritance
  - Share permissions are always inherited but only apply to network access
  - Effective permissions are most restrictive of share versus NTFS
- Configure Full Control share permissions and use NTFS permissions to achieve policy design



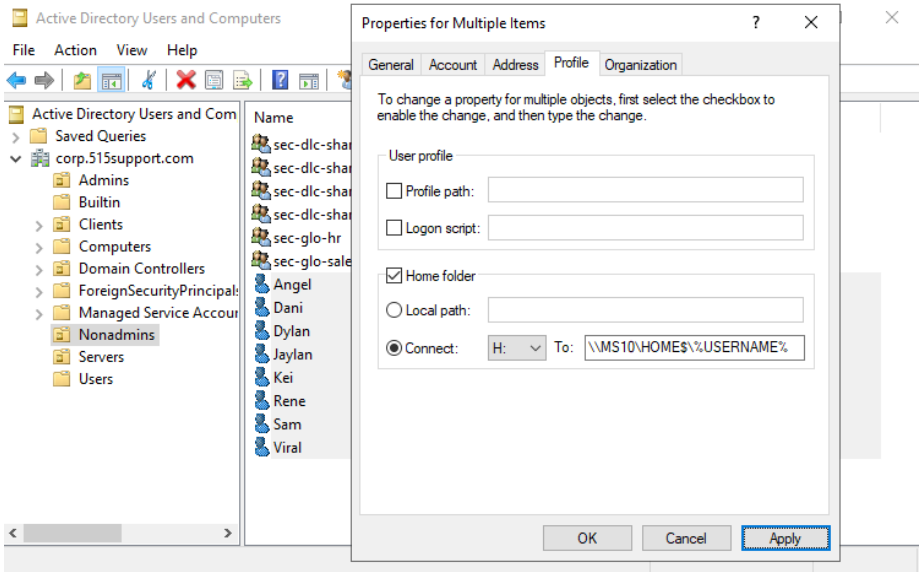
Domain Setup

- Joining a domain
  - Network requirements
    - Appropriate IP configuration (DHCP)
    - DNS servers
  - Administrator approval
- Domain sign-in



Screenshots courtesy of Microsoft

Home Folders

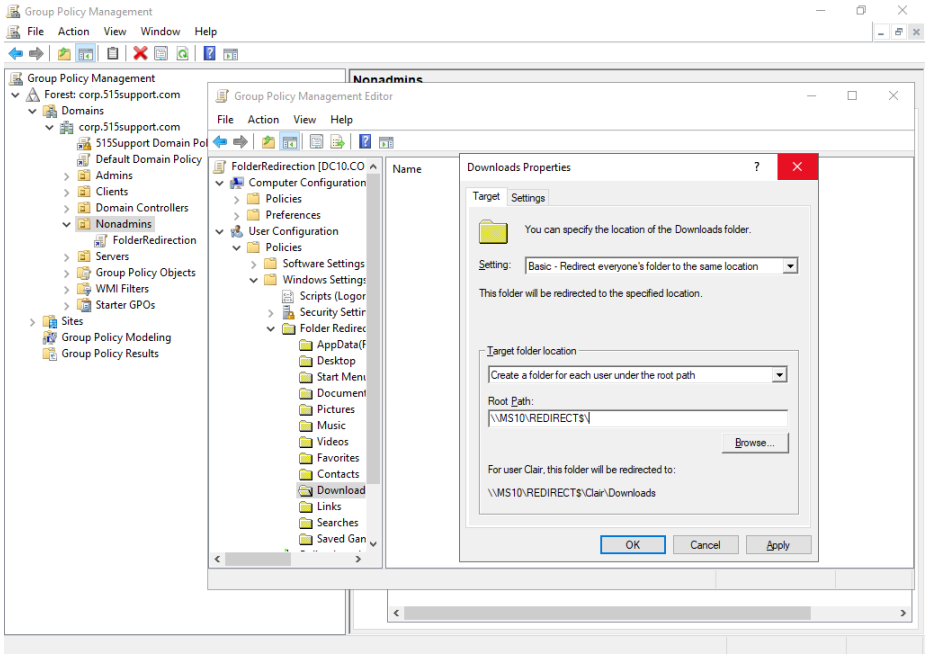


Screenshot courtesy of Microsoft

- Configure personal share for each user on file server
- User accesses home folder as mapped drive

Roaming Profiles and Folder Redirection

- Roaming profile
  - Profile is copied to workstation at login
  - Copied back to file share at logoff
- Folder redirection
  - Personal folders are redirected to file share
  - Centralizes data storage and reduces load on profile copying



Screenshot courtesy of Microsoft

Review Activity: Windows Shares

- Workgroup Setup
- File Share Configuration
- Network Browsing and Mapping Drives
- Printer Sharing
- NTFS versus Share Permissions
- Permissions Inheritance
- Domain Setup
- Home Folders
- Roaming Profiles and Folder Redirection

Lab Activity

- Assisted Lab: Configure Folder Sharing in a Workgroup
  - Configure and test a file share on a Windows host
- Assisted Lab: Support Active Directory Networking
  - Join a computer to a domain and implement a logon script and folder redirection policy

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Lesson 14

Summary