CompTIA Network+ Exam N10-008

Lesson 11

Explaining Network Applications

Objectives

- Explain the use of web, file/print, and database services
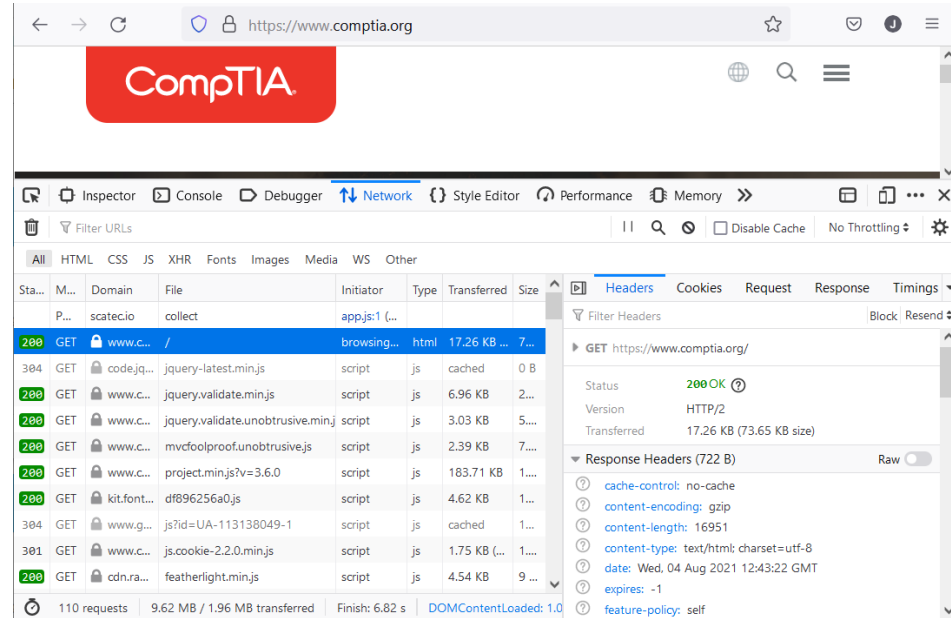
- Explain the use of email and voice services

Topic 11A

Explain the Use of Web, File/Print, and Database Services

Hypertext Transfer Protocol

- Port TCP/80

- Uniform Resource Locator (URL)

- Headers and payload

- HyperText Markup Language (HTML)

- Web server implementation

 - Hosting type

  - Server software

Secure Sockets Layer/Transport Layer Security

- Encryption service independent of application protocol

  - OSI session layer

  - Typically used with TCP

  - DTLS used with UDP

- HTTP Secure (HTTPS) over TCP/443

  - Install key pair and digital certificate on web server

  - Issuing certificate authority (CA) trusted by both server and client

  - Clients use public key in certificate to encrypt
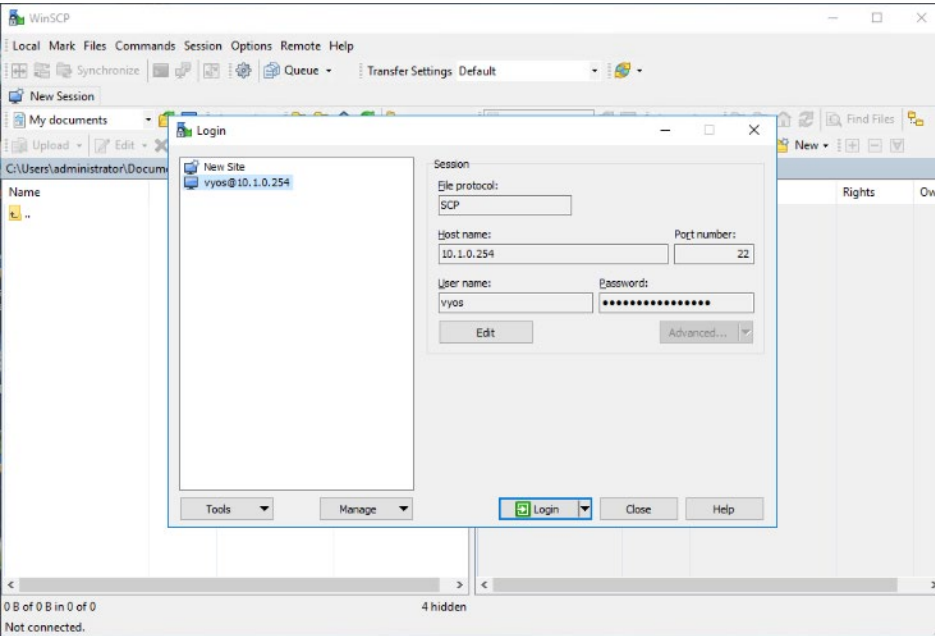
  - Server uses private key to decrypt
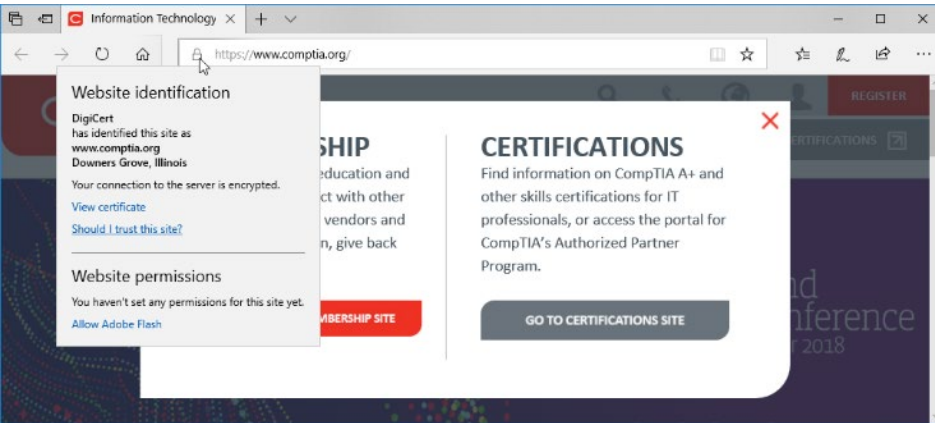
File Transfer Protocol

- File Transfer Protocol (FTP)

  - Download, upload, and directory management

- Active/passive transfer modes

  - Ports TCP/21 + TCP/20

  - Port TCP/21 + Ephemeral

- Trivial File Transfer Protocol (TFTP)

  - Download (GET) and upload (PUT) only

  - Port UDP/69
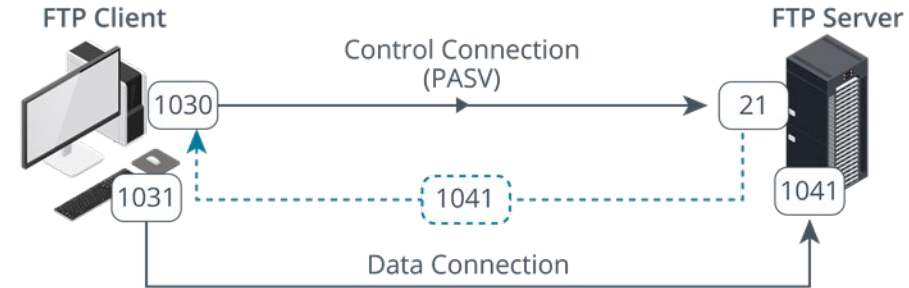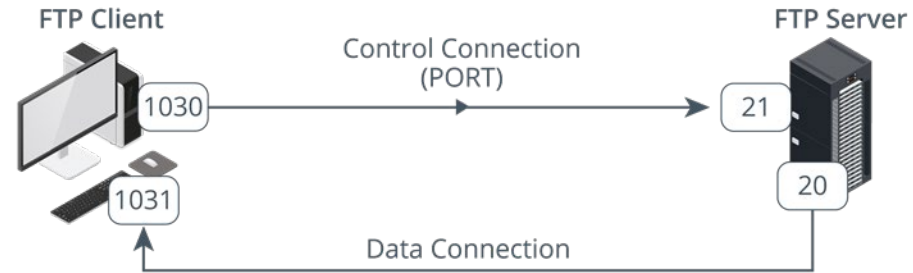
Secure File Transfer Protocol

- Secure FTP (SFTP)

  - Using FTP over Secure Shell (SSH) on port TCP/22

- FTP over SSL (FTPS)

  - Explicit TLS (FTPES)

    - Use the AUTH TLS command to upgrade an unsecure connection established over port TCP/21

  - Implicit TLS (FTPS)

    - Negotiate an SSL/TLS tunnel before the exchange of any FTP commands

    - Uses the secure port TCP/990 for the control connection

File and Print Services

- Server Message Block (SMB)

  - Underpins Windows File/Printer sharing

  - Supported on UNIX and Linux by the Samba package

  - Runs over port TCP/445 or NetBIOS ports (137 – 139) on legacy hosts

- Remote Print Protocols

  - Communicate with print monitor over network

  - Port 9100

  - Internet Printing Protocol (IPP)

  - Web Services for Devices (WSD)/AirPrint

  - Printer sharing

Database Services

- Relational databases

    - Structured in linked tables defined by column (field)/row structure

    - Structured Query Language (SQL)

- Relational Database Management System (RDBMS)

    - Oracle SQL*Net over TCP/1521

    - Microsoft SQL Server over TCP/1433

    - MySQL over TCP/3306
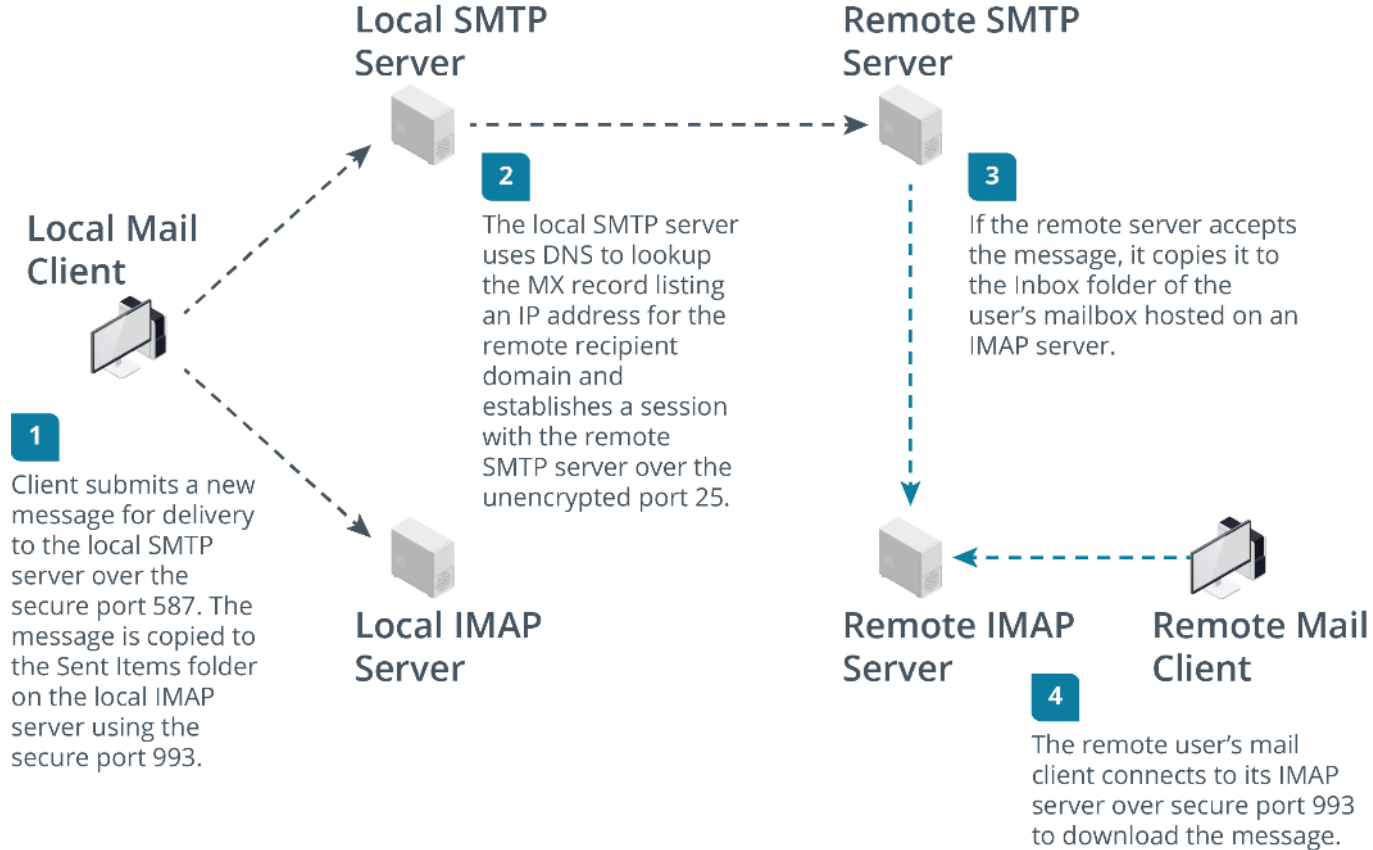
    - PostgreSQL over TCP/5432

- NoSQL databases

- Hypertext Transfer Protocol

- Secure Sockets Layer/Transport Layer Security

- File Transfer Protocol

- Secure File Transfer Protocol

- File and Print Services

- Database Services

Topic 11B

Explain the Use of Email and Voice Services

CompTIA.

Local SMTP Server

Remote SMTP Server

Local Mail Client

2 The local SMTP server uses DNS to lookup the MX record listing an IP address for the remote recipient domain and establishes a session with the remote SMTP server over the unencrypted port 25.

3 If the remote server accepts the message, it copies it to the Inbox folder of the user's mailbox hosted on an IMAP server.

1 Client submits a new message for delivery to the local SMTP server over the secure port 587. The message is copied to the Sent Items folder on the local IMAP server using the secure port 993.

Local IMAP Server

Remote IMAP Server

Remote Mail Client

4 The remote user's mail client connects to its IMAP server over secure port 993 to download the message.

Simple Mail Transfer Protocol

- Server-to-server mail delivery

    - MX records

    - Non-delivery report (NDR)

- Connection security methods

    - STARTTLS versus SMTPS

- SMTP ports

    - Port TCP/25 for message relay between SMTP servers or Message Transfer Agents (MTAs)

    - Port TCP/587 for Message Submission Agents (MSAs) to submit messages for delivery by an SMTP server

    - Port TCP/465 alternative port for message submission over implicit TLS (SMTPS)

Mailbox Access Protocols

- Post Office Protocol (POP/POP3)

  - Allows client to retrieve messages from mailbox server

  - TCP/110 unsecure or TCP/995 secure

- Internet Message Access Protocol (IMAP)

  - Allows client to manage mail folders in mailbox

  - TCP/143 unsecure or TCP/993 secure

```
  GNU nano 2.2.2          File: /etc/dovecot/dovecot.conf          Modified

protocols = imap imaps
#protocols = none

# A space separated list of IP or host addresses where to listen in for
# connections. "*" listens in all IPv4 interfaces. "[::]" listens in all IPv6
# interfaces. Use "*, [::]" for listening both IPv4 and IPv6.
#
# If you want to specify ports for each service, you will need to configure
# these settings inside the protocol imap/pop3/managesieve { ... } section,
# so you can specify different ports for IMAP/POP3/MANAGESIEVE. For example:
   protocol imap {
     listen = *:143
     ssl_listen = *:943
   }
#  protocol pop3 {
#    listen = *:10100
#    ..
#  }
#  protocol managesieve {
#    listen = *:12000
#    ..
#  }
#listen = *

# Disable LOGIN command and all other plaintext authentications unless
                         [ Read 1280 lines ]
^G Get Help   ^O WriteOut   ^R Read File   ^Y Prev Page   ^K Cut Text    ^C Cur Pos
^X Exit       ^J Justify    ^W Where Is    ^V Next Page   ^U UnCut Text  ^T To Spell
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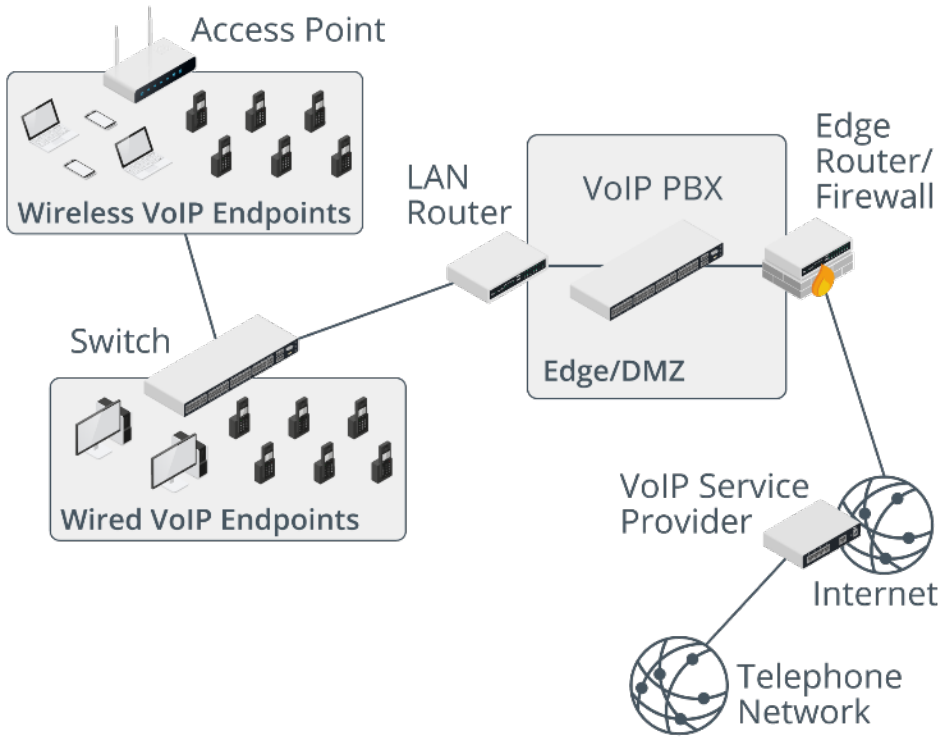
Voice and Video Services

- Private Branch Exchange (PBX)

  - Legacy PBX terminates lines from telecom provider to provision extensions and call features

  - Supplied as vendor-specific hardware

- VoIP-enabled PBX

  - Voice over IP transfers voice traffic as packetized data

  - VoIP PBX can be hardware or software solutions

  - Normally placed at the network's edge and protected by a firewall

VoIP Protocols

- Session control, data transport, and Quality of Service (QoS) functions

- Session Initiation Protocol (SIP)

  - Session control

  - User agents and user discovery (SIP URI)

  - Ports TCP|UDP/5060 and 5061

- Real-time Transport Protocol (RTP)

  - Delivery of media packets

- RTP Control Protocol (RTCP)

  - Monitor session and provide information to QoS

VoIP Phones

- Software or handsets

- Can use normal data cabling but often assigned to separate VLAN for performance

- Power over Ethernet

- Connection security

- Installation and testing

Voice Gateways

- Means of translating between the VoIP network and external voice networks, such as public switched telephone network (PSTN) lines

- Different VoIP gateways for different functions

  - Connect internal VoIP with external PSTN lines (Foreign Exchange Office (FXO) gateway)

  - Route voice calls to external VoIP service

  - Connect legacy phones/fax to VoIP PBX (Foreign Exchange Subscriber (FXS) gateway)

↻ Review Activity: Use of Email and Voice Services

- Simple Mail Transfer Protocol

- Mailbox Access Protocols

- Voice and Video Services

- VoIP Protocols

- VoIP Phones

- Voice Gateways

🧪 Lab Activity

Assisted Lab: Analyze Application Security Configurations

- Lab types
    - Assisted labs guide you step-by-step through tasks
    - Applied labs set goals with limited guidance
- Complete lab
    - Submit all items for grading and check each progress box
    - Select "Grade Lab" from final page
- Save lab
    - Select the hamburger menu and select "Save"
    - Save up to two labs in progress for up to 7 days
- Cancel lab without grading
    - Select the hamburger menu and select "End"

Lesson 11

Summary