

NETWORK INFRASTRUCTURE DEVELOPMENT BY AUGMENT.CO



MEET THE TEAM !!

Project Manager: Muskan Soni

Lead Network Engineer: Cabdirahman Ibrahim

Network Security Specialist: Arjun Walia

IT Director and Operations Manager: Talha Shaikh

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ABSTRACT



Equity Pharmaceuticals is a pharmaceutical business that specializes in providing medications for Gastroenterology, Neurology, Oncology, Infectious Diseases, Chronic conditions, and Substance Abuse amongst others. They asked AUGMENT.CO, an IT consulting company, to help their network expand to meet their new clientele expectations. AUGMENT.CO helps SMEs to expand and grow into MNCs. They assist them in opening branches in different third world countries like Africa and South America, along with building their network to handle the company expansion.

AUGMENT.CO's project proposal was accepted on Sep 30th, 2024. The company delivered the completed project by 10 Dec 2024. This project followed the budget outlined in the proposal and adhered to it strictly. The designing stage regarding the network was completed before the expected completion date, giving more time to work on the technical part of networking and installations. The project utilized Cisco switches and routers, along with Microsoft Windows Server 2019 to demonstrate the Virtual Server and Microsoft Virtual Client for virtual clients. This project is of equal importance to both companies as they want to expand their services. In addition, Augment also needs to build their clientele necessary for their company to grow.

INTRODUCTION TO AUGMENT.CO AND EQUITY PHARMACEUTICALS

AUGMENT.CO OVERVIEW

- ✦ AUGMENT.CO is an IT solutions and consulting firm specializing in helping SMEs expand to MNCs.
- ✦ The company provides network topology advice, hardware and software installations, and connectivity solutions.
- ✦ Headquartered in North America, AUGMENT.CO oversees global operations for clients like Equity Pharmaceuticals.

EQUITY PHARMACEUTICALS OVERVIEW

- ✦ Equity Pharmaceuticals specializes in medications for Gastroenterology, Neurology, Oncology, and more.
 - ✦ The company approached AUGMENT.CO to assist with expanding their operations in Canada.
 - ✦ This partnership aims to enhance Equity Pharmaceuticals' network capabilities and support their growth objectives.
-

PROJECT PLANNING STAGE

PROPOSAL ACCEPTED

The project proposal was accepted on Sep 30th, 2024, marking the official start of the project with stakeholder agreement.

Accepted Project Proposal
Initial Meeting Minutes
Stakeholder Agreement

DESIGN PHASE

The design stage was completed by Oct 10th, 2024, allowing extra time for technical tasks and installations.

Complete Network Topology
Design Documentation
Project Design Review

HARDWARE INSTALLATION

Network hardware installation was completed by Oct 24th, 2024, setting up routers and switches as per the design.

Installed Network Hardware
Configuration Files
Installation Reports

FINAL TESTING

Final testing for network efficiency was completed by Nov 28th, 2024, ensuring all functionalities were verified.

Testing Documentation
Certification of Network
Functionality
Final Project Report

PROPOSAL OVERVIEW

INTRODUCTION TO PROJECT



AUGMENT.CO is an IT consulting firm that supports SMEs in developing economies by building robust network infrastructures.

PURPOSE OF THE PROPOSAL



The goal is to design and implement a secure, scalable network for AUGMENT Pharmaceutical, enhancing communication and data sharing.

OBJECTIVES OF THE PROJECT



Key tasks include designing the network layout, configuring devices, and establishing VLANs for secure departmental communication.

PROJECT DELIVERABLES



Deliverables include creating a network layout, installing switches and routers, and organizing the network for various departments.

PROJECT DELIVERABLES

NETWORK DESIGN AND DOCUMENTATION



Completion Date: October 10th, 2024. This deliverable includes a complete network topology, including IP allocation and network segmentation, alongside the project proposal and sponsor's acceptance.

NETWORK HARDWARE INSTALLATION



Completion Date: October 24th, 2024. This involves the installation of routers, switches, servers, and other necessary hardware, along with troubleshooting as required.

SOFTWARE AND SECURITY SETUP



Completion Date: November 7th, 2024. This deliverable consists of the installation of network management software and implementation of security protocols such as firewalls and VPNs.

TESTING AND CERTIFICATION



Completion Date: November 28th, 2024. A thorough testing of network efficiency, speed, and security will be conducted, followed by official certification of the network.

PROJECT SCOPE

This project includes the design and installation of a network infrastructure for Equity Pharmaceuticals' new offices, warehouses, and stores in different countries.

The network will enable secure communication and data sharing across multiple locations, with provisions for scaling up in the future.

The project is limited to the infrastructure necessary for internal communication, data management, and external connectivity to suppliers, partners, and clients.

It does not include website design or external marketing solutions.



BUDGET BREAKDOWN

523,000

Total Estimated Budget

250,000

Hardware Procurement

100,000

Software and Licensing

120,000

Labor Costs



Item	Description	Quantity	Cost per Unit (CAD)	Total Cost (CAD)
Routers	Cisco ISR 4431/K9 Integrated Services Router	10	9500	95000
Switches	Cisco Catalyst 9300 24-Port Switch	20	4800	96000
Servers	Dell PowerEdge R640 Server	5	5800	29000
Firewalls	Fortinet FortiGate 100F Next-Gen Firewall	5	3800	19000
UPS Systems	APC Smart-UPS SRT 3000VA	10	2200	22000
Ethernet Cabling	Belden 2412 CAT6 Cable	5000	0.5	2500
Network Racks	APC NetShelter 42U Rack	5	1200	6000
Wireless Access Points (WAPs)	Ubiquiti UniFi U6 Pro	15	300	4500
Network Management Software	SolarWinds Network Performance Monitor	1	40000	40000
Security Software (Firewalls, VPN)	Fortinet FortiOS	1	18000	18000
Operating System Licenses	Microsoft Windows Server 2022 Standard	10	1600	16000
Data Backup Software	Veeam Backup & Replication	1	10000	10000
Network Engineers	Local Expertise + Project Consultants	4	25000	100000
IT Support Staff	Regional IT Staff	2	10000	20000
Transport and Import Duties	Shipping & Import Fees		10000	10000
Training for Local Staff	Training Program		10000	10000
Unforeseen Expenses	Miscellaneous		10000	10000
Budget Total				508000

RISK ANALYSIS AND LIMITATIONS



Pros

- Structured risk analysis allows for proactive management of potential issues.
- Identifying limitations helps in setting realistic project expectations and timelines.
- Effective risk management can enhance stakeholder confidence and project credibility.

Cons

- Network Growth: Designing the network to support future company expansion while maintaining security might be tricky.
 - Security Risks: Since the company handles sensitive pharmaceutical data, it's important to set up strong security measures. Any mistakes could lead to data breaches.
 - Setting Up VLANs: Organizing multiple departments into separate VLANs can be complicated.
 - Downtime During Setup: Installing and upgrading the network might cause some downtime, so it's important to minimize disruptions to daily operations.
-

MAIN HEADQUARTERS AND BRANCH NETWORK ANALYSIS

Main Headquarters

Equity Pharmaceutical's headquarters is in South Africa, serving as the strategic and operational hub for the company. The South African team leads in research and development, ensuring innovative and cost-effective solutions for their business growth.

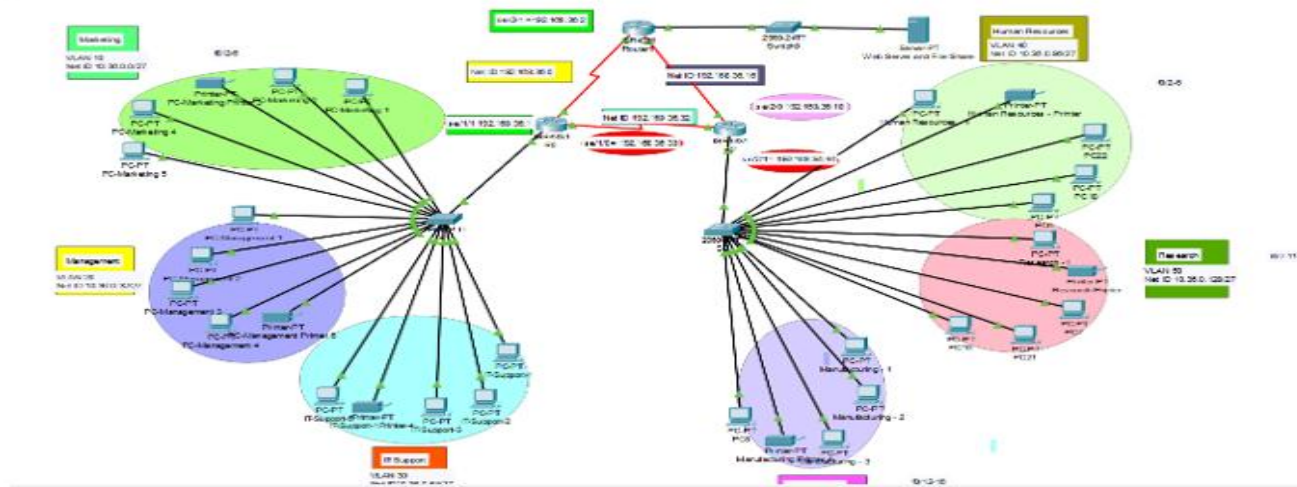
Branch Network Overview

Branches are strategically placed in Asia, Australia, and South America, focusing on regional expansion. Each branch aims to gain expertise in ethically sourcing affordable medications, enhancing local and international market operations.

Interconnected Operations

The network strategy ensures seamless communication between the headquarters and branches. This interconnected system supports efficient data sharing and collaboration, crucial for maintaining operational integrity across regions.

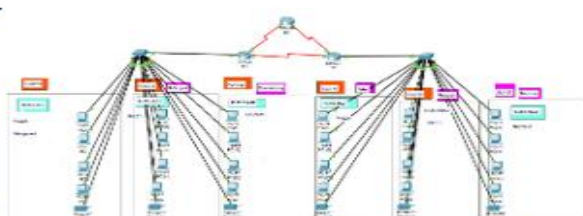
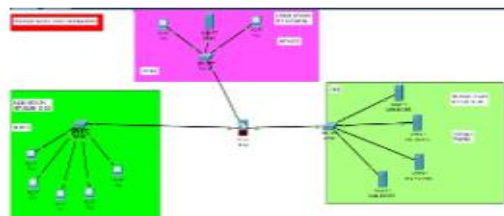
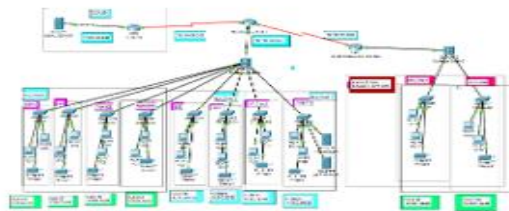
Main Company-Equity Pharmaceuticals



Branch 1: Asia

Branch 2: Australia

Branch 3: South America



MICROSOFT WINDOWS SERVER 2019 - 50 USER CALs

- The company has invested in Microsoft Windows Server 2019 Remote Desktop Services (RDS) with 50 User Client Access Licenses (CALs).
- This software enables employees to securely access company systems and applications from remote locations, ensuring a more flexible work environment.
- The RDS setup helps safeguard sensitive company data while supporting uninterrupted access to resources, enhancing both productivity and operational efficiency.
- The system also provides the scalability required to meet future needs as the business grows.
- Key configuration involves setting up a virtual machine, configuring network settings, and managing user permissions effectively.



Microsoft

Windows Server 2019

50 RDS USER CAL PACK



CREATING USER ACCOUNTS IN ACTIVE DIRECTORY

ACCESSING ACTIVE DIRECTORY



Open the Active Directory Users and Computers tool in the Windows Server interface to begin user account creation.

CREATING USER PROFILES

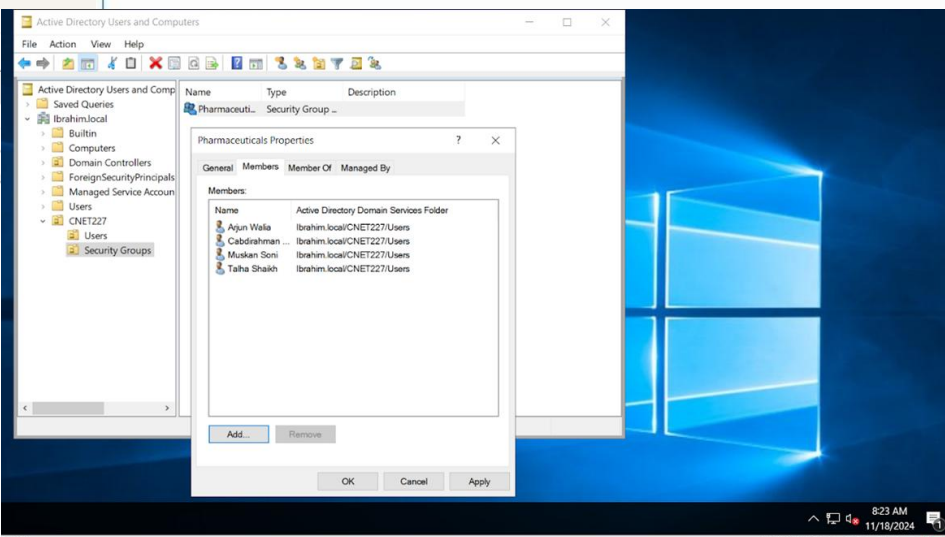
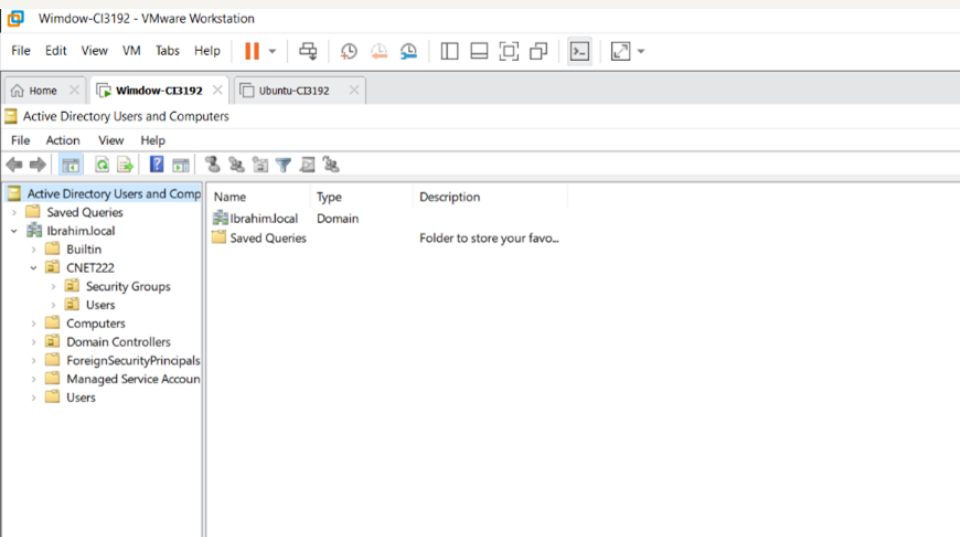
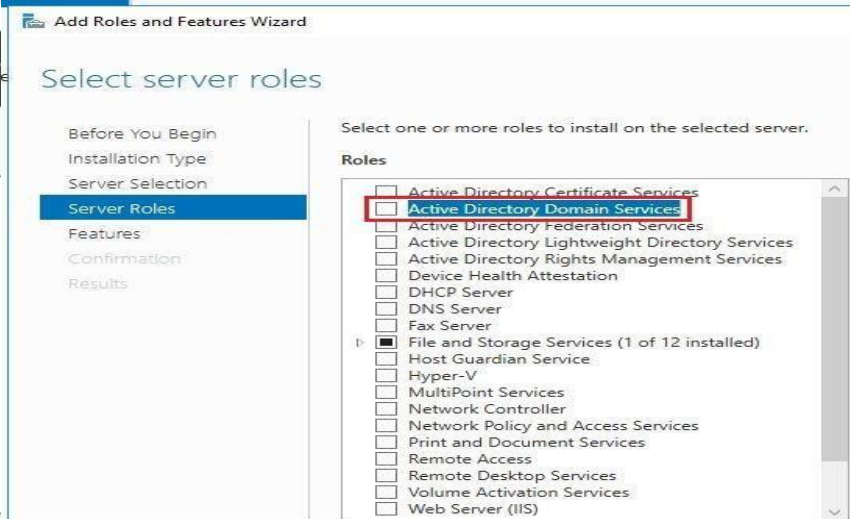
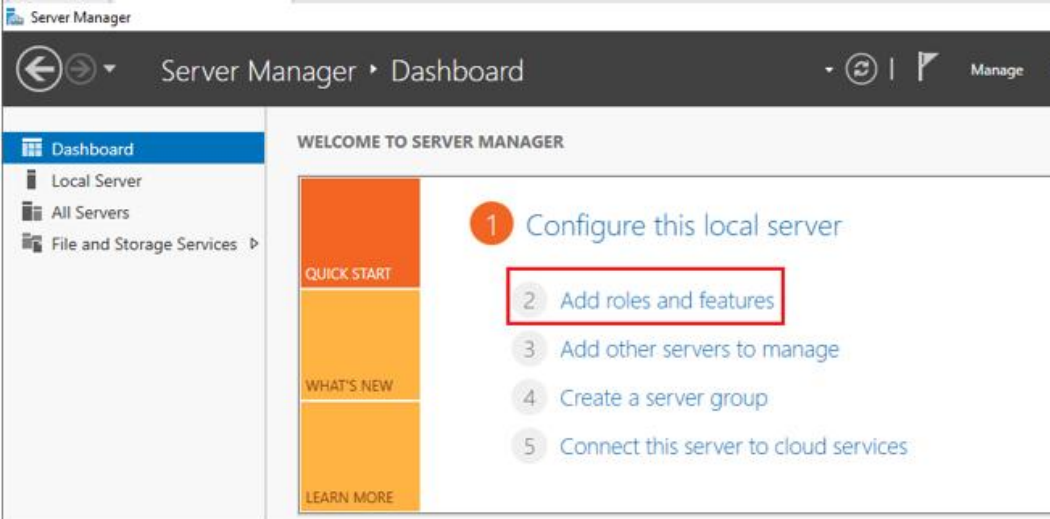


Create user profiles for team members, such as Arjun Walia, Cabdiraham Ibrahim, Muskan Soni, and Talha Shaikh, assigning secure passwords and appropriate group permissions.

SETTING PERMISSIONS



Ensure that each user has individual access to the network while maintaining secure and organized user management through role-based permissions.



CONFIGURING USER ACCESS BASED ON ROLES

User access is configured based on roles and policies to enhance security and ensure operational efficiency. For instance, specific configurations allow Arjun Walia, a manager, to have login permissions restricted to weekdays only, ensuring he can perform his work during regular business hours. This approach prevents access to the system over weekends, aligning with company policies and enhancing security.

In order to facilitate this, user accounts are created in Active Directory, where each team member is assigned a secure password and appropriate group permissions based on their roles. This ensures organized user management and secure access to network resources, tailored to the specific needs of each department.

Windows-CI3192 - VMware Workstation

File Edit View VM Tabs Help

Library

Windows-CI3192

Active Directory Users and Computers

File Action View Help

My Computer

Windows-CI3192

Active Directory Users and Computers

Saved Queries

ibrahim.local

Builtin

CNET227

Security Groups

Users

Computers

Domain Controllers

ForeignSecurityPrincipals

Managed Service Accounts

Users

Arjun W

Cabdiral

Muskan

Talha Sh

Arjun W

Remote control

Remote Desktop Services Profile

COM+

Member Of

Dial in

Environment

Sessions

General

Address

Account

Profile

Telephones

Organization

User logon name:

Management

@ibrahim.local

User logon name (pre-Windows 2000):

Management

Logon Hours for Arjun W

12 · 2 · 4 · 6 · 8 · 10 · 12 · 2 · 4 · 6 · 8 · 10 · 12

OK

Cancel

All

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Logon Permitted

Logon Denied

Sunday from 12:00 AM to 1:00 AM

OK

Cancel

Apply

Help

4:06 PM 11/28/2024

CONNECTING CLIENTS TO THE WINDOWS SERVER DOMAIN

Client Connection Overview

The connection of various clients to the Windows Server domain is critical for seamless network operation. Each client is configured to access the domain, allowing centralized management and resource sharing.

User Account Configuration

User accounts for team members are created in the Active Directory, ensuring each user has individual access while maintaining secure and organized management.

Windows 10 Client Setup

For example, the Manufacturing Client, running Windows 10, was successfully connected to the Windows Server domain. This setup ensures that the client has access to necessary network resources.

Testing Connectivity

After configuration, connectivity tests such as ping requests confirm that each client can communicate effectively with the Windows Server, ensuring a robust network environment.

sim - VMware Workstation

Help

Home

Windows 10-300803192-1...

Settings

System Properties

Computer Name/Domain Changes

You can change the name and the membership of this computer. Changes might affect access to network resources.

Computer name:
Human-Resource

Full computer name:
Human-Resource

Member of
☒ Domain:
brahim.local
☐ Workgroup:
WORKGROUP

OK Cancel Apply

Human-Resource

Intel(R) Core(TM) i7-8700 CPU @ 3.20GHz 3.19 GHz (2 processors)

8.00 GB

96E942D0-A44F-4811-BFCB-242666E88977

00329-00000-00003-AA511

64-bit operating system, x64-based processor

No pen or touch input is available for this display

Copy

Rename this PC

Windows specifications

Edition Windows 10 Enterprise

Version 22H2

Installed on 9/11/2024

OS build 19045.2846

Experience Windows Feature Experience Pack 120.2212.4190.0

Copy

Change product key or upgrade your edition of Windows

Read the Microsoft Services Agreement that applies to our services

sim - VMware Workstation

Help

Home

Windows 10-300803192-1...

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brahim.local
☐ Workgroup:
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OK Cancel Apply

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Full computer name:
Human-Resource

Member of
☒ Domain:
brahim.local
☐ Workgroup:
WORKGROUP

OK Cancel Apply

Human-Resource

Intel(R) Core(TM) i7-8700 CPU @ 3.20GHz 3.19 GHz (2 processors)

8.00 GB

96E942D0-A44F-4811-BFCB-242666E88977

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CYBERSECURITY MEASURES



SonicWall Appliances

Five SonicWall 02-SSC-4324 NSA 2700 Network Security/Firewall Appliances are being purchased to strengthen network security. These devices protect against cyber threats like DDoS attacks, providing strong firewall protection, secure VPN connections, and efficient traffic management.



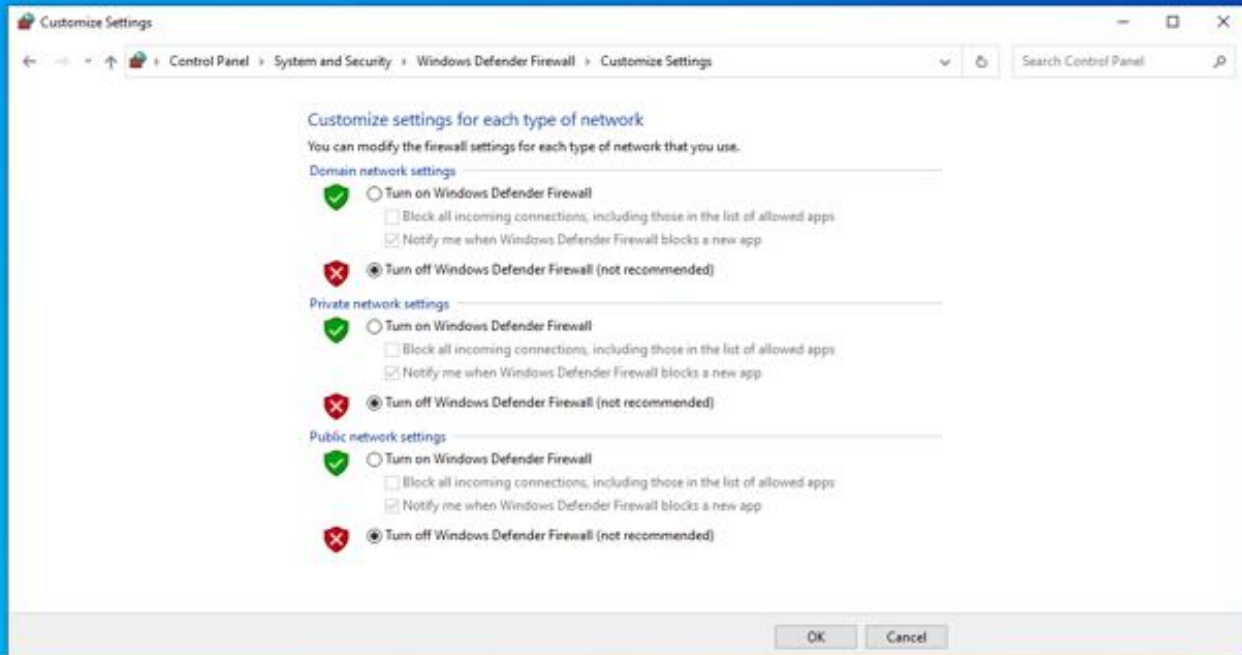
Antivirus Solutions

Antivirus protection solutions are provided to ensure the smooth and secure operation of the network, protecting against threats like malware, ransomware, and phishing attacks for up to 50 users.



Centralized Management

The antivirus solution offers centralized management and regular reports, allowing complete control over network security from any location, ensuring productivity is not interrupted by cyber threats.



UPGRADING NETWORK INFRASTRUCTURE

NETWORK INFRASTRUCTURE UPGRADE

- * Ten units of the Cisco ISR 4431/K9 Integrated Services Router are being purchased to enhance network infrastructure, providing high-performance, secure connectivity, and integrated services for various business applications.
- * Twenty units of the Cisco Catalyst 9300 24-Port Switch are being purchased to improve network performance, offering 24 Gigabit Ethernet ports with advanced security features and scalability for future growth.
- * Five thousand units of Ethernet Cable Cat6 200ft Blue, supporting speeds of up to 10Gbps, are being bought to enhance the organization's network, ensuring stable and efficient internet connectivity.
- * These upgrades are designed to meet the growing needs of Equity Pharmaceuticals as they expand operations, ensuring seamless communication across multiple locations.





ROUTER CONFIGURATION AT EQUITY PHARMACEUTICALS

ROUTER 1 CONFIGURATION

Router 1 handles the primary internet connection, ensuring secure routing of traffic to the internal network. It is configured with the hostname 'CNET227', includes settings for no IP domain lookup, and assigns IP addresses on interfaces.

ROUTER 2 CONFIGURATION

Router 2 facilitates communication between departments, utilizing encapsulation protocols like PPPoE or Frame Relay to optimize data flow and segment traffic effectively.

ROUTER 3 CONFIGURATION

Router 3 is set up for remote access via SSH, allowing network administrators to securely manage the router using a command-line interface. Configuration includes SSH keys and VTY line settings.

ROUTER CONFIGURATION PURPOSE

The configuration of each router is tailored to its purpose, ensuring a secure and efficient network across various departments at Equity Pharmaceuticals.

WAN Subnetting Network			LAN Subnetting Network		
ROUTERS					Subnet Mask
ROUTER (1) OR ONE			VLAN 10		
Network-ID	192.168.36.0/28	255.255.255.240	Network-ID	10.36.0.0/27	
First-ID	192.168.36.1/28		First-ID	10.36.0.1/27	
Second-ID	192.168.36.14/28		Second-ID	10.36.0.30/27	
Broadcast-ID	192.168.36.16/28		Broadcast-ID	10.36.0.32/27	
Range usehostable	192.168.36.1 to 192.168.36.14		Range usehostable	10.36.0.1 to 10.36.0.30	255.255.255.224
ROUTER (2) OR TWO			VLAN 20		
Network-ID	192.168.36.16/28	255.255.255.240	Network-ID	10.36.0.32/27	
First-ID	192.168.36.17/28		First-ID	10.36.0.33/27	
Second-ID	192.168.36.30/28		Second-ID	10.36.0.62/27	
Broadcast-ID	192.168.36.32/28		Broadcast-ID	10.36.0.64/27	
Range usehostable	192.168.36.17 to 192.168.36.30		Range usehostable	10.36.0.33 to 10.36.0.62	
ROUTER (3) OR THREE			VLAN 30		
Network-ID	192.168.36.32/28	255.255.255.240	Network-ID	10.36.0.64/27	255.255.255.224
First-ID	192.168.36.33/28		First-ID	10.36.0.65/27	
Second-ID	192.168.36.46/28		Second-ID	10.36.0.94/27	
Broadcast-ID	192.168.36.48/28		Broadcast-ID	10.36.0.96/27	
Range usehostable	192.168.36.33 to 192.168.36.46		Range usehostable	10.36.0.65 to 10.36.0.94	
			VLAN 40		
Network-ID			Network-ID	10.36.0.96/27	255.255.255.224
First-ID			First-ID	10.36.0.97/27	
Second-ID			Second-ID	10.36.0.126/27	
Broadcast-ID			Broadcast-ID	10.36.0.128/27	
Range usehostable			Range usehostable	10.36.0.97 to 10.36.0.126	
			VLAN 50		
Network-ID			Network-ID	10.36.0.128/27	255.255.255.224
First-ID			First-ID	10.36.0.129/27	
Second-ID			Second-ID	10.36.0.158/27	
Broadcast-ID			Broadcast-ID	10.36.0.160/27	
Range usehostable			Range usehostable	10.36.0.129 to 10.36.0.158	
			VLAN 60		
Network-ID			Network-ID	10.36.0.160/27	255.255.255.224
First-ID			First-ID	10.36.0.161/27	
Second-ID			Second-ID	10.36.0.190/27	
Broadcast-ID			Broadcast-ID	10.36.0.192/27	
Range usehostable			Range usehostable	10.36.0.161 to 10.36.0.190	

VLAN CONFIGURATION FOR CAPE TOWN BRANCH

VLAN ASSIGNMENTS



In the Cape Town branch, six VLANs are configured: VLAN 10 for Marketing, VLAN 20 for Management, VLAN 30 for IT-Support, VLAN 40 for Manufacturing, VLAN 50 for Research, and VLAN 60 for Human Resources.

PURPOSE OF VLANS



Each VLAN is designated to separate department traffic, improving security and network efficiency. For instance, VLAN 10 handles marketing campaigns, while VLAN 20 focuses on executive tasks.

NETWORK EFFICIENCY



The VLAN configuration prevents unauthorized data flow between departments while allowing necessary communication, thus optimizing the overall network performance.



AUTOMATIC IP ADDRESS ASSIGNMENT VIA DHCP



Inside the trusted network, the PC is configured to use DHCP to obtain its IP address automatically. This setup ensures dynamic IP assignments, simplifying network management.

Based on the provided screenshot, the PC successfully connected to the DHCP server and obtained an IP address.

Using DHCP allows for flexibility and reduces the risk of manual configuration errors compared to static IP addressing.

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.36.0.2

Subnet Mask 255.255.255.224

Default Gateway 10.36.0.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:2FFF:FE42:7406

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.36.0.66

Subnet Mask 255.255.255.224

Default Gateway 10.36.0.65

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::204:9AFF:FEAB:BD84

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.36.0.34

Subnet Mask 255.255.255.224

Default Gateway 10.36.0.33

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::203:E4FF:FE2C:6205

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 192.168.36.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.36.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::230:F2FF:FE5A:2DB8

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Command Prompt

C:\WINDOWS\system32>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Link-local IPv6 Address : fe80::f042:f8b5:f0f4:997%5
IPv4 Address. : 10.36.0.2
Subnet Mask : 255.255.255.224
Default Gateway : 10.36.0.1

Ethernet adapter Ethernet 3:

C:\WINDOWS\system32>

C:\WINDOWS\system32>ping 10.36.0.34

Pinging 10.36.0.34 with 32 bytes of data:

Reply from 10.36.0.34: bytes=32 time=1ms TTL=126

Reply from 10.36.0.34: bytes=32 time=2ms TTL=126

Reply from 10.36.0.34: bytes=32 time=2ms TTL=126

Reply from 10.36.0.34: bytes=32 time=2ms TTL=126

Ping statistics for 10.36.0.34:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\WINDOWS\system32>

C:\WINDOWS\system32>ping 10.36.0.33

Pinging 10.36.0.33 with 32 bytes of data:

Reply from 10.36.0.33: bytes=32 time=1ms TTL=254

Reply from 10.36.0.33: bytes=32 time=1ms TTL=254

Reply from 10.36.0.33: bytes=32 time=1ms TTL=254

Reply from 10.36.0.33: bytes=32 time=1ms TTL=254

Ping statistics for 10.36.0.33:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\WINDOWS\system32>

C:\WINDOWS\system32>

C:\WINDOWS\system32>

C:\WINDOWS\system32>ping 10.36.0.66

Pinging 10.36.0.66 with 32 bytes of data:

Reply from 10.36.0.66: bytes=32 time=18ms TTL=126

Reply from 10.36.0.66: bytes=32 time=19ms TTL=126

Reply from 10.36.0.66: bytes=32 time=19ms TTL=126

Reply from 10.36.0.66: bytes=32 time=19ms TTL=126

Ping statistics for 10.36.0.66:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 18ms, Maximum = 19ms, Average = 18ms

C:\WINDOWS\system32>

SSH REMOTE ACCESS CONFIGURATION

SSH remote access has been successfully configured on Router 1 (R1) with the hostname 'CNET227' and the appropriate password.

The router is set up with a domain name, RSA keys have been generated, and SSH access has been enabled on the VTY lines. Local authentication is configured to ensure secure login using the configured username and password.

```
R1(config)#
R1(config)#ip domain name cnet227
R1(config)#us
R1(config)#usern
R1(config)#username cnet227 pass
R1(config)#username cnet227 password cnet227
WARNING: Command has been added to the configuration using a type 0 password. However, type 0 passwords will soon be
deprecated. Migrate to a supported password type
R1(config)#
*Apr 30 21:09:15.772: %AAAA-4-CLI_DEPRECATED: WARNING: Command has been added to the configuration using a type 0 pas
sword. However, type 0 passwords will soon be deprecated. Migrate to a supported password type
R1(config)#cr
R1(config)#crypto key generate rsa
The name for the keys will be: R1.cnet227
Choose the size of the key modulus in the range of 2048 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

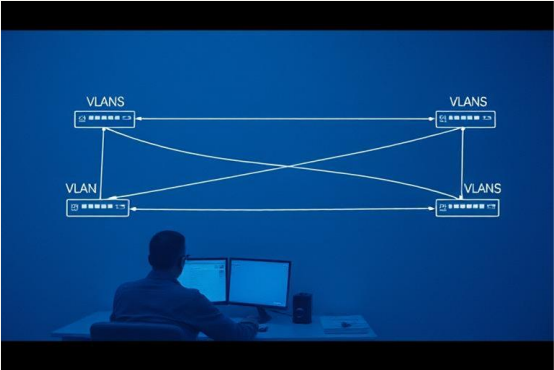
How many bits in the modulus [2048]: 2048
% Generating 2048 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)

R1(config)#
*Apr 30 21:10:15.837: %CRYPTO_ENGINE-5-KEY_ADDITION: A key named R1.cnet227 has been generated or imported by crypto-
engine
R1(config)#line vty 0 15
R1(config-line)#login loc
R1(config-line)#login local
R1(config-line)#tr
R1(config-line)#transport input ssh
R1(config-line)#do wr m
% Ambiguous command: "do wr m"
R1(config-line)#do wr mem
Building configuration...
[OK]
R1(config-line)#
R1(config-line)#
*Apr 30 21:11:19.474: %SYS-6-PRIVCFG_ENCRYPT_SUCCESS: Successfully encrypted private config file
```

```
C:\WINDOWS\system32>
C:\WINDOWS\system32>
C:\WINDOWS\system32>ssh -l cnet227 10.36.0.33
The authenticity of host '10.36.0.33 (10.36.0.33)' can't be established.
RSA key fingerprint is SHA256:7t4G8ovdg0rpbV+0NfatBc/NoiicdvYRF9C+xAn79xA.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.36.0.33' (RSA) to the list of known hosts.
Password:
```

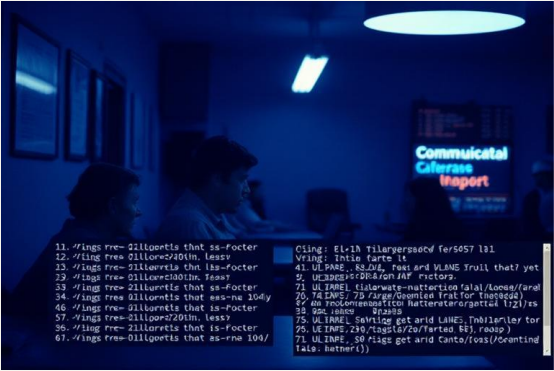
```
R2>
```

TESTING AND VERIFYING NETWORK CONNECTIVITY



NETWORK CONNECTIVITY TESTS

Testing and verifying network connectivity ensured all devices, including VLANs and routers, communicated properly. Successful ping tests confirmed operational efficiency: 'All the Pings go through, and the network is overall connected thoroughly including the virtual client and server.'



VLAN AND ROUTER COMMUNICATION

Communication between VLANs and routers was verified through systematic testing. Each VLAN was tested for connectivity to routers, confirming effective communication. 'The server was able to reach each device, confirming that the VLAN configurations and IP addressing were correctly set up.'

```
C:\WINDOWS\system32>
C:\WINDOWS\system32>
C:\WINDOWS\system32>ping 192.168.36.33
```

```
Pinging 192.168.36.33 with 32 bytes of data:
Reply from 192.168.36.33: bytes=32 time=473ms TTL=254
Reply from 192.168.36.33: bytes=32 time=1ms TTL=254
Reply from 192.168.36.33: bytes=32 time=1ms TTL=254
Reply from 192.168.36.33: bytes=32 time=1ms TTL=254

Ping statistics for 192.168.36.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 473ms, Average = 119ms
```

```
C:\WINDOWS\system32>
```

```
C:\WINDOWS\system32>
C:\WINDOWS\system32>
C:\WINDOWS\system32>ping 192.168.36.34
```

```
Pinging 192.168.36.34 with 32 bytes of data:
Reply from 192.168.36.34: bytes=32 time=19ms TTL=254
Reply from 192.168.36.34: bytes=32 time=19ms TTL=254
Reply from 192.168.36.34: bytes=32 time=19ms TTL=254
Reply from 192.168.36.34: bytes=32 time=19ms TTL=254

Ping statistics for 192.168.36.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\WINDOWS\system32>
```

```
R3(config)#do show ip int br
Interface                IP-Address      OK? Method Status        Protocol
GigabitEthernet0/0/0     unassigned      YES unset        up            up
Gi0/0/0.30               10.36.0.65      YES manual      up            up
GigabitEthernet0/0/1     unassigned      YES unset        administratively down down
Serial0/1/0              192.168.36.34   YES manual      up            up
Serial0/1/1              192.168.36.18   YES manual      up            up
GigabitEthernet0         unassigned      YES unset        administratively down down
R3(config)#
R3(config)#
```

```
Home X Windows-CI3192 X
Administrator: Command Prompt
Reply from 172.18.36.3: bytes=32 time<1ms TTL=128
Ping statistics for 172.18.36.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\Users\Administrator>
C:\Users\Administrator>
C:\Users\Administrator>
C:\Users\Administrator>ping 10.36.0.67
Pinging 10.36.0.67 with 32 bytes of data:
Reply from 10.36.0.67: bytes=32 time=1ms TTL=127
Reply from 10.36.0.67: bytes=32 time=2ms TTL=127
Reply from 10.36.0.67: bytes=32 time=1ms TTL=127
Reply from 10.36.0.67: bytes=32 time=2ms TTL=127
Ping statistics for 10.36.0.67:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
C:\Users\Administrator>ping 10.36.0.65
Pinging 10.36.0.65 with 32 bytes of data:
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255
Ping statistics for 10.36.0.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
C:\Users\Administrator>ping 10.36.0.66
Pinging 10.36.0.66 with 32 bytes of data:
Reply from 10.36.0.66: bytes=32 time=1ms TTL=127
Reply from 10.36.0.66: bytes=32 time=1ms TTL=127
Reply from 10.36.0.66: bytes=32 time=2ms TTL=127
Reply from 10.36.0.66: bytes=32 time=1ms TTL=127
Ping statistics for 10.36.0.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
C:\Users\Administrator>
```

```
C:\WINDOWS\system32>
C:\WINDOWS\system32>ping 10.36.0.33
Pinging 10.36.0.33 with 32 bytes of data:
Reply from 10.36.0.33: bytes=32 time=473ms TTL=254
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
Ping statistics for 10.36.0.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 473ms, Average = 131ms
C:\WINDOWS\system32>ping 10.36.0.34
Pinging 10.36.0.34 with 32 bytes of data:
Reply from 10.36.0.34: bytes=32 time=18ms TTL=126
Reply from 10.36.0.34: bytes=32 time=18ms TTL=126
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
Ping statistics for 10.36.0.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 19ms, Average = 18ms
C:\WINDOWS\system32>
C:\WINDOWS\system32>
C:\WINDOWS\system32>ping 10.36.0.1
Pinging 10.36.0.1 with 32 bytes of data:
Reply from 10.36.0.1: bytes=32 time=481ms TTL=254
Reply from 10.36.0.1: bytes=32 time=18ms TTL=254
Reply from 10.36.0.1: bytes=32 time=18ms TTL=254
Reply from 10.36.0.1: bytes=32 time=18ms TTL=254
Ping statistics for 10.36.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 481ms, Average = 133ms
C:\WINDOWS\system32>ping 10.36.0.2
Pinging 10.36.0.2 with 32 bytes of data:
Reply from 10.36.0.2: bytes=32 time=18ms TTL=126
Reply from 10.36.0.2: bytes=32 time=18ms TTL=126
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126
Reply from 10.36.0.2: bytes=32 time=18ms TTL=126
Ping statistics for 10.36.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 19ms, Average = 18ms
C:\WINDOWS\system32>
```

CONFIGURING VIRTUAL CLIENTS AND SERVERS

VIRTUAL MACHINE CONFIGURATION



To install Windows Server 2019, start by configuring the virtual machine. Select the firmware type, set the memory size to 4 GB, and configure the network type as NAT for internet access.

USER ACCOUNT CREATION

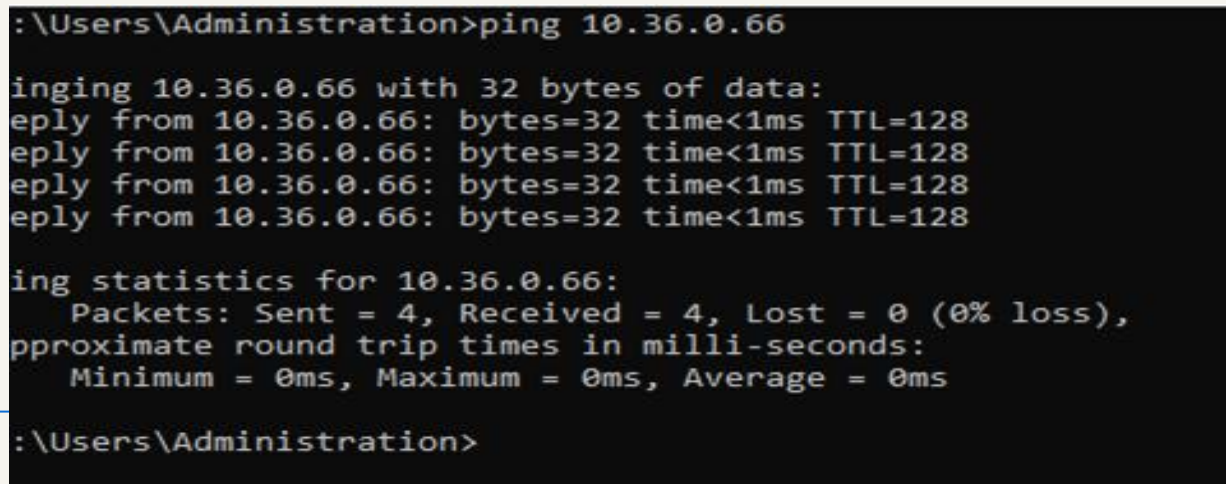
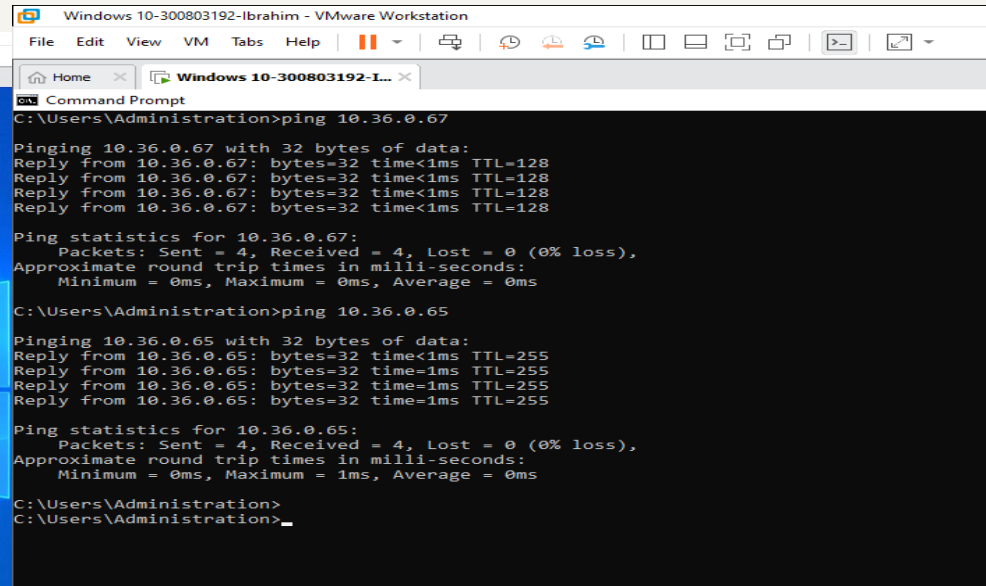
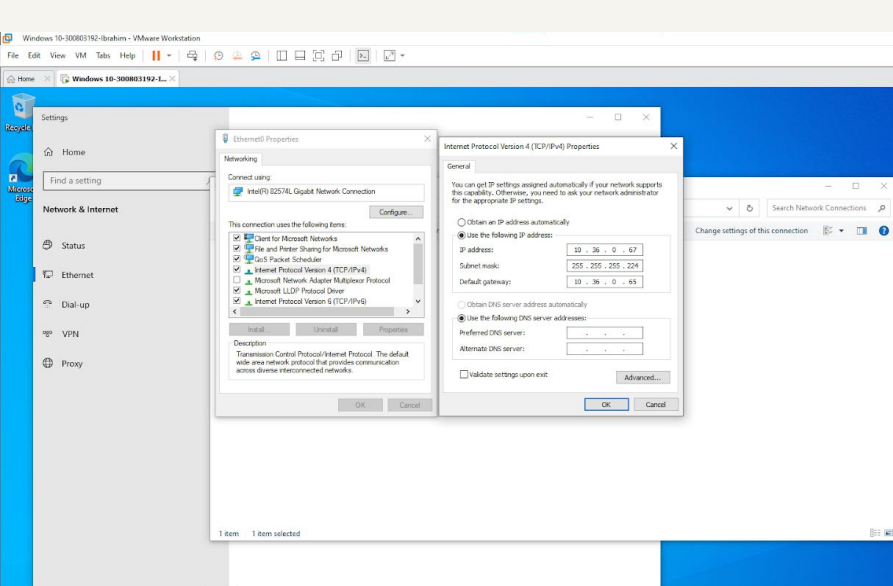


After installation, create user accounts for team members in Active Directory. Assign secure passwords and group permissions to ensure organized user management.

NETWORK INTEGRATION TESTING



Pings were successfully sent from the virtual server to all physical PCs across different VLANs, confirming overall network connectivity and proper integration of virtual clients.




```
C:\Users\Administration>ping 10.36.0.1

Pinging 10.36.0.1 with 32 bytes of data:
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254

Ping statistics for 10.36.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\Users\Administration>ping 10.36.0.2

Pinging 10.36.0.2 with 32 bytes of data:
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126
Reply from 10.36.0.2: bytes=32 time=20ms TTL=126
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126

Ping statistics for 10.36.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 19ms, Maximum = 20ms, Average = 19ms
```

```
C:\Users\Administration>ping 10.36.0.33

Pinging 10.36.0.33 with 32 bytes of data:
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
Reply from 10.36.0.33: bytes=32 time=19ms TTL=254
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254

Ping statistics for 10.36.0.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 18ms, Maximum = 19ms, Average = 18ms
```

```
C:\Users\Administration>ping 10.36.0.34

Pinging 10.36.0.34 with 32 bytes of data:
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126

Ping statistics for 10.36.0.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
```

Microsoft Edge

```
C:\Users\Administration>ping 192.168.36.1

Pinging 192.168.36.1 with 32 bytes of data:
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254

Ping statistics for 192.168.36.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 28ms, Maximum = 28ms, Average = 28ms
```

```
C:\Users\Administration>ping 192.168.36.2

Pinging 192.168.36.2 with 32 bytes of data:
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254

Ping statistics for 192.168.36.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 28ms, Maximum = 28ms, Average = 28ms
```

```
C:\Users\Administration>ping 192.168.36.17

Pinging 192.168.36.17 with 32 bytes of data:
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254

Ping statistics for 192.168.36.17:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\Users\Administration>ping 192.168.36.18

Pinging 192.168.36.18 with 32 bytes of data:
Reply from 192.168.36.18: bytes=32 time<1ms TTL=255
Reply from 192.168.36.18: bytes=32 time=1ms TTL=255
Reply from 192.168.36.18: bytes=32 time=1ms TTL=255
Reply from 192.168.36.18: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.36.18:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
```

Microsoft Edge

```
C:\Users\Administration>ping 192.168.36.33
```

```
Pinging 192.168.36.33 with 32 bytes of data:
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254
```

```
Ping statistics for 192.168.36.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\Users\Administration>ping 192.168.36.34
```

```
Pinging 192.168.36.34 with 32 bytes of data:
Reply from 192.168.36.34: bytes=32 time<1ms TTL=255
Reply from 192.168.36.34: bytes=32 time=1ms TTL=255
Reply from 192.168.36.34: bytes=32 time<1ms TTL=255
Reply from 192.168.36.34: bytes=32 time<1ms TTL=255
```

```
Ping statistics for 192.168.36.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\Users\Administration>
```

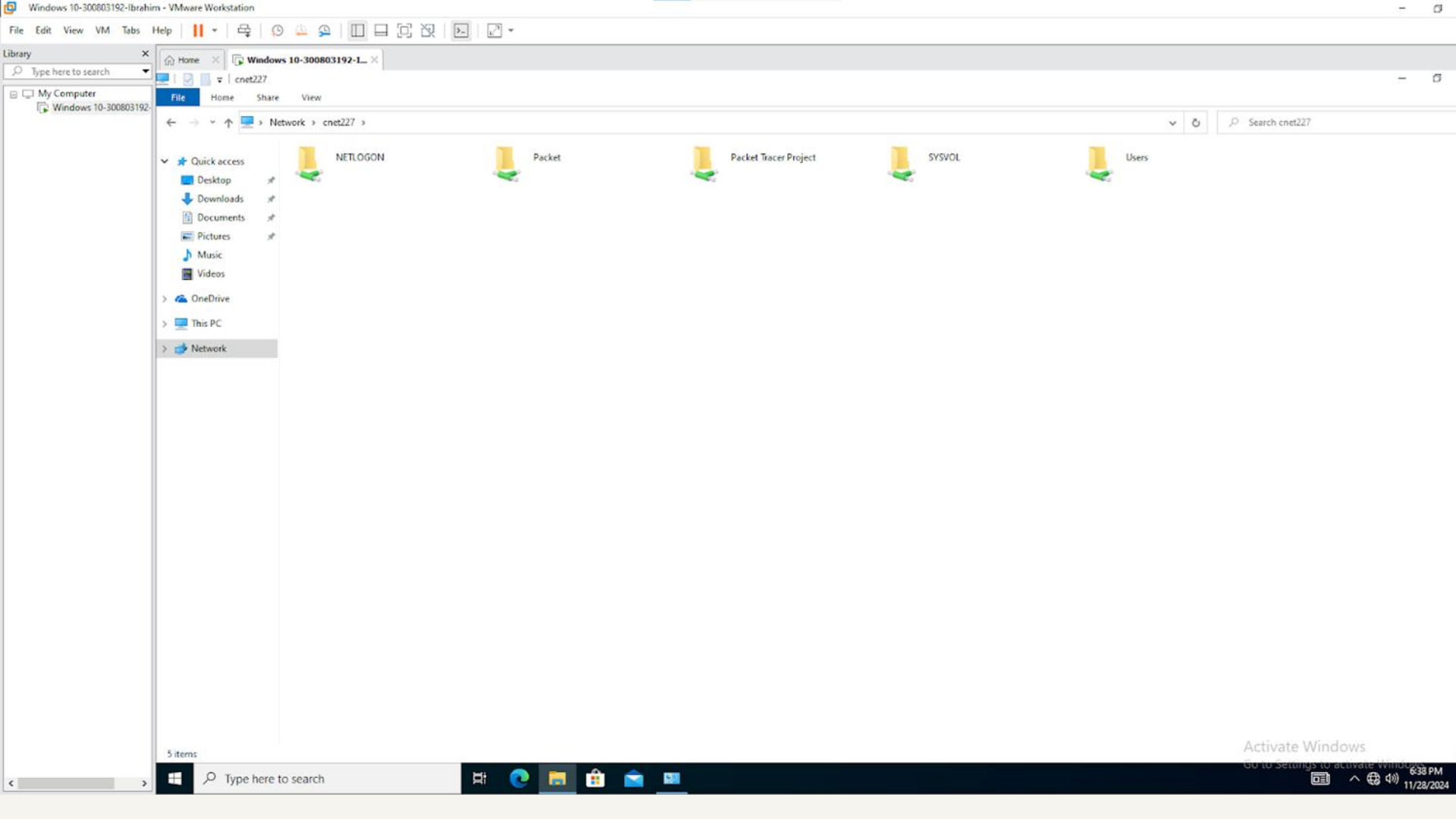
FILE SHARING CONFIGURATIONS

HR DEPARTMENT FILE SHARING

- * File sharing has been set up for the Human Resource (HR) client on Windows 10 with read-only access.
- * This configuration allows HR employees to view and access files, but they are not able to make any changes or edits.
- * Permissions were adjusted to ensure that HR can open and read the shared files from the network, while preventing any accidental changes.

SALES DEPARTMENT FILE SHARING

- * Full file sharing has been enabled for the Sales client on Windows 10, allowing them complete access to shared files.
 - * Sales employees can view, edit, and delete files as needed, providing them with flexibility in managing documents.
 - * Permissions were set to give them full control over the files, ensuring they can make updates or changes as part of their daily tasks.
-



Library

Type here to search

My Computer

Windows 10-300803192

Home

Windows 10-300803192-L...

cnet227

File Home Share View

Network > cnet227

Search cnet227

Quick access

- Desktop
- Downloads
- Documents
- Pictures
- Music
- Videos
- OneDrive
- This PC
- Network

NETLOGON

Packet

Packet Tracer Project

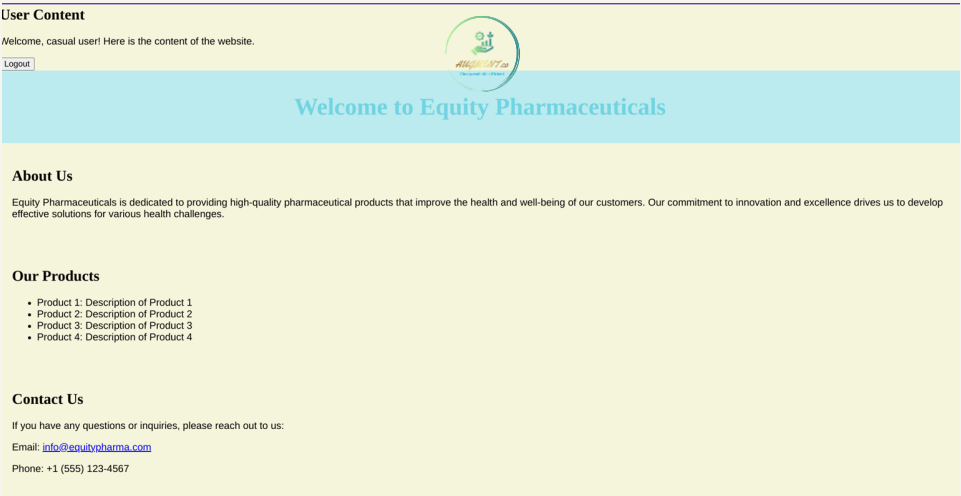
SYSVOL

Users

5 items

Activate Windows
Go to Settings to activate Windows.

DESIGNING THE COMPANY WEBSITE HOMEPAGE



User-Friendly Website Design

- The homepage features a simple and clean design that enhances user experience, ensuring visitors can easily find information.
- A friendly welcome message greets visitors, making them feel invited and engaged with the company's mission.
- Navigation elements are strategically placed to allow quick access to important information, such as product categories and services offered.
- The design caters to both desktop and mobile users, ensuring accessibility across different devices and screen sizes.
- Visual elements are incorporated to create an attractive layout, helping to guide users through the site effortlessly.

Login

Username: Password:



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Cheap realistic efficient



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Equity Pharmaceuticals is dedicated to providing high-quality pharmaceutical products that improve the health and well-being of our customers. Our commitment to innovation and excellence drives us to develop effective solutions for various health challenges.

Our Products

- Product 1: Description of Product 1
- Product 2: Description of Product 2
- Product 3: Description of Product 3
- Product 4: Description of Product 4

Contact Us

If you have any questions or inquiries, please reach out to us:

Email: info@equitypharma.com

Phone: +1 (555) 123-4567

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- Product 4: Description of Product 4

Contact Us

If you have any questions or inquiries, please reach out to us:

Email: info@equitypharma.com

Phone: +1 (555) 123-4567

ANALYSIS OF RESULTS

NETWORK CONNECTIVITY VALIDATION



All the Pings go through, confirming that the network is overall connected thoroughly, including the virtual client and server. This demonstrates effective communication across different VLANs.

SYSTEM FUNCTIONALITY TESTING



The testing process involved successful pings from the Windows Server 2019 to all physical PCs across different VLANs, confirming that VLAN configurations and IP addressing were correctly set up.

PERFORMANCE METRICS



The network design ensures that all devices are accessible, enhancing operational efficiency and supporting the company's growing demands.

Ethernet adapter Ethernet1:

```
Connection-specific DNS Suffix  . :  
Link-local IPv6 Address . . . . . : fe80::44de:a362:6098:24  
IPv4 Address. . . . . : 172.18.36.2  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . : 172.18.36.1
```

C:\Users\Administrator>ping 172.18.36.1

Pinging 172.18.36.1 with 32 bytes of data:

```
Reply from 172.18.36.1: bytes=32 time=1ms TTL=255  
Reply from 172.18.36.1: bytes=32 time=1ms TTL=255  
Reply from 172.18.36.1: bytes=32 time=1ms TTL=255  
Reply from 172.18.36.1: bytes=32 time=1ms TTL=255
```

Ping statistics for 172.18.36.1:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

C:\Users\Administrator>ping 172.18.36.2

Pinging 172.18.36.2 with 32 bytes of data:

```
Reply from 172.18.36.2: bytes=32 time<1ms TTL=128  
Reply from 172.18.36.2: bytes=32 time<1ms TTL=128  
Reply from 172.18.36.2: bytes=32 time<1ms TTL=128  
Reply from 172.18.36.2: bytes=32 time<1ms TTL=128
```

Ping statistics for 172.18.36.2:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

C:\Users\Administrator>ping 172.18.36.3

Pinging 172.18.36.3 with 32 bytes of data:

```
Reply from 172.18.36.3: bytes=32 time<1ms TTL=128  
Reply from 172.18.36.3: bytes=32 time<1ms TTL=128  
Reply from 172.18.36.3: bytes=32 time<1ms TTL=128  
Reply from 172.18.36.3: bytes=32 time<1ms TTL=128
```

Ping statistics for 172.18.36.3:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

C:\Users\Administrator>

Reply from 172.18.36.3: bytes=32 time<1ms TTL=128

Ping statistics for 172.18.36.3:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

C:\Users\Administrator>

C:\Users\Administrator>

C:\Users\Administrator>

C:\Users\Administrator>ping 10.36.0.67

Pinging 10.36.0.67 with 32 bytes of data:

```
Reply from 10.36.0.67: bytes=32 time=1ms TTL=127  
Reply from 10.36.0.67: bytes=32 time=2ms TTL=127  
Reply from 10.36.0.67: bytes=32 time=1ms TTL=127  
Reply from 10.36.0.67: bytes=32 time=2ms TTL=127
```

Ping statistics for 10.36.0.67:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

C:\Users\Administrator>ping 10.36.0.65

Pinging 10.36.0.65 with 32 bytes of data:

```
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255  
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255  
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255  
Reply from 10.36.0.65: bytes=32 time=1ms TTL=255
```

Ping statistics for 10.36.0.65:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

C:\Users\Administrator>ping 10.36.0.66

Pinging 10.36.0.66 with 32 bytes of data:

```
Reply from 10.36.0.66: bytes=32 time=1ms TTL=127  
Reply from 10.36.0.66: bytes=32 time=1ms TTL=127  
Reply from 10.36.0.66: bytes=32 time=2ms TTL=127  
Reply from 10.36.0.66: bytes=32 time=1ms TTL=127
```

Ping statistics for 10.36.0.66:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

C:\Users\Administrator>



```
C:\Users\Administration>ping 10.36.0.66
```

```
Pinging 10.36.0.66 with 32 bytes of data:
```

```
Reply from 10.36.0.66: bytes=32 time<1ms TTL=128
```

```
Reply from 10.36.0.66: bytes=32 time<1ms TTL=128
```

```
Reply from 10.36.0.66: bytes=32 time<1ms TTL=128
```

```
Reply from 10.36.0.66: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 10.36.0.66:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\Users\Administration>
```

```
C:\Users\Administration>ping 10.36.0.67
```

```
Pinging 10.36.0.67 with 32 bytes of data:
```

```
Reply from 10.36.0.67: bytes=32 time<1ms TTL=128
```

```
Reply from 10.36.0.67: bytes=32 time<1ms TTL=128
```

```
Reply from 10.36.0.67: bytes=32 time<1ms TTL=128
```

```
Reply from 10.36.0.67: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 10.36.0.67:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\Users\Administration>ping 10.36.0.65
```

```
Pinging 10.36.0.65 with 32 bytes of data:
```

```
Reply from 10.36.0.65: bytes=32 time<1ms TTL=255
```

```
Reply from 10.36.0.65: bytes=32 time<1ms TTL=255
```

```
Reply from 10.36.0.65: bytes=32 time<1ms TTL=255
```

```
Reply from 10.36.0.65: bytes=32 time<1ms TTL=255
```

```
Ping statistics for 10.36.0.65:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\Users\Administration>
```

```
C:\Users\Administration>
```

```
C:\Users\Administration>ping 10.36.0.1
```

```
Pinging 10.36.0.1 with 32 bytes of data:
```

```
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
```

```
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
```

```
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
```

```
Reply from 10.36.0.1: bytes=32 time=19ms TTL=254
```

```
Ping statistics for 10.36.0.1:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\Users\Administration>ping 10.36.0.2
```

```
Pinging 10.36.0.2 with 32 bytes of data:
```

```
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126
```

```
Reply from 10.36.0.2: bytes=32 time=20ms TTL=126
```

```
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126
```

```
Reply from 10.36.0.2: bytes=32 time=19ms TTL=126
```

```
Ping statistics for 10.36.0.2:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 19ms, Maximum = 20ms, Average = 19ms
```

```
C:\Users\Administration>ping 10.36.0.33
```

```
Pinging 10.36.0.33 with 32 bytes of data:
```

```
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
```

```
Reply from 10.36.0.33: bytes=32 time=19ms TTL=254
```

```
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
```

```
Reply from 10.36.0.33: bytes=32 time=18ms TTL=254
```

```
Ping statistics for 10.36.0.33:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 18ms, Maximum = 19ms, Average = 18ms
```

```
C:\Users\Administration>ping 10.36.0.34
```

```
Pinging 10.36.0.34 with 32 bytes of data:
```

```
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
```

```
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
```

```
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
```

```
Reply from 10.36.0.34: bytes=32 time=19ms TTL=126
```

```
Ping statistics for 10.36.0.34:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```



```
C:\Users\Administration>ping 192.168.36.1
```

```
Pinging 192.168.36.1 with 32 bytes of data:  
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254  
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254  
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254  
Reply from 192.168.36.1: bytes=32 time=28ms TTL=254
```

```
Ping statistics for 192.168.36.1:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 28ms, Maximum = 28ms, Average = 28ms
```

```
C:\Users\Administration>ping 192.168.36.2
```

```
Pinging 192.168.36.2 with 32 bytes of data:  
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254  
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254  
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254  
Reply from 192.168.36.2: bytes=32 time=28ms TTL=254
```

```
Ping statistics for 192.168.36.2:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 28ms, Maximum = 28ms, Average = 28ms
```

```
C:\Users\Administration>ping 192.168.36.17
```

```
Pinging 192.168.36.17 with 32 bytes of data:  
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254  
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254  
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254  
Reply from 192.168.36.17: bytes=32 time=19ms TTL=254
```

```
Ping statistics for 192.168.36.17:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\Users\Administration>ping 192.168.36.18
```

```
Pinging 192.168.36.18 with 32 bytes of data:  
Reply from 192.168.36.18: bytes=32 time<1ms TTL=255  
Reply from 192.168.36.18: bytes=32 time=1ms TTL=255  
Reply from 192.168.36.18: bytes=32 time=1ms TTL=255  
Reply from 192.168.36.18: bytes=32 time=1ms TTL=255
```

```
Ping statistics for 192.168.36.18:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:
```

```
C:\Users\Administration>ping 192.168.36.33
```

```
Pinging 192.168.36.33 with 32 bytes of data:  
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254  
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254  
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254  
Reply from 192.168.36.33: bytes=32 time=19ms TTL=254
```

```
Ping statistics for 192.168.36.33:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 19ms, Maximum = 19ms, Average = 19ms
```

```
C:\Users\Administration>ping 192.168.36.34
```

```
Pinging 192.168.36.34 with 32 bytes of data:  
Reply from 192.168.36.34: bytes=32 time<1ms TTL=255  
Reply from 192.168.36.34: bytes=32 time=1ms TTL=255  
Reply from 192.168.36.34: bytes=32 time<1ms TTL=255  
Reply from 192.168.36.34: bytes=32 time<1ms TTL=255
```

```
Ping statistics for 192.168.36.34:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\Users\Administration>
```

CONCLUSIONS AND RECOMMENDATIONS

- ✦ The project for creating a network design for Equity Pharmaceuticals is a success, as evidenced by successful pings demonstrating overall network connectivity and functioning web and file servers.
- ✦ The network is designed meticulously to ensure security and relevance, utilizing tools such as firewalls, SSH, and limited access to safeguard sensitive data.
- ✦ The virtual server and clients were implemented as cost-effective methods to avoid additional hardware costs, leading to sustainability and financial stability for the company.
- ✦ Future recommendations include continuous monitoring of network performance and security enhancements, along with considering cloud integration for further scalability and efficiency.



THANK YOU !



ANY QUESTIONS?
