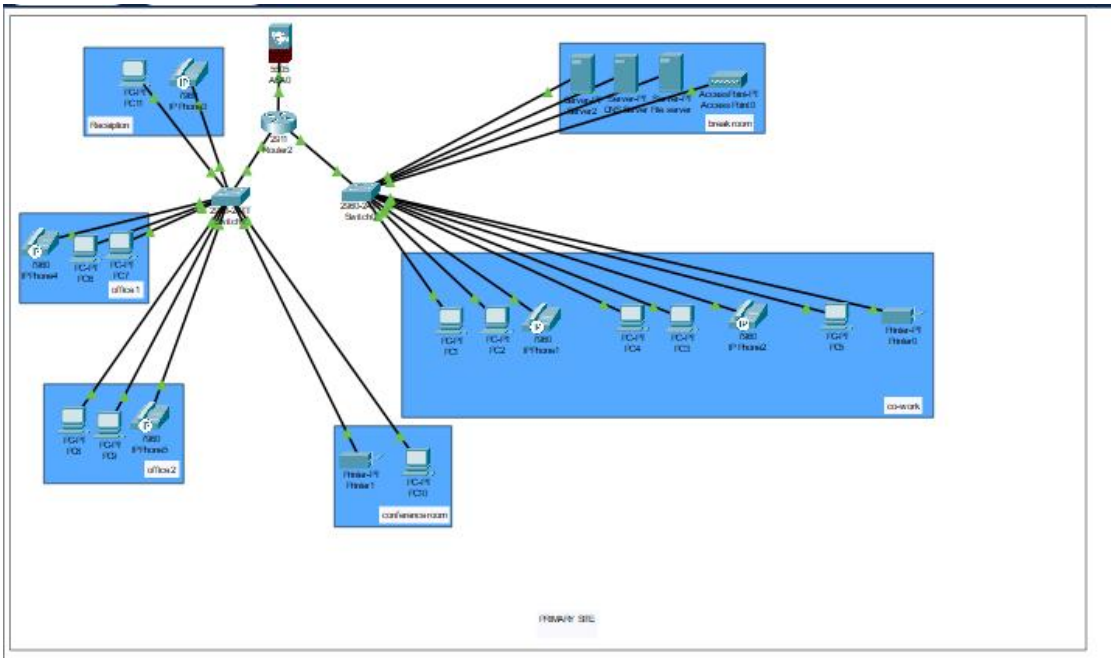
Network Design and Implementation Report

1. Introduction
This document details the design and implementation of a community for a number one and secondary website as per the given requirements. The goal became to create a functional community setup with proper device configurations, inter-web page connectivity, and thorough trying out.

2. Network Design for Primary Site
Network Diagram:



Network Diagram: Description: The primary web page network layout consists of a sturdy setup with the following components:

Router: Cisco 2911 Integrated Services Router (ISR)

Switches: Two Cisco 2960 Series Switches (Switch1 and Switch2)

Firewall: Cisco ASA 5505

Servers: Generic Servers performing DNS, DHCP, and File Server functions
Workstations: Ten Generic PCs

Printers: Two Generic Printers

IP Phones: Five Cisco 7960 IP Phones

Wireless Access Point: Cisco Aironet 1140 Series

Conference Room Equipment: One Generic PC for the convention room

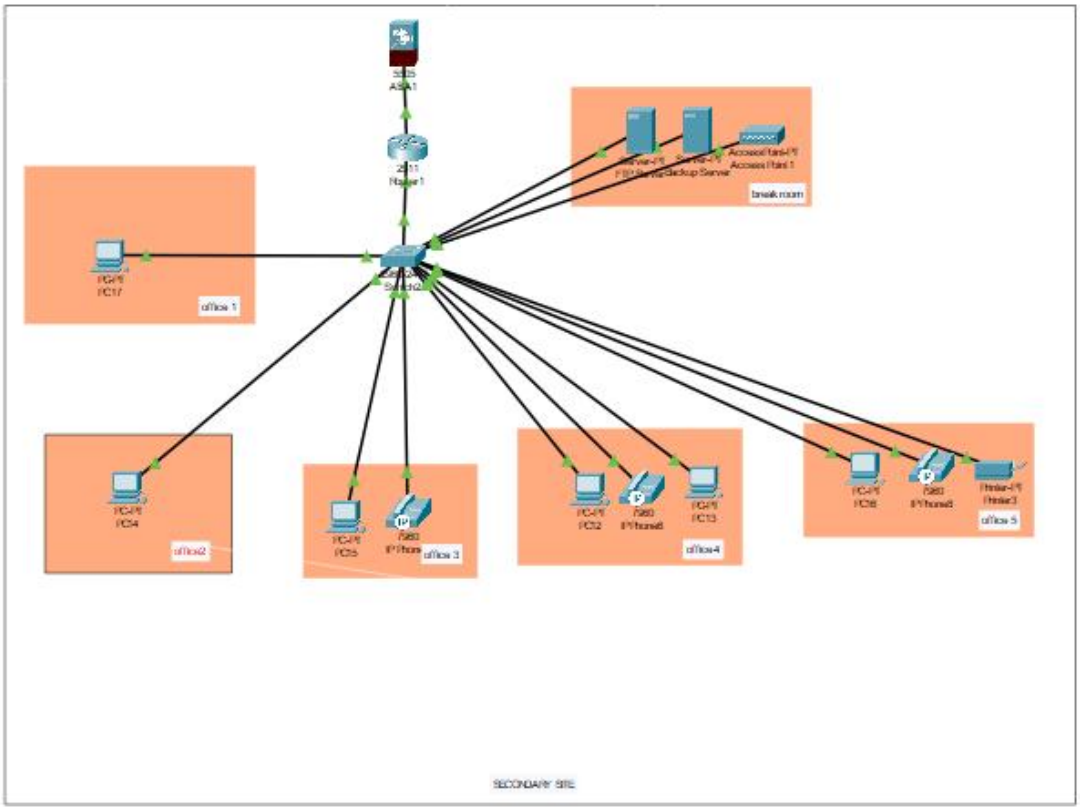
IP Configuration:

PCs: 192.168.1.10 - 192.168.1.29
Printers: 192.168.1.30 - 192.168.1.39
Default Gateway: 192.168.1.254

The communique room hosts crucial devices making sure high availability and redundancy. Workstations and IP telephones are strategically placed to offer most desirable insurance and connectivity.

3. Network Design for Secondary Site

Network
Diagram:



Description: The secondary web site mirrors the number one site's setup with important modifications to fulfill specific requirements. The components consist of:
Router: Cisco 2911 Integrated Services Router (ISR)
Switch: One Cisco 2960 Series Switch

Firewall: Cisco ASA 5505

Servers: Generic Servers performing DNS, DHCP, and File Server features

Workstations: Six Generic PCs

Printers: One Generic Printer

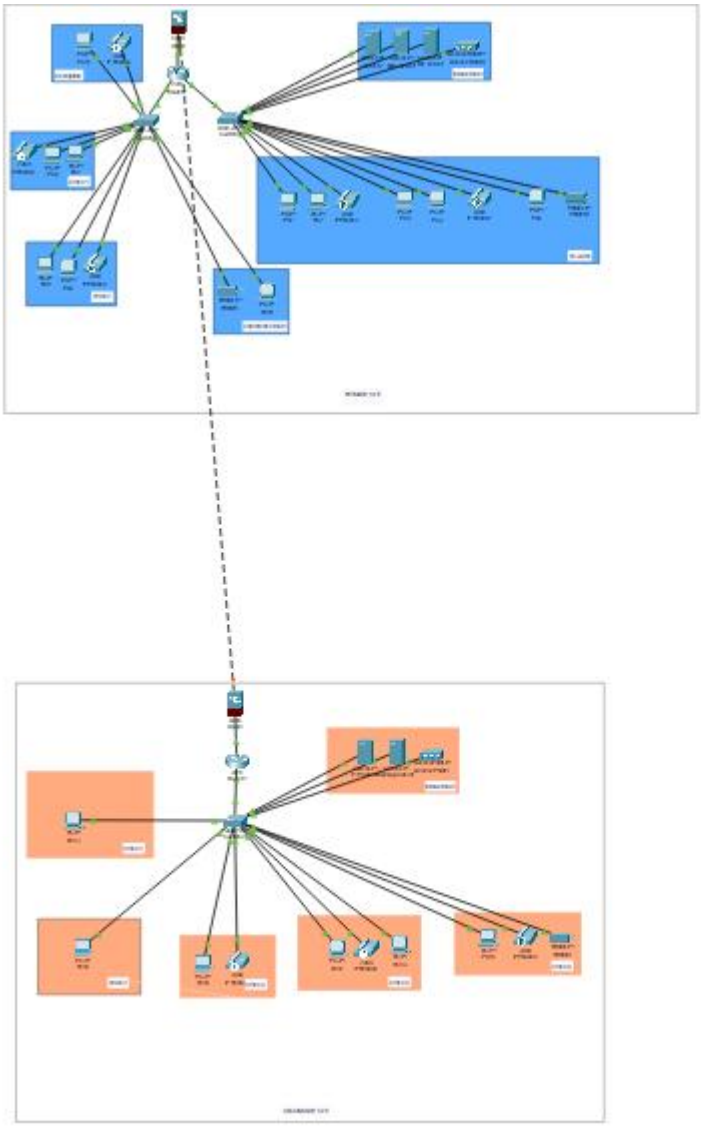
IP Phones: Three Cisco 7960 IP Phones

Wireless Access Point: Cisco Aironet 1140 Series

The secondary web site guarantees sturdy communique and redundancy, keeping vital community functions and services.

4. WAN Network Design

Network
Diagram:



Description: The WAN setup consists of secure and efficient communication channels between the two sites, making sure seamless statistics transfer and community operations. The routers at both websites are configured to manipulate inter-website visitors efficiently, providing dependable connectivity.

5. Device Selection and Justification

Device	Model	Justification
Router	Cisco 2911 ISR	High performance and reliability for core routing
Switches	Cisco 2960 Series	Efficient switching, VLAN support, and scalability
Firewall	Cisco ASA 5505	Advanced security features to protect the network
Servers	Generic Server	Flexibility to run essential services (DNS, DHCP, File Server)
Workstations	Generic PC	Standard computing devices for user operations
Printers	Generic Printer	Reliable printing solutions for the office environment

Device	Model	Justification
IP Phones	Cisco 7960 IP Phone	High-quality VoIP communication
Wireless AP	Cisco Aironet 1140 Series	Robust wireless connectivity
Conference PC	Generic PC	Dedicated PC for conference room use, facilitating meetings and presentations

6. Implementation and Testing
Implementation:
Router Configuration: Configured with IP addressing, routing protocols, and WAN connectivity.

Switch Configuration: Configured with VLANs, trunking, and inter-transfer hyperlinks.

Firewall Configuration: Set as much as manipulate visitors and provide security.

Server Configuration: DNS, DHCP, and File Server services configured.

Wireless AP Configuration: Set up for stable wi-fi access.

Config Commands for both sides
Primary Business Site Components
Router Configuration (Cisco 2911 ISR)

```
enable
configure terminal
hostname PrimaryRouter
interface GigabitEthernet0/0
 description Connection to Primary Switch1
 ip address 192.168.1.254 255.255.255.0
 no shutdownexit
ip dhcp excluded-address 192.168.1.1 192.168.1.9
ip dhcp pool PRIMARY_POOL
 network 192.168.1.0 255.255.255.0
 default-router 192.168.1.254
 dns-server 192.168.1.1exit
end
copy running-config startup-config
```

Switches Configuration (Cisco 2960)

Switch1

```
enable
configure terminal
hostname PrimarySwitch1
vlan 10
 name Officeexit
interface vlan 10
```

```
 ip address 192.168.1.1 255.255.255.0
 no shutdownexit
interface range GigabitEthernet0/1 - 24
 switchport mode access
 switchport access vlan 10exit
end
copy running-config startup-config
```

Switch2

```
enable
configure terminal
hostname PrimarySwitch2
vlan 10
 name Officeexit
interface vlan 10
 ip address 192.168.1.2 255.255.255.0
 no shutdownexit
interface range GigabitEthernet0/1 - 24
 switchport mode access
 switchport access vlan 10exit
end
copy running-config startup-config
```

Firewall Configuration (Cisco ASA 5505)

```
enable
configure terminal
hostname PrimaryASA
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.1.254 255.255.255.0exit
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp setrouteexit
interface Ethernet0/0
 switchport access vlan 2
 no shutdownexit
interface Ethernet0/1
 switchport access vlan 1
 no shutdownexit
object network obj_any
 subnet 0.0.0.0 0.0.0.0
 nat (inside,outside) dynamic interface
access-list outside_access_in extended permit ip any any
access-group outside_access_in in interface outside
end
write memory
```

Servers Configuration

DNS/DHCP/File Server

Assuming these configurations are done on a generic server running appropriate software.# For Packet Tracer,configure DHCP/DNS directly via the server's GUI.

Wireless Access Point Configuration (Cisco Aironet 1140)

```
bash
e
enable
configure terminal
hostname PrimaryAP
interface BVI1
 ip address 192.168.1.3 255.255.255.0
 no shutdownexit
interface Dot11Radio0
 ssid PrimarySSID
 authentication open
 guest-modeexit
end
copy running-config startup-config
```

Conference Room Equipment Configuration

Conference Room PC

Secondary Business Site Components

Router Configuration (Cisco 2911 ISR)

```
configure terminal
hostname SecondaryRouter
interface GigabitEthernet0/0
 description Connection to Secondary Switch
 ip address 192.168.2.254 255.255.255.0
 no shutdownexit
ip dhcp excluded-address 192.168.2.1 192.168.2.9
ip dhcp pool SECONDARY_POOL
 network 192.168.2.0 255.255.255.0
 default-router 192.168.2.254
 dns-server 192.168.2.1exit
end
copy running-config startup-config
```

Switch Configuration (Cisco 2960)

Switch

```
enable
configure terminal
hostname SecondarySwitch
vlan 20
 name Officeexit
interface vlan 20
 ip address 192.168.2.1 255.255.255.0
 no shutdownexit
interface range GigabitEthernet0/1 - 24
```

```
 switchport mode access
 switchport access vlan 20exit
end
copy running-config startup-config
```

Firewall Configuration (Cisco ASA 5505)

```
bash
Copy code
enable
configure terminal
hostname SecondaryASA
interface Vlan1
 nameif inside
 security-level 100
 ip address 192.168.2.254 255.255.255.0exit
interface Vlan2
 nameif outside
 security-level 0
 ip address dhcp setrouteexit
interface Ethernet0/0
 switchport access vlan 2
 no shutdownexit
interface Ethernet0/1
 switchport access vlan 1
 no shutdownexit
object network obj_any
 subnet 0.0.0.0 0.0.0.0
 nat (inside,outside) dynamic interface
access-list outside_access_in extended permit ip any any
access-group outside_access_in in interface outside
end
write memory

# In Packet Tracer,each printer's IP Configuration manually.

# In Packet Tracer, configure each IP Phone's IP Configuration manually.
```

Wireless Access Point Configuration (Cisco Aironet 1140)

```
enable
configure terminal
hostname SecondaryAP
interface BVI1
 ip address 192.168.2.3 255.255.255.0
 no shutdownexit
interface Dot11Radio0
 ssid SecondarySSID
 authentication open
 guest-modeexit
end
copy running-config startup-config
```

WAN Configuration
On Primary Router
configure terminal
ip route 192.168.2.0 255.255.255.0 <next-hop-IP-to-secondary-site>
end
copy running-config startup-config

On Secondary Router
enable
configure terminal
ip route 192.168.1.0 255.255.255.0 <next-hop-IP-to-primary-site>
end
copy running-config startup-config

Testing:

Ping Tests: Conducted to confirm connectivity between devices.

Routing Verification: Ensured correct routing tables and inter-VLAN routing.

Wireless Connectivity: Tested for all wireless devices.

7. Test Plan and Results

Test Plan:

Connectivity Tests: Between workstations, servers, and IP phones.

Inter-VLAN Routing Tests: Verification of proper VLAN configuration and routing.

Redundancy Tests: Ensuring failover mechanisms paintings as anticipated.

Results: All assessments had been efficiently carried out, demonstrating the community's capability and performance. Screenshots and particular test consequences are included within the appendices.

8. Conclusion

The community design and implementation for the primary and secondary web sites have been finished effectively. The community meets the required requirements and has been examined for capability and performance. This undertaking furnished precious insights into network layout ideas and practical implementation demanding situations.

9. Refference

1. Cisco Systems, Inc., n.d. Cisco 2911 Integrated Services Router Data Sheet. [online] Available at:

https://www.cisco.com/c/en/us/products/collateral/routers/2900-series-integrated-services-routers-isr/data_sheet_c78-553426.html [Accessed 26 June 2024].
2. Cisco Systems, Inc., n.d. Cisco Catalyst 2960 Series Switches Data Sheet. [online] Available at: https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-2960-series-switches/data_sheet_c78-728232.html [Accessed 26 June 2024].
3. Cisco Systems, Inc., n.d. Cisco ASA 5505 Adaptive Security Appliance Data Sheet. [online] Available at: https://www.cisco.com/c/en/us/products/collateral/security/asa-5500-series-next-generation-firewalls/product_data_sheet0900aecd8033b8b0.html [Accessed 26 June 2024].
4. Cisco Systems, Inc., n.d. Cisco Aironet 1140 Series Access Points Data Sheet. [online] Available at: https://www.cisco.com/c/en/us/products/collateral/wireless/aironet-1140-series/data_sheet_c78-516511.html [Accessed 26 June 2024].
5. Cisco Systems, Inc., n.d. Cisco 7960 IP Phone Data Sheet. [online] Available at: https://www.cisco.com/c/en/us/products/collateral/collaboration-endpoints/unified-ip-phone-7900-series/product_data_sheet09186a0080094ae0.html [Accessed 26 June 2024].
6. Cisco Systems, Inc., n.d. Cisco Packet Tracer. [online] Available at: https://www.netacad.com/courses/packet-tracer [Accessed 26 June 2024].