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Spring 2021

Secure Network Access via LDAP

Nicholas Valaitis
ncv4@ziips.uakron.edu

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SENIOR PROJECT

Secure Network Device Access

Course: 2440-490-001

Instructor: Dr. Shirong Du

Time: Spring 2020

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Project Plan

This Project is to configure a sample network in order to test the configuration of a TACACS+ server on the network and its functionality to allow secure remote access onto devices. In order to do this a TACACS+ software will be installed on to a server. With this software accounts will be configured for remote SSH access to network devices via authentication from the TACACS+ server.

Project Analysis

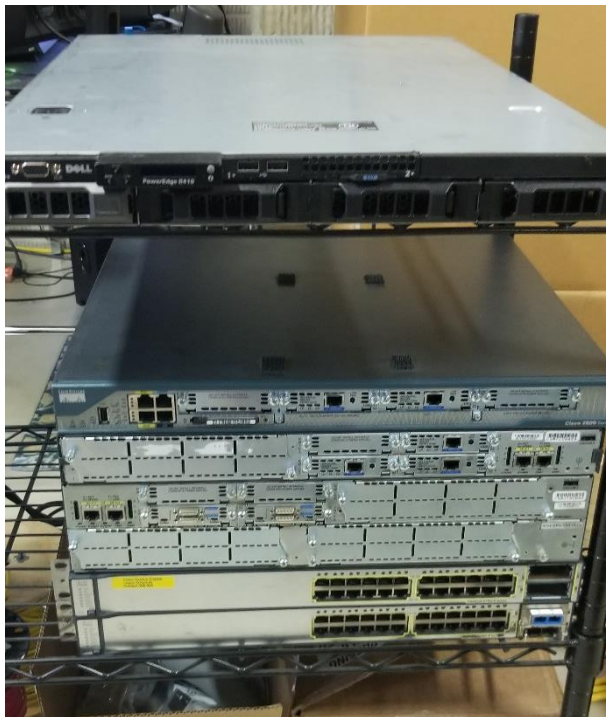
This project was unique to me as it had more so moved away from the functional side of routing and switching and more so into the management side of configuration. With this I also gained knowledge of both server-side development and unique network credential management. All aspects of the project were complete within the scope, however it got narrowed down more so, so that I could focus on the development of TACACS. In the future however I plan to delve deeper into the exploration of the limits of management network infrastructure.

Project Description

Description

- To create a network with advanced secure network access and not just local accounts for individual access. This will allow for the administrator access of accounts and not the way of every person just using a local account to log into a device and then have no one able to track what changes are made by whoever logged in and when.
- To simulate the actual implementation of a secure network access with these technologies' devices will be configured according to what kind of device they are and the access for which they will be receiving. With the proper configuration an authenticated user will be able to log onto a device with his own unique ID and Password combination via one of the approved methods.
- The network will consist of a variety of devices to allow for access to devices in each of the unique methods needed. The network will be comprised of cisco router equipment as well as switches and a central server.

Network Diagram/Picture



○

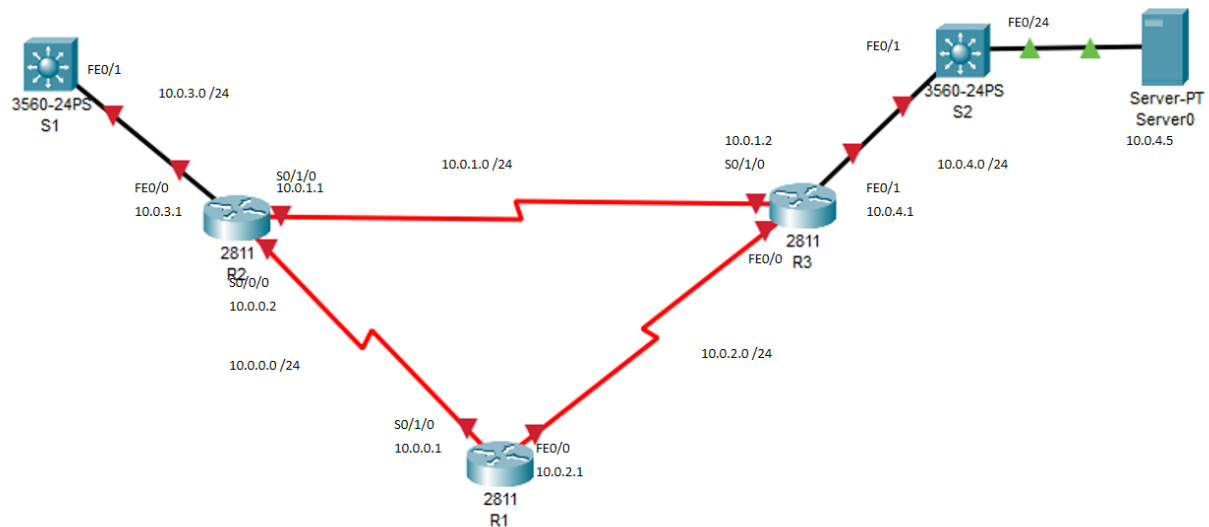
Physical Build and Setup

This network has been built with the following equipment:

- Dell Poweredge 510 server
 - 2800 model series
- 3 Cisco Routers
 - 2800 model series
- 2 Cisco Switches
 - Catalyst 3750 E-series
- 1 PC/Laptop for credential testing

Cabling

Cable Diagram



IP Addressing

Devices	Interface	Addresses
R1	S 0/1/0	10.0.0.1
	Fe 0/0	10.0.2.1
R2	S 0/0/0	10.0.0.2
	S 0/1/0	10.0.1.0
	Fe 0/0	10.0.3.1
R3	S 0/1/0	10.0.1.2
	Fe 0/0	10.0.2.2

	Fe 0/1	10.0.4.1
Tacacs+ Server	GIG 1	10.0.4.5
	GIG 2	DHCP Connection to internet "temp connection for software download"

Device Wiping/Provisioning

Routers

- All 3 of the routers had to be reset by wiping the startup configuration and breaking into the device by booting into ROMMON in order to do so as the previous device logins where not provided to me
- Once loaded into ROMON the boot order had to be changed as well as have to flash memory where the running config is saved to be erased
 - Confreg0x2142
 - reset

Switches

- Both of the switches had to be reset by wiping the startup configuration and breaking into the device by booting into ROMMON in order to do so as the previous device logins where not provided to me
- Once loaded into ROMON the boot order had to be changed as well as have to flash memory where the running config is saved to be erased
 - Confreg 0x2142
 - reset

Server

- The server order was cleanly shipped with no operating system or previous software installed on it. With this the device had to be provisioned with an operating system for it
- The OS chosen was Windows server 2016 Datacenter Evaluation as this is a free 180 day license
- OS Installation

- The Operating system was installed by Downloading the OS to a Laptop to then load onto a flash drive to then create as a boot drive
- This boot drive was created by partitioning the USB drive and then moving the OS over to it
- Then inserting the drive into one of the server's free USB ports
- Once the USB was inserted turning on the machine and changing the boot order to load from USB
- As the USB loads the OS the initial server setup is configured such as name, region, and layout

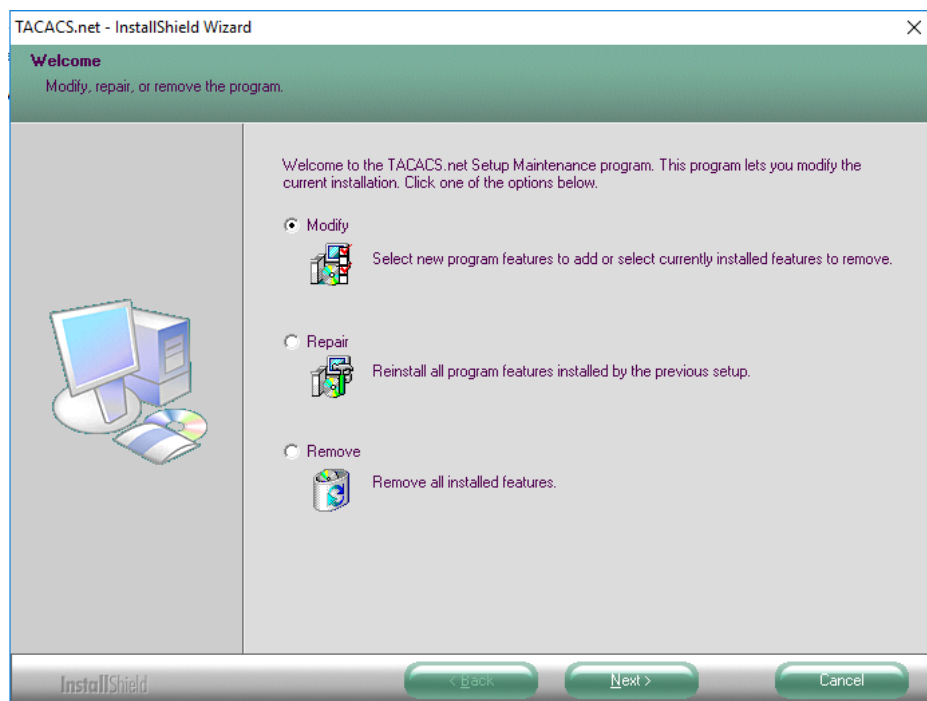
Configurations/Installations

Server

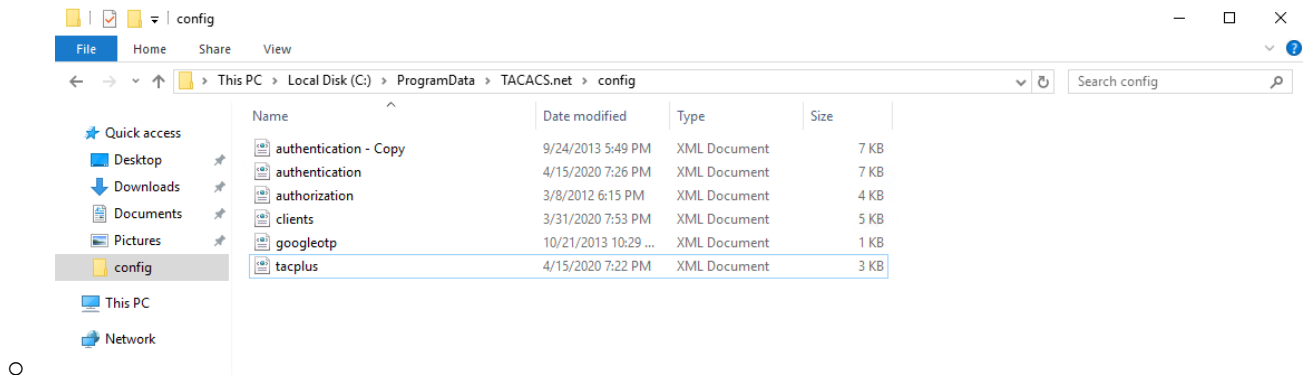
- Server has had the processes of Active Domain Directory, Remote Desktop Services, DNS and other functions

Installing Tacacs+ server

- To install the Tacacs+ server it will be used via a software suite to create and develop everything needed for accounts with Tacacs+



- This software suite can be installed via a web browser on the Dell server by going to <https://www.tacacs.net/>
- The other option can be to install the program on to a removable drive and then move the program onto the server
- Once Tacacs+ is running on the server you can begin the initial configuration
- Tacacs+ is managed through configuration files, each one of these files corresponds to a different area of Tacacs+ that is needed to be configured



- First go to the tacplus file
- In this file you will need to change the local ip address to the IP address of the server NIC card that is in use

- 10.0.4.5

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Version 1.2 -->
<!-- This is the global configuration file for the TACACS+ Server. If you have multiple NICs or IP addresses on this system (including virtual NICs), you will need to manually hard code the IP address in <LocalIP>, disconnect any open sessions, and restart the service. You will also need to manually hard code the IP address in <SyslogHost>, disconnect any open sessions, and restart the service. You will also need to manually hard code the IP address in <AccountingLog>, disconnect any open sessions, and restart the service. You will also need to manually hard code the IP address in <DebugLog>, disconnect any open sessions, and restart the service. You will also need to manually hard code the IP address in <SystemLog>, disconnect any open sessions, and restart the service. -->
<Server xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Port>49</Port>
  <LocalIP>10.0.4.5</LocalIP>
  <DisabledPrompt>This account has been disabled</DisabledPrompt>
  <PasswordPrompt>Password:</PasswordPrompt>
  <UserNamePrompt>Username:</UserNamePrompt>
  <ExpiredPasswordPrompt>The password for this account has expired</ExpiredPasswordPrompt>
  <IncorrectPasswordPrompt>Incorrect Password</IncorrectPasswordPrompt>
  <IncorrectUserOrPasswordPrompt>Invalid username or incorrect password</IncorrectUserOrPasswordPrompt>
  <SocketTimeoutSecs>30</SocketTimeoutSecs>
  <AccountingLog LoggingLevel="Information" DeleteDays="90" RolloverMB="10" RolloverDays="30"></AccountingLog>
  <DebugLog LoggingLevel="Debug" DeleteDays="90" RolloverMB="10" RolloverDays="30"></DebugLog>
  <SystemLog LoggingLevel="Information" DeleteDays="90" RolloverMB="10" RolloverDays="30"></SystemLog>
  <!-- <Syslog Host="127.0.0.1" Port="514" MaxLength="1000" Facility="Local6"></Syslog -->
  <AccountLockoutPeriodMins>30</AccountLockoutPeriodMins>
  <SessionIdleTimeoutMins>15</SessionIdleTimeoutMins>
  <TimedCacheExpirySecs>5</TimedCacheExpirySecs>
  <OTPSeparator>*</OTPSeparator>
  <AuthorizationRuleRequiredForAuthentication>Disabled</AuthorizationRuleRequiredForAuthentication>
</Server>
```

- The next thing to configure is authentication file
- In this file you will have to configure the type of account that you want to create for network access
 - The best account for this is a File User
 - The account being created for network access will be called admin with the password servicepass

```
<User>
  <Name>admin</Name>
  <LoginPassword ClearText="servicepass" DES=""> </LoginPassword>
  <EnablePassword ClearText="" DES=""></EnablePassword>
  <CHAPPassword ClearText="" DES=""> </CHAPPassword>
  <OutboundPassword ClearText="" DES=""> </OutboundPassword>
</User>
```

-
- For this configuration file a lot of options are not used as they are not needed such as the EnablePassword, CHAPPassword, and OutboundPassword

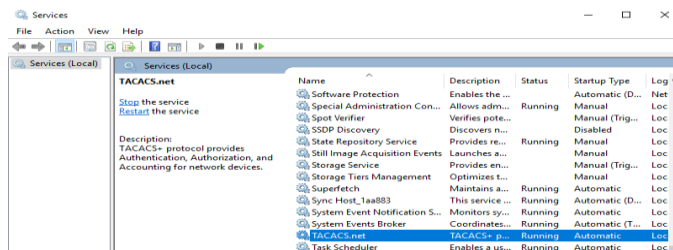
▪ The next file to configure will be the client's configuration file

- In this file make sure all possible networks are allowed for configuration

```
- <ClientGroup Name="LOCALHOST">
  <Secret DES="" ClearText="nvtacacs"/>
  - <Clients>
    <Client>127.0.0.1</Client>
  </Clients>
</ClientGroup>
<!-- INTERNAL GROUP The INTERNAL Group is a
- <ClientGroup Name="INTERNAL">
  <Secret DES="" ClearText="nvtacacs"/>
  - <Clients>
    <Client>10.0.0.0/8</Client>
    <Client>172.16.0.0/12</Client>
    <Client>192.168.0.0/16</Client>
  </Clients>
</ClientGroup>
```

-
- For this configuration the best possible thing is to configure all classful networks for clients

▪ After this is done go to services to turn on and start Tacacs+



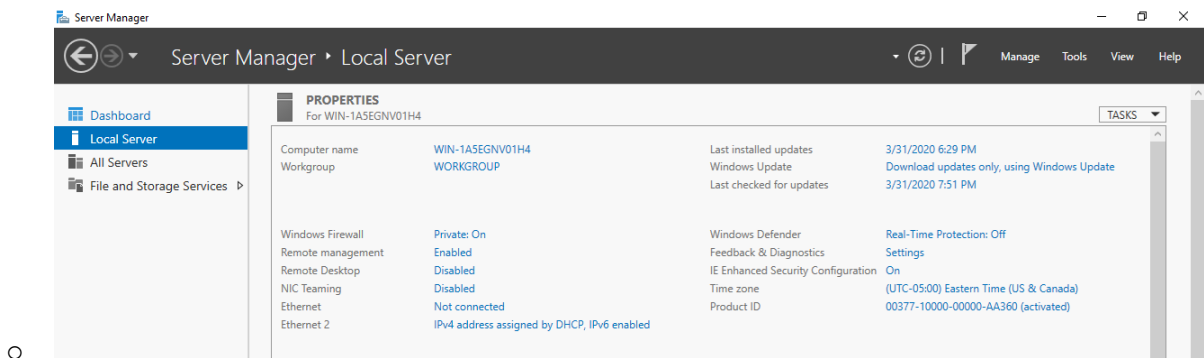
- Once the services are started test the initially configured accounts
- This test is done though a command prompt for tacacs

```
C:\Program Files (x86)\TACACS.net>tactest -s 10.0.4.5 -u testuser -k nvtacacs -p
Performing LoginASCII with testuser,password,True
Trying to open connection to 10.0.4.5:49
```

-

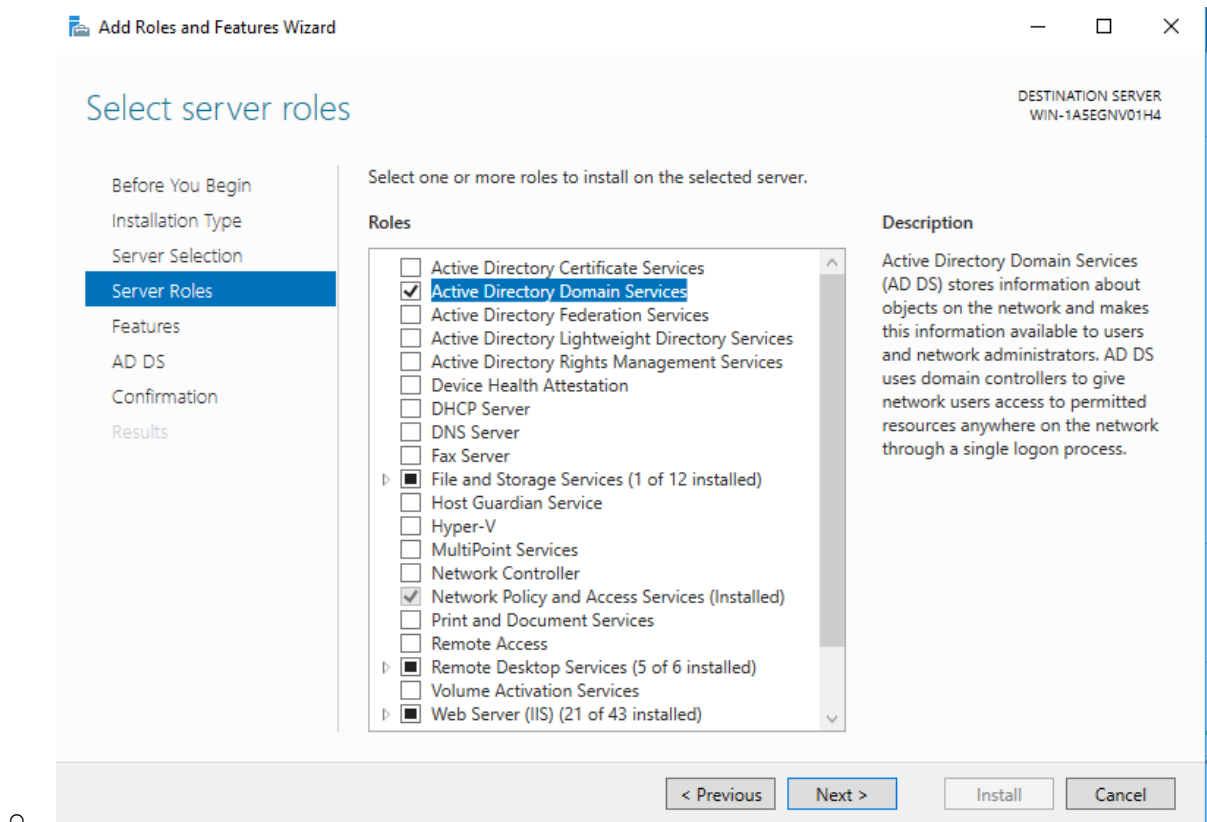
installing RDP/AD

- Through server management portal install Remote Desktop Protocol



- When once installed the desktop will be able to be accessed remotely from any other device on the network using the correct user accounts

○ Installing Active Directory



Active Directory Domain Services Configuration Wizard

Deployment Configuration

TARGET SERVER
WIN-1A5EGNV01H4

Deployment Configuration

Domain Controller Options

Additional Options

Paths

Review Options

Prerequisites Check

Installation

Results

Select the deployment operation

☐ Add a domain controller to an existing domain

☐ Add a new domain to an existing forest

☒ Add a new forest

Specify the domain information for this operation

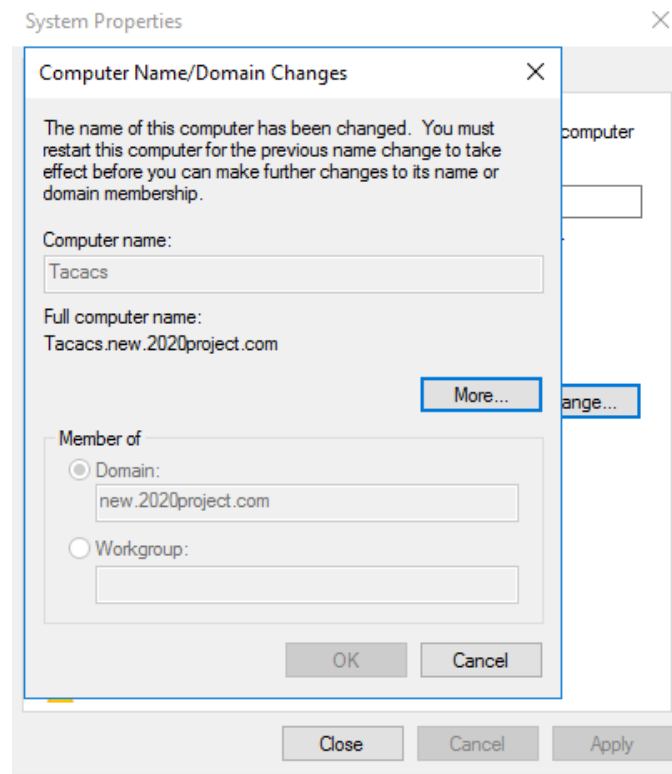
Root domain name:

[More about deployment configurations](#)

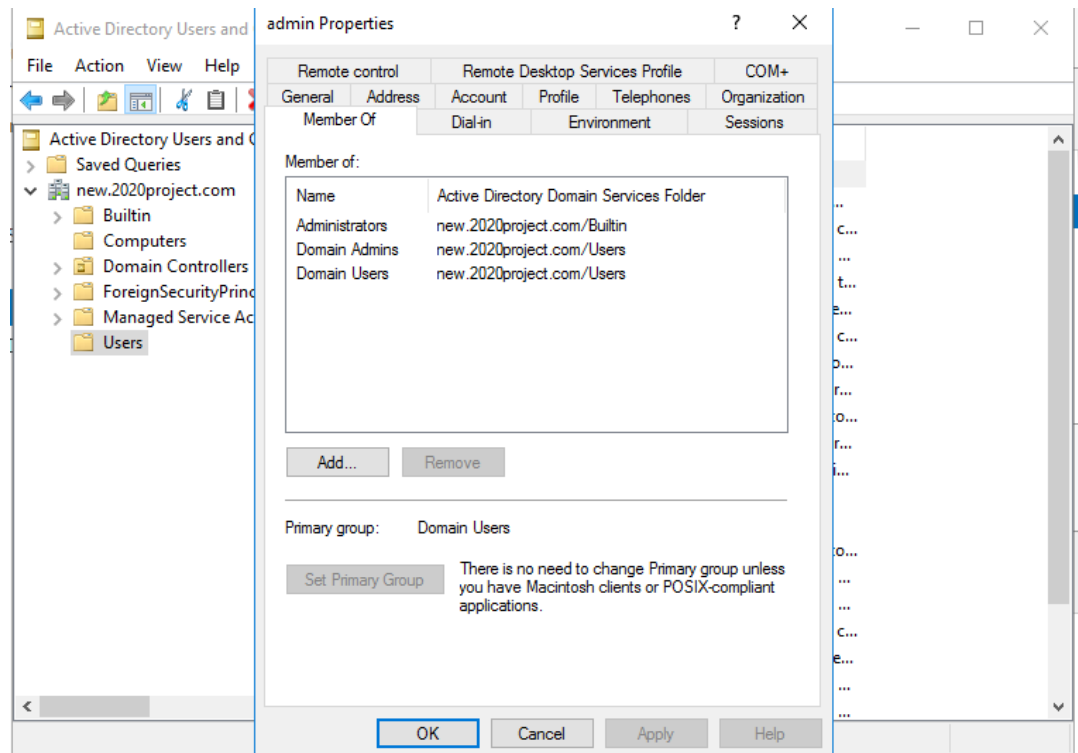
< Previous Next > Install Cancel

- For active directory this will create the domain name that will be used across the network by all devices

- With this new domain the AD server will be renamed to be TACACS.new.2020project.com as the new fully qualified domain name



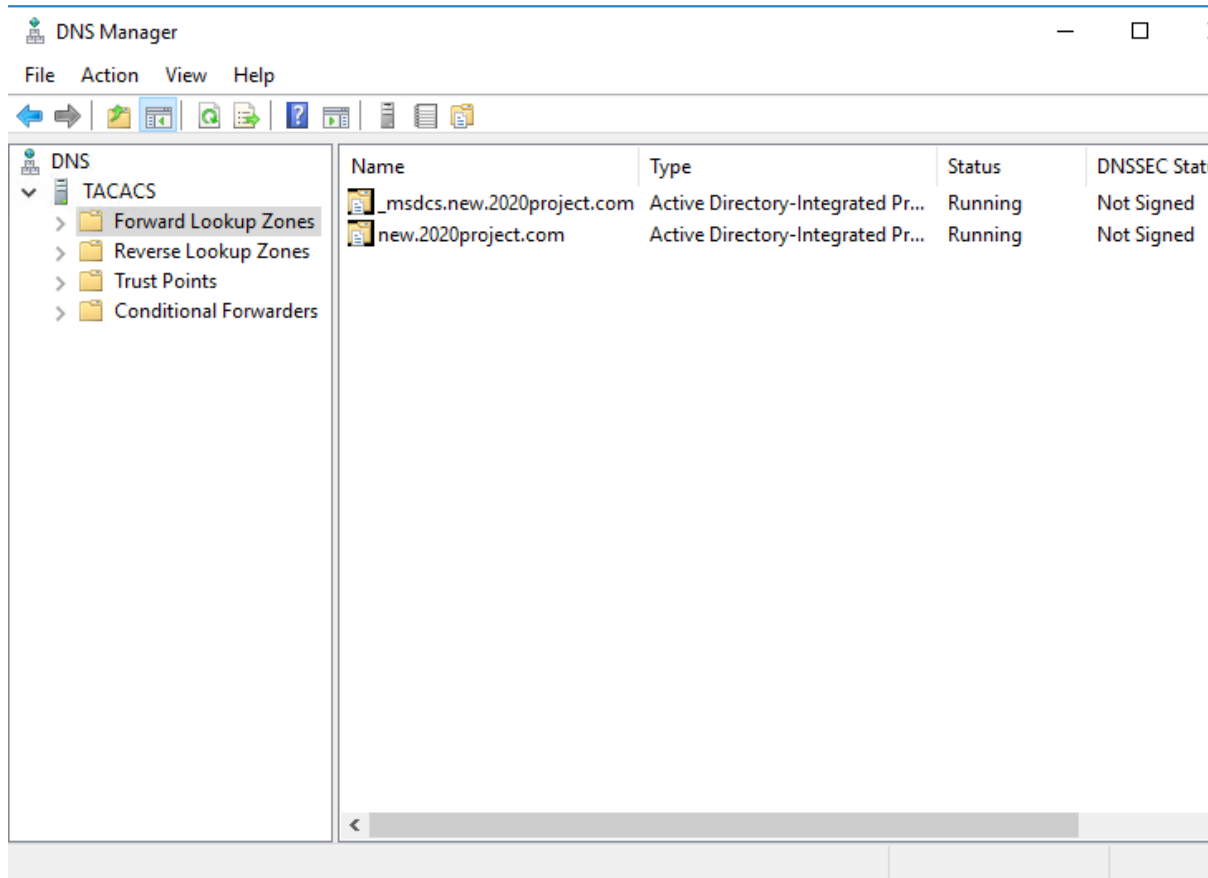
- This will also play into the configuration for the servers DNS capabilities
- Once AD has been installed, we can configure all the needed accounts for the domain
 - In specific this will only need to be one main account which will be called ADMIN
 - Password: Passw0rd



- Once the account is made it must be put into these following groups in order to ensure network access with RDP onto any device that has been added to the domain on the network
 - Through this it ensures administrative access to all devices

Installing DNS

- DNS is installed via the Server Manager portal once again



-
- Once installed make sure that the TACACS server is in the forward lookup zones as if it is not it will have issues with domain name resolution

Addressing

- For the server it has 2 NIC cards
- Primary NIC:
 - This NIC is used for connection into our test network for all of the project
 - The address is 10.0.4.5 with a 255.255.255.0 subnet
- Secondary NIC:
 - This NIC is used for connection to the internet in order to download software and receive updates
 - This is connected via DHCP to a local router in my house

```

C:\Users\Administrator>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::bd88:f14b:9271:7e07%2
    IPv4 Address. . . . . : 10.0.4.5
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 10.0.4.1

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : neo.rr.com
    Link-local IPv6 Address . . . . . : fe80::2089:8e83:e695:3271%11
    IPv4 Address. . . . . : 10.30.101.122
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::6238:e0ff:fe0c:1655%11
                                10.30.101.125

Tunnel adapter isatap.neo.rr.com:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : neo.rr.com

Tunnel adapter Teredo Tunneling Pseudo-Interface:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

Tunnel adapter isatap.{0CDD8A2D-C990-4F12-8404-9425899A5FE2}:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

```

○

Routers

- This test network as documented is comprised of 3 routers that are all in the 2800 series from cisco

Naming

- All the routers will follow a simple naming scheme of R1, R2, and R3

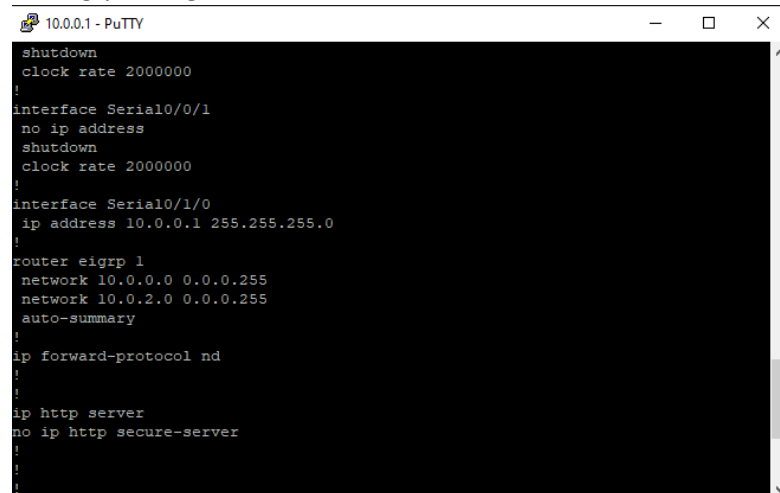
Addressing

- This network will be built of a simple 10.0.0.0 class A address subnetted into Five areas with them turning into /24 address spaces
- 10.0.0.0 R1 -> R2
- 10.0.1.0 R2 -> R3
- 10.0.2.0 R3 -> R1
- 10.0.3.0 Lan of R2

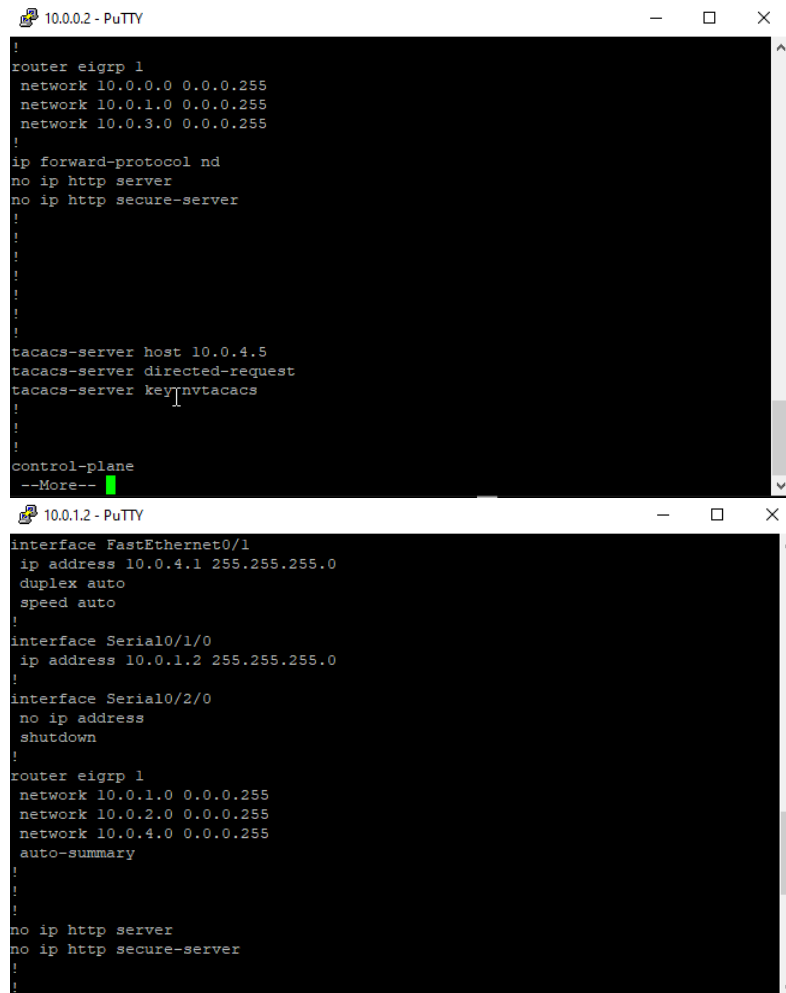
- 10.0.4.0 Lan of R3

Routing – EIGRP

- The routers are configured with eigrp as the routing protocol to allow for connections to all subnets
- The router ID process is EIGRP 1
- All routers will use their respective number as their router ID number inside the eigrp configuration



```
10.0.0.1 - PuTTY
shutdown
clock rate 2000000
!
interface Serial10/0/1
no ip address
shutdown
clock rate 2000000
!
interface Serial10/1/0
ip address 10.0.0.1 255.255.255.0
!
router eigrp 1
network 10.0.0.0 0.0.0.255
network 10.0.2.0 0.0.0.255
auto-summary
!
ip forward-protocol nd
!
!
ip http server
no ip http secure-server
!
!
```



```
10.0.0.2 - PuTTY
!
router eigrp 1
 network 10.0.0.0 0.0.0.255
 network 10.0.1.0 0.0.0.255
 network 10.0.3.0 0.0.0.255
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
!
!
!
tacacs-server host 10.0.4.5
tacacs-server directed-request
tacacs-server key nvtacacs
!
!
!
control-plane
--More--

10.0.1.2 - PuTTY
interface FastEthernet0/1
 ip address 10.0.4.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial10/1/0
 ip address 10.0.1.2 255.255.255.0
!
interface Serial10/2/0
 no ip address
 shutdown
!
router eigrp 1
 network 10.0.1.0 0.0.0.255
 network 10.0.2.0 0.0.0.255
 network 10.0.4.0 0.0.0.255
 auto-summary
!
!
!
!
no ip http server
no ip http secure-server
!
```

AAA configuration

- In order to have remote authentication work AAA needs to be configured properly in the routers

aaa new-model

!

!

aaa authentication login vty group tacacs+ local

aaa authentication login console group tacacs+ local

aaa authorization config-commands

aaa authorization exec default group tacacs+ local

aaa accounting nested

aaa accounting exec default start-stop group tacacs+

aaa accounting commands 1 default start-stop group tacacs+

aaa accounting commands 15 default start-stop group tacacs+

aaa accounting connection default start-stop group tacacs+

no aaa accounting system guarantee-first

- AAA new model command must be used to enable the subset of commands for AAA configuration
- For this AAA configuration first, one must create a name for the feature for this I called it vty
- Then I had to specify that it would TACACS+ as the primary login method with the local username account being the backup
- In addition, another group was created for login authentication to the console if you want to apply it to that line con 0
- Then with this the aaa allows configuration commands to be used by users in these groups
- The groups then get exec command privileges or else they wouldn't be able to access config mode
- The rest of the config has to deal with what privilege level to allow the user to access when they log into the device

TACACS+

- In order to have aaa groups work right they have to be able to talk to some tacacs+ server with the services running on it

tacacs-server host 10.0.4.5

tacacs-server directed-request

tacacs-server key nvtacacs

!

- For this configuration the IOS on the device matters greatly

- Thankfully all my devices were on a older or in the middle IOS where it would take the old commands across all of them
- If they had a newer IOS however, the commands would be to name the TACACS server then to have a subset of commands for configuration
- First you must type in the address of the TACACS server of 10.0.4.5
- Then you must have for the server to directly request that authentication from it
- Lastly the server key must be entered
 - Without this server key the server will not communicate with the router or network equipment

Local Accounts

- On the devices they need to have at least 1 local user account configured
- The reason for this being if for some reason the TACACS+ server goes down then you need to still be able to access the device in emergency
- However, with the config method implemented local account can only be used if this is the case

Switches

Naming

- The 2 switches will be name Switch1 and Switch2
- Switch 1 being off R2
- Switch 2 being off of R3 and connecting TACACS+ server

VLAN

- The switches will have vlans configured in order to allow addressing and ssh access with communication to the TACACS server

AAA

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!

!

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aaa accounting nested

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```

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```
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- However, with the config method implemented local account can only be used if this is the case

Testing

Ping

- All devices on the network are configured to be accessible by any device from any point as the purpose of this project is to test authentication

```
C:\Users\nv454>ping 10.0.0.1
```

Pinging 10.0.0.1 with 32 bytes of data:

```
Reply from 10.0.0.1: bytes=32 time=1ms TTL=254
```

```
Reply from 10.0.0.1: bytes=32 time=1ms TTL=254
```

```
Reply from 10.0.0.1: bytes=32 time=1ms TTL=254
```

```
Reply from 10.0.0.1: bytes=32 time=1ms TTL=254
```

Ping statistics for 10.0.0.1:

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

Approximate round trip times in milli-seconds:

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

C:\Users\nv454>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=2ms TTL=254

Reply from 10.0.0.2: bytes=32 time=2ms TTL=254

Reply from 10.0.0.2: bytes=32 time=2ms TTL=254

Reply from 10.0.0.2: bytes=32 time=2ms TTL=254

Ping statistics for 10.0.0.2:

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

Approximate round trip times in milli-seconds:

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

C:\Users\nv454>ping 10.0.1.1

Pinging 10.0.1.1 with 32 bytes of data:

Reply from 10.0.1.1: bytes=32 time=2ms TTL=254

Reply from 10.0.1.1: bytes=32 time=2ms TTL=254

Reply from 10.0.1.1: bytes=32 time=3ms TTL=254

Reply from 10.0.1.1: bytes=32 time=2ms TTL=254

Ping statistics for 10.0.1.1:

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

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\Users\nv454>ping 10.0.1.2

Pinging 10.0.1.2 with 32 bytes of data:

Reply from 10.0.1.2: bytes=32 time=1ms TTL=255

Reply from 10.0.1.2: bytes=32 time=1ms TTL=255

Reply from 10.0.1.2: bytes=32 time=1ms TTL=255

Reply from 10.0.1.2: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.1.2:

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

Approximate round trip times in milli-seconds:

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

C:\Users\nv454>ping 10.0.2.1

Pinging 10.0.2.1 with 32 bytes of data:

Reply from 10.0.2.1: bytes=32 time=1ms TTL=254

Reply from 10.0.2.1: bytes=32 time=1ms TTL=254

Reply from 10.0.2.1: bytes=32 time=1ms TTL=254

Reply from 10.0.2.1: bytes=32 time=1ms TTL=254

Ping statistics for 10.0.2.1:

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

Approximate round trip times in milli-seconds:

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


```
C:\Users\nv454>ping 10.0.2.2
```

Pinging 10.0.2.2 with 32 bytes of data:

Reply from 10.0.2.2: bytes=32 time=1ms TTL=255

Reply from 10.0.2.2: bytes=32 time=1ms TTL=255

Reply from 10.0.2.2: bytes=32 time=1ms TTL=255

Reply from 10.0.2.2: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.2.2:

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

Approximate round trip times in milli-seconds:

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

```
C:\Users\nv454>ping 10.0.3.1
```

Pinging 10.0.3.1 with 32 bytes of data:

Reply from 10.0.3.1: bytes=32 time=2ms TTL=254

Reply from 10.0.3.1: bytes=32 time=2ms TTL=254

Reply from 10.0.3.1: bytes=32 time=2ms TTL=254

Reply from 10.0.3.1: bytes=32 time=2ms TTL=254

Ping statistics for 10.0.3.1:

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

Approximate round trip times in milli-seconds:

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

```
C:\Users\nv454>ping 10.0.3.2
```

Pinging 10.0.3.2 with 32 bytes of data:

Reply from 10.0.3.2: bytes=32 time=3ms TTL=253

Reply from 10.0.3.2: bytes=32 time=3ms TTL=253

Reply from 10.0.3.2: bytes=32 time=2ms TTL=253

Reply from 10.0.3.2: bytes=32 time=3ms TTL=253

Ping statistics for 10.0.3.2:

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

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\Users\nv454>ping 10.0.4.1

Pinging 10.0.4.1 with 32 bytes of data:

Reply from 10.0.4.1: bytes=32 time=1ms TTL=255

Reply from 10.0.4.1: bytes=32 time=1ms TTL=255

Reply from 10.0.4.1: bytes=32 time=1ms TTL=255

Reply from 10.0.4.1: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.4.1:

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

Approximate round trip times in milli-seconds:

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

C:\Users\nv454>ping 10.0.4.2

Pinging 10.0.4.2 with 32 bytes of data:

Reply from 10.0.4.2: bytes=32 time=13ms TTL=255

Reply from 10.0.4.2: bytes=32 time=21ms TTL=255

Reply from 10.0.4.2: bytes=32 time=1ms TTL=255

Reply from 10.0.4.2: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.4.2:

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

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 21ms, Average = 9ms

C:\Users\nv454>ping 10.0.4.5

Pinging 10.0.4.5 with 32 bytes of data:

Reply from 10.0.4.5: bytes=32 time=1ms TTL=128

Reply from 10.0.4.5: bytes=32 time=1ms TTL=128

Reply from 10.0.4.5: bytes=32 time=1ms TTL=128

Reply from 10.0.4.5: bytes=32 time=1ms TTL=128

Ping statistics for 10.0.4.5:

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

Approximate round trip times in milli-seconds:

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

C:\Users\nv454>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

Media State : Media disconnected

Connection-specific DNS Suffix . : neo.rr.com

Ethernet adapter Ethernet 2:

Connection-specific DNS Suffix . :

Link-local IPv6 Address : fe80::79f3:f9d0:5c95:f75b%3

IPv4 Address. : 192.168.56.1

Subnet Mask : 255.255.255.0

Default Gateway :

Ethernet adapter Ethernet 3:

Connection-specific DNS Suffix . :

Link-local IPv6 Address : fe80::24d4:c93a:d738:270f%13

IPv4 Address. : 10.0.4.6

Subnet Mask : 255.255.255.0

Default Gateway : 10.0.4.1

Wireless LAN adapter Local Area Connection* 2:

Media State : Media disconnected

Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 3:

Media State : Media disconnected

Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:

Media State : Media disconnected

Connection-specific DNS Suffix . : neo.rr.com

Ethernet adapter Bluetooth Network Connection:

Media State : Media disconnected

Connection-specific DNS Suffix . :

TACACS+

- TACACS+ account login for each device

The image displays four separate PuTTY terminal windows, each representing a different network device. Each window shows the process of logging in using a TACACS+ account. The windows are titled '10.0.0.1 - PuTTY', '10.0.0.2 - PuTTY', '10.0.1.2 - PuTTY', and '10.0.3.2 - PuTTY'. The first three windows are for routers R1, R2, and R3, while the fourth is for a switch named Switch1. In each terminal, the user enters 'en' to enter enable mode, followed by the username 'admin' and the password. The output shows the successful login for each device, with the prompt changing from '>' to '#'. The terminal windows are stacked vertically, showing the sequence of logins.

```
10.0.0.1 - PuTTY
Using username "admin".
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server

R1>en
Password:
R1#
```

```
10.0.0.2 - PuTTY
login as: admin
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server

R2>en
Password:
R2#
```

```
10.0.1.2 - PuTTY
login as: admin
admin@10.0.1.2's password:

R3>en
Password:
R3#
```

```
10.0.3.2 - PuTTY
login as: admin
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server

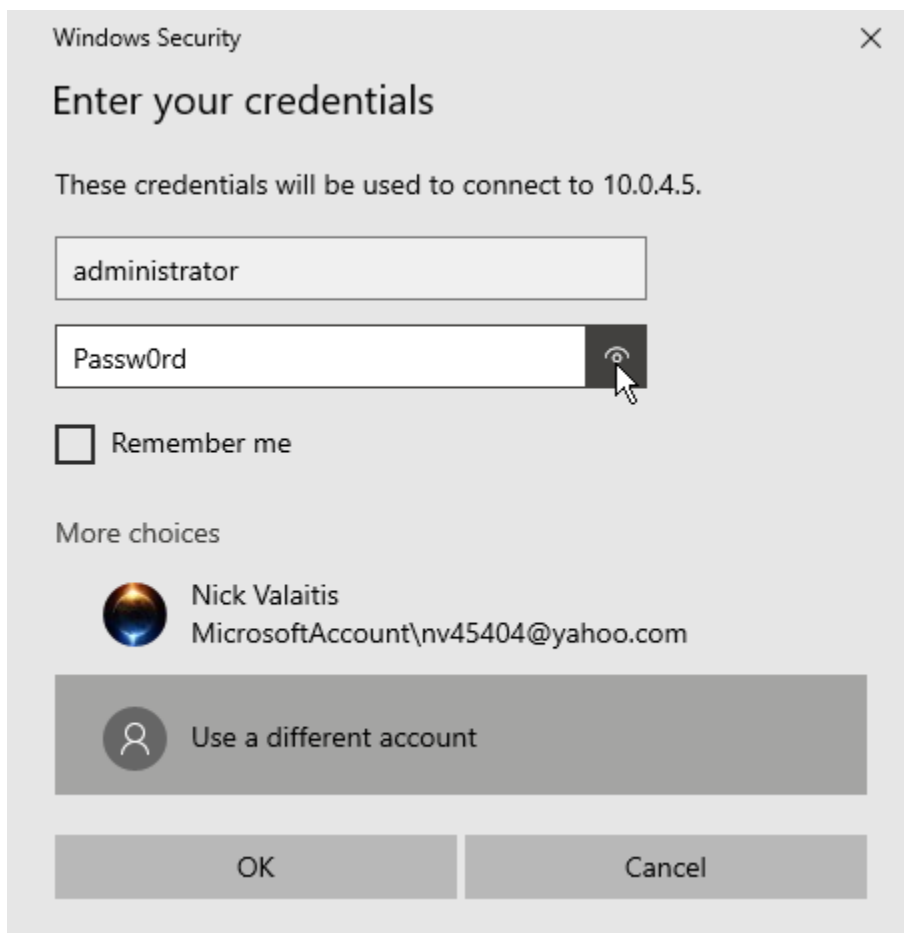
Switch1>en
Password:
Switch1#
```

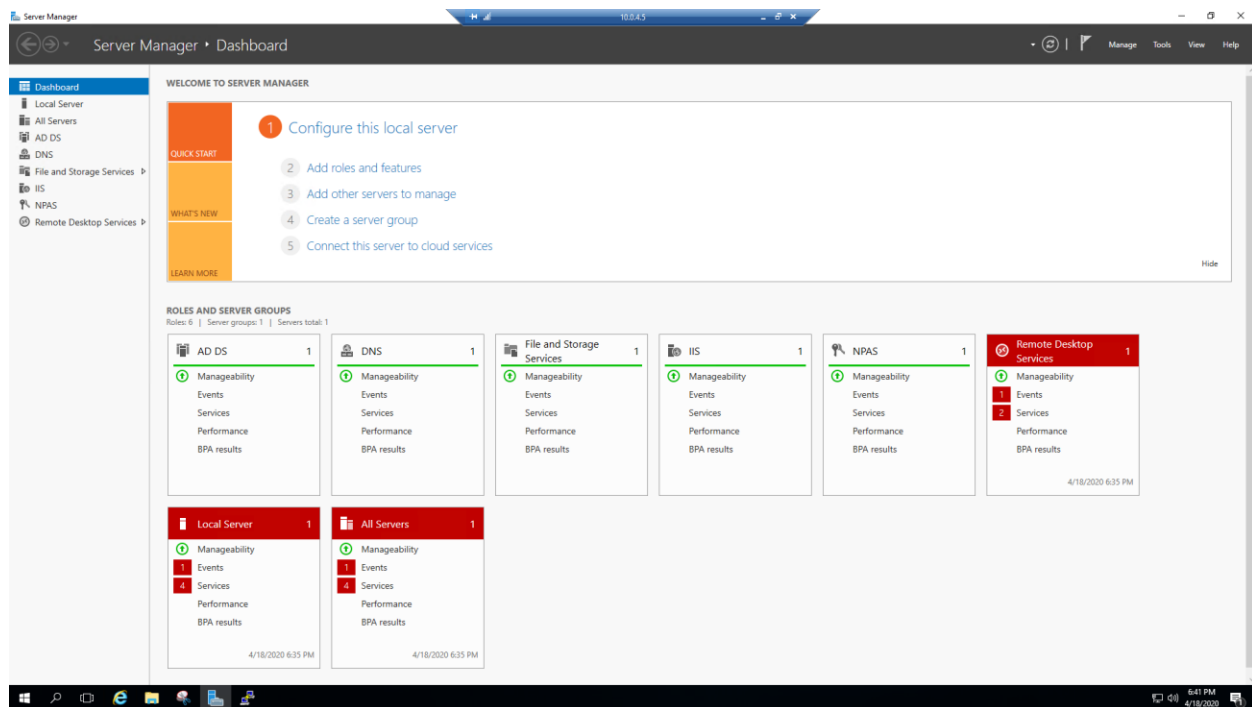
```
10.0.4.2 - PuTTY
login as: admin
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server

Switch2>en
Password:
Switch2#
```

RDP

- Remote desktop is use from remote server management to the TACACS server





Device base config outputs

R1

- R1#show running-config full
- Building configuration...
-
- Current configuration : 1896 bytes
- !
- ! Last configuration change at 18:27:30 UTC Sat Apr 18 2020
- ! NVRAM config last updated at 18:27:37 UTC Sat Apr 18 2020
- !
- version 12.4
- service timestamps debug datetime msec
- service timestamps log datetime msec
- no service password-encryption
- !
- hostname R1
- !
- boot-start-marker
- boot-end-marker
- !
- enable password password
- !
- aaa new-model
- !

- ☐ !
- ☐ aaa authentication login vty group tacacs+ local
- ☐ aaa authentication login console group tacacs+ local
- ☐ aaa authorization config-commands
- ☐ aaa authorization exec default group tacacs+ local
- ☐ aaa accounting nested
- ☐ aaa accounting exec default start-stop group tacacs+
- ☐ aaa accounting commands 1 default start-stop group tacacs+
- ☐ aaa accounting commands 15 default start-stop group tacacs+
- ☐ aaa accounting connection default start-stop group tacacs+
- ☐ no aaa accounting system guarantee-first
- ☐ !
- ☐ aaa session-id common
- ☐ !
- ☐ !
- ☐ ip cef
- ☐ !
- ☐ !
- ☐ ip domain name new.2020project.com
- ☐ ip auth-proxy max-nodata-conns 3
- ☐ ip admission max-nodata-conns 3
- ☐ !
- ☐ !
- ☐ voice-card 0
- ☐ no dspfarm
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ !
- ☐ username local password 0 password
- ☐ !
- ☐ !
- ☐ ip ssh version 2
- ☐ !

- !
- !
- !
- !
- interface GigabitEthernet0/0
- ip address 10.0.2.1 255.255.255.0
- duplex auto
- speed auto
- !
- interface GigabitEthernet0/1
- no ip address
- shutdown
- duplex auto
- speed auto
- !
- interface Serial0/0/0
- no ip address
- shutdown
- clock rate 2000000
- !
- interface Serial0/0/1
- no ip address
- shutdown
- clock rate 2000000
- !
- interface Serial0/1/0
- ip address 10.0.0.1 255.255.255.0
- !
- router eigrp 1
- network 10.0.0.0 0.0.0.255
- network 10.0.2.0 0.0.0.255
- auto-summary
- !
- ip forward-protocol nd
- !
- !
- ip http server
- no ip http secure-server
- !
- !
- !
- tacacs-server host 10.0.4.5
- tacacs-server directed-request
- tacacs-server key nvtacacs

- !
- control-plane
- !
- !
- !
- !
- mgcp behavior g729-variants static-pt
- !
- !
- !
- !
- !
- !
- line con 0
- line aux 0
- line vty 0 4
- login authentication vty
- transport input ssh
- !
- scheduler allocate 20000 1000
- !
- end

R2

- R2#show run all
- Building configuration...
-
- Current configuration with default configurations exposed : 34436 bytes
- !
- ! Last configuration change at 22:50:45 UTC Sat Apr 18 2020
- version 15.1
- parser cache
- parser config partition
- parser command serializer
- downward-compatible-config 15.1
- no service log backtrace
- no service config
- no service exec-callback
- no service nagle
- service slave-log
- no service slave-coredump
- no service pad to-xot
- no service pad from-xot
- no service pad cmns
- service pad

- no service telnet-zeroidle
- no service tcp-keepalives-in
- no service tcp-keepalives-out
- service timestamps debug datetime msec
- service timestamps log datetime msec
- no service password-encryption
- no service exec-wait
- no service linenumbers
- no service internal
- no service scripting
- no service compress-config
- service prompt config
- no service old-slip-prompts
- no service pt-vty-logging
- no service disable-ip-fast-frag
- no service sequence-numbers
- no service call-home
- service dhcp
- !
- hostname R2
- !
- boot-start-marker
- boot-end-marker
- !
- shell processing
- !
- no logging discriminator
- logging exception 4096
- no logging count
- no logging message-counter log
- no logging message-counter debug
- logging message-counter syslog
- no logging snmp-authfail
- no logging userinfo
- logging buginf
- logging queue-limit 100
- logging queue-limit esm 0
- logging queue-limit trap 100
- logging buffered 0 debugging
- logging reload message-limit 1000 notifications
- no logging persistent
- logging rate-limit console 10 except errors
- logging console guaranteed
- logging console debugging

- logging monitor debugging
- logging cns-events informational
- logging on
- enable password password
- !
- autoupgrade disk-cleanup crashinfo
- autoupgrade disk-cleanup core
- autoupgrade disk-cleanup image
- ipc holdq threshold upper 0
- ipc holdq threshold lower 0
- ipc header-cache permanent 1000 100
- ipc buffers max-free 8
- ipc buffers min-free 1
- ipc buffers permanent 2
- aaa new-model
- !
- !
- aaa authentication attempts login 3
- aaa authentication login vty group tacacs+ local
- aaa authentication login console group tacacs+ local
- aaa authorization config-commands
- aaa authorization exec default group tacacs+ local
- aaa accounting nested
- aaa accounting jitter maximum 300
- aaa accounting exec default start-stop group tacacs+
- aaa accounting commands 1 default start-stop group tacacs+
- aaa accounting commands 15 default start-stop group tacacs+
- aaa accounting connection default start-stop group tacacs+
- no aaa accounting system guarantee-first
- !
- port 1645
- !
- !
- !
- port 1700
- !
- aaa session-id common
- aaa memory threshold authentication reject 3
- aaa memory threshold accounting disable 2
- ethernet cfm ieee
- ethernet cfm alarm notification mac-remote-error-xcon
- ethernet cfm alarm delay 2500
- ethernet cfm alarm reset 10000
- ppp hold-queue 2800

- !
- process cpu extended history 12
- process cpu autoprofile hog
- cef table consistency-check IPv4 type scan-rib-ios count 1000 period 60
- cef table consistency-check IPv4 type scan-ios-rib count 1000 period 60
- no cef table consistency-check IPv4 data-checking
- no cef table consistency-check IPv4 error-message
- cef table consistency-check IPv4 auto-repair delay 10 holddown 300
- cef table vrf tree IPv4 type MTRIE short-mask-protection 4 stride-pattern 8-8-8-8 hardware-api-notify off
- cef table output-chain build favor default
- cef table rate-monitor-period 5
- errdisable detect cause all
- errdisable recovery interval 300
- network-clock-switch 10 10
- !
- dot11 syslog
- dot11 activity-timeout unknown default 60
- dot11 activity-timeout client default 60
- dot11 activity-timeout repeater default 60
- dot11 activity-timeout workgroup-bridge default 60
- dot11 activity-timeout bridge default 60
- dot11 aaa csid default
- call-home
- alert-group configuration
- alert-group environment
- alert-group inventory
- alert-group syslog
- rate-limit 20
- profile "CiscoTAC-1"
- no active
- destination preferred-msg-format xml
- destination message-size-limit 3145728
- no destination transport-method http
- destination transport-method email
- destination address email callhome@cisco.com
- destination address http
- <https://tools.cisco.com/its/service/oddce/services/DDCEService>
- subscribe-to-alert-group environment severity minor
- subscribe-to-alert-group syslog severity major pattern ".*"
- subscribe-to-alert-group configuration periodic monthly 6 14:32
- subscribe-to-alert-group inventory periodic monthly 6 14:17
- prompt config hostname-length 20
- ip subnet-zero

- ip source-route
- ip routing protocol purge interface
- ip arp queue 512
- ip icmp redirect subnet
- ip spd queue threshold minimum 73 maximum 74
- ip verify drop-rate compute window 300
- ip verify drop-rate compute interval 30
- ip verify drop-rate notify hold-down 300
- !
- !
- no ip nbar bypass
- ip nbar resources system 30 4292 128
- ip nbar port-map edonkey tcp 4662
- ip nbar port-map kazaa2 tcp 80
- ip nbar port-map gnutella udp 6346 6347 6348
- ip nbar port-map gnutella tcp 6346 6347 6348 6349 6355 5634
- ip nbar port-map fasttrack tcp 1214
- ip nbar port-map citrix udp 1604
- ip nbar port-map citrix tcp 2598 2512 2513 1494
- ip nbar port-map http tcp 80
- ip nbar port-map sap tcp 3200 3300 3600
- ip nbar port-map telepresence-control tcp 5060
- ip nbar port-map microsoftds udp 445
- ip nbar port-map microsoftds tcp 445
- ip nbar port-map blizwow udp 3724
- ip nbar port-map blizwow tcp 3724
- ip nbar port-map youtube tcp 80
- ip nbar port-map cisco-phone udp 5060
- ip nbar port-map cisco-phone tcp 2000 2001 2002 5060
- ip nbar port-map cifs tcp 445 139
- ip nbar port-map aol-messenger tcp 5190 1080 443
- ip nbar port-map yahoo-messenger tcp 80 119 1080 5050 5101
- ip nbar port-map msn-messenger tcp 80 1863 1080
- ip nbar port-map dns udp 53
- ip nbar port-map dns tcp 53
- ip nbar port-map smtp tcp 25 587
- ip nbar port-map directconnect tcp 411 412 413
- ip nbar port-map bittorrent udp 3724
- ip nbar port-map bittorrent tcp 3724 1080 6969 6881 6882 6883 6884 6885 6886 6887 6888 6889
- ip nbar port-map winmx tcp 6699
- ip nbar port-map sip udp 5060
- ip nbar port-map sip tcp 5060
- ip nbar port-map h323 udp 1300 1718 1719 1720 11720

- ip nbar port-map h323 tcp 1300 1718 1719 1720 11000 - 11999
- ip nbar port-map skinny tcp 2000 2001 2002
- ip nbar port-map mgcp udp 2427 2727
- ip nbar port-map mgcp tcp 2427 2428 2727
- ip nbar port-map rtsp tcp 554 8554
- ip nbar port-map custom-10 udp
- ip nbar port-map custom-10 tcp
- ip nbar port-map custom-09 udp
- ip nbar port-map custom-09 tcp
- ip nbar port-map custom-08 udp
- ip nbar port-map custom-08 tcp
- ip nbar port-map custom-07 udp
- ip nbar port-map custom-07 tcp
- ip nbar port-map custom-06 udp
- ip nbar port-map custom-06 tcp
- ip nbar port-map custom-05 udp
- ip nbar port-map custom-05 tcp
- ip nbar port-map custom-04 udp
- ip nbar port-map custom-04 tcp
- ip nbar port-map custom-03 udp
- ip nbar port-map custom-03 tcp
- ip nbar port-map custom-02 udp
- ip nbar port-map custom-02 tcp
- ip nbar port-map custom-01 udp
- ip nbar port-map custom-01 tcp
- ip nbar port-map streamwork udp 1558
- ip nbar port-map sunrpc udp 111
- ip nbar port-map sunrpc tcp 111
- ip nbar port-map netshow tcp 1755
- ip nbar port-map rcmd tcp 512 513 514
- ip nbar port-map sqlnet tcp 1521
- ip nbar port-map vdolive tcp 7000
- ip nbar port-map exchange tcp 135
- ip nbar port-map tftp udp 69
- ip nbar port-map nntp udp 119
- ip nbar port-map nntp tcp 119
- ip nbar port-map socks tcp 1080
- ip nbar port-map netbios udp 137 138
- ip nbar port-map netbios tcp 139 137
- ip nbar port-map secure-http tcp 443
- ip nbar port-map submit tcp 773
- ip nbar port-map tacacs udp 49 65
- ip nbar port-map tacacs tcp 49 65
- ip nbar port-map corba-iiop udp 683 684

- ip nbar port-map corba-iiop tcp 683 684
- ip nbar port-map vnc udp 5800 5900 5901
- ip nbar port-map vnc tcp 5800 5900 5901
- ip nbar port-map novadigm udp 3460 3461 3462 3463 3464 3465
- ip nbar port-map novadigm tcp 3460 3461 3462 3463 3464 3465
- ip nbar port-map xwindows tcp 6000 6001 6002 6003
- ip nbar port-map shell tcp 514
- ip nbar port-map syslog udp 514
- ip nbar port-map snmp udp 161 162
- ip nbar port-map snmp tcp 161 162
- ip nbar port-map rsvp udp 1698 1699
- ip nbar port-map pcanywhere udp 22 5632
- ip nbar port-map pcanywhere tcp 65301 5631
- ip nbar port-map kerberos udp 88 749
- ip nbar port-map kerberos tcp 88 749
- ip nbar port-map secure-imap udp 585 993
- ip nbar port-map secure-imap tcp 585 993
- ip nbar port-map imap udp 143 220
- ip nbar port-map imap tcp 143 220
- ip nbar port-map dhcp udp 67 68
- ip nbar port-map cuseeme udp 7648 7649 24032
- ip nbar port-map cuseeme tcp 7648 7649
- ip nbar port-map ftp tcp 21
- ip cef optimize neighbor resolution
- ip cef
- no ip cef accounting
- ip cef load-sharing algorithm universal 505B79A2
- ip dhcp relay information policy replace
- ip dhcp relay information check
- ip dhcp use class
- ip dhcp use vrf connected
- ip dhcp binding cleanup interval 120
- ip dhcp compatibility suboption link-selection cisco
- ip dhcp conflict logging
- ip dhcp ping packets 2
- ip dhcp ping timeout 500
- !
- !
- !
- no ip sctp asconf auto
- ip sctp asconf authenticate check
- no ip sctp authenticate data
- no ip sctp authenticate init
- no ip sctp authenticate init-ack

- no ip sctp authenticate sack
- no ip sctp authenticate heartbeat
- no ip sctp authenticate heartbeat-ack
- no ip sctp authenticate abort
- no ip sctp authenticate shutdown
- no ip sctp authenticate shutdown-ack
- no ip sctp authenticate error
- no ip sctp authenticate cookie-echo
- no ip sctp authenticate cookie-ack
- no ip sctp authenticate ecne
- no ip sctp authenticate cwr
- no ip sctp authenticate shutdown-complete
- no ip sctp authenticate authentication
- no ip sctp authenticate 16
- no ip sctp authenticate 17
- no ip sctp authenticate 18
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- no ip sctp authenticate 67
- no ip sctp authenticate 68
- no ip sctp authenticate 69
- no ip sctp authenticate 70
- no ip sctp authenticate 71
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- no ip sctp authenticate 87
- no ip sctp authenticate 88
- no ip sctp authenticate 89
- no ip sctp authenticate 90

- no ip sctp authenticate 91
- no ip sctp authenticate 92
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- no ip sctp authenticate 123
- no ip sctp authenticate 124
- no ip sctp authenticate 125
- no ip sctp authenticate 126
- no ip sctp authenticate 127
- no ip sctp authenticate packet-drop
- no ip sctp authenticate stream-reset
- no ip sctp authenticate 131
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- no ip sctp authenticate 133
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- no ip sctp authenticate 137
- no ip sctp authenticate 138
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- no ip sctp authenticate 190
- no ip sctp authenticate 191
- no ip sctp authenticate fwd-tsn
- no ip sctp authenticate 194
- no ip sctp authenticate 195
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- no ip sctp authenticate 251
- no ip sctp authenticate 252
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- no ip sctp authenticate 255
- ip flow-cache entries 4096
- ip flow-cache timeout inactive 15
- ip flow-cache timeout active 30
- ip bootp server
- ip domain name new.2020project.com
- ip sap cache-timeout 1440
- ip multicast route-limit 2147483647
- ip mfib
- ip pgm host ttl 255
- ip pgm host stream-type apdu
- ip pgm host nak-gen-ivl 60000
- ip pgm host nak-rb-ivl 500
- ip pgm host nak-rpt-ivl 2000
- ip pgm host nak-rdata-ivl 2000

- ip pgm host rx-buffer-mgmt minimum
- ip pgm host tpdu-size 1400
- ip pgm host ihb-min 1000
- ip pgm host ihb-max 10000
- ip pgm host join 0
- ip pgm host spm-ambient-ivl 6000
- ip pgm host txw-adv-secs 6000
- ip pgm host txw-adv-timeout-max 3600000
- ip pgm host txw-rte 16384
- ip pgm host txw-secs 30000
- ip pgm host ncf-max 4294967295
- ip pgm host spm-rpt-ivl 3000
- ip pgm host tx-buffer-mgmt return
- ip pgm host txw-adv-method time
- ip pgm router elimination-interval 2
- ip ips memory threshold 14
- ip dhcp-server query lease retries 2
- ip dhcp-server query lease timeout 10
- ip dhcp-client broadcast-flag
- ip dhcp-client default-router distance 254
- ip igmp snooping vlan 1
- ip igmp snooping vlan 1 mrouter learn pim-dvmrp
- ip igmp snooping
- ip igmp ssm-map query dns
- kerberos timeout 15
- kerberos retry 4
- kerberos processes 1
- ntp max-associations 100
- !
- multilink virtual-template 0
- multilink bundle-name authenticated
- !
- cwmp agent
- no enable download
- no enable
- request outstanding 5
- parameter change notify interval 60
- session retry limit 11
- management server username 00000C-CISCO2811V04-FTX1101A27F
- no management server password
- no management server url
- no provision code
- no connection request username
- no connection request password

- no wan ipaddress
- !
- parameter-map type inspect default
- audit-trail off
- alert on
- sessions maximum 2147483647
- max-incomplete low 2147483647
- max-incomplete high 2147483647
- one-minute low 2147483647
- one-minute high 2147483647
- udp idle-time 30
- icmp idle-time 10
- dns-timeout 5
- tcp idle-time 3600
- tcp finwait-time 5
- tcp synwait-time 30
- tcp max-incomplete host 4294967295 block-time 0
-
- parameter-map type ooo global
- tcp reassembly timeout 5
- tcp reassembly queue length 16
- tcp reassembly memory limit 1024
- isis display delimiter return 1
- frame-relay address registration auto-address
- mls qos map cos-dscp 0 8 16 26 32 46 48 56
- !
- no virtual-template subinterface
- no virtual-template snmp
- crypto pki token default removal timeout 0
- !
- !
- no snap notification exclude service acl
- no snap notification exclude service eem
- no snap notification exclude service snapt
- !
- !
- port-channel load-balance src-dst-ip
- license udi pid CISCO2811 sn FTX1101A27F
- license agent max-sessions 9
-
- license agent default authenticate
- license call-home url <https://tools.cisco.com/SWIFT/Licensing>
- memory check-interval 60
- memory statistics history table 24

- memory validate-checksum 60
- memory lite
- memory reserve console 0
- memory chunk siblings threshold 10000
- file prompt alert
- emm clear 1b5b324a1b5b303b30480d
- vtp file flash:vlan.dat
- vtp mode server
- vtp version 1
- username local privilege 15 password 0 password
- !
- redundancy
- no maintenance-mode
- scripting tcl low-memory 33553121
- scripting tcl trustpoint untrusted terminate
- no scripting tcl secure-mode
- !
- process-max-time 200
- !
- no ip finger
- no ip tcp ecn
- no ip tcp selective-ack
- no ip tcp timestamp
- ip tcp delayed-ack
- ip tcp chunk-size 0
- ip tcp mss 0
- ip tcp window-size 4128
- ip tcp queuemax 20
- ip tcp synwait-time 30
- no ip tcp path-mtu-discovery
- no ip tcp async-mobility server
- ip tcp RST-count 10 RST-window 5000
- ip telnet tos C0
- ip telnet timeout retransmit 0
- no ip telnet quiet
- no ip telnet hidden hostnames
- no ip telnet hidden addresses
- ip telnet comports enable
- ip telnet comports flow level 16
- ip telnet comports receive window 4128
- ip telnet comports disconnect delay 0
- ip ftp passive
- ip tftp min-timeout 3000
- no ip tftp claim-netascii

- ip ssh time-out 120
- ip ssh authentication-retries 3
- ip ssh break-string ~break
- ip ssh version 2
- ip ssh dh min size 1024
- ip rcmd domain-lookup
- !
- crypto engine software ipsec
- crypto ctcp keepalive 5
- crypto isakmp aggressive-mode disable
- crypto ipsec optional retry 300
- !
- crypto ipsec security-association lifetime kilobytes 4608000
- crypto ipsec security-association lifetime seconds 3600
- no crypto ipsec security-association replay disable
- crypto ipsec security-association replay window-size 64
- !
- crypto ipsec default transform-set
- crypto ipsec nat-transparency udp-encapsulation
- !
- crypto call admission limit ike sa 0
- crypto call admission limit ike in-negotiation-sa 1000
- crypto call admission limit ipsec sa 0
- crypto mib ipsec flowmib history tunnel size 200
- crypto mib ipsec flowmib history failure size 200
- buffers element permanent 500
- buffers element minimum 100
- buffers header permanent 768
- buffers header max-free 1024
- buffers header min-free 128
- buffers header initial 0
- buffers fastswitching permanent 768
- buffers fastswitching max-free 1024
- buffers fastswitching min-free 128
- buffers fastswitching initial 0
- buffers small permanent 50
- buffers small max-free 150
- buffers small min-free 20
- buffers small initial 0
- buffers middle permanent 25
- buffers middle max-free 150
- buffers middle min-free 10
- buffers middle initial 0
- buffers big permanent 50

- buffers big max-free 150
- buffers big min-free 5
- buffers big initial 0
- buffers verybig permanent 10
- buffers verybig max-free 100
- buffers verybig min-free 0
- buffers verybig initial 0
- buffers large permanent 0
- buffers large max-free 10
- buffers large min-free 0
- buffers large initial 0
- buffers huge permanent 0
- buffers huge max-free 4
- buffers huge min-free 0
- buffers huge size 18024
- buffers huge initial 0
- no buffers tune automatic
- buffers FastEthernet0/0 permanent 384
- buffers FastEthernet0/0 max-free 384
- buffers FastEthernet0/0 min-free 0
- buffers FastEthernet0/0 initial 0
- buffers FastEthernet0/1 permanent 384
- buffers FastEthernet0/1 max-free 384
- buffers FastEthernet0/1 min-free 0
- buffers FastEthernet0/1 initial 0
- buffers Serial0/0/0 permanent 64
- buffers Serial0/0/0 max-free 64
- buffers Serial0/0/0 min-free 0
- buffers Serial0/0/0 initial 0
- buffers Serial0/1/0 permanent 64
- buffers Serial0/1/0 max-free 64
- buffers Serial0/1/0 min-free 0
- buffers Serial0/1/0 initial 0
- buffers Serial0/2/0 permanent 64
- buffers Serial0/2/0 max-free 64
- buffers Serial0/2/0 min-free 0
- buffers Serial0/2/0 initial 0
- buffers Serial0/2/1 permanent 64
- buffers Serial0/2/1 max-free 64
- buffers Serial0/2/1 min-free 0
- buffers Serial0/2/1 initial 0
- !
- !
- !

- !
- interface FastEthernet0/0
- mtu 1500
- ip address 10.0.3.1 255.255.255.0
- ip redirects
- ip proxy-arp
- ip load-sharing per-destination
- ip cef accounting non-recursive internal
- ip pim dr-priority 1
- ip pim query-interval 30
- ip mfib forwarding input
- ip mfib forwarding output
- ip mfib cef input
- ip mfib cef output
- ip route-cache cef
- ip split-horizon
- ip igmp last-member-query-interval 1000
- ip igmp last-member-query-count 2
- ip igmp query-max-response-time 10
- ip igmp version 2
- ip igmp query-interval 60
- ip igmp tcn query count 2
- ip igmp tcn query interval 10
- load-interval 300
- duplex auto
- speed auto
- dot1q tunneling ethertype 0x8100
- snmp trap link-status
- max-reserved-bandwidth 75
- hold-queue 75 in
- hold-queue 0 out
- no bgp-policy accounting input
- no bgp-policy accounting output
- no bgp-policy accounting input source
- no bgp-policy accounting output source
- no bgp-policy source ip-prec-map
- no bgp-policy source ip-qos-map
- no bgp-policy destination ip-prec-map
- no bgp-policy destination ip-qos-map
- !
- interface FastEthernet0/1
- mtu 1500
- no ip address
- ip redirects

- ip proxy-arp
- ip load-sharing per-destination
- ip cef accounting non-recursive internal
- ip pim dr-priority 1
- ip pim query-interval 30
- ip mfib forwarding input
- ip mfib forwarding output
- ip mfib cef input
- ip mfib cef output
- ip route-cache cef
- ip split-horizon
- ip igmp last-member-query-interval 1000
- ip igmp last-member-query-count 2
- ip igmp query-max-response-time 10
- ip igmp version 2
- ip igmp query-interval 60
- ip igmp tcn query count 2
- ip igmp tcn query interval 10
- load-interval 300
- shutdown
- duplex auto
- speed auto
- dot1q tunneling ethertype 0x8100
- snmp trap link-status
- max-reserved-bandwidth 75
- hold-queue 75 in
- hold-queue 0 out
- no bgp-policy accounting input
- no bgp-policy accounting output
- no bgp-policy accounting input source
- no bgp-policy accounting output source
- no bgp-policy source ip-prec-map
- no bgp-policy source ip-qos-map
- no bgp-policy destination ip-prec-map
- no bgp-policy destination ip-qos-map
- !
- interface Serial0/0/0
- mtu 1500
- ip address 10.0.0.2 255.255.255.0
- ip redirects
- ip proxy-arp
- ip load-sharing per-destination
- ip cef accounting non-recursive internal
- ip pim dr-priority 1

- ip pim query-interval 30
- ip mfib forwarding input
- ip mfib forwarding output
- ip mfib cef input
- ip mfib cef output
- ip route-cache cef
- ip split-horizon
- ip igmp last-member-query-interval 1000
- ip igmp last-member-query-count 2
- ip igmp query-max-response-time 10
- ip igmp version 2
- ip igmp query-interval 60
- ip igmp tcn query count 2
- ip igmp tcn query interval 10
- load-interval 300
- dot1q tunneling ethertype 0x8100
- snmp trap link-status
- service-module t1 clock source line
- service-module t1 data-coding normal
- service-module t1 remote-loopback full
- service-module t1 remote-loopback fdl
- service-module t1 framing esf
- service-module t1 linecode b8zs
- service-module t1 lbo none
- service-module t1 timeslots all speed 64
- transmitter-delay 0
- max-reserved-bandwidth 75
- hold-queue 75 in
- hold-queue 0 out
- no bgp-policy accounting input
- no bgp-policy accounting output
- no bgp-policy accounting input source
- no bgp-policy accounting output source
- no bgp-policy source ip-prec-map
- no bgp-policy source ip-qos-map
- no bgp-policy destination ip-prec-map
- no bgp-policy destination ip-qos-map
- !
- interface Serial0/1/0
- mtu 1500
- ip address 10.0.1.1 255.255.255.0
- ip redirects
- ip proxy-arp
- ip load-sharing per-destination

- ip cef accounting non-recursive internal
- ip pim dr-priority 1
- ip pim query-interval 30
- ip mfib forwarding input
- ip mfib forwarding output
- ip mfib cef input
- ip mfib cef output
- ip route-cache cef
- ip split-horizon
- ip igmp last-member-query-interval 1000
- ip igmp last-member-query-count 2
- ip igmp query-max-response-time 10
- ip igmp version 2
- ip igmp query-interval 60
- ip igmp tcn query count 2
- ip igmp tcn query interval 10
- load-interval 300
- dot1q tunneling ethertype 0x8100
- snmp trap link-status
- service-module t1 clock source line
- service-module t1 data-coding normal
- service-module t1 remote-loopback full
- service-module t1 remote-loopback fdl
- service-module t1 framing esf
- service-module t1 linecode b8zs
- service-module t1 lbo none
- service-module t1 timeslots all speed 64
- transmitter-delay 0
- max-reserved-bandwidth 75
- hold-queue 75 in
- hold-queue 0 out
- no bgp-policy accounting input
- no bgp-policy accounting output
- no bgp-policy accounting input source
- no bgp-policy accounting output source
- no bgp-policy source ip-prec-map
- no bgp-policy source ip-qos-map
- no bgp-policy destination ip-prec-map
- no bgp-policy destination ip-qos-map
- !
- interface Serial0/2/0
- mtu 1500
- no ip address
- ip redirects

- ip proxy-arp
- ip load-sharing per-destination
- ip cef accounting non-recursive internal
- ip pim dr-priority 1
- ip pim query-interval 30
- ip mfib forwarding input
- ip mfib forwarding output
- ip mfib cef input
- ip mfib cef output
- ip route-cache cef
- ip split-horizon
- ip igmp last-member-query-interval 1000
- ip igmp last-member-query-count 2
- ip igmp query-max-response-time 10
- ip igmp version 2
- ip igmp query-interval 60
- ip igmp tcn query count 2
- ip igmp tcn query interval 10
- load-interval 300
- shutdown
- dot1q tunneling ethertype 0x8100
- snmp trap link-status
- clock rate 2000000
- transmitter-delay 0
- max-reserved-bandwidth 75
- hold-queue 75 in
- hold-queue 0 out
- no bgp-policy accounting input
- no bgp-policy accounting output
- no bgp-policy accounting input source
- no bgp-policy accounting output source
- no bgp-policy source ip-prec-map
- no bgp-policy source ip-qos-map
- no bgp-policy destination ip-prec-map
- no bgp-policy destination ip-qos-map
- !
- interface Serial0/2/1
- mtu 1500
- no ip address
- ip redirects
- ip proxy-arp
- ip load-sharing per-destination
- ip cef accounting non-recursive internal
- ip pim dr-priority 1

- ip pim query-interval 30
- ip mfib forwarding input
- ip mfib forwarding output
- ip mfib cef input
- ip mfib cef output
- ip route-cache cef
- ip split-horizon
- ip igmp last-member-query-interval 1000
- ip igmp last-member-query-count 2
- ip igmp query-max-response-time 10
- ip igmp version 2
- ip igmp query-interval 60
- ip igmp tcn query count 2
- ip igmp tcn query interval 10
- load-interval 300
- shutdown
- dot1q tunneling ethertype 0x8100
- snmp trap link-status
- clock rate 2000000
- transmitter-delay 0
- max-reserved-bandwidth 75
- hold-queue 75 in
- hold-queue 0 out
- no bgp-policy accounting input
- no bgp-policy accounting output
- no bgp-policy accounting input source
- no bgp-policy accounting output source
- no bgp-policy source ip-prec-map
- no bgp-policy source ip-qos-map
- no bgp-policy destination ip-prec-map
- no bgp-policy destination ip-qos-map
- !
- !
- router eigrp 1
- network 10.0.0.0 0.0.0.255
- network 10.0.1.0 0.0.0.255
- network 10.0.3.0 0.0.0.255
- !
- ip classless
- ip forward-protocol nd
- no ip http server
- ip http port 80
- ip http authentication enable
- no ip http secure-server

- ip http secure-port 443
- ip http secure-active-session-modules all
- ip http max-connections 5
- ip http timeout-policy idle 180 life 180 requests 1
- ip http active-session-modules all
- ip http digest algorithm md5
- ip http client cache memory pool 100
- ip http client cache memory file 2
- ip http client cache age interval 5
- ip http client connection timeout 10
- ip http client connection retry 1
- ip http client connection pipeline-length 5
- ip http client connection idle timeout 30
- ip http client response timeout 30
- ip http path
- !
- !
- ip pim dm-fallback
- ip pim autorp
- ip pim bidir-offer-interval 100 msec
- ip pim bidir-offer-limit 3
- ip pim v1-rp-reachability
- ip pim log-neighbor-changes
- ip msdp timer 30
- ip rtcp report interval 5000
- ip rtcp sub-rtcp message-type 209
- ip route static adjust-time 60
- ip route static inter-vrf
- ip rsvp policy cops timeout 300
- ip rsvp authentication type md5
- ip rsvp pq-profile 12288 592 110
- ip rsvp signalling initial-retransmit-delay 1000
- ip rsvp signalling refresh reduction ack-delay 250
- ip rsvp signalling refresh interval 30000
- ip rsvp signalling refresh misses 4
- no ip identd
- no ip access-list helper egress check
- !
- ip prefix-list sequence-number
- ip sla responder twamp
- timeout 900
- ip sla low-memory 30894149
- ip sla server twamp
- port 862

- timer inactivity 900
- logging policy-firewall rate-limit 30
- logging history size 1
- logging history warnings
- logging trap informational
- logging delimiter tcp
- no logging origin-id
- logging facility local7
- no logging source-interface
- ethernet cfm mep crosscheck start-delay 30
- mac-address-table aging-time 300
- cdp run
- terminal-queue entry-retry-interval 60
- !
- !
- !
- snmp-server inform retries 3 timeout 15 pending 25
- snmp mib event sample minimum 60
- snmp mib event sample instance maximum 0
- snmp mib expression delta minimum 1
- snmp mib expression delta wildcard maximum 0
- snmp mib nhrp
- snmp mib notification-log globalsize 500
- snmp mib notification-log globalageout 15
- !
- tacacs-server host 10.0.4.5
- tacacs-server timeout 5
- tacacs-server directed-request
- tacacs-server key nvtacacs
- tacacs-server cache expiry 24 enforce hours
- !
- radius-server attribute 77 include-in-acct-req
- radius-server attribute 77 include-in-access-req
- radius-server attribute 11 default direction out
- radius-server attribute nas-port format a
- radius-server attribute 31 mac format default
- radius-server cache expiry 24 enforce hours
- radius-server transaction max-tries 8
- radius-server retransmit 3
- radius-server timeout 5
- radius-server ipc-limit in 10
- radius-server ipc-limit done 10
- !
- !

- control-plane
- !
- !
- vstack join-window mode auto
- alias exec h help
- alias exec lo logout
- alias exec p ping
- alias exec r resume
- alias exec s show
- alias exec u undebug
- alias exec un undebug
- alias exec w where
- no configuration mode exclusive
- default-value exec-character-bits 7
- default-value special-character-bits 7
- default-value data-character-bits 8
- !
- line con 0
- exec-timeout 10 0
- timeout login response 30
- privilege level 1
- flush-at-activation
- logout-warning 20
- absolute-timeout 0
- modem answer-timeout 15
- modem dtr-delay 5
- data-character-bits 8
- exec-character-bits 7
- special-character-bits 7
- length 24
- width 80
- history size 20
- databits 8
- stopbits 2
- start-character 17
- stop-character 19
- speed 9600
- line aux 0
- exec-timeout 10 0
- timeout login response 30
- privilege level 1
- flush-at-activation
- logout-warning 20
- absolute-timeout 0

- modem answer-timeout 15
- modem dtr-delay 5
- data-character-bits 8
- exec-character-bits 7
- special-character-bits 7
- length 24
- width 80
- history size 20
- callback forced-wait 4
- callback nodsr-wait 5000
- databits 8
- stopbits 2
- start-character 17
- stop-character 19
- speed 9600
- line vty 0 4
- exec-timeout 10 0
- timeout login response 30
- privilege level 1
- flush-at-activation
- logout-warning 20
- absolute-timeout 0
- login authentication vty
- modem answer-timeout 15
- modem dtr-delay 5
- data-character-bits 8
- exec-character-bits 7
- special-character-bits 7
- length 24
- width 80
- history size 20
- transport input ssh
- start-character 17
- stop-character 19
- !
- exception-slave core-file R2-core
- exception-slave protocol tftp
- exception protocol tftp
- exception region-size 131072
- exception crashinfo file flash:crashinfo
- exception crashinfo buffersize 32
- exception crashinfo maximum files 1
- no exception crashinfo dump garbage-detector
- monitor event-trace stacktrace

- monitor event-trace timestamps datetime msec
- scheduler max-task-time 2000
- scheduler process-watchdog normal
- scheduler allocate 20000 1000
- ntp maxdistance 8
- ntp broadcastdelay 0
- cns id hostname
- cns id hostname event
- cns id hostname image
- cns image retry 60
- netconf max-sessions 4
- netconf lock-time 10
- netconf max-message 0
- wsma id hostname
- event manager scheduler script thread class default number 1
- event manager scheduler applet thread class default number 32
- event manager scheduler call-home thread class default number 32
- event manager scheduler shell thread class default number 1
- event manager scheduler shell thread class Z number 1
- event manager history size events 10
- event manager history size traps 10
- event manager detector rpc max-sessions 4
- event manager detector routing bootup-delay 0
- !
- webvpn sslvpn-vif nat outside
- !
- webvpn sslvpn-vif nat inside
- !
- webvpn sslvpn-vif nat enable
-
- !
- no webvpn cef
- end

R3

- R3#show run
- Building configuration...
-
- Current configuration : 1602 bytes
- !
- version 12.4
- service timestamps debug datetime msec
- service timestamps log datetime msec
- no service password-encryption
- !

- !
- !
- !
- !
- username local privilege 15 password 0 password
- !
- !
- !
- !
- !
- interface FastEthernet0/0
- ip address 10.0.2.2 255.255.255.0
- duplex auto
- speed auto
- !
- interface FastEthernet0/1
- ip address 10.0.4.1 255.255.255.0
- duplex auto
- speed auto
- !
- interface Serial0/1/0
- ip address 10.0.1.2 255.255.255.0
- !
- interface Serial0/2/0
- no ip address
- shutdown
- !
- router eigrp 1
- network 10.0.1.0 0.0.0.255
- network 10.0.2.0 0.0.0.255
- network 10.0.4.0 0.0.0.255
- auto-summary
- !
- !
- !
- no ip http server
- no ip http secure-server
- !
- !
- !
- tacacs-server host 10.0.4.5
- tacacs-server directed-request
- tacacs-server key nvtacacs
- !

- control-plane
- !
- !
- !
- !
- !
- !
- !
- !
- line con 0
- line aux 0
- line vty 0 4
- login authentication vty
- transport input ssh
- !
- scheduler allocate 20000 1000
- end

Switch1

- Switch1#show run all
- Building configuration...
-
- Current configuration with default configurations exposed : 29205 bytes
- !
- version 12.2
- parser cache
- no service log backtrace
- no service config
- no service exec-callback
- no service nagle
- service slave-log
- no service slave-coredump
- no service pad to-xot
- no service pad from-xot
- no service pad cmns
- no service pad
- no service telnet-zeroidle
- no service tcp-keepalives-in
- no service tcp-keepalives-out
- service timestamps debug datetime msec
- service timestamps log datetime msec
- no service password-encryption
- no service exec-wait
- no service linenumber
- no service internal

- no service scripting
- no service compress-config
- service prompt config
- no service old-slip-prompts
- no service pt-vty-logging
- no service disable-ip-fast-frag
- no service sequence-numbers
- service counters max age 0
- !
- hostname Switch1
- !
- boot-start-marker
- boot-end-marker
- !
- shell processing
- no logging discriminator
- logging exception 4096
- no logging count
- no logging message-counter log
- no logging message-counter debug
- logging message-counter syslog
- no logging snmp-authfail
- logging buginf
- logging queue-limit 100
- logging queue-limit esm 0
- logging queue-limit trap 100
- logging buffered 4096 debugging
- logging reload message-limit 1000 notifications
- logging console debugging
- logging monitor debugging
- logging on
- enable password password
- !
- username local privilege 15 password 0 password
- !
- !
- aaa new-model
- !
- !
- aaa authentication login vty group tacacs+ local
- aaa authentication login console group tacacs+ local
- aaa authorization config-commands
- aaa authorization exec default group tacacs+ local
- aaa accounting nested

- aaa accounting exec default start-stop group tacacs+
- aaa accounting commands 1 default start-stop group tacacs+
- aaa accounting commands 15 default start-stop group tacacs+
- aaa accounting connection default start-stop group tacacs+
- no aaa accounting system guarantee-first
- !
- !
- !
- aaa session-id common
- switch 1 provision ws-c3750e-24td
- system mtu routing 1500
- power xps 1 name
- power xps 1 port 1 name
- power xps 1 port 2 name
- power xps 1 port 3 name
- power xps 1 port 4 name
- power xps 1 port 5 name
- power xps 1 port 6 name
- power xps 1 port 7 name
- power xps 1 port 8 name
- power xps 1 port 9 name
- power xps 2 name
- power xps 2 port 1 name
- power xps 2 port 2 name
- power xps 2 port 3 name
- power xps 2 port 4 name
- power xps 2 port 5 name
- power xps 2 port 6 name
- power xps 2 port 7 name
- power xps 2 port 8 name
- power xps 2 port 9 name
- power xps 3 name
- power xps 3 port 1 name
- power xps 3 port 2 name
- power xps 3 port 3 name
- power xps 3 port 4 name
- power xps 3 port 5 name
- power xps 3 port 6 name
- power xps 3 port 7 name
- power xps 3 port 8 name
- power xps 3 port 9 name
- power xps 4 name
- power xps 4 port 1 name
- power xps 4 port 2 name

- power xps 4 port 3 name
- power xps 4 port 4 name
- power xps 4 port 5 name
- power xps 4 port 6 name
- power xps 4 port 7 name
- power xps 4 port 8 name
- power xps 4 port 9 name
- power xps 5 name
- power xps 5 port 1 name
- power xps 5 port 2 name
- power xps 5 port 3 name
- power xps 5 port 4 name
- power xps 5 port 5 name
- power xps 5 port 6 name
- power xps 5 port 7 name
- power xps 5 port 8 name
- power xps 5 port 9 name
- power xps 6 name
- power xps 6 port 1 name
- power xps 6 port 2 name
- power xps 6 port 3 name
- power xps 6 port 4 name
- power xps 6 port 5 name
- power xps 6 port 6 name
- power xps 6 port 7 name
- power xps 6 port 8 name
- power xps 6 port 9 name
- power xps 7 name
- power xps 7 port 1 name
- power xps 7 port 2 name
- power xps 7 port 3 name
- power xps 7 port 4 name
- power xps 7 port 5 name
- power xps 7 port 6 name
- power xps 7 port 7 name
- power xps 7 port 8 name
- power xps 7 port 9 name
- power xps 8 name
- power xps 8 port 1 name
- power xps 8 port 2 name
- power xps 8 port 3 name
- power xps 8 port 4 name
- power xps 8 port 5 name
- power xps 8 port 6 name

- power xps 8 port 7 name
- power xps 8 port 8 name
- power xps 8 port 9 name
- power xps 9 name
- power xps 9 port 1 name
- power xps 9 port 2 name
- power xps 9 port 3 name
- power xps 9 port 4 name
- power xps 9 port 5 name
- power xps 9 port 6 name
- power xps 9 port 7 name
- power xps 9 port 8 name
- power xps 9 port 9 name
- authentication mac-move deny
- authentication logging verbose
- authentication command bounce-port ignore
- authentication command disable-port ignore
- authentication critical recovery delay 100
- no cisp enable
- ip subnet-zero
- ip sticky-arp
- !
- !
- no ip dhcp snooping information option allow-untrusted
- ip dhcp snooping information option
- no ip dhcp snooping database
- ip dhcp snooping database write-delay 300
- ip dhcp snooping database timeout 300
- ip dhcp snooping verify mac-address
- ip dhcp snooping verify no-relay-agent-address
- ip domain-name new.2020project.com
- ip device tracking probe count 3
- ip device tracking probe interval 30
- ip device tracking probe use-svi
- ip device tracking probe delay 0
- no ip device tracking
- ip arp inspection log-buffer entries 32
- ip arp inspection log-buffer logs 5 interval 1
- ip igmp snooping report-suppression
- no ip igmp snooping tcn query solicit
- ip igmp snooping tcn flood query count 2
- ip igmp snooping robustness-variable 2
- ip igmp snooping last-member-query-count 2
- ip igmp snooping last-member-query-interval 1000

- ip igmp snooping querier version 2
- ip igmp snooping querier query-interval 60
- ip igmp snooping querier max-response-time 10
- ip igmp snooping querier timer expiry 0
- ip igmp snooping querier tcn query count 2
- ip igmp snooping querier tcn query interval 10
- no ip igmp snooping querier
- ip igmp snooping vlan 1
- ip igmp snooping vlan 1 mrouter learn pim-dvmrp
- no ip igmp snooping vlan 1 immediate-leave
- ip igmp snooping vlan 1 robustness-variable 0
- ip igmp snooping vlan 1 last-member-query-count 0
- ip igmp snooping vlan 1 last-member-query-interval 0
- ip igmp snooping
- no mab request format attribute 32
- mab logging verbose
- nmsp notification interval attachment 30
- nmsp notification interval location 30
- cluster run
- !
- no cts sxp enable
- cts sxp retry period 120
- cts sxp reconciliation period 120
- vmps reconfirm 60
- vmps retry 3
- mls qos rewrite ip dscp
- mvr vlan 1
- mvr querytime 5
- mvr mode compatible
- setup express
- !
- scripting tcl low-memory 37049064
- !
- crypto pki trustpoint TP-self-signed-4153279872
- enrollment selfsigned
- subject-name cn=IOS-Self-Signed-Certificate-4153279872
- revocation-check none
- rsakeypair TP-self-signed-4153279872
- !
- !
- crypto pki certificate chain TP-self-signed-4153279872
- certificate self-signed 01
- 30820253 308201BC A0030201 02020101 300D0609 2A864886 F70D0101 04050030
- 31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

- 69666963 6174652D 34313533 32373938 3732301E 170D3933 30333031 30303032
- 31375A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
- 4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D34 31353332
- 37393837 3230819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
- 8100A132 0AAA152C 4EB58E00 82B94429 196F6A0A CAA18D52 9A962E1C 6CFC8F01
- B0F369FD 5442407E F9975E39 91B01F22 8D0C315A 81D92ED8 D9CC7861 F505187B
- 76D60EF3 DE9030C8 720D05C4 2438E16E 275A9488 64C88A76 66E9EC3F E7619FB6
- E45207AA A2A238D9 66C7D7EF 23291B98 20EE3EAA 50BF5C6B 35AB7672 B9D46DA9
- 89B30203 010001A3 7B307930 0F060355 1D130101 FF040530 030101FF 30260603
- 551D1104 1F301D82 1B537769 74636831 2E6E6577 2E323032 3070726F 6A656374
- 2E636F6D 301F0603 551D2304 18301680 14940226 2EDF18FD EB7811F0 05A4A372
- AF4F83E2 D4301D06 03551D0E 04160414 9402262E DF18FDEB 7811F005 A4A372AF
- 4F83E2D4 300D0609 2A864886 F70D0101 04050003 81810093 B0AC4D42 6483D813
- FFA01510 74303F87 44C4EE89 5A66A7EA 3C030C91 0E7E0DC4 A5B5DF99 0F81BEDF
- AC37B0FA AF88720F 4BF27294 12903CB5 308AC1CF 656254B9 838822A5 4178453E
- A7469426 33AC61A5 30DBD95C 4D1415BF F1221BEA 6424300E 84378A7D 05FF29DA
- 2C8C88E5 28CCEB40 E919F93A 5ED1567A BF375C26 7215B3
- quit
- dot1x system-auth-control
- dot1x logging verbose
- dot1x supplicant force-multicast
- dot1x supplicant controlled transient
- no dot1x critical eapol
- spanning-tree mode pvst
- no spanning-tree dispute
- spanning-tree transmit hold-count 6
- spanning-tree optimize bpdu transmission
- spanning-tree queue maxsize 12288
- spanning-tree etherchannel guard misconfig
- spanning-tree extend system-id
- spanning-tree uplinkfast max-update-rate 105715032
- spanning-tree pathcost method short
- power inline consumption default 15400
- location prefer static weight 0
- location prefer lldp-med weight 2
- location prefer cdp weight 1
- !
- !
- !
- port-channel load-balance src-mac
- !
- !
- vlan internal allocation policy ascending
- !

- ip ssh version 2
- !
- !
- interface FastEthernet0
- no ip address
- shutdown
- snmp trap link-status
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- !
- interface GigabitEthernet1/0/1
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/2
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast

- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/3
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/4
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected

- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/5
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/6
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate

- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/7
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/8
- switchport

- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/9
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !

- interface GigabitEthernet1/0/10
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/11
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3

- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/12
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/13
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app

- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/14
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/15
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location

- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet1/0/16
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet1/0/17
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status

- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/18
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/19
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added

- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/20
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/21
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15

- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/22
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/23
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust

- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/24
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/25
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast

- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/26
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/27
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate

- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet1/0/28
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface TenGigabitEthernet1/0/1
- switchport
- switchport access vlan 1

- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface TenGigabitEthernet1/0/2
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface Vlan1

- ip address 10.0.3.2 255.255.255.0
- no shutdown
- snmp trap link-status
- spanning-tree port-priority 3
- spanning-tree cost 3
- !
- ip default-gateway 10.0.3.1
- ip classless
- ip http server
- ip http port 80
- ip http authentication enable
- ip http secure-server
- ip http secure-port 443
- ip http secure-active-session-modules all
- ip http max-connections 16
- ip http timeout-policy idle 180 life 180 requests 25
- ip http active-session-modules all
- ip http client cache memory pool 100
- ip http client cache memory file 2
- ip http client cache age interval 5
- ip http client connection timeout 10
- ip http client connection retry 1
- ip http client connection idle timeout 30
- ip http client response timeout 30
- ip http path flash:html
- !
- no ip sla logging traps
-
- logging history size 1
- logging history warnings
- logging trap informational
- logging delimiter tcp
- no logging origin-id
- logging facility local7
- no logging source-interface
- cdp run
- cdp tlv location
- cdp tlv app
- snmp-server inform retries 3 timeout 15 pending 25
- snmp mib notification-log global-size 500
- snmp mib notification-log global-echo 15
- tacacs-server host 10.0.4.5
- tacacs-server directed-request
- tacacs-server key nvtacacs

- !
- vstack join-window mode auto
- alias exec h help
- alias exec lo logout
- alias exec p ping
- alias exec r resume
- alias exec s show
- alias exec u undebug
- alias exec un undebug
- alias exec w where
- default-value exec-character-bits 7
- default-value special-character-bits 7
- default-value data-character-bits 8
- !
- line con 0
- no media-type rj45
- line vty 0 4
- login authentication vty
- transport input ssh
- line vty 5 15
- login authentication vty
- transport input ssh
- !
- cns id hostname
- cns id hostname event
- cns id hostname image
- cns image retry 60
- mac address-table notification change interval 1
- mac address-table notification change history-size 1
- mac address-table notification change
- mac address-table aging-time 300
- mac address-table aging-time 300 vlan 1
- netconf max-sessions 4
- netconf lock-time 10
- event manager scheduler script thread class default number 1
- event manager scheduler applet thread class default number 32
- event manager scheduler shell thread class default number 1
- event manager scheduler shell thread class Z number 1
- event manager history size events 10
- event manager history size traps 10
- end

Switch2

- Switch2#show run all
- Building configuration...

-
- Current configuration with default configurations exposed : 29584 bytes
- !
- version 12.2
- parser cache
- no service log backtrace
- no service config
- no service exec-callback
- no service nagle
- service slave-log
- no service slave-coredump
- no service pad to-xot
- no service pad from-xot
- no service pad cmns
- no service pad
- no service telnet-zeroidle
- no service tcp-keepalives-in
- no service tcp-keepalives-out
- service timestamps debug datetime msec
- service timestamps log datetime msec
- no service password-encryption
- no service exec-wait
- no service linenumber
- no service internal
- no service scripting
- no service compress-config
- service prompt config
- no service old-slip-prompts
- no service pt-vty-logging
- no service disable-ip-fast-frag
- no service sequence-numbers
- service counters max age 0
- !
- hostname Switch2
- !
- boot-start-marker
- boot-end-marker
- !
- shell processing
- no logging discriminator
- logging exception 4096
- no logging count
- no logging message-counter log
- no logging message-counter debug

- logging message-counter syslog
- no logging snmp-authfail
- logging buginf
- logging queue-limit 100
- logging queue-limit esm 0
- logging queue-limit trap 100
- logging buffered 4096 debugging
- logging reload message-limit 1000 notifications
- logging console debugging
- logging monitor debugging
- logging on
- enable password password
- !
- username local privilege 15 password 0 password
- !
- !
- aaa new-model
- !
- !
- aaa authentication login vty group tacacs+ local
- aaa authentication login console group tacacs+ local
- aaa authorization config-commands
- aaa authorization exec default group tacacs+ local
- aaa accounting nested
- aaa accounting exec default start-stop group tacacs+
- aaa accounting commands 1 default start-stop group tacacs+
- aaa accounting commands 15 default start-stop group tacacs+
- aaa accounting connection default start-stop group tacacs+
- no aaa accounting system guarantee-first
- !
- !
- !
- aaa session-id common
- switch 5 provision ws-c3750e-24td
- system mtu routing 1500
- power xps 1 name
- power xps 1 port 1 name
- power xps 1 port 2 name
- power xps 1 port 3 name
- power xps 1 port 4 name
- power xps 1 port 5 name
- power xps 1 port 6 name
- power xps 1 port 7 name
- power xps 1 port 8 name

- power xps 1 port 9 name
- power xps 2 name
- power xps 2 port 1 name
- power xps 2 port 2 name
- power xps 2 port 3 name
- power xps 2 port 4 name
- power xps 2 port 5 name
- power xps 2 port 6 name
- power xps 2 port 7 name
- power xps 2 port 8 name
- power xps 2 port 9 name
- power xps 3 name
- power xps 3 port 1 name
- power xps 3 port 2 name
- power xps 3 port 3 name
- power xps 3 port 4 name
- power xps 3 port 5 name
- power xps 3 port 6 name
- power xps 3 port 7 name
- power xps 3 port 8 name
- power xps 3 port 9 name
- power xps 4 name
- power xps 4 port 1 name
- power xps 4 port 2 name
- power xps 4 port 3 name
- power xps 4 port 4 name
- power xps 4 port 5 name
- power xps 4 port 6 name
- power xps 4 port 7 name
- power xps 4 port 8 name
- power xps 4 port 9 name
- power xps 5 name
- power xps 5 port 1 name
- power xps 5 port 2 name
- power xps 5 port 3 name
- power xps 5 port 4 name
- power xps 5 port 5 name
- power xps 5 port 6 name
- power xps 5 port 7 name
- power xps 5 port 8 name
- power xps 5 port 9 name
- power xps 6 name
- power xps 6 port 1 name
- power xps 6 port 2 name

- power xps 6 port 3 name
- power xps 6 port 4 name
- power xps 6 port 5 name
- power xps 6 port 6 name
- power xps 6 port 7 name
- power xps 6 port 8 name
- power xps 6 port 9 name
- power xps 7 name
- power xps 7 port 1 name
- power xps 7 port 2 name
- power xps 7 port 3 name
- power xps 7 port 4 name
- power xps 7 port 5 name
- power xps 7 port 6 name
- power xps 7 port 7 name
- power xps 7 port 8 name
- power xps 7 port 9 name
- power xps 8 name
- power xps 8 port 1 name
- power xps 8 port 2 name
- power xps 8 port 3 name
- power xps 8 port 4 name
- power xps 8 port 5 name
- power xps 8 port 6 name
- power xps 8 port 7 name
- power xps 8 port 8 name
- power xps 8 port 9 name
- power xps 9 name
- power xps 9 port 1 name
- power xps 9 port 2 name
- power xps 9 port 3 name
- power xps 9 port 4 name
- power xps 9 port 5 name
- power xps 9 port 6 name
- power xps 9 port 7 name
- power xps 9 port 8 name
- power xps 9 port 9 name
- authentication mac-move deny
- authentication logging verbose
- authentication command bounce-port ignore
- authentication command disable-port ignore
- authentication critical recovery delay 100
- no cisp enable
- ip subnet-zero

- ip sticky-arp
- !
- !
- no ip dhcp snooping information option allow-untrusted
- ip dhcp snooping information option
- no ip dhcp snooping database
- ip dhcp snooping database write-delay 300
- ip dhcp snooping database timeout 300
- ip dhcp snooping verify mac-address
- ip dhcp snooping verify no-relay-agent-address
- ip domain-name new.2020project.com
- ip device tracking probe count 3
- ip device tracking probe interval 30
- ip device tracking probe use-svi
- ip device tracking probe delay 0
- no ip device tracking
- ip arp inspection log-buffer entries 32
- ip arp inspection log-buffer logs 5 interval 1
- ip igmp snooping report-suppression
- no ip igmp snooping tcn query solicit
- ip igmp snooping tcn flood query count 2
- ip igmp snooping robustness-variable 2
- ip igmp snooping last-member-query-count 2
- ip igmp snooping last-member-query-interval 1000
- ip igmp snooping querier version 2
- ip igmp snooping querier query-interval 60
- ip igmp snooping querier max-response-time 10
- ip igmp snooping querier timer expiry 0
- ip igmp snooping querier tcn query count 2
- ip igmp snooping querier tcn query interval 10
- no ip igmp snooping querier
- ip igmp snooping vlan 1
- ip igmp snooping vlan 1 mrouter learn pim-dvmrp
- no ip igmp snooping vlan 1 immediate-leave
- ip igmp snooping vlan 1 robustness-variable 0
- ip igmp snooping vlan 1 last-member-query-count 0
- ip igmp snooping vlan 1 last-member-query-interval 0
- ip igmp snooping vlan 99
- ip igmp snooping vlan 99 mrouter learn pim-dvmrp
- no ip igmp snooping vlan 99 immediate-leave
- ip igmp snooping vlan 99 robustness-variable 0
- ip igmp snooping vlan 99 last-member-query-count 0
- ip igmp snooping vlan 99 last-member-query-interval 0
- ip igmp snooping

- no mab request format attribute 32
- mab logging verbose
- nmsp notification interval attachment 30
- nmsp notification interval location 30
- cluster run
- !
- no cts sxp enable
- cts sxp retry period 120
- cts sxp reconciliation period 120
- vmps reconfirm 60
- vmps retry 3
- mls qos rewrite ip dscp
- mvr vlan 1
- mvr querytime 5
- mvr mode compatible
- setup express
- !
- scripting tcl low-memory 37077376
- !
- crypto pki trustpoint TP-self-signed-1419776384
- enrollment selfsigned
- subject-name cn=IOS-Self-Signed-Certificate-1419776384
- revocation-check none
- rsakeypair TP-self-signed-1419776384
- !
- !
- crypto pki certificate chain TP-self-signed-1419776384
- certificate self-signed 01
- 30820253 308201BC A0030201 02020101 300D0609 2A864886 F70D0101 04050030
- 31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
- 69666963 6174652D 31343139 37373633 3834301E 170D3933 30333031 30303032
- 30375A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
- 4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D31 34313937
- 37363338 3430819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
- 8100C648 AE470BF2 494B16A2 F2B58189 1B75396D D35E8321 E71E323B 2CA2191E
- A1BFD096 FE3D73C3 97D27709 35F5D546 09EB2D94 C0D74AF0 FE8C0F74 DED145B9
- FBA31CBB B42E231D BD067AD4 935519C3 980E4F51 6AB97514 9F10DD52 FBD3B838
- E859DF1C 7C7B1BE5 1BB31590 ACCD3812 9A646C6C 8EE069FD 3A2D4F72 88F77C64
- 992D0203 010001A3 7B307930 0F060355 1D130101 FF040530 030101FF 30260603
- 551D1104 1F301D82 1B537769 74636832 2E6E6577 2E323032 3070726F 6A656374
- 2E636F6D 301F0603 551D2304 18301680 146A3486 84522A83 1CE43B55 7B7F99DA
- C06F4408 C7301D06 03551D0E 04160414 6A348684 522A831C E43B557B 7F99DAC0
- 6F4408C7 300D0609 2A864886 F70D0101 04050003 818100C0 AB76A080 87EB9640
- 733FDA8F 2CEA2D7F E085BEF7 F997699C 8D0B0CED 40B31962 C4CFD6F3 543C3184

- 7B15B3EB 3EA03979 63623D21 1E484E1A CB461A1D 7B2DC1F9 4025012F 0EAAAA28
- 148F6EB2 61A224B3 F1F0F30E 3764B941 8A215449 D37CC99F E16DA681 9C99881D
- 92DCE240 CA0B543A 5EF2EBE1 526F690E 010CE1D7 990DB9
- quit
- dot1x system-auth-control
- dot1x logging verbose
- dot1x supplicant force-multicast
- dot1x supplicant controlled transient
- no dot1x critical eapol
- spanning-tree mode pvst
- no spanning-tree dispute
- spanning-tree transmit hold-count 6
- spanning-tree optimize bpdu transmission
- spanning-tree queue maxsize 12288
- spanning-tree etherchannel guard misconfig
- spanning-tree extend system-id
- spanning-tree uplinkfast max-update-rate 105303584
- spanning-tree pathcost method short
- power inline consumption default 15400
- location prefer static weight 0
- location prefer lldp-med weight 2
- location prefer cdp weight 1
- !
- !
- !
- port-channel load-balance src-mac
- !
- !
- vlan internal allocation policy ascending
- !
- !
- !
- interface FastEthernet0
- no ip address
- no shutdown
- snmp trap link-status
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- !
- interface GigabitEthernet5/0/1
- switchport

- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet5/0/2
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !

- interface GigabitEthernet5/0/3
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/4
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3

- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/5
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/6
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app

- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/7
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/8
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location

- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet5/0/9
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet5/0/10
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status

- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/11
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/12
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added

- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/13
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/14
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15

- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/15
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/16
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust

- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/17
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/18
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast

- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/19
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/20
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate

- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/21
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/22
- switchport
- switchport access vlan 1

- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet5/0/23
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet5/0/24

- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/25
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood

- !
- interface GigabitEthernet5/0/26
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcu flood
- !
- interface GigabitEthernet5/0/27
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3

- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface GigabitEthernet5/0/28
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface TenGigabitEthernet5/0/1
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location

- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface TenGigabitEthernet5/0/2
- switchport
- switchport access vlan 1
- switchport trunk encapsulation negotiate
- no switchport nonegotiate
- no switchport protected
- no switchport block multicast
- no switchport block unicast
- no ip arp inspection trust
- ip arp inspection limit rate 15 burst interval 1
- ip arp inspection limit rate 15
- no shutdown
- snmp trap mac-notification change added
- snmp trap mac-notification change removed
- snmp trap link-status
- mls qos cos 0
- cdp tlv location
- cdp tlv server-location
- cdp tlv app
- spanning-tree port-priority 3
- spanning-tree cost 3
- ip igmp snooping tcn flood
- !
- interface Vlan1
- ip address 10.0.4.2 255.255.255.0
- no shutdown
- snmp trap link-status
- spanning-tree port-priority 3
- spanning-tree cost 3
- !
- interface Vlan99
- no ip address
- no shutdown
- snmp trap link-status
- spanning-tree port-priority 3
- spanning-tree cost 3
- !
- ip default-gateway 10.0.4.1
- ip classless

- ip http server
- ip http port 80
- ip http authentication enable
- ip http secure-server
- ip http secure-port 443
- ip http secure-active-session-modules all
- ip http max-connections 16
- ip http timeout-policy idle 180 life 180 requests 25
- ip http active-session-modules all
- ip http client cache memory pool 100
- ip http client cache memory file 2
- ip http client cache age interval 5
- ip http client connection timeout 10
- ip http client connection retry 1
- ip http client connection idle timeout 30
- ip http client response timeout 30
- ip http path flash:html
- !
- no ip sla logging traps
-
- logging history size 1
- logging history warnings
- logging trap informational
- logging delimiter tcp
- no logging origin-id
- logging facility local7
- no logging source-interface
- cdp run
- cdp tlv location
- cdp tlv app
- snmp-server inform retries 3 timeout 15 pending 25
- snmp mib notification-log global-size 500
- snmp mib notification-log global-out 15
- tacacs-server host 10.0.4.5
- tacacs-server directed-request
- tacacs-server key nvtacacs
- !
- vstack join-window mode auto
- alias exec h help
- alias exec lo logout
- alias exec p ping
- alias exec r resume
- alias exec s show
- alias exec u undebg

- alias exec un undebug
- alias exec w where
- default-value exec-character-bits 7
- default-value special-character-bits 7
- default-value data-character-bits 8
- !
- line con 0
- no media-type rj45
- line vty 0 4
- login authentication vty
- transport input ssh
- line vty 5 15
- login authentication vty
- transport input ssh
- !
- cns id hostname
- cns id hostname event
- cns id hostname image
- cns image retry 60
- mac address-table notification change interval 1
- mac address-table notification change history-size 1
- mac address-table notification change
- mac address-table aging-time 300
- mac address-table aging-time 300 vlan 1
- netconf max-sessions 4
- netconf lock-time 10
- event manager scheduler script thread class default number 1
- event manager scheduler applet thread class default number 32
- event manager scheduler shell thread class default number 1
- event manager scheduler shell thread class Z number 1
- event manager history size events 10
- event manager history size traps 10
- end

Weekly Logs

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 02/16/20 – 02/22/16

Date	Start/End Time	Summary Description	Hours spent
2/17/20	9am-11am	Worked on process of gaining equipment from my employer to use for this project	2
2/20/20	8pm-9pm	Decided on OS for server to run if possible	1
2/22/20	6pm-7pm	Went online to purchase server	1
			Total hours: 4

Journal Details

2/17/20

- Worked with my employer to receive all the needed hardware for networking
 - 3 Routers
 - 2 Switches

2/20/20

- Researched the needs of the operating system to be installed on the server
 - <https://www.microsoft.com/en-us/cloud-platform/windows-server>

2/22/20

- Went online and research the best possible server to run the AD/LDAP/Radius/Tacacs + server
 - Settled on dell poweredge server

2440-491-001 Senior Project Weekly Report**Spring 2020****Instructor: Dr. Shirong Du****Name: Nicholas Valaitis****Week from 2/23/20 – 2/29/20**

Date	Start/End Time	Summary Description	Hours spent
2/24	3pm – 5pm	Setup devices and cabling	2

			Total hours:2
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Journal Details

2/24/20

- Gathered all equipment and started the initial setup and cabling

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 3/1/20 – 3/7/20

Date	Start/End Time	Summary Description	Hours spent
3/2	10pm – 2am	Identifying Router NIC card installation issues	4
			Total hours:4

Journal Details

3/2

- Had to configure a special cable to use with the specific NIC cards installed into my routers

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 3/8/20 – 3/14/20

Date	Start/End Time	Summary Description	Hours spent
3/10	8 pm – 12 pm	Setup server OS	4
3/11	5 pm – 10 pm	Configured server	5
			Total hours: 9

Journal Details

3/10

- Worked on the configuration for the server OS had to create a boot drive as the server did not come with an OS pre-loaded onto it
- <https://helpdeskgeek.com/help-desk/how-to-make-bootable-usb-and-save-your-pc/>

3/11

- Began the initial configuration for the server like installing the base server settings and services

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 3/15/20 – 3/21/20

Date	Start/End Time	Summary Description	Hours spent
3/15	5pm – 10pm	Build Out IP address scheme/ Finished installation of all local server configuration files	5
3/17	5pm – 10pm	Research into TACACS+ software	5
3/18	5pm – 10pm	Installation of tacacs software onto the server	5
			Total hours:15

Journal Details

3/15

- Configured the address scheme diagram to use a simple class a 10 network subnetted into /24
- Installed RDP, AD, DNS and other services

3/17

- Looked up best tacacs software to install for the server.
- <https://www.tacacs.net/>

3/18

- Downloaded and installed tacacs software on the server

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 3/22/20 – 3/28/20

Date	Start/End Time	Summary Description	Hours spent
3/24	5-10 pm	Provisioned all devices	5
3/26	5-10 pm	Configured server addressing and Firewall	5
3/28	11 am – 8 pm	Began router base configurations	9
			Total hours:19

Journal Details

3/24

- Provisioned all devices by wiping them clean and ensuring they had the highest possible OS on them

3/26

- Configured server addressing based on the IP addressing scheme for the server
- Put on firewall rules to allow for traffic coming from the tacacs server to go out to the network

3/28

- Put on the base router configurations like Naming/Addressing/Routing

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 3/29/20 – 4/4/20

Date	Start/End Time	Summary Description	Hours spent
3/29	5-10pm	Documentation	5
3/31	7-10pm	Documentation	3
4/1	11am-6pm	Configure TACACS+ software	7
4/2	11am – 8pm	Configure TACACS+ software	9
4/3	5pm – 10 pm	Finish Configuring Routers	5
			Total hours: 29

Journal Details

3/29

- Documentation

3/31

- Documentation

4/1

- Learning and understanding the TACACS+ software and how the accounts need to be configured

4/2

- Configuring the TACACS+ accounts for device authentication

4/3

- Put on AAA and all other necessary configs for routers

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 4/5/20 – 4/11/20

Date	Start/End Time	Summary Description	Hours spent
4/5	5-9pm	Switch 1 config	4
4/7	12-4pm	Switch 2 config	4
			Total hours:8

Journal Details

4/5

- Put on all switch 1 configuration needed
 - Naming
 - VLAN
 - AAA
 - TACACS+
 - Local Accounts

4/7

- Put on all switch 2 configuration needed
 - Naming
 - VLAN
 - AAA
 - TACACS+
 - Local Accounts

2440-491-001 Senior Project Weekly Report

Spring 2020

Instructor: Dr. Shirong Du

Name: Nicholas Valaitis

Week from 4/12/20 – 4/19/20

Date	Start/End Time	Summary Description	Hours spent
4/13	3pm-8pm	Testing	5
4/14	12-10pm	Documentation	10
4/16	4pm-7pm	Documentation	3
			Total hours: 18

Journal Details

4/13

- Tested all credential access to all devices as well as all remote access and reachability

4/14

- Documentation

4/16

- Documentation

References/Research Material

- Benitez, Christopher Jan. "How to Make a Bootable USB and Save Your PC." *Help Desk Geek*, Help Desk Geek, 3 May 2019, helpdeskgeek.com/help-desk/how-to-make-bootable-usb-and-save-your-pc/.
- "Configuring Secure Shell on Routers and Switches Running Cisco IOS." *Cisco*, Cisco, 31 Jan. 2020, www.cisco.com/c/en/us/support/docs/security/vpn/secure-shell-ssh/4145-ssh.html.
- "How to Make a T1 Crossover Cable." *SH RUN*, 3 June 1970, sh-run.com/2009/06/04/how-to-make-a-t1-crossover-cable/.
- "Password Recovery Procedure for the Cisco 2900 Integrated Services Router." *Cisco*, Cisco, 31 Jan. 2019, www.cisco.com/c/en/us/support/docs/routers/2800-series-integrated-services-routers/112033-c2900-password-recovery-00.html.
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- "TACACS Net." *TACACS.net*, www.tacacs.net/.
- "Tacacs Configuration on Cisco Switch and Router." *Tech Space KH*, 3 June 2017, www.techspacekh.com/tacacs-configuration-on-cisco-switch-and-router/.
- "Won't Load Startup Config." *Technology and Support - Cisco Community*, 6 Mar. 2019, community.cisco.com/t5/switching/won-t-load-startup-config/td-p/771348.