

NET3720 - Fall 2021 – Jenkins

Lab 5– Autonomous AP Bridge

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Lab Objectives:

- Connect (2) Cisco AP's and give WiFi to a computer with no WiFi

Hardware needed:

- (2) Cisco Aironet 3700 AP
- (2) ZYCEL PoE Switch
- (1) USB to RS232 cable
- Computer 1 – Console
- Computer 2- Internet off and getting internet from computer 1

Software:

- Console application
 - PuTTY <http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe>
 - Instructions on how to download PuTTY
 - <https://www.weber.edu/CS/remote-access.html>

Instructions:

In this lab you will learn how to configure a Cisco AP unit using the CLI. You will connect Cisco AP 1 to computer 1 and then have Cisco AP 2 give WiFi to computer 2.

Method:

Internet is connected to the ZYXEL switch with Cat.6 cables. The switch is then connected to the Cisco AP unit with Cat.6 cables. In order to configure the AP it needs to be controlled by a computer. You are able to do this with USB to RS232 + VGA to RJ-45, green light on the AP unit means its on. Open up PuTTY and click on **Serial** then type **/dev/ttyUSB0** and then open.

Connections:

Setup 1: Get a cat.6 cable can plug into the CenturyLink modem. Get another cat6 cable connect to the **ZYXEL switch**, connect the switch to power. Get a cat 6 cable and connect to **Cisco AP**. Get a USB to RS232 and a VGA to RJ-45 cable and connect to **Computer1**. Setup 2: Connect ZYXEL switch to power. Then get a cat6 cable and connect to Cisco AP and when you are done configuring Setup 1 you will then connect the RS232 and a VGA to RJ-45 cable and connect to **Computer2**, that has no WiFi.

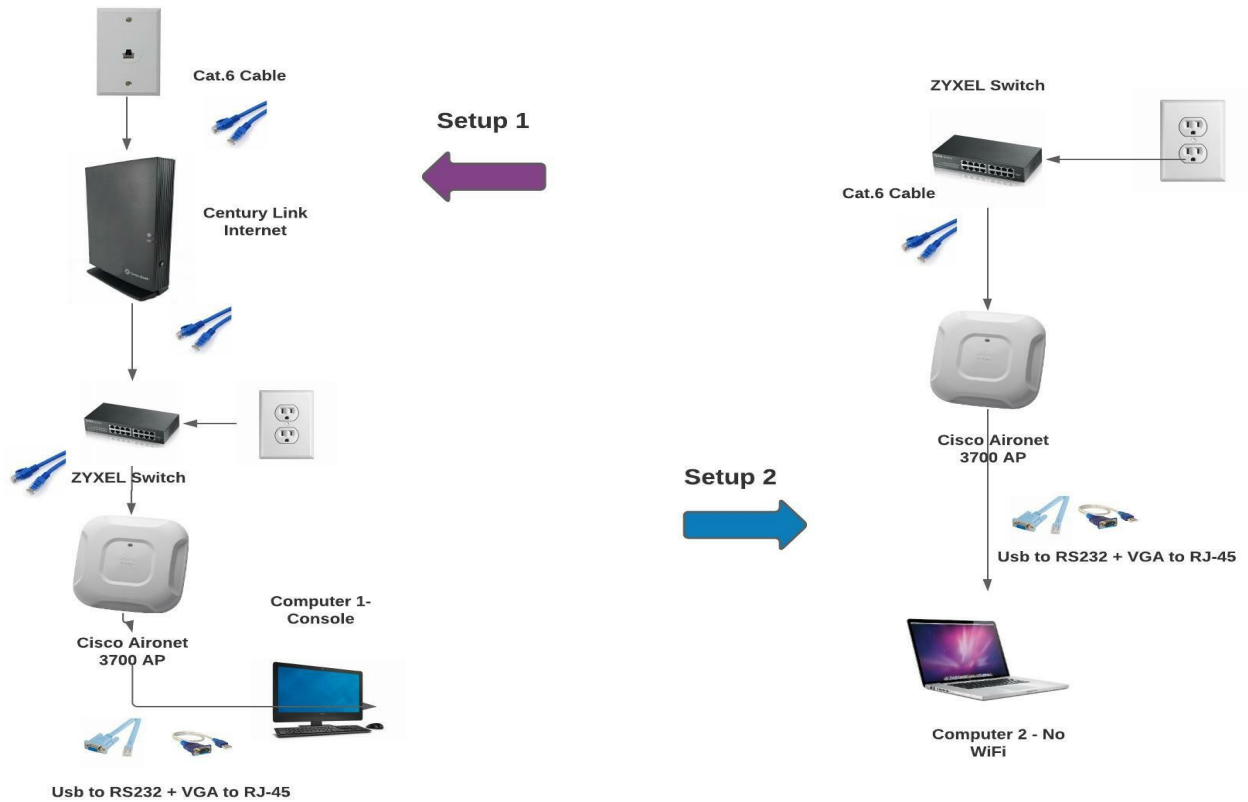


Illustration 1: Network layout – For Setup 1 and Setup 2

Turn on the **ZYXEL switch** on, and make sure the USB is plugged in and make sure the computer pickups the USB.

Open up you Linux **Terminal**

Type **sudo putty** in Terminal

```

dez@dwez: ~
File Edit View Search Terminal Help
dez@dwez:~$ sudo putty

```

Figure 1: Terminal - sudo putty

Type your **password** ----

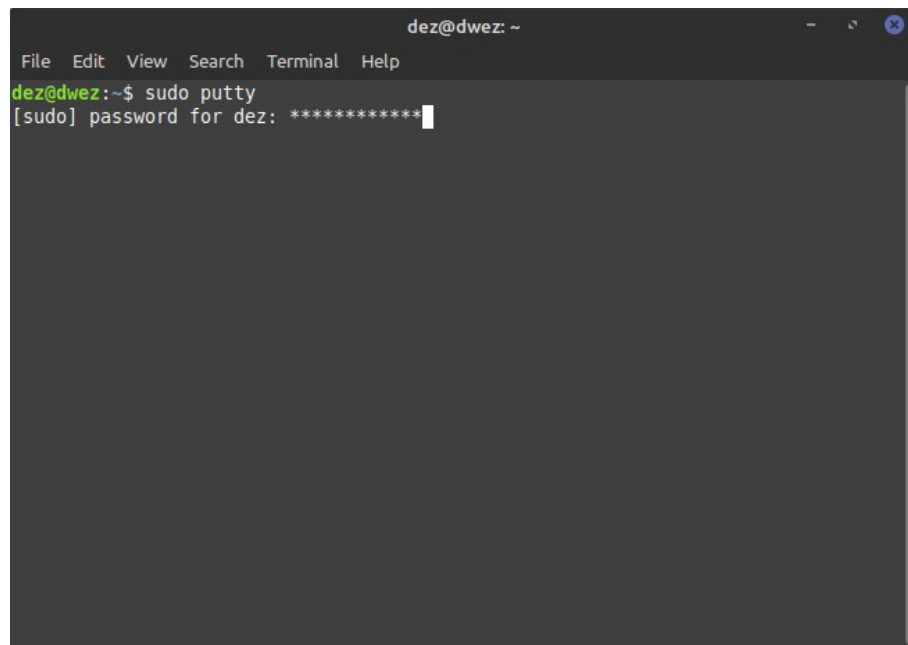


Figure 2: Type password

After your putty should open up.
Serial Line – Location should be open
Speed – 9600

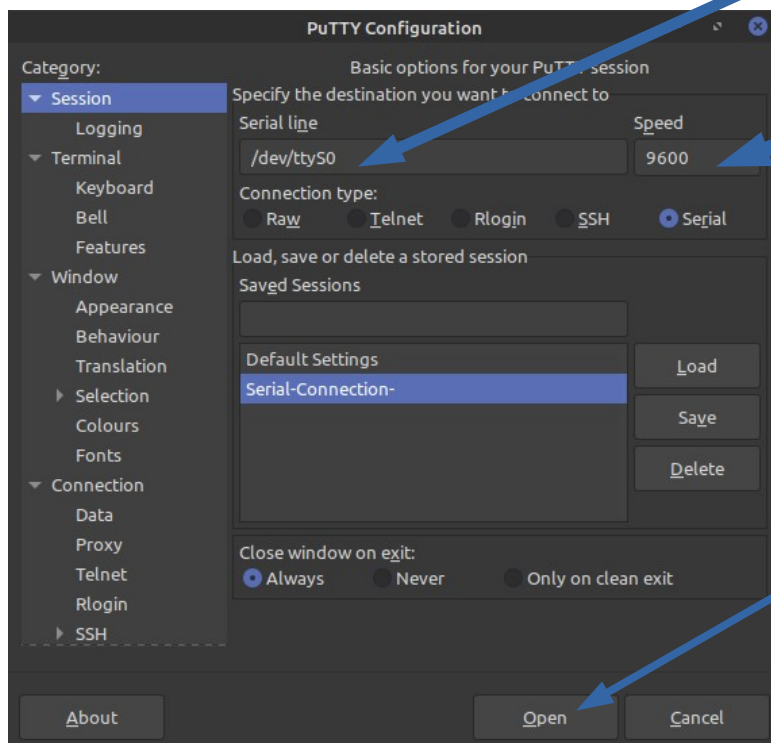


Figure 3: PuTTY - Make sure these are the same

Setup 1 – This is the first part of this process. Input the following commands:

```
ap> enable
Password: Cisco
ap# show running-config
```

(See if anything is configure- Move on if ok)

```
ap# hostname net3720-ap46
```

```
ap# config-term
```

```
net3720-ap46(config)#dot11 ssid net3720-Hernandez-bridge
```

```
net3720-ap46(config-ssid)#authentication open
```

```
net3720-ap46(config-ssid)#authentication key-management wpa version
```

```
net3720-ap46(config-ssid)#wpa-psk ascii 0 8012592236 (NOTE: This is a password and needs to be a
number )
```

```
net3720-ap46(config-ssid)#interface Dot11Radio1
```

```
net3720-ap46(config-if)#encryption mode ciphers aes-ccm
```

```
net3720-ap46(config-if)#ssid net3720-Hernandez-bridge
```

```
net3720-ap46(config-if)#channel 165
```

```
net3720-ap46(config-if)#station-role root bridge
```

```
net3720-ap46(config-if)#no shutdown
```

```

/dev/ttyUSB0 - PuTTY
net3720-ap46>
net3720-ap46>enable
Password:
net3720-ap46#
net3720-ap46#
net3720-ap46#show dot11
net3720-ap46#show dot11 as
net3720-ap46#show dot11 associations al
net3720-ap46#show dot11 associations all-client
Address      : d8b1.9031.7680      Name      : NONE
IP Address   : 0.0.0.0             IPv6 Address :
Gateway Address : 0.0.0.0
Netmask Address : 0.0.0.0          Interface   : Dot11Radio 1
Bridge-group  : 0
reap_flags_1  : 0x0      ip_learn_type : 0x0      transient_static_ip : 0x0
Device        : Br-client      Software Version : NONE
CCX Version    : NONE          Client MFP      : Off

State        : Assoc          Parent      : d8b1.9036.e490
SSID         : net3720-Hernandez-bridge
VLAN         : 0
Hops to Infra : 0
Clients Associated: 0          Repeaters associated: 0
Client Vlan   : 0
11w Status    : Off
Client SGT    : 0

Address      : d8b1.9036.e490      Name      : net3720-ap2
IP Address   : 0.0.0.0             IPv6 Address :
Gateway Address : 0.0.0.0
Netmask Address : 0.0.0.0          Interface   : Dot11Radio 1
Bridge-group  : 1
reap_flags_1  : 0x0      ip_learn_type : 0x0      transient_static_ip : 0x0
Device        : bridge          Software Version : 15.3
CCX Version    : 5              Client MFP      : On

State        : Assoc          Parent      : self
SSID         : net3720-Hernandez-bridge
VLAN         : 0
Hops to Infra : 1              Association Id : 1
Clients Associated: 1          Repeaters associated: 0
Tunnel Address : 0.0.0.0
Key Mgmt type : WPAv2 PSK      Encryption   : AES-CCMP
Current Rate   : a9.3b2        Capability     : WMM ShortHdr 11h
Supported Rates : 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0 m0-2 m1-2 m2-2 m3-2 m4-2 m5-2 m6-2 m7-2 m8-2 m9-2 m10-2 m11-2
m12-2 m13-2 m14-2 m15-2 m16-2 m17-2 m18-2 m19-2 m20-2 m21-2 m22-2 m23-2 a0,1-2 a1,1-2 a2,1-2 a3,1-2 a4,1-2 a5,1-2 a6,1-2
a7,1-2 a8,1-2 a9,1-4 a0,2-2 a1,2-2 a2,2-2 a3,2-2 a4,2-2 a5,2-2 a6,2-2 a7,2-2 a8,2-2 a0,3-2 a1,3-2 a2,3-2 a3,3-2 a4,3-2
a5,3-2 a6,3-2 a7,3-2 a8,3-2 a9,3-2
Voice Rates    : disabled      Bandwidth     : 20 MHz
Signal Strength : -20 dBm      Connected for : 466 seconds
Signal to Noise : 76 dB        Activity Timeout : 29 seconds
Power-save     : Off           Last Activity  : 1 seconds ago
Apss DE AC(s) : NONE

Packets Input  : 42852          Packets Output : 83506
Bytes Input    : 19024353       Bytes Output    : 112751774
Duplicates Rcvd : 0             Data Retries    : 6633
Decrypt Failed : 0              RTS Retries     : 0
MIC Failed     : 0              MIC Missing     : 0
Packets Redirected: 0           Redirect Filtered: 0
IP source guard failed : 0      PPPoE passthrough failed : 0
DAI failed : IP mismatch : 0    src MAC mismatch : 0          target MAC mismatch : 0
Existing IP failed : 0          New IP failed : 0
Client Vlan    : 0
11w Status     : Off
Client SGT     : 0
Session timeout : 0 seconds
Reauthenticate in : never

net3720-ap46#

```

Figure 4: Output: "Show dot11 association all-client"

Setup 2 – Unplug Console cable from the Cisco AP 1 and plug into Cisco AP 2. Make sure switch 2 is powered up. Switch 2 should be plugged into your computer that has no WiFi. (See *Illustration 1*)

Input the following commands:

```
ap>enable
Password: Cisco

ap(config)#hostname net3720-ap2

net3720-ap2(config)#dot11 ssid net3720-Hernandez-bridge

net3720-ap2(config-ssid)#authentication open

net3720-ap2(config-ssid)#authentication key-management wpa version 2

net3720-ap2(config-ssid)#wpa-psk ascii 0 8012592236

net3720-ap2(config-ssid)#interface Dot11Radio1

net3720-ap2(config-if)#encryption mode ciphers aes-ccm

net3720-ap2(config-if)#ssid net3720-Hernandez-bridge

net3720-ap2(config-if)#channel 165

net3720-ap2(config-if)#station-role non-root bridge

net3720-ap2(config-if)#no shut
```

```

net3720-ap2#show dot11
net3720-ap2#show dot11
net3720-ap2#show dot11 ass
net3720-ap2#show dot11 associations all
net3720-ap2#show dot11 associations all-client
Address      : d8b1.9018.ce60      Name      : net3720-ap46
IP Address   : 192.168.0.49      IPv6 Address :
Gateway Address : 0.0.0.0
Netmask Address : 0.0.0.0      Interface : Dot11Radio 1
Bridge-group  : 0
reap_flags_1 : 0x0      ip_learn_type : 0x0      transient_static_ip : 0x0
Device       : bridge      Software Version : 15.3
CCX Version  : 5      Client MFP : On

State        : Assoc      Parent      : -
SSID         : net3720-Hernandez-bridge
VLAN         : 0
Hops to Infra : 0      Association Id : 1
Tunnel Address : 0.0.0.0
Key Mgmt type : WPAv2 PSK      Encryption : AES-CCMP
Current Rate  : a9.3b2      Capability : WMM ShortHdr 11h
Supported Rates : 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0 m0-2 m1-2 m2-2 m3-2 m4-2 m5-2 m6-2 m7-2 m8-2 m9-2 m10-2 m11-2
m12-2 m13-2 m14-2 m15-2 m16-2 m17-2 m18-2 m19-2 m20-2 m21-2 m22-2 m23-2 a0,1-2 a1,1-2 a2,1-2 a3,1-2 a4,1-2 a5,1-2 a6,1-2
a7,1-2 a8,1-2 a9,1-4 a0,2-2 a1,2-2 a2,2-2 a3,2-2 a4,2-2 a5,2-2 a6,2-2 a7,2-2 a8,2-2 a0,3-2 a1,3-2 a2,3-2 a3,3-2 a4,3-2
a5,3-2 a6,3-2 a7,3-2 a8,3-2 a9,3-2
Voice Rates   : disabled      Bandwidth : 20 MHz
Signal Strength : -20 dBm      Connected for : 119 seconds
Signal to Noise : 78 dB      Activity Timeout : 15 seconds
Power-save    : Off      Last Activity : 0 seconds ago
Apsd DE AC(s) : NONE

Packets Input : 81920      Packets Output : 40760
Bytes Input   : 111833206  Bytes Output : 18584751
Duplicates Rcvd : 0      Data Retries : 4172
Decrypt Failed : 0      RTS Retries : 0
MIC Failed    : 0      MIC Missing : 0
Packets Redirected: 0      Redirect Filtered: 0
IP source guard failed : 0      PPPoE passthrough failed : 0
DAI failed : IP mismatch : 0      src MAC mismatch : 0      target MAC mismatch : 0
Existing IP failed : 0      New IP failed : 0
Client Vlan   : 0
llw Status    : Off
Client SGT    : 0

net3720-ap2#

```

Figure 5: Output: "Show dot11 associations all-client"

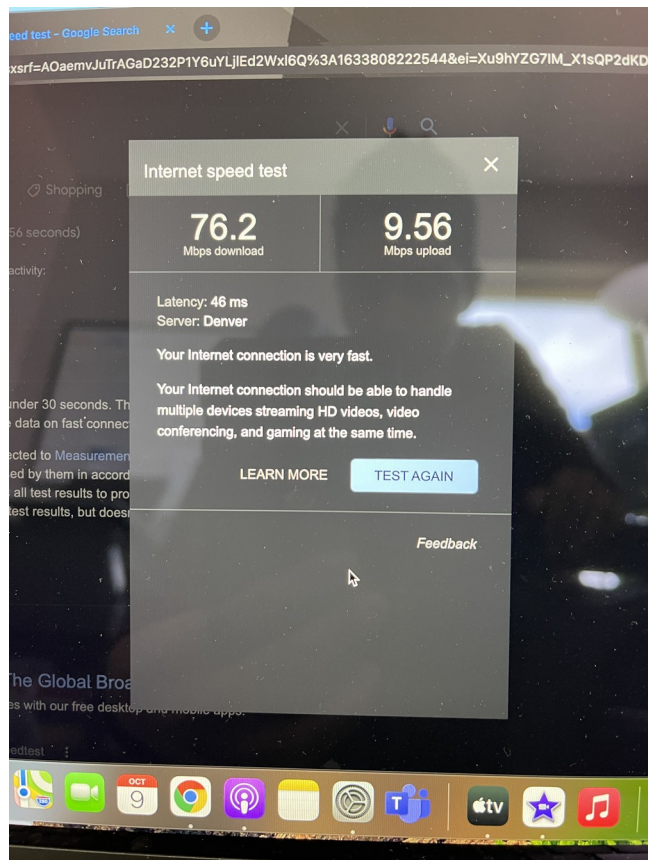


Figure 6: Blue- Both APs have a blue light on, it means its working!



This has an IP address this means you are connected to WiFi now.

Illustration 2: Network- You are connected to WiFi



You can open up your favorite internet browser and see the internet speed.

Illustration 3: Speed- Test the speed

After you are done with all of the configurations run the following commands on both AP's to output the following:

```
net3720-ap2#show tech-support
```

```
----- show running-config -----
```

Building configuration...

Current configuration : 1603 bytes

!

! Last configuration change at 00:14:52 UTC Mon Mar 1 1993

version 15.3

no service pad

service timestamps debug datetime msec

service timestamps log datetime msec

service password-encryption

!

```
hostname net3720-ap2
!
!
logging rate-limit console 9
enable secret 5 <removed>
!
no aaa new-model
no ip source-route
no ip cef
!
!
!
!
dot11 pause-time 100
dot11 syslog
!
dot11 ssid net3720-Hernandez-bridge
    authentication open
    authentication key-management wpa version 2
    wpa-psk ascii 7 065E5F701E1B504B574444
!
!
!
no ipv6 cef
!
!
username Cisco password 7 <removed>
!
!
bridge irb
!
!
!
interface Dot11Radio0
    no ip address
    shutdown
    antenna gain 0
    station-role root
    bridge-group 1
    bridge-group 1 subscriber-loop-control
    bridge-group 1 spanning-disabled
    bridge-group 1 block-unknown-source
    no bridge-group 1 source-learning
    no bridge-group 1 unicast-flooding
!
interface Dot11Radio1
    no ip address
```

```
!  
encryption mode ciphers aes-ccm  
!  
ssid net3720-Hernandez-bridge  
!  
antenna gain 0  
peakdetect  
station-role non-root bridge  
bridge-group 1  
bridge-group 1 spanning-disabled  
!  
interface GigabitEthernet0  
no ip address  
duplex auto  
speed auto  
bridge-group 1  
bridge-group 1 spanning-disabled  
!  
interface BVI1  
mac-address d8b1.9038.86a0  
ip address dhcp client-id GigabitEthernet0  
ipv6 address dhcp  
ipv6 address autoconfig  
ipv6 enable  
!  
ip forward-protocol nd  
no ip http server  
no ip http secure-server  
ip http help-path http://www.cisco.com/warp/public/779/smbiz/prodconfig/help/eag  
!  
!  
bridge 1 route ip  
!  
!  
!  
line con 0  
line vty 0 4  
login local  
transport input all  
!  
end
```

net3720-ap46#show tech-support

----- show running-config -----

Building configuration...

Current configuration : 1633 bytes

!

! Last configuration change at 00:52:38 UTC Mon Mar 1 1993

version 15.3

no service pad

service timestamps debug datetime msec

service timestamps log datetime msec

service password-encryption

!

hostname net3720-ap46

!

!

logging rate-limit console 9

enable secret 5 <removed>

!

no aaa new-model

no ip source-route

no ip cef

!

!

!

!

dot11 pause-time 100

dot11 syslog

!

dot11 ssid net3720-Hernandez-bridge

authentication open

authentication key-management wpa version 2

wpa-psk ascii 7 115149544547525E56797D

!

!

!

no ipv6 cef

!

!

username Cisco password 7 <removed>

!

!

bridge irb

```

!
!
!
interface Dot11Radio0
no ip address
shutdown
antenna gain 0
station-role root
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 spanning-disabled
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
!
interface Dot11Radio1
no ip address
!
encryption mode ciphers aes-ccm
!
ssid net3720-Hernandez-bridge
!
antenna gain 0
peakdetect
no dfs band block
channel 5825
station-role root bridge
bridge-group 1
bridge-group 1 spanning-disabled
!
interface GigabitEthernet0
no ip address
duplex auto
speed auto
bridge-group 1
bridge-group 1 spanning-disabled
!
interface BVI1
mac-address d8b1.9043.08bc
ip address dhcp client-id GigabitEthernet0
ipv6 address dhcp
ipv6 address autoconfig
ipv6 enable
!
ip forward-protocol nd
no ip http server
no ip http secure-server

```

```
ip http help-path http://www.cisco.com/warp/public/779/smbiz/prodconfig/help/eag
!  
!  
bridge 1 route ip  
!  
!  
!  
line con 0  
line vty 0 4  
  login local  
  transport input all  
!  
end
```

References

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