

# NET3720 - Fall 2021 – Jenkins

## Lab 6 – Rate Vs. Range

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### Lab Objectives:

- Connect (2) Cisco AP's and find the Rate Vs. Range

### Hardware needed:

- (2) Cisco Aironet 3700 AP
- (2) ZYCEL PoE Switch
- (1) USB to RS232 cable
- Computer 1 – Console
- 

### 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 configure the range and rate between both AP's

### Method:

Power up two ZYXEL switches, and open up lab 5 commands after that. Open up PuTTY and click on **Serial** then type **/dev/ttyUSB0** and then open.

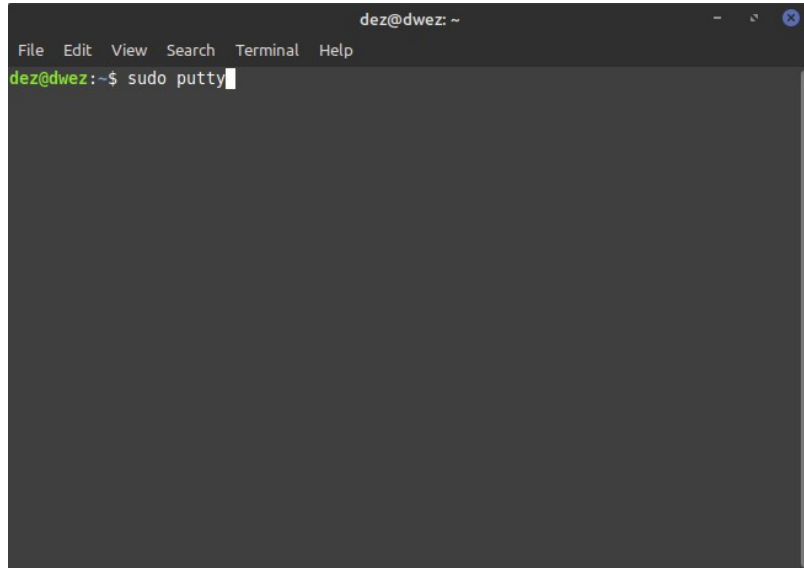
### Connections:

Get a cat6 cable connect to the **ZYXEL switch**, Do this twice to both switches. Get your console computer and connect the USB to RS232 to your computer. Connect a bridge between both AP's. So make sure your AP's are connected to their own switch.

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

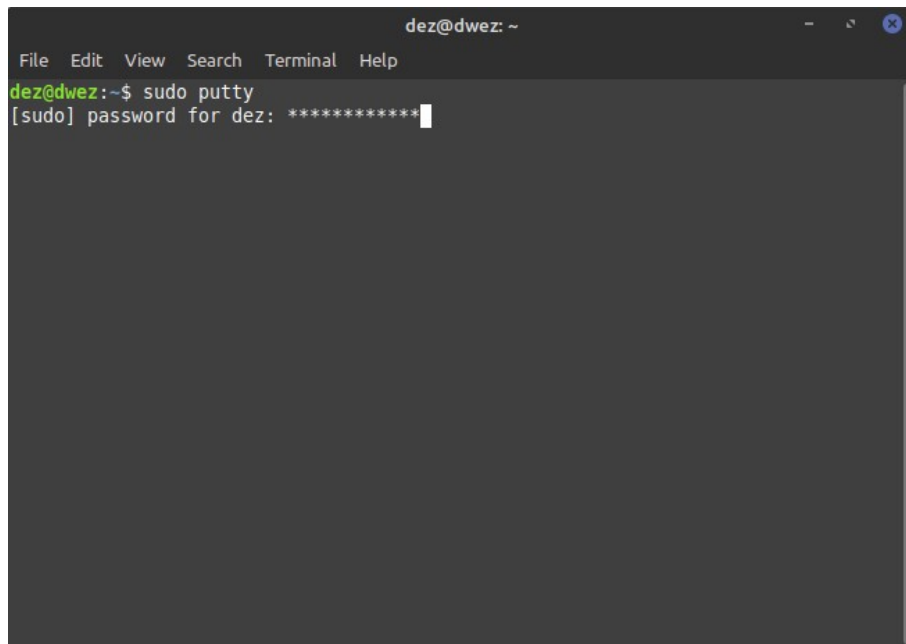
Open up you Linux **Terminal**

Type **sudo putty** in Terminal



*Figure 1: Terminal - sudo putty*

Type your **password** ----



*Figure 2: Type password*

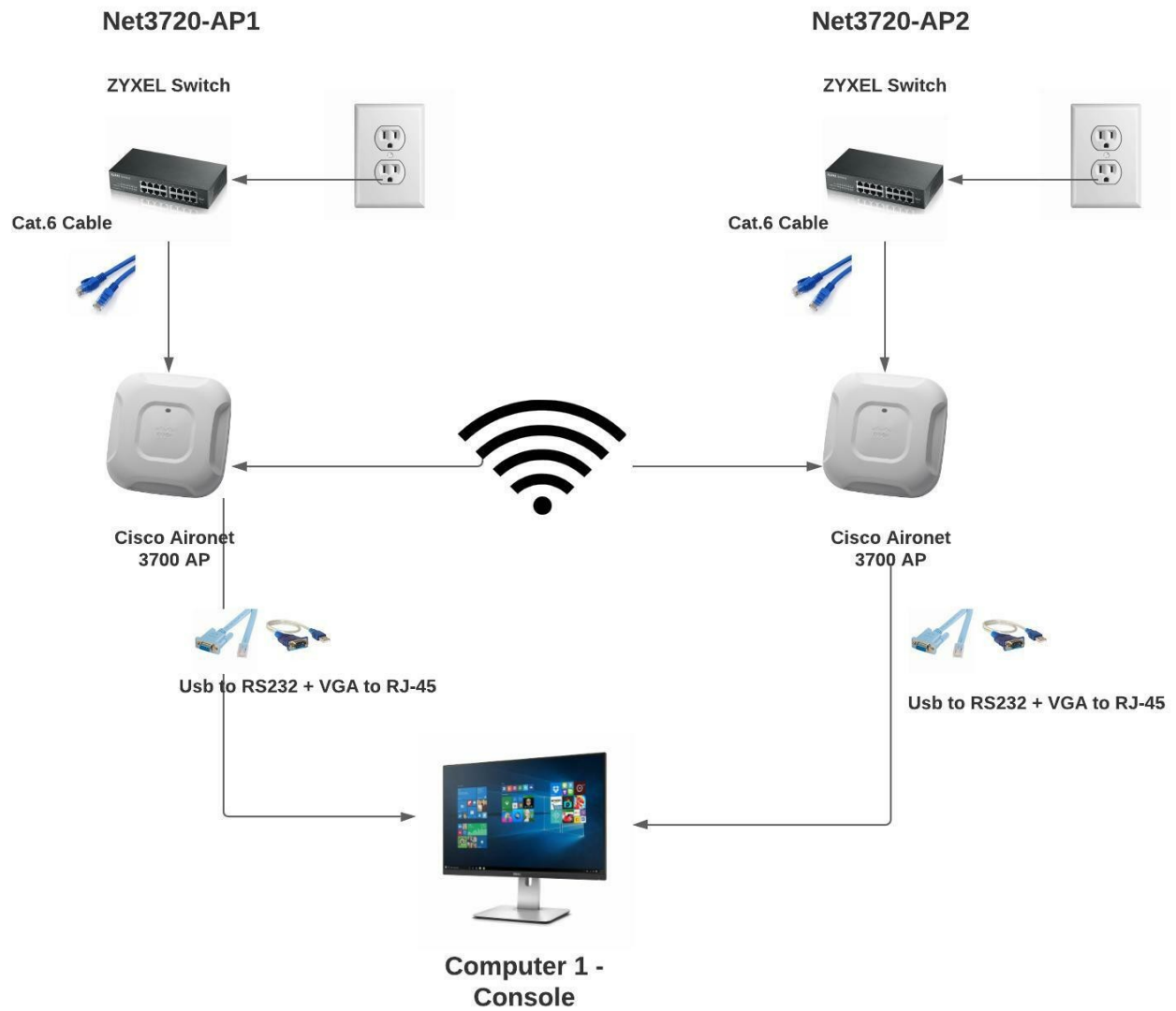
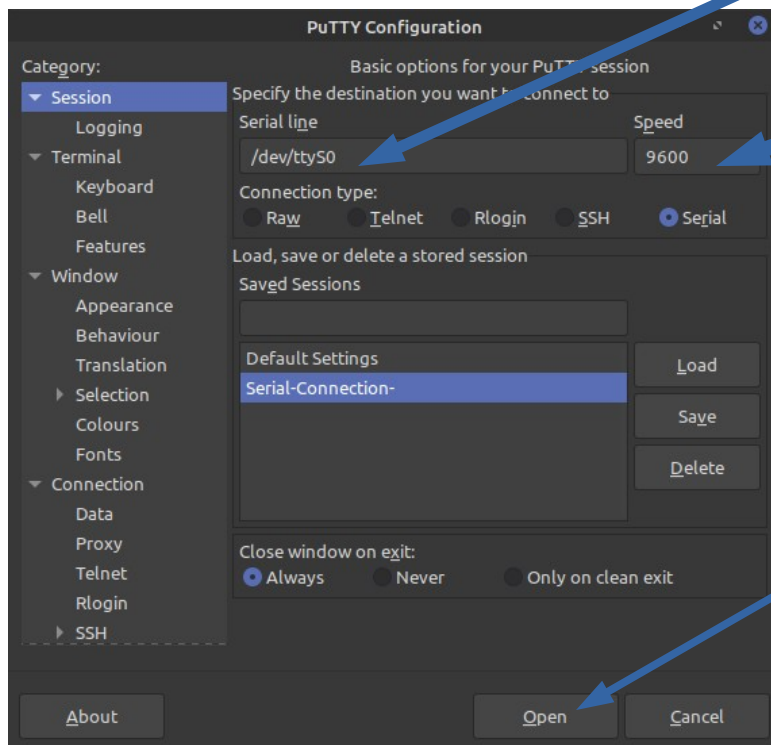


Figure 3: Network layout

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



**Setup 1 – This is the first part of this process. Input the**

Figure 4: PuTTY - Make sure these are the same

# AP1 Configuration

## Following commands:

```
ap> enable
```

```
Password: Cisco
```

```
ap# show running-config
```

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

```
ap# hostname net3720-ap1
```

```
ap# config-term
```

```
net3720-ap1(config)#dot11 ssid net3720-Hernandez-bridge
```

```
net3720-ap1(config-ssid)#authentication open
```

```
net3720-ap1(config-ssid)#authentication key-management wpa version
```

```
net3720-ap1(config-ssid)#wpa-psk ascii 0 8012592236 (NOTE: This is a password and needs to be a  
number )
```

```
net3720-ap1(config-ssid)#interface Dot11Radio1
```

```
net3720-ap1(config-if)#encryption mode ciphers aes-ccm
```

```
net3720-ap1(config-if)#ssid net3720-Hernandez-bridge
```

```
net3720-ap1(config-if)#channel 165
```

```
net3720-ap1(config-if)#station-role root bridge
```

```
net3720-ap1(config-if)#no shut
```

```
net3720-ap1(config)#interface BVI 1
```

```
net3720-ap1(config-if)#ip address 10.1.1.1 255.255.255.0 (NOTE: I picked 10.1.1.1)
```

## AP2 Configuration

**Setup 2 – Unplug Console cable from the Cisco AP 1 and plug into Cisco AP 2. Make sure switch 2 is powered up.**

**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(config)#interface BVI1

Net3720-ap2(config-if)#ip address 10.1.1.1 255.255.255.0
```

## Capturing the packet rates

We are now going to do 4 different test and see how we are able to get the rates of each packets. From on top each other. 10 ft away, 20 ft away and over 30 ft away.

Input the following commands after each attempt:

```
net3720-ap1# clear counters dot11radio 1
```

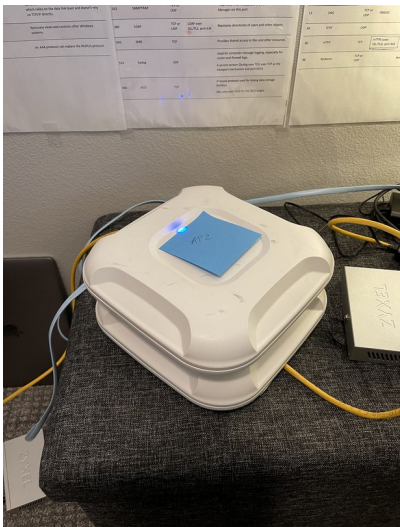
```
net3720-ap1#ping ip 10.1.1.2 size 18024 repeat 60000
```

```
net3720-ap1# show dot11 associations all-client
```

```
net3720-ap1#show controllers dot11Radio 1 radio-stats
```

### Attempt 1: AP's stacked on top of each other with AP1

The following input will be the packet rates of the AP's when they are stacked on top of each other



*Figure 5: AP's stacked on top of each other- Blue light means they are communicating*

```
/dev/ttyUSB0 - PuTTY
net3720-ap1#show controllers dot11Radio 1 radi
net3720-ap1#show controllers dot11Radio 1 radio-stats
DOT11 Statistics (Cumulative Total/Last 5 Seconds):
RECEIVER                                TRANSMITTER
Host Rx K Bytes:    1082587 / 0          Host Tx K Bytes:    1107194 / 0
Unicasts Rx:        780470 / 4          Unicasts Tx:        803054 / 5
Unicasts to host:    780470 / 4          Unicasts by host:   780367 / 4
Broadcasts Rx:       549 / 2            Broadcasts Tx:       13220 / 48
Beacons Rx:          0 / 0             Beacons Tx:         13220 / 48
Broadcasts to host:  549 / 2            Broadcasts by host:  0 / 0
Multicasts Rx:       0 / 0             Multicasts Tx:      0 / 0
Multicasts to host:  0 / 0             Multicasts by host: 0 / 0
Mgmt Packets Rx:     565 / 2            Mgmt Packets Tx:    27 / 0
RTS received:        0 / 0             RTS transmitted:    23473 / 0
Duplicate frames:    0 / 0             CTS not received:   305 / 0
CRC errors:          57201 / 41         Unicast Fragments Tx: 803054 / 5
WEP errors:          0 / 0             Retries:            62849 / 2
Buffer full:         0 / 0             Packets one retry:   22003 / 0
Host buffer full:    0 / 0             Packets / 1 reorg.   13188 / 1
Header CRC errors:   0 / 0             Protocol defers:     0 / 0
Invalid header:      0 / 0             Energy detect defers: 0 / 0
Length invalid:      0 / 0             Jammer detected:     0 / 0
Incomplete fragments: 0 / 0            Packets aged:        0 / 0
Rx Concats:          0 / 0            Tx Concats:          0 / 0
R2H Buffer full:     0 / 0
Rx err len pkt:      0 / 0

Tx Watchdog stats:
Tx SW Watchdog      0 / 0
Tx HW Watchdog      0 / 0

RATE 6.0
Rx Packets:        574 / 2          Tx Packets:         25 / 0
Rx Bytes:          76342 / 318      Tx Bytes:           2270 / 0
RTS Retries:       0 / 0           Data Retries:       0 / 0

RATE a3,1-2
Rx Packets:        45 / 0          Tx Packets:         29 / 0
Rx Bytes:          67860 / 0        Tx Bytes:           40832 / 0
RTS Retries:       0 / 0           Data Retries:       150 / 0

RATE a5,1-2
Rx Packets:       2041 / 0          Tx Packets:         86 / 0
Rx Bytes:        3030044 / 0        Tx Bytes:          122398 / 0
RTS Retries:       0 / 0           Data Retries:       333 / 0

RATE a7,1-2
Rx Packets:        2 / 0          Tx Packets:         0 / 0
Rx Bytes:          382 / 0          Tx Bytes:           0 / 0
RTS Retries:       0 / 0           Data Retries:       0 / 0

RATE a3,2-2
Rx Packets:        0 / 0          Tx Packets:        213 / 0
Rx Bytes:          0 / 0          Tx Bytes:          321204 / 0
RTS Retries:       0 / 0          Data Retries:       639 / 0

RATE a4,2-2
Rx Packets:        1 / 0          Tx Packets:         1 / 0
Rx Bytes:          50 / 0          Tx Bytes:           50 / 0
RTS Retries:       0 / 0          Data Retries:       0 / 0

RATE a5,2-2
Rx Packets:       4786 / 0          Tx Packets:        1068 / 0
Rx Bytes:        6939642 / 0        Tx Bytes:        1599768 / 0
RTS Retries:       0 / 0          Data Retries:       3194 / 0

RATE a7,2-2
Rx Packets:        1 / 0          Tx Packets:         1 / 0
Rx Bytes:          50 / 0          Tx Bytes:           50 / 0
RTS Retries:       0 / 0          Data Retries:       0 / 0

RATE a8,2-2
```

Figure 6: Phase 1- Rates print out



```

/dev/ttyUSB0 - PuTTY

RATE a5,1-2
Rx Packets:      2041 / 0      Tx Packets:      86 / 0
Rx Bytes:      3030044 / 0      Tx Bytes:      122338 / 0
RTS Retries:      0 / 0      Data Retries:      333 / 0

RATE a7,1-2
Rx Packets:      2 / 0      Tx Packets:      0 / 0
Rx Bytes:      382 / 0      Tx Bytes:      0 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a3,2-2
Rx Packets:      0 / 0      Tx Packets:      213 / 0
Rx Bytes:      0 / 0      Tx Bytes:      321204 / 0
RTS Retries:      0 / 0      Data Retries:      639 / 0

RATE a4,2-2
Rx Packets:      1 / 0      Tx Packets:      1 / 0
Rx Bytes:      50 / 0      Tx Bytes:      50 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a5,2-2
Rx Packets:      4786 / 0      Tx Packets:      1068 / 0
Rx Bytes:      6939642 / 0      Tx Bytes:      1599768 / 0
RTS Retries:      0 / 0      Data Retries:      3194 / 0

RATE a7,2-2
Rx Packets:      1 / 0      Tx Packets:      1 / 0
Rx Bytes:      50 / 0      Tx Bytes:      50 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a8,2-2
Rx Packets:      0 / 0      Tx Packets:      6 / 0
Rx Bytes:      0 / 0      Tx Bytes:      9048 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a3,3-2
Rx Packets:      1 / 0      Tx Packets:      1 / 0
Rx Bytes:      50 / 0      Tx Bytes:      50 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a4,3-2
Rx Packets:      1 / 0      Tx Packets:      133 / 0
Rx Bytes:      50 / 0      Tx Bytes:      195338 / 0
RTS Retries:      0 / 0      Data Retries:      264 / 0

RATE a5,3-2
Rx Packets:      601 / 0      Tx Packets:      367 / 1
Rx Bytes:      863896 / 0      Tx Bytes:      489648 / 50
RTS Retries:      0 / 0      Data Retries:      726 / 2

RATE a6,3-2
Rx Packets:      0 / 0      Tx Packets:      17 / 0
Rx Bytes:      0 / 0      Tx Bytes:      19238 / 0
RTS Retries:      0 / 0      Data Retries:      4 / 0

RATE a7,3-2
Rx Packets:      22 / 0      Tx Packets:      95091 / 0
Rx Bytes:      30260 / 0      Tx Bytes:      134322187 / 0
RTS Retries:      0 / 0      Data Retries:      9357 / 0

RATE a8,3-2
Rx Packets:      679011 / 0      Tx Packets:      460700 / 0
Rx Bytes:      959205476 / 0      Tx Bytes:      650792797 / 0
RTS Retries:      0 / 0      Data Retries:      44051 / 0

RATE a9,3-2
Rx Packets:      93933 / 4      Tx Packets:      222624 / 3
Rx Bytes:      132101220 / 200      Tx Bytes:      314190428 / 150
RTS Retries:      0 / 0      Data Retries:      4131 / 0

net3720-ap1#
```

Figure 7: Continuing with Phase 1

```

net3720-ap1# clear counters dot11radio 1

net3720-ap1#ping ip 10.1.1.2 size 18024 repeat 60000

net3720-ap1# show dot11 associations all-client

net3720-ap1#show controllers dot11Radio 1 radio-stats

```

## Attempt 2: 10 feet away with AP1

Run the commands above and we will run the attempt from 10 feet away.

```

/dev/ttyUSB0 - PuTTY
Success rate is 100 percent (60000/60000), round-trip min/avg/max = 1/4/32 ms
net3720-ap1#
net3720-ap1#show dot11 associations all-client
Address      : d8b1.9031.7690  Name      : NONE
IP Address   : 0.0.0.0    IPv6 Address :
Gateway Address : 0.0.0.0    Interface : Dot11Radio 1
Network Address : 0.0.0.0
Bridge-group : 0
reap_flags_1 : 0x0    ip_learn_type : 0x0    transient_static_ip : 0x0
Device       : Br-client Software Version : NONE
CCK Version  : NONE    Client WEP : OFF
State        : Assoc   Parent      : d8b1.9035.e490
SSID        : net3720-Hernandez-bridge
VLAN        : 0
Hops to Infra : 0
Clients Associated: 0    Repeaters associated: 0
Client VLAN  : 0
L2L Status   : Off
Client SGT   : 0
Address      : d8b1.9035.e490  Name      : Net3720-ap2
IP Address   : 10.1.1.2    IPv6 Address :
Gateway Address : 0.0.0.0    Interface : Dot11Radio 1
Network Address : 0.0.0.0
Bridge-group : 1
reap_flags_1 : 0x0    ip_learn_type : 0x0    transient_static_ip : 0x0
Device       : bridge Software Version : 15.3
CCK Version  : 5    Client WEP : 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 : WPA2 PSK    Encryption : AES-128
Current Rate  : a5.256    Capability : WMM ShortRate 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 m0.1-2 m1.1-2 m2.1-2 m3.1-2 m4.1-2 m5.1-2 m6.1-2 m7.1-2
m8.1-2 m9.1-2 m10.1-2 m11.1-2 m12.1-2 m13.1-2 m14.1-2 m15.1-2 m16.1-2 m17.1-2 m18.1-2 m19.1-2 m20.1-2 m21.1-2 m22.1-2 m23.1-2
m24.1-2 m25.1-2 m26.1-2 m27.1-2 m28.1-2 m29.1-2 m30.1-2 m31.1-2 m32.1-2 m33.1-2 m34.1-2 m35.1-2 m36.1-2 m37.1-2 m38.1-2 m39.1-2
m40.1-2 m41.1-2 m42.1-2 m43.1-2 m44.1-2 m45.1-2 m46.1-2 m47.1-2 m48.1-2 m49.1-2 m50.1-2 m51.1-2 m52.1-2 m53.1-2 m54.1-2 m55.1-2 m56.1-2 m57.1-2 m58.1-2 m59.1-2 m60.1-2 m61.1-2 m62.1-2 m63.1-2 m64.1-2 m65.1-2 m66.1-2 m67.1-2 m68.1-2 m69.1-2 m70.1-2 m71.1-2 m72.1-2 m73.1-2 m74.1-2 m75.1-2 m76.1-2 m77.1-2 m78.1-2 m79.1-2 m80.1-2 m81.1-2 m82.1-2 m83.1-2 m84.1-2 m85.1-2 m86.1-2 m87.1-2 m88.1-2 m89.1-2 m90.1-2 m91.1-2 m92.1-2 m93.1-2 m94.1-2 m95.1-2 m96.1-2 m97.1-2 m98.1-2 m99.1-2 m100.1-2 m101.1-2 m102.1-2 m103.1-2 m104.1-2 m105.1-2 m106.1-2 m107.1-2 m108.1-2 m109.1-2 m110.1-2 m111.1-2 m112.1-2 m113.1-2 m114.1-2 m115.1-2 m116.1-2 m117.1-2 m118.1-2 m119.1-2 m120.1-2 m121.1-2 m122.1-2 m123.1-2 m124.1-2 m125.1-2 m126.1-2 m127.1-2 m128.1-2 m129.1-2 m130.1-2 m131.1-2 m132.1-2 m133.1-2 m134.1-2 m135.1-2 m136.1-2 m137.1-2 m138.1-2 m139.1-2 m140.1-2 m141.1-2 m142.1-2 m143.1-2 m144.1-2 m145.1-2 m146.1-2 m147.1-2 m148.1-2 m149.1-2 m150.1-2 m151.1-2 m152.1-2 m153.1-2 m154.1-2 m155.1-2 m156.1-2 m157.1-2 m158.1-2 m159.1-2 m160.1-2 m161.1-2 m162.1-2 m163.1-2 m164.1-2 m165.1-2 m166.1-2 m167.1-2 m168.1-2 m169.1-2 m170.1-2 m171.1-2 m172.1-2 m173.1-2 m174.1-2 m175.1-2 m176.1-2 m177.1-2 m178.1-2 m179.1-2 m180.1-2 m181.1-2 m182.1-2 m183.1-2 m184.1-2 m185.1-2 m186.1-2 m187.1-2 m188.1-2 m189.1-2 m190.1-2 m191.1-2 m192.1-2 m193.1-2 m194.1-2 m195.1-2 m196.1-2 m197.1-2 m198.1-2 m199.1-2 m200.1-2 m201.1-2 m202.1-2 m203.1-2 m204.1-2 m205.1-2 m206.1-2 m207.1-2 m208.1-2 m209.1-2 m210.1-2 m211.1-2 m212.1-2 m213.1-2 m214.1-2 m215.1-2 m216.1-2 m217.1-2 m218.1-2 m219.1-2 m220.1-2 m221.1-2 m222.1-2 m223.1-2 m224.1-2 m225.1-2 m226.1-2 m227.1-2 m228.1-2 m229.1-2 m230.1-2 m231.1-2 m232.1-2 m233.1-2 m234.1-2 m235.1-2 m236.1-2 m237.1-2 m238.1-2 m239.1-2 m240.1-2 m241.1-2 m242.1-2 m243.1-2 m244.1-2 m245.1-2 m246.1-2 m247.1-2 m248.1-2 m249.1-2 m250.1-2 m251.1-2 m252.1-2 m253.1-2 m254.1-2 m255.1-2 m256.1-2 m257.1-2 m258.1-2 m259.1-2 m260.1-2 m261.1-2 m262.1-2 m263.1-2 m264.1-2 m265.1-2 m266.1-2 m267.1-2 m268.1-2 m269.1-2 m270.1-2 m271.1-2 m272.1-2 m273.1-2 m274.1-2 m275.1-2 m276.1-2 m277.1-2 m278.1-2 m279.1-2 m280.1-2 m281.1-2 m282.1-2 m283.1-2 m284.1-2 m285.1-2 m286.1-2 m287.1-2 m288.1-2 m289.1-2 m290.1-2 m291.1-2 m292.1-2 m293.1-2 m294.1-2 m295.1-2 m296.1-2 m297.1-2 m298.1-2 m299.1-2 m300.1-2 m301.1-2 m302.1-2 m303.1-2 m304.1-2 m305.1-2 m306.1-2 m307.1-2 m308.1-2 m309.1-2 m310.1-2 m311.1-2 m312.1-2 m313.1-2 m314.1-2 m315.1-2 m316.1-2 m317.1-2 m318.1-2 m319.1-2 m320.1-2 m321.1-2 m322.1-2 m323.1-2 m324.1-2 m325.1-2 m326.1-2 m327.1-2 m328.1-2 m329.1-2 m330.1-2 m331.1-2 m332.1-2 m333.1-2 m334.1-2 m335.1-2 m336.1-2 m337.1-2 m338.1-2 m339.1-2 m340.1-2 m341.1-2 m342.1-2 m343.1-2 m344.1-2 m345.1-2 m346.1-2 m347.1-2 m348.1-2 m349.1-2 m350.1-2 m351.1-2 m352.1-2 m353.1-2 m354.1-2 m355.1-2 m356.1-2 m357.1-2 m358.1-2 m359.1-2 m360.1-2 m361.1-2 m362.1-2 m363.1-2 m364.1-2 m365.1-2 m366.1-2 m367.1-2 m368.1-2 m369.1-2 m370.1-2 m371.1-2 m372.1-2 m373.1-2 m374.1-2 m375.1-2 m376.1-2 m377.1-2 m378.1-2 m379.1-2 m380.1-2 m381.1-2 m382.1-2 m383.1-2 m384.1-2 m385.1-2 m386.1-2 m387.1-2 m388.1-2 m389.1-2 m390.1-2 m391.1-2 m392.1-2 m393.1-2 m394.1-2 m395.1-2 m396.1-2 m397.1-2 m398.1-2 m399.1-2 m400.1-2 m401.1-2 m402.1-2 m403.1-2 m404.1-2 m405.1-2 m406.1-2 m407.1-2 m408.1-2 m409.1-2 m410.1-2 m411.1-2 m412.1-2 m413.1-2 m414.1-2 m415.1-2 m416.1-2 m417.1-2 m418.1-2 m419.1-2 m420.1-2 m421.1-2 m422.1-2 m423.1-2 m424.1-2 m425.1-2 m426.1-2 m427.1-2 m428.1-2 m429.1-2 m430.1-2 m431.1-2 m432.1-2 m433.1-2 m434.1-2 m435.1-2 m436.1-2 m437.1-2 m438.1-2 m439.1-2 m440.1-2 m441.1-2 m442.1-2 m443.1-2 m444.1-2 m445.1-2 m446.1-2 m447.1-2 m448.1-2 m449.1-2 m450.1-2 m451.1-2 m452.1-2 m453.1-2 m454.1-2 m455.1-2 m456.1-2 m457.1-2 m458.1-2 m459.1-2 m460.1-2 m461.1-2 m462.1-2 m463.1-2 m464.1-2 m465.1-2 m466.1-2 m467.1-2 m468.1-2 m469.1-2 m470.1-2 m471.1-2 m472.1-2 m473.1-2 m474.1-2 m475.1-2 m476.1-2 m477.1-2 m478.1-2 m479.1-2 m480.1-2 m481.1-2 m482.1-2 m483.1-2 m484.1-2 m485.1-2 m486.1-2 m487.1-2 m488.1-2 m489.1-2 m490.1-2 m491.1-2 m492.1-2 m493.1-2 m494.1-2 m495.1-2 m496.1-2 m497.1-2 m498.1-2 m499.1-2 m500.1-2 m501.1-2 m502.1-2 m503.1-2 m504.1-2 m505.1-2 m506.1-2 m507.1-2 m508.1-2 m509.1-2 m510.1-2 m511.1-2 m512.1-2 m513.1-2 m514.1-2 m515.1-2 m516.1-2 m517.1-2 m518.1-2 m519.1-2 m520.1-2 m521.1-2 m522.1-2 m523.1-2 m524.1-2 m525.1-2 m526.1-2 m527.1-2 m528.1-2 m529.1-2 m530.1-2 m531.1-2 m532.1-2 m533.1-2 m534.1-2 m535.1-2 m536.1-2 m537.1-2 m538.1-2 m539.1-2 m540.1-2 m541.1-2 m542.1-2 m543.1-2 m544.1-2 m545.1-2 m546.1-2 m547.1-2 m548.1-2 m549.1-2 m550.1-2 m551.1-2 m552.1-2 m553.1-2 m554.1-2 m555.1-2 m556.1-2 m557.1-2 m558.1-2 m559.1-2 m560.1-2 m561.1-2 m562.1-2 m563.1-2 m564.1-2 m565.1-2 m566.1-2 m567.1-2 m568.1-2 m569.1-2 m570.1-2 m571.1-2 m572.1-2 m573.1-2 m574.1-2 m575.1-2 m576.1-2 m577.1-2 m578.1-2 m579.1-2 m580.1-2 m581.1-2 m582.1-2 m583.1-2 m584.1-2 m585.1-2 m586.1-2 m587.1-2 m588.1-2 m589.1-2 m590.1-2 m591.1-2 m592.1-2 m593.1-2 m594.1-2 m595.1-2 m596.1-2 m597.1-2 m598.1-2 m599.1-2 m600.1-2 m601.1-2 m602.1-2 m603.1-2 m604.1-2 m605.1-2 m606.1-2 m607.1-2 m608.1-2 m609.1-2 m610.1-2 m611.1-2 m612.1-2 m613.1-2 m614.1-2 m615.1-2 m616.1-2 m617.1-2 m618.1-2 m619.1-2 m620.1-2 m621.1-2 m622.1-2 m623.1-2 m624.1-2 m625.1-2 m626.1-2 m627.1-2 m628.1-2 m629.1-2 m630.1-2 m631.1-2 m632.1-2 m633.1-2 m634.1-2 m635.1-2 m636.1-2 m637.1-2 m638.1-2 m639.1-2 m640.1-2 m641.1-2 m642.1-2 m643.1-2 m644.1-2 m645.1-2 m646.1-2 m647.1-2 m648.1-2 m649.1-2 m650.1-2 m651.1-2 m652.1-2 m653.1-2 m654.1-2 m655.1-2 m656.1-2 m657.1-2 m658.1-2 m659.1-2 m660.1-2 m661.1-2 m662.1-2 m663.1-2 m664.1-2 m665.1-2 m666.1-2 m667.1-2 m668.1-2 m669.1-2 m670.1-2 m671.1-2 m672.1-2 m673.1-2 m674.1-2 m675.1-2 m676.1-2 m677.1-2 m678.1-2 m679.1-2 m680.1-2 m681.1-2 m682.1-2 m683.1-2 m684.1-2 m685.1-2 m686.1-2 m687.1-2 m688.1-2 m689.1-2 m690.1-2 m691.1-2 m692.1-2 m693.1-2 m694.1-2 m695.1-2 m696.1-2 m697.1-2 m698.1-2 m699.1-2 m700.1-2 m701.1-2 m702.1-2 m703.1-2 m704.1-2 m705.1-2 m706.1-2 m707.1-2 m708.1-2 m709.1-2 m710.1-2 m711.1-2 m712.1-2 m713.1-2 m714.1-2 m715.1-2 m716.1-2 m717.1-2 m718.1-2 m719.1-2 m720.1-2 m721.1-2 m722.1-2 m723.1-2 m724.1-2 m725.1-2 m726.1-2 m727.1-2 m728.1-2 m729.1-2 m730.1-2 m731.1-2 m732.1-2 m733.1-2 m734.1-2 m735.1-2 m736.1-2 m737.1-2 m738.1-2 m739.1-2 m740.1-2 m741.1-2 m742.1-2 m743.1-2 m744.1-2 m745.1-2 m746.1-2 m747.1-2 m748.1-2 m749.1-2 m750.1-2 m751.1-2 m752.1-2 m753.1-2 m754.1-2 m755.1-2 m756.1-2 m757.1-2 m758.1-2 m759.1-2 m760.1-2 m761.1-2 m762.1-2 m763.1-2 m764.1-2 m765.1-2 m766.1-2 m767.1-2 m768.1-2 m769.1-2 m770.1-2 m771.1-2 m772.1-2 m773.1-2 m774.1-2 m775.1-2 m776.1-2 m777.1-2 m778.1-2 m779.1-2 m780.1-2 m781.1-2 m782.1-2 m783.1-2 m784.1-2 m785.1-2 m786.1-2 m787.1-2 m788.1-2 m789.1-2 m790.1-2 m791.1-2 m792.1-2 m793.1-2 m794.1-2 m795.1-2 m796.1-2 m797.1-2 m798.1-2 m799.1-2 m800.1-2 m801.1-2 m802.1-2 m803.1-2 m804.1-2 m805.1-2 m806.1-2 m807.1-2 m808.1-2 m809.1-2 m810.1-2 m811.1-2 m812.1-2 m813.1-2 m814.1-2 m815.1-2 m816.1-2 m817.1-2 m818.1-2 m819.1-2 m820.1-2 m821.1-2 m822.1-2 m823.1-2 m824.1-2 m825.1-2 m826.1-2 m827.1-2 m828.1-2 m829.1-2 m830.1-2 m831.1-2 m832.1-2 m833.1-2 m834.1-2 m835.1-2 m836.1-2 m837.1-2 m838.1-2 m839.1-2 m840.1-2 m841.1-2 m842.1-2 m843.1-2 m844.1-2 m845.1-2 m846.1-2 m847.1-2 m848.1-2 m849.1-2 m850.1-2 m851.1-2 m852.1-2 m853.1-2 m854.1-2 m855.1-2 m856.1-2 m857.1-2 m858.1-2 m859.1-2 m860.1-2 m861.1-2 m862.1-2 m863.1-2 m864.1-2 m865.1-2 m866.1-2 m867.1-2 m868.1-2 m869.1-2 m870.1-2 m871.1-2 m872.1-2 m873.1-2 m874.1-2 m875.1-2 m876.1-2 m877.1-2 m878.1-2 m879.1-2 m880.1-2 m881.1-2 m882.1-2 m883.1-2 m884.1-2 m885.1-2 m886.1-2 m887.1-2 m888.1-2 m889.1-2 m890.1-2 m891.1-2 m892.1-2 m893.1-2 m894.1-2 m895.1-2 m896.1-2 m897.1-2 m898.1-2 m899.1-2 m900.1-2 m901.1-2 m902.1-2 m903.1-2 m904.1-2 m905.1-2 m906.1-2 m907.1-2 m908.1-2 m909.1-2 m910.1-2 m911.1-2 m912.1-2 m913.1-2 m914.1-2 m915.1-2 m916.1-2 m917.1-2 m918.1-2 m919.1-2 m920.1-2 m921.1-2 m922.1-2 m923.1-2 m924.1-2 m925.1-2 m926.1-2 m927.1-2 m928.1-2 m929.1-2 m930.1-2 m931.1-2 m932.1-2 m933.1-2 m934.1-2 m935.1-2 m936.1-2 m937.1-2 m938.1-2 m939.1-2 m940.1-2 m941.1-2 m942.1-2 m943.1-2 m944.1-2 m945.1-2 m946.1-2 m947.1-2 m948.1-2 m949.1-2 m950.1-2 m951.1-2 m952.1-2 m953.1-2 m954.1-2 m955.1-2 m956.1-2 m957.1-2 m958.1-2 m959.1-2 m960.1-2 m961.1-2 m962.1-2 m963.1-2 m964.1-2 m965.1-2 m966.1-2 m967.1-2 m968.1-2 m969.1-2 m970.1-2 m971.1-2 m972.1-2 m973.1-2 m974.1-2 m975.1-2 m976.1-2 m977.1-2 m978.1-2 m979.1-2 m980.1-2 m981.1-2 m982.1-2 m983.1-2 m984.1-2 m985.1-2 m986.1-2 m987.1-2 m988.1-2 m989.1-2 m990.1-2 m991.1-2 m992.1-2 m993.1-2 m994.1-2 m995.1-2 m996.1-2 m997.1-2 m998.1-2 m999.1-2 m1000.1-2 m1001.1-2 m1002.1-2 m1003.1-2 m1004.1-2 m1005.1-2 m1006.1-2 m1007.1-2 m1008.1-2 m1009.1-2 m1010.1-2 m1011.1-2 m1012.1-2 m1013.1-2 m1014.1-2 m1015.1-2 m1016.1-2 m1017.1-2 m1018.1-2 m1019.1-2 m1020.1-2 m1021.1-2 m1022.1-2 m1023.1-2 m1024.1-2 m1025.1-2 m1026.1-2 m1027.1-2 m1028.1-2 m1029.1-2 m1030.1-2 m1031.1-2 m1032.1-2 m1033.1-2 m1034.1-2 m1035.1-2 m1036.1-2 m1037.1-2 m1038.1-2 m1039.1-2 m1040.1-2 m1041.1-2 m1042.1-2 m1043.1-2 m1044.1-2 m1045.1-2 m1046.1-2 m1047.1-2 m1048.1-2 m1049.1-2 m1050.1-2 m1051.1-2 m1052.1-2 m1053.1-2 m1054.1-2 m1055.1-2 m1056.1-2 m1057.1-2 m1058.1-2 m1059.1-2 m1060.1-2 m1061.1-2 m1062.1-2 m1063.1-2 m1064.1-2 m1065.1-2 m1066.1-2 m1067.1-2 m1068.1-2 m1069.1-2 m1070.1-2 m1071.1-2 m1072.1-2 m1073.1-2 m1074.1-2 m1075.1-2 m1076.1-2 m1077.1-2 m1078.1-2 m1079.1-2 m1080.1-2 m1081.1-2 m1082.1-2 m1083.1-2 m1084.1-2 m1085.1-2 m1086.1-2 m1087.1-2 m1088.1-2 m1089.1-2 m1090.1-2 m1091.1-2 m1092.1-2 m1093.1-2 m1094.1-2 m1095.1-2 m1096.1-2 m1097.1-2 m1098.1-2 m1099.1-2 m1100.1-2 m1101.1-2 m1102.1-2 m1103.1-2 m1104.1-2 m1105.1-2 m1106.1-2 m1107.1-2 m1108.1-2 m1109.1-2 m1110.1-2 m1111.1-2 m1112.1-2 m1113.1-2 m1114.1-2 m1115.1-2 m1116.1-2 m1117.1-2 m1118.1-2 m1119.1-2 m1120.1-2 m1121.1-2 m1122.1-2 m1123.1-2 m1124.1-2 m1125.1-2 m1126.1-2 m1127.1-2 m1128.1-2 m1129.1-2 m1130.1-2 m1131.1-2 m1132.1-2 m1133.1-2 m1134.1-2 m1135.1-2 m1136.1-2 m1137.1-2 m1138.1-2 m1139.1-2 m1140.1-2 m1141.1-2 m1142.1-2 m1143.1-2 m1144.1-2 m1145.1-2 m1146.1-2 m1147.1-2 m1148.1-2 m1149.1-2 m1150.1-2 m1151.1-2 m1152.1-2 m1153.1-2 m1154.1-2 m1155.1-2 m1156.1-2 m1157.1-2 m1158.1-2 m1159.1-2 m1160.1-2 m1161.1-2 m1162.1-2 m1163.1-2 m1164.1-2 m1165.1-2 m1166.1-2 m1167.1-2 m1168.1-2 m1169.1-2 m1170.1-2 m1171.1-2 m1172.1-2 m1173.1-2 m1174.1-2 m1175.1-2 m1176.1-2 m1177.1-2 m1178.1-2 m1179.1-2 m1180.1-2 m1181.1-2 m1182.1-2 m1183.1-2 m1184.1-2 m1185.1-2 m1186.1-2 m1187.1-2 m1188.1-2 m1189.1-2 m1190.1-2 m1191.1-2 m1192.1-2 m1193.1-2 m1194.1-2 m1195.1-2 m1196.1-2 m1197.1-2 m1198.1-2 m1199.1-2 m1200.1-2 m1201.1-2 m1202.1-2 m1203.1-2 m1204.1-2 m1205.1-2 m1206.1-2 m1207.1-2 m1208.1-2 m1209.1-2 m1210.1-2 m1211.1-2 m1212.1-2 m1213.1-2 m1214.1-2 m1215.1-2 m1216.1-2 m1217.1-2 m1218.1-2 m1219.1-2 m1220.1-2 m1221.1-2 m1222.1-2 m1223.1-2 m1224.1-2 m1225.1-2 m1226.1-2 m1227.1-2 m1228.1-2 m1229.1-2 m1230.1-2 m1231.1-2 m1232.1-2 m1233.1-2 m1234.1-2 m1235.1-2 m1236.1-2 m1237.1-2 m1238.1-2 m1239.1-2 m1240.1-2 m1241.1-2 m1242.1-2 m1243.1-2 m1244.1-2 m1245.1-2 m1246.1-2 m1247.1-2 m1248.1-2 m1249.1-2 m1250.1-2 m1251.1-2 m1252.1-2 m1253.1-2 m1254.1-2 m1255.1-2 m1256.1-2 m1257.1-2 m1258.1-2 m1259.1-2 m1260.1-2 m1261.1-2 m1262.1-2 m1263.1-2 m1264.1-2 m1265.1-2 m1266.1-2 m1267.1-2 m1268.1-2 m1269.1-2 m1270.1-2 m1271.1-2 m1272.1-2 m1273.1-2 m1274.1-2 m1275.1-2 m1276.1-2 m1277.1-2 m1278.1-2 m1279.1-2 m1280.1-2 m1281.1-2 m1282.1-2 m1283.1-2 m1284.1-2 m1285.1-2 m1286.1-2 m1287.1-2 m1288.1-2 m1289.1-2 m1290.1-2 m1291.1-2 m1292.1-2 m1293.1-2 m1294.1-2 m1295.1-2 m1296.1-2 m1297.1-2 m1298.1-2 m1299.1-2 m1300.1-2 m1301.1-2 m1302.1-2 m1303.1-2 m1304.1-2 m1305.1-2 m1306.1-2 m1307.1-2 m1308.1-2 m1309.1-2 m1310.1-2 m1311.1-2 m1312.1-2 m1313.1-2 m1314.1-2 m1315.1-2 m1316.1-2 m1317.1-2 m1318.1-2 m1319.1-2 m1320.1-2 m1321.1-2 m1322.1-2 m1323.1-2 m1324.1-2 m1325.1-2 m1326.1-2 m1327.1-2 m1328.1-2 m1329.1-2 m1330.1-2 m1331.1-2 m1332.1-2 m1333.1-2 m1334.1-2 m1335.1-2 m1336.1-2 m1337.1-2 m1338.1-2 m1339.1-2 m1340.1-2 m1341.1-2 m1342.1-2 m1343.1-2 m1344.1-2 m1345.1-2 m1346.1-2 m1347.1-2 m1348.1-2 m1349.1-2 m1350.1-2 m1351.1-2 m1352.1-2 m1353.1-2 m1354.1-2 m1355.1-2 m1356.1-2 m1357.1-2 m1358.1-2 m1359.1-2 m1360.1-2 m1361.1-2 m1362.1-2 m1363.1-2 m1364.1-2 m1365.1-2 m1366.1-2 m1367.1-2 m1368.1-2 m1369.1-2 m1370.1-2 m1371.1-2 m1372.1-2 m1373.1-2 m1374.1-2 m1375.1-2 m1376.1-2 m1377.1-2 m1378.1-2 m1379.1-2 m1380.1-2 m1381.1-2 m1382.1-2 m1383.1-2 m1384.1-2 m1385.1-2 m1386.1-2 m1387.1-2 m1388.1-2 m1389.1-2 m1390.1-2 m1391.1-2 m1392.1-2
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net3720-ap1#show controllers dot11Radio 1 radio-stats
DOT11 Statistics (Cumulative Total/Last 5 Seconds):
RECEIVER
Host Rx K Bytes: 1082567 / 0
Unicasts Rx: 780240 / 4
Unicasts to host: 780240 / 4
Broadcasts Rx: 230 / 3
Beacons Rx: 0 / 0
Broadcasts to host: 230 / 3
Multicasts Rx: 0 / 0
Multicasts to host: 0 / 0
Mgmt Packets Rx: 230 / 3
RTS received: 0 / 0
Duplicate frames: 0 / 0
CRC errors: 55707 / 25
WEP errors: 0 / 0
Buffer full: 0 / 0
Host buffer full: 0 / 0
Header CRC errors: 0 / 0
Invalid header: 0 / 0
Length invalid: 0 / 0
Incomplete fragments: 0 / 0
Rx Concats: 0 / 0
R2H Buffer full: 0 / 0
Rx err len pkt: 0 / 0

TRANSMITTER
Host Tx K Bytes: 1092370 / 0
Unicasts Tx: 791864 / 5
Unicasts by host: 780123 / 4
Broadcasts Tx: 4117 / 48
Beacons Tx: 4117 / 48
Broadcasts by host: 0 / 0
Multicasts Tx: 0 / 0
Multicasts by host: 0 / 0
Mgmt Packets Tx: 0 / 0
RTS transmitted: 14788 / 0
CTS not received: 129 / 0
Unicast Fragments Tx: 791866 / 5
Retries: 34522 / 2
Packets one retry: 23372 / 0
Packets > 1 retry: 5575 / 1
Protocol defers: 0 / 0
Energy detect defers: 0 / 0
Jammer detected: 0 / 0
Packets aged: 0 / 0
Tx Concats: 0 / 0

Tx Watchdog stats:
Tx SW Watchdog 0 / 0
Tx HW Watchdog 0 / 0

RATE 6.0
Rx Packets: 230 / 3
Rx Bytes: 41607 / 598
RTS Retries: 0 / 0
Tx Packets: 0 / 0
Tx Bytes: 0 / 0
Data Retries: 0 / 0

RATE a7,1-2
Rx Packets: 2 / 0
Rx Bytes: 100 / 0
RTS Retries: 0 / 0
Tx Packets: 2 / 0
Tx Bytes: 100 / 0
Data Retries: 0 / 0

RATE a5,2-2
Rx Packets: 4 / 0
Rx Bytes: 3116 / 0
RTS Retries: 0 / 0
Tx Packets: 2 / 0
Tx Bytes: 100 / 0
Data Retries: 0 / 0

RATE a6,2-2
Rx Packets: 3 / 0
Rx Bytes: 150 / 0
RTS Retries: 0 / 0
Tx Packets: 3 / 0
Tx Bytes: 150 / 0
Data Retries: 0 / 0

RATE a7,2-2
Rx Packets: 3 / 0
Rx Bytes: 150 / 0
RTS Retries: 0 / 0
Tx Packets: 3 / 0
Tx Bytes: 150 / 0
Data Retries: 0 / 0

RATE a8,2-2
Rx Packets: 5 / 0
Rx Bytes: 7540 / 0
RTS Retries: 0 / 0
Tx Packets: 0 / 0
Tx Bytes: 0 / 0
Data Retries: 0 / 0

RATE a3,3-2
Rx Packets: 1 / 0
Rx Bytes: 50 / 0
RTS Retries: 0 / 0
Tx Packets: 1 / 0
Tx Bytes: 50 / 0
Data Retries: 0 / 0

RATE a4,3-2
Rx Packets: 4 / 0
Rx Bytes: 1658 / 0
RTS Retries: 0 / 0
Tx Packets: 3 / 0
Tx Bytes: 150 / 0
Data Retries: 0 / 0

--More--
```

Figure 10: Phase 2 - Rates print out

```

/dev/ttyUSB0 - PuTTY
Rx err len pkt:      0 / 0

Tx Watchdog stats:
Tx SW Watchdog      0 / 0
Tx HW Watchdog      0 / 0

RATE 6,0
Rx Packets:      230 / 3      Tx Packets:      0 / 0
Rx Bytes:      41607 / 598      Tx Bytes:      0 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a7,1-2
Rx Packets:      2 / 0      Tx Packets:      2 / 0
Rx Bytes:      100 / 0      Tx Bytes:      100 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a5,2-2
Rx Packets:      4 / 0      Tx Packets:      2 / 0
Rx Bytes:      3116 / 0      Tx Bytes:      100 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a6,2-2
Rx Packets:      3 / 0      Tx Packets:      3 / 0
Rx Bytes:      150 / 0      Tx Bytes:      150 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a7,2-2
Rx Packets:      3 / 0      Tx Packets:      3 / 0
Rx Bytes:      150 / 0      Tx Bytes:      150 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a8,2-2
Rx Packets:      5 / 0      Tx Packets:      0 / 0
Rx Bytes:      7540 / 0      Tx Bytes:      0 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a3,3-2
Rx Packets:      1 / 0      Tx Packets:      1 / 0
Rx Bytes:      50 / 0      Tx Bytes:      50 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a4,3-2
Rx Packets:      4 / 0      Tx Packets:      3 / 0
Rx Bytes:      1658 / 0      Tx Bytes:      150 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a5,3-2
Rx Packets:      12230 / 1      Tx Packets:      995 / 2
Rx Bytes:      17470890 / 50      Tx Bytes:      1420114 / 100
RTS Retries:      0 / 0      Data Retries:      1956 / 2

RATE a6,3-2
Rx Packets:      2790 / 0      Tx Packets:      3 / 0
Rx Bytes:      3937206 / 0      Tx Bytes:      150 / 0
RTS Retries:      0 / 0      Data Retries:      0 / 0

RATE a7,3-2
Rx Packets:      3071 / 1      Tx Packets:      11 / 1
Rx Bytes:      4324902 / 50      Tx Bytes:      2008 / 50
RTS Retries:      0 / 0      Data Retries:      1 / 0

RATE a8,3-2
Rx Packets:      753972 / 1      Tx Packets:      733817 / 1
Rx Bytes:      1065135306 / 50      Tx Bytes:      1036725764 / 50
RTS Retries:      0 / 0      Data Retries:      26664 / 0

RATE a9,3-2
Rx Packets:      8155 / 1      Tx Packets:      45283 / 0
Rx Bytes:      11374678 / 50      Tx Bytes:      63940502 / 0
RTS Retries:      0 / 0      Data Retries:      5901 / 0

net3720-ap1#
```

Figure 11: Continuing with phase 2

```

net3720-ap1# clear counters dot11radio 1

net3720-ap1#ping ip 10.1.1.2 size 18024 repeat 60000

net3720-ap1# show dot11 associations all-client

net3720-ap1#show controllers dot11Radio 1 radio-stats

```

## Attempt 3: 20 feet away with AP1

Run the commands above and we will run the attempt from 20 feet away.

```

Success rate is 99 percent (59999/60000), round-trip min/avg/max = 1/4/32 ms
net3720-ap1#
net3720-ap1#
net3720-ap1#show dot11
net3720-ap1#show dot11 ass
net3720-ap1#show dot11 associations all
net3720-ap1#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
llw Status       : OFF
Client SGT       : 0

Address          : d8b1.9036.e490   Name          : Net3720-ap2
IP Address       : 10.1.1.2         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     : a9.362           Capability      : WMM Shorthd: 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 a9.1-2 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 a9.2-2 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
Signal Strength  : -51 dBm          Connected for   : 626 seconds
Signal to Noise  : 45 dB           Activity Timeout : 28 seconds
Power-save       : Off             Last Activity    : 1 seconds ago
Apsd IE AC(s)   : NONE

Packets Input    : 780209           Packets Output  : 780076
Bytes Input      : 1110080520        Bytes Output    : 1109887428
Duplicates Rcvd  : 4                Data Retries    : 80865
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
Session timeout  : 0 seconds
Reauthenticate in : never
net3720-ap1#

```

Figure 12: Show dot11 associations all-client print out

```
/dev/ttyUSB0 - PuTTY
Session timeout : 0 seconds
Reauthenticate in : never

net3720-ap1#show controllers dot11Radio 1 radio-stats
DOT11 Statistics (Cumulative Total/Last 5 Seconds):
RECEIVER                                TRANSMITTER
Host Rx K Bytes:    1082568 / 0          Host Tx K Bytes:    1121034 / 0
Unicasts Rx:        780242 / 2          Unicasts Tx:        812661 / 4
Unicasts to host:    780242 / 2          Unicasts by host:    780109 / 3
Broadcasts Rx:       163 / 1            Broadcasts Tx:       4069 / 48
Beacons Rx:         0 / 0              Beacons Tx:         4069 / 48
Broadcasts to host:  163 / 1            Broadcasts by host:  0 / 0
Multicasts Rx:      0 / 0              Multicasts Tx:      0 / 0
Multicasts to host:  0 / 0              Multicasts by host:  0 / 0
Mgmt Packets Rx:    163 / 1            Mgmt Packets Tx:    0 / 0
RTS received:       0 / 0              RTS transmitted:    16329 / 0
Duplicate frames:    0 / 0              RTS not received:    161 / 0
CRC errors:         45074 / 19          Unicast Fragments Tx: 812663 / 4
WEP errors:         0 / 0              Retries:            80870 / 2
Buffer full:        0 / 0              Packets one retry:   43638 / 0
Host buffer full:    0 / 0              Packets / 1 retry:   16375 / 1
Header CRC errors:   0 / 0              Protocol defers:     0 / 0
Invalid header:      0 / 0              Energy detect defers: 0 / 0
Length invalid:      0 / 0              Jammer detected:     0 / 0
Incomplete fragments: 0 / 0              Packets aged:        0 / 0
Rx Concats:          0 / 0              Tx Concats:          0 / 0
R2H Buffer full:     0 / 0
Rx err len pkt:      0 / 0

Tx Watchdog stats:
Tx SW Watchdog       0 / 0
Tx HW Watchdog       0 / 0

RATE 6.0
Rx Packets:          165 / 1          Tx Packets:          0 / 0
Rx Bytes:            24312 / 29       Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a0,1-2
Rx Packets:          16 / 0          Tx Packets:          0 / 0
Rx Bytes:            24128 / 0        Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a2,1-2
Rx Packets:           1 / 0          Tx Packets:          0 / 0
Rx Bytes:            1508 / 0         Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a3,1-2
Rx Packets:          51 / 0          Tx Packets:          0 / 0
Rx Bytes:            75672 / 0        Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a5,1-2
Rx Packets:          239 / 0          Tx Packets:          0 / 0
Rx Bytes:           345580 / 0        Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a7,1-2
Rx Packets:           4 / 0          Tx Packets:          0 / 0
Rx Bytes:            6032 / 0         Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a3,2-2
Rx Packets:           4 / 0          Tx Packets:          0 / 0
Rx Bytes:            6032 / 0         Tx Bytes:             0 / 0
RTS Retries:         0 / 0           Data Retries:        0 / 0

RATE a5,2-2
Rx Packets:          2029 / 0          Tx Packets:           11 / 0
Rx Bytes:          2910176 / 0        Tx Bytes:           16588 / 0
RTS Retries:         0 / 0           Data Retries:         33 / 0

--More--
```

Figure 13: Phase 3 Rates print out

```

/dev/ttyUSB0 - PuTTY
Rx Bytes:      24312 / 29    Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a0,1-2
Rx Packets:    16 / 0       Tx Packets:    0 / 0
Rx Bytes:      24128 / 0    Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a2,1-2
Rx Packets:    1 / 0       Tx Packets:    0 / 0
Rx Bytes:      1508 / 0    Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a3,1-2
Rx Packets:    51 / 0       Tx Packets:    0 / 0
Rx Bytes:      75672 / 0   Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a5,1-2
Rx Packets:    239 / 0      Tx Packets:    0 / 0
Rx Bytes:      345580 / 0   Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a7,1-2
Rx Packets:    4 / 0       Tx Packets:    0 / 0
Rx Bytes:      6032 / 0    Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a3,2-2
Rx Packets:    4 / 0       Tx Packets:    0 / 0
Rx Bytes:      6032 / 0    Tx Bytes:      0 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a5,2-2
Rx Packets:    2029 / 0     Tx Packets:    11 / 0
Rx Bytes:      2910176 / 0 Tx Bytes:      16588 / 0
RTS Retries:   0 / 0       Data Retries:   33 / 0

RATE a8,2-2
Rx Packets:    5 / 0       Tx Packets:    5 / 0
Rx Bytes:      7540 / 0    Tx Bytes:      7540 / 0
RTS Retries:   0 / 0       Data Retries:   0 / 0

RATE a4,3-2
Rx Packets:    345 / 0      Tx Packets:    10 / 0
Rx Bytes:      491832 / 0   Tx Bytes:      12386 / 0
RTS Retries:   0 / 0       Data Retries:   20 / 0

RATE a5,3-2
Rx Packets:    24492 / 1    Tx Packets:    2642 / 2
Rx Bytes:      34657016 / 50 Tx Bytes:      3878440 / 100
RTS Retries:   0 / 0       Data Retries:   5250 / 2

RATE a6,3-2
Rx Packets:    5 / 0       Tx Packets:    6296 / 0
Rx Bytes:      7540 / 0    Tx Bytes:      8896144 / 0
RTS Retries:   0 / 0       Data Retries:   6 / 0

RATE a7,3-2
Rx Packets:    23748 / 0    Tx Packets:    11800 / 0
Rx Bytes:      33545730 / 0 Tx Bytes:      16674255 / 0
RTS Retries:   0 / 0       Data Retries:   439 / 0

RATE a8,3-2
Rx Packets:    231054 / 0   Tx Packets:    311963 / 0
Rx Bytes:      326444914 / 0 Tx Bytes:      440721026 / 0
RTS Retries:   0 / 0       Data Retries:   20084 / 0

RATE a9,3-2
Rx Packets:    498247 / 1    Tx Packets:    447382 / 1
Rx Bytes:      703753696 / 50 Tx Bytes:      631882276 / 387
RTS Retries:   0 / 0       Data Retries:   55028 / 0

net3720-ap1#
```

Figure 14: Continuing phase 3 print out

```
net3720-ap1# clear counters dot11radio 1
```

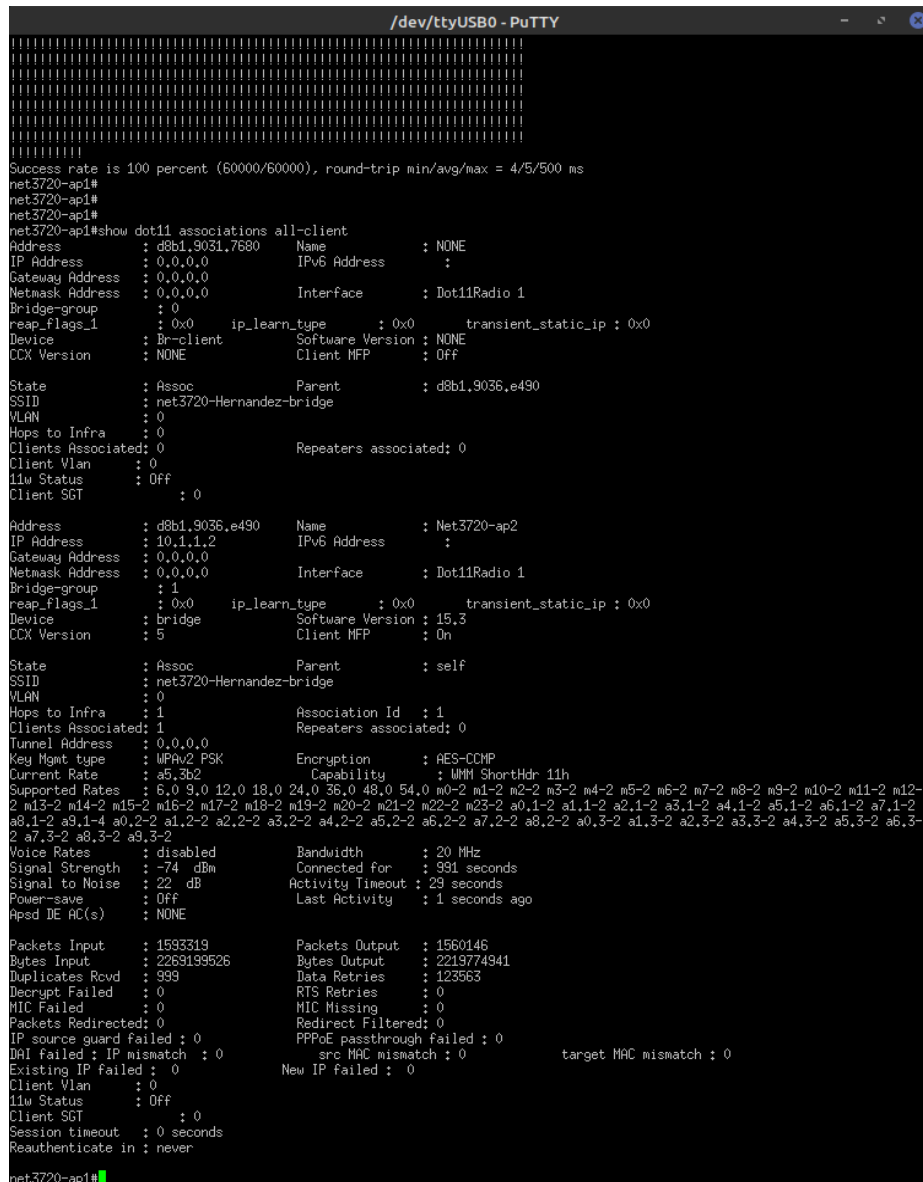
```
net3720-ap1#ping ip 10.1.1.2 size 18024 repeat 60000
```

```
net3720-ap1# show dot11 associations all-client
```

```
net3720-ap1#show controllers dot11Radio 1 radio-stats
```

## Attempt 4: 30 feet + away with AP1

Run the commands above and we will run the attempt from 30 feet + away.



```
/dev/ttyUSB0 - PuTTY
Success rate is 100 percent (60000/60000), round-trip min/avg/max = 4/5/500 ms
net3720-ap1#
net3720-ap1#
net3720-ap1#
net3720-ap1#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   : 10.1.1.2         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
Clients Associated: 1          Repeaters associated: 0
Tunnel Address : 0.0.0.0
Key Mgmt type : WPAv2 PSK      Encryption  : AES-CCMP
Current Rate   : a5.3b2        Capability   : UMM 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 a9.1-2 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 a9.2-2 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 : -74 dBm       Connected for : 991 seconds
Signal to Noise : 22 dB         Activity Timeout : 29 seconds
Power-save     : Off           Last Activity  : 1 seconds ago
Apsd IE AC(s)  : NONE

Packets Input  : 1593319        Packets Output : 1560146
Bytes Input    : 2269199526     Bytes Output    : 2219774941
Duplicates Rcvd : 999          Data Retries    : 123563
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-ap1#
```

Figure 15: show dot11 associations all-client print out



```

/dev/ttyUSB0 - PuTTY
Session timeout : 0 seconds
Reauthenticate in : never

net3720-ap1#show controllers dot11Radio 1 radio-stats
DOT11 Statistics (Cumulative Total/Last 5 Seconds):
RECEIVER                                TRANSMITTER
Host Rx K Bytes:    2214445 / 0          Host Tx K Bytes:    2248699 / 0
Unicasts Rx:        1593352 / 4          Unicasts Tx:        1630142 / 5
Unicasts to host:   1593352 / 4          Unicasts by host:   1560180 / 4
Broadcasts Rx:      421 / 2             Broadcasts Tx:       9430 / 48
Beacons Rx:         0 / 0              Beacons Tx:         9430 / 48
Broadcasts to host: 421 / 2             Broadcasts by host: 0 / 0
Multicasts Rx:      0 / 0              Multicasts Tx:      0 / 0
Multicasts to host: 0 / 0              Multicasts by host: 0 / 0
Mgmt Packets Rx:    421 / 2             Mgmt Packets Tx:    0 / 0
RTS received:       0 / 0              RTS transmitted:    171024 / 0
Duplicate frames:   0 / 0              CTS not received:   8764 / 0
CRC errors:         51748 / 40          Unicast Fragments Tx: 1630144 / 5
WEP errors:         0 / 0              Retries:            123582 / 2
Buffer full:        0 / 0              Packets one retry:   94429 / 0
Host buffer full:   0 / 0              Packets > 1 retry:   13543 / 1
Header CRC errors:  0 / 0              Protocol defers:     0 / 0
Invalid header:     0 / 0              Energy detect defers: 0 / 0
Length invalid:     0 / 0              Jammer detected:     0 / 0
Incomplete fragments: 0 / 0            Packets aged:        0 / 0
Rx Concats:         0 / 0              Tx Concats:         0 / 0
R2H Buffer full:    0 / 0
Rx err len pkt:     0 / 0

Tx Watchdog stats:
Tx SW Watchdog      0 / 0
Tx HW Watchdog      0 / 0

RATE 6.0
Rx Packets:        1314 / 2          Tx Packets:         114 / 0
Rx Bytes:          1400040 / 58      Tx Bytes:           169218 / 0
RTS Retries:       0 / 0             Data Retries:       873 / 0

RATE a0,1-2
Rx Packets:        926 / 0          Tx Packets:         118 / 0
Rx Bytes:          1341802 / 0        Tx Bytes:           175250 / 0
RTS Retries:       0 / 0             Data Retries:       539 / 0

RATE a2,1-2
Rx Packets:        1520 / 0         Tx Packets:          96 / 0
Rx Bytes:          2163616 / 0        Tx Bytes:           144768 / 0
RTS Retries:       0 / 0             Data Retries:       296 / 0

RATE a3,1-2
Rx Packets:        2235 / 0         Tx Packets:         198 / 0
Rx Bytes:          3210714 / 0        Tx Bytes:           297126 / 0
RTS Retries:       0 / 0             Data Retries:       782 / 0

RATE a4,1-2
Rx Packets:         1 / 0          Tx Packets:          1 / 0
Rx Bytes:           50 / 0          Tx Bytes:            50 / 0
RTS Retries:       0 / 0          Data Retries:         0 / 0

RATE a5,1-2
Rx Packets:        4054 / 0         Tx Packets:         539 / 0
Rx Bytes:          5803016 / 0        Tx Bytes:           783652 / 0
RTS Retries:       0 / 0          Data Retries:       1545 / 0

RATE a7,1-2
Rx Packets:         5 / 0          Tx Packets:         11 / 0
Rx Bytes:          7540 / 0          Tx Bytes:           13898 / 0
RTS Retries:       0 / 0          Data Retries:        16 / 0

RATE a1,2-2
Rx Packets:         1 / 0          Tx Packets:          1 / 0
Rx Bytes:           50 / 0          Tx Bytes:            50 / 0
RTS Retries:       0 / 0          Data Retries:         0 / 0

--More--
```

Figure 16: Phase 4 rates print out

```

/dev/ttyUSB0 - PuTTY
Rx Bytes:      5803016 / 0      Tx Bytes:      783652 / 0
RTS Retries:   0 / 0          Data Retries:   1545 / 0

RATE a7,1-2
Rx Packets:    5 / 0          Tx Packets:    11 / 0
Rx Bytes:      7540 / 0       Tx Bytes:      13898 / 0
RTS Retries:   0 / 0         Data Retries:   16 / 0

RATE a1,2-2
Rx Packets:    1 / 0          Tx Packets:    1 / 0
Rx Bytes:      50 / 0         Tx Bytes:      50 / 0
RTS Retries:   0 / 0         Data Retries:   0 / 0

RATE a2,2-2
Rx Packets:    7 / 0          Tx Packets:    3 / 0
Rx Bytes:      6182 / 0       Tx Bytes:      150 / 0
RTS Retries:   0 / 0         Data Retries:   0 / 0

RATE a3,2-2
Rx Packets:    5095 / 1       Tx Packets:    260 / 1
Rx Bytes:      7251038 / 50   Tx Bytes:      365836 / 50
RTS Retries:   0 / 0         Data Retries:   568 / 0

RATE a4,2-2
Rx Packets:    20674 / 1      Tx Packets:    2610 / 2
Rx Bytes:      29318042 / 50  Tx Bytes:      3663632 / 100
RTS Retries:   0 / 0         Data Retries:   973 / 2

RATE a5,2-2
Rx Packets:    39665 / 1      Tx Packets:    12682 / 1
Rx Bytes:      56088006 / 50  Tx Bytes:      18194937 / 50
RTS Retries:   0 / 0         Data Retries:   7160 / 0

RATE a6,2-2
Rx Packets:    982799 / 1     Tx Packets:    199873 / 0
Rx Bytes:      1389694916 / 50 Tx Bytes:      282339137 / 0
RTS Retries:   0 / 0         Data Retries:   8883 / 0

RATE a7,2-2
Rx Packets:    1 / 0          Tx Packets:    0 / 0
Rx Bytes:      1508 / 0       Tx Bytes:      0 / 0
RTS Retries:   0 / 0         Data Retries:   0 / 0

RATE a1,3-2
Rx Packets:    1 / 0          Tx Packets:    1 / 0
Rx Bytes:      50 / 0         Tx Bytes:      50 / 0
RTS Retries:   0 / 0         Data Retries:   0 / 0

RATE a2,3-2
Rx Packets:    1 / 0          Tx Packets:    1 / 0
Rx Bytes:      50 / 0         Tx Bytes:      50 / 0
RTS Retries:   0 / 0         Data Retries:   0 / 0

RATE a3,3-2
Rx Packets:    13 / 0         Tx Packets:    8 / 0
Rx Bytes:      13994 / 0      Tx Bytes:      6454 / 0
RTS Retries:   0 / 0         Data Retries:   0 / 0

RATE a4,3-2
Rx Packets:    535426 / 0     Tx Packets:    321479 / 0
Rx Bytes:      756979666 / 0   Tx Bytes:      454188880 / 0
RTS Retries:   0 / 0         Data Retries:   11752 / 0

RATE a5,3-2
Rx Packets:    35 / 0         Tx Packets:    1022181 / 0
Rx Bytes:      52780 / 0      Tx Bytes:      1443826344 / 0
RTS Retries:   0 / 0         Data Retries:   90193 / 0

RATE a6,3-2
Rx Packets:    0 / 0          Tx Packets:    4 / 0
Rx Bytes:      0 / 0          Tx Bytes:      6032 / 0
RTS Retries:   0 / 0         Data Retries:   2 / 0

net3720-ap1#

```

Figure 17: continuing with Phase 4 print out

## Attempt 4: 30 feet + away with AP1

```
net3720-ap1#ping ip 10.1.1.2 size 18024 repeat 60000
```

[illegible]

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## Rates graph

Here we have a chart that is showing the different phases.

**Phase 1** – On top of each other

**Phase 2** – 10 feet away

**Phase 3** – 20 feet away

**Phase 4** – Over 20 feet away

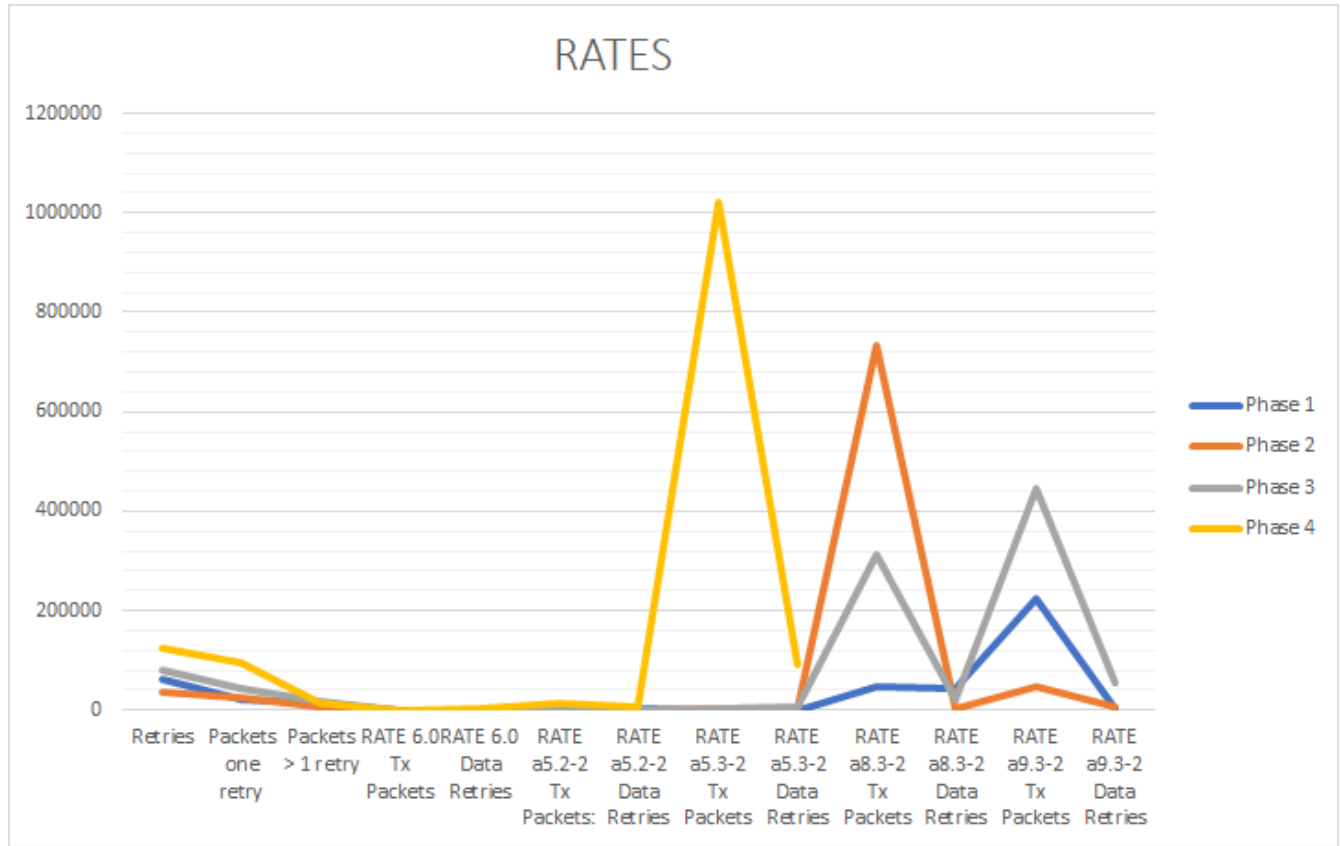


Figure 19: Graph of all the numbers combined of the rates

Phase 1	Phase 2	Phase 3	Phase 4
Retries: 62849 / 2 Packets one retry: 22003 / 0 Packets > 1 retry: 13160 / 1	Retries: 34522 / 2 Packets one retry: 23370 / 0 Packets > 1 retry: 5575 / 1	Retries: 80870/20 Packets one retry: 43638/ 0 Packets > 1 retry: 1875/1	Retries: 123582/ 2 94429/0 13349/ 1
<u>Rate 6.0</u> Tx Packets: 25 / 0 Data Retries: 0 / 0	<u>Rate: 6.0</u> Tx Packets: 0/0 Data Retries: 0/0	<u>Rate 6.0</u> Tx Packets: 0/0 Data Retries: 0/0	<u>Rate 6.0</u> Tx Packets: 114/ 0 Data Retries: 873/ 0
<u>Rate a5.2-2</u> Tx Packets: 1068 / 0 Data Retries: 3194 / 0	<u>Rate: a5.2-2</u> Tx Packets: 2/0 Data Retries: 0/0	<u>Rate: a5.2-2</u> Tx Packets: 11/0 Data Retries: 33/0	<u>Rate a5.2-2</u> Tx Packets: 12682/ 1 Data Retries: 7160/ 0
<u>Rate a5.3-2</u> Tx Packets: 367 / 1 Data Retries: 726 / 2	<u>Rate a5.3-2</u> Tx Packets: 995/2 Data Retries: 1956 / 2	<u>Rate a5.3-2</u> Tx Packets: 2642/2 Data Retries: 5260/ 2	<u>Rate a5.3-2</u> Tx Packets:1022181/0 Data Retires:90193/ 0
<u>Rate a8.3-2</u> Tx Packets: 46070 / 0 Data Retries: 44051 / 0	<u>Rate a8.3-2</u> Tx Packets: 733817/1 Data Retires: 2664/0	<u>Rate a8.3-2</u> Tx Packets: 311963/ 0 Data Retires: 20084/ 0	<u>Rate a8.3-2</u> Tx Packets: No data Data Retries: No data
<u>Rate a9.3-2</u> Tx Packets: 222624 / 3 Data Retries: 4131 / 0	<u>Rate a9.3-2</u> Tx Packets: 45282/0 Data Retries: 5901/0	<u>Rate a9.3-2</u> Tx Packets: 447382/ 1 Data Retries: 55028/ 0	<u>Rate a9.3-2</u> Tx Packets: No data Data Retries: No data

# Closing- Tech-support for both AP's

## AP1 – Report

net3720-ap1#show tech-support

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

Building configuration...

Current configuration : 1623 bytes

!

! Last configuration change at 00:00:38 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-ap1

!

!

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 0757711D1C5C405745415D

!

!

!

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 10.1.1.1 255.255.255.0  
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

```

```

/dev/ttyUSB0 - PuTTY
net3720-ap1#show dot11 associations all
net3720-ap1#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   : 10.1.1.2            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   : a8,3-2           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 : -18 dBm          Connected for  : 141 seconds
Signal to Noise : 80 dB            Activity Timeout : 27 seconds
Power-save     : Off              Last Activity   : 3 seconds ago
Apsd DE AC(s) : NONE

Packets Input  : 118               Packets Output : 124
Bytes Input    : 9604             Bytes Output    : 10172
Duplicates Rcvd : 0               Data Retries    : 54
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-ap1#

```



## AP2 – Show tech support Report

Net3720-ap2#show tech-support

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

Building configuration...

Current configuration : 1535 bytes

!

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 10.1.1.2 255.255.255.0
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
```

```

/dev/ttyUSB0 - PuTTY
*Mar 1 00:24:00.683: %DOT11-4-UPLINK_DOWN: Interface Dot11Radio1, parent lost: Missed beacons
*Mar 1 00:24:14.687: %DOT11-4-CANT_ASSOC: Interface Dot11Radio1, cannot associate: No Response
Net3720-ap2#
Net3720-ap2#
Net3720-ap2#
*Mar 1 00:25:09.699: %DOT11-4-CANT_ASSOC: Interface Dot11Radio1, cannot associate: Rcvd response from d8b1.9018.ce60 channe
l 165 741
*Mar 1 00:25:10.699: %DOT11-4-CANT_ASSOC: Interface Dot11Radio1, cannot associate: EAP authenticating
*Mar 1 00:25:11.227: %DOT11-4-UPLINK_ESTABLISHED: Interface Dot11Radio1, Associated To AP net3720-ap1 d8b1.9018.ce60 [None
WPAv2 PSK]
*Mar 1 00:25:13.699: %DOT11-4-UPLINK_DOWN: Interface Dot11Radio1, parent lost: Missed beacons
*Mar 1 00:25:17.715: %DOT11-4-UPLINK_ESTABLISHED: Interface Dot11Radio1, Associated To AP net3720-ap1 d8b1.9018.ce60 [None
WPAv2 PSK]
*Mar 1 00:25:17.715: %DOT11-4-UPLINK_DOWN: Interface Dot11Radio1, parent lost: Received deauthenticate (7) not authenticat
ed
*Mar 1 00:25:20.771: %DOT11-4-UPLINK_ESTABLISHED: Interface Dot11Radio1, Associated To AP net3720-ap1 d8b1.9018.ce60 [None
WPAv2 PSK]
Net3720-ap2#
Net3720-ap2#
Net3720-ap2#show do
Net3720-ap2#show dot11 ass
Net3720-ap2#show dot11 associations all
Net3720-ap2#show dot11 associations all-client
Address      : d8b1.9018.ce60      Name      : net3720-ap1
IP Address   : 10.1.1.1           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 : -16 dBm          Connected for : 29 seconds
Signal to Noise : 82 dB            Activity Timeout : 15 seconds
Power-save     : Off               Last Activity  : 0 seconds ago
Apsd DE AC(s) : NONE

Packets Input : 343                Packets Output : 40
Bytes Input   : 78415              Bytes Output    : 4234
Duplicates Rcvd : 0                Data Retries    : 36
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

Net3720-ap2#

```

## References

Jenkins, L. (2021, October 13). Lecture. Interview. Layton, UT.