

# WiFi Capacity Test

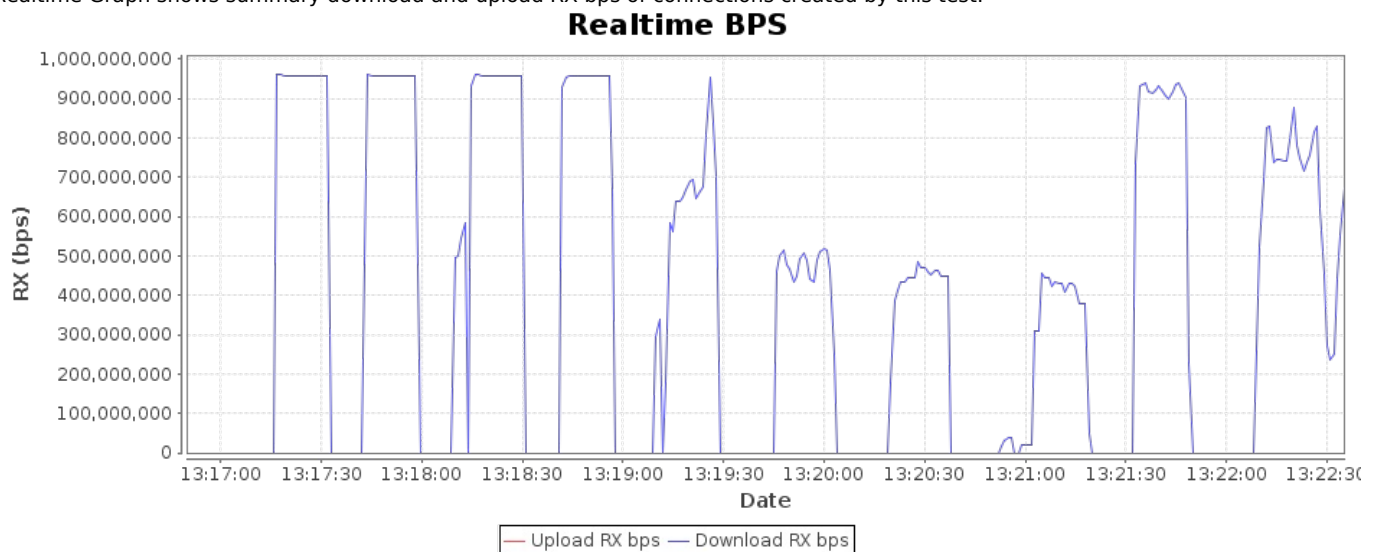


Sat Jun 01 13:25:23 PDT 2019

## Objective

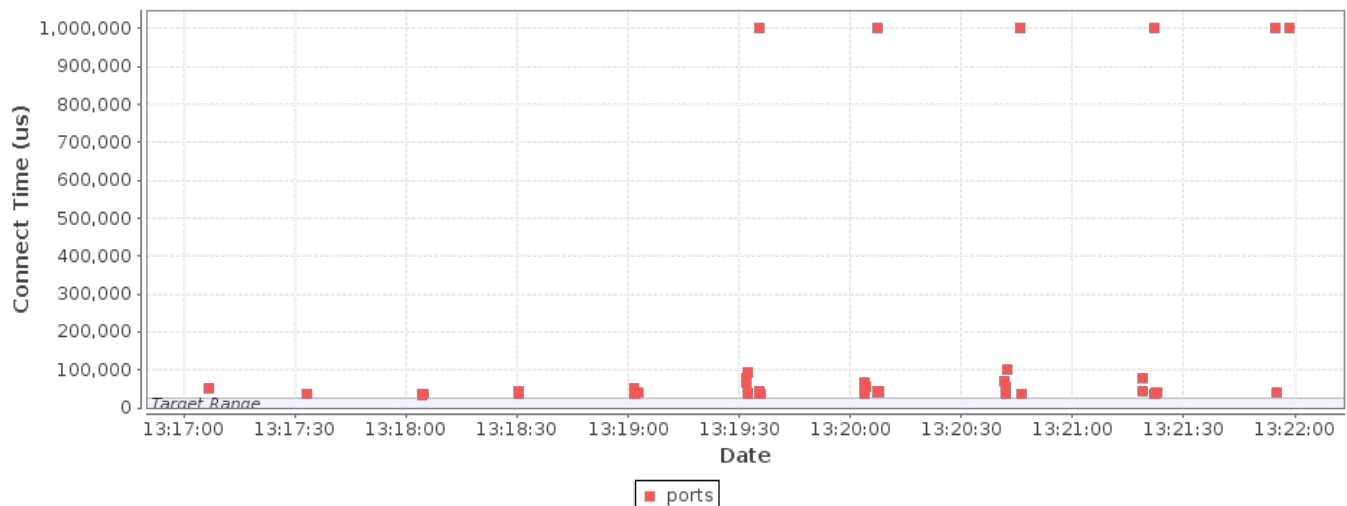
The Candela WiFi Capacity test is designed to measure performance of an Access Point when handling different amounts of WiFi Stations. The test allows the user to increase the number of stations in user defined steps for each test iteration and measure the per station and the overall throughput for each trial. Along with throughput other measurements made are client connection times, Fairness, % packet loss, DHCP times and more. The expected behavior is for the AP to be able to handle several stations( within the limitations of the AP specs) and make sure all stations get a fair amount of airtime both in the upstream and downstream. An AP that scales well will not show a significant over-all throughput decrease as more stations are added.

Realtime Graph shows summary download and upload RX bps of connections created by this test.



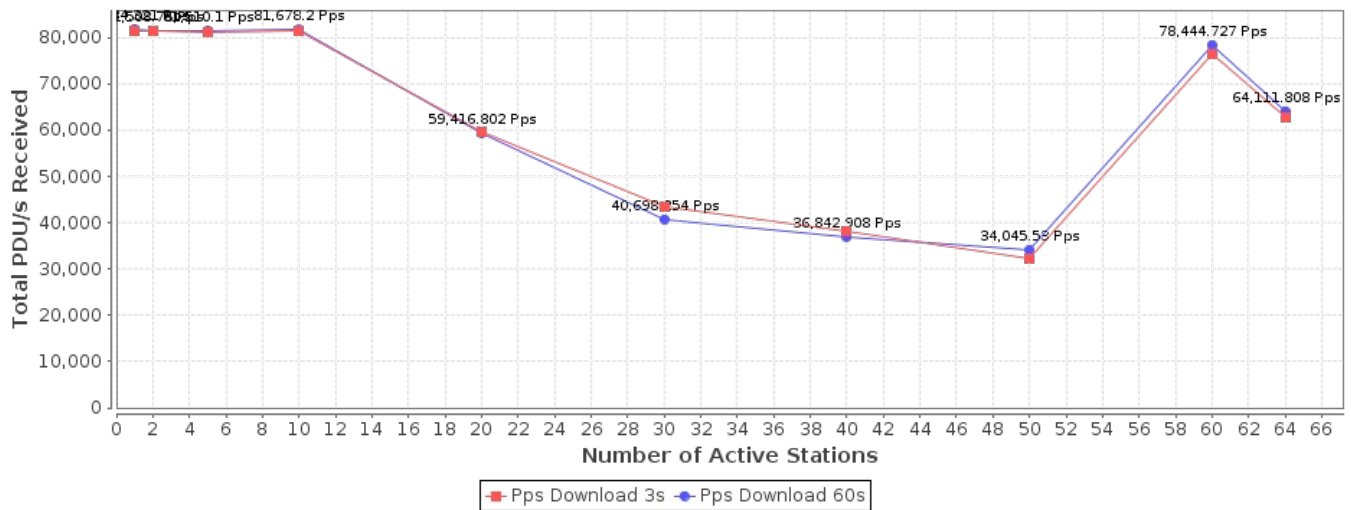
Station connect time is calculated from the initial Authenticate message through the completion of Open or RSN association/authentication.

## Station Connect Times



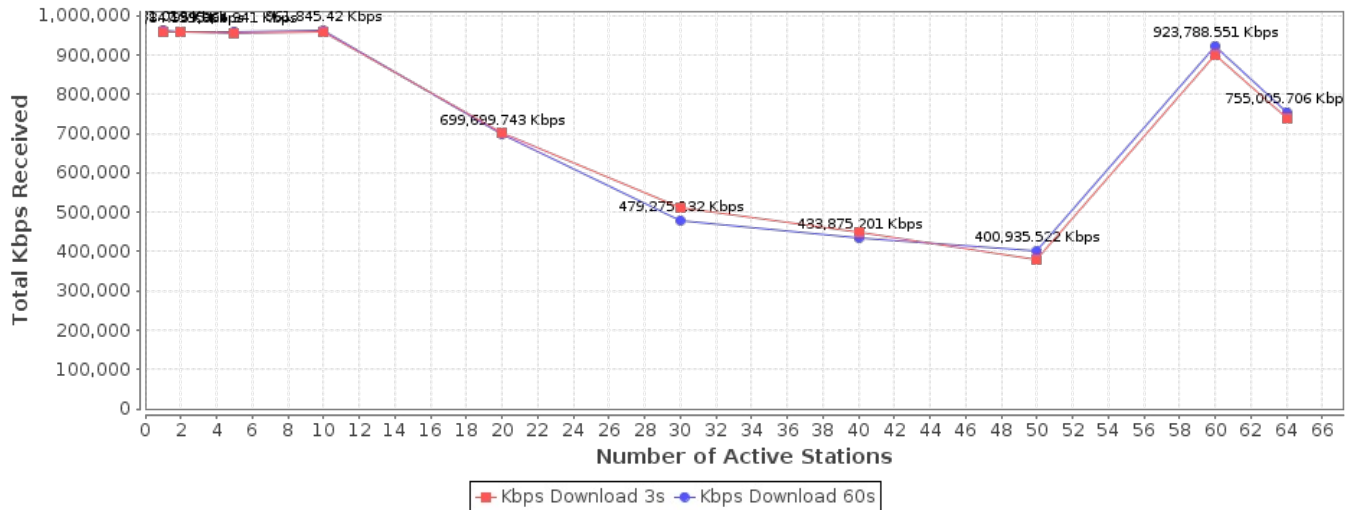
Protocol-Data-Units received. For TCP, this does not mean much, but for UDP connections, this correlates to packet size. If the PDU size is larger than what fits into a single frame, then the network stack will segment it accordingly. A well behaving system will show about the same rate as stations increase. If the rate decreases significantly as stations increase, then it is not scaling well.

**Total PDU/s Received vs Number of Stations Active**



Total bits-per-second transferred. This only counts the protocol payload, so it will not count the Ethernet, IP, UDP, TCP or other header overhead. A well behaving system will show about the same rate as stations increase. If the rate decreases significantly as stations increase, then it is not scaling well.  
 If selected, the Golden AP comparison graphs will be added. These tests were done in an isolation chamber, Open encryption, conductive connection, with LANforge CT525 wave-1 3x3 NIC as the stations.

**Total Kbps Received vs Number of Stations Active**



Wifi-Capacity Test requested values	
Station Increment:	1,2,5,10,20
Loop Iterations:	Single (1)
Duration:	15s
Protocol:	UDP-IPv4
Layer-4 Endpoint:	NONE
Payload Size:	AUTO
MSS	AUTO
Total Download Rate:	1gbps
Total Upload Rate:	Zero (0 bps)
Percentage TCP Rate:	10% (10%)

Randomize Rates	true
Leave Ports Up	false
Socket buffer size:	OS Default
Settle Time:	5 sec (5 s)
Rpt Timer:	fast (1 s)
IP ToS:	Best Effort (0)
Multi-Conn:	AUTO
Show-Per-Iteration-Charts	true
Show-Per-Loop-Totals	true
Hunt-Lower-Rates	false
Show Events	true
CSV Reporting Dir	- not selected -
Build Date	Sat Jun 1 10:16:10 PDT 2019
Build Version	5.3.9
Ports	1.1.eth1 1.1.sta0000 1.1.sta0001 1.1.sta0002 1.1.sta0003 1.1.sta0004 1.1.sta0005 1.1.sta0006 1.1.sta0007 1.1.sta0008 1.1.sta0009 1.1.sta0010 1.1.sta0011 1.1.sta0012 1.1.sta0013 1.1.sta0014 1.1.sta0015 1.1.sta0016 1.1.sta0017 1.1.sta0018 1.1.sta0019 1.1.sta0020 1.1.sta0021 1.1.sta0022 1.1.sta0023 1.1.sta0024 1.1.sta0025 1.1.sta0026 1.1.sta0027 1.1.sta0028 1.1.sta0029 1.1.sta0030 1.1.sta0031 1.1.sta0032 1.1.sta0033 1.1.sta0034 1.1.sta0035 1.1.sta0036 1.1.sta0037 1.1.sta0038 1.1.sta0039 1.1.sta0040 1.1.sta0041 1.1.sta0042 1.1.sta0043 1.1.sta0044 1.1.sta0045 1.1.sta0046 1.1.sta0047 1.1.sta0048 1.1.sta0049 1.1.sta0050 1.1.sta0051 1.1.sta0052 1.1.sta0053 1.1.sta0054 1.1.sta0055 1.1.sta0056 1.1.sta0057 1.1.sta0058 1.1.sta0059 1.1.sta0060 1.1.sta0061 1.1.sta0062 1.1.sta0063
Firmware	0.6-1 10.4b-ct-9984-xtH-012-f6434814c
Machines	MobileStations

Requested Parameters:

Download Rate: Per station: 1000000000 ( 1 Gbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 1 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

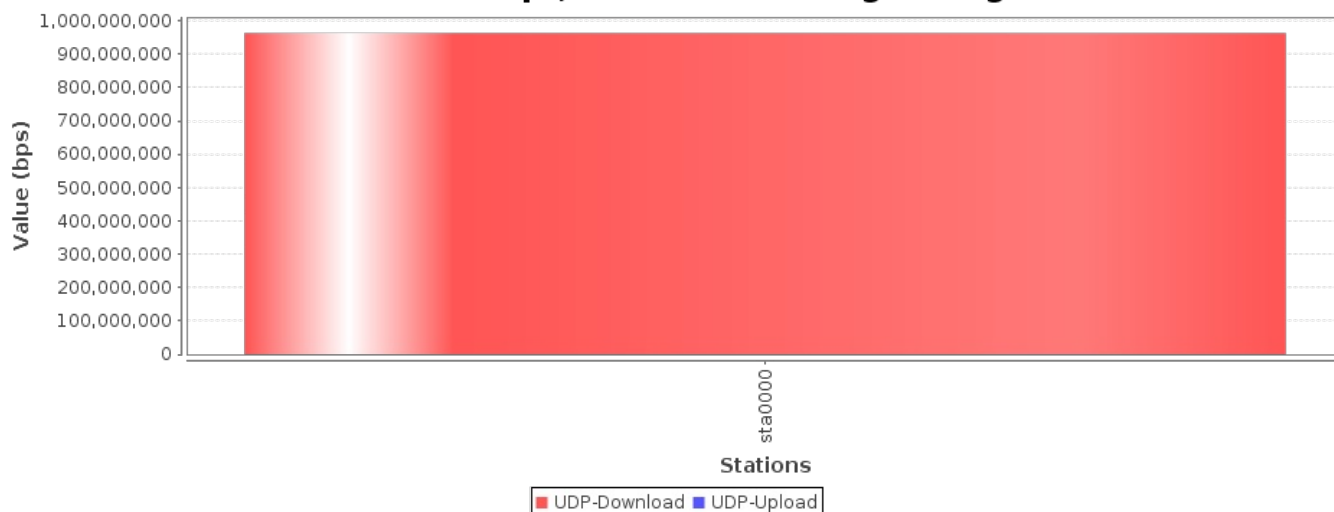
Observed Rate:

Download Rate: Cx Min: 963.681 Mbps Cx Ave: 963.681 Mbps Cx Max: 963.681 Mbps All Cx: 963.681 Mbps  
Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
Total: 963.681 Mbps

Aggregated Rate: Min: 963.681 Mbps Avg: 963.681 Mbps Max: 963.681 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

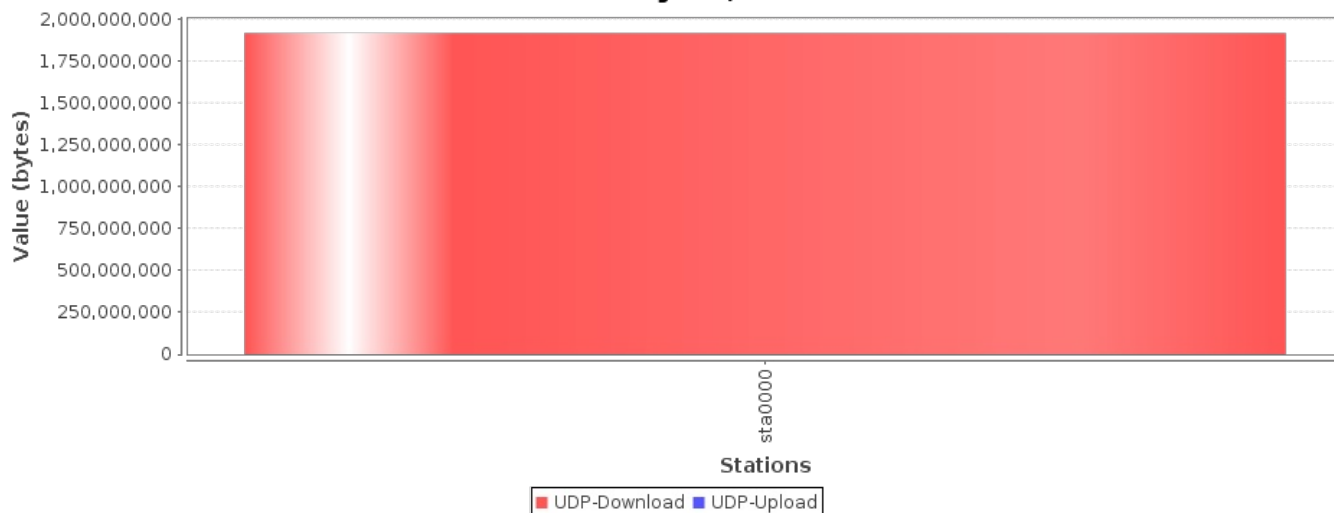
Download Rate: Per station: 1000000000 ( 1 Gbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 1 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 1.786 GB Cx Ave: 1.786 GB Cx Max: 1.786 GB All Cx: 1.786 GB  
 Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
 Total: 1.786 GB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 500000000 ( 500 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 2 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

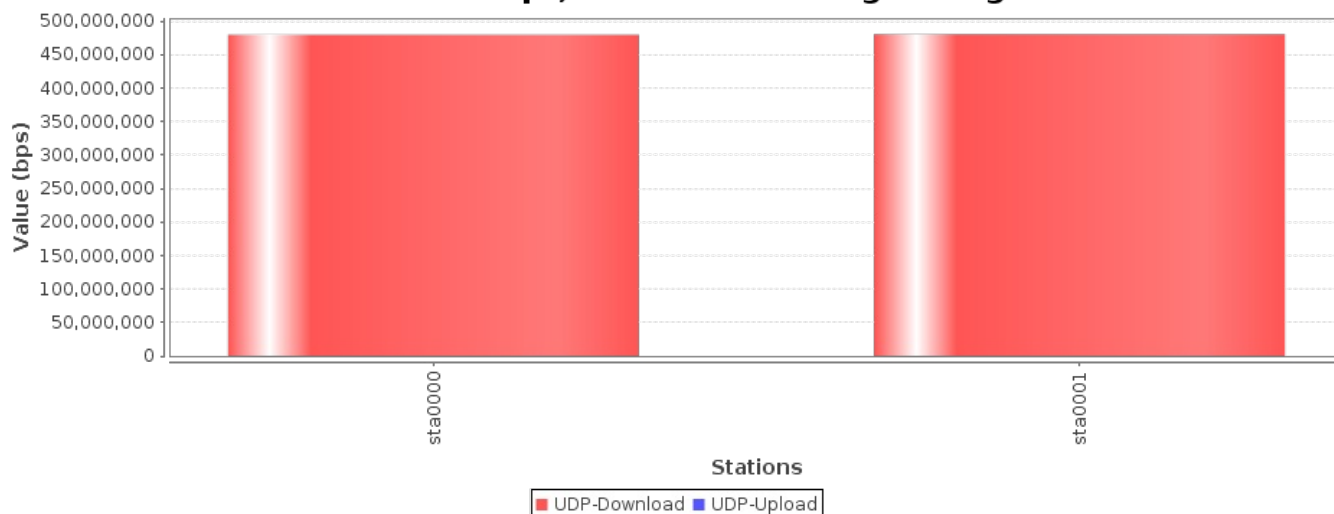
### Observed Rate:

Download Rate: Cx Min: 479.51 Mbps Cx Ave: 479.924 Mbps Cx Max: 480.338 Mbps All Cx: 959.848 Mbps  
 Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
 Total: 959.848 Mbps

Aggregated Rate: Min: 479.51 Mbps Avg: 479.924 Mbps Max: 480.338 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

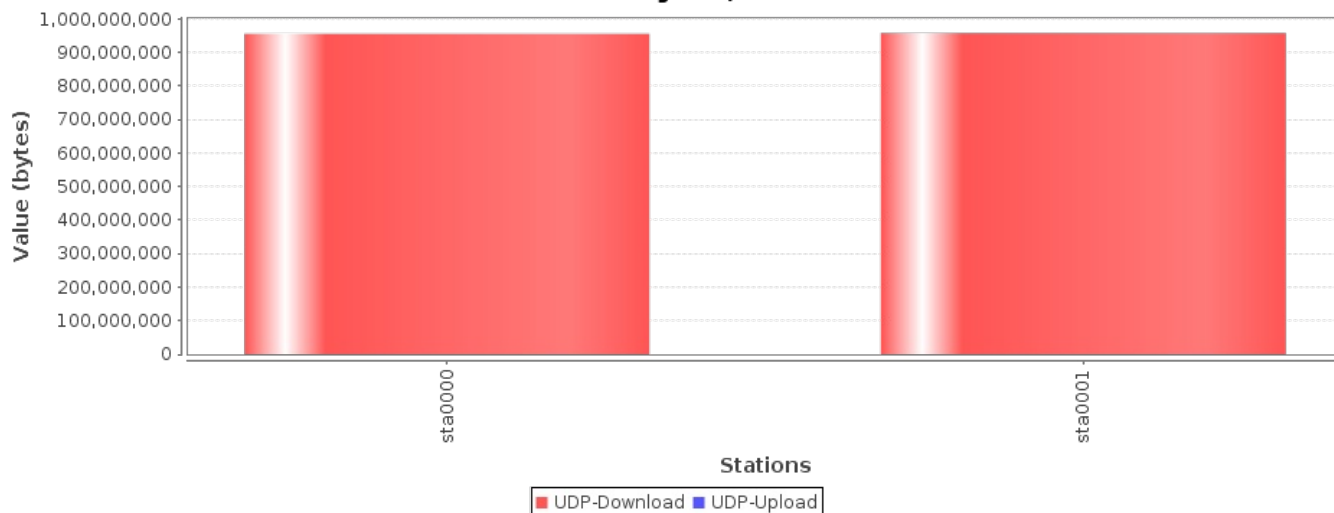
Download Rate: Per station: 500000000 ( 500 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 2 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 911.747 MB Cx Ave: 912.825 MB Cx Max: 913.903 MB All Cx: 1.783 GB  
Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
Total: 1.783 GB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 200000000 ( 200 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 5 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

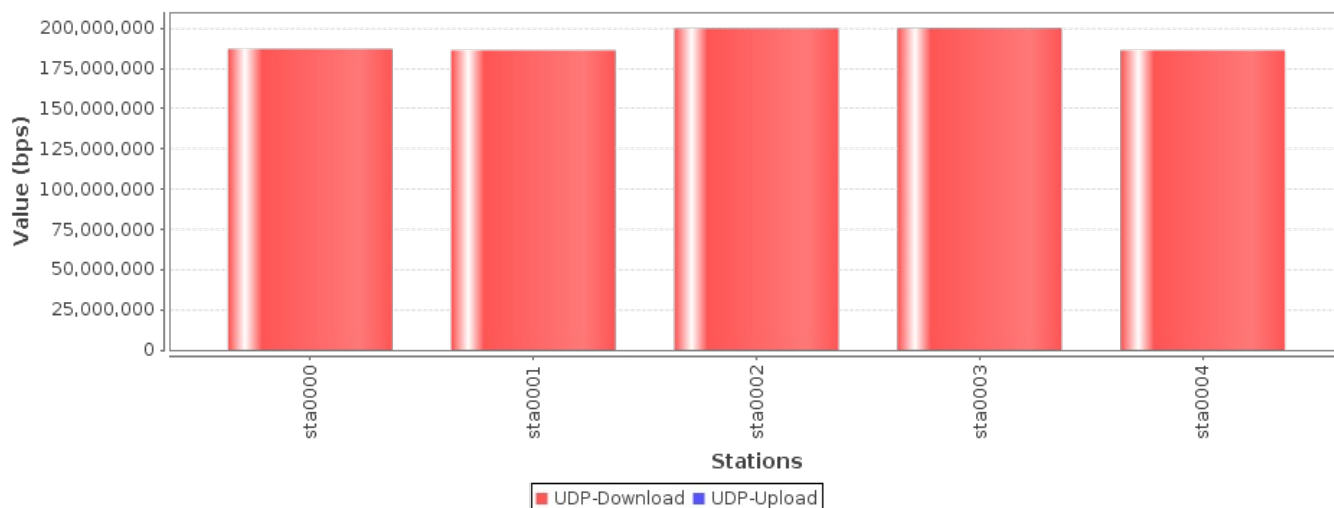
### Observed Rate:

Download Rate: Cx Min: 186.286 Mbps Cx Ave: 191.973 Mbps Cx Max: 200.071 Mbps All Cx: 959.865 Mbps  
Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
Total: 959.865 Mbps

Aggregated Rate: Min: 186.286 Mbps Avg: 191.973 Mbps Max: 200.071 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

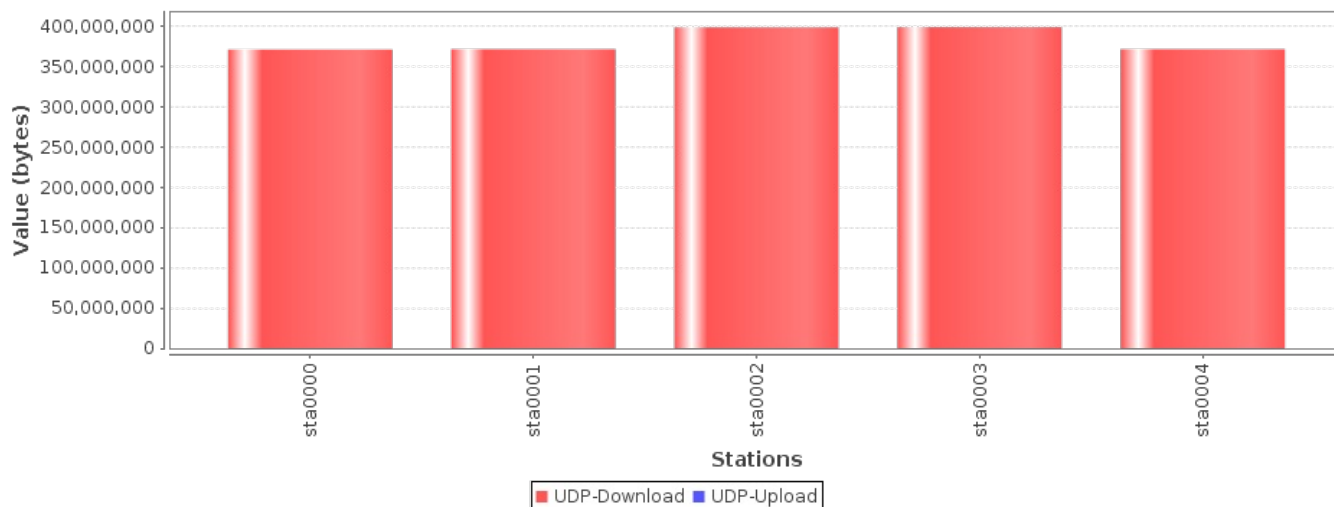
Download Rate: Per station: 200000000 ( 200 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 5 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 354.227 MB Cx Ave: 365.058 MB Cx Max: 380.911 MB All Cx: 1.783 GB  
 Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
 Total: 1.783 GB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 100000000 ( 100 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 10 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

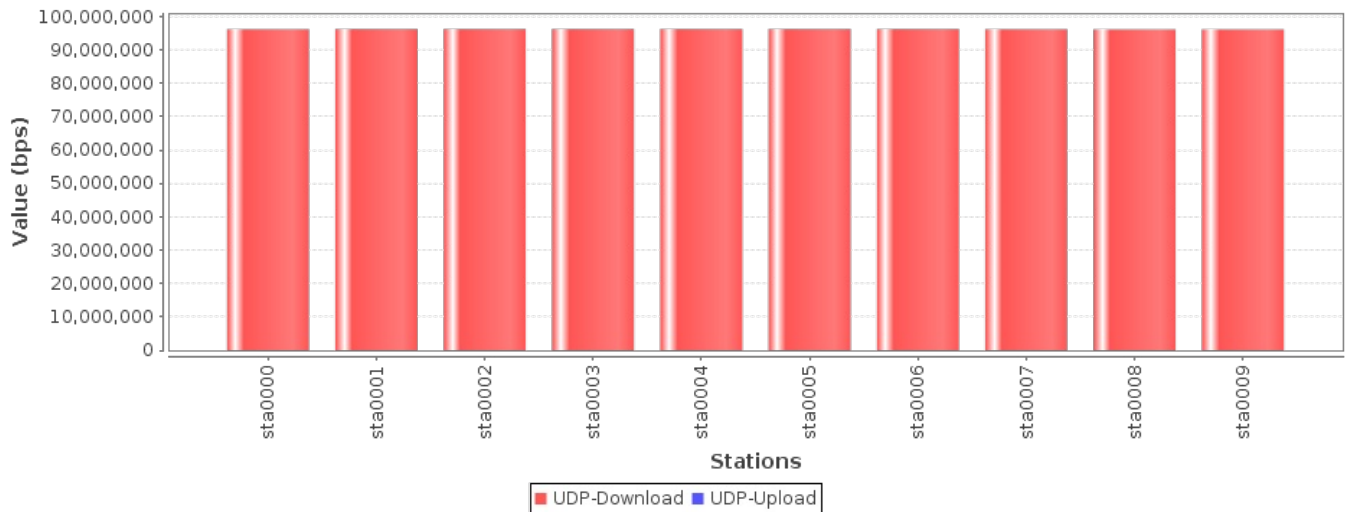
### Observed Rate:

Download Rate: Cx Min: 96.115 Mbps Cx Ave: 96.185 Mbps Cx Max: 96.217 Mbps All Cx: 961.845 Mbps  
 Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
 Total: 961.845 Mbps

Aggregated Rate: Min: 96.115 Mbps Avg: 96.185 Mbps Max: 96.217 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

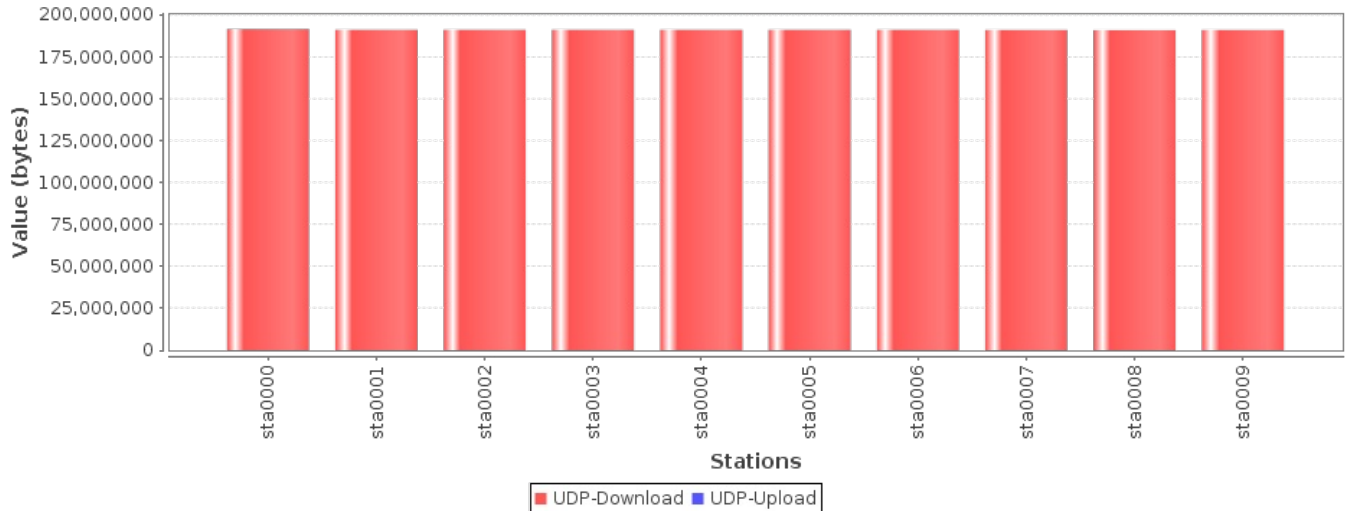
Download Rate: Per station: 100000000 ( 100 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 10 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 182.101 MB Cx Ave: 182.275 MB Cx Max: 182.661 MB All Cx: 1.78 GB  
Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
Total: 1.78 GB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 50000000 ( 50 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 20 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

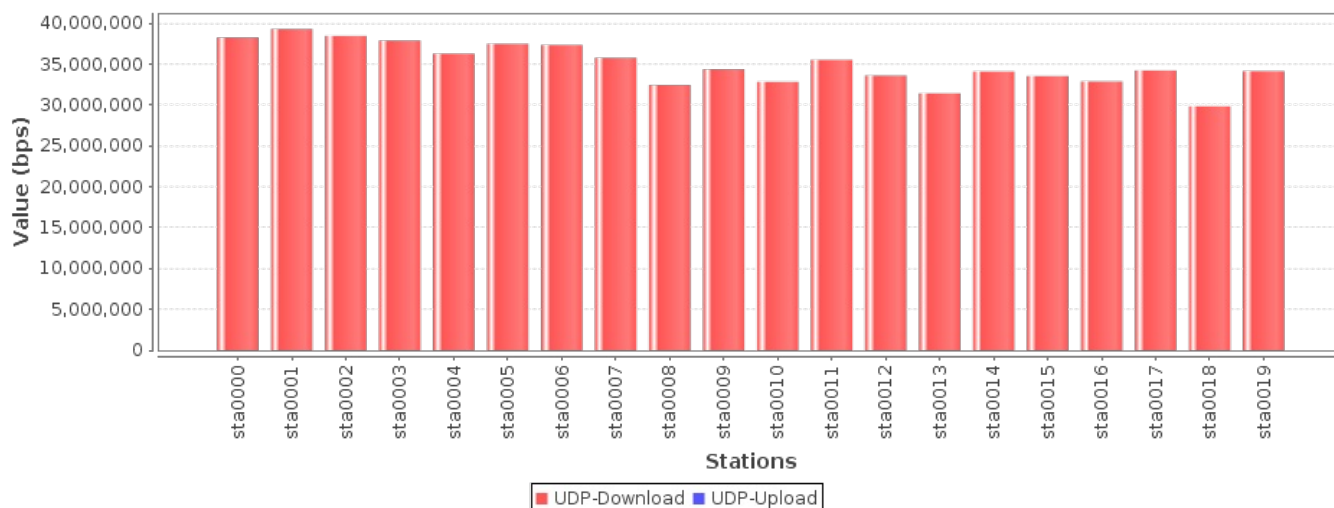
### Observed Rate:

Download Rate: Cx Min: 29.848 Mbps Cx Ave: 34.985 Mbps Cx Max: 39.294 Mbps All Cx: 699.7 Mbps  
Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
Total: 699.7 Mbps

Aggregated Rate: Min: 29.848 Mbps Avg: 34.985 Mbps Max: 39.294 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

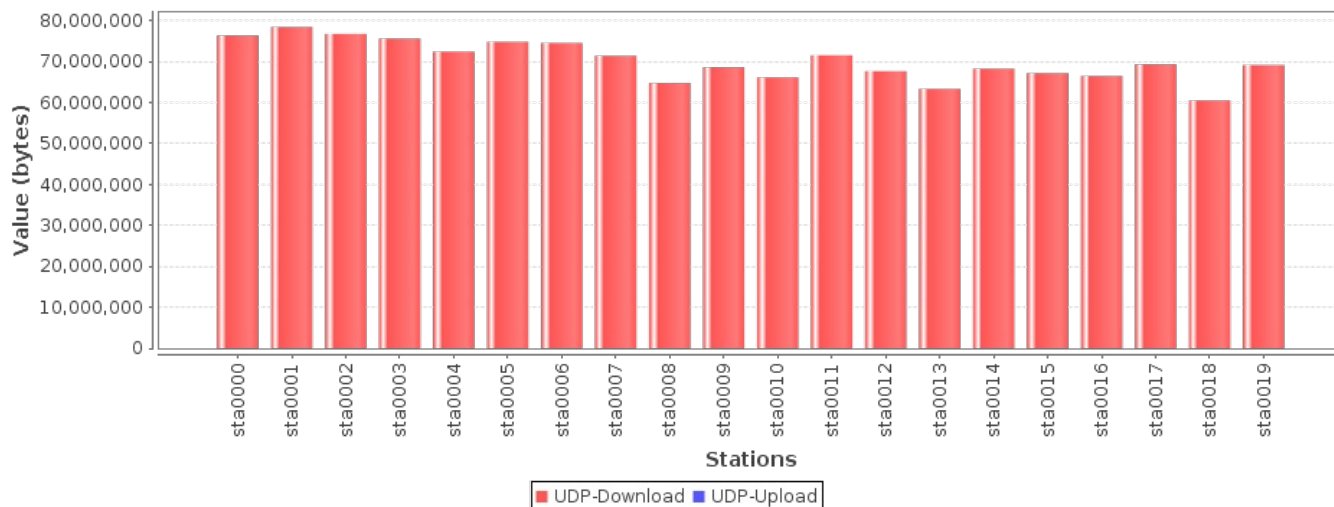
Download Rate: Per station: 50000000 ( 50 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 20 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 57.699 MB Cx Ave: 66.923 MB Cx Max: 74.812 MB All Cx: 1.307 GB  
 Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
 Total: 1.307 GB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 33333333 (33.333 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 30 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Rate:

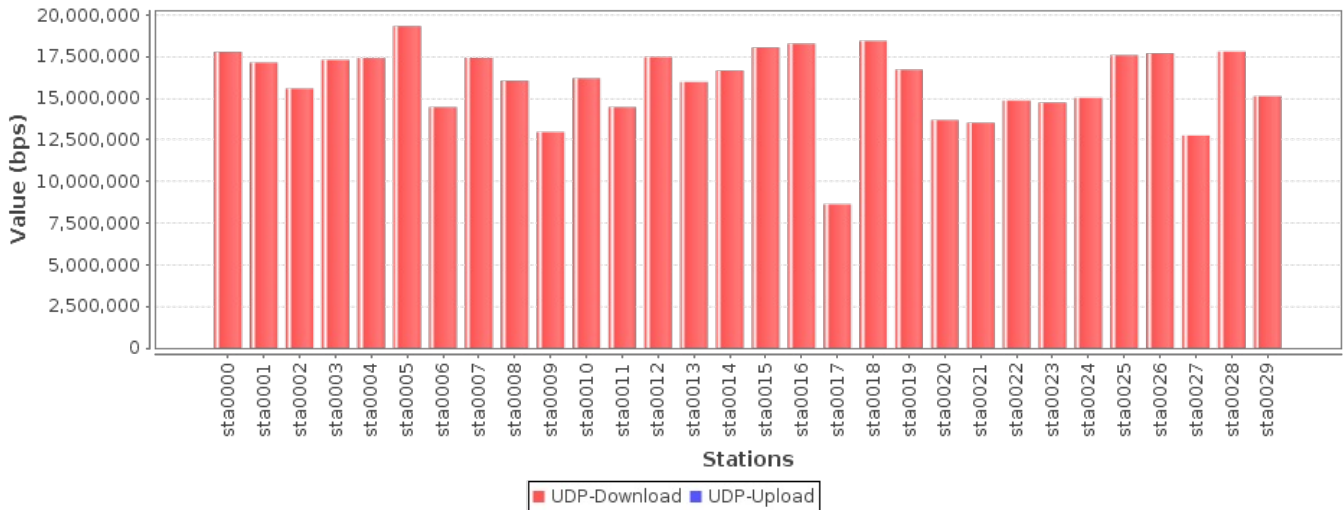
Download Rate: Cx Min: 8.628 Mbps Cx Ave: 15.976 Mbps Cx Max: 19.336 Mbps All Cx: 479.275 Mbps  
 Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
 Total: 479.275 Mbps

Aggregated Rate: Min: 8.628 Mbps Avg: 15.976 Mbps Max: 19.336 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.



## Combined bps, 60 second running average



### Requested Parameters:

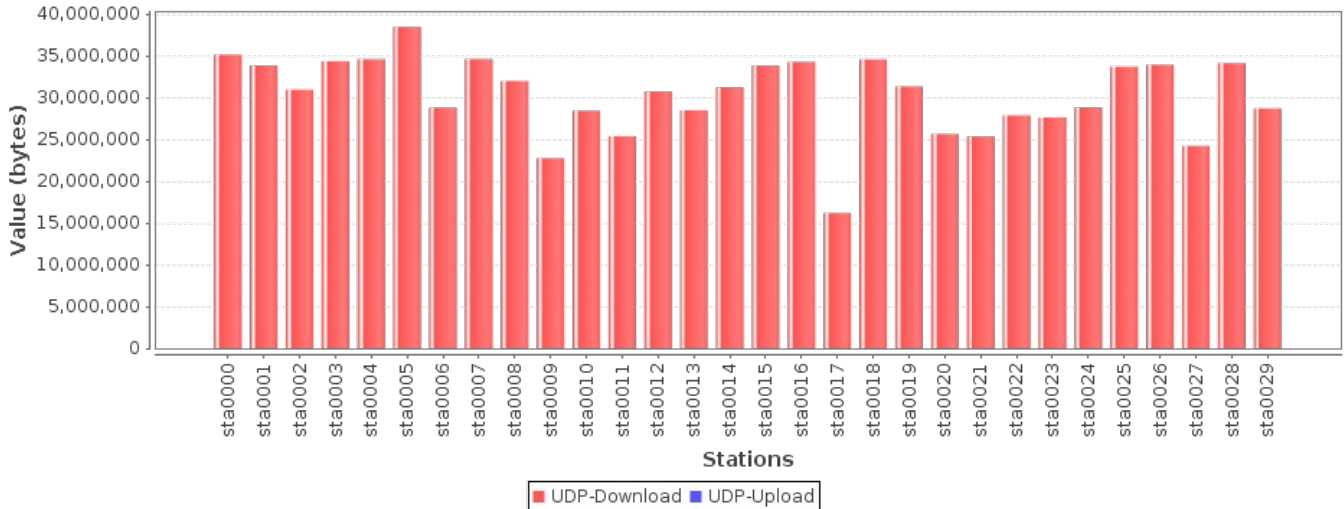
Download Rate: Per station: 33333333 (33.333 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 30 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 15.429 MB Cx Ave: 28.93 MB Cx Max: 36.68 MB All Cx: 867.906 MB  
Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
Total: 867.906 MB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 25000000 ( 25 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 40 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

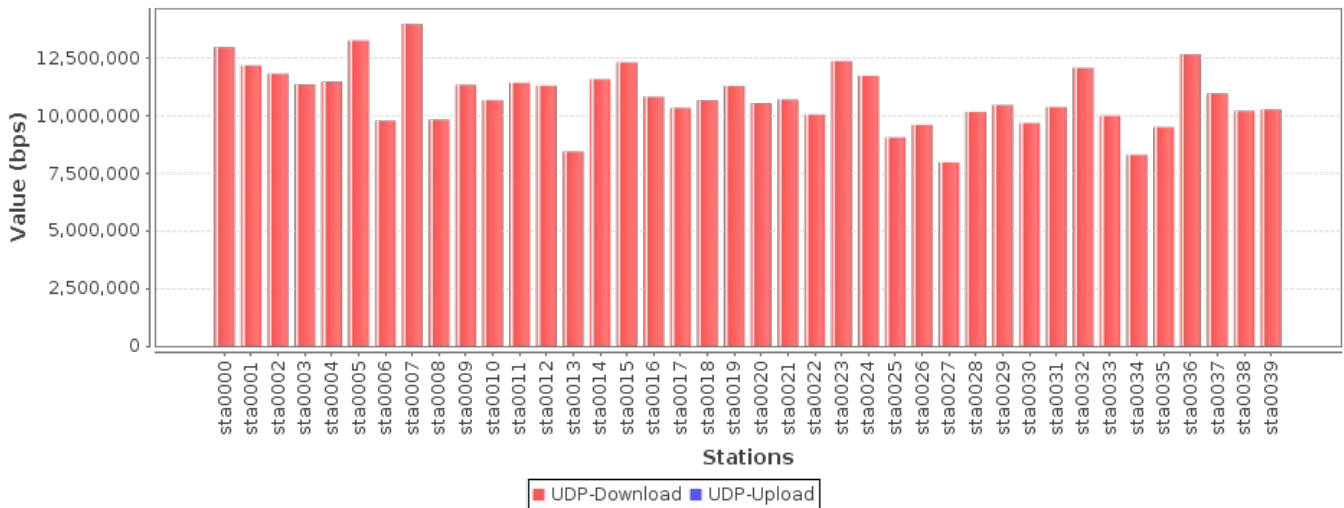
### Observed Rate:

Download Rate: Cx Min: 7.981 Mbps Cx Ave: 10.847 Mbps Cx Max: 13.988 Mbps All Cx: 433.875 Mbps  
Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
Total: 433.875 Mbps

Aggregated Rate: Min: 7.981 Mbps Avg: 10.847 Mbps Max: 13.988 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

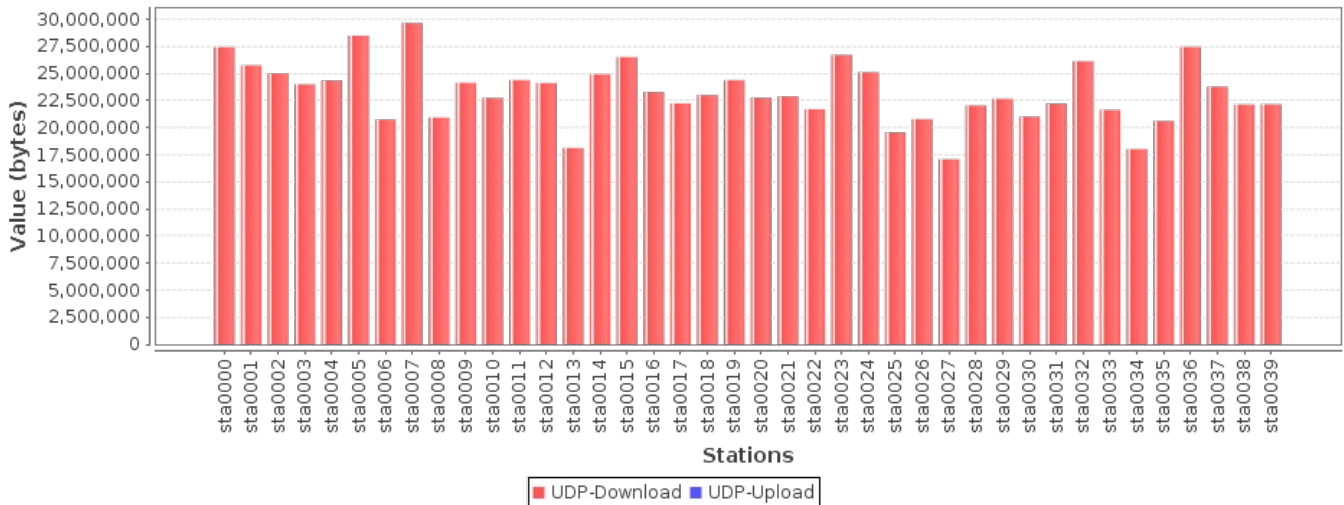
Download Rate: Per station: 25000000 ( 25 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 40 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 16.291 MB Cx Ave: 22.188 MB Cx Max: 28.28 MB All Cx: 887.536 MB  
Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
Total: 887.536 MB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 20000000 ( 20 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 50 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

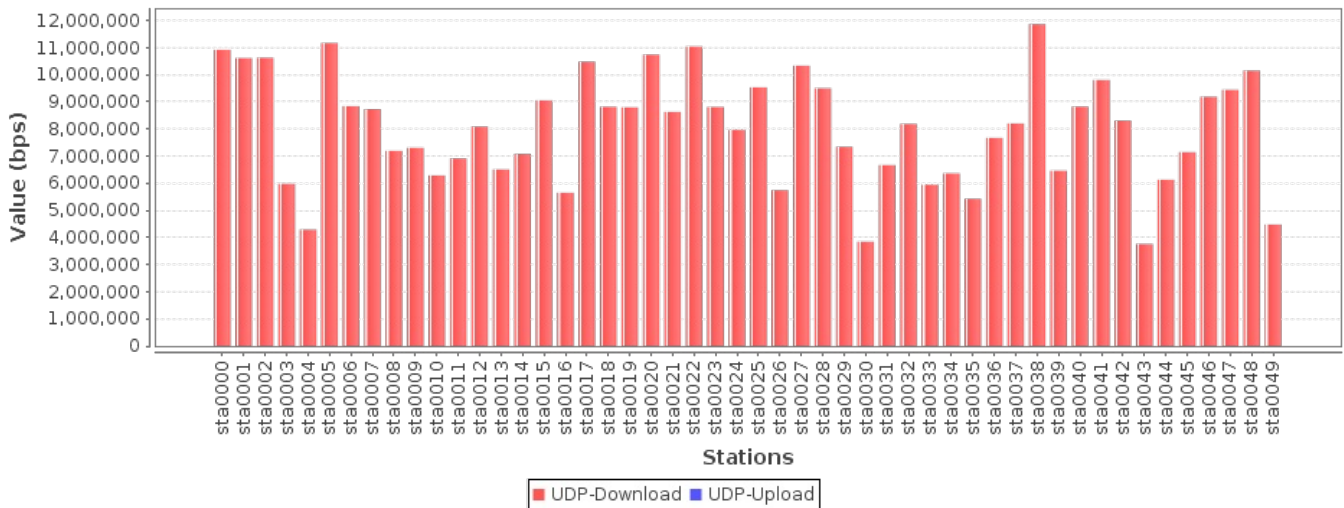
### Observed Rate:

Download Rate: Cx Min: 3.763 Mbps Cx Ave: 8.019 Mbps Cx Max: 11.865 Mbps All Cx: 400.936 Mbps  
Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
Total: 400.936 Mbps

Aggregated Rate: Min: 3.763 Mbps Avg: 8.019 Mbps Max: 11.865 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

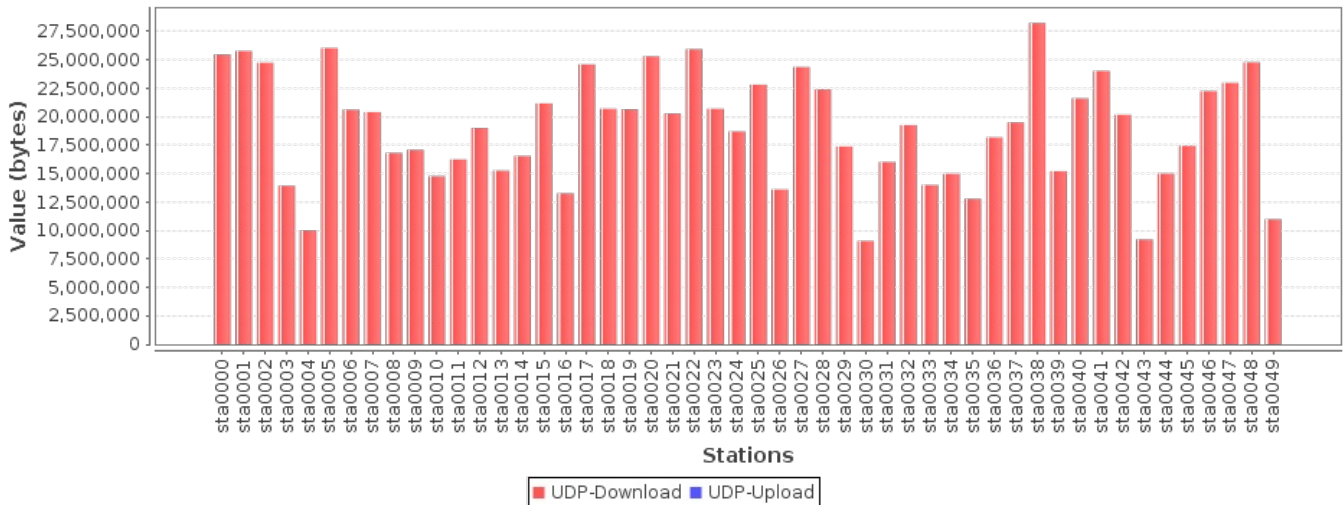
Download Rate: Per station: 20000000 ( 20 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 50 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 8.649 MB Cx Ave: 18.13 MB Cx Max: 26.929 MB All Cx: 906.477 MB  
 Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
 Total: 906.477 MB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 16666666 (16.667 Mbps) All: 1000000000 ( 1 Gbps)  
 Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
 Total: 1000000000 ( 1 Gbps)  
 Station count: 60 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

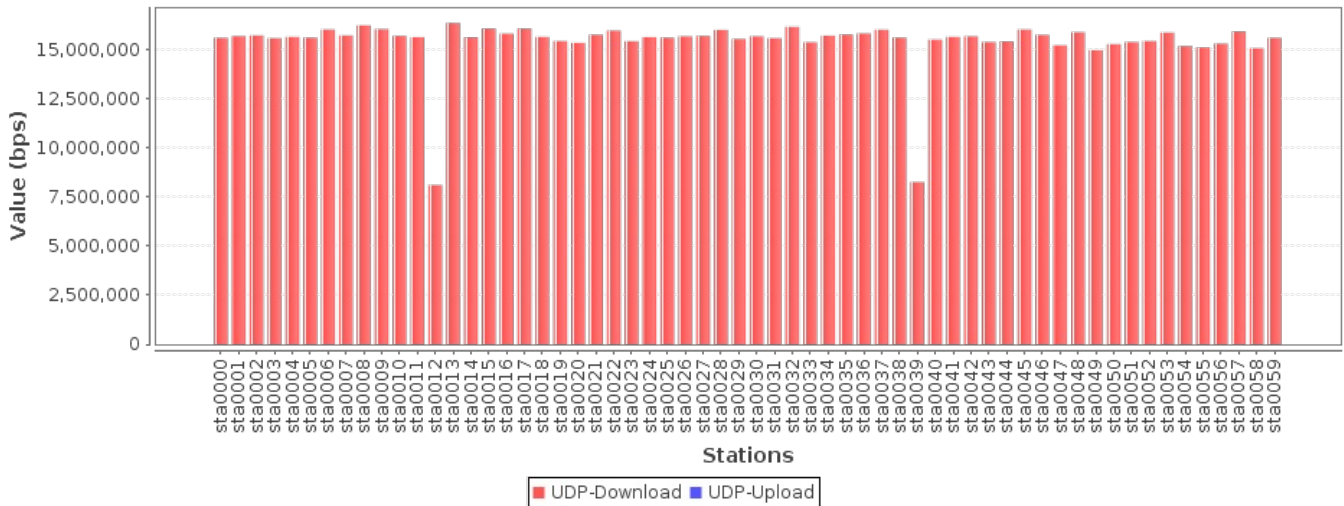
### Observed Rate:

Download Rate: Cx Min: 8.102 Mbps Cx Ave: 15.396 Mbps Cx Max: 16.338 Mbps All Cx: 923.789 Mbps  
 Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
 Total: 923.789 Mbps

Aggregated Rate: Min: 8.102 Mbps Avg: 15.396 Mbps Max: 16.338 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

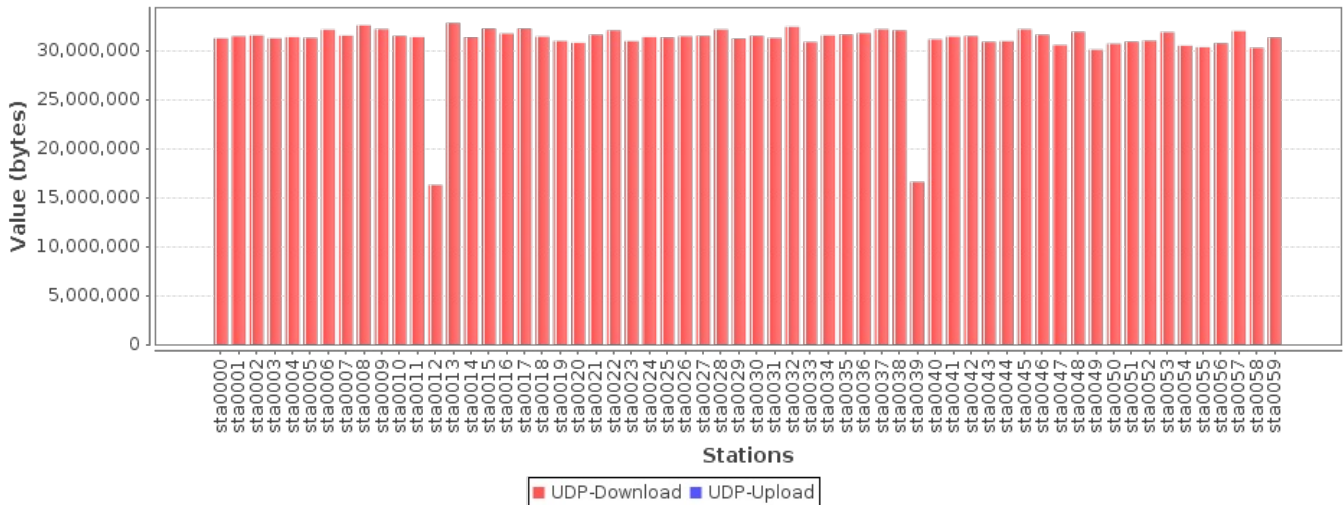
Download Rate: Per station: 16666666 (16.667 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 60 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 15.521 MB Cx Ave: 29.519 MB Cx Max: 31.299 MB All Cx: 1.73 GB  
Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
Total: 1.73 GB

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



### Requested Parameters:

Download Rate: Per station: 15625000 (15.625 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 64 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

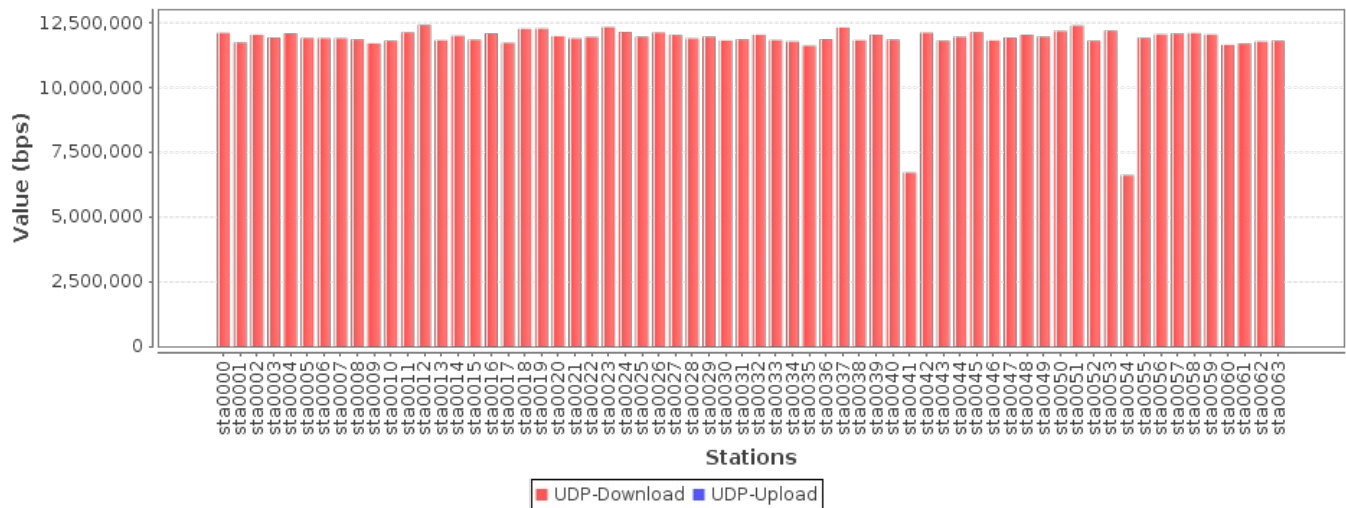
### Observed Rate:

Download Rate: Cx Min: 6.608 Mbps Cx Ave: 11.797 Mbps Cx Max: 12.409 Mbps All Cx: 755.006 Mbps  
Upload Rate: Cx Min: 0 bps Cx Ave: 0 bps Cx Max: 0 bps All Cx: 0 bps  
Total: 755.006 Mbps

Aggregated Rate: Min: 6.608 Mbps Avg: 11.797 Mbps Max: 12.409 Mbps

This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined bps, 60 second running average



### Requested Parameters:

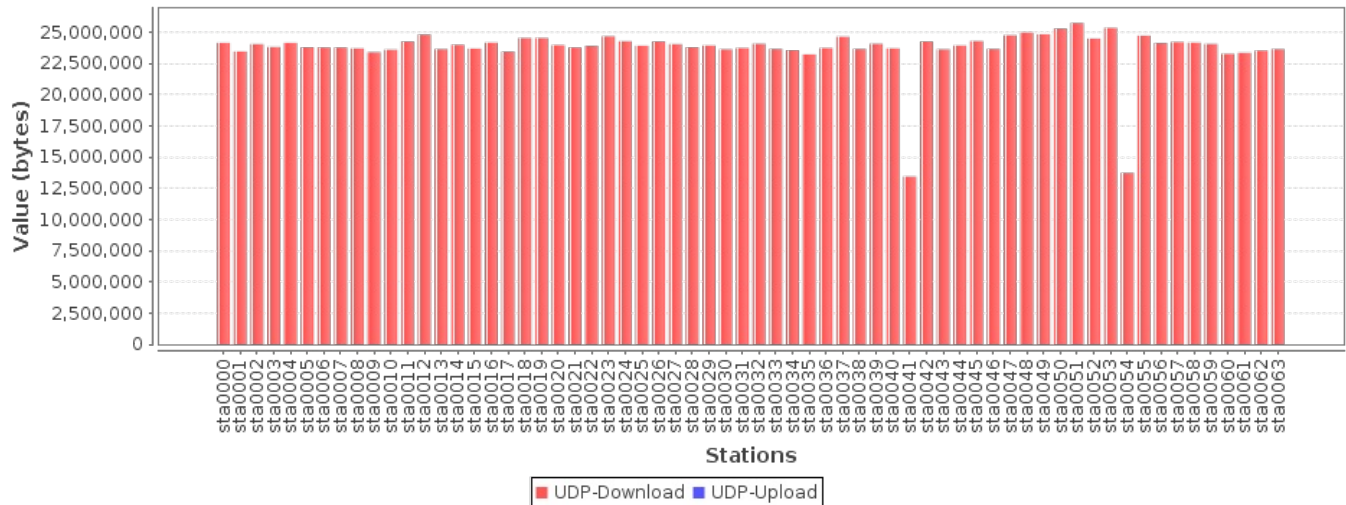
Download Rate: Per station: 15625000 (15.625 Mbps) All: 1000000000 ( 1 Gbps)  
Upload Rate: Per station: 0 ( 0 bps) All: 0 ( 0 bps)  
Total: 1000000000 ( 1 Gbps)  
Station count: 64 Connections per station: 1 Payload (PDU) sizes: AUTO (AUTO)

### Observed Amount:

Download Amount: Cx Min: 12.811 MB Cx Ave: 22.627 MB Cx Max: 24.544 MB All Cx: 1.414 GB  
Upload Amount: Cx Min: 0 B Cx Ave: 0 B Cx Max: 0 B All Cx: 0 B  
Total: 1.414 GB

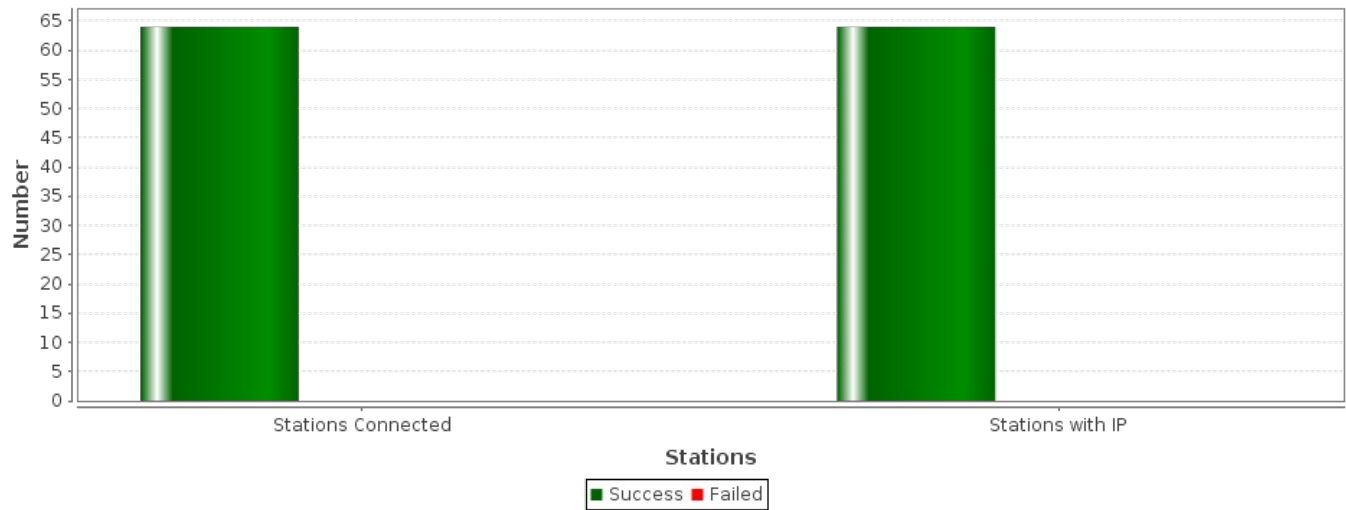
This graph shows fairness. On a fair system, each station should get about the same throughput. In the download direction, it is mostly the device-under-test that is responsible for this behavior, but in the upload direction, LANforge itself would be the source of most fairness issues unless the device-under-test takes specific actions to ensure fairness.

## Combined Received bytes, for entire 15 s run



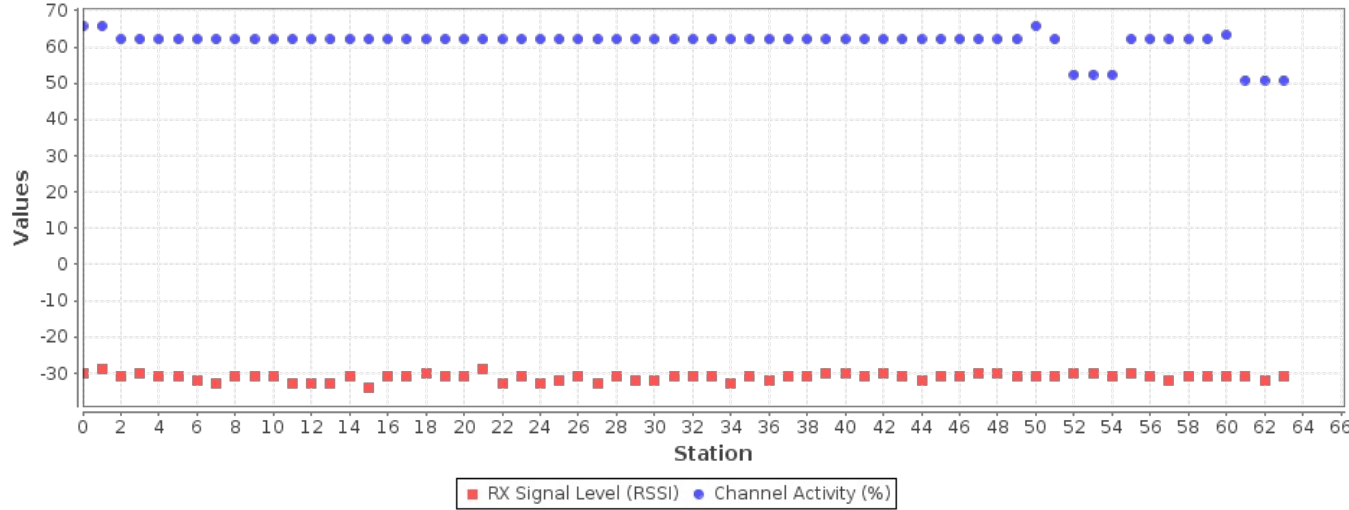
Maximum Stations Connected: 64  
Stations NOT connected at this time: 0  
Maximum Stations with IP Address: 64  
Stations without IP at this time: 0

### Station Maximums



RF stats give an indication of how well how congested is the RF environment. Channel activity is what the wifi radio reports as the busy-time for the RF environment. It is expected that this be near 100% when LANforge is running at max speed, but at lower speeds, this should be a lower percentage unless the RF environment is busy with other systems.

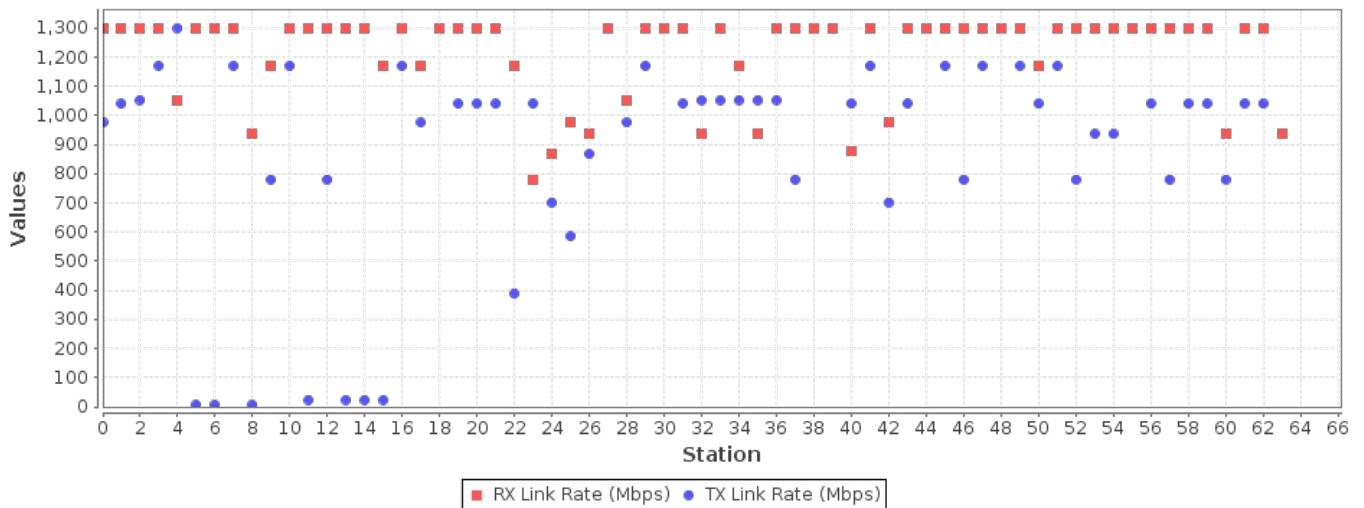
### RF Stats for Stations



Link rate stats give an indication of how well the rate-control is working. For rate-control, the 'RX' link rate corresponds to what the device-under-test is transmitting. If all of the stations are on the same radio, then the TX and RX encoding rates should be similar for all stations. If there is a definite pattern where some stations do not get good RX rate, then probably the device-under-test has rate-control problems. The TX rate is what LANforge is transmitting at.



## Link Rate for Stations



Scan Results for SSIDs used in this test.

```
BSS 78:d2:94:bf:16:43(on sta0000) -- associated
TSF: 171806930444 usec (1d, 23:43:26)
freq: 5785
beacon interval: 100 TUs
capability: ESS Privacy SpectrumMgmt ShortSlotTime RadioMeasure (0x1511)
signal: -79.00 dBm
last seen: 162 ms ago
Information elements from Probe Response frame:
SSID: labap
Supported rates: 6.0* 9.0 12.0* 18.0 24.0* 36.0 48.0 54.0
DS Parameter set: channel 157
Country: US Environment: Indoor/Outdoor
Channels [36 - 36] @ 23 dBm
Channels [40 - 40] @ 23 dBm
Channels [44 - 44] @ 23 dBm
Channels [48 - 48] @ 23 dBm
Channels [52 - 52] @ 17 dBm
Channels [56 - 56] @ 17 dBm
Channels [60 - 60] @ 17 dBm
Channels [64 - 64] @ 17 dBm
Channels [100 - 100] @ 17 dBm
Channels [104 - 104] @ 17 dBm
Channels [108 - 108] @ 17 dBm
Channels [112 - 112] @ 17 dBm
Channels [116 - 116] @ 17 dBm
Channels [120 - 120] @ 17 dBm
Channels [124 - 124] @ 17 dBm
Channels [128 - 128] @ 17 dBm
Channels [132 - 132] @ 17 dBm
Channels [136 - 136] @ 17 dBm
Channels [140 - 140] @ 17 dBm
Channels [149 - 149] @ 23 dBm
Channels [153 - 153] @ 23 dBm
Channels [157 - 157] @ 23 dBm
Channels [161 - 161] @ 23 dBm
Channels [165 - 165] @ 23 dBm
Power constraint: 3 dB
HT capabilities:
Capabilities: 0x9ef
RX LDPC
HT20/HT40
SM Power Save disabled
RX HT20 SGI
RX HT40 SGI
TX STBC
RX STBC 1-stream
Max AMSDU length: 7935 bytes
No DSSS/CKK HT40
Maximum RX AMPDU length 65535 bytes (exponent: 0x003)
Minimum RX AMPDU time spacing: No restriction (0x00)
HT TX/RX MCS rate indexes supported: 0-31
HT operation:
* primary channel: 157
* secondary channel offset: above
* STA channel width: any
* RIFS: 0
* HT protection: no
* non-GF present: 1
* OBSS non-GF present: 0
* dual beacon: 0
* dual CTS protection: 0
* STBC beacon: 0
* L-SIG TXOP Prot: 0
* PCO active: 0
* PCO phase: 0
Extended capabilities:
* TFS
* WNM-Sleep Mode
* TIM Broadcast
* BSS Transition
* SSID List
* Operating Mode Notification
* Max Number Of MSDUs In A-MSDU is unlimited
```

```

VHT capabilities:
  VHT Capabilities (0x338b79f2):
    Max MPDU length: 11454
    Supported Channel Width: neither 160 nor 80+80
    RX LDPC
    short GI (80 MHz)
    short GI (160/80+80 MHz)
    TX STBC
    SU Beamformer
    SU Beamformee
    MU Beamformer
    RX antenna pattern consistency
    TX antenna pattern consistency
  VHT RX MCS set:
    1 streams: MCS 0-9
    2 streams: MCS 0-9
    3 streams: MCS 0-9
    4 streams: MCS 0-9
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
  VHT RX highest supported: 0 Mbps
  VHT TX MCS set:
    1 streams: MCS 0-9
    2 streams: MCS 0-9
    3 streams: MCS 0-9
    4 streams: MCS 0-9
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
  VHT TX highest supported: 0 Mbps
VHT operation:
  * channel width: 1 (80 MHz)
  * center freq segment 1: 155
  * center freq segment 2: 0
  * VHT basic MCS set: 0xffff
WMM:
  * Parameter version 1
  * u-APSD
  * BE: CW 15-1023, AIFS 3
  * BK: CW 15-1023, AIFS 7
  * VI: CW 7-15, AIFS 2, TXOP 3008 usec
  * VO: CW 3-7, AIFS 2, TXOP 1504 usec
RSN:
  * Version: 1
  * Group cipher: CCMP
  * Pairwise ciphers: CCMP
  * Authentication suites: PSK
  * Capabilities: 1-PTKSA-RC 1-GTKSA-RC (0x0000)
WPS:
  * Version: 1.0
  * Wi-Fi Protected Setup State: 2 (Configured)
  * Response Type: 3 (AP)
  * UUID: 87654321-9abc-def0-1234-78d294bf1641
  * Manufacturer: NTGR
  * Model: R7800
  * Model Number: R7800
  * Serial Number: 78d294bf1641
  * Primary Device Type: 6-0050f204-1
  * Device name: R7800(Wireless AP)
  * Config methods: Display
  * Unknown TLV (0x1049, 6 bytes): 00 37 2a 00 01 20

```

Scan Results for SSIDs used in this test.

```

BSS 78:d2:94:bf:16:43(on sta0000) -- associated
TSF: 172225573265 usec (1d, 23:50:25)
freq: 5785
beacon interval: 100 TUs
capability: ESS Privacy SpectrumMgmt ShortSlotTime RadioMeasure (0x1511)
signal: -28.00 dBm
last seen: 145 ms ago
Information elements from Probe Response frame:
SSID: labap
Supported rates: 6.0* 9.0 12.0* 18.0 24.0* 36.0 48.0 54.0
DS Parameter set: channel 157
Country: US      Environment: Indoor/Outdoor
Channels [36 - 36] @ 23 dBm
Channels [40 - 40] @ 23 dBm
Channels [44 - 44] @ 23 dBm
Channels [48 - 48] @ 23 dBm
Channels [52 - 52] @ 17 dBm
Channels [56 - 56] @ 17 dBm
Channels [60 - 60] @ 17 dBm
Channels [64 - 64] @ 17 dBm
Channels [100 - 100] @ 17 dBm
Channels [104 - 104] @ 17 dBm
Channels [108 - 108] @ 17 dBm
Channels [112 - 112] @ 17 dBm
Channels [116 - 116] @ 17 dBm
Channels [120 - 120] @ 17 dBm
Channels [124 - 124] @ 17 dBm
Channels [128 - 128] @ 17 dBm
Channels [132 - 132] @ 17 dBm
Channels [136 - 136] @ 17 dBm
Channels [140 - 140] @ 17 dBm
Channels [149 - 149] @ 23 dBm
Channels [153 - 153] @ 23 dBm
Channels [157 - 157] @ 23 dBm
Channels [161 - 161] @ 23 dBm
Channels [165 - 165] @ 23 dBm
Power constraint: 3 dB
HT capabilities:
  Capabilities: 0x9ef
  RX LDPC
  HT20/HT40
  SM Power Save disabled
  RX HT20 SGI
  RX HT40 SGI
  TX STBC
  RX STBC 1-stream

```



```

        Max AMSDU length: 7935 bytes
        No DSSS/CKK HT40
        Maximum RX AMPDU length 65535 bytes (exponent: 0x003)
        Minimum RX AMPDU time spacing: No restriction (0x00)
        HT TX/RX MCS rate indexes supported: 0-31
HT operation:
    * primary channel: 157
    * secondary channel offset: above
    * STA channel width: any
    * RIFS: 0
    * HT protection: no
    * non-GF present: 1
    * OBSS non-GF present: 0
    * dual beacon: 0
    * dual CTS protection: 0
    * STBC beacon: 0
    * L-SIG TXOP Prot: 0
    * PCO active: 0
    * PCO phase: 0
Extended capabilities:
    * TFS
    * WNM-Sleep Mode
    * TIM Broadcast
    * BSS Transition
    * SSID List
    * Operating Mode Notification
    * Max Number Of MSDUs In A-MSDU is unlimited
VHT capabilities:
    VHT Capabilities (0x338b79f2):
        Max MPDU length: 11454
        Supported Channel Width: neither 160 nor 80+80
        RX LDPC
        short GI (80 MHz)
        short GI (160/80+80 MHz)
        TX STBC
        SU Beamformer
        SU Beamformee
        MU Beamformer
        RX antenna pattern consistency
        TX antenna pattern consistency
    VHT RX MCS set:
        1 streams: MCS 0-9
        2 streams: MCS 0-9
        3 streams: MCS 0-9
        4 streams: MCS 0-9
        5 streams: not supported
        6 streams: not supported
        7 streams: not supported
        8 streams: not supported
    VHT RX highest supported: 0 Mbps
    VHT TX MCS set:
        1 streams: MCS 0-9
        2 streams: MCS 0-9
        3 streams: MCS 0-9
        4 streams: MCS 0-9
        5 streams: not supported
        6 streams: not supported
        7 streams: not supported
        8 streams: not supported
    VHT TX highest supported: 0 Mbps
VHT operation:
    * channel width: 1 (80 MHz)
    * center freq segment 1: 155
    * center freq segment 2: 0
    * VHT basic MCS set: 0xfffc
WMM:
    * Parameter version 1
    * u-APSD
    * BE: CW 15-1023, AIFS 3
    * BK: CW 15-1023, AIFS 7
    * VI: CW 7-15, AIFS 2, TXOP 3008 usec
    * VO: CW 3-7, AIFS 2, TXOP 1504 usec
RSN:
    * Version: 1
    * Group cipher: CCMP
    * Pairwise ciphers: CCMP
    * Authentication suites: PSK
    * Capabilities: 1-PTKSA-RC 1-GTKSA-RC (0x0000)
WPS:
    * Version: 1.0
    * Wi-Fi Protected Setup State: 2 (Configured)
    * Response Type: 3 (AP)
    * UUID: 87654321-9abc-def0-1234-78d294bf1641
    * Manufacturer: NTGR
    * Model: R7800
    * Model Number: R7800
    * Serial Number: 78d294bf1641
    * Primary Device Type: 6-0050f204-1
    * Device name: R7800(Wireless AP)
    * Config methods: Display
    * Unknown TLV (0x1049, 6 bytes): 00 37 2a 00 01 20

```

Scan Results for SSIDs NOT used in this test.

Scan Results for SSIDs NOT used in this test.

