

REMOVING BOTTLENECKS IN LOCAL NETWORKS

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EXECUTIVE SUMMARY

To get the best Internet download and upload speeds for your local network, you can use your computer to measure the actual Internet "bandwidth" at different points in your local network. Then you can bypass or replace the troublemaking network devices.

A demonstration of a
real bottleneck in a
typical home
network:

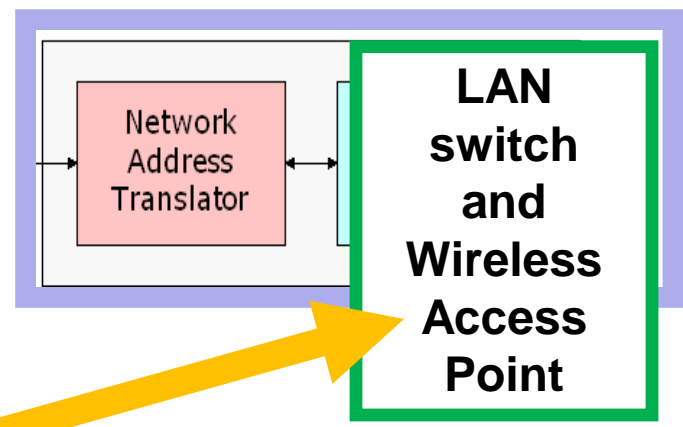
An equipment
diagram of our
demonstration:



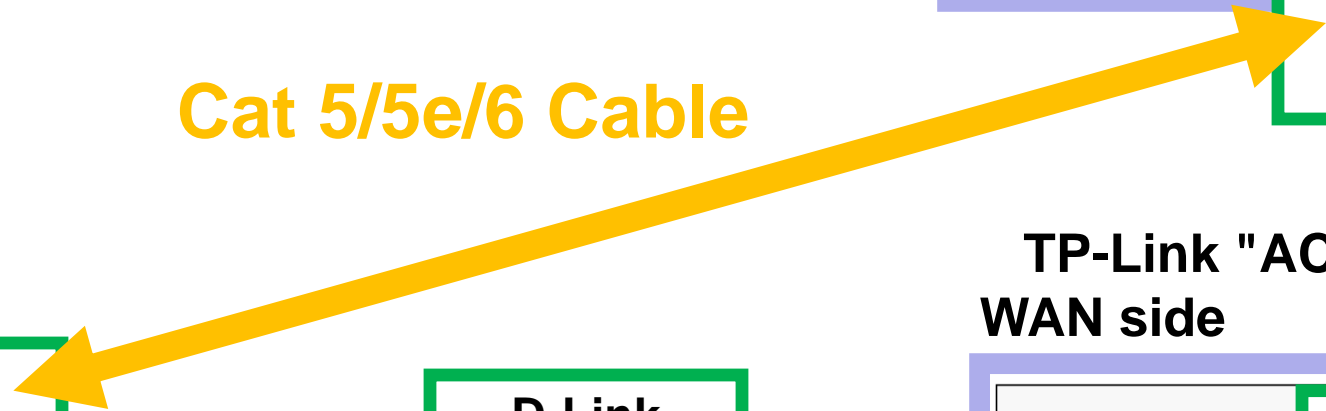
**2.45 GHz
or
5 GHz
WiFi radio
waves**



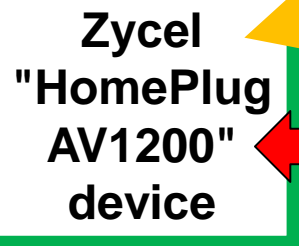
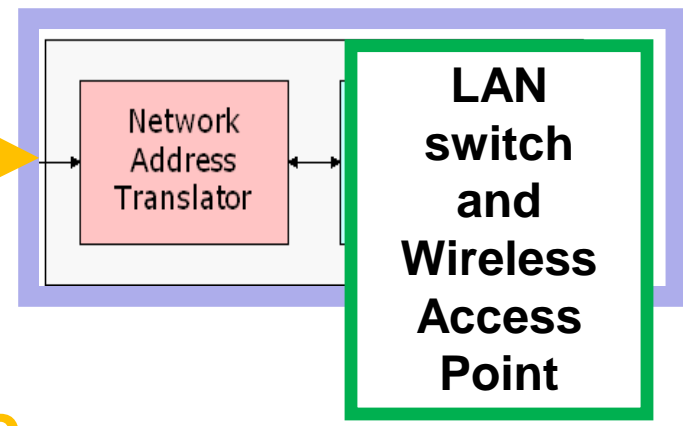
**Edimax "AC" Router
WAN side LAN side**



Cat 5/5e/6 Cable



**TP-Link "AC" Router
WAN side LAN side**



**Cat 5
/5e/6
Cable**

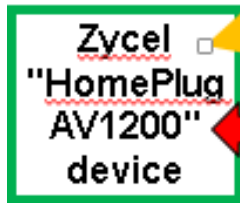
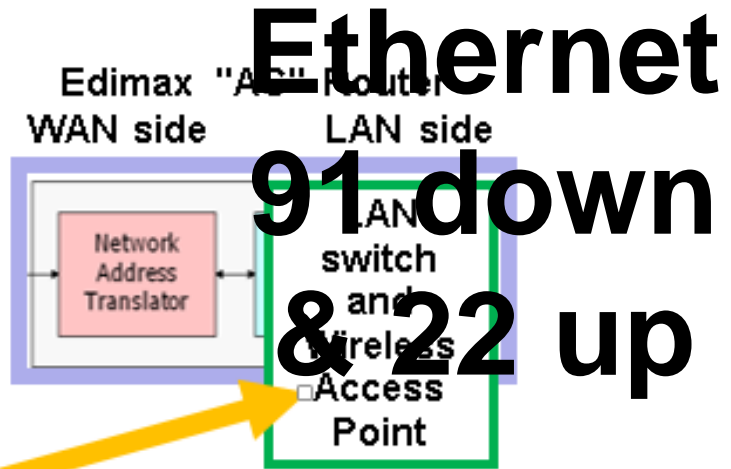
**110 VAC Existing
House Electrical
Wiring (up to 300 feet)**

A diagram with
nominal data
transmission
speeds:

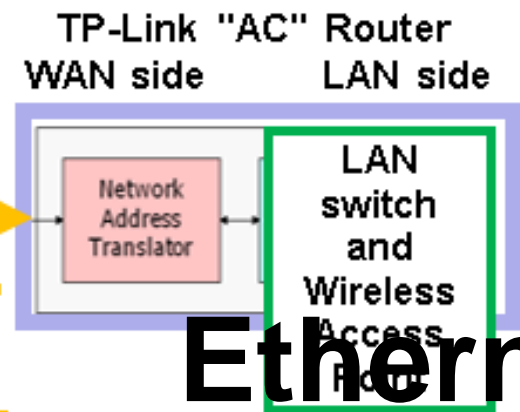
Wi-Fi
Wireless Internet Service Provider (WISP)
154 down & 22 up

2.45 GHz or 5 GHz WiFi radio waves

Cat 5e/6 Cable (up to 328 feet)



Cat 5 (EoS) Cable (up to 328 feet)



110 VAC Existing House Electrical Wiring (up to 300 feet)
Ethernet
94 down & 22 up

Ethernet
88 down & 22 up

INTERNET SPEED MEASUREMENTS TAKEN AT HUNTINGTON BEACH, CA IN JUNE 2015

❑ Comcast modem: 154 down & 22 up



❑ Edimax Router-WISP: 91 down & 22 up



❑ Powerline Link-Far End: 94 down & 21 up



❑ TP-Link Router-Far end: 88 down & 22 up

(All values in Megabits per second)

TOPICS

- **Big Step 100:**
**Measure Internet Bandwidth At
Various LAN Locations**
- **Big Step 200:**
**Measure Local Area Network
Speeds At Various LAN Locations**

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

- **Small Step 101:**
Connect your computer to the "LAN" (= "Local Area Network") jack of your broadband modem (or connect your computer by means of WiFi if your "Internet Service Provider" (ISP) only has wireless connections for you)

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS (continued)

- **Small Step 102:
Start a Web browser.**

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS (continued)

- **Small Step 103:**
Use the configuration screens of the Web browser to delete all history.

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS (continued)

- **Small Step 104:**
Close the Web browser.

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

(continued)

- **Small Step 105:**
Re-start the Web browser.

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

(continued)

- Small Step 106:
Go to
"http://speedtest.net"

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS (continued)

- **Small Step 107:
Click on "Begin test"**

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

(continued)

- **Small Step 108:**
Write down the measured download and upload speeds.

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

(continued)

- **Small Step 109:**
Repeat Steps 103 through 108 nine times.
Then go to Step 110.:

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

(continued)

- **Small Step 110:**
Calculate the average download and speed over the ten above tests.

BIG STEP 100: MEASURE INTERNET BANDWIDTH AT VARIOUS LAN LOCATIONS

(continued)

- Small Step 111:

For each accessible location in your local area network, repeat Steps 102 through 110 in order to locate any devices or cabling that might be bottleneck the Internet bandwidth that your Internet Service Provider is providing.

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS

- Small Step 201:
Open a Web browser.

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- Small Step 202:
Go to
<http://www.totusoft.com/downloads.html>

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- Small Step 203:
Go to
<http://www.totusoft.com/downloads.html>

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- Small Step 204:
Download
"LAN Speed Test (Lite) (Free)".

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- Small Step 205:
Install "LAN Speed Test (Lite) (Free)" into your "Windows.." or Mac "OS X" computer.

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- Small Step 206:
Install "LAN Speed Test (Lite) (Free)" into your "Windows.." or Mac "OS X" computer.

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- **Small Step 207:**
Install a second computer with a shared folder somewhere on your local network.

BIG STEP 200: MEASURE LOCAL AREA NETWORK SPEEDS AT VARIOUS LAN LOCATIONS (continued)

- **Small Step 208:**
Run "LAN Speed Test (Lite)(Free)" to locate and replace devices on your local network that are running slower than the average download and upload speeds that your Internet Service Provider (ISP) are providing you.

