# Slow Speed Troubleshooting

# Made Easy

Our goal with troubleshooting slow speeds is to identify the source of the problem and to educate the customer what they are able to do to help resolve the issue. This might be identifying issues within our network which I need to be powered it to our branch team, or this might be identifying issues with the customers equipment or the broader Internet as a whole. With this training packet I hope to enable you to quickly and efficiently identify what's causing the slow speed issues and what we can do as agents to help resolve them.

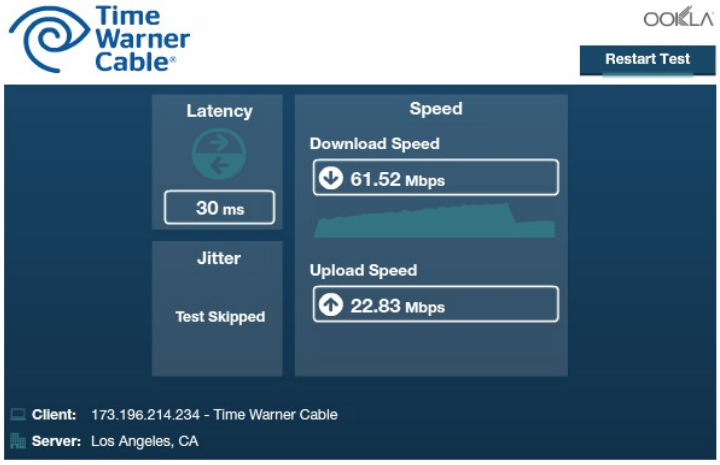
The first thing we need to do is determine what type of connections we are dealing with. We need to ask the customer how it is at the house the system connected, and what types of applications they're attempting to run, what the area is like etc. Through this identification process we should be able to isolate any sort of physical issue that could be causing the customers slow speed problems such as local interference, poor placement of the modem, electromagnetic interference or even something as simple as signal attenuation over distance.

## Collecting a Baseline

Once we've identified how the system is connected and what the customers attempted to do an incident and we have taken steps to eliminate some of the most obvious physical issues of the configuration we need to collect a baseline for us to use as a reference point. This baseline is not necessarily for us as agent but more for the customers themselves. If the customer can see where their services began at and are able to see some form of improvement through the remaining troubleshooting steps that allows them to accept the answers that we give them much easier.

Southern California (LA, DC, SD) - speedtest.west.rr.com
Mountain West - speedtest.peakview.rr.com

These speed test sites stay within the Time Warner Cable network. They never leaves our backbone and provides a good detailed picture of how our connections are working for the customer. This is the speed test which we should be starting whenever we run speed test. If you encounter an issue on this speed test, you must begin to isolate where the issue is coming from.

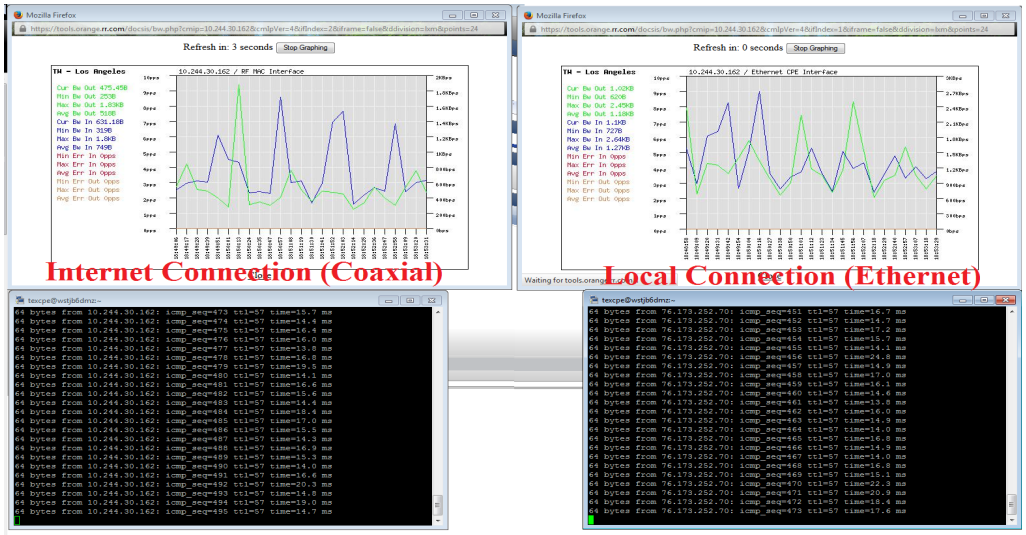


# Internal Speed Issues

The first step is to begin monitoring the customer's connection on a live basis. In order to do this we need to connect the customer's system directly to the modem via Ethernet cable. If the customer refuses to comply, simply advise the customer that this could result in a trip charge and end the call. If they are able to comply, open DOCSIS and begin the bandwidth monitor for both the CableMacLayer as well as the Ethernet cable. This provides you a view of both the external bandwidth as well as the internal bandwidth traffic.

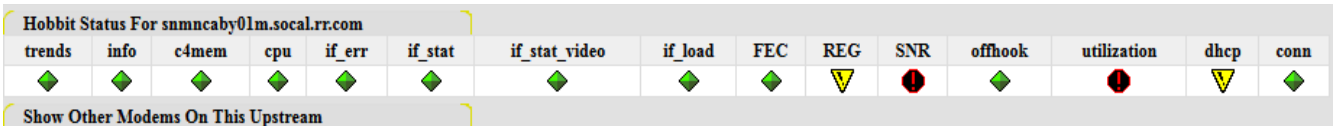
| Interface | Type | Speed | Status | In Bw | Out Bw | In Err | Out Err |
|---|---|---|---|---|---|---|---|
| Ethernet CPE Interface | Ethernet | 1 Gb | up(1)/up(1) | 112.62 MB | 832.54 MB | 0 | 0 |
| RF MAC Interface | CableMaclayer | 0 b | up(1)/up(1) | 853.37 MB | 50.23 MB | 0 | 0 |
| RF Downstream Interface | Downstream | 42.88 Mb | up(1)/up(1) | 1.75 GB | 0 B | 0 | 0 |
| RF Upstream Interface | Upstream | 10.24 Mb | up(1)/up(1) | 0 B | 15.02 MB | 0 | 0 |
| Gateway WAN Interface | Other | 0 b | up(1)/up(1) | 64.24 MB | 5.89 MB | 0 | 0 |
| Wireless Interface 1 | Other | 0 b | down(2)/down(2) | 0 B | 0 B | 0 | 0 |
| Wireless Interface 2 | Other | 0 b | down(2)/down(2) | 0 B | 0 B | 0 | 0 |
| Wireless Interface 3 | Other | 0 b | down(2)/down(2) | 0 B | 0 B | 0 | 0 |
| Wireless Interface 4 | Other | 0 b | down(2)/down(2) | 0 B | 0 B | 0 | 0 |
| PacketCable Embedded Interface | Other | 0 b | up(1)/up(1) | 53.44 MB | 64.85 KB | 0 | 0 |
| RF Downstream Interface 1 | Downstream | 42.88 Mb | up(1)/up(1) | 586.08 MB | 0 B | 0 | 0 |
| RF Downstream Interface 2 | Downstream | 42.88 Mb | up(1)/up(1) | 761.31 MB | 0 B | 0 | 0 |
| RF Downstream Interface 3 | Downstream | 42.88 Mb | up(1)/up(1) | 793.07 MB | 0 B | 0 | 0 |
| RF Downstream Interface 4 | Downstream | 42.88 Mb | up(1)/up(1) | 768.39 MB | 0 B | 0 | 0 |
| RF Downstream Interface 5 | Downstream | 42.88 Mb | up(1)/up(1) | 626.13 MB | 0 B | 0 | 0 |
| RF Downstream Interface 6 | Downstream | 42.88 Mb | up(1)/up(1) | 594.48 MB | 0 B | 0 | 0 |
| RF Downstream Interface 7 | Downstream | 42.88 Mb | up(1)/up(1) | 431.75 MB | 0 B | 0 | 0 |
| RF Upstream Interface 1 | Upstream | 30.72 Mb | up(1)/up(1) | 0 B | 16.85 MB | 0 | 0 |
| RF Upstream Interface 2 | Upstream | 30.72 Mb | up(1)/up(1) | 0 B | 13.59 MB | 0 | 0 |
| RF Upstream Interface 3 | Upstream | 10.24 Mb | up(1)/up(1) | 0 B | 13.57 MB | 0 | 0 |

After opening both bandwidth tests, begin a live constant ping on the CPE IP address for their device as well as for the CM IP address. This is only partially for your reference because once you have determined that this ping results seem fine (after 500 pings or so) you can stop the test and share the average results with the customer as a point of reference as to our system's proper function.



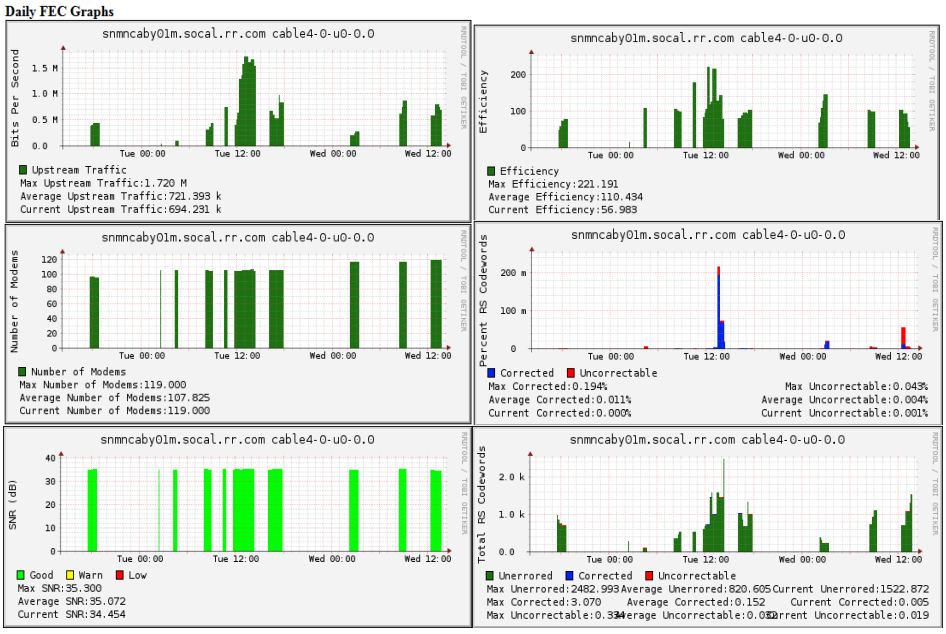
**- If issue results in modem only problem for ping or bandwidth or both**

If the issue is displaying as only a modem problem but not a problem with the CPE device then the issue is either our modem or an issue with the customer's local blade at the head-end. Diagnosing a blade issue can be a very straight-forward process and DOCSIS even summarizes the associated data at the bottom of the report for quick live reference:




Other simple ways to see a historical review of the customer's local blade performance can be viewed by opening the graph options within the DOCSIS test:


By opening the graph tab, you receive a panel to the right which contains a easy to view summary of each state that could affect the blade's function. Everything in our system is color-coded so if you see a lot of red at the end of any of these graphs it could indicate a problem.




There eight tabs which give direct feedback about the blade but the only two you truly need to pay attention to are the FEC (Forward Error Correction) tab and the Utilization tab. The FEC tab gives a great overview of the overall functionality of the blade in question and the Utilization tab will show you if the blade is nearing capacity which is typically a cause of slow speeds but it is also a precursor to a blade split as well.

If our modem is showing the same issue after a reset and firmware dump (pressing and holding the reset button for 30 seconds minimum) and you have confirmed that the customer's blade is problem free then this calls for a technician visit to replace the customer's modem or it calls for directing the customer to return the equipment to a Time Warner Cable office in exchange for a new device.

**- If issue results in CPE (Customer Provided Equipment) only problem for ping or bandwidth or both**

If the issue that the customers experiencing once they are computer is directly connected is showing only on the local pain and bandwidth monitors the issue is due to something within their network. Either it's their computer or it's a secondary device which is exceeding their bandwidth allotment.

I have provided a quick reference chart that lists the common software causes and what the effects on the network that they have are:

| Problematic Software | Effect on Network | Solution |
|---|---|---|
| Torrent | Torrents consume as much bandwidth as they are able. | Enable bandwidth restriction for any seeded torrents. |
| Backup Software | Backup Software also consumes any available Bandwidth | Enable bandwidth restriction for backup updates. |
| VPN (Virtual Protocol Network) | Carves out and Privatizes a segment of bandwidth as large as the program's maximum bandwidth requirement and denies access to it | There is not a good solution for this that the customer can take. Advise them to contact the person they are trying to VPN to for assistance in restrict VPN size |
| VOIP systems | Builds a VPN to the call server the service uses | Contact VOIP service Provider for solution |
| Cloud Based Software | Sporadically claims large chunks of bandwidth to maintain an active backup | Some applications have limitations that can be set. |
| Remote Access Protocol Software | Actively consumes bandwidth in varying amounts depending on need but always in relatively large quantities especially if the user has a remote desktop application running. | These pieces cannot typically be limited because they rely on a dynamically shifting bandwidth. |

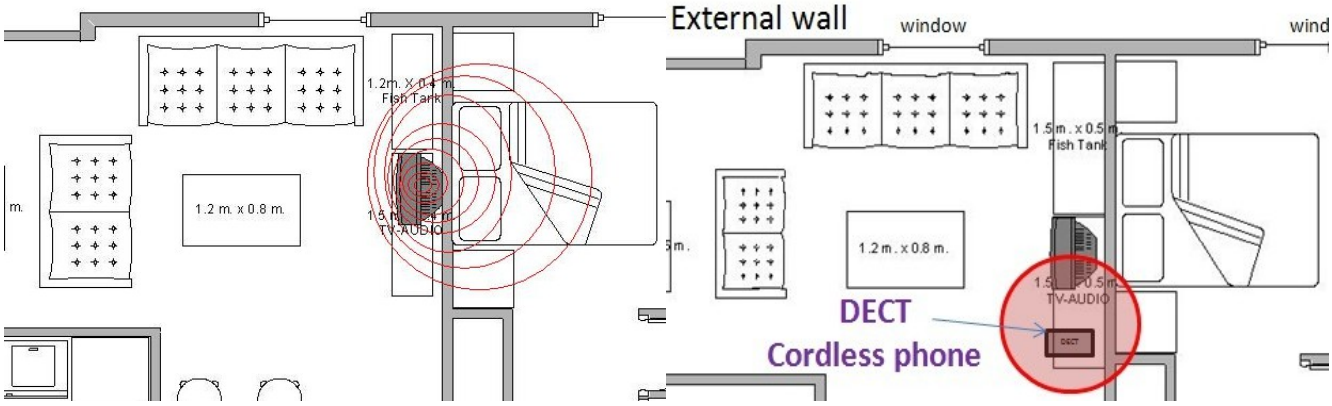
If the issue persists after having the customer close everything but the bare essential software on their computer it is likely that they have some form of virus which is claiming this bandwidth.

**- If the issue is not present once the computer is directly connected**

If the issue has vanished once the computer is directly connected, have your customer return to their wireless connection and advise you of the number of other networks which are present. At this point in the call you should have eliminated issues relating to physical placement problems with our modem. These physical issues could be proximity to electrical devices which emit high amounts of Elecromagnetic energy (IE plasma tv sets [not lcd or led as plasma is supercharged particles and these other common types of HD are not.] Microwaves, stereo speakers etc.) proximity to devices which emit radio frequencies (IE H.A.M. Radios, cordless phone base stations, other wireless networking devices etc.).

**EMF/EMR low frequency (ELF) sources in the house:**

- CRT TV
- Air conditioner systems
- Refrigerators
- Electric Ovens
- Electrical heating systems
- Underfloor heating system
- Electric beds
- Bed side electronic clock-alarm-radio devices
- Power supplies and voltage converters
- Stereo and home entertainment systems
- Fans
- Computers and laptops
- CFL (Compact Florescent Light) bulbs.
- Neighbors' ELF sources that are located next to your walls.




Radio Frequency ranges can vary greatly between devices but it is good to have our modem away from all major sources of electromagnetic and radio interference generating devices. If you have further questions about anything else regarding either type of interference
please visit: http://www.norad4u.com/

If there does not appear to be any sort of immediate interference sources, advise the customer of such and also advise that some sources of interference are not easily detected inside the home. At this point a quick glace of their address in google maps might show a nearby school (usually has a dispatch broadcast tower), hospital etc which might have a large radio footprint that could be triggering their wireless issues.

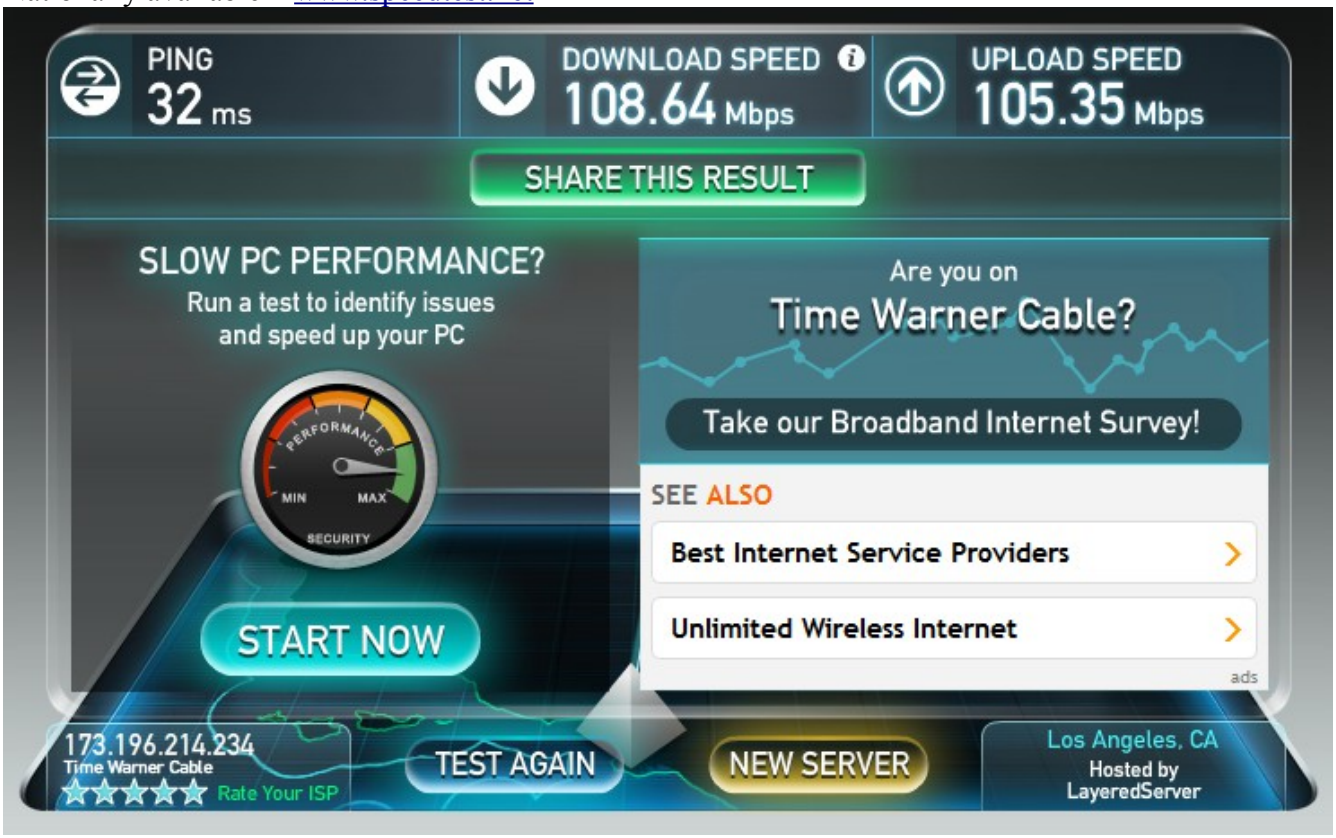
It is possible that they may have an issue with their WiFi configurations as well so if you are able to remotely access it ensure that the modem has the following configurations: (these will minimize the effects of incompatibility as well as local interference)

| | |
|---|---|
| Control Channel: | 9 |
| Security Mode: | WPA/WPA2-PSK |
| Encryption Algorithm: | TKIP/AES |

These settings will ensure that they are not on any manufacturer's default broadcast channel for any radio equipment (ie cordless phones, baby monitors etc.) and that the modem has the most compatability possible from our equipment. If the customer possesses 5Ghz capable devices and this is an option on our modem, offer this to them as an option because most of the wireless community is broadcasting in 2.4 Ghz.

# Outside TWC Network Speed Issues

Nationally available – [www.speedtest.net](http://www.speedtest.net)




This site is one of many speed testing sites which exist outside of our network. This site is a really good one to use because the customer can clearly see that the same company has produced not only our speed test but this one as well. Between the customers computer and the server which is running the speed test you not only have the Time Warner Cable network but you also have the public backbone which forms the national network for the United States, the receiving server's service provider network as well as the receiving server itself.


Once you've identified that the issue is outside of our network there are very basic steps we can walk our customer through to educate them as to how they can identify the source of their problem and also who they can contact in order to find resolution.

**Traceroute Test**

In order to run a traceroute, you need to know what system you will be running it on. Some of our customers already know how to do this and are glad to complete one for you. Never have the customer rely on your expertise in reading this by requesting they email the results to you because you are entirely missing the opportunity to educate them on completing this later WITHOUT our assistance.

Determine first what operating system the customer is using as this could change the initial command you need them to enter. If they are using windows then have them open a command prompt and enter 'tracert www.ted.com'. If the customer is using an Apple Computer then the trace route steps are almost the same. Using a mac, have the customer open the Terminal program located in their utilities folder and enter 'traceroute www.ted.com'. Once this command has been run, a signal will propagate to the destination server whilst also returning a report from each 'hop' or routing switch between the customer and their requested destination.

```
C:\Users\E146719>tracert www.facebook.com

Tracing route to star.c10r.facebook.com [69.171.237.20]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  10.88.2.1
  2    <1 ms    <1 ms    <1 ms  cos-cc-ar-j-01-ge0-0-1--200.inf.twcable.com [165.237.0.34]
  3    <1 ms    <1 ms    <1 ms  coscocc-rc-02-irbu102.inf.twcable.com [10.240.113.62]
  4    28 ms    28 ms    28 ms  10.240.113.57
  5    34 ms    33 ms    33 ms  10.240.113.22
  6    31 ms    31 ms    31 ms  sdgdcrc01-g1-48.inf.twcable.com [165.237.241.32]
  7    37 ms    34 ms    33 ms  bowdcrc02-g1-3.inf.twcable.com [165.237.241.10]
  8    33 ms    33 ms    33 ms  bow-rx-fw-n-12-eth3-1.inf.twcable.com [165.237.245.12]
  9    34 ms    34 ms    35 ms  rrcs-173-196-214-225.west.biz.rr.com [173.196.214.225]
 10    34 ms    34 ms    34 ms  ge3-20.lsaicaev05r.socal.rr.com [72.129.55.28]
 11    34 ms    34 ms    34 ms  tge2-1.lsaicaev03r.socal.rr.com [72.129.55.252]
 12    34 ms    34 ms    34 ms  agg20.lsaicaev01v.socal.rr.com [72.129.55.2]
 13    39 ms    35 ms    39 ms  agg34.lsancarc01r.socal.rr.com [72.129.61.64]
 14    39 ms    39 ms    39 ms  bu-ether26.lsancarc0yw-bcr00.tbone.rr.com [66.109.6.212]
 15    35 ms    35 ms    35 ms  ae-0-0.pr0.lax00.tbone.rr.com [66.109.6.135]
 16    36 ms    36 ms    36 ms  66.109.9.122
 17    45 ms    45 ms    45 ms  vl-3601-ve-225.ebr2.Tustin1.Level3.net [4.69.158.81]
 18    47 ms    47 ms    46 ms  ae-7-7.ebr3.LosAngeles1.Level3.net [4.69.153.225]
 19    46 ms    46 ms    46 ms  ae-3-3.ebr1.SanJose1.Level3.net [4.69.132.9]
 20    46 ms    46 ms    46 ms  ae-61-61.csw1.SanJose1.Level3.net [4.69.153.2]
 21    47 ms    46 ms    48 ms  ae-1-60.edge2.SanJose3.Level3.net [4.69.152.17]
 22    47 ms    47 ms    47 ms  4.53.210.78
 23    47 ms    47 ms    49 ms  ae1.bb01.sjc1.tfbnw.net [74.119.76.23]
 24    66 ms    66 ms    66 ms  ae30.bb03.prn2.tfbnw.net [31.13.24.254]
 25    69 ms    69 ms    69 ms  ae2.dr01.prn1.tfbnw.net [173.252.64.245]
 26     *        *        *     Request timed out.
 27     *        *        *     Request timed out.
 28    69 ms    69 ms    69 ms  edge-star-shv-12-prn1.facebook.com [69.171.237.20]

Trace complete.
```

From here you are presented with the information regarding the trip that the connection takes. Point out to our customer the 'hop' which represents the end of our network. It is always displayed containing the address tbone.rr.com (listed above as hop 15) from this point we as a company have no control over any issues which exists outside this point.

*For those who do not know how to read this information the format is as follows:*

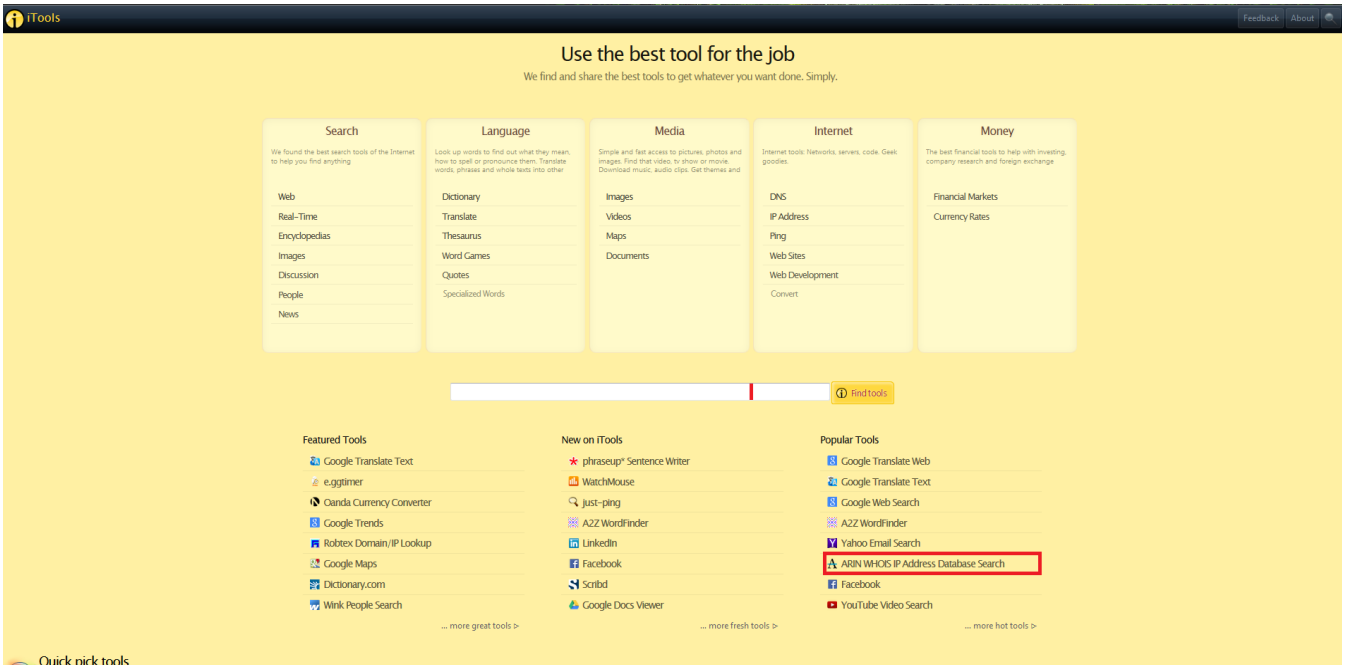
*Hop number  Max Ping  Avg Ping  Min Ping  Domain Name  [IPv4 Address]*

These pings are going to show an average level if everything is routing fine but if there is a problem, the ping values will be clearly elevated on one or more IP addresses. This first elevated result is the source of the issue.

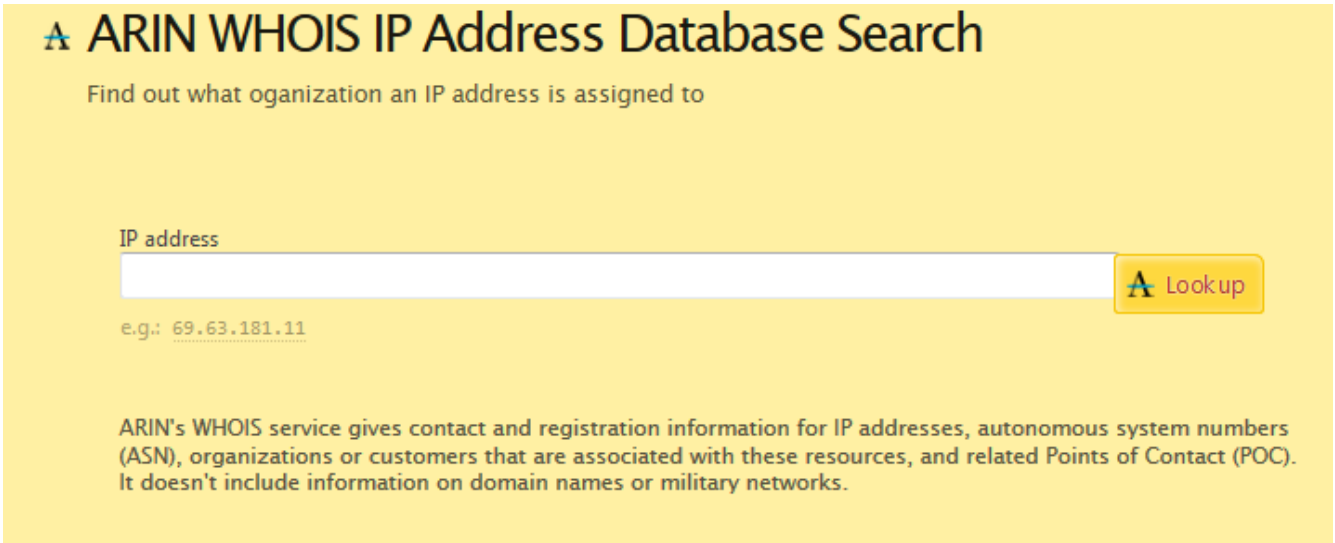
**Determining Who to Call**

Once you've located the IP address of the routing switch which is displaying higher than normal pings, advise the customer to collect the IP address that is connected to those ping results. Using this ip we can determine who the customer should call and report their findings to.

Www.iTools.com




At this point you have shown the customer that this issue is not TWC but not how they are able to fix it. Using the website above advise the customer click on the ARIN WHOIS Address Database Search (highlighted in red above) and enter the IP address in the search bar provided.



Upon searching the IP address you will see all of the information relating to the it and it's host device including the point of contact for either the company, Network Operations Center (NOC), or technical support agent. This is who the customer needs to contact. Usually there is a phone number they can use to call with but if there is not there is almost always at least an email address.

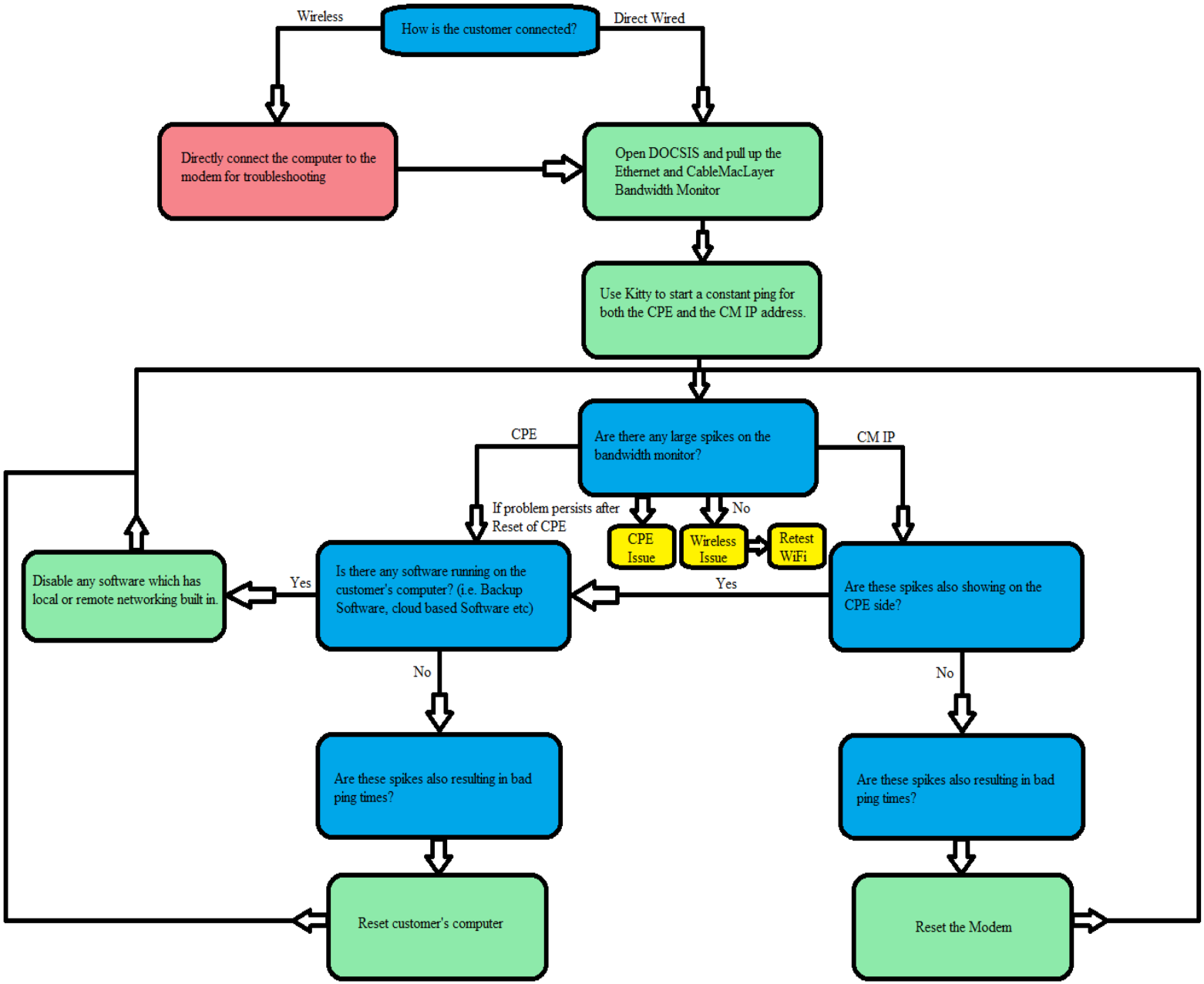
| Point of Contact | |
|---|---|
| Name | Internet Corporation for Assigned Names and Number |
| Handle | IANA-IP-ARIN |
| Company | Internet Corporation for Assigned Names and Number |
| Street | 12025 Waterfront Drive<br>Suite 300 |
| City | Los Angeles |
| State/Province | CA |
| Postal Code | 90292 |
| Country | US |
| Registration Date | 2003-08-25 |
| Last Updated | 2013-11-11 |
| Comments | Think we're attacking you? Please look here:<br>http://www.iana.org/abuse |
| Phone | +1-310-301-5820 (Office) |
| Email | abuse@iana.org |
| RESTful Link | http://whois.arin.net/rest/poc/IANA-IP-ARIN |
| See Also | Related organizations. |

When they call, all they need to tell them is that this IP address is displaying irregularly high ping times and is causing their internet to run slowly.

Educating our customers of the procedures above should help not only reduce our call volumes but also improve your own personal First Call Resolution because the customer will completely understand at this point that we at Time Warner Cable have no control over their slow speed issue based on what you have had them look up.

## Conclusion

Provided below I have built a flowchart which will walk you through the basic steps of troubleshooting slow speeds. This in combination with the document above should help significantly reduce your slow speed issue troubleshooting times as well as your truck roll percentage for this issue. Please print and keep this chart (and document) within arms reach until you feel that you have mastered what was discussed.


How is the customer connected?
Wireless
Direct Wired
Directly connect the computer to the modem for troubleshooting
Open DOCSIS and pull up the Ethernet and CableMacLayer Bandwidth Monitor
Use Kitty to start a constant ping for both the CPE and the CM IP address.
Are there any large spikes on the bandwidth monitor?
CPE
CM IP
If problem persists after Reset of CPE
No
CPE Issue
Wireless Issue
Retest WiFi
Disable any software which has local or remote networking built in.
Yes
Is there any software running on the customer's computer? (i.e. Backup Software, cloud based Software etc)
Yes
Are these spikes also showing on the CPE side?
No
No
Are these spikes also resulting in bad ping times?
Are these spikes also resulting in bad ping times?
Reset customer's computer
Reset the Modem