Ethernet

End User Technical Support

Version	Date	Description
1.0	21/01/2019	Document created
1.1	14/02/2019	Updated with minor changes to wording

Contents

Technical Support

All managed Ethernet circuits are monitored 24 hours a day, 7 days a week, 365 days a year. Your service provider support team will be notified in an event that a circuit becomes unavailable.

Fault Types

Hard Down

A "Hard Down" is Ethernet jargon for total loss of service in one or both directions (uploading and/or downloading). A hard down would come under a Priority 1 fault, which is defined in the Service Level Agreement. Please contact your service provider for more information on 'Ethernet Terms and Conditions' which state the 'Service Level Agreements'. Your account manager can provide you the latest Service Level Agreement document should you wish to review the priorities for this service.

Intermittent Connection

An intermittent connection would come under a Priority 2 or 3 fault in the Service Level Agreement, depending on if there is a significant business impact for your end user. Please contact your service provider for more information relating to 'Ethernet Terms and Conditions'. Your account manager can provide you the latest Service Level Agreement document should you wish to review the priorities for this service.

Slow Speed Faults

Slow Speed Faults could be caused by one of a few reasons, and could again be a Priority 2 or 3 fault in the Service Level Agreement, depending on if there is a significant business impact for the end user. Please contact your service provider for more information relating to 'Ethernet Terms and Conditions'. Your account manager can provide you the latest Service Level Agreement document should you wish to review the priorities for this service.

Packet Loss or High Latency

Your end user may be experiencing Packet Loss or High Latency with their Ethernet connection. These would be a Priority 2 or 3 fault in the Service Level Agreement, depending on if there is a significant business impact for your end user. Please refer to your service provider for more information relating to 'Ethernet Terms and Conditions'. Your account manager can provide you the latest Service Level Agreement document should you wish to review the priorities for this service.

Hard Down

A Hard Down fault is when an Ethernet connection goes down and there is no connection, either upstream or downstream (maybe both). We work hard with a number of different parties in the case of a hard down to make sure that your end user is back up and running as quickly as possible.

We monitor all of our Ethernet circuits 24 hours a day, 7 days a week so we can spot any possible hard down faults.

When a circuit is in a hard down state, your service provider support team will send you an email to alert you of the circuits state, with some further questions in the event you are want to raise this as a fault.

The clock for the Service Level Agreement only starts from when you've answered these questions, and until then, the circuit is classified as an "alert".

Questions which you need to answer before the fault can be logged are:

- Is there power to the BT socket?
- What LED's are lit on the BT socket?
- Is there power to the Managed router?
- What lights are lit on the Managed router?
- Is the Managed router cabled according to the handover documentation?
- Can you provide onsite contact details (name and number) and availability in case this has to go to an Engineer visit?

Use our Fibre (EAD) Hard Down step by step process to help you understand these questions, or use our EFM Hard Down step by step process if you have an EFM circuit.

Fibre (EAD) Hard Down

If you're end user is using a Fibre (EAD) circuit, they'll be using a different Network Termination Equipment (NTE) than an EFM circuit.

This is what EAD NTE/socket looks like - it is a long white box with a few different sockets for different things. On the left we've got two power supply units plugged in. The "Access" ports are where the EU connects their CPE/equipment and the "Network" port is where BT's fibre comes into the building.

This page is going to cover some of the questions you will be asked when you report a fault. It is critical that these questions are answered correctly first time, as we want to get your circuit back up and running.

Is there power to the BT NTE?

Check that both power cables are plugged in correctly, and that the alarm lights for the PSUs are solid green.

What LED's are lit on the BT NTE?

Network Alarms

LED/Light	*Description*	*Colour*	*Meaning*
Tx Port A	Network Fibre - port A status	Off	In combination with a Green/Red Rx LED, it may indicate loopback at one end as part of test traffic feature.
		Off	In combination with a Red Ex LED, it may indicate a non-approved SFP module has been inserted.
		Yellow	10/100 Mbps
		Green	1000 Mbps
Rx Port A	Network Fibre - port A status	Off	Link Down.
		Green	Operating OK

		Red	In combination with a Yellow/Green Tx LED indicates a low received optical power level at the SPF, this will be accompanied by a critical alarm LED.
Active	Network Fibre A	Off	Link Down.
		Green	Active Link
		Yellow	Standby Link (resilient circuits only)

Access Alarms

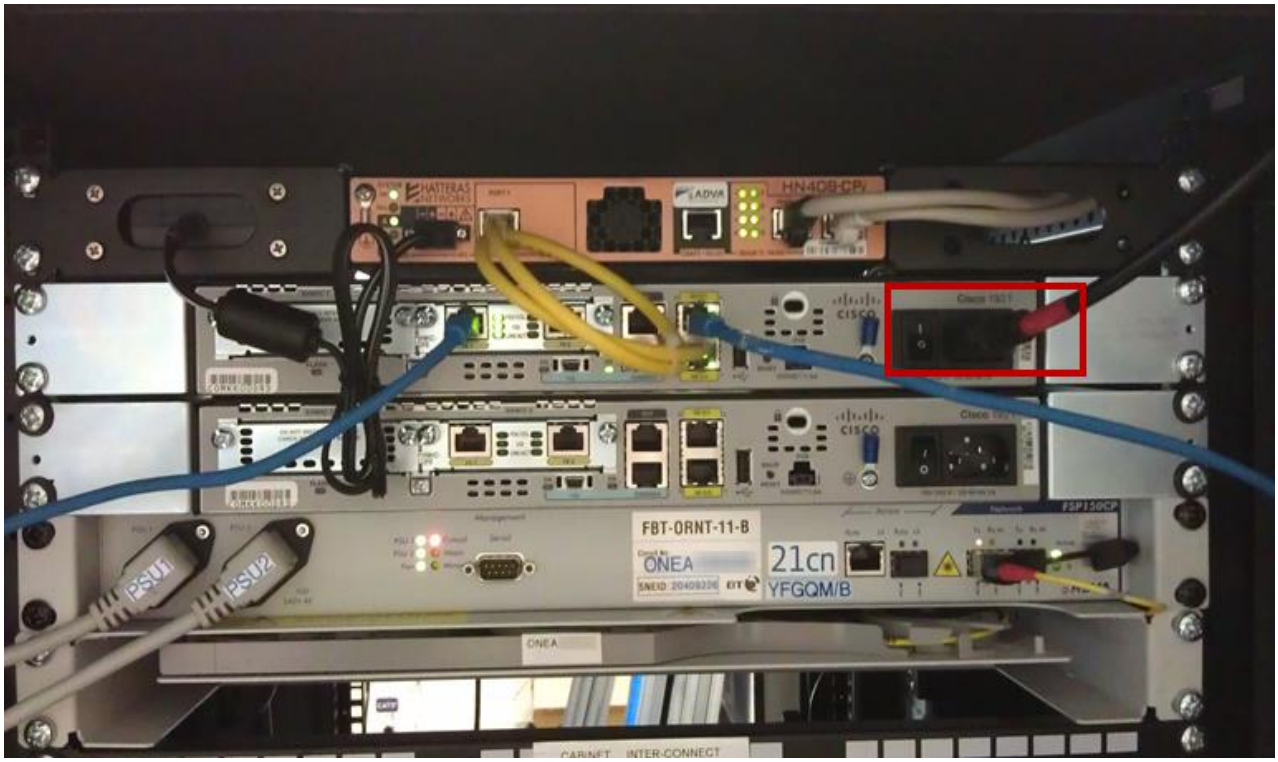
LED/Light	*Description*	*Colour*	*Meaning*
Rate	Customer RJ45 Port	Off	10Mbps
		Yellow	100Mbps
		Green	1000Mbps (although not actually available on RJ25)
Lk	Customer RJ45 Port	Off	Nothing connected or CPE not seen.
		Green	Active link
		FlashesGreen	Active link passing data
Tx	Customer optical port	Green	Acceptable SFP fitted
RX	Customer optical port	Green	Active link
		FlashesGreen	Active link passing data
		Red	Link fail

General Alarms

LED/Light	*Description*	*Colour*	*Meaning*
PSU 1	PSU 1 alarm indicator	Off	No Power
		Green	PSU OK
		Red	PSU Fail
PSU 2	PSU 2 alarm indicator	Off	No Power
		Green	PSU OK
		Red	PSU Fail
Fan	Status of Fan	Green	Fan OK
		Red	Fan Fail
Critical	Critical alarm indicator	Off	No critical alarms exist
		Red	Critical alarms exist
Major	Major Alarm Indicator	Off	No major alarms
		Yellow	Major alarms exist
Minor	Minor Alarm Indicator	Off	No minor alarms
		Yellow	Minor alarms exist

Is there power to the Managed router?

This image is a representational image. Your setup may look different to this, and the router may look slightly different. This is intended as a guide on what you're looking for.

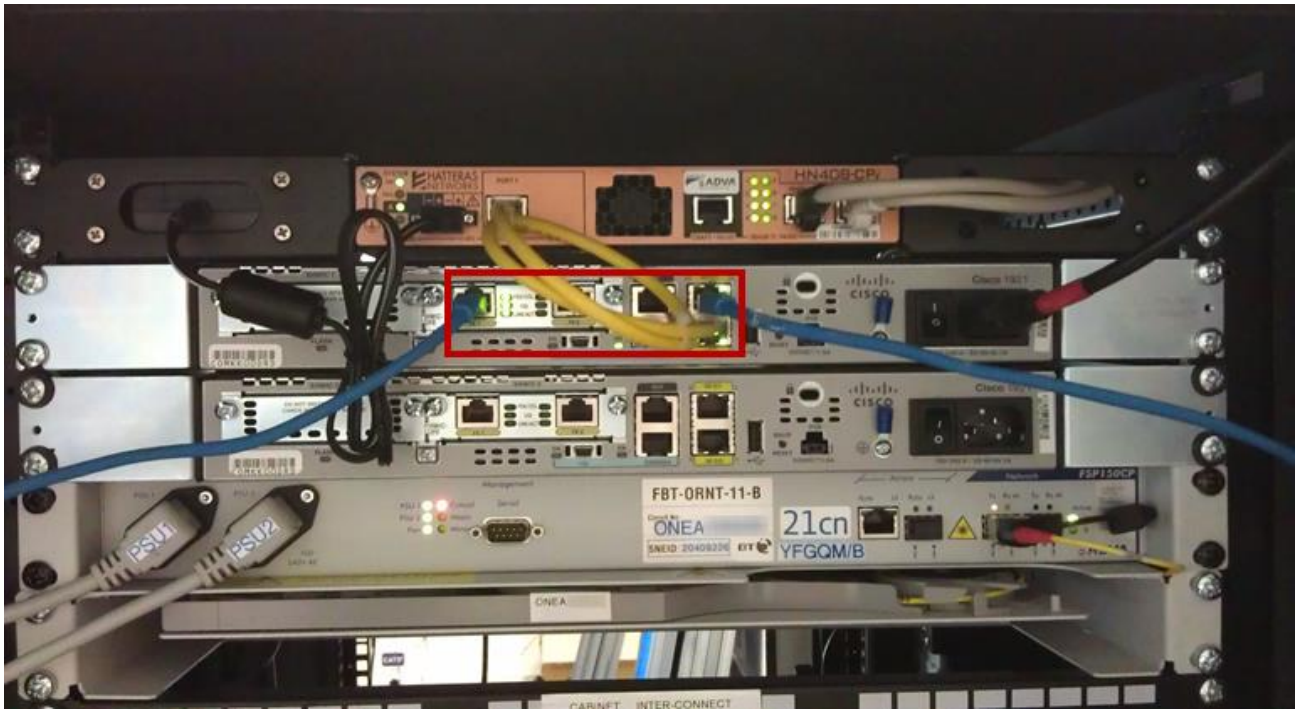


On this example, you can see that the power cable is plugged into the router, it is switched on and that there are lights on the router, indicating that there is power.

On the router below the one with power, you can see that there is no power cable there. If there is power going to the unit, the "Status" light will be lit green.

What Lights are lit on the Managed router?

This image is a representational image. Your setup may look different to this, and the router may look slightly different. This is intended as a guide on what you're looking for.



We also need to know if there are lights that represent GE 0/0 and GE 0/1.

Is the Managed router cabled according to the handover documentation?

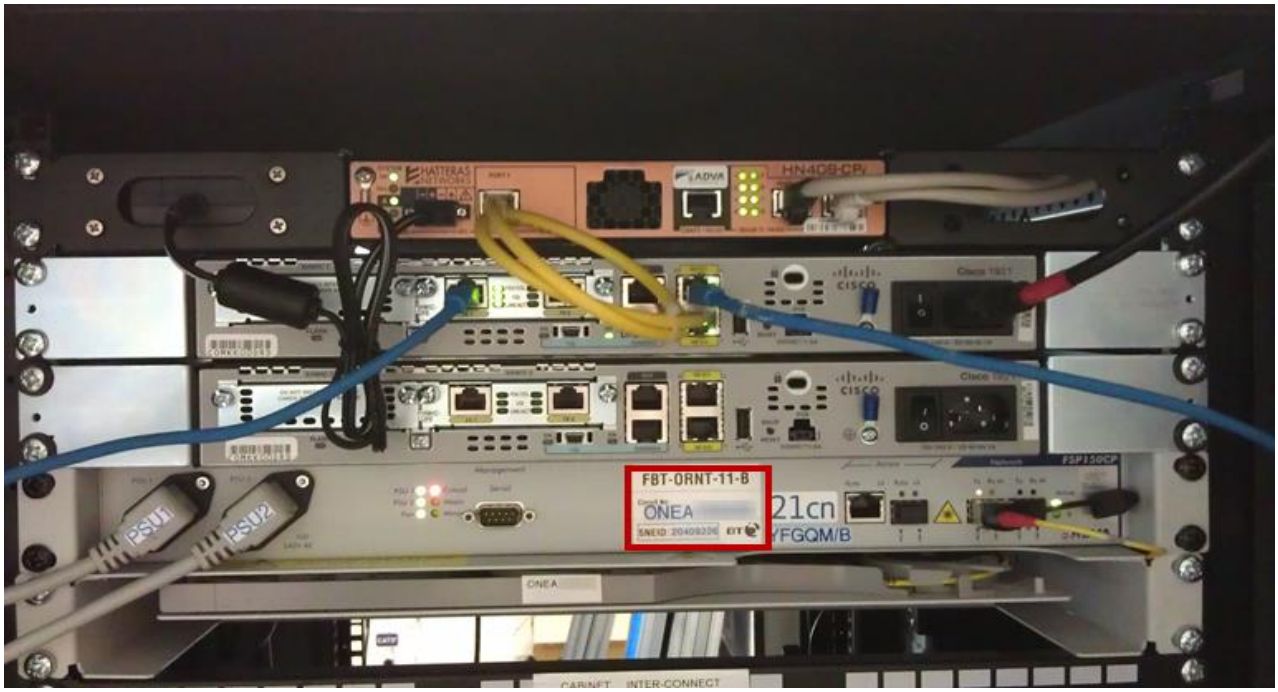
When the service had been installed, you'll have been given a handover document. Within this document, it'll tell you what your specific router cable setup would be. You should check this document and the router to ensure that the cables are in the places that the document says they should be.

Can you provide onsite contact details (name and number) and availability in case this has to go to an Engineer visit?

We need this information so that if an engineer is sent out, the engineer knows who to contact and ask for when arriving on site. We'll also need to availability of the on-site contact and when they'll be on site, so that we can arrange for the engineer to turn up on site when the nominated contact is there.

What is the ONEA number on the NTE?

This image is a representational image. Your setup may look different to this, and the NTE may not actually be placed here.



Just so that we can make sure that the NTE/socket is correct, could you also let us know what the ONEA reference is on the NTE.

EFM Hard Down

If you're end user is using an EFM circuit, they'll be using Network Termination Equipment (NTE) than a Fibre circuit. You should have cables going into the Power unit, the Ethernet port and the pairs ports. The port that has "Craft" underneath it is disabled.

This is what an EFM NTE/socket looks like - it is smaller than a Fibre socket, with a copper plated back.

This page is going to be split into some questions you will be asked when repoint a fault. It is critical that these questions are answered correctly first time, as we want to get your circuit back up and running as soon as possible.

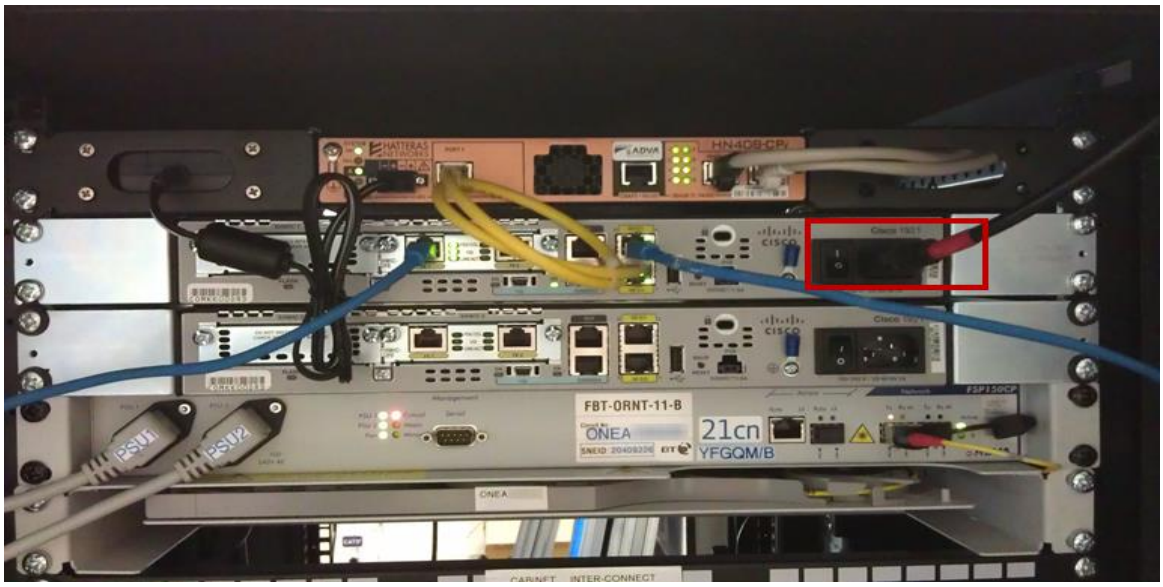
Is there power to the BT NTE/socket?

You should check that there power connection hasn't come lose, and that there is a green light next to A . This will always be A as B is not used.

What lights are lit on the BT NTE/socket?

LED/Light	*Description*
System Status OK	This light up be lit up and solid green.
System Status Fail	If this light is on, you need to inform us.
Power A	This light will inform you if there is power going into the NTE and should be solid green.
Power B	This power supply is not used, so this light will always be off.
Copper Pair status LEDs	The service could require any number from one to eight pairs. The number of LEDs lit should be the same number of pairs you got on the service. The LEDs will flash green to show that data is passing through the pair.
Link	This LED lets us know that the router is connected into the socket. This light should be solid green.

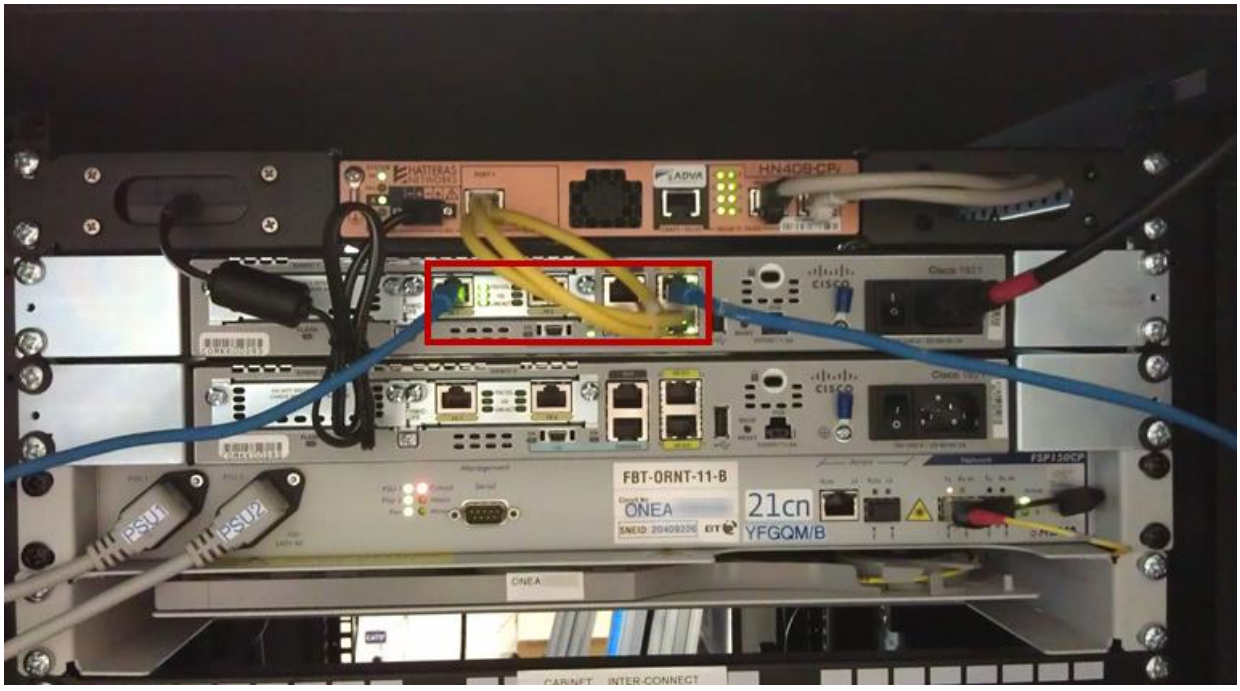
Is there power to the Managed router?



On this example, you can see that the power cable is plugged into the router, it is switched on and that there are lights on the router, indicating that there is power.

On the router below the one with power, you can see that there is no power cable there. If there is power going to the unit, the "Status" light will be lit green.

What LED’s are lit on the Managed router?



We also need to know if there are lights that represent Geo/0 and Geo/1.

Is the Managed router cabled according to the handover documentation?

When the service had been installed, you'll have been given a handover document. Within this document, it'll tell you what your specific router cable setup would be. You should check this document and the router to ensure that the cables are in the places that the document says they should be.

Can you provide onsite contact details (name and number) and availability in case this has to go to an Engineer visit?

We need this information so that if an engineer is sent out, the engineer knows who to contact and ask for when arriving on site. We'll also need to availability of the on-site contact and when they'll be on site, so that we can arrange for the engineer to turn up on site when the nominated contact is there.

Packet Loss or High Latency

If you believe that your customers circuit is experiencing Packet Loss or High Latency issues, then there are a couple of checks that you can do before you contact us.

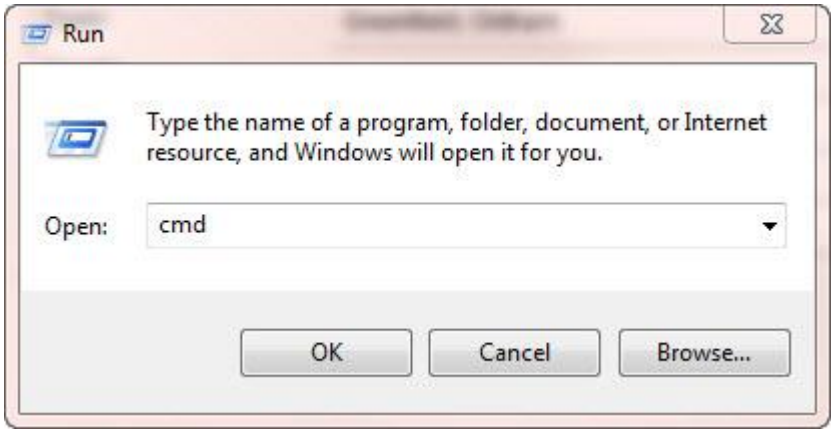
Step 1

We should do a "ping" test to check that the connection between your computer and a particular domain is working correctly.

Go to "Start" on your PC and then "Run".

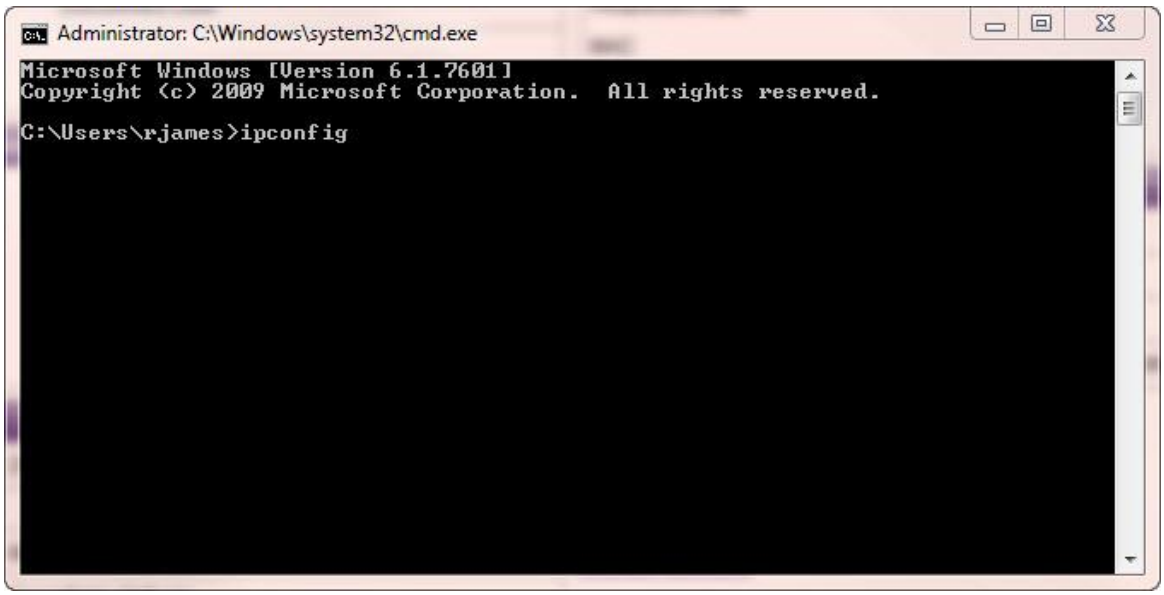
Within the text box of the "Run" facility, type in "cmd" and press "OK".

This can also be achieved by going to Start > All Programs > Accessories > Command Prompt



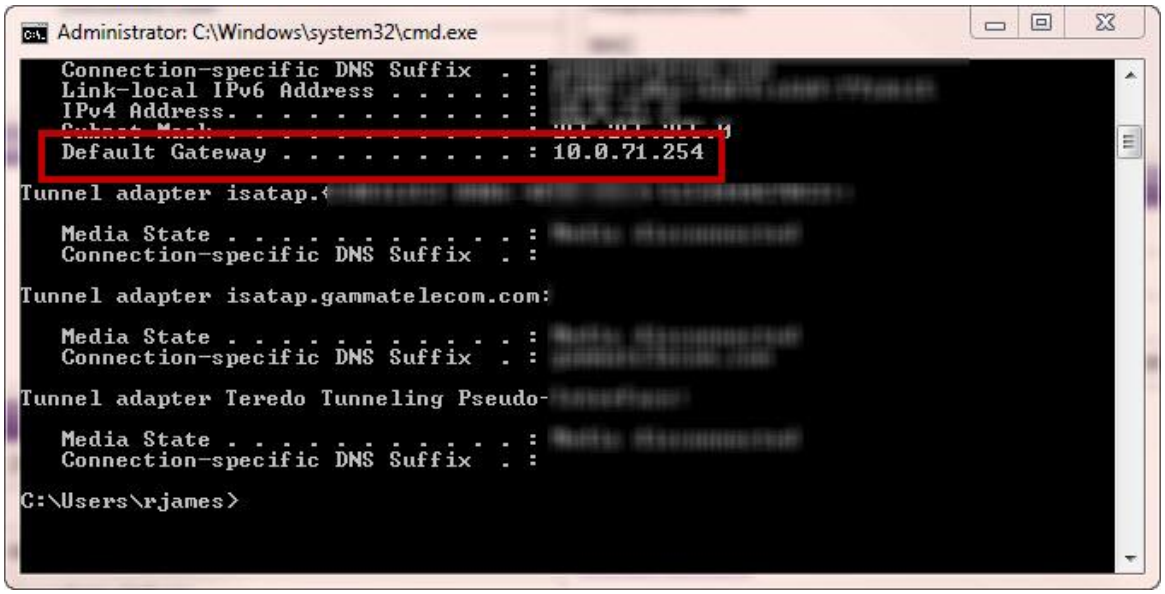
Step 2

Type in "ipconfig" and press enter.



Step 3

Look for the Default Gateway address and make a note of this.



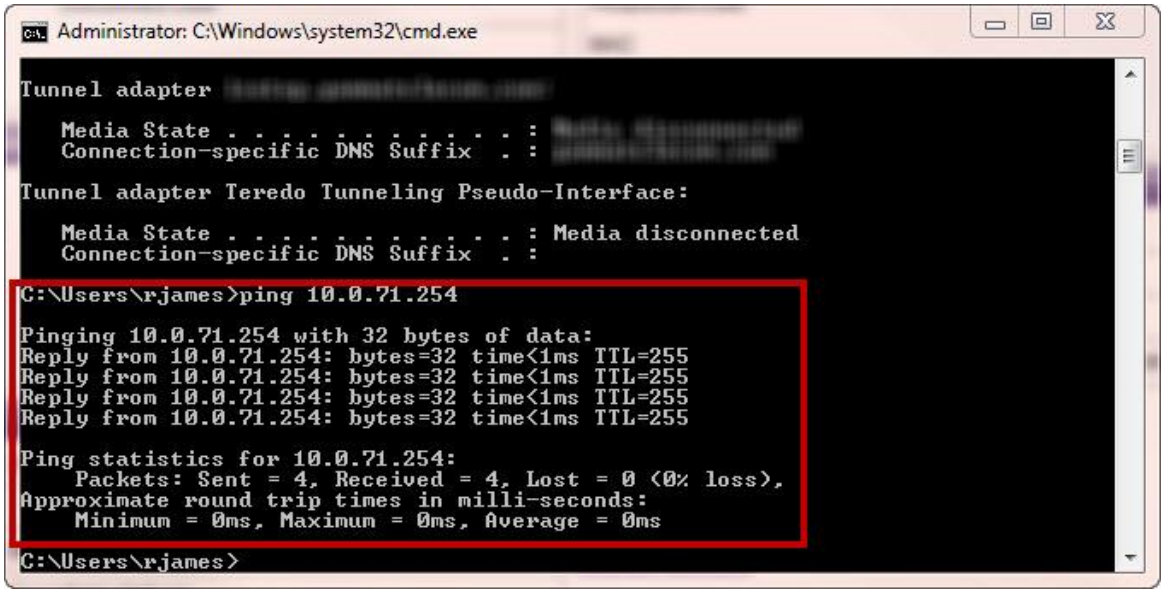
Step 4

Type in "ping" followed by a space, then the Default Gateway address and press enter.

Step 5

If you get replies from the ping (like in the screen shot across), this means that you can connect to the router and you should proceed to Step 6.

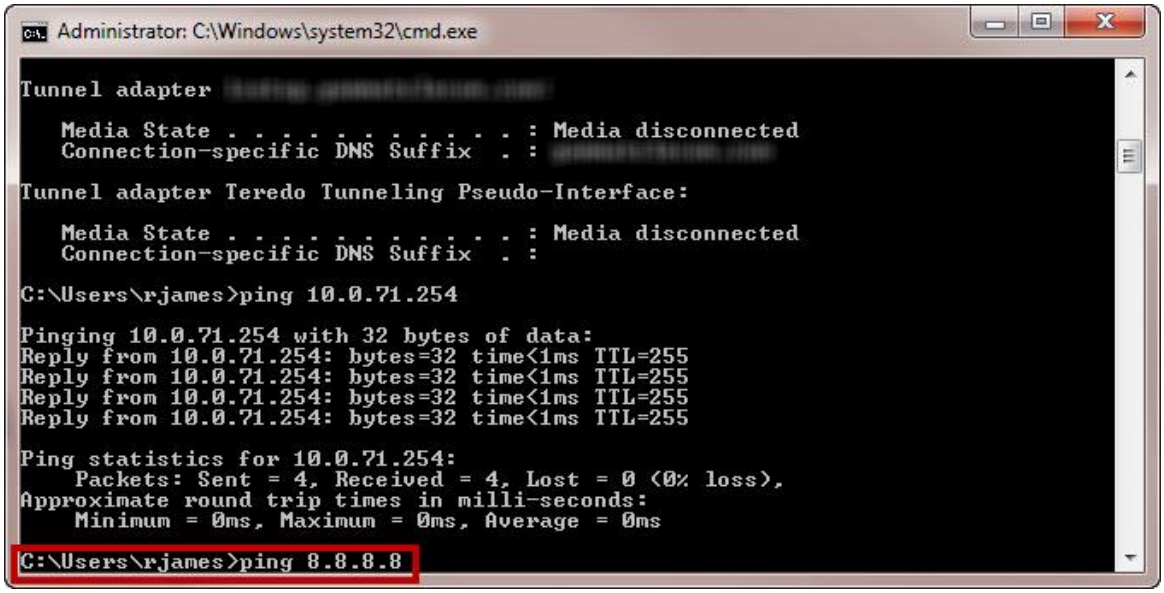
If you get no results from the router, this means that you have no connection to the router and would need to contact your IT Administrator.



Step 6

If you get a reply from the router ping, you would need to ping a live web address. We recommend sending a ping to Google's address.

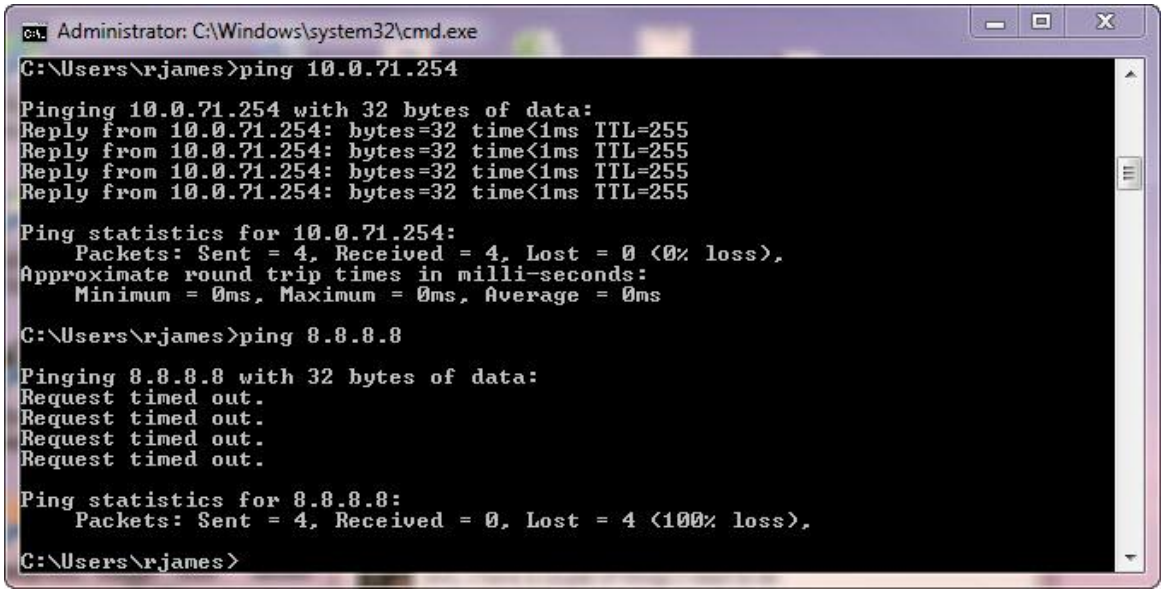
To do this, type in "ping 8.8.8.8" and press enter.



Step 7

If you are unable to get a reply from the Google DNS ping (example in the screen shot across), this would suggest that it is a local issue firewall issue and you would need to speak to your IT Administrator regarding this. If your IT Administrator confirms that the firewall is working as it should be, contact your service provider support team.

If you have got a ping result back from Google, you have access to the Internet and need to do some more tests. Please see Step 8.

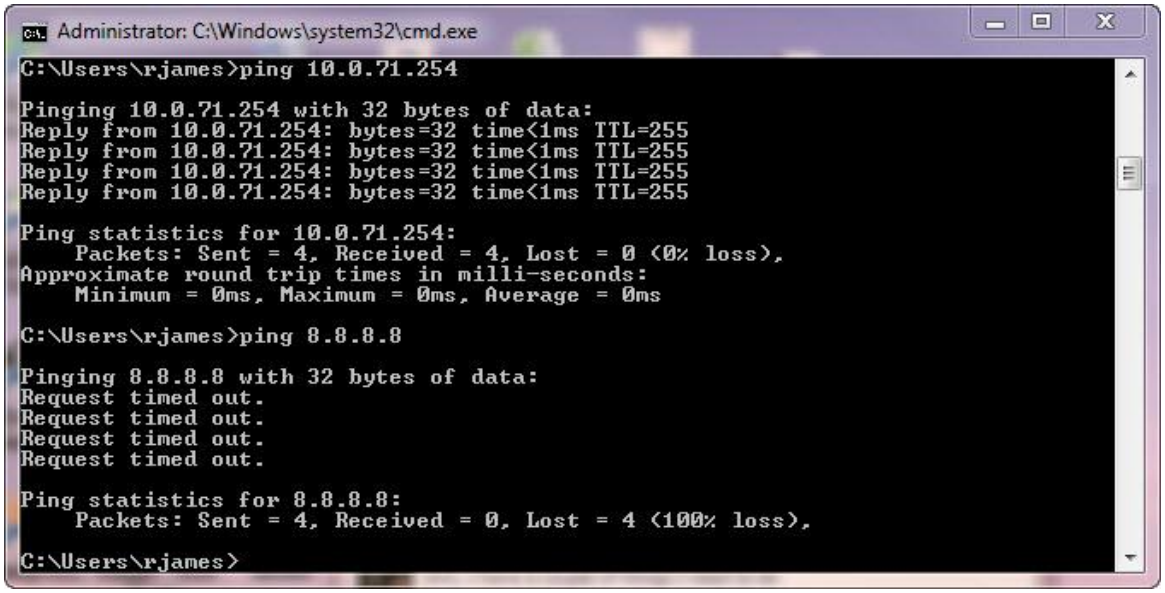


Step 8

We now need to ping a web address, again we recommend google. In the command prompt, type in "ping google.co.uk".

If you get no results back, this would suggest a DNS error. You should speak to your service provider support team if you have got this error.

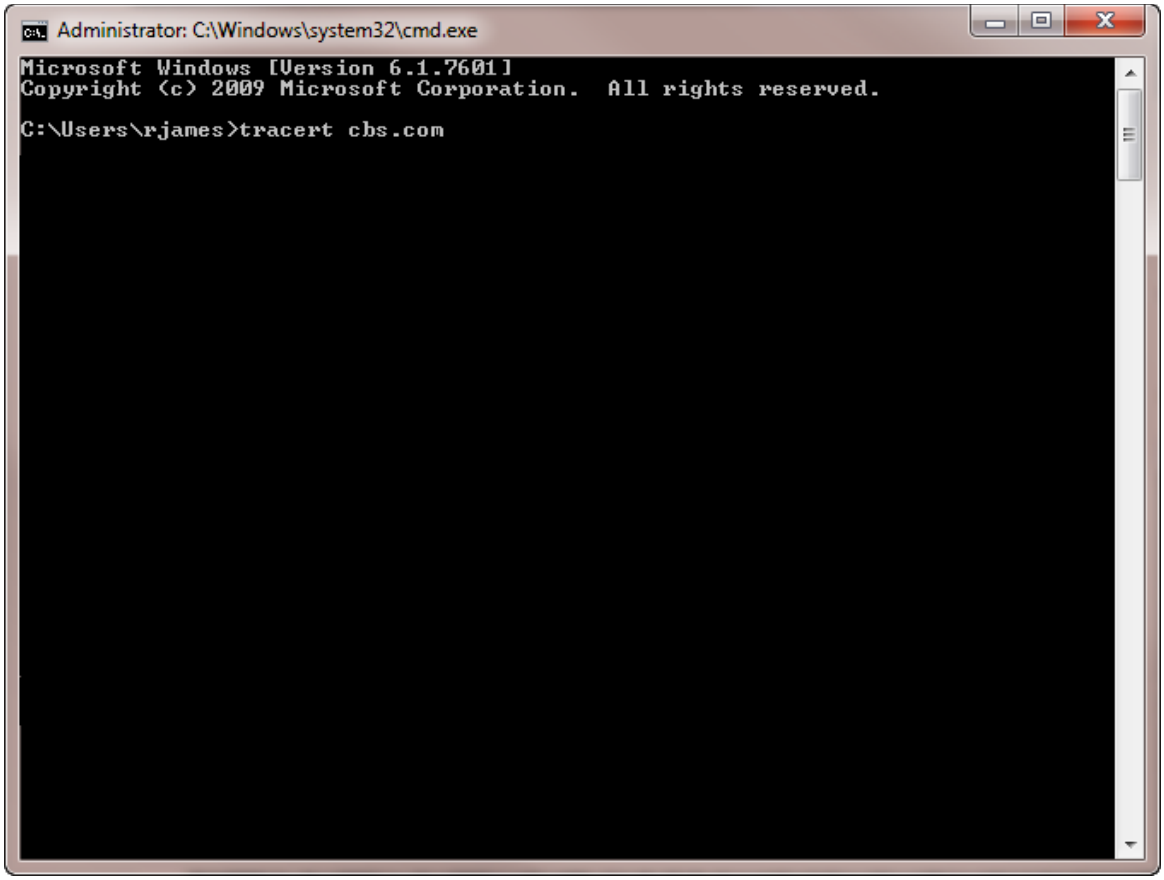
If you have got results back, then you should be OK to view web pages. If you are still unable to view web pages, then this could be a Browser error or a proxy may be enabled, and again you'd need to speak to your IT Administrator.



Trace Route

Step 1

Once again in cmd prompt, type in "tracert cbs.com" and hit enter.

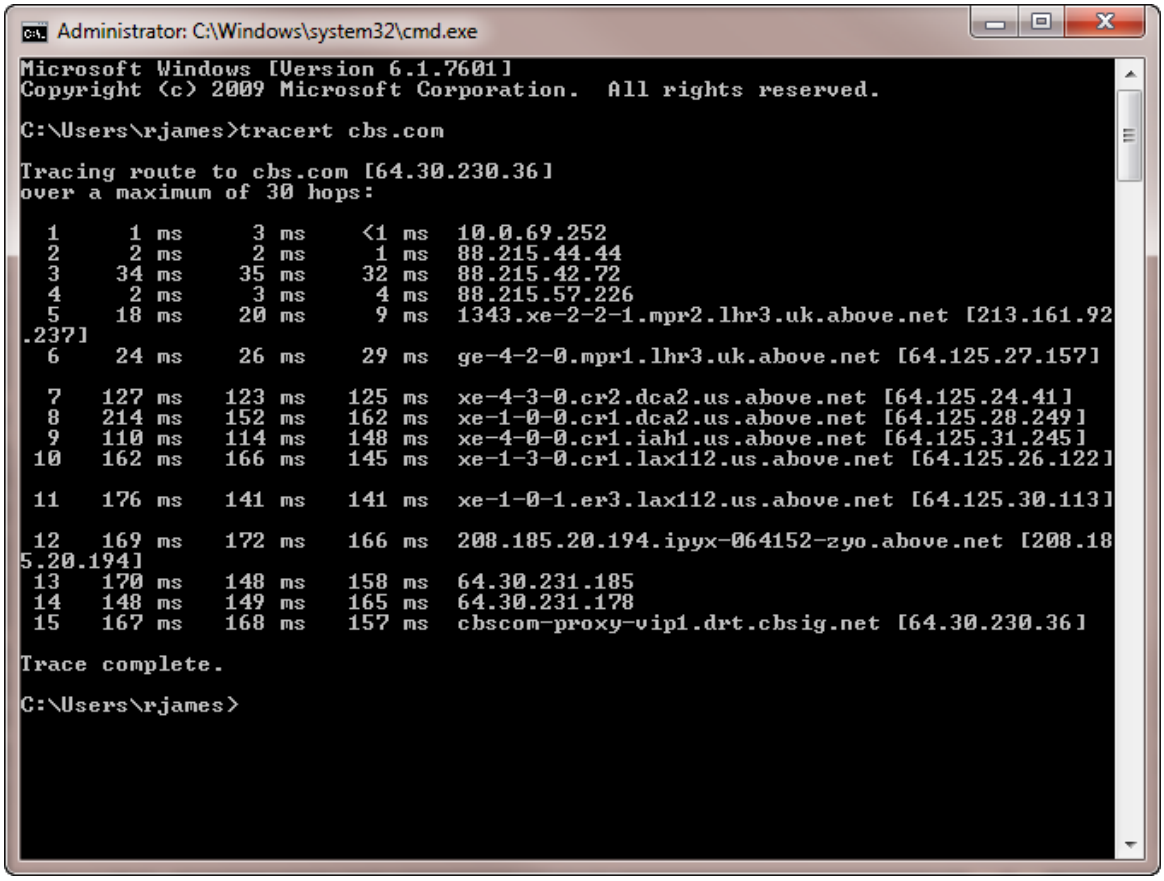


Step 2

Trace Route will now trace the route a packet of information takes from your computer to the cbs.com address, which is located in Los Angeles.

Look at the below table for a description on what the trace route results mean:

- Each hop is tested three times, hence three response times
- If you get an asterisk, this means that the hop has timed out on that router, so the next line will attempt a different router.
- Use this Airport City Codes Reference website to see where a hop is currently located. Routers commonly use airport city reference codes so you can roughly see where a packet is.
-



Hop Number	*1st Hop Response Time*	*2nd Hop Response Time*	*3rd Hop Response Time*	*Destination of Hop*	*Description*
1	1ms	3ms	<1ms	10.0.69.252	This is the internet gateway on the network that the traceroute has been done from. We'd expect the response times to be really quicker here (i.e. as close to 0ms as possible)
2	2ms	2ms	1ms	88.215.44.44	The packet is now passing through the Gamma network.
3	34ms	35ms	32ms	88.215.42.72	The packet is now passing through the Gamma network.
4	2ms	3ms	4ms	88.215.57.226	The packet is now passing through the Gamma network.
5	18ms	20ms	9ms	1343.xe-2-2-1.mpr2.lhr3.	The packet has now reached another router in the UK, and based on the "lhr3" code, we can tell that this router is near London (lhr is the airport code for London

				uk.above.net 213.161.92	Heathrow). We'd expect a little jump in response time for the packet now.
6	24ms	26ms	29ms	ge-4-2-0.mpr1.lhr.uk.above.net64.125.27.157	The packet has now hopped to another router that is still in the UK and still near London based on the "lhr" code.
7	127ms	123ms	125ms	xe-4-3-0.cr2.dca2.us.above.net64.125.24.41	The packet has now hopped over the Atlantic, as we can see with the ".us." within the destination, and based on the airport code, we can see it's on the east coast around Washington DC (dca). We can see that the response time has gone up now, which is to be expected as it is now covering a greater geographical distance.
8	214ms	152ms	162ms	xe-1-0-0.cr1.dca2.us.above.net64.125.28.249	The packet has now hopped over to another router around the Washington DC area.
9	110ms	114ms	148ms	xe-4-0-0.cr1.iah.us.above.net64.125.26.122	The packet has now hopped to a new geographic area, this time Houston, Texas (iah is the airport code for Houston). We'd expect to see similar times to the hop that happened from London to Washington as it's a similar geographical distance.
10	162ms	166ms	145ms	xe-1-3-0.cr1.lax112.us.above.net64.125.26.122	This hop is now Houston to Los Angeles, California (lax is the airport code for Los Angeles). This is quite a large geographic distance for this hop, so we'd expect it to be a little longer.
11	176ms	141ms	141ms	xe-1-0-1.er2.lax112.us.above.net64.125.30.113	This hop is to another router within the Los Angeles area.
12	169ms	172ms	166ms	208.185.20.194.ipyz-064152-zyo.above.n	And now it's getting to close to the server that cbs.com is hosted on, this is on a zayo server.

				et208.18.5.20.194	
13	170ms	148ms	158ms	64.30.231.185	A router within the zayo network.
14	148ms	149ms	165ms	64.30.231.178	A router within the zayo network.
15	167ms	168ms	157ms	cbscom-proxy-vip1.drt.cbsig.net6430.230.36	This is the computer / proxy that cbs.com is hosted on. The packet has hopped 15 times from my computer in Manchester, through to London, Washington, Houston and finally Los Angeles.

REIN on EFM

Repetitive Electrical Impulse Noise (REIN) and Single Isolated Impulse Noise (SHINE) is interference found on copper connections and is caused by electrical impulses from such electrical items as a faulty power supply which can result in line errors, slow speed and even disconnections. Usually, power sources and a copper connection can co-inside happily. SHINE happens in a burst (i.e. when a device is switched off), whereas REIN is constant throughout a devices usage.

REIN only affects EFM Ethernet circuits as the service is delivered into the premises through a copper pair(s).

How do I look for a REIN or SHINE fault?

Diagnosing REIN or SHINE faults can be complicated. It is the End User who would diagnose these faults and it is simply a process of elimination. You should get an AM/MW radio and set it to 612KHz. If you place the radio next to your modem/router, you'll hear the SDSL signal. If you then place the radio next to another power source, such as an LCD monitor, you'll hear a distinct sound and such fade out as you move it away. By using the radio, you may be able to see where the noise is coming from, and switch off that power source and then retest your SDSL connection.

Not all noise you may hear will affect your SDSL connection, this is just to help you find the potential cause.

If you are unable to find the cause within the site of the SDSL connection, it could be further afield, such as a neighbour's equipment, or something along the route of the SDSL connection from the exchange, such as roadworks or a faulty streetlight. If the source is external, then you should call into the service desk who will then be able to assist you further.

⚠ **REIN and SHINE faults can be complicated and can take months to resolve. In extreme cases, the cause cannot be eliminated.**

Typical REIN and SHINE Causes

- Faulty Power Adapters
- Christmas tree lights
- Thermostats (central heating etc)
- Railway cables
- Electric fences / motors
- Street lighting
- Laptops / TVs / Set top boxes for Sky, Virgin, Freeview etc.
- Roadworks