

Router Configuration Guide

TELUS Business Connect™



Router Configuration Guide Table of Contents

Section 1 - What is Quality of Service (QoS)	3	Linksys E1200	7
Introduction	3	NetGear G54	14
QoS Basics	3	NetGear N300	16
		NetGear N600	18
		NetGear N750	20
		NetGear N900	22
Section 2 - TELUS Business Connect Recommended Routers	4	Section 4 - Troubleshooting Port and Firewall issues	24
List of Recommended Routers	4		
Connecting Your Device	4	Section 5 - Support Information	24
		TELUS Business Connect	24
Section 3 - Configuration Guides	5		
Step-by-Step Router Configuration	5		
ASUS RT-N66U Dark Knight	5		

Section 1 - What is Quality of Service (QoS)

Introduction

Welcome to your new TELUS Business Connect phone solution. Since our cloud based business phone system works through an Internet connection, you will need to make some basic adjustments to your router in order to ensure that it is optimized for the best quality. Most small-office routers are up to the task; however, they may not be optimally configured for Voice-Over-IP (VoIP). Fortunately, this document will present steps you can take to improve the quality of your calls.

What is Quality of Service (QoS)?

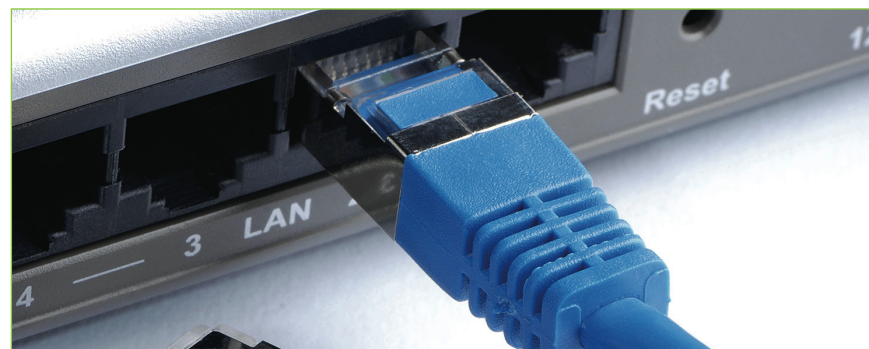
Quality of Service or (QoS) is a digital network solution that prioritizes your network traffic, including voice and multi-media, to ensure that your key data has priority over less important traffic during times of high usage. VoIP can guarantee high-quality voice transmissions only if the voice packets are given priority over other kinds of network traffic.

Your Internet connection and devices you use to connect to the Internet can affect your QoS. Design your network for voice and use QoS-enabled network equipment. There are special considerations when designing your network to support voice traffic. QoS-enabled routers prioritize voice traffic over lower priority network traffic, such as large downloads. QoS-enabled switches perform the same function in the switch.

Ensure you have the right amount of bandwidth

A solid Internet connection means solid voice quality. We recommend using a high-speed DSL, cable, or fiber optic connection with dedicated upload and download bandwidth (speed only for voice, not sharing with data) How much bandwidth do you need? It depends on how many calls and devices you want to connect. Here is our rule of thumb. XX/YY represents your internet speed:

How much capacity do I need?	XX/1	XX/5	XX/10
Number of concurrent calls	1 to 3	1 to 25	1 to 50
Number of connected devices	Up to 5	Up to 50	Up to 150



Why Do I Need To Adjust My Router?

Routers handle traffic from many devices. To ensure you the best performance from your VoIP phone service, you need to configure your router to make sure your service operates well. In order to make sure that your routers are configured properly, you need to follow the Quality of Service (QoS) best practices for your router.

Why Do I Need to Optimize My Router for Voice (VoIP) Traffic?

In this case, adjusting the QoS will allow packets containing voice data, which is mandatory for maintaining the highest quality phone communication performance, to be treated as critical and therefore given top priority. Unless you instruct your network router to prioritize voice over data traffic, the two types of traffic will compete, often at the expense of voice quality. When your voice traffic is prioritized, the audio performance will be smoother, jitter will be reduced, and the overall user experience at both ends will dramatically improve.

Section 2 - TELUS Business Connect Recommended Routers

List of Recommended Routers

ASUS RT-N66U Dark Knight

Linksys E1200

NetGear G54

NetGear N300

NetGear N600

NetGear N750

NetGear N900

What if my router is not listed?

Consult your router's user manual for how to configure QoS.

Connecting Your Device

1. First, connect a computer to the router. This step can work through Wi-Fi, especially if you're reconfiguring a router instead of starting fresh. We recommend you use a wired, Ethernet cable to eliminate potential problems. Connect the cable between a PC and one of the router's LAN ports.
2. The next step is similar for different routers, although it can vary by brand. Frequently, Linksys routers use 192.168.1.1, D-Link uses 192.168.0.1, Belkin uses 192.168.2.1, and Netgear uses 192.168.0.1 or 192.168.1.1. Open a web browser, and enter the address, such as "http://192.168.0.1". Consult your documentation or search online for "[your router model] default IP address".
3. Next, you should be prompted for a username and password. Often, Netgear uses "admin" and "password". D-Link and Linksys routers often use "admin" and "admin", or just use "admin" for one and a blank value for the other. Belkin often uses "admin" and a blank value. You can look in your manual or search online for your specific brand.
4. If the router and computer are set for DHCP by default, as most are, you're finished. Once you're in, be sure to change the default password (and login if possible). Also, change the internal (LAN) IP address for the router. Pick something such as "192.168.n.1", where n equals anything between 2 and 254, like "192.168.22.1". Be sure to write down all of this information; you'll now reach the router in a web browser through that new IP address. If you lose any of these details, follow the manual's directions to reset the router.

Section 3 - Configuration Guides

Step by Step Router Configuration

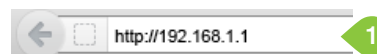
We've provided step by step configuration instructions for some of the most commonly available and recommended wireless routers to ensure that you will experience the finest QoS with your TELUS Business Connect service. Below you will find 7 routers listed by brand name and model number.

Configuring QoS on the ASUS RT-N66U Dark Knight to Prioritize VoIP Traffic

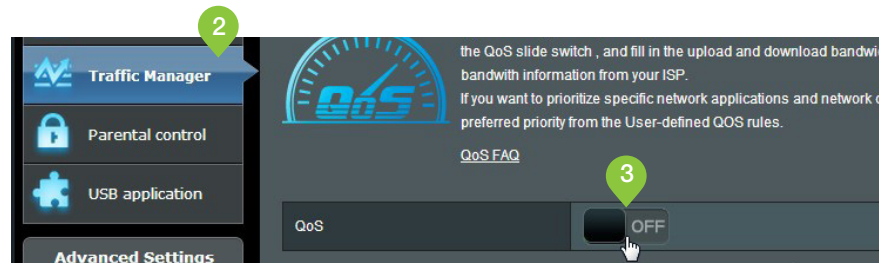
Brand: ASUS
Model: RT-N66U
Firmware Version: 3.0.0.3.112



1. Log in to the router. Follow the prompts to create a password and a username will be given to you.



2. Click "Traffic Manager" on the left hand side.



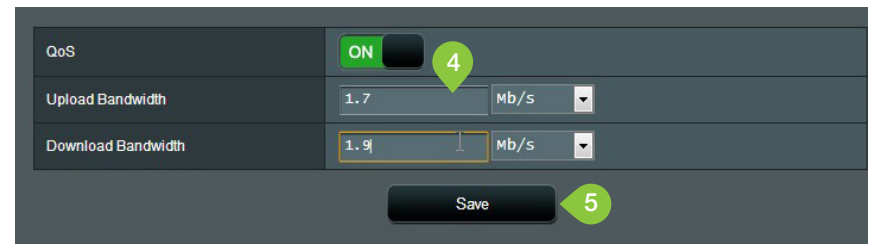
3. Click on the "QoS" slider to turn QoS on.

4. When the QoS slider turns green, enter your current bandwidth for both the upload and download. (If unsure of your current bandwidth speed, please run a speed test at <http://toronto.speedtest.telus.com/>.)

5. Click "Save" after entering your bandwidth figures.

6. Be sure to power cycle/reboot the router before proceeding.

7. Your QoS should now be configured.



The screenshot shows a QoS configuration interface. At the top, there is a 'QoS' section with a toggle switch set to 'ON', indicated by a green circle with the number '4'. Below this, there are two input fields: 'Upload Bandwidth' with the value '1.7' and 'Download Bandwidth' with the value '1.9', both followed by a unit selector set to 'Mb/s'. A green circle with the number '5' points to a 'Save' button at the bottom right of the interface.

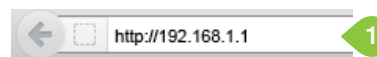
QoS	ON
Upload Bandwidth	1.7 Mb/s
Download Bandwidth	1.9 Mb/s
Save	

Configuring QoS on the Linksys E1200 to Prioritize VoIP Traffic (MAC Method)

Brand: Linksys
Model: E1200
Hardware Version: E1200
Firmware Version: 2.0.04 build 1



1. Log in to the router. The default IP address is 192.168.1.1.
The default username is "admin". The default password is "admin".



2. Click on "Applications & Gaming" tab.

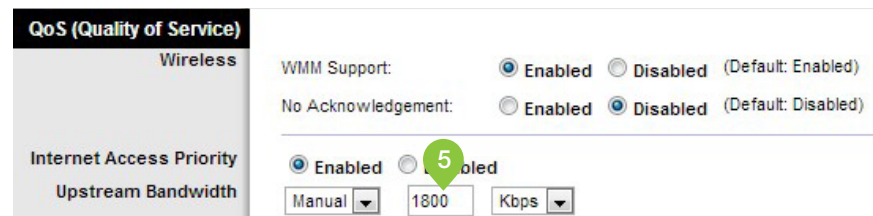


3. Click on "QoS".

4. Select the radial button "Enabled" next to the field labeled "Internet Access Priority".



5. In the field labeled "Upstream Bandwidth", select "Manual" from the drop-down menu and enter your current upload speed. (If unsure of your current upload speed, please run a speed test at <http://toronto.speedtest.telus.com/>.)



QoS (Quality of Service)

Wireless

Internet Access Priority Upstream Bandwidth

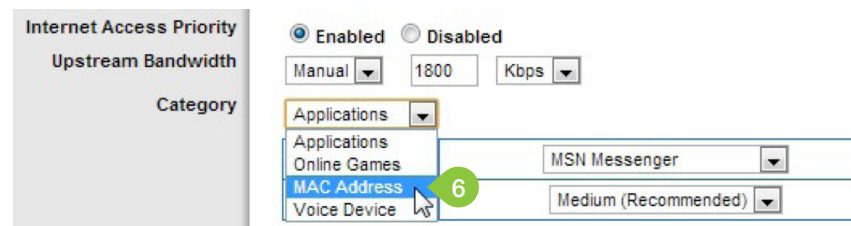
WMM Support: ☒ Enabled ☐ Disabled (Default: Enabled)

No Acknowledgement: ☐ Enabled ☒ Disabled (Default: Disabled)

☒ Enabled ☐ Disabled

Manual 1800 Kbps

6. Select "MAC Address" from the drop-down menu labeled "Category".



Internet Access Priority Upstream Bandwidth

Category

☒ Enabled ☐ Disabled

Manual 1800 Kbps

Applications

Applications

Online Games

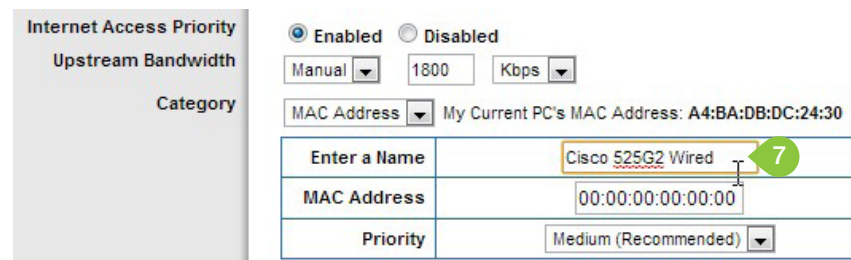
MAC Address

Voice Device

MSN Messenger

Medium (Recommended)

7. You will need the MAC address for each IP device to continue. In the field labeled "Enter a Name", enter a unique name for the device for which you will prioritize traffic.



Internet Access Priority Upstream Bandwidth

Category

☒ Enabled ☐ Disabled

Manual 1800 Kbps

MAC Address My Current PC's MAC Address: A4:BA:DB:DC:24:30

Enter a Name	Cisco 525G2 Wired
MAC Address	00:00:00:00:00:00
Priority	Medium (Recommended)

8. In the field labeled "MAC Address" enter the MAC address for the device.

Internet Access Priority
Upstream Bandwidth
Category

☒ Enabled ☐ Disabled
Manual Kbps
MAC Address

Enter a Name	Cisco 525G2 Wired
MAC Address	70:81:05:B8:30:34
Priority	Medium (Recommended)

9. In the field labeled "Priority", select "High" from the drop-down menu.

Internet Access Priority
Upstream Bandwidth
Category

☒ Enabled ☐ Disabled
Manual Kbps
MAC Address

Enter a Name	Cisco 525G2 Wired
MAC Address	70:81:05:B8:30:34
Priority	Medium (Recommended)

Priority	Name	Information
High		
Medium (Recommended)		
Normal		
Low		

10. Click "Apply" to save changes.

Internet Access Priority

Upstream Bandwidth

Category

☒ Enabled ☐ Disabled

Manual Kbps

MAC Address

Enter a Name	<input type="text" value="Cisco 525G2 Wired"/>
MAC Address	<input type="text" value="70:81:05:B8:30:34"/>
Priority	<input type="text" value="High"/>

Apply 10

11. Repeat steps 6-10 until you have entered all of the IP phones. When all have been entered and you see them in the "Summary" section, click on "Save Settings".

12. Power cycle/reboot the router before proceeding.

Summary

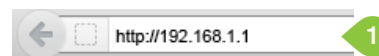
Priority	Name	Information		
High	Cisco 525G2 Wired	MAC 70:81:05:B8:30:34	<input type="button" value="Remove"/>	<input type="button" value="Edit"/>
High	Cisco 525G2 Wireless	MAC 70:81:05:B8:1B:4E	<input type="button" value="Remove"/>	<input type="button" value="Edit"/>
High	polycom	MAC 00:04:F2:40:83:24	<input type="button" value="Remove"/>	<input type="button" value="Edit"/>
High	pc softphone	MAC A4:DB:DB:DC:24:30	<input type="button" value="Remove"/>	<input type="button" value="Edit"/>

11

Save Settings **Cancel Changes**

Configuring QoS on the Linksys E1200 to Prioritize VoIP Traffic (Port Method)

1. Log in to the router. The default IP address is 192.168.1.1.
The default username is "admin". The default password is "admin".



2. Click on "Applications & Gaming" tab.

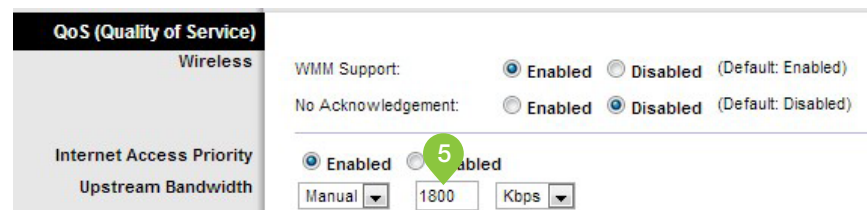


3. Click on "QoS".

4. Select the radial button "Enabled" next to the field labeled "Internet Access Priority".



5. In the field labeled "Upstream Bandwidth", select "Manual" from the drop-down menu and enter your current upload speed. (If unsure of your current upload speed, please run a speed test at <http://toronto.speedtest.telus.com/>.)



6. In the "Category" section, select "Applications" from the drop-down menu.

7. In the field labeled "Applications", select "Add a New Application" from the drop-down menu.

The screenshot shows the 'Internet Access Priority' configuration page. The 'Upstream Bandwidth' section is set to 'Manual' with a value of '1800' Kbps. The 'Category' dropdown is set to 'Applications'. The 'Applications' dropdown menu is open, showing a list of applications including MSN Messenger, Skype, Yahoo Messenger, Windows Live Messenger, AIM, Windows Media Player, RealPlayer, QuickTime, iTunes, Yahoo Music Jukebox, and Rhapsody. The 'Add a New Application' option is highlighted at the bottom of the list. A green circle with the number '6' points to the 'Applications' dropdown, and a green circle with the number '7' points to the 'Add a New Application' option.

8. Enter a unique name in the "Enter a Name" field. Enter the following port ranges and select "UDP" from the drop-down menu to the right of each port range field and set the priority to "High" on the drop-down menu: 5060-5090, 8000-8200, 16384-16482.

The screenshot shows the 'Internet Access Priority' configuration page. The 'Upstream Bandwidth' section is set to 'Manual' with a value of '1800' Kbps. The 'Category' dropdown is set to 'Applications'. The 'Applications' dropdown is set to 'Add a New Application'. The 'Enter a Name' field is filled with 'RingCentral'. The 'Port Range' section has three rows, each with a port range and a protocol dropdown: 5060 to 5090 (UDP), 8000 to 8200 (UDP), and 16384 to 16482 (UDP). The 'Priority' dropdown is set to 'High'. The 'Apply' button is visible at the bottom. Green circles with numbers 8a, 8b, and 8c point to the 'Enter a Name' field, the '8000 to 8200' port range, and the 'High' priority dropdown, respectively.

9. Click "Apply". You will see your changes in the "Summary" section.

Internet Access Priority

Upstream Bandwidth

Category

Summary

☒ Enabled ☐ Disabled

Manual

▼

 1800 Kbps

▼

Applications

▼

Applications	Add a New Application <div>▼</div>		
Enter a Name	TELUS Business Connect		
Port Range	5060 to 5090	UDP <div>▼</div>	
	(Optional) 8000 to 8200	UDP <div>▼</div>	
	(Optional) 16384 to 16482	UDP <div>▼</div>	
Priority	High <div>▼</div>		

Apply 9

Priority	Name	Information		
High	TELUS Business Connect	Port 5060 - 5090 8000 - 8200 16384 - 16482	Remove	Edit

10. Click "Save Settings".

11. Power cycle/reboot the router before proceeding.

Summary

Priority	Name	Information		
High	TELUS Business Connect	Port 5060 - 5090 8000 - 8200 16384 - 16482	Remove	Edit

10

Save Settings Cancel Changes

Configuring QoS on the Netgear G54 to Prioritize VoIP Traffic

Brand: NetGear

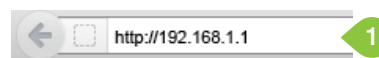
Model: G54

Hardware Version: WGR614v10

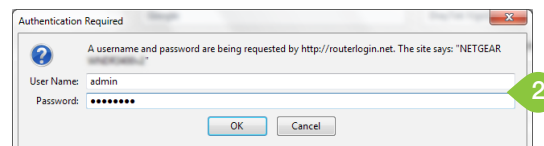
Firmware Version: V1.0.2.26_51.0.59NA



1. Open your browser and navigate to <http://192.168.1.1>.



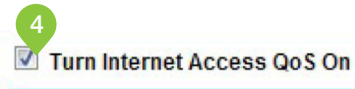
2. Log in to the router. The default username is "admin".
The default password is "password".



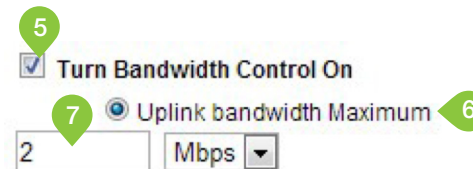
3. Under the "Advanced" header, select "QoS Setup".



4. Check the box next to "Turn Internet Access QoS On".



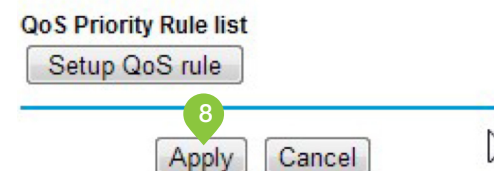
5. Check the box next to "Turn Bandwidth Control On".



6. Select the "Uplink bandwidth Maximum" radial button.

7. Enter in your current upload speed.
(If unsure of the current upload speed, run a speedtest at <http://toronto.speedtest.telus.com/1>.)

8. Be sure to save any changes and reboot the router before proceeding.



9. Your QoS should now be configured.

Configuring QoS on the Netgear N300 to Prioritize VoIP Traffic

Brand: NetGear

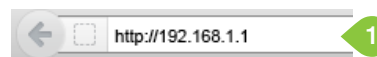
Model: N300

Hardware Version: WNR3500Lv2

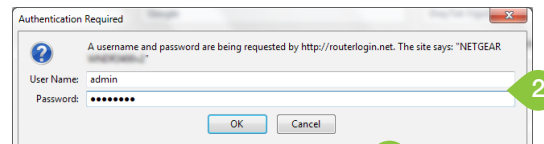
Firmware Version: V1.2.0.16_40.0.66



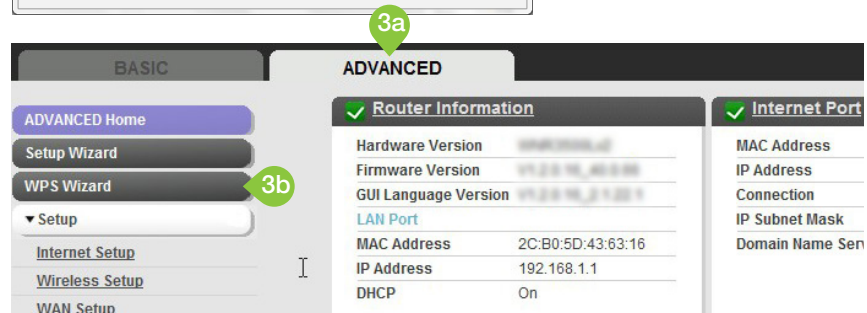
1. Open your browser and navigate to <http://192.168.1.1>.



2. Log in to the router. The default username is "admin".
The default password is "password".



3. Select the "Advanced" tab and then select "WPS Wizard" on the left hand side.



4. Select "Setup".

5. Select "QoS Setup".

6. Check the box next to "Turn Internet Access QoS On" if not already checked.

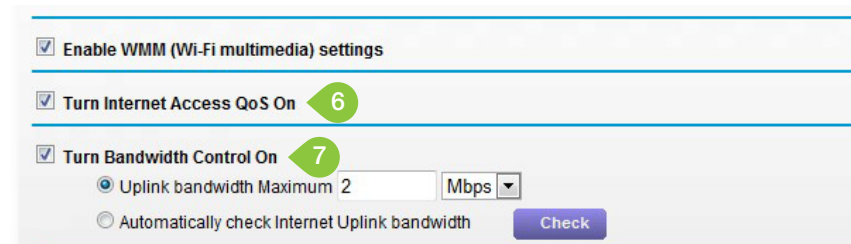
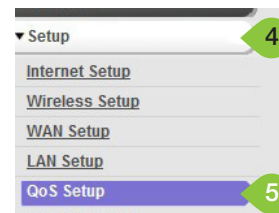
7. Check the box next to "Turn Bandwidth Control On".

8. Select the "Uplink bandwidth Maximum" radial button.

9. In the field to the right of the radial button enter in your current upload speed. (If unsure of the current upload speed, run a speedtest at <http://toronto.speedtest.telus.com/>.)

10. Be sure to save any changes and reboot the router before proceeding.

11. Your QoS should now be configured.

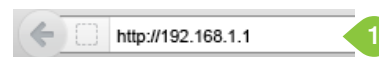


Configuring QoS on the Netgear N600 to Prioritize VoIP Traffic

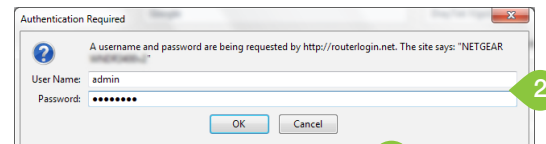
Brand: NetGear
Model: N600
Hardware Version: WNDR3400v2
Firmware Version: V.1.0.0.34_1.0.52



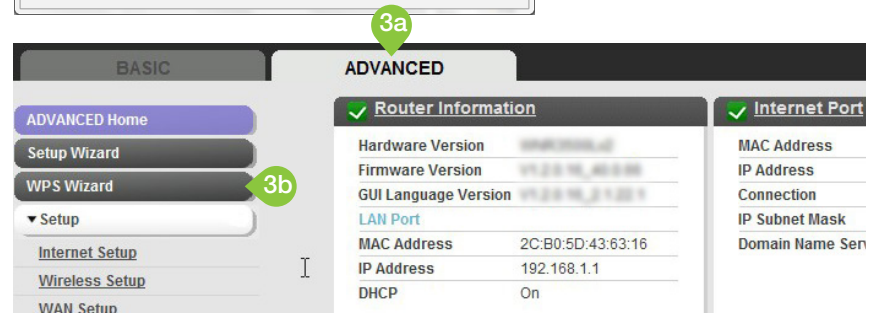
1. Open your browser and navigate to <http://192.168.1.1>.



2. Log in to the router. The default username is "admin".
The default password is "password".



3. Select the "Advanced" tab and select "WPS Wizard" on the left hand side.



4. Select "Setup".

5. Select "QoS Setup".

6. Check the box next to "Turn Internet Access QoS On" if not already checked.

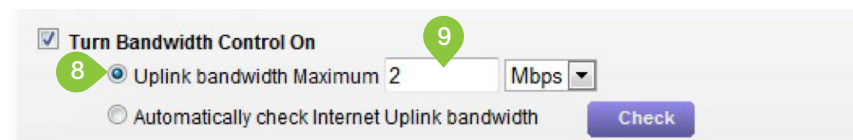
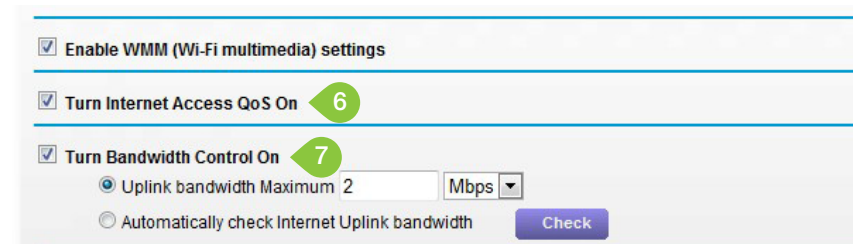
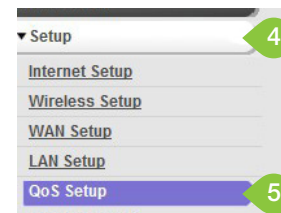
7. Check the box next to "Turn Bandwidth Control On".

8. Select the "Uplink bandwidth Maximum" radial button.

9. In the field to the right of the radial button enter in your current upload speed. (If unsure of the current upload speed, run a speedtest at <http://toronto.speedtest.telus.com/>.)

10. Be sure to save any changes and reboot the router before proceeding.

11. Your QoS should now be configured.



Configuring QoS on the Netgear N750 to Prioritize VoIP Traffic

Brand: NetGear

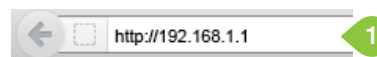
Model: N750

Hardware Version: WNDR4000

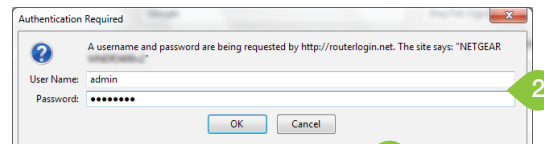
Firmware Version: V1.0.0.90_9.1.79



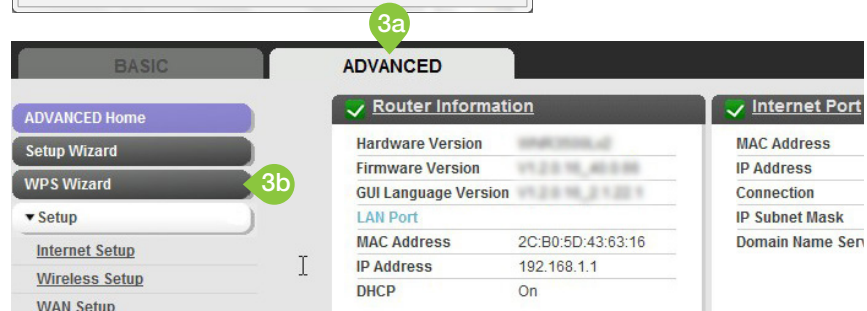
1. Open your browser and navigate to <http://192.168.1.1>.



2. Log in to the router. The default username is "admin".
The default password is "password".



3. Select the "Advanced" tab and select "WPS Wizard" on the left hand side.



4. Select "Setup".

5. Select "QoS Setup".

6. Check the box next to "Turn Internet Access QoS On" if not already checked.

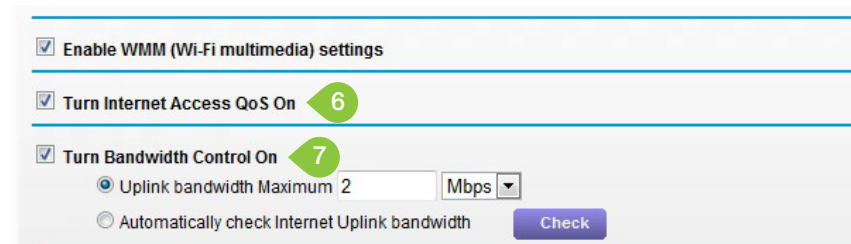
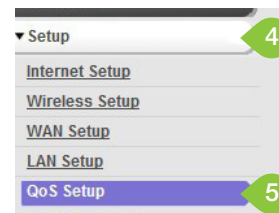
7. Check the box next to "Turn Bandwidth Control On".

8. Select the "Uplink bandwidth Maximum" radial button.

9. In the field to the right of the radial button enter in your current upload speed. (If unsure of the current upload speed, run a speedtest at <http://toronto.speedtest.telus.com/>.)

10. Be sure to save any changes and reboot the router before proceeding.

11. Your QoS should now be configured.

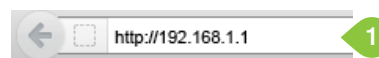


Configuring QoS on the Netgear N900 to Prioritize VoIP Traffic

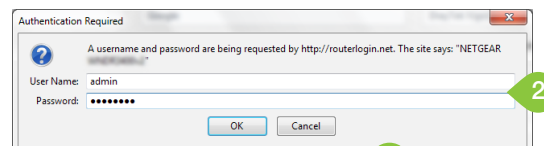
Brand: NetGear
Model: N900
Hardware Version: WNDR4000
Firmware Version: V1.0.1.20_1.0.40



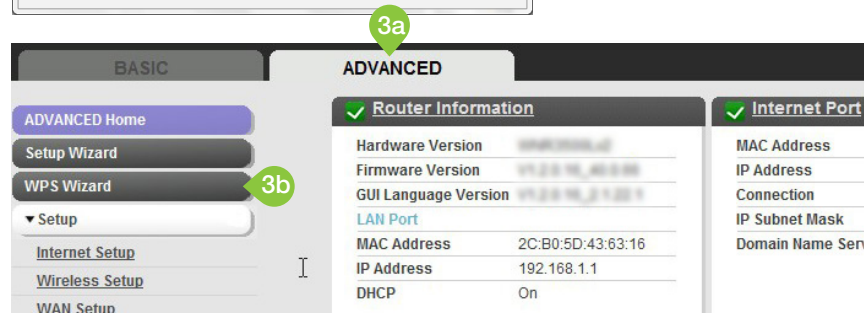
1. Open your browser and navigate to <http://192.168.1.1>.



2. Log in to the router. The default username is "admin".
The default password is "password".



3. Select the "Advanced" tab and select "WPS Wizard" on the left hand side.



4. Select "Setup".

5. Select "QoS Setup".

6. Check the box next to "Turn Internet Access QoS On" if not already checked.

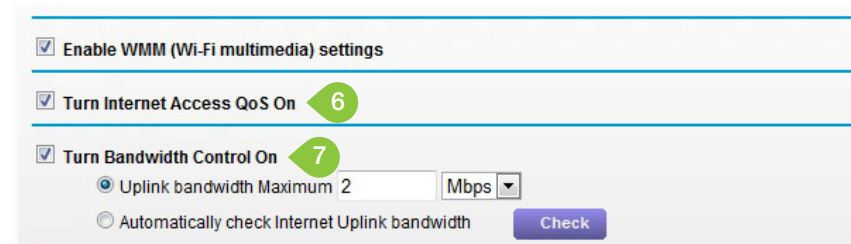
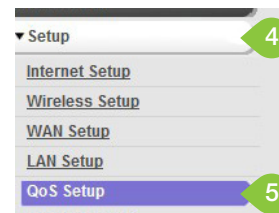
7. Check the box next to "Turn Bandwidth Control On".

8. Select the "Uplink bandwidth Maximum" radial button.

9. In the field to the right of the radial button enter in your current upload speed. (If unsure of the current upload speed, run a speedtest at <http://toronto.speedtest.telus.com/>.)

10. Be sure to save any changes and reboot the router before proceeding.

11. Your QoS should now be configured.



Section 4 - Troubleshooting Port and Firewall Issues

In a typical network, routers are used to allow access to any device that connects to the local network or the Internet. Routers have built-in security features that prevent unrequested access to the network. A router firewall may cause issues with your VoIP connectivity through the TELUS Business Connect service.

Port triggering is a configuration that you can set on your router to allow access to specific service ports in a secure manner. A router acts like the sender and receiver of requests, allowing VIP pass to these service ports that are Triggered.

To allow seamless Voice over IP (VoIP) connectivity to your devices, the following ports should be triggered on your router.

Device type	Protocol	Source Port Customer Side	Destination Port TELUS Side
Deskphone signaling	SIP/UDP	5060-5090	5090
Deskphone signaling	SIP/TCP	5060	5090
Deskphone media	RTP/UDP	16384-16482	20000-39999
Deskphones signaling Secure Voice	SIP/TLS/TCP	5060	5096
Deskphones media Secure Voice	SRTP/UDP	16384-16482	40000-49999
Deskphone provisioning	HTTP/IP/TCP	80, 443	80, 443
Deskphone clock sync	NTP/UDP	123	123
Deskphone BLA/Presence	SIP/UDP	5060	5099
Deskphone BLA/Presence	SIP/TCP	5060	5090
Mobile App signaling	SIP/UDP	5060	5090-5091
Mobile App signaling	SIP/TCP	random	5090-5091
Mobile App media	RTP/UDP	4000-5000, 20000-60000	50000-59999
Mobile App signaling Secure Voice	SIP/TLS/SRTP	random	5097
Mobile app media Secure Voice	SRTP/UDP	4000-5000, 20000-60000	60000-64999
Mobile app BLA/Presence	SIP/TCP	N/A	5091
Mobile app BLA/Presence	SIP/UDP	N/A	5099
Mobile app data sync with RC backend	HTTPS	443	443
Desktop app signalling	SIP/UDP	5060-5090	5091
Desktop app signalling	SIP/TCP	random	5091
Desktop app media	RTP/UDP	8000-8200	50000-59999
Desktop app signalling Secure Voice	SIP/TLS/SRTP	random	5097
Desktop app media Secure Voice	SRTP/UDP	4000-5000, 20000-60000	60000-64999
Desktop app BLA/Presence	SIP/TCP	N/A	5091
Desktop app BLA/Presence	SIP/UDP	N/A	5099
Business Connect Meetings signalling	SIP/TCP	N/A	8801, 8802
Business Connect Meetings signalling Secure	SIP/TLS/TCP	N/A	443
Business Connect Meetings media	RTP/UDP	N/A	8801
Business Connect Meetings media Secure	TLS/TCP	N/A	443

Section 5 - Support Information

If you have additional questions or are experiencing difficulty in setting up your router to work with your TELUS Business Connect service.

There are several ways to access support.

1) For self-help visit the Business Connect support page to access:

- How-to guides
- Troubleshooting tips
- User guides and manuals

<http://business.telus.com/en/business/support/bundles-business-connect-support/learningcentre/Guides-and-Manuals/business-connect-user-guides>

2) For account support call 1-844-626-6638, enter your TELUS Business Connect number and follow the prompts.

3) For technical support call 1-844-626-6638, enter your TELUS Business Connect number and follow the prompts.