Recommended QoS Configuration Settings for Dell SonicWALL SOHO Router
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Introduction

RingCentral® has taken the “guesswork” out of router selection. Since we know that Quality of Service (QoS) is paramount to your business, we have carefully selected and tested a set of dependable routers suitable for supporting high quality Voice-over-IP conversations.

This document provides recommended configuration settings to ensure the highest possible QoS for voice calls on the Dell® SonicWALL® SOHO router.

Additional routers that have been tested and recommended are shown on the Recommended Routers page of the RingCentral Customer Care website.

Supported browsers for test

- Internet Explorer 11 or higher (Windows XP, 7, 8 or higher)
- Firefox version 36 or higher (Windows and Mac)
- Safari version 6.2 or higher (Mac)

Note:

*The routers recommended here are quality hardware that we have tested internally and work reliably with our services. However, given the constantly updated firmware and physical changes made by manufacturers and the nature of cloud-based services, RingCentral cannot control the final configuration of the hardware or your computer systems/networks, or promise that any given router will work with your system, or guarantee that our information is 100% up to date.*
Quality of Service

RingCentral provides reliable, high-quality voice service. Your local network, Internet connection, and your router all contribute to overall call quality, with sufficient dedicated bandwidth to voice calls being the biggest factor. To help you manage your call quality, RingCentral offers tools to check your Internet connection speed, and instructions to configure the Quality of Service (QoS) settings of your routers.

The Quality of Service (QoS) settings on your router enable it to give priority to real time voice traffic over lower priority data traffic, such as large downloads. This document provides recommended configuration settings to ensure the highest possible QoS on the Dell SonicWALL SOHO router. After configuring your router for optimum QoS, select port and firewall settings for mobile and softphone apps from the table here.

Test your connection capacity

The RingCentral Connection Capacity test will help determine the maximum number of simultaneous RingCentral calls that can be supported on your broadband connection. Run this test during normal business hours when the connection is in use by other applications, including large file downloads.

The capacity test should be run using the maximum number of simultaneous call connections needed, and should use the G.711 codec selection.

Specific requirements for QoS: Bandwidth 100Kbps up and down per call; Latency (one-way) less than 150ms; Jitter not to exceed 100ms; Packet loss less than 3%.

These requirements are the foundation for ensuring your local network can support satisfactory VoIP. Failure to meet these requirements will result in poor voice quality.

When the test completes, you will see the recommended number of simultaneous calls your connection can support while maintaining good quality voice calls.
Test your connection quality

RingCentral provides a **VoIP Quality test** that will simulate VoIP calls between your computer and RingCentral, and provide an estimate of the voice quality you should expect when using our service. For the most accurate results, run this test **at least** three different times throughout a business day, and **during peak usage times**, while connected to the network that you plan to use for RingCentral.

A two-minute test is typically sufficient, while longer tests are useful to find intermittent problems or to simultaneously test VoIP performance along with other traffic such as file transfers or remote access.

Select the maximum number of simultaneous users you expect to support, and set the test duration between 1 and 5 minutes; 2 minutes is considered sufficient in most instances.

Click **jitter** and **packet loss** on the **RESULTS SUMMARY** panel to view the overall quality of your expected VoIP connection.

**MOS score** (Mean Opinion Score) refers to a test that has been used for decades in telephony networks to obtain the human user's view of the quality of the network. The MOS is the arithmetic mean of all the individual scores, and can range from 1 (worst) to 5 (best). An MOS score of 4 is good.
Configure your router

Dell SonicWALL SOHO QoS configuration

Brand: Dell
Model: SonicWALL SOHO
Hardware version: 12831
Firmware version: SonicOS Enhanced 5.9.1.7-20

To review the guide that covers configuring QoS in the SonicOS operating system click here.

1. Log into the SonicWALL router with administrative permissions. The default username is admin and the default password is admin. Click OK.

2. On the left side of the page, expand VoIP / Settings. Check the Enable consistent NAT box and uncheck all other settings. Select Accept to save the changes.
(See the graphic on the next page.)
2. On the left side of the page, expand VoIP / Settings – illustrated; see instructions above.
3. Go to Firewall Settings / BWM.
   3A. Under Bandwidth Management Type, select Global.
   3B. Under Priority, disable EVERY category, except for Medium, which is enabled by default; set Guaranteed to 50%; Maximum\Burst to 100%.
   3C. Enable Realtime; set Guaranteed to 50%; Maximum\Burst to 100%.
   3D. Click Accept to save changes/settings.
4. Go to Network / Interfaces / X1 (WAN).
   4A. Under the General tab, click the Configure icon (on far right).
   4B. Go to Advanced tab > Link Speed: and set to Auto Negotiate (UNLESS there’s a need to set it to something specific)
   4C. Under Bandwidth Management check Enable Egress; set Interface Egress Bandwidth to match the available bandwidth;
       check Enable Ingress; set Interface Ingress Bandwidth to match the available bandwidth.
   4D. Click OK to save changes/settings.
5. On the left side of the page, Expand Network. Select Address Objects and create objects for 199.255.120.0, subnet mask 255.255.252.0; 199.68.212.0, subnet mask 255.255.252.0; 104.245.56.0, subnet mask 255.255.248.0; 185.23.248.0, subnet mask 255.255.252.0; and 103.44.68.0, subnet mask 255.255.255.0 as shown at bottom.
6A. Once the address objects are added, add the address group from the same section of the interface, as seen below.

6B. Click OK. Once added you can expand the group and it should look like this:
7A. On the left side of the page, **Expand Network** and select **Services**.

![Screenshot of Dell SonicWALL SOHO router configuration page]

- **Incoming Interface:** WAN
- **Source Address:**
  - Click Add button
  - RC Network 1
  - Hit Add button
  - RC Network 2
- **Outgoing Interface:** LAN
- **Destination Address:** all
- **Schedule:** always
- **Service:** Click Add button
  - RC VoIP SIP RTP
- **Traffic Shaping:**
  - Shared Shaper: Set to RC VoIP
  - Reverse Shaper: Set to RC VoIP
7B. Under Services click the add option. Then add five services, RC1 through RC5.

1. RC1: UDP 1000 – 65535
2. RC2: TCP 5060 – 6000
3. RC3: TCP 80 – 80
4. RC4: TCP 443 – 443
5. RC5: UDP 123 – 123

Note: Select applicable TCP/UDP port ranges, as needed, for your mobile and softphone apps from this table.

7D. Now select the Add Group option from the Service Groups section, also under the Services section. Name the group RingCentral; highlight all RingCentral Services. Use the arrows in the box to move the highlighted information from left the right.

Note:
Selections shown at left are the default profiles for the SonicWALL router before step 7B.

Select OK. The RingCentral Service should now be added.
8. On the left side of the page, **Expand Firewall. Select Access Rules. Click the Add button.**

![Access Rules screen capture](image-url)
9. Create two new rules for WAN to LAN and LAN to WAN, as seen below. Select Add for both.
10. The RingCentral Access Rule should now be added.

11. Click edit on both the LAN to WAN and WAN to LAN settings and go to the Ethernet BWM tab. Enable both the inbound and outbound bandwidth management settings and set to Realtime.
12. Go to the QoS tab and set the DSCP Marking Action to Explicit and set the Explicit DSCP Value to “46” and click OK to save.

Congratulations. You have finished configuring your Dell SonicWALL SOHO firewall/router for QoS prioritization of voice packets. Now select the port and firewall settings for mobile and softphone apps from the table on the next page.
Ports and Firewalls Settings for RingCentral VoIP Service

Please see RingCentral Ports and Firewalls reference link for the required TCP/UDP ports that need to be opened for RingCentral devices to work. Categories are:

- Device Type
- Protocol
- Source Port—Customer Side
- Destination Port—RingCentral Side

Also see information on Port Triggering on the referenced page.