



Prioritizing Business Applications in the Home Network

Feeling the Pain of Internet Congestion

Business applications are now competing with a lot of different types of internet traffic as more people are working from home. Compared to internet-reliant business communications and applications, typical residential internet use consists of a lot of "bulk data." Bulk data includes streaming media, video games, casual web browsing, and other entertainment-based consumption. When sharing an internet connection with multiple residential users who are on platforms using bulk data, business users' data gets squeezed and they feel the pain of choppy VoIP calls and video conferences.

Rural users face even more challenges. Internet connections in rural communities are frequently slower, have higher latency, and are less reliable.

To keep bulk data from disrupting at-home work, we need tools and technology to prioritize business applications and make sure they are running optimally on the internet connections available to each household.

Covered in this e-Book

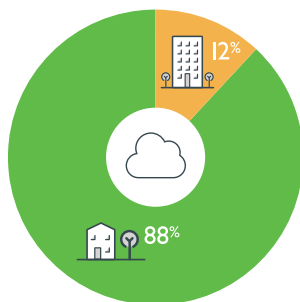
- How to improve network performance for business applications
- Understanding QoS challenges for the home office
- Traditional and modern approaches to QoS



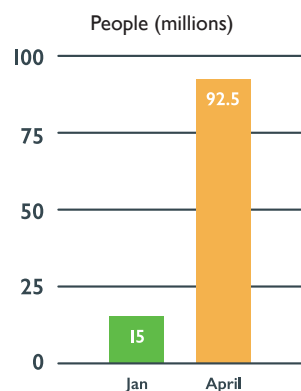


Right Now Everybody is a Remote Worker

The stay at home mandates in the Spring of 2020 created an explosive growth in the number of people working at home. In just a few months, the number of employees working from home climbed from 15 million to over 92 million! ¹

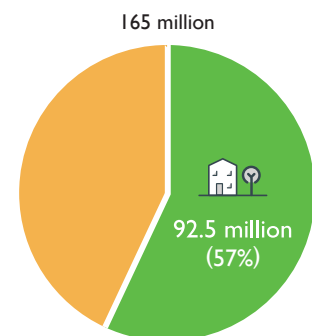


88% of organizations have encouraged people to work from home. ²



In the first few months of 2020, the number of people working from home climbed to

92.5 million



57% of the workforce has been working from home since April 2020.

The number of at-home workers has increased six-fold since stay-at-home mandates!

1. Based on BLS labor force data and polling from CNBC and Waveform.
2. "Gartner HR Survey Reveals 88% of Organizations Have Encouraged or Required Employees to Work From Home Due to Coronavirus" (March 2020 survey)

What do we need to know to prioritize traffic?





Prioritization: The Big Questions

Which Business Applications Are Most Affected?

While all applications that use the internet are impacted by connection quality and bandwidth issues, those with real-time features and requirements will feel it the most. Uses involving file sharing and downloading can run quietly in the background, but video conferencing and VoIP will feel the effects of bandwidth issues right away.

What Are the QoS Challenges for Home Offices?

Home offices face a number of QoS challenges and they aren't restricted to network use inside the home. While business applications are definitely competing for network resources with residential bulk data, residential internet connections also pose their own challenges.

Typical QoS bandwidth allocation happens at the residential router, so it can't do anything to improve traffic performance between the home and the ISP. Residential internet can be oversubscribed or below the expected quality, which is a challenge that QoS can't address. Residential QoS solutions are also not standardized across devices, presenting a challenge for maintenance and administration of all those workers with different ISPs, routers, and modems.

How Do We Know if Prioritization Can Help?

Sometimes the network problem is on the LAN, and sometimes it is between the residential router and the ISP. Connection and throughput issues can also spring up between the ISP and its upstream providers.

To check if prioritization can help on the LAN, the first and easiest test is to load up a business application, such as video conferencing, and turn off all of the other internet devices in the house. Turn off the TV with streaming video, switch phones to mobile data only, and take the tablets away from the kids. If this eliminates all of the lag, jitter, and delay problems with the business app, then QoS prioritization can definitely help by making sure that business-critical applications receive a higher priority over that bulk data.

Unfortunately, connection issues beyond the home can't be solved by typical QoS and will need a more intelligent, adaptable QoS solution. Home office workers can use the ping tool to test for connection issues inside and outside the house.

What is Quality of Service?

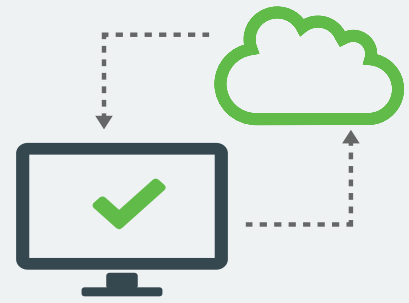
Quality of service (QoS) measures the overall performance of a computer network. QoS controls the flow of data used by different types of network traffic to ensure that high priority traffic gets a smooth, uninterrupted experience.

If you think of your internet connection as a huge multi-lane freeway, QoS is the tool that sets aside carpool lanes and bus-only lanes, so that when traffic gets heavy, high priority users still have lanes reserved for them.

Ping can tell a lot about network problems.



Diagnosing Networking Issues for the Home Office



Use the ping tool

To use ping, have the user **open a terminal** (AKA Command Prompt) on the computer.

How to open terminal

Mac

- Click the *magnifying glass* in the top right of the screen or press the **Command button + Spacebar**.
- The **Spotlight Search bar** appears. Type **terminal** and then press the **return** button.

Windows

- Click the **Windows** button and then type **CMD**.
- In the results, click **Command Prompt**.

Determine the gateway or router: The quickest way is to type **tracert bigleaf.net** (or on a Mac **traceroute bigleaf.net**) and **press return**. The first address that appears is the LAN gateway.

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For more details, please visit https://support.apple.com/kb/HT208050.
The-Discerner:~ joel$ traceroute bigleaf.net
traceroute to bigleaf.net (23.185.0.3), 64 hops max, 52 byte packets
 1  modem.home (192.168.0.1)  3.766 ms  1.949 ms  1.433 ms
 2  ptld-dsl-gw52.ptld.qwest.net (207.225.84.52)  28.833 ms  32.917 ms
```

The first IP mentioned in a traceroute is most likely the home router that will be pinged in the next step.

Now, with two different terminal windows, start two pings.

WAN: a location on the internet, for instance Bigleaf's internet presence.
Type **ping bigleaf.net**

LAN: The Gateway IP
Type **ping 192.168.0.1**
or the results from the tracert above.

For more detailed information on your network routes and health, we recommend using [PingPlotter](#).

1. Are the two pings in sync?

If the two pings keep in sync, then QoS can help prioritize LAN traffic before it reaches the WAN.

2. Is there a lot of variation from the mean (jitter)?

If there is a lot of variation between the LAN and WAN pings, you are seeing jitter. This can be a problem outside the LAN, which could mean that typical QoS won't be able to help.

What hardware can support QoS for the home office?





Setting up QoS for the Home Office

Businesses used to have much simpler prioritization requirements. Most businesses had, for example, ERP traffic, and that was the priority. But now there are dozens of applications connecting to different cloud service providers, databases, and diverse locations. Home offices are even more complex, sharing bandwidth with entertainment, e-learning, and internet-attached devices.

QoS relies on being able to identify different classes of traffic. One class of traffic could include key apps such as voice, video, and business-critical cloud applications. Another class could then cover low-priority bulk traffic such as video games, streaming media, and low-priority downloads. With the right QoS tools, much of this can be done automatically.

Can Existing Residential Hardware Be Used for QoS?

Yes, but this solution will vary widely in effectiveness across different modem and router manufacturers, models, and versions. Most residential hardware has very limited QoS capabilities – and in many cases, it's just an on/off switch in the configuration screen.

Residential hardware is not typically adept at identifying a variety of traffic types, which means that while it's possible to turn QoS support on, it might not actually be addressing the problem.

If the router does have greater QoS configuration options, a certain level of technical know-how will likely be needed to make those policy changes. Whether the options are basic or more complex, it's likely that each of your home workers is using a different model of router and different hardware to connect to the internet. This means the tech team will be supporting an array of devices with different capabilities.

Do Traditional Enterprise Approaches to QoS Work?

Traditional approaches to QoS will work to some extent. In order for a QoS solution to be able to prioritize business traffic over residential traffic, it needs to be able to do these three things:

1. Identify the source and type of network traffic.
2. Synchronize information across devices.
3. Be aware of the total amount of bandwidth available.

Most traditional enterprise QoS solutions can handle the first two requirements just fine, but many don't have the ability to be aware of throughput or network capacity.

But what if all of your end users end up with different QoS solutions?





Advanced Solutions for Home Office QoS

Bigleaf Networks is committed to helping organizations provide their employees with reliable communications, internet access, and application performance in their home offices. Bigleaf Home Office can keep the chaos and unpredictability of residential Internet connections from impacting business communications and applications.

QoS solutions have been around for a long time, but almost everything available has been built for enterprise situations and larger office networks. Unfortunately, most options for residential use have been limited, as discussed earlier.

Bigleaf understands the frustration of home office users and believes its Dynamic QoS prioritization technology can minimize that frustration. Bigleaf Home office uses proprietary algorithms, instead of policies that have to be manually built, to automatically identify and prioritize the traffic for your business communications and applications over other household

traffic—while monitoring and adjusting to varying broadband capacity in real time—to make sure your key applications don't drop or lag.

Bigleaf Home Office can also be easily deployed across your team's home offices. The simple set up works seamlessly with existing ISP and broadband connections, supporting both single and multiple circuits.

Alongside QoS, Bigleaf Home Office offers software-defined networking (SD-WAN) with support for redundant network connections and outage detection outside the home network. Bigleaf utilizes its nationwide Cloud Access Network to ensure a high performance connection to the Cloud. It continually monitors the connection quality of your internet connection. Based on changing circuit conditions, QoS settings and rate limits are adjusted in real time to give your traffic the best possible experience.

Learn More

To get more information on Bigleaf Home Office, visit <https://sommita.net/tools/networking/bigleaf/>

