When a GIG isn't a GIG

Understanding Network Bandwidth and Speed

Why Fiber-Based, Dedicated, Symmetrical Internet Is The Way To Go

Over the last few years, home connectivity, driven by an ever-increasing demand for high-speed Internet, has surged. According to the Viavi Gigabit Monitor, more than 300 million people globally now have Gigabit Internet, the next generation of broadband Internet service, representing roughly 4.2 percent of the world's total population. This number is expected to surge in the future, especially as business models take advantage of the expanded bandwidth for Virtual Reality (VR), Augmented Reality (AR) and the Internet of Things (IoT), as they did for streaming video and audio in recent years. The rising demand for Gigabit Internet is likely to be fueled by increased availability.

True Gigabit Internet connections offer speeds that are over 50 times faster than today's average broadband connection, even if your broadband is running at 100 megabits per second (Mbps), which is extremely generous given that the average fixed broadband download speed in the U.S. is 64.17 Mbps, according to Internet speed test company Ookla. Gigabit Internet service offers users up to 1,000 Mbps upload and download speeds. Moving large amounts of data, whether for replication, file sharing or graphic-intensive applications, can be done at up to 10 times the rate over a true Gigabit Internet connection.

With the increased marketing of 'Gigabit Internet,' it's important to understand the details around the various service offerings and why fiber-based, dedicated, symmetrical Gigabit Internet service is the way of the future.

Fiber-Based Services Future-Proof Your Network

Having your services delivered over a dedicated fiber optic connection provides the advantage of future proofing your network. The reason for this is due to the fact that 100% fiber to the premise (FTTP) networks have virtually no bandwidth limitation. What this means is that as your needs change, you have the opportunity to quickly increase your bandwidth and, as a result, will hopefully never find yourself in a situation where you reach maximum capacity and end up having to migrate to a different type of technology.

> Having your services delivered over a dedicated fiber optic connection provides the advantage of future proofing your network.

With fiber-based Gigabit Internet service, businesses can enjoy an improved online experience for simultaneous users; the ability to seamlessly stream high-definition (HD) video content; offer supreme video conferencing capabilities to users; experience incredible speeds for data transfer; easily download and upload files to the cloud and more.

Asymmetrical Versus Symmetrical Bandwidth — What's Right For Your Business?

Let's start with some definitions. Asymmetrical bandwidth is a connection that has different upload and download speeds. This method worked well for legacy cable networks, which were built primarily to transmit broadcast TV signals. Because this methodology was in place, many cable companies chose to use this same asymmetrical solution to support Internet service. But what if your traffic pattern doesn't fit with an asymmetrical solution?

> …the connection may be able to scale to a full Gigabit, but the business only has access to a portion of the maximum capacity…

Conversely, symmetrical bandwidth has the same speeds to push and pull data and is better aligned with how many businesses operate today. As we migrate more applications to the cloud, such as file sharing, off-site backups and Office365™, companies will likely push as much traffic to the Internet as it pulls and, therefore, will require higher speed symmetrical bandwidth connections to ensure optimal network performance.

Gigabit Connections Versus Bandwidth

When sourcing Internet, another consideration is the difference between the interface and the bandwidth. Many service providers will provide a Gigabit interface into the subscriber's main location, and then only deliver a fraction of the bandwidth the interface is capable of supporting. This is like having a trickle of water coming out of your faucet.

While it is true that the connection may be able to scale to a full Gigabit connection, the business only has access to a portion of the maximum capacity today (a mere trickle), and will likely have to pay more to add additional bandwidth to reach maximum capacity. Don't get fooled by your service provider; make sure you get what it has promised you by asking for clarification on exactly how much bandwidth you are getting over the connection it provides.

FirstLight *Our Network is Just the Beginning…*   in FirstLight Fiber   X @firstlightfiber   ☉ FirstLightFiber   www.FirstLight.net   1-800-461-4863

2

Shared Versus Dedicated Bandwidth

Another consideration is whether or not your business will have consistent access to your Internet bandwidth. Sometimes you hear the term best effort. What that means is if the bandwidth is available, you can use it up to the maximum amount you subscribe to. This is your clue that your Internet service is being provided over a shared network. The downside of this is that during peak traffic times, you may not have the bandwidth you need to support your networking needs.
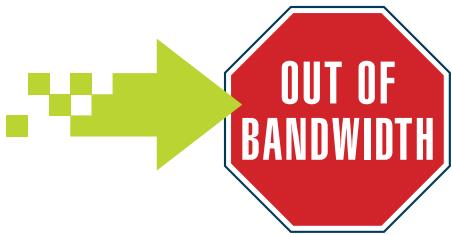
If you have ever noticed your network slows to a crawl at certain times of day, you are likely on a shared network and could be victim to the gamers playing online gaming sensation Fortnite: Battle Royale, which leaves you in a bandwidth tug of war with your neighbors.

Legacy cable networks and even some of the new fiber networks being deployed by large telephone and Internet companies are typically shared networks and, as such, would be susceptible to bandwidth contention. On a dedicated network, you are guaranteed to have consistent access to your bandwidth 7x24x365. This bandwidth is not shared; it is not a 'best effort' service and, therefore, you are not impacted by other subscribers' usage patterns – ensuring that your business has consistent access to the bandwidth it needs to run efficiently.

## How Is The Service Provider's Network Architected?

Other factors that affect your network's performance is how your service provider architects its network, what type of routing protocols it chooses to use and how it impacts latency. Older Internet networks were designed to interconnect at a few peering points, which are often located in major 'NFL' cities such as New York, Boston, Miami, and Chicago. So all traffic, regardless of its ultimate destination, is routed to these major meet points so that the carrier can exchange traffic with its peers. The problem for you is that your data may be traveling long distances only to be returned back to the original market. This type of architecture can add latency, which degrades network performance.

This is particularly evident on sensitive applications such as Voice over IP (VoIP), video conferencing and cloud services such as Office365™. Peering at a single location also creates reliability issues should there be a localized issue that occurs in that major city, potentially impacting all of the providers' networks that interconnect there. Another factor that can impact network performance is the routing protocol your network provider uses. Many service provider networks use a routing protocol called Least Cost Routing where it will choose to have your Internet traffic follow the cheapest path available to that provider. The cheapest path isn't always the best path and can cause your traffic to needlessly hop around the globe, which adds latency, negatively impacting your users' experience.

FirstLight   *Our Network is Just the Beginning...*   in FirstLight Fiber   𝕏 @firstlightfiber   FirstLightFiber   www.FirstLight.net   1-800-461-4863

3

Last, But Not Least: Low Latency

A common mistake people make (and some ISPs lead them to believe) is confusing Internet speed with bandwidth. Your Internet connections have little to do with speed, but more so with how much data you can receive every second. This means that accurate Internet speeds involve a combination of bandwidth and latency. Latency is equal to time, and time is money. Latency refers to the amount of time that it takes for a packet of data to reach its destination and it is typically measured in milliseconds. A low latency connection is crucial to support your business. Bandwidth, on the other hand, is the volume of data your network can transmit before packets start piling up at choke points. Simply increasing bandwidth may not be enough for businesses who rely on high performance computing Internet, which is why a network connection that experiences small delay times is essential.
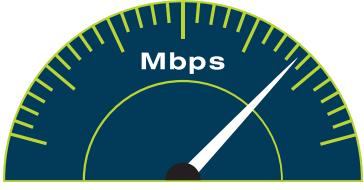
Networks that are specifically designed to minimize latency feature very straight paths from location to location, and very few switches or routers on the path and termination that is close to the users.

> Although most service providers today are touting their 'super-fast' Internet speeds, not all Internet services are created equal.

As more businesses move to the cloud, certain processes will continue to drive the requirement for optimal network performance and increase the need for low latency connectivity over simply more bandwidth. Does your provider offer an SLA associated with latency? Do they back it up with credits when they fail to meet it?

Conclusion

Although most service providers today are touting their 'super-fast' Internet speeds, not all Internet services are created equal. When sourcing an Internet connection for your business, don't just focus on the bandwidth; consider all of the factors that will impact your network performance. Remember that the cheapest solution can end up being very costly for your organization in terms of lost productivity. Make sure you select the Internet service, bandwidth and provider that is right for you. By delivering services over its own advanced fiber optic network, FirstLight's services provide businesses dedicated, symmetrical bandwidth, higher speeds, and greater reliability than copper, coax or wireless communication networks.

Want to learn more about FirstLight's network solutions?

Visit www.FirstLight.net/network

You can also e-mail us at sales@firstlight.net or call 800-461-4863 to begin a discussion about how to improve your network.

1 Source: http://gigabitmonitor.com/ September 2020
2 http://www2.deloitte.com/global/en/pages/technology-media-and.telecommunications/articles/tmt-pred16-telecomm-dawn-of-the-gigabit-internet-age.html
3 https://www.washingtonpost.com/blogs/govbeat/wp/2014/01/09/the-fastest-and-slowest-internet.speeds-in-america/
4 Pokémon is a registered trademark of Nintendo Co., Ltd.
5 Office365 is a registered trademark of Microsoft Corporation

FirstLight   *Our Network is Just the Beginning...*   in FirstLight Fiber   X @firstlightfiber   FirstLightFiber   www.FirstLight.net   1-800-461-4863

4