



White
Paper

Enterprise Broadband Access: What's your choice?

Executive Summary

Today, broadband access isn't just about making a connection to the Internet; it's about running bandwidth-intensive business and multimedia software, transferring large data files and tapping into hosted or cloud-based applications. Your ability to do so will depend upon the performance, scalability and reach of the Internet access method you choose. This paper highlights the differences between broadband Internet services, so you can make an informed decision for your enterprise.

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Across industries, geographies and companies of all sizes, the push is to raise the reach, reliability and quality of broadband access to the Internet. Users want instant connectivity, faster downloads, secure and dependable access from anywhere. Businesses want easy deployments and robust performance now, with scalable bandwidth and global expansion capabilities for the future.

With so many choices, it's hard to know which broadband access service is right for you. For example, you can choose a Digital Subscriber Line (DSL) connection to transport information over a traditional phone network, or cable internet services to move data along the same network that delivers television signals.

Another option is Ethernet access, which is fast becoming the most popular choice for broadband access. As you review the comparisons between Ethernet, DSL and cable access services within this paper, you'll see the differences are many. But the bottom line is this: While each access method can connect you to the Internet, the difference lies in what you can do and how fast you can do it once you're there.

Service Coverage

DSL

DSL can provide nationwide access services to multiple offices or remote workers. These broadband connections are fairly easy to find in cities and suburban areas.

Access Type	Service Coverage
DSL	Domestic U.S., Limited in some remote areas
Cable	Mostly Domestic U.S.
Ethernet	Global footprint

However, service quality and availability can be difficult for rural locations, so DSL may not be a viable solution for all of your business locations. This can leave you managing a mix of broadband services, providers and pricing plans, depending upon service delivery location. Also, keep in mind that DSL performance is closely linked to proximity: The further away your offices are from the phone company's central offices, the more network performance problems can occur.

Cable

Cable broadband services are widely available. Service quality is less distance-dependent, but coverage is predominantly domestic. So, if you have one or many global offices, or global aspirations, cable access services may only present a short-term solution.

Even if global coverage is offered, you should be aware that cable Internet services are more popular than DSL in the U.S., but it is the opposite in many other countries. Again, this raises the complexity issues involved with juggling multiple broadband service types, providers and vendor bills, but on a global basis.

In addition, given its legacy as a residential TV service with add-on offerings for broadband services, cable Internet may not be available as a standalone access service in some locations. Since cable

companies typically bundle Internet with phone or TV services to drive down costs for customers, standalone cable broadband services for businesses may become cost prohibitive.

Ethernet

With a global footprint, Ethernet broadband can be more available on a local, national and worldwide basis. You can consolidate broadband services with a global standard and eliminate managing multiple technologies, vendors or networks.

Ease of Installation and Deployment

You don't have time for complex installs and deployments. You need the ease and speed of "plug and play" network connections.

DSL

You probably already have a connection to the traditional telephone line for voice services, so your transition to DSL broadband for data services can be an easy one. You can buy or lease a DSL modem inexpensively from your provider and, in most cases, install the equipment and software yourself.

Access Type	Ease of Installation
DSL	New equipment (modem), DIY install
Cable	New equipment (modem, router, cables), may require service call
Ethernet	Leverage existing equipment and skill sets

Cable

Cable broadband services also require a leased or purchased modem, router and software from your provider. However, installation gets a bit more complicated, as new cable wiring may need to be installed. Depending upon skill levels in your business, this could require a third-party contractor. If you have offices dispersed around the country or the globe, that could become very expensive and put you in the position of scheduling and managing multiple installations.

Ethernet

Ethernet is the accepted LAN standard for most business networks. So, when you choose Ethernet for broadband access, you can most likely leverage the same equipment you have in place today, as well as technology you and your staff are already comfortable with. If you do need to buy new equipment, the gear needed to establish a 100 Mbps Ethernet Internet connection costs about the same as the equipment needed for broadband services over cable networks.

Many PCs, peripherals, switches, routers and other network appliances come with 10/100/1000 Mbps Ethernet interface cards installed. So, you can plug into an Ethernet port to establish broadband access as easily as hooking up a PC or a printer, using familiar Ethernet cables.

With Ethernet as an Internet access method, you can have the ease of plug and play and the cost advantages of re-using equipment, without negotiating a learning curve for DSL or cable technologies.

Bandwidth and Performance

In general, when it comes to delivering faster access, bandwidth equals speed. While that's certainly an important discussion to have, speed is really about performance – being able to get more done in a workday.

Access Type	Bandwidth Range	Applications Supported
DSL	Up to 25 Mbps. Bandwidth caps imposed	Internet, TV, VPN
Cable	Varies by provider. Bandwidth caps imposed	Internet, TV
Ethernet	2 Mbps to 10 Gbps. No bandwidth caps imposed	Business and multimedia apps (voice, data, video) Internet, VPN

If your employees spend too much time waiting for pages to load and files to download, they not only get frustrated, they get less productive. Multiply that affect across your business and it could add up to some pretty inefficient workdays.

DSL

DSL access services are available at different data transfer rates to suit consumer or business needs, with prices linked to those speeds. The most common DSL service ranges from 6 to 24 Mbps (megabits per second).

Cable

While cable access speeds are not influenced by distances from a service provider's central offices, performance is heavily impacted by bandwidth sharing. Unlike a dedicated DSL or Ethernet connection to the Internet, cable customers in a given area share the same connection.

This means that, when a large number of users access the Internet simultaneously, your business must compete with other businesses and residential users for bandwidth. Both performance and productivity can suffer as a result.

Access Type	Performance	Upload/Download Speeds
DSL	Depends on proximity to phone company office	Symmetric uploads/downloads available
Cable	Depends on volume of traffic on shared network	Limited availability of symmetric uploads/downloads
Ethernet	Unrestricted by proximity and limits of shared connections	Symmetric upload/download speeds

Both DSL and cable Internet service providers can also impose bandwidth caps – setting a maximum speed for the bandwidth delivered to each customer. They do this to enforce a fair and equitable distribution of speed across user bases in specific areas. During high traffic times, your 30 Mbps service can be ratcheted down to 3 Mbps or lower to ensure everyone who wants to connect to the Internet will be able to, albeit very slowly.

When it comes to simultaneous upload and download speeds, most cable providers offer much higher data transfer rates for downloading, since their organic customer base consists of residences.

Ethernet

Moving into the realm of gigabytes (Gbps), Ethernet access boosts connection speeds to as much as 10 Gbps, depending on your provider's offerings. That can be hundreds of times faster than cable modems and tens of thousands of times faster than dial-up modems. As a dedicated access solution, you can work without worrying about Internet traffic jams or the dramatic bandwidth drops that can occur with a shared cable connection.

Ethernet access offers the same high speeds for uploads as for downloads. So, you can do more than just surf the net and download files, you can move large data volumes back and forth quickly to work without waiting. You can also serve up bandwidth-intensive business applications, such as telepresence or telemedicine solutions, to multiple locations from your data center.

Further, if you plan on transitioning to network-based cloud services, rather than hosting your own applications, you'll need the bandwidth capacity of Ethernet access to avoid performance problems and the resulting effect on productivity.

Service Reliability

DSL

DSL connections provide a very reliable, consistent level of service. Since DSL signals travel on a dedicated connection from the user's location to the Internet Service Provider ("ISP"), DSL connections are not impacted by the usage patterns, volumes or behavior of other residences or businesses.

Access Type	Service Reliability	Service Level Agreements (SLA)	Class of Service Support
DSL	Consistent	Yes	No
Cable	Varies and depends upon shared network traffic	Limited	Limited
Ethernet	Consistent	Yes	Yes

You basically get what you pay for: The bandwidth levels that exist upon installation will remain constant, as long as the network is up and running.

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Cable

As a shared access solution, the reliability and consistency of cable Internet service can vary during the business day. Your connections depend upon the number of users in a given geography or at a given time, how many are sharing a connection and the functions being performed.

To make matters worse, many cable providers over-subscribe their Internet services so they can spread costs across many customers. Since there are no guarantees that your cable provider won't continue to add more subscribers, it follows that there is no guarantee that your service delivery will be stable. Without a dedicated Internet service, most of these variables are beyond your control, making cable service less predictable and reliable for business use.

Ethernet. Depending upon the provider you choose, can offer up to 99.999% network availability as part of a Service Level Agreement (SLA). Since the timely delivery of network packets greatly impacts the performance of the applications you run, they can also offer data delivery SLAs to help ensure critical business data is delivered without interruption. Further, some Ethernet providers include Class of Service support. This allows you to designate the data that should be given priority delivery via the IP network.

“Demand for Ethernet connectivity continues to remain strong with double-digit growth. Today, datacenter connectivity, disaster recovery/business continuity, and datacenter storage replication are the three primary applications driving adoption of Ethernet. Growth is particularly strong with Ethernet access to other services such as dedicated Internet access, IP VPNs, datacenter interconnect, and now private cloud services. Enterprises are continuing to expand the use of Ethernet for VoIP, video, and other real-time applications and are also increasingly interested in on-demand bandwidth. With enterprises increasing their use of cloud-based applications throughout their network and the early use cases of on-demand bandwidth, features such as application performance, Ethernet service assurance, CoS, traffic management, and customer experience requirements will become more critical for Ethernet service providers in differentiating their Ethernet services!”

– Nav Chander, Research Manager, IDC

Flexibility and Growth

Even when you're satisfied with current performance levels, what happens if you add new employees, open new offices or other factors occur that clog the network with added activity? Performance suffers, employees complain and online customers go elsewhere.

DSL and Cable

Whether you have DSL or cable, you can certainly call your provider to upgrade to the next level of services as your business needs change. The bandwidth flexibility offered will depend upon your provider.

Ethernet

Offers higher bandwidth than DSL or cable right from the start, Ethernet broadband can deliver better performance and flexibility now and over the long haul. You can have more room to grow without having to consider new broadband technology.

Manage Bandwidth. You can monitor and manage your Ethernet bandwidth the same way you manage your other Ethernet-based networks. Unlike DSL and Cable broadband, you have the flexibility and control to route traffic or allocate bandwidth, depending upon the broadband needs of specific locations, the applications they need to run and the volumes of users they need to support.

Add Capacity. As demands change, most Ethernet broadband service providers let you add capacity in much smaller increments – by as little as a single Mbps at a time. So, you can better align business needs with the bandwidth you deliver, without paying for extra capacity you don't need.

Since your Ethernet access provider can generally upgrade bandwidth capacity remotely, upgrades are fast and easy. Equipment upgrades are also easier, because you can leverage the in-house networking expertise you have to equip more PCs with Ethernet broadband access or add new routers.

Broaden Access to Other Networks. Beyond providing LAN and WAN access, Ethernet is flexible enough to connect into IP-based Virtual Private Networks (VPN) and to provide Wi-Fi network coverage. So you can have the reach and bandwidth needed to access the feature-rich applications on your IP-VPN, while supporting mobile and remote users and adopting globally consistent access to data and applications.

Transition From T1. A T1 is a two-point, dedicated, high capacity, digital service provided on terrestrial digital facilities capable of transmitting 1.544 Mbps. If you currently have T1 Internet connections, you know how hard it can be to manage the multiple lines you need to deliver voice and data services. It can also be time consuming and costly to expand bandwidth as you grow. New equipment and higher speed circuits are required, which may take days or even weeks to implement. Further, your growth can be limited by the ceiling of a T1 connection.

Access Type	Level of Protection	New Security Tools Needed
DSL	Security of a dedicated connection	Yes
Cable	Vulnerabilities of a shared connection.	Yes
Ethernet	Security of a dedicated connection	Common tools shared across Ethernet LAN and WAN

That's why many businesses today are transitioning to Ethernet broadband. By combining voice and data on the same network, Ethernet can help lower the cost of delivering those services while providing the scalable, elastic bandwidth you need as business requirements change.

Security

DSL

DSL offers the security characteristics of a dedicated connection to an ISP. However, there are security ramifications to an "always on" connection. You will need to install an appropriate software- or hardware-based firewall and take other security measures to help protect your business data from prying eyes, theft or corruption as it travels the network.

Cable

Cable connections to an ISP are more open to security threats because you are sharing a connection with other business and residential customers. Again, the "always on" nature of your connection raises security issues. It makes you more vulnerable to threats that could put your data and business operations at risk. To ward off attacks from hackers, you must implement security solutions and keep them updated.

Ethernet

Ethernet gives you much more control over the security measures you can put in place for the access services you buy. You get the inherent protection of a dedicated link to your ISP, plus the ability to use the same, familiar Ethernet-based security solutions that protect your LAN environment. So, you can guard the safety of your Internet connection the same way you prevent threats to your LAN, leveraging the tools and expertise you already have on hand.

Conclusion

DSL, cable and Ethernet broadband services can all be viable solutions for your business, depending upon your needs. But if you want a true enterprise-class solution for broadband Internet access, Ethernet can be a good choice because it can provide:

- Broad service availability and a global footprint
- Easy installation and deployment, leveraging existing networking technology, equipment and skill sets
- Higher bandwidth for demanding business and multimedia software, transferring large data files and accessing hosted or cloud-based applications
- Dedicated Internet access for consistent, reliable performance and enhanced security, often backed by network and data delivery SLAs and Class of Service support
- Scalability for growth without having to consider new broadband technology
- The simplicity of converging access to LAN, WAN and IP-VPN connections on a single Ethernet network

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¹IDC, "U.S. Carrier Ethernet Services 2013–2017 Forecast," Doc # 243425, September 2013

