ETHERNET E-BOOK

SPEED UP, SCALE UP, KEEP UP

ENTERPRISE SOLUTIONS ADD VALUE BEYOND THE LAN

HOW CARRIER ETHERNET CAN HELP YOUR BUSINESS STAY AHEAD OF BANDWIDTH DEMANDS

As our global economy becomes increasingly digitized, traditional business LAN networks are feeling the strain. Voice, data, high-res video, large file transfers, cloud services and online applications demand the fast, smooth flow of data in real time. Yet many businesses are held back by network complexity and multiple independent connections. That's where Carrier Ethernet comes in: a long-trusted, smart solution for meeting the ever-increasing bandwidth demands that are pushing the limits of traditional T1, Frame Relay and Asynchronous Transfer Mode LANs.

IN THIS E-BOOK

MOVE APPLICATIONS TO THE CLOUD

According to Logic Monitor, 83% of enterprise workloads will be in the cloud by 2020. As cloud computing continues to grow and applications become increasingly complex, businesses need a more reliable, scalable, secure and ultimately higher-performance connectivity solution to keep up with the growth. Carrier Ethernet meets the most critical requirements for migrating your enterprise applications to the cloud. The high-capacity, low-latency network infrastructure helps to manage data growth, drive application performance and securely access cloud and data center resources.

GET CLOUD-READY: WHAT TO LOOK FOR IN AN ETHERNET SOLUTION SERVICE-LEVEL AGREEMENT

Not all Carrier Ethernet solutions are the same. To help get your network cloud-ready, your service-level agreement should ensure your network is:

RELIABLE

- Guaranteed uptime that minimizes disruptions
- Guaranteed service levels for optimal application performance
- Network routing to handle large volumes of traffic from cloud-based applications

SCALABLE

- "Pay as you grow" model that meets current bandwidth demands while allowing for long-term evolution
- Simple infrastructure that makes it easy to plan, deploy and manage at scale
- Limited need to upgrade LAN connectivity to accelerate pace of growth

SECURE

- Isolated data, applications and traffic with private, direct connections
- Strong security defenses and data protection by keeping all traffic on a single network
- Controlled network access that prevents eavesdropping on data exchanges

LOWER IT COSTS

Carrier Ethernet has a lower cost per Mb than T1, Frame Relay and Asynchronous Transfer Mode, reducing your overall Internet expenses–especially if your business relies on high-bandwidth activities. Here are additional ways switching to Ethernet can cut your IT costs:

- It's easier to deploy and maintain than traditional LANs, keeping your total cost of ownership down.
- A single network can carry all of your voice and data traffic, so you no longer have to support duplicative services and equipment or spend resources on managing separate networks.
- The ability to tailor connectivity requirements for each of your locations means you only pay for what you need.
- Sharing Internet access across the entire network is more cost-effective than purchasing separate connections.
- Integrating with and complementing current and future infrastructure leverages IT investments.

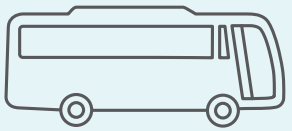
NOT ALL TRAFFIC IS THE SAME

Vehicles come in all different sizes–and so do Internet tasks. High-bandwidth activities are like the delivery trucks on your highway. They can slow down traffic on the road and prevent other, smaller vehicles from moving freely.

Here are bandwidth estimates for different Internet activities, assuming one user performing one activity at a time:

.33 Mbps
WEB BROWSING

1 Mbps
EMAIL



2 Mbps
UPLOADING LARGE FILES

.55 Mbps
FILE SHARING

1.3 Mbps
VoIP CALLS

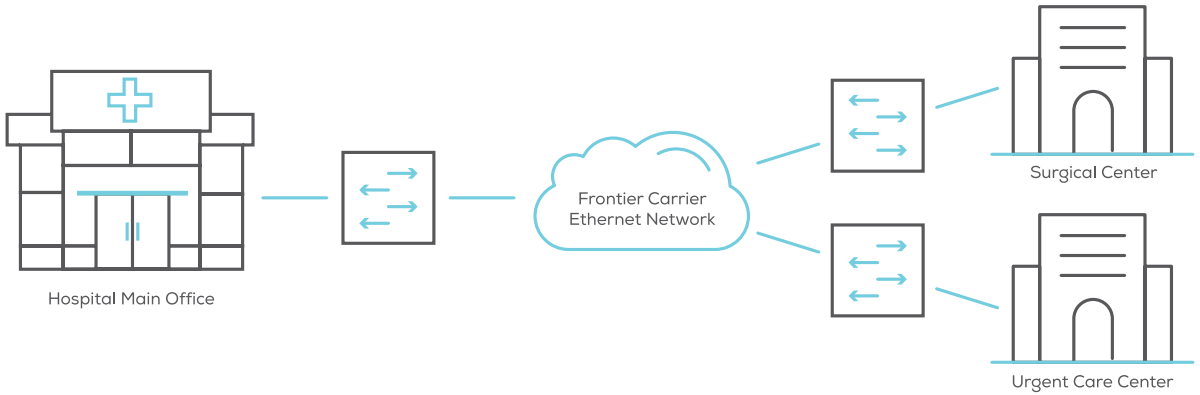
4 Mbps
VIDEO CONFERENCING

SIMPLIFY NETWORK INFRASTRUCTURE

Especially for a multi-site organization, Carrier Ethernet reduces complexity by carrying all voice and data traffic over one network, making it easier to plan, deploy and manage at scale. Standardizing on Carrier Ethernet technology allows you to:

- Add and remove locations without time-consuming, expensive, cumbersome network changes, business disruptions or capital investments in new equipment.
- Scale up and down to exactly the bandwidth you need, on demand, without an unpredictable cost increase or the need to upgrade LAN connectivity.
- Share Internet, VoIP and video services across all locations, eliminating duplicate services.
- Incorporate communication and collaboration applications like VoIP, voice and video conferencing quickly, as needed.
- Manage your voice and data traffic from a single, centralized location and incorporate more remotely programmable services, freeing your IT staff for higher-value work.
- Secure the port, block IP addresses and filter content from a single-entry point of Internet access.
- Resolve issues faster, improving workforce productivity and customer experiences with consistent service, accessibility and swift response times.
- Reduce the number of routers and truck rolls, resulting in a lower cost per bit than other methods.

CARRIER ETHERNET REDUCES COMPLEXITY



SPEED UP PERFORMANCE

With its high transmission rates, Carrier Ethernet can handle massive volumes of traffic, speeding the pace of data exchange and cloud backup and improving the performance of voice and video applications. Here's how:

- Low latency minimizes delay, allowing high performance.
- Low packet loss rates transmit data with little to no chance of error.
- Minimal to no disruptions guarantee uptime.
- Centralized network with remote troubleshooting allows fast resolution of potential issues.
- Connection speeds up to 10 Gbps move large data sets and files quickly.
- Tailored connections with guaranteed service levels optimize application performance.
- Dependable connectivity solutions accelerate business process workflow.

IDC PREDICTS

175

ZETTABYTES

(1 TRILLION GIGABYTES)

OF DATA WILL BE CREATED GLOBALLY BY 2025

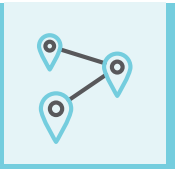
Source: IDC, *Data Age 2025: The Digitization of the World from Edge to Core*, November 2018

MAINTAIN BUSINESS CONTINUITY WITH OFF-SITE DATA BACKUP

With connection speeds up to 10 Gbps+, Carrier Ethernet provides simple, reliable disaster recovery and business continuity by:

- Moving large data sets and files quickly, securely and continuously backing them up in off-site locations, protected from unauthorized users.
- Rerouting traffic to alternate sites when needed.
- Giving employees, customers, suppliers and key stakeholders access to cloud applications from anywhere.
- Guaranteeing uptime to support mission-critical equipment, operations and applications in emergencies.
- Meeting Metro Ethernet Forum (MEF) Carrier Ethernet industry standards for performance, compatibility and security.

CONNECT MULTIPLE LOCATIONS WITH SECURE, PRIVATE DATA PATHS



Carrier Ethernet networks can be segmented and configured to determine the exact path traffic will take between network endpoints, improving security and compliance. Its flexible configuration options can complement your MPLS and IP-VPN and can be designed with point-to-point, hub-and-spoke or any-to-any connectivity. For example, if you need to:

- Connect two locations, an EPL (Ethernet Private Line) allows both locations to communicate seamlessly while supporting Layer 2 control protocols like Spanning Tree Protocol (STP). For example, a mid-sized manufacturing company deploys an EPL to connect its headquarters to its warehouse.
- Connect three or more locations in a hub-and-spoke configuration, an EVPL (Ethernet Virtual Private Line) ensures communication only takes place between a hub and spoke, never between two spokes. For example, a hospital network deploys an EVPL to connect each outpatient location to the electronic medical records software at headquarters, but not to each other.
- Connect three or more locations in an any-to-any configuration, an EP-LAN (Ethernet Private Local Area Network) provides a fully-meshed network topology solution for enterprises migrating from Multiprotocol Label Switching (MPLS) VPN and other technologies. With full mesh, this solution yields the greatest amount of redundancy so if one of those nodes fails, your network traffic can be directed to any of the other nodes. For example, a large enterprise with distributed resources across its footprint deploys an EP-LAN so each location can access resources on demand.
- Connect three or more locations while integrating other services, an EVP-LAN (Ethernet Virtual Private Local Area Network) combines the benefits of a fully-meshed network solution with the ability to integrate additional services like Ethernet Internet Access (EIA) and IP Connect via Service Multiplexing at the User Network Interface (UNI), a bidirectional point for Ethernet service delivery. For example, a school district requires two separate LANs for voice and data, so an EVPL and EVP-LAN are combined at the headquarters UNI to hand off on a single port.
- Connect privately to multiple cloud service providers through a single network connection, a solution like Frontier Connect Cloud allows secure access to the cloud's shared infrastructure through a "pay-as-you-grow" pricing model.

COLLABORATE AND COMMUNICATE ACROSS LOCATIONS

Carrier Ethernet networks provide an ideal foundation for crucial business collaboration technologies like Unified Communications as a Service (UCaaS), cloud-based apps, videoconferencing and instant messaging. Here's why:

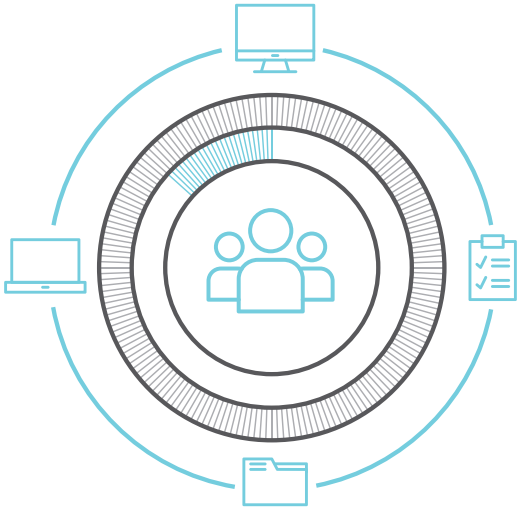
- Faster speeds elevate performance and quality, which means clear audio and sharp video.
- Carrier Ethernet's class of service feature prioritizes traffic to ensure smooth, real-time streaming with minimal to no lag.
- Metro Ethernet Forum (MEF) Carrier Ethernet industry standards ensure seamless integration and compatibility.

THE NUMBER OF REMOTE WORKERS IS UP

115%

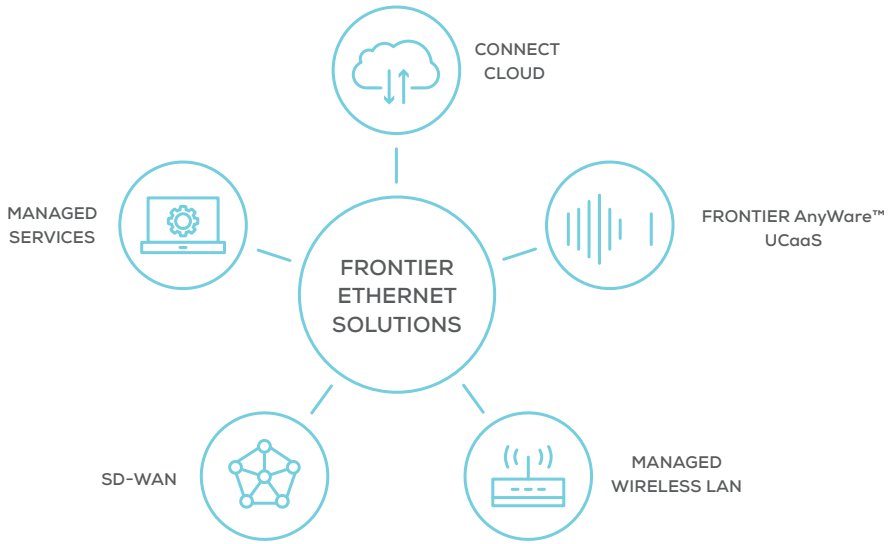
SINCE 2005

Source: globalworkplaceanalytics.com/tag/flexjobs



ABOUT FRONTIER® BUSINESS

Frontier's advanced fiber network serves businesses of all sizes, ranging from small and mid-sized businesses to Fortune 500 companies.



MEF 2.0 Certified Carrier Grade Network and Services

Frontier's MEF Certified Ethernet Solutions deliver value beyond the LAN. Connectivity solutions like Carrier Ethernet can help your business stay agile while meeting today's increasing bandwidth demands.

For more information about our Ethernet Solutions:

VISIT OUR ETHERNET RESOURCE CENTRAL

OR CALL 888.308.6371 TO TALK WITH AN EXPERT.