Making the most of Carrier Ethernet

Built on a long-standing and highly popular technology, Carrier Ethernet has gone through a variety of iterations and enhancements over the years and continues to play a role at the heart of many telecoms players' strategies.

Operators remain committed to deploying Carrier Ethernet as a key technology to support services, with the global market estimated to be worth $80 billion annually. A large number have already harnessed it to provide CE 2.0-certified services under the program of industry consortium the MEF, building on the earlier generation of the technology.

More recently, they have been moving to the next phase, MEF 3.0, which seeks to drive an ever more agile on-demand, cloud-centric experience. As one of the technologies in the planned MEF 3.0 family, dynamic Carrier Ethernet is set to help meet some of the digital economy's most demanding needs.

Solid Carrier Ethernet services will help maximize the opportunity and give carriers' customers a strong offering to meet their needs in the current digital environment. But what does the technology offer, and how can it be harnessed effectively?

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The Ethernet lowdown

The technology builds on traditional Ethernet, a family of networking technologies that facilitate communication between computers in a local area network (LAN). Carrier Ethernet expands this to enable use over a wide area network (WAN) by incorporating additional "carrier class" capabilities, allowing it to be used as an alternative to technologies such as Asynchronous Transfer Mode (ATM) and frame relay.

The Metro Ethernet Forum (MEF) identifies a number of key facets of an effective Carrier Ethernet service. One is the technology enables scalability compared with traditional Ethernet, allowing it to be easily upgraded to meet rising bandwidth demand and provisioned on a wide basis in a carrier environment.

Another key facet is the service provides standardized features, with the aim of setting the expectations for a uniform experience regardless of carrier. It also needs to be highly reliable – with effective fault detection and fast recovery – and offer strong quality of service, as well as support and monitor service management on a wide scale.

Among the benefits of Carrier Ethernet is that network administrators and engineers already know the technology well because of its long-time use in both homes and offices, making it much easier to manage and adapt. It also employs standard Ethernet hardware available today, which costs substantially less than that for traditional leased-line technology.

In addition, Carrier Ethernet services often provide burstable options with bandwidth options tailored to actual needs and low-bandwidth commitments that can be grown over time, thus cutting costs for customers. The ability for the technology to enable multiplexing – or the ability to run multiple network services over a single physical port – can also reduce costs by saving money on the use of more ports and cross-connects.

Carrier Ethernet has the versatility to be deployed over a wide array of complementary technologies, such as **dark fiber, MPLS, WDM** and **microwave**.

Wide uses

A variety of service classifications come under the Carrier Ethernet umbrella. E-Line services, for example, are pointto- point offerings, while there is also the point-to-multipoint variety E-Tree and the multipoint-to-multipoint E-LAN. The latter is similar to a virtual private LAN service, which enables multiple remote locations to participate in a common virtual LAN as if they were in the same office building.

In addition, Carrier Ethernet has the versatility to be deployed over a wide array of complementary technologies, such as dark fiber, Multiprotocol Label Switching (MPLS), Wavelength-division multiplexing (WDM) and microwave. A common implementation is over MPLS, whereby Ethernet frames are transmitted over a packet network such as an IP backbone.

Deploying Carrier Ethernet opens up possibilities for a large number of potential uses, again displaying its versatility. These range from acting as a replacement for legacy time-division multiplexing (TDM) circuits to providing connections between data centers and use as a virtual backbone between customer sites.

Carrier Ethernet can also be used as an inexpensive backup circuit for primary leased lines, as well as for supporting VPN services, interconnection, disaster recovery, offsite backups and for 4G and 5G backhaul as demand for bandwidth rises. With its high level of performance and low jitter, it is an effective method for transmitting voice-over-IP (VoIP) and video data too.

Connecting to the cloud

On top of these uses, Carrier Ethernet is becoming an increasingly common option for connecting to cloud service providers as clients move a growing number of applications and workloads into that arena.

The technology offers a path to interconnect applications and resources in a stable, more private way than over the internet. This creates a strong proposition for customers looking to order Carrier Ethernet connections from their network provider to connect to cloud players.

Each of the major cloud providers offers a product that enables customers to connect to gain direct access to their hosted services and virtual private cloud environments, with this link-up often made via carrier-neutral data centers. Some of these offerings include options for those that need private access for compliance or regulatory reasons.

Carrier Ethernet helps to facilitate a smooth end-to-end experience for customers taking advantage of hybrid cloud services, whereby they maintain a private environment in their own data center but also leverage functions in the public cloud.

If needed, the technology can also be used to provide high availability and resilient access for critical workloads by enabling the establishment of multiple connections from multiple data centers.

Maximizing Carrier Ethernet

To maximize the effectiveness of Carrier Ethernet, it is important to work with network engineers to set out the needs and requirements for services from the start. This includes working out what a particular application is required to do and then ensuring the organization has the necessary protocols in place to support this use. For example, whether the protocols provide full or partial transparency, with certain types of Ethernet traffic filtered.

Another factor to consider is whether certain applications need jumbo frames with higher payloads than the standard maximum transmission unit (MTU) of 1,500 bytes. In addition, it is advisable to work with building management to understand the process for extending telco circuits from the main point of entry into a building, and consider whether the carrier providing the service has “on-net” or “off-net” equipment or facilities.

On-net means the provider has such equipment on-site, usually meaning it can deliver services faster, whereas offnet means the carrier may have to supply equipment at the organization’s location or contract an on-net provider to provide last-mile access.

Fully considering all these factors can help get the best out of a Carrier Ethernet service, giving it the right ingredients for success.

We have two key types of Carrier Ethernet offering, known as **VLink** and **Global Virtual Link.**

Carrier Ethernet can help facilitate a **smooth end-to-end experience** for customers taking advantage of hybrid cloud services.

Real-life service

As an example of real-life Carrier Ethernet services, we provide a simple, transparent offering that gives users a virtual Ethernet cross-connect. Using Layer 2 virtual private network (VPN) pseudowire technology, it combines the flexibility and scalability of Layer 3 technology with the dedicated traffic paths and management capabilities of our Multi-Protocol Label Switching.

Harnessing our global IP network, the services take advantage of prioritized buffering for traffic and built-in redundancy, ensuring that those packets are given priority over IP traffic and the circuit automatically reroutes along a secondary path if the site is down for maintenance.

The Carrier Ethernet services provide specific SLAs for latency, packet loss and jitter, and support for GE and 10GE interfaces. They also include flexible usage billing and options for bursting in the event of needing more bandwidth, ensuring that customers pay only for traffic that they actually require. Access lines and dark fiber can be used to extend services to facilities where we do not have a presence, such as data centers or client offices.

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VLink provides virtual circuits within a region, allowing point-to-point connections between locations inside Asia, Europe or the Americas. The service is available at every PoP and node in our global network, using the company’s presence in multiple data centers around the world. Leased lines and circuits, as well as dark fiber, can be employed to extend services to locations where we do not have a presence.

VLink itself has several iterations of services, known as VLink Direct, Plus and Mesh. The simplest of these, Direct, provides a simple point-to-point connection between two locations.

The Plus option offers point-tomultipoint architecture via a “hub and spoke” configuration, connecting a primary hub location to two or more remote locations across our global IP backbone. The third option, Mesh, comprises multipoint-to-multipoint architecture, offering customers a path to interconnect three or more locations across the network.

Global Virtual Link, meanwhile, uses the same technology as VLink, but differs in providing virtual point-to-point circuits between regions. This means the circuits can be built, for instance, between Asia and Europe or Europe and the US.

Our service allows a secure flow of information between locations via a private path across the company’s network, as well as seamless connection around the clock.

Planning ahead

Apart from such benefits, it helps to plan to make the most of Carrier Ethernet. In addition to ensuring the protocols used by the organization will work effectively with such services, it pays to recognize that carriers have different ways of deploying services, so talking to them can help find ways to achieve specific required goals.

An idea of the types of service level agreements needed is also key, as well as knowledge of what the organization's equipment will support and the length of time for installation at off-net locations.

Having a good sense of the anticipated traffic level over the contract term can help secure a better price, while understanding the limitations of media types will ensure the best choice of equipment to achieve the right distance for any cross-connects. And when estimating how long installation of Carrier Ethernet will take, it is important to factor in that installs to certain locations such as off-net ones can take longer than expected.

When determining how to interconnect with a cloud provider, it is advisable to follow the cloud providers' recommendations for high availability to protect against outages.

Last but certainly not least, whatever the transport type, it is crucial to encrypt data that should be encrypted, given that Ethernet has no built-in security.

Taking these steps will help to maximize the significant opportunities that Carrier Ethernet promises for an organization..

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