

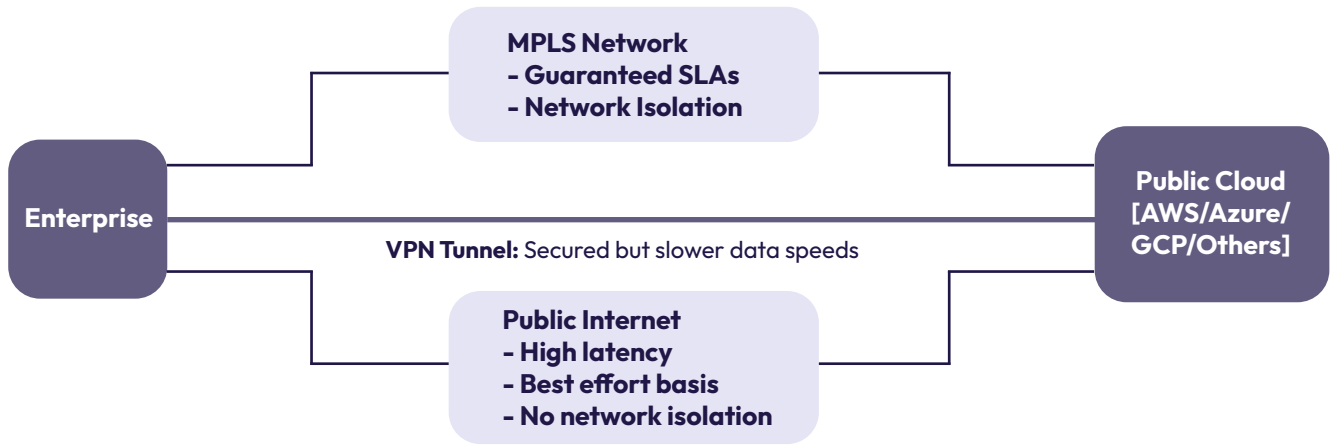


# Secured Enterprise Network Connectivity to Public Clouds - A Network-as-a-Service Model

The topmost concerns for Enterprises today regarding sending their data over networks are:

1. Guaranteed network performance in terms of data latency
2. Prevention of unauthorized access to data on the network

Addressing the above issues is many times mandated by the law or driven by business needs where security and integrity of data are of utmost importance. For instance, banking or financial institutions are mandated to protect their customer data, backup transactions, and possibly detect anomalous behavior in real time. For these reasons, the public Internet is not ideal for Enterprises for network connectivity. They sign up for premium network services such as Multipath Label Switching (MPLS) that interconnects branch offices and data centers of the Enterprises. MPLS is a private network service offered by Telcos to provide secured network connectivity with committed SLAs. Over the last decade, we have witnessed an exponential adoption of public cloud platforms to host compute workloads and store data instead of hosting on-prem hardware infrastructure. Enterprises have also joined this bandwagon, relieving them of managing and procuring on-prem IT infrastructure. Their mission-critical compute workloads and sensitive data have now started residing on cloud platforms such as AWS, Azure, and GCP. Certainly, these resources on the public cloud need to be secured without exposure to the public Internet that provides only best-effort services with no guaranteed SLAs.

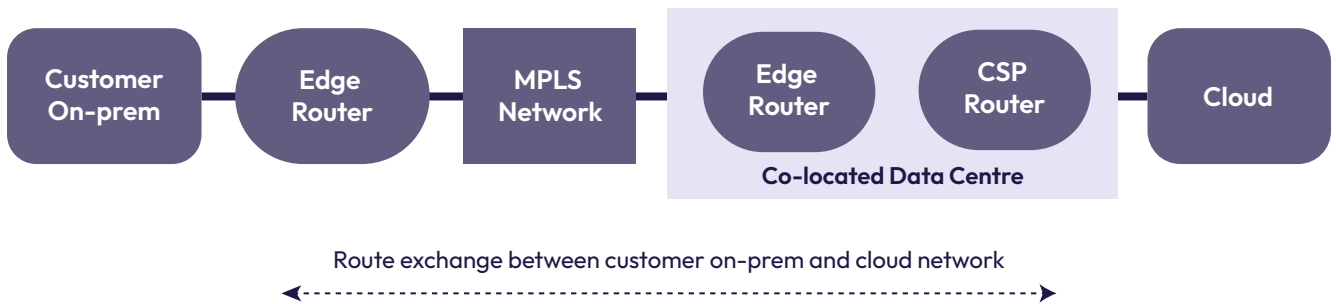


**Figure 1:** Network connectivity options to public clouds

While the public Internet can be used to communicate to the cloud using secured VPN tunnels, data transfer speeds are lower than the usual demands of Enterprises, and, for certain cases, sending data over the public Internet is simply unacceptable. MPLS networks provide Layer 2 speeds over Layer 3 networks along with network isolation. This service is extended to securely and reliably connect Enterprises to public Cloud Service Providers (CSPs).

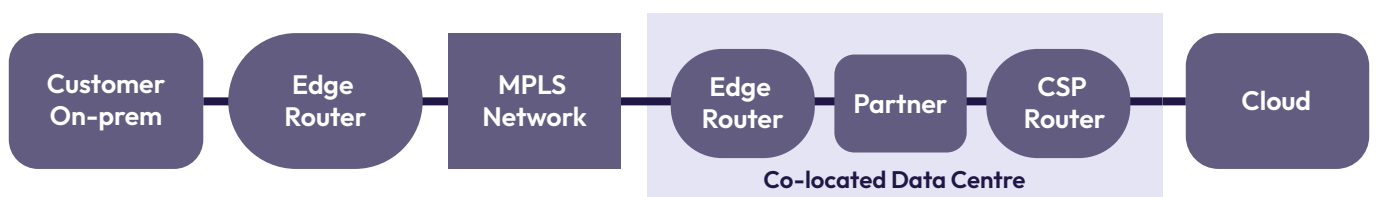
## How it works

Private network connectivity to the cloud is enabled through co-located data centers where a direct network link between the CSP and the Telco MPLS network is established. These 'Co-lo' data centers are present in different cities across the world, and enable private network access to the cloud across one or more regions. Information on such data centers is available at [peeringdb.com](http://peeringdb.com) website. Routes between the customer's on-prem network and cloud network are exchanged between the Telco router and the CSP router



**Figure 2:** Connecting Telco Private Network to CSP Network through co-located data center

If direct private network connectivity to the cloud is not possible, Telcos can opt to connect through partners that have private network access to cloud providers.



**Figure 3:** Connecting Telco Private Network to CSP Network through partner

# Services accessed through Secured Enterprise Network Connectivity

Enterprises require private network connectivity to the cloud to access two kinds of services:

**1. Public Services:** These services are made publicly available by CSPs. AWS S3, Google Workspace, and AWS Dynamo DB are a few examples. They are accessible through a public URL or public IP address. Enterprises that extensively use such services would prefer to access them through a private network without exposing their data over public networks.

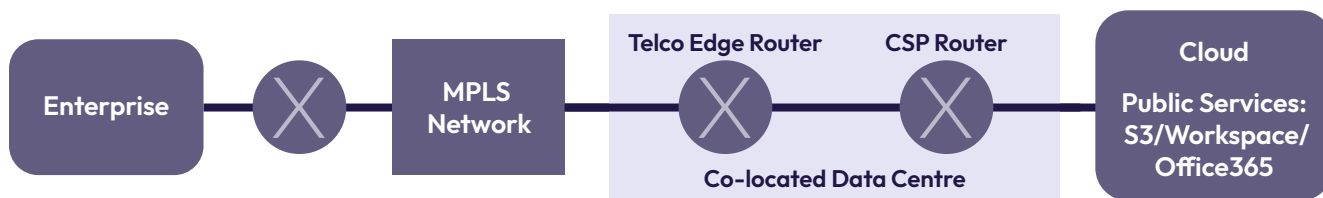


Figure 4: Accessing public services hosted by CSP

**2. Private Services:** Extension of On-prem Networks in Cloud: In this case, the cloud is an extension of on-prem networks that use private IP addresses. Enterprise services on the cloud use private IP addresses and Telcos facilitate the routing of data between on-prem and cloud networks. These services are not accessible to external networks.

## Secured Multi-cloud Network Connectivity – Need of the future

Enterprises are adopting a multi-cloud strategy by hosting their applications and data across different CSPs. The reasons for this strategy could be multiple, some of which are mentioned below:

- Remain unrestricted to a single CSP and leverage the strengths and capabilities of each CSP.
- Deploy microservices across CSPs communicating with each other with APIs.
- Load balance service requests across different CSPs.
- Back up data from one CSP to another.
- Enable high availability or disaster recovery by switching across CSP regions or CSPs.

Enterprises would prefer to keep cloud network traffic over secured private networks while accessing services across different CSPs. For these reasons, they would need a seamless network across CSPs that can be secured centrally without getting into specifics of each CSP’s networking aspects. With the help of 3rd-party distributed cloud systems, Telcos can realize secured multi-cloud networking for Enterprises.

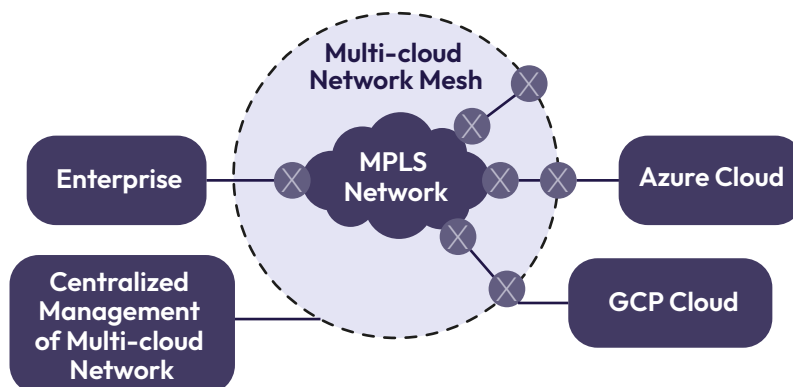


Figure 5: Secured Multi-cloud Network Connectivity

# Network-as-a-Service Business Model

This section describes business models that Telcos leverage for offering network connectivity to cloud service to Enterprise customers.

- 1. Bandwidth-based Model:** Customers are offered guaranteed bandwidth to the cloud by allocating a network port with a specific bandwidth. This model is beneficial when a customer consistently sends large streams of data to the cloud and has specific bandwidth requirements.
- 2. Consumption-based Model:** In this model, Telcos offer a range of data plans to customers to suit their requirements. These plans range from non-committed usage (pay per GB) to multiple tiers of committed usage (typically in increments of terabytes). Pricing per GB of data transfer reduces as the customer moves towards higher committed data plans. Consumption-based pricing model provides flexibility to the customer by enabling them to pay for what they use. Customers have the option to switch between data plans based on their needs. While this model provides the flexibility of data plans, it may not provide guaranteed network speeds to the cloud network and offers the best-effort service to customers. This is because the network bandwidth to the cloud is shared across customers.

MPLS network services are charged separately by Telcos to their customers. In addition, customers can be charged by CSPs for the usage of their network resources.

## Brillio Expertise

Brillio is a digital transformation product engineering organization backed by an institutional investor, Bain Capital. The company has a unique blend of developing software systems for enterprise network connectivity to the cloud and driving its business aspects. Having close-knit partnerships with tier-1 carriers, Brillio has successfully enabled them in offering network services to Enterprises. Brillio offers the following Network-as-a-Service expertise:

Engineering Expertise	Business Expertise
<ul style="list-style-type: none"><li>• Software systems for ordering and provisioning of Enterprise network connectivity services to the cloud.</li><li>• Billing systems for subscription-based network services.</li><li>• UX interfaces for monitoring and managing network connectivity to cloud.</li><li>• Network debugging systems manage routing between carrier and Cloud provider networks.</li></ul>	<ul style="list-style-type: none"><li>• Enable GTM activities for Network-as-a-Service (NaaS) offering. Apply market insights in providing network connectivity services to cloud in specific regions and geographies.</li><li>• Create a pricing strategy for a usage-based network services model</li><li>• Product ownership of NaaS software systems by defining product roadmap and strategy.</li><li>• Interface with Telco customers needing secured network connectivity to the cloud.</li></ul>

## ABOUT BRILLIO

At Brillio, our customers are at the heart of everything we do. We were founded on the philosophy that to be great at something, you need to be unreasonably focused. That's why we are relentless about delivering the technology-enabled solutions our customers need to thrive in today's digital economy. Simply put, we help our customers accelerate what matters to their business by leveraging our expertise in agile engineering to bring human-centric products to market at warp speed. Born in the digital age, we embrace the four superpowers of technology, enabling our customers to not only improve their current performance but to rethink their business in entirely new ways. Headquartered in Silicon Valley, Brillio has exceptional employees worldwide and is trusted by hundreds of Fortune 2000 organizations across the globe.



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