

Igniting the 100G to 400G Service Evolution

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With the introduction of 4G and the smartphone, the popularity of the mobile Internet has grown exponentially. The demand for bandwidth has been spurred by applications such as video streaming, video calls, real-time mapping, and cloud computing and storage. Data consumption has not only increased for everyday consumers but also on a grand corporate scale, affecting the financial sector, government entities, healthcare and numerous other industries. This growth is also spurred by advancements such as Artificial Intelligence (AI) and other infant technologies.



This need for more bandwidth is driving a requirement for reliable high-capacity, high-performance scalable networks to move towards 400G services—providing rapid optical backbone network support for all 10G and 100G customer service scenarios on a carrier's network.

What is behind this evolution to 400G services? There are three primary areas of demand causing service providers, data centers and wireless carriers to move toward 400G services over their networks:

1. Increasing demand for network reliability and scalability
2. Wireless carriers' need for 1G to 10G macrocell connections
3. Interconnection of multiple pipe networks to support capacities over 100G

Rapid 400G optical network support allows carriers to respond seamlessly to bursts of high traffic and mobile video streaming while also supporting the day-to-day bandwidth demands of the vibrant business enterprise. The 400G evolution promises to alleviate stress on backbone infrastructure systems to provide ample headroom for sudden spikes during peak operation.



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A 400G service to support 100G customer circuits

The wireline-to-wireless evolution is driving changes to network upgrades and how infrastructure is

designed to be scalable and reliable, especially in regard to improving existing infrastructure. While carriers work to meet consumer demand for high-speed connectivity, transport providers and fiber network owners are engaged in infrastructure upgrades to support this evolution. Customers looking for 100G circuits need to know if their service provider has enough backbone capacity to support that level of service. Service providers must utilize a 400G channel to provide reliable, affordable 100G services. The move from 100G to 400G services is a matter of densifying the capacity on a preexisting network to increase transport capacity while decreasing customer circuit cost.

As the functionality of wireless devices' connectivity increases—such as in the proliferation of hand-held, wearable, in-home and tablet devices—wireless providers are responding to this massive growth in bandwidth usage with the deployment of 5G and small cell technologies. Multiple macrocell and small cell towers can be found in the same geographic area, all to support the demand for bandwidth. As a result, many wireless carriers now design for 1G and 10G connectivity when they are looking to deploy towers. This demand drives network providers to evolve their backbone services to a more densified platform such as 400G.

As bandwidth needs at the macro level increase, networks will need to be capable of speeds beyond 100G. So long as Internet usage continues to grow at its current rate, service providers must remain one step ahead of the end user, so 100G for the end user necessitates 400G services on the provider network and so on. End users currently asking for 100G service are already becoming increasingly common, and providers must be prepared to have more than 100G of capacity in their network backbone to deliver robust connectivity if they are to remain competitive.

There can be no doubt that ISPs and backbone providers are scaling up for this surge in speed and capacity demand. One interim solution that data centers employ to attract customers is the connectivity partnership. This mutually beneficial relationship enables partners to balance workloads and manage bursts on the backend while providing seamless network delivery to customers on the front.

The benefits of partnerships

The first step is for carriers and wireless providers to support 10G, then aggregate with a partner to move to 100G and 400G. Note that while very few carriers are deploying 100G customer circuits, some smaller data centers are doing so. Smaller data centers are more flexible and can more easily grow and accommodate as customers grow, managing their network within a smaller user base inside their facility. When searching for a suitable data center, it is imperative to understand the technology, scalability and flexibility of the transport providers serving that data center.

In a collective network scenario, users would concentrate their IT resources in data centers. When that happens, it's generally for extensive bandwidth requirements. Some customers are using this capacity to reach their company data center operation across its network. Data that is remotely stored must be secure but also easily retrievable, whether for day-to-day usage or in the event of disaster recovery. A high-bandwidth connection ensures reliable data access between data center and user.

Moving into the modern age, many industries are becoming increasingly technology-reliant. For example, the financial sector is increasingly moving away from the tangible reality of physical currency to the digital realm of online bill pay, e-commerce and electronic recordkeeping. Digital transaction and digital transaction management (DTM) are moving closer to the mainstream. By removing the friction of physical efforts (for instance, sending documents via the postal service), organizations are making significant cuts in their operating expenses and redirecting financial resources to virtual processes that are faster, easier and more secure.

Security and the protection of financial transactions is increasingly reliant on a state-of-the-art network for support. In addition, as government agencies move to provide more services via the Internet and better data exchange for emergency responders, their data needs will continue to grow. As the healthcare industry's needs for high-resolution imaging and telemedicine applications for diagnostics and treatment continues to improve, network providers will need to grow their ability

to deliver high-capacity bandwidth networks to potentially help save lives. Additional big drivers of large bandwidth (100G now and 400G very soon) are online movie subscription services like Hulu, Amazon and Netflix.

In the realm of advanced technology, AI applications will require lower network latency. High-performance voice and video technologies will follow this trend. The introduction of quantum computers will move bandwidth budgets into the terabit range. All of these budding technology enrichments will need this necessary step for 400G service development.

The 400G paradigm may seem like an exclusive, cutting-edge development, yet it will provide a very practical, day-to-day benefit to many different ordinary users. Dynamic workload flexibility, faster virtualization, the dependence on in-home wireless devices, mainstreaming of hyperscalers and development in the speeds of Ethernet will all become possible through a 400G service. When considering where society is going technologically over the next ten years, business leaders can understand the importance of the evolution from 100G services to 400G services and beyond.

Interested in 400G? Make a plan.

The move to a more resilient, scalable 400G service solution is still in its earliest stages. The good news is that technology manufacturers are getting ready to roll out 10TB routers with 100G interfaces and other needed equipment to handle the build-out. Some providers are offering these higher speeds in rural markets so that they can get the bandwidth they require for their customers, as well as concentrating IT resources in private data centers and connecting them across their respective geographical regions.

If you see the demand for your data exponentially growing, look at 2019 as the time to future-proof your bandwidth needs.