



[www.pipelinepub.com](http://www.pipelinepub.com)

Volume 18, Issue 8

## Transforming the Digital Economy at the Edge

By: [Loren Long](#)

If there was any doubt regarding the significant role high-speed broadband plays in America's digital landscape, it was eradicated in November 2021 with the passing of the Bipartisan Infrastructure Deal. When President Biden signed a \$1 trillion infrastructure bill, which set aside \$65 million for broadband and the digital infrastructure that supports it, he solidified what those in the connectivity world have understood for years—that digital transformation is driving a business evolution uplifting local communities and shifting economic paradigms.



Though much of the digital transformation in recent years is attributed to the pandemic, the move to remote work, online education, and telehealth merely expedited the shift, putting a spotlight on the ways the digital economy and broadband have changed how we live and work. The fact is that the digital economy boom was simmering long before COVID-19 brought it to an explosive boil.

Take Netflix for example—a company that today is synonymous with live media streaming. However, Netflix founders Reed Hastings and Marc Randolph probably had no idea the company would come to dominate the digital ecosystem. They essentially intended to replace video rental stores by providing the convenience of having DVDs mailed directly to customers. Netflix was meant as a disruptor to the video rental market. And disrupt it did.

Whether or not the pandemic had occurred, it was inevitable that digital infrastructure would become an integral part of our day-to-day lives as it has been in a state of flux since its inception.

### Evolution of digital infrastructure

The digital infrastructure ecosystem focuses on ensuring increasingly faster delivery of infrastructure hardware, software, and technological resources and processes to support the

continuous development of digital services and experiences. A key component of the ever-evolving digital infrastructure ecosystem is data centers. In the late 1980s, multi-tenant data centers, or colocation facilities, began to emerge. This marked the first big shift in digital infrastructure. The next substantial shift was the emergence of virtualization, which changed the game for everybody. Companies were grabbing huge applications and making them virtual, layering all the necessary software on the operating system, and then adding virtual applications to it.

Now, the industry is experiencing a shift from traditional virtual machines to abstraction, microservices, and containers. Portions of applications are running in smaller, more defined, purpose-built pieces of software. The distribution of these software pieces is facilitating the rapid inception of Web 3.0 and Internet decentralization.

And with containerization and microservices, the real-time, build-on-demand operating model exists across the board, from public and private cloud to application development. The demand for “composable” infrastructure is driving the market. In addition, software-defined network fabrics are making networking simpler.

## The digital divide

Today, people interact with technology in real time thanks to better-than-ever Internet connectivity. It spurs agribusiness operations, expedites media and gaming content, empowers the evolution of education and healthcare, and generates entrepreneurial ventures. The way telecommunications networks have provided a connection to customers has remained generally unchanged for decades. While the Internet has grown and demand for content has escalated, we still see that most content resides in a few major markets; digital transformation drives innovation and expands growth opportunities. But these innovations, combined with other technological evolutions such as rapidly increasing streaming, two-way video services, 5G and the future promise of IoT, continue to drive up bandwidth needs and put pressure on latency in growing markets across the country. While demand for bandwidth has skyrocketed, most content resides in Tier 1 markets, often referred to as the “NFL cities.”

Anyone outside those immediate areas depends on a series of hand-offs from the big carriers to smaller carriers and ultimately to the end-user. This is a major cause of the digital divide, because it adds costs and reduces performance. Considering the newer, emerging applications and technologies, this model simply isn’t viable. It’s like trying to drink a milkshake through a six-foot straw. The answer isn’t to get a bigger straw, it’s

to bring the milkshake closer. Some digital content providers are doing just that, and in doing so, they are enabling local carriers to invest in their networks—gaining access to Internet exchange points, through local peering. This exchange of data from one network to another provides a valuable solution for anyone in the IX ecosystem. It is revamping the centralized model for the Internet, enabling it to work optimally despite heavy traffic by allowing network carriers, operators, and ISPs to exchange data quickly and frequently. Much like Netflix was a disruptor to the video rental market, these innovative digital content providers are disrupting the interconnection community and industries.

## Leveling the playing field

Not long ago, only a handful of carrier hotels existed, but for the most part, enterprises were building their own in-house data centers at headquarters or on a company's campus. Multi-tenant data storage facilities were mostly confined to the basements of telecom providers. As content providers began to see the benefits of carrier-neutral data centers, these facilities—also known as network-neutral data centers or carrier hotels—gained momentum.

Carrier-neutral data centers operate independently of any providers and allow interconnection between many colocation and interconnection providers. The ability to connect with multiple carriers enables redundancy, optimal uptime, and cost efficiency. Because of these benefits, it wasn't long before at least one carrier hotel could be found in every major city across the country. While this was excellent for Tier 1 markets, Tier 2 and Tier 3 markets were at a disadvantage.

Enter distributed edge colocation data center points. Carrier-neutral edge colocation data centers keep data at the edge, where it is produced and used. This interconnection creates network ecosystem aggregation opportunities between carriers, content, and applications. Moreover, interconnection improves data delivery and allows adjacent, rural, developing, and underserved markets to leverage Tier 1 market advantages.

## It's all about placement

When networks exchange their data with one another locally, the data does not need to take long routes to the next point where, by chance, both networks—or the transit providers of the respective networks—are located in the same data center and have a direct fiber-optic interconnection. In this way, the participants save on transit costs, can use one single connection to peer with hundreds of networks rather than needing hundreds of single connections, and the data packets reach their destination much more quickly.

IXPs like Bridge IX that enable content delivery networks, Internet service providers, enterprises, and hyperscale cloud providers to interconnect or “peer” directly with each other offer direct access to the networks they need with improved network performance, increased resiliency, and reduced connectivity costs. In addition, they extend the network presence of all involved, allowing direct connections into underserved or untapped markets.

Today, local networks are strained to deliver low latency connectivity in smaller markets, as they rely on backhaul connections to core content. Most organizations are aware that the cloud enables digital transformation through benefits like efficiency, scalability, cost-effectiveness, and agility, but it's less well-known that partnering with a cloud service provider could expedite their journey toward digital transformation.

Enabling customers to peer locally means they can directly connect to each other, as well as carriers and content providers, instead of relying on third-party networks to carry traffic across the Internet, which is an expensive process that puts smaller carriers and markets at a disadvantage. There's no question that growth at the edge offers tremendous opportunity for

end users and providers alike. Digital transformation at the network's community level significantly reduces transit costs for telecom carriers, which boosts competition and drives down the cost of broadband.

The coming years will bring an even greater demand for a more connected and intelligent digital infrastructure. To achieve this, content delivery networks, cloud providers, and network service operators need to invest today in tomorrow's distributed digital infrastructure. Doing so will facilitate more services in more locations while building a better digital future and bridging the digital divide.