

Delivering a secure, compelling user experience with edge compute



At the heart and soul of many business models is the customer experience

Within the modern world, that customer experience is often delivered via some type of interaction with digital content. We see this especially in the media and entertainment industry, but any enterprise that provides rich content faces the same issues. Whether it's delivering streamed entertainment to a mobile device, delivering an interactive webinar to someone's desktop, broadcasting an online exercise class, or providing a rich, online viewing experience in people's living rooms, enterprises need to think about the entire system from the cloud to the end user. What architecture most efficiently delivers their content as well as structures their business to drive revenue and customer satisfaction?

Challenges: Reduce latency, ensure content and application performance

Hybrid clouds, mixed compute and storage environments composed of public and private clouds, have become the key mechanism for management, storage and security for digital content. This migration solved many issues, but potentially introduces new challenges.

While cloud data centers (the huge facilities providing compute and storage) are able to store massive amounts of data, their physical locations can introduce limitations to content delivery through sheer distance traveled. Network topology can also create a form of architectural distance. Latency also occurs with each network step when serving content from one location to another, even if the backbone is fiber. The last-mile network might be basic broadband. Latency accumulates with every hop in the network between the cloud and the user. This cumulative latency

negatively impacts the real-time user experience. Relying solely on the cloud also introduces potential cost issues in constantly shipping large amounts of data from the edge to the cloud and back again.

High bandwidth alone will not solve latency or network cost issues. By moving some of the processing power and business logic out of the cloud and closer to the edge and the customer, enterprises can reduce latency and lower costs.

Solution: Edge computing drives a high-quality, low-latency user experience

Lumen works with major cloud providers to put their data centers on Lumen fiber optic networks. With edge computing, Lumen can replicate many cloud capabilities at the edge.

Because of Lumen's relationships with major cloud providers, these edge sites can provide Persistent Data Storage at the edge. This can effectively replicate a cloud database to drive the user experience with resources situated much closer to the edge, while maintaining the ability to synchronize with the central database in the cloud. In many cases, Lumen can create API-level interfaces between edge and cloud-based resources. Additional tools can allow all the operational efficiencies of data collection, server orchestration, and monitoring of network health all at the edge.

These edge facilities can be configured in different ways, from Lumen servers that are dedicated to a single customer (sometimes called "bare metal" servers) to colocation facilities to fully managed

hosting services. Security applications such as DDoS protection can be deployed close to the edge. The edge computing sites can also act as "base camps" for data, staging data harvested about the business – user behavior, performance monitoring, etc. – for eventual processing for insights by analytic software. The analytics can run in the edge cloud or pass only the most important data on up to the cloud for further algorithmic processing, reducing the data load on the network.

Results: Satisfied users, robust business models

For interaction-intensive firms such as the media and entertainment industry, content can be replicated at the network edge, along with the applications that control and monetize the content stream, helping to improve performance and enhance security. These edge deployments are designed to reduce latency from hundreds of milliseconds to as little as 5 milliseconds in various regions around the world. It also allows global content providers to customize the user experience to meet specific regional or international needs. Data can be processed at the edge to reduce traffic on the WAN.

The database-driven applications that manage the business model are often separate from the content, but they are part of the overall experience. User authentication, content guides, ad serving for some content and other pieces of monetizing the user experience are all part of the experience itself. Persistent databases at the edge drive fast access and operational efficiency for the content business.

The combination of strategically placed data centers and deep peering relationships across the world enables Lumen to minimize latency, optimize user experience and enhance business models.

Visit Lumen today for more information or contact a Lumen Expert for consultation to get started.

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