

Enabling Latency-Sensitive Applications at the Edge Is No Longer Optional

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The quest for higher speeds and more extensive bandwidth, combined with the need for lower latency in industries requiring millisecond-fast responses such as healthcare and manufacturing, is one of the forces behind locating latency-sensitive applications at the edge.

Pushing compute closer to the user circumvents the distance, capacity constraints, multiple network hops, and centralized processing loads that negatively impact performance. Plus, non-cloud-native applications at the edge, currently handled by legacy technologies, are a resource and budget-drain.

This paper explores how US Signal can help latency-sensitive industries, and bandwidth-hungry technologies like AI, ML, and IoT, benefit from reduced latency and exploit the capabilities of edge computing for a myriad of users.

Faster, compliant, secure, and cost-effective technologies are the currency of better business outcomes in industries such as healthcare, manufacturing, and technologies, including artificial intelligence (AI), machine learning (ML), and Internet of Things (IoT). However, these efforts are undermined by latency and legacy issues that IT can't overcome by employing centralized models such as cloud computing and on-premises data centers.

Edge computing is made for budget-busting, bandwidth-hungry applications.

Legacy paradigms, centralized data centers, and core networks give rise to many challenges involving inadequate capacity, throughput slowdowns, and higher costs. Edge data centers can solve these issues by moving computing and data storage closer to the end user, resulting in increased capacity, lower latency, and reduced expenditures.

Re-engineering Latency-Prone Applications Falls Short

Network performance, low latency, and good ISP connections are crucial, especially for end users geographically distant from data centers. But recycling legacy solutions isn't meeting expectations, for a variety of reasons.

To make applications more latency-tolerant, DevOps could take a stab at a redesign. But, all too often, user experience suffers, and the expense is often not worth the effort. Building latency-sensitive applications in a hyperscale cloud comes with its own set of challenges.

It's possible to meet requirements for low latency and high bandwidth by pushing the infrastructure, applications, and other resources a lot closer to the source of the data. Yet, this option may not be realistic due to space, power, cooling, staffing, and connectivity constraints.

Although a multi-protocol label switching (MPLS) network architecture enables IT to manage capacity, prioritize different services, and prevent congestion, it was never designed as Software as a Service (SaaS). However,

it's often the right choice when deploying a new network or upgrading an existing one.

While once a technology stalwart, legacy wide-area network (WAN) architectures are often ill-equipped to accommodate today's connectivity demands. WAN infrastructures using legacy routers are limiting, and many hyperconverged infrastructure (HCI) solutions are not kind to the bottom line.

The Smart Money Is on Edge Computing

Edge computing is made for budget-busting, bandwidth-hungry applications. While AI, ML, and IoT steal the spotlight in most discussions, traditional enterprise applications such as Enterprise Resource Planning (ERP) and Electronic Health Records (EHR) and Customer Experience (CX) are rapidly moving from legacy architectures to the cloud, with the belief that this shift will alleviate latency and bandwidth issues.

For personalization efforts to be successful, marketers need to respond quickly enough to customer needs to provide the right information, offer, and incentive at the moment of decision.

In fact, ERP cloud implementations have become a common practice. But expectations wane as companies realize that cloud, in and of itself, is not always nirvana. ERP is big and bulky. It's well-known for having trouble balancing high-latency, heavy database computation tasks and low bandwidth.

Enter edge computing. Edge in conjunction with cloud ERP provides low latency, partial workload balancing, and the bandwidth that results in faster throughput (**Figure 1**).

Now, let's look at CX. Forrester Research data shows that 72% of businesses say improving customer experience is

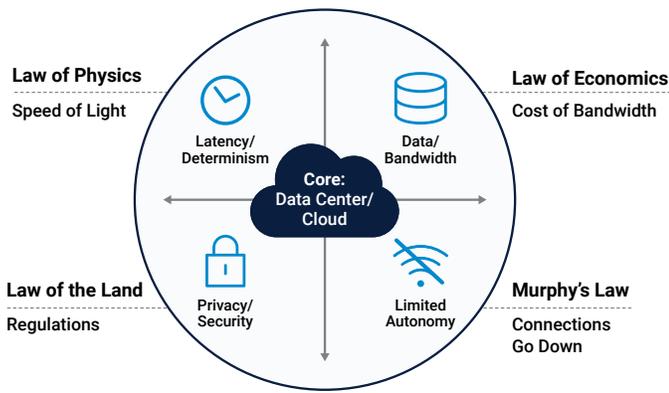


Figure 1: The four imperatives driving processing closer to the edge

their top priority. Here’s why: For personalization efforts to be successful, marketers need to respond quickly enough to customer needs to provide the right information, offer, and incentive at the moment of decision.

These are just a couple of examples of how moving applications to the edge have transformed those businesses forward-thinking enough to implement edge computing. As a result, the ability of apps to respond in real time has become a critical business driver and is putting pressure on CIOs to replace slow and complex technology with smarter (think AI) and more nimble solutions (edge + cloud) to get to customers faster.

Pine Rest Taps US Signal to Bring IT into the Electronic Era

The benefits of apps at the service edge are real. Consider Pine Rest Christian Mental Health Services, for instance. Pine Rest, one of the largest mental health organizations in the country, needed the assurance of downtime mitigation and mission-critical app availability to support continuous care delivery and reduce potential productivity losses. Ensuring patient services access in rural, underserved areas was another priority.

Pine Rest also needed help with the implementation and adoption of a new electronic health records (EHR) platform, a designed and customized IT infrastructure to host the EHR system, the ability to provide updates to its service portfolio to accommodate future telemedicine

services, and last but not least, to establish a disaster recovery plan.

THE US SIGNAL SOLUTION IS THE RIGHT PRESCRIPTION FOR A HEALTHY IT FUTURE

Reliable, cost-efficient bandwidth provided by US Signal enabled Pine Rest to eliminate some geographical barriers using telepsychiatry. Telepsychiatry provides real-time “virtual” therapy sessions using secure video chat technology.

US Signal’s multi-component, hybrid IT solution provided a robust, secure EHR infrastructure, availability of EHR, and other mission-critical applications in the event of a disaster. It also helped the organization prepare to launch a more advanced, IT-dependent care solution.

The implementation included US Signal’s HIPAA-compliant Hosted Private Cloud to house the EHR system, tailored to meet the EHR vendor design guidelines. Additionally, the combination of Disaster Recovery as a Service (DRaaS), network services, professional services, and managed security, were all customized to meet Pine Rest’s specific IT needs.

In a business where mere milliseconds can mean the difference between life and death, Pine Rest now boasts resilient connectivity to HQ and all locations, latency of < 30ms, and sub-15-minute Recovery Time Objectives (RTOs). Staff members now have faster access to critical data, disaster recovery, safe and secure data, and the ability to make decisions that improve patient health.

How US Signal Edge Solutions Feed the Rising Need for Speed

Pine Rest’s makeover is one that will be happening more and more. Gartner Inc. estimates that by 2025, 75% of data will be processed at the edge, outside of traditional, centralized data centers and the cloud, an increase from less than 10% today. This shift to the edge is driven by a need for a faster response time. The main benefit of edge computing is its ability to eliminate latency.

Applications that benefit most from edge computing, such as AI, ML, and IoT, are those where low latency and high throughput are critical, where network is bandwidth insufficient or unreliable, and when data security cannot be compromised as was the case for Pine Rest.

The speed and flexibility of edge computing are enabling businesses across nearly every industry to re-invent processes and drive digital transformation initiatives. Having a service edge data center as an intermediate between end users and other cloud resources provides a more reliable, consistent, performant experience, especially for companies banking on AI, ML, and IoT technologies.

With robust cloud and colocation options, and a wholly owned fiber network, US Signal is one of the few Midwest data center services providers that can deliver secure, dedicated network options and diverse IT environments while offering single-point-of-contact support.

Its network is strategically engineered to optimize edge computing and facilitate private WAN, one-hop connections to the Internet through Tier 1 upstream relationships, and direct connections to hyperscale cloud providers.

US Signal also offers fast, secure, always-on access to and between cloud providers, data centers, content distribution networks, sensors, endpoints, enterprises, employees, customers, and suppliers with 5ms to 10ms site-to-site latency to meet service-level agreements (SLAs) and ensure high availability.

Edge with Cloud Computing Offers the Best of Both Worlds

US Signal provides industry-leading data center technologies, cloud solutions, and managed services to help companies transform their IT operations and meet ever-changing technology and business needs. One of the most transformative of those technologies, as you've seen, is edge computing.

And, while cloud computing continues to play a significant role in modernizing infrastructure, moving increasingly large data sets back and forth between far-flung clouds creates latency issues and a barrier to fully adopting and leveraging data-intensive technologies.

The speed and flexibility of edge computing are enabling businesses across nearly every industry to re-invent processes and drive digital transformation initiatives.

Edge data centers complement the cloud by locating resources, intelligence, and processing closer to the data and users. Placing applications at the service edge exponentially reduces latency, increases availability, and facilitates the new era of apps at the edge.

By implementing edge with hosted cloud computing, US Signal is helping companies maximize the potential of both approaches by managing and maintaining these infrastructures, which in turn enables IT departments to get on with the business of adding revenue-generating value to the organization.

Get Started

If you're ready to start exploring what moving to the edge can do for your applications, be sure to download the US Signal eBook, "[Your Connection for Digital Transformation](#)," and learn how to facilitate your organization's digital transformation with the help of the US Signal network.