Whitepaper

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From Cloud-Native Applications to Composable Infrastructure: 5 New Realities at the Edge

For networks, the name of the game is accelerating connectivity for consumption. How can organizations make their deployments faster without blowing through budgets? Solving infrastructure challenges has always involved addressing gaps all the way from the network core to the edge, and modern applications have new demands that are forcing the industry to redefine the edge itself. What do providers need to know about next generation application enablement to ensure they are prepared for the hurdles that await them?

REDEFINING THE EDGE: WHAT ARE THE NEEDS?

The definition of "the edge" is also changing in terms of its implied performance. The connectivity timing at the edge is one such area. Applications requiring telemetry analysis like AI, machine learning, and gaming demand more real-time data than was previously handled at the edge. In these applications, data isn't just being consumed at the end of its route. It's being brought back to the core data center, processed, and then pushed back to either a sensor or end application to make a modification—and the expectation for this relay is that it happens in real time.

For instance, let's take the example of augmented glasses—a technology with major investment that is expected to develop a large market share in the coming years. When using this type of wearable tech, users will walk around a real-world environment while employing augmented reality. Users are looking, moving, and interacting, with the expectation that the digital aspects of their actions and decisions will keep up with them in real time. The connection speed required for the experience is monumental.

The next generation of technology will encourage end users to interact socially with peers at, say, a concert or sporting event in real time. In order for that to happen, a minimal latency in the supporting network is not only key, it is the most essential facet of the technology's usability. This speed expectation is something that simply didn't exist a few years ago.

Reliability requirements of edge applications are also shifting. The next generation of edge applications require extremely low recovery point objectives and recovery time objectives—often so low that they are near impossible to meet in many regions and will continue to become more demanding. For network business continuity and disaster recovery, acceptable downtime will soon be almost zero

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NEW EDGE REALITIES:

#1 DECENTRALIZATION

So, the idea of the edge isn't what it used to be. What do proponents of the new edge need to account for as they plan for the future? One chief characteristic is a decentralized network. In today's most common paradigm, edge applications connect back to a central node, centralizing data directly into large cloud storage solutions to be processed.

However, new demands on edge applications are causing a fracture. Countless new applications and devices requiring real-time responsiveness need higher network availability, faster data loads, and less restricted data transfer than streaming directly into the cloud can provide. The response is a shift toward distributing data across multiple nodes, which decreases dependency on any individual endpoint. Next-generation technology will eventually necessitate the bandwidth and transfer times afforded by a decentralized network setup.

#2 CLOUD-NATIVE APPLICATIONS

A large piece of the puzzle when preparing for the modern edge is planning for emerging technology to be completely cloud native. With cloud-native applications, everything is written cloud-first, with a development centered around application programming interfaces (APIs). With traditional legacy workloads, a dependency on the underlying operating system, hardware, storage, and backing services, means siloed, unpredictable digital infrastructure that can only be scaled manually.

Conversely, API-first programming provides workloads that are designed to scale automatically, in real time. The wave of cloud-native applications is coming, and the edge needs to be ready.

#3 HYBRID CLOUD

If edge applications of the future are going to thrive, they will depend on hybrid cloud. Applications need to be supported across environments in a way that is both consistent and flexible, and depending on on-prem cloud infrastructure to accomplish this task isn't realistic. With the ability to partition data between public and private clouds, organizations can benefit from the optimal solution for each workload that comes down the pipe. The future will bring a heightened importance for running workloads as close to the source as possible, and a hybrid cloud setup is the most efficient way to get there.

#4 CONTAINERIZATION

With cloud-native deployments across every application, organizations need to outfit themselves with the capacity for high-performance computing (HPC) at the edge, not just storage. Containerization is the platform that can enable this kind of performance. Virtualization was a game-changer for the industry, as de-coupling applications from underlying hardware let organizations focus on applications without concern about server configuration and the like. Containers are the next step for virtualization, where applications can now use virtualized operating systems and hardware.

By leveraging containers at the edge of a network, companies can progress from virtual machines to more defined pieces that run purpose-built functions—microservices. Instead of virtualizing entire pieces of hardware or software, the future of the edge will feature key components of the hardware or software existing as pre-built stacks on the edge, ready to be deployed on demand. With an existing repository of pre-containerized components, the effect is akin to assembling a car based on your needs instead of receiving a pre-assembled one from the factory. The body, wheels, engine, and transmission can be constructed elsewhere and added to the car as needed. It's a bolt-on solution to digital architecture. Since containers are so easy to deploy, the effect is a way to shift intelligence to the edge that speeds up response times at the same time as decentralizing services. For instance, load balancing and other formerly manual tasks can now be automated across geographies in an inherently scalable way.

A shift toward containerization and microservices represents a significant shift in the way the industry conducts business. Containers demonstrate a more application-centric, function-focused infrastructure where companies can now buy on demand. In this view, it is less a new technology piece than a new financial approach or operating model—a kind of consumerization of the cloud.

#5 COMPOSABLE INFRASTRUCTURE

As a companion to containerization, composable infrastructure represents a solution that accomplishes a similar effect but for applications running on bare metal. While virtualized infrastructure can handle a majority of applications, some workloads are still most beneficial on single host operations. Composable infrastructure gives an organization the capacity to carry compute, storage, and networking in pools of resources in either a public or private cloud. From there they can be provisioned through an API interface and deployed into bare metal server nodes. By combining composable infrastructure with containerization, organizations can take everything from traditional physical infrastructure serving a conventional colocation workload to globally distributed virtual workloads and deploy them on demand. The total abstraction of network functions from hardware ensures any workload is running from the best possible location. For instance, something like switch capacity can be deployed and destroyed in real time. In other words, the future of the edge will bring intelligence into the application layer in small pieces to present the data closest to where it is requested from.

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IN SEARCH OF SOLUTIONS

As edge strategies begin to shift under the industry's feet, organizations need to evolve their network infrastructure and software stacks in response. For organizations with large, established DevOps departments, these changes may be old news. Some companies have been writing code toward the public cloud for some time now and have already morphed their procedures to a new way of doing things.

For others with fewer resources, though, creating the right software development and moving it in the cloud presents a considerable challenge. There are a few common obstacles on the journey. One roadblock may be identifying gaps in infrastructure, finding the parts of distributed data management that may not be serving the company well as part of an end-to-end strategy. The difficulty here is addressing each component that affects quality across business units and end users. After this step, another barrier is to create a unified plan that covers data expansion, management, and protection. Once again, this may involve investigating various vendors, providers, and services—from cloud and colocation to software and telecom. It's apparent that the core components needed for modern application enablement must be brought together in new ways. The need for reliable, powerful connectivity necessitates a next-generation approach to internet infrastructure to serve business IT—one that combines tomorrow's distributed digital infrastructure with today's cloud and colocation solutions. The answer lies in redefining the edge, understanding its new realities, and equipping yourself with the best tactical approach.

At DartPoints, we've combined hybrid cloud and digital infrastructure with our Bridge IX and Liquid Edge offerings to deliver one unique edge computing platform called Digital Next. By weaving together cloud, interconnection, colocation and managed services into one solutions suite, we're enabling edge ecosystems for enterprises, carriers and cloud and content providers. Learn more about Digital Next here.

About DartPoints

DartPoints is a leading owner and operator of edge colocation data centers and internet exchange points (IXs) serving communities across the United States. DartPoints empowers enterprises, carriers, and cloud and content providers with interconnection, colocation, infrastructure-as-a-service, and managed services.

Our unique ecosystem creates a strategic and affordable way to enhance user experience, increase performance and extend network reach. DartPoints is helping to bridge the digital divide by transforming the way data traffic is managed, processed, and fulfilled within local markets. Visit us online at **www.dartpoints.com** and connect with us on social media.

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