

GigaOm Radar for Edge Platforms Market Radar

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GigaOm Radar for Edge Platforms

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1. Summary

Edge platforms leverage distributed infrastructure to deliver services, bringing content, computing, and security closer to end devices, offloading networks, and improving performance.

Edge platform vendors provide a multi-purpose environment that offers customers cloud-like services with minimal latency. This means that vendors have to manage many moving parts, such as compute, storage, web optimization, video streaming, and security, all at a global scale. These elements are brought together via orchestration, integration with DevOps tools, real-time configurations, interoperability through APIs, and support for CI/CD practices.

It is important to distinguish between different definitions of what could be called "the edge." Data from each end device can follow a different path before reaching the nearest point of presence. For example, a desktop may connect to a home router, a tablet to a wireless access point, and a mobile phone to a cell tower. These are the outermost layers of the networks' edges, and would pose the lowest possible latency. However, in practical terms, most edge platforms' points of presence will sit "behind" (upstream from) these access points, in the access layers, aggregation networks, or even beyond.

We've observed that in the wider technology industry, the term "edge" is used fairly loosely. In previous reports on edge infrastructure, GigaOm has defined "edge" as encompassing the technology stack that sits outside of cloud providers, on-premises data centers, and enterprise offices. Even within this definition of edge there are at least two major layers:

- Device Edge: The outermost components, including end-user devices and sensors, located in the "last mile" of the network. Look for future reports on mobile edge and IoT to cover this space.
- Infrastructure Edge: Typically sits in close proximity to the device edge but has characteristics of a traditionally hosted data center. Infrastructure edge represents a sweet spot for many edge applications and is the focus of this report.

There are additional layers within the infrastructure edge as well. Specifically, there are edge applications that run on edge platforms (the subject of this report), as shown in **Figure 1**. These platform systems are built on core systems (such as servers, operating systems, and hypervisors) that run on physical infrastructure (space, power, cooling, and connectivity).



Figure 1. Edge Applications Depend on Physical, Core, and Platform Systems

This report focuses on managed edge platforms. All vendors featured in the report must own multiple globally distributed points of presence from which they can provision their services.

Edge platform vendors typically come from one of the following four backgrounds:

- **Content Delivery Network (CDN):** Owning the distributed infrastructure for content delivery purposes positioned CDNs to enter the edge platform space easily. They comprise the majority of edge platform vendors in this report.
- **Cloud Service Provider:** In addition to their data center footprints, cloud service providers with a CDN offering will have additional smaller points of presence from which to deliver services.
- **Dedicated Edge:** Some players have identified the edge platform space as a future market and have built their networks quickly from the ground up, specifically to deliver these services.
- **Telecommunication Providers:** Typically large organizations with innate geographical reach and large investment funds, some telecom companies are using their in-house expertise and extensive networks to create an edge-focused product portfolio.

Each of the above has certain advantages and disadvantages defined by their operating model and existing business strategy. For example, we can expect CDN providers to have hundreds or thousands of PoPs, dedicated edge vendors to have purpose-built solutions, cloud providers to merge their very scalable solutions with a geographic reach, and telcos to own their whole infrastructure end-to-end.

This report will assess each vendor's capabilities against the same metrics regardless of background. However, we will highlight areas where the vendor's background may impact their edge platform offering.

HOW TO READ THIS REPORT

This GigaOm report is one of a series of documents that helps IT organizations assess competing solutions in the context of well-defined features and criteria. For a fuller understanding consider reviewing the following reports:

Key Criteria report: A detailed market sector analysis that assesses the impact that key product features and criteria have on top-line solution characteristics—such as scalability, performance, and TCO—that drive purchase decisions.

GigaOm Radar report: A forward-looking analysis that plots the relative value and progression of vendor solutions along multiple axes based on strategy and execution. The Radar report includes a breakdown of each vendor's offering in the sector.

Vendor Profile: An in-depth vendor analysis that builds on the framework developed in the Key Criteria and Radar reports to assess a company's engagement within a technology sector. This analysis includes forward-looking guidance around both strategy and product.

2. Market Categories and Deployment Types

For a better understanding of the market and vendor positioning (**Tables 1** and **2**), we assess how well edge platforms are positioned to serve specific geographic areas. Business decision makers interested in buying edge platforms must know whether their areas of interest are within a vendor's geographic reach. While this is always true, it is of paramount importance when working within strict latency requirements. We will be evaluating each vendor's geographic reach in the following areas:

- North America
- South America
- Europe
- Africa
- Middle East
- Far East
- Southeast Asia
- Oceania

We have described the different backgrounds edge platforms vendors may have. For every vendor, we will state which of the following deployment models applies:

- Content delivery network providers (CDN)
- Cloud service providers (Cloud)
- Communications service providers (Telco)
- Dedicated edge service providers (Edge)

Table 1. Vendor Positioning

	GEOGRAPHIC REGION									
	NORTH AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	FAR EAST	SOUTHEAST ASIA	OCEANIA		
Akamai	+++	+++	+++	+++	+++	+++	+++	+++		
Amazon CloudFront	+++	++	+++	++	++	+++	+++	+++		
CacheFly	+++	++	++	+	++	++	++	++		
CDNetworks	++	++	+++	++	+++	+++	+++	+		
Cloudflare	+++	++	+++	+++	+++	+++	+++	+++		
Fastly	+++	++	+++	+	+	++	+	+++		
Limelight	+++	++	+++	+	+++	+++	+++	+		
Lumen	+++	+++	+++	+++	++	++	++	+++		
StackPath	++	++	++	-		++	+	+		
Verizon Digital Media	+++	++	+++	+	+	+++	++	++		
Volterra.io	++	+	++	-		+	+	-		

Source: GigaOm 2020

+++ Strong focus and perfect fit of the solution ++ The solution is good in this area, but there is still room for improvement + The solution has limitations and a narrow set of use cases - Not applicable or absent.

MARKET SEGMENT CLOUD CDN EDGE Akamai ++ 4 - -- - - -Amazon CloudFront -++ CacheFly ++ 2 **CDN**etworks ++ --- -- -++ Cloudflare 4 2 Fastly ++ ++ 4 Limelight ++ Lumen ++ StackPath . . - -++ Verizon Digital Media ++ Volterra.io +++ Strong focus and perfect fit of the solution ++ The solution is good in this area, but there is still room for improvement Source: GigaOm 2020 + The solution has limitations and a narrow set of use cases - Not applicable or absent.

Table 2. Vendor Market Segmentation

Building on the findings from the GigaOm report, "Key Criteria for Evaluating Edge Platforms," **Table 3** summarizes how each vendor included in this research performs in the areas we consider differentiating and critical in this sector. The objective is to give the reader a snapshot of the technical capabilities of different solutions and define the perimeter of the market landscape.

Table 3. Key Criteria Comparison

1	KEY CRITERIA									
	EDGE COMPUTING	CONTENT DELIVERY	LIVE AND On-demand video	INFRASTRUCTURE Connectivity	ANALYTICS AND Diagnostics	ADVANCED SECURITY	SECURE ACCESS	DEVOPS AND Orchestration	STORAGE	
Akamai	+	+++	+++	+++	++	+++	+++	+++	++	
Amazon CloudFront	++	+++	++	+++	+++	+++	++	+++	+	
CacheFly	-	++	+++	++	+	+	++	++	++	
CDNetworks	++	++	++	+	++	++	+	++	++	
Cloudflare	++	+++	++	+++	++	++	+++	+++	++	
Fastly	++	+++	+++	++	+++	++	++	+++	+	
Limelight	+++	+++	+++	++	++	++	++	+++	++	
Lumen	+++	++	++	++++	+++	+++	+++	+++	+++	
StackPath	+++	++	+	++	++	++	++	+++	+++	
Verizon Digital Media	+++	++	+++	++	++	+++	•	+++	+	
Volterra.io	++	+	-	+++	+++	+++	++	+++	+	
Source: GigaOm 2020 +++ Strong focus and perfect fit of the solution ++ The solution is good in this area, but there is still room for improvement + The solution has limitations and a narrow set of use cases - Not applicable or absent.										

Table 4 compares each vendor in terms of the evaluation metrics considered in this report.

Table 4. Evaluation Metrics Comparison

	EVALUATION METRICS								
	EASE OF USE AND Mgmt services	GEOGRAPHIC SCALABILITY And Efficiency	PERFORMANCE	SOLUTION AND Partner ecosystem	RETURN ON Investment	ADAPTABILITY/ Flexibility	CLARITY OF Offerings		
Akamai	++	+++	++	+++	+++	++	+++		
Amazon CloudFront	+++	+++	++	+++	++	+++	++		
CacheFly	++	++	++	+	++	+	++		
CDNetworks	++	++	++	+	++	+	++		
Cloudflare	+++	+++	++	++	++	+++	+++		
Fastly	+++	++	++	+++	++	+++	+++		
Limelight	++	+++	+++	++	+++	+++	+++		
Lumen	++	++	+++	+++	++	+++	++		
StackPath	++++	++	++	++	++	+++	+++		
Verizon Digital Media	++	++	++	++	+++	+++	++		
Volterra.io	++++	++	++	++	++	++	+++		
Source: GigaOm 2020 +++ Strong focus and perfect fit of the solution ++ The solution is good in this area, but there is still room for improvement + The solution has limitations and a narrow set of use cases - Not applicable or absent.									

By combining the information provided in the tables above, the reader can develop a clear understanding of the technical solutions available in the market.

3. GigaOm Radar

This report synthesizes the analysis of key criteria and their impact on evaluation metrics to inform the GigaOm Radar graphic in **Figure 2**. The resulting chart is a forward-looking perspective on all the vendors in this report, based on their products' technical capabilities and feature sets.



Figure 2. GigaOm Radar for Edge Platforms

The GigaOm Radar plots vendor solutions across a series of concentric rings, with those set closer to center judged to be of higher overall value. The chart characterizes each vendor on two axes—Maturity versus Innovation and Feature Play versus Platform Play—while providing an arrow that projects each solution's evolution over the coming 12 to 18 months.

Considering that this report assesses edge platforms, it should not be a surprise that all included vendors are featured on the right-hand side of the radar graphic, in the platform play quadrants. There is differentiation among platforms, however, based on how comprehensive the platform is and how many use cases it is able to support. For example, AWS and Lumen are both very strong platform plays, in part due to their large portfolios of adjacent services. CDNetworks also ranks high on the platform play axis for its massive number of global PoPs. By contrast, some vendors offer more of a niche service, focusing on edge computing with fewer media delivery capabilities, or the inverse of that, with more focus on media delivery and less on edge computing. Examples of platforms leaning more

toward feature play are CacheFly and Volterra.

The other (vertical) axis of maturity and innovation shows a more even distribution. Up top you will find several stalwarts of the CDN space, including Akamai and Limelight, which each have a couple of decades of operation under their belt. Verizon and Lumen have also been active in this space for a long time, albeit under different names in the past (EdgeCast and Level3, respectively).

Down below we find the relative upstarts—companies that entered the fray in just the past decade or so, like Cloudflare (2009) and Fastly (2011), or even more recently, such as StackPath (2015). Volterra is the lone new entrant; having been founded in 2017, it is the youngest of the bunch.

Volterra's recent acquisition by F5 Networks contributed to us categorizing them as one of four outperformers on this radar—a high percentage that shows how young and fast-moving this whole edge platforms market really is. In fact, you'll note that nine out of 11 included vendors have been ranked as fast movers or better.

INSIDE THE GIGAOM RADAR

The GigaOm Radar weighs each vendor's execution, roadmap, and ability to innovate to plot solutions along two axes, each set as opposing pairs. On the Y axis, **Maturity** recognizes solution stability, strength of ecosystem, and a conservative stance, while **Innovation** highlights technical innovation and a more aggressive approach. On the X axis, **Feature Play** connotes a narrow focus on niche or cutting-edge functionality, while **Platform Play** displays a broader platform focus and commitment to a comprehensive feature set.

The closer to center a solution sits, the better its execution and value, with top performers occupying the inner Leaders circle. The centermost circle is almost always empty, reserved for highly mature and consolidated markets that lack space for further innovation.

The GigaOm Radar offers a forward-looking assessment, plotting the current and projected position of each solution over a 12- to 18-month window. Arrows indicate travel based on strategy and pace of innovation, with vendors designated as Forward Movers, Fast Movers, or Outperformers based on their rate of progression.

Note that the Radar excludes vendor market share as a metric. The focus is on forwardlooking analysis that emphasizes the value of innovation and differentiation over incumbent market position.

4. Vendor Insights

Akamai

A long-standing name in the CDN space, Akamai has developed its networks and services over 20 years. It currently has the largest fleet of distributed servers and covers the widest geographical area. Akamai's infrastructure and features enable its customers to achieve high-grade static and dynamic content delivery, as well as very good live and on-demand video streaming.

Akamai is also heavily focused on providing infrastructure and application security, as well as ensuring secure access to its own platform. The CDN provider is a noteworthy researcher in the cybersecurity space, where employees publish reports on new vulnerabilities and attacks. This not only establishes Akamai's authority in the space, but also ensures its customers' services are protected against the latest threats.

For edge computing, Akamai has developed EdgeWorkers, a serverless computing service that enables customers to run microservices at the edge. EdgeWorkers is designed to run lightweight code for CDN-enhancing functions, such as geolocation, URL decoding, and enhanced routing. However, compared to other vendors featured in this report, Akamai's edge computing capabilities are more restrictive. Still, EdgeWorkers makes the platform more DevOps friendly, one of the criteria on which the vendor rates highly.

Akamai's Direct Connect solution and preexisting connectivity with hyperscalers offers users improved security, redundancy, and reliability. Overall, Akamai's edge platform is comprehensive, and future developments in the edge computing space will secure the company's position as a leader within the space.

Strengths: Akamai ranks high across a variety of metrics, including content delivery, video streaming, advanced security and direct infrastructure connectivity. The vendor has the widest geographic reach and the largest number of points of presence.

Challenges: Customers interested in running more intensive applications at the edge may not be able to do so with Akamai's current edge computing product.

Amazon CloudFront

Amazon's CDN product, CloudFront, brings content, security, and serverless computing close to users across the world. As CloudFront is part of the wider AWS portfolio, it is deeply integrated with the rest of the product suite. This places CloudFront in a unique position within the edge platforms space.

CloudFront has very strong capabilities for web optimization and static and dynamic content delivery while maintaining a very high level of security. Inheriting the strict practices of AWS' security standards,

CloudFront has multiple compliance accreditations and strong network and service security infrastructure.

Lambda@Edge is CloudFront's compute product, which enables customers to deploy microservices at the edge of the network to improve CDN performance, dynamic content generation, and security. Through the wider AWS portfolio, users can also employ the very strong elastic compute products for larger workloads while benefiting from private backbone and network infrastructure.

It's worth keeping in mind that CloudFront achieves the complete set of criteria and metrics laid out in this edge platforms report by leveraging a range of products from AWS' full portfolio. This has two implications:

- Existing AWS customers can deploy a powerful edge solution for content delivery, media delivery, security, and compute without partnering with another vendor. Current users will already be familiar with the AWS environment and the deep integration should ensure easy deployment and smooth interoperation between products.
- For full edge platform capabilities, CloudFront needs to leverage products such as Elemental Media Services, S3 buckets, Elastic Containers, CloudWatch, CloudTrail, Shield, and CloudFormation.
 Potential CloudFront buyers who do not already have AWS services may have to create complex environments that require time and expertise to be set up, and they could end up with large, complicated bills. Latency could also be at risk for cloud- (rather than edge-) delivered compute services.

It should be noted that while this report focuses specifically on Amazon CloudFront, AWS also offers several complementary edge-related services, such as Local Zones, Outposts, and Wavelength. These services have been or will be covered in other GigaOm reports.

Strengths: Amazon CloudFront is a comprehensive CDN solution with serverless capabilities and is deeply integrated with other AWS products. AWS' portfolio product has innate security policies and procedures, which makes it a safe environment for running sensitive workloads.

Challenges: To achieve full edge platform status as we've defined it here, Amazon CloudFront relies on a range of AWS products, which may affect pricing, complexity, and latency, particularly for an enterprise that is not already an AWS client.

CacheFly

CacheFly's CDN network helps distribute content around the world, as the vendor has points of presence across every continent. The standout feature in CacheFly's repertoire is its video streaming capabilities, which enable sub-second live video, support 4K and 8K streaming resolutions, and offer additional features through its Advanced Playback technology.

CacheFly also offers a Storage Optimization System that optimizes download speeds by ensuring a 100% cache hit ratio for customers using cloud storage providers such as AWS S3, Azure Storage, or Google Cloud Storage. CacheFly is also able to provide traditional storage, S3-compatible object storage, or resold Wasabi, all of which can be used as an origin for caching and delivery.

In contrast to most other players in this report, CacheFly shows limited capabilities in two main areas—edge computing and advanced security. The vendor does not currently offer edge computing services, and these services are not a part of its short-term strategy. However, the CDN provider has the unique opportunity to collaborate with its sister company, Servercentral, to tap into a globally distributed data center infrastructure and to implement computing services in its CDN offering to create a true edge platform.

For security, CacheFly does not offer advanced security options such as DNS filtering and protection, URL tokenization, or geo-blocking. However, through its partnership with Kasada, the company implements strong bot mitigation capabilities. Similarly, from a secure access perspective, CacheFly offers encryption services but has not yet implemented practices such as ZTNA, or technologies such as cloud access security brokers, or secure web gateways.

Strengths: CacheFly has very strong video streaming capabilities. This is due to its implementation of websockets, which achieves sub-second live video streaming. It can also convert live videos to VOD and offer out-of-the-box video players.

Challenges: The vendor does not currently offer edge computing, which makes it less competitive than other edge platforms featured in this report. Also CacheFly can develop its security and secure access services further.

CDNetworks

Based in Seoul, South Korea, CDNetworks has extensive global coverage, with a very high density of points of presence in East and Southeast Asia. While its number of PoPs totals 1,500 for the media delivery solution, its self-service CDN360 platform—which offers a DevOps-friendly configuration environment—currently stands at 55 points of presence that are distributed across the Far East, Europe, and North America.

CDNetworks also offers edge computing capabilities that focus on enduring instances, which entails bare metal, virtual machines, and containers. The vendor provides the standard CPU and storage services, as well as a standout GPU service that is not widely available from other vendors featured here. The GPU is particularly useful for complex processes such as graphics and video rendering, as well as for machine learning, simulation, and prediction processing.

CDNetworks has limitations impacting two major criteria—secure access controls and protocols and infrastructure connectivity. CDNetworks currently offers VPN and SSL authentication and plans to implement ZTNA policies in the future, but does not currently have features such as cloud access security brokers, secure web gateways, or user and entity behavior analytics.

In terms of infrastructure connectivity, CDNetworks currently does not have the option to connect to a customer's existing on-premises or cloud infrastructure. This may also be a limitation from a partner ecosystem point of view, as CDNetworks owns and operates its networks and hardware.

Strengths: CDNetworks has extensive coverage across Asia and maintains a good footprint in other large markets as well, such as North America and Europe. The vendor has good opportunities to further develop its edge computing and self-service CDN products to become a leader in the space.

Challenges: Compared to other vendors in the report, CDNetworks lacks a direct infrastructure connectivity product that would connect its extensive network into a customer's existing environment. Its secure access technology is also limited.

Cloudflare

Cloudflare has seen rapid success and growth since its inception in 2009 due to its well-performing CDN services. It fares very well across metrics such as static and dynamic content delivery, infrastructure connectivity, secure access, and DevOps and orchestration as well.

Cloudflare offers dynamic web acceleration through its Argo Smart Routing technology, which uses machine learning to analyze real-time network conditions and dynamically steer traffic across its network for the lowest end-to-end latency. Its serverless computing service, Workers, enables developers to deploy custom code and fully fledged applications. This is possible through Cloudflare's implementation of key-value and durable object storage features that enable applications such as chat rooms, real-time document editing, shopping carts, and social feeds.

Cloudflare Network Interconnect allows customers to connect to Cloudflare's network either directly through physical links to a customer's premises, or virtually through Layer 2 partners such as Equinix and Megaport. Through Cloudflare Network Interconnect, customers can create private connections between branches or data centers.

Another strong aspect of Cloudflare's offering is its secure access solution, with the vendor providing fully fleshed out ZTNA through secure web gateways, DNS security, browser isolation, and fully private networks.

While Cloudflare's shortcomings in this report are modest, it is worth noting that its cloud computing capabilities are currently solely serverless and do not include bare metal or containers.

Strengths: Cloudflare has an all-around strong edge platform offering, leading in terms of secure access, infrastructure connectivity, content delivery, and a robust serverless computing environment.

Challenges: Even though Cloudflare's offering is comprehensive, the vendor could expand its edge computing services to include bare metal, VMs, or containers, and add the additional storage capabilities that would be required to support them.

Fastly

Fastly has designed its offering around the concept of edge cloud, where it has built a platform that is programmable in real time and enables customers to move logic closer to their end users. Fastly's platform is complementary to private and public clouds, and the distributed infrastructure allows it to offer services, such as its CDN, edge computing, and security.

With its acquisition of Signal Sciences, Fastly inherited a robust security portfolio, including a next-gen WAF, API Security, RASP, Advanced Rate Limiting, and DDoS protection.

Fastly has a very good solution for live and on-demand video streaming that supports large user bases consuming video simultaneously. Its Media Shield product can sit behind one or more CDNs and act as an origin server, collapsing multiple identical incoming requests into one. Media Shield lowers the burden on existing infrastructure and yields cost savings as egress traffic is significantly reduced.

Fastly also ranks high for analytics and diagnostics, with the vendor offering observability across its delivery, security, and compute services. Fastly streams real-time logs from its network edge, providing near-instant visibility into traffic trends, potential problems, and security threats. These real-time streams can then be forwarded to multiple third-party data analysis tools.

One shortcoming in Fastly's edge platform offering is its lack of storage offerings. Users can connect third-party cloud storage services to their Fastly platform, but these storage instances would not be hosted in the points of presence. Because Compute@Edge is a serverless offering, the lack of edge storage is not as impactful as it would be for bare metal services.

Strengths: Fastly has very good content delivery capabilities and strong features for its video streaming product. Following the Signal Sciences acquisition, the vendor inherited good security solutions, and the Compute@Edge platform is a well-developed environment for serverless computing.

Challenges: Fastly's capabilities around storage are limited, with the vendor offering integration with third-party cloud storage services. Its edge computing product only supports serverless computing, so it is suitable only for smaller ephemeral workloads rather than larger enduring workloads supported by bare metal and virtual machines.

Limelight Networks

Limelight has evolved its network over almost two decades to offer very good content delivery and video streaming, as well as a robust and comprehensive edge computing platform.

Compared to other vendors in this report, Limelight offers the widest range of edge computing services, which consist of bare metal, virtual machines, and serverless. Each of Limelight's models for delivering computing power has a specific purpose—bare metal offers customers dedicated resources; VMs are easy to deploy and scale; and the serverless model enhances video streaming and content

delivery features.

In addition to edge computing, Limelight's portfolio is strong from both a content and video delivery point of view. Its static and dynamic content delivery and live and on-demand video streaming capabilities are powerful out of the box and can be further enhanced through its serverless computing service.

Limelight is working to develop a mature edge platform that can offer a lot of support for customers. It will do this through integrations with DevOps tools that can be used to provision and control its CDN and computing capabilities.

While Limelight provides secure access capabilities such as IP address whitelisting and blacklisting, end-user geolocation-based permissions, tokenization-based content access control, and VPN across PoPs, its offering is not as strong as other vendors' that implement ZTNA, secure web gateways, or cloud access security brokers.

Strengths: Limelight ranks highly across the edge computing, content delivery, and video streaming key criteria. The platform is comprehensive and can enable customers to deploy a wide range of latency-sensitive applications.

Challenges: Secure Access is definitely the metric on which Limelight can improve the most. Its existing access control capabilities provide a solid base for the vendor to implement additional features and frameworks that can become leaders in the space.

Lumen

Lumen ranked highly across the board for this report's Key Criteria, which is a testament to the company's long-term strategy and investments in its distributed infrastructure, platforms, and applications.

Lumen's edge platform strategy is built on three layers: dynamic connections, hybrid cloud, and edge orchestrator layers. This approach can help customers address their use cases with flexibility. In fact, Lumen itself is using this method for certain internal workloads. Lumen has an in-house need for edge-based applications, so it is designing the services that it offers customers by implementing the best practices and lessons learned from its own internal developments.

Lumen has extensive security capabilities, both in terms of network security and secure access. Because Lumen owns all the infrastructure, including fiber optic cabling, it can deliver secure end-toend connectivity, especially within the United States. Lumen's edge computing offering is also strong, with enduring compute services like bare metal, virtual machines, and containers.

It is worth noting that Lumen's edge computing deployments are still ongoing. It has currently rolled out in the U.S. and plans to expand to the rest of the world at existing CDN points of presence in 2021.

While Lumen can deploy edge infrastructure at any of its global points of presence, buyers interested in the platform should find out when computing services will be available in the areas where they need them.

Strengths: Lumen's edge platform offering is comprehensive, with the vendor ranking highly across most metrics, including edge computing, advanced security, infrastructure connectivity, secure access, storage, and DevOps support.

Challenges: As the vendor's edge computing platform is still being rolled out, its coverage includes only North America at the time of this writing. The slower rollout may be a disadvantage compared to other vendors who currently offer similar services globally.

StackPath

StackPath is one of two vendors featured in the report that have purpose-built edge platform solutions. Even though StackPath was only founded in 2015, it has reached its position in the space quickly after strategically acquiring six companies. This is one of the reasons StackPath offers a robust portfolio of features. These acquired capabilities include website delivery, DDoS protection, web application firewall, virtual private networks, large object file delivery, and network monitoring.

As StackPath targeted the edge platform space from its inception, its model has no limitations from legacy solutions. Its EdgeEngine is built on three layers: physical infrastructure, edge compute, and edge applications. StackPath's physical infrastructure (consisting of bare metal, storage, and networking) forms the foundational layer on which StackPath runs its edge compute layer, namely containers, virtual machines, object storage, and serverless functions. The top edge application layer then runs services such CDN, WAF, and network monitoring. This innovative stack delivers scalability in a frictionless way, with a self-service and highly-customizable user experience.

While StackPath can deliver scalable live and on-demand video streaming through its CDN, the solution is not as mature as other vendors' in this report. StackPath's video streaming solution does not include request collapsing, media players, live rewind, or ad insertion. While the vendor supports some secure access capabilities through its EdgeRules platform, StackPath also falls short from a secure access point of view because the vendor does not yet implement ZTNA policies.

Strengths: StackPath has a strong edge computing offering and solid support for DevOps and orchestration tools. The way it has designed its edge platform offers customers high levels of flexibility to enable a wide breadth of use cases.

Challenges: The vendor's capabilities around video streaming are not as mature as that of other vendors featured in this report. Its geographical coverage is also fairly limited, especially in emerging markets, but new points of presence are being deployed continuously.

Verizon Digital Media CDN Edge

The expansion of Verizon Digital Media's distributed infrastructure to deliver edge computing on top of its existing CDN and security solutions indicates that the company recognizes the technical and commercial potential of developing an edge platform. With its business model in its name, Verizon Digital Media focuses on media delivery and has very good capabilities around content delivery, especially when it comes to live and on-demand video streaming, as well as strong security capabilities.

In terms of edge computing, Verizon Digital Media is one of the few vendors that offers both ephemeral and enduring computing with its Functions@Edge and Containers@Edge products. To further enhance its video delivery capabilities, Verizon Digital Media has integrated its solution with Microsoft Azure to add more points of presence plus user authentication, Azure Media Indexer, and blob storage.

While Verizon Digital Media is part of the wider Verizon Communications company, there are clear distinctions among different edges. Splitting up the device edge, 5G edge, CDN edge, and cloud, Verizon Digital Media focuses solely on the CDN edge where it leverages 165 regional points of presence that cover most of the world's metropolitan areas.

The CDN Edge solution from Verizon has some shortcomings, mainly when looking at the storage and secure access key criteria. In terms of storage, the vendor implements Azure blob storage to offer cloud-hosted object storage rather than storage at their own points of presence.

Strengths: Verizon Digital Media's strengths lie in its capability to deliver edge computing, video streaming, and advanced security. Its partnership with Azure helps it to implement additional features that differentiate it in the CDN edge space.

Challenges: Compared to other vendors in the report, Verizon Digital Media offers limited secure access and storage capabilities. The lack of an edge storage product also affects other features, such as its content delivery offering.

Volterra.io

Founded in 2017 and recently acquired by F5, Volterra.io is the newest entrant in the edge platforms space. Volterra leverages its purpose-built distributed infrastructure network to deliver edge computing, multi-cloud management, and security, as well as application and infrastructure orchestration.

Volterra carved out its own niche in the edge platforms space by focusing on computing and orchestration rather than on content and video delivery. It has adapted the content delivery network model to build an application delivery network that helps customers run application workloads closer to end users for minimum latency.

Volterra ranks high in infrastructure connectivity, analytics and diagnostics, and DevOps. Its value proposition positions Volterra as a single pane of glass for managing and monitoring networks, computing, and security across multiple clouds. Volterra's platforms also automate the configuration of cloud resources like AWS transit gateway, Azure, and GCP networking to reduce the automation burden on NetOps.

Volterra is the only vendor in this report that offers physical hardware that can be deployed by customers on-premises at edge locations and managed through VoltConsole to encompass these sites. These hardware devices contain CPU, memory, storage, and multiple connectivity modules that natively run VoltStack and VoltMesh.

Because Volterra is focused largely on modern application delivery across distributed clouds, its platform does not rank highly on the content delivery and video streaming metrics.

Strengths: Volterra has a very well-defined proposition that addresses challenges around edge computing and multi-cloud management. Its platform ranks high on the infrastructure connectivity, analytics and diagnostics, advanced security, and DevOps report criteria.

Challenges: Content and video delivery are not part of Volterra's repertoire, which makes the platform less suitable for customers who have requirements around accelerating media at a global scale.

5. Analyst's Take

Regardless of their background, all vendors featured in this report are deliberately and strategically building edge platforms. Perhaps the most interesting observation is that all players in the space have ranked highly in the DevOps and orchestration metric. Each featured vendor has independently observed a demand for interoperability, CI/CD practices, and real-time configuration changes. Building a true edge platform is highly dependent on catering to developer and DevOps audiences, which is what has also created a strong demand for edge computing.

All the vendors we evaluated are pioneers in the space and the market is still maturing. Current edge platform users who take full advantage of these new services are early adopters. We expect that the availability of edge-based technologies and the general consensus that edge applications go hand-in-hand with cloud-based offerings will drive innovation and encourage users to buy into the benefits of edge platforms.

The technical novelty of edge-based applications makes it hard to determine what the next development will be. However, we can safely conclude that the vendors' focus on expanding their capabilities will come from partnerships and integrations. Edge expansion will entail closer collaboration between communication service providers and edge platforms—even telcos will need to encourage cross collaboration between lines of business, such as connectivity and cloud/edge. Edge marketplaces will follow in the steps of cloud marketplaces and enable users to provision technologies on their platforms without risk of incompatibility. Lastly, multi-edge solutions will most likely require some intensive collaboration efforts from edge platform vendors, but we can leverage experiences from multi-CDN and multi-cloud solutions as examples going forward.

In short, it's a great time to start experimenting with truly distributed applications. We encourage those companies with the right resources to jump in and drive this burgeoning market.

6. About Chris Grundemann



Chris Grundemann is a passionate, creative technologist and a strong believer in technology's power to aid in the betterment of humankind. In his current role as VP, Strategy at Myriad360 he is expressing that passion by helping clients build bigger, faster, more efficient technology infrastructure that is both more secure and easier to operate and scale. Chris has well over a decade of experience as both a network engineer and solution architect designing, building, securing, and operating large IP, Ethernet, and Wireless Ethernet networks. His specialties include infrastructure design, protocol design, consensus building, technology evangelism, research and

development (R&D), leading collaborative groups, communicating abstract ideas to diverse audiences, and generally getting stuff done!

Chris has given presentations in 34 countries and is often sought out to speak at conferences, NOGs, and NOFs the world over. He holds 8 patents in network technology and has written two books: *Day One: Exploring IPv6* and *Day One: Advanced IPv6 Configuration*; as well as an IETF RFC, various industry papers, a personal weblog, and several other publications, including contributions to GestaltIT, CircleID, Packet Pushers, and Forbes.

Chris is also a co-founder and Vice President of IX-Denver and Chair of the Open-IX BCOP committee. He has held previous positions with Markley Group, Internet Society, CableLabs, tw telecom, CO ISOC, ISOC-NY, ARIN, NANOG, AfPIF, CEA, UPnP, DLNA, RMv6TF, and several others.

Chris is currently based in Brooklyn, NY.

7. About Logan Andrew Green



As a writer first and technologist second, Logan Andrew Green communicates technicalities through narratives and looks at technology through a business-focused lens. His engineering experience as an Operational Support System Designer and Radio Networks Optimization Engineer helps him assess new technologies from both a technical and commercial point of view. Logan is currently in Vodafone's Cloud and Security line of business where he manages the portfolio of managed IT products targeted at large enterprises.

In addition, he's been working as a technical writer and

business strategist across the technology industries, helping mid-sized organizations define their propositions, offerings, and market positioning. His areas of expertise include enterprise IT, fintech, Internet of Things, Artificial Intelligence, fixed and mobile connectivity.

Logan's other interests include building a stronger relationship with his wife, macroeconomics, geopolitics, sustainability and future studies.

8. About GigaOm

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