

Deliver amazing streaming video experiences.

Verizon 5G Edge with AWS Wavelength opens up new possibilities to transform streaming video experiences.

Solution brief

Powered by its high speed, low latency and massive capacity, 5G promises to deliver a new generation of mobile entertainment. These leading-edge capabilities open up a broad range of potential applications and use cases, especially when advances in 5G networks are combined with mobile edge computing (MEC) and AWS Regions.

- Content providers need to be able to support the streaming of increasingly higher bit rates at scale
- Providers need broad distribution and network capacity to rapidly push out high-quality content to various devices
- Cloud agility and elasticity is investment intensive and is often inefficiently utilized when not operating at peak demand

The challenges that media and entertainment companies face

Media and entertainment companies are constantly challenged by changing consumer behavior and ever-increasing expectations. For viewers, life is good because consumers have more options for streaming media and digital entertainment than ever before. But for content providers, the competition is fierce, and media platforms are looking for ways to elevate their content and experiences to cement customer loyalty and pique interest from new customers.

Standing in the way are a number of challenges related to latency, connectivity and bandwidth. Broadly speaking, consumers want to get news, sports and nearly everything else instantly on their mobile devices. They want live statistics, background information and other real-time context overlaid or interspersed with both live and recorded content. These demands require low latency and fast connectivity.

In addition, viewers are constantly and rapidly changing behaviors as new forms of content consumption come online, so providers not only need the agility to meet those demands, but also rapid access to extensive content libraries to ensure that viewers can get the bandwidth-intensive content they want quickly.

There are also more specific technical hurdles that exist:

- Higher latency occurs largely on the distribution side of a video stream
- Enhanced connectivity is needed to deliver 4K and 8K video streaming to mobile devices

Verizon 5G Edge with Amazon Web Services (AWS) Wavelength makes it possible to build and deploy edge-specific applications that enable scalable streaming video experiences with less friction.

The solution lies at the edge.

The emergence of edge computing promises to solve many of the challenges that media and entertainment companies are struggling with. Moving compute and storage functions to the edge brings workloads closer to the end user or device, shortening the response time and making it possible to deliver video and additional data streams quickly. With the introduction of 5G connectivity into MEC, applications can now take advantage of increased bandwidth and enhanced mobility.

In addition, a cloud/edge architecture allows for lower on-premises infrastructure requirements by moving rendering to the server side, providing greater mobility in the experience and enabling lighter and leaner end-user compute requirements, which means less power consumption by the device.

The lower latency afforded by the mobile edge enhances video production and consumption, reducing the lag between the two. These new capabilities open up a broad range of potential applications and use cases, especially when the capabilities of 5G networks are combined with MEC and cloud computing.

Verizon 5G Edge brings you right to the edge of Verizon’s 5G network for low latency and high bandwidth to offer more immersive video experiences.

Why Verizon 5G Edge with AWS Wavelength

Verizon and AWS have partnered to provide a MEC infrastructure – Verizon 5G Edge with AWS Wavelength – colocated at the edge of Verizon 5G network sites.* Verizon’s 5G Ultra Wideband network is built right with millimeter-wave spectrum and it will eventually incorporate C-Band spectrum. Millimeter-wave spectrum supports 5G Ultra Wideband’s transformative performance, and C-Band will enable performance and expanded coverage.

AWS Wavelength is an AWS infrastructure offering that is optimized for MEC applications. Wavelength Zones are AWS infrastructure deployments that embed AWS compute and storage services at the edge of the Verizon 5G network. This proximity makes it possible for application traffic from 5G devices to access application servers running in Wavelength Zones without leaving the Verizon 5G network.

AWS Wavelength enables you to use well-known AWS tools and services to build, manage, secure and scale your applications. With Wavelength, you get AWS benefits like elasticity, availability and low pay-as-you-go pricing, so you can start small and scale as your needs grow, without worrying about managing physical hardware.

Verizon 5G Edge with AWS Wavelength brings the cloud close to the endpoint or user, significantly reducing application latency and improving performance. By bringing powerful cloud-based services and cloud computing infrastructure closer to content consumption and content generation locations, Verizon 5G Edge with AWS Wavelength makes it possible for innovative media companies and independent software vendors (ISVs) to bring new services and experiences to market.

How 5G Edge with AWS Wavelength can help media and entertainment companies with their video streaming challenges

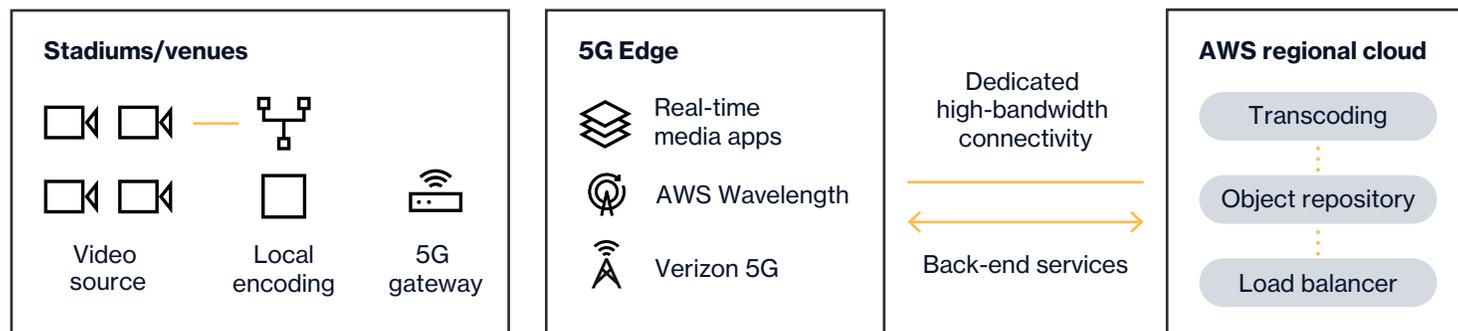
Use case #1: Venue- or stadium-based video production

5G Edge with AWS Wavelength could dramatically change the way media and entertainment companies create, capture, manage and distribute content, especially during live events.

The ability to produce live video, especially 4K, during an event has traditionally required significant onsite infrastructure and production equipment. But with 5G Edge with AWS Wavelength, video production can be supported without onsite production trucks and infrastructure, enabling media companies to be independent from the production facilities and logistics available within different venues.

Producers would be able to prestage media content and assets, such as advertisements and stock footage, to the nearest 5G Edge node for live insertion into the production workflow. The encoded camera feed would be ingested over 5G and processed using software-defined workflows running on AWS Wavelength edge compute and GPU-enabled hardware, allowing for live editing and switching with low latency. Production workflows for pre- and post-event content could use the same planned infrastructure.

With all of the media assets at the mobile edge, compositing happens on the fly, enabling seamless management of prestaged assets and multiple live feeds. Finally, media transcoding could also be performed at the edge, and then content could be immediately fed back to the venue over the 5G network or sent into the cloud for redistribution via a content delivery network (CDN).



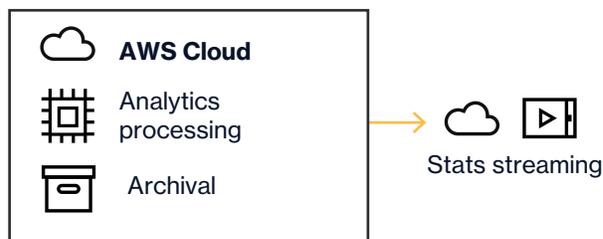
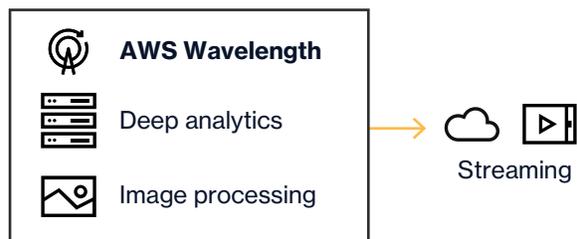
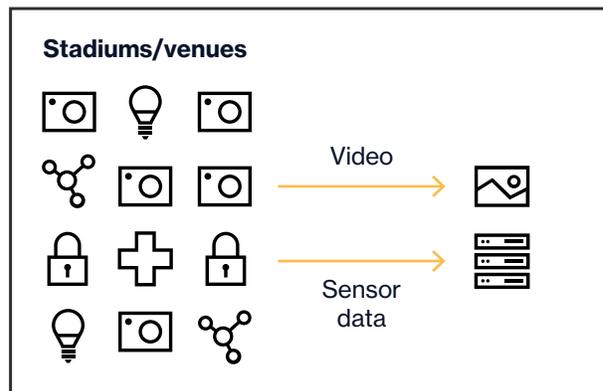
Transforming onsite video production via mobile edge computing

Use case #2: Live video streaming

Shifting the compute processing of live video from centralized cloud data centers to Verizon 5G Edge with AWS Wavelength enables the next generation of immersive and interactive video experiences. With the ability to encode video for various formats (HTTP Live Streaming, Web Real-Time Communication, SubRip Subtitle, etc.) at the mobile edge and stream it back over the 5G network to the venue, new possibilities for enhanced viewing arise.

For example, the ability to manage near real-time graphics, special effects and volumetric video capture opens up new options for broadcasters to provide more engaging and immersive video experiences. This could make seamless virtual reality (VR) possible, changing how people interact with digital media. VR experiences could also become shared 3D virtual spaces where people can join together to collaborate, play or socialize.

Augmented reality (AR) experiences can also be revolutionized by allowing people to interact with the physical world in new, digitally defined ways. AR/VR requires low latency and compute capabilities to create these experiences. With the low-latency video stream provided by 5G Edge with AWS Wavelength, motion-to-photon-to-render latency gets reduced, making these experiences more seamless and immersive.



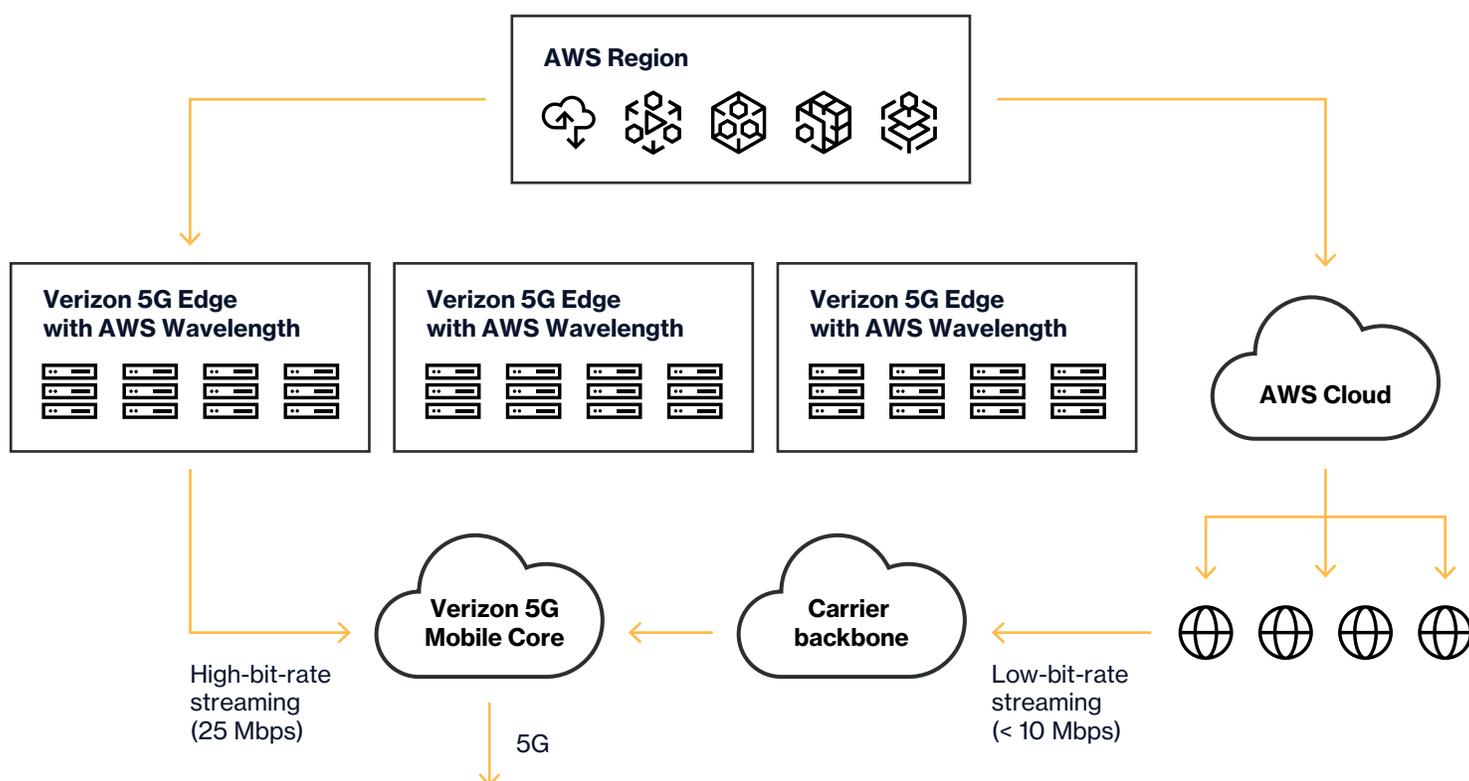
Use case #3: Intelligent content caching

For content consumption, 5G Edge with AWS Wavelength can serve as a universal CDN that is provisioned as needed to reduce media load times and improve user experiences. With a decentralized cache at the edge of the carrier network, subscribers will have faster downloads and better user experiences.

In addition, decreased start-up times can enable higher-quality video content with enhanced features and offer improved experiences for downloads such as operating system and application updates. Edge caching on AWS Wavelength reduces network requests to origin servers and provides internet link and support scaling for high-connection concurrency.

Coupling cloud computing and analytics can also open up intelligent CDNs that could transform content on the fly under the direction of a control-and-orchestration system. Content owners operating their own cache can collect real metrics from both the cache server and device applications. These metrics might range from device type, consumption, duration and user experience to chunk size, bit rate and adaptive bit rate (ABR) ladder switching. Content owners can iterate and monetize against these metrics, improving the subscriber experience while properly leveraging content and advertising inventory.

Creating enhanced viewer experiences through live video streaming



Delivering faster downloads and better user experiences through intelligent content caching

With the edge cache application and data solution deployed on AWS Wavelength behind an application load balancer, subscribers on the carrier network have direct access to the caching front end and data streaming service. This means devices can download content on the carrier network without exiting to the internet or traversing into the AWS Region.

Many applications, one familiar environment

Verizon 5G Edge with AWS Wavelength not only reduces application latency and improves performance, but it also gives you full and seamless control using the same console, application programming interfaces (APIs), tools and AWS services used in an AWS Region.

Of course, the same stringent security and operational management standards are applied to edge computing, meaning that all the same principles and controls are applied, regardless of whether they are in an AWS Region or an edge location. You can create Amazon® Elastic Compute Cloud® (EC2®) instances, attach Elastic Block Store (EBS) storage, launch services such as databases and containers, and provision GPU-based compute resources for applications involving 3D graphics, video processing, AR/VR experiences or other applications.

Get started.

Verizon 5G Edge with AWS Wavelength can help change the way video is produced and consumed. And since it's supported by industry leaders, you can focus on creating and delivering the next generation of innovative media and entertainment experiences for your customers with the network and cloud capabilities you need, and the assistance of professional services to help with the underlying technologies.

For details on how Verizon 5G Edge with AWS Wavelength can help you create transformative media and entertainment applications and services, contact your Verizon Business Account Manager.

Learn more:

verizon.com/5gedgeawscloud