

# Transformational Performance with 5G and Edge Computing

As enterprises face pressure to lower costs, speed time to market, and become more dynamic, they are undergoing digital transformations, adding a wide range of new technologies into their processes and environments. The arrival of 5G and Edge Computing offer enterprises across all industries the capability to deliver innovative applications and immersive next-generation experiences to their customers.

The increase in speed and bandwidth offered by 5G, combined with the reduction in latency achieved by bringing compute capabilities closer to the end users, can boost performance of applications and enable large amounts of data to be processed in real-time.

## 5G and Edge Computing in Numbers

**10x**  
Faster than current 4G networks.<sup>1</sup>

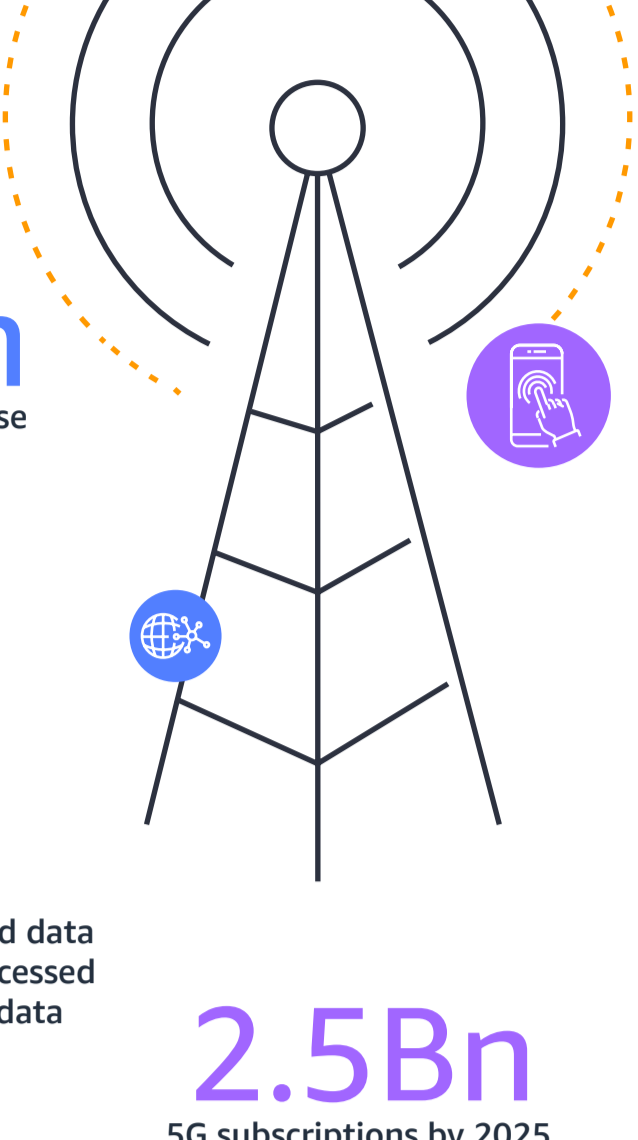
**1/3**  
Of the world's land mass to be 5G covered by 2025.<sup>3</sup>

**32.8%**  
Predicted compound annual growth rate of edge computing from 2018-2025.<sup>5</sup>

**75Bn**  
Smart devices in use by 2025.<sup>2</sup>

**75%**  
Of enterprise-generated data will be created and processed outside a traditional data center by 2025.<sup>4</sup>

**2.5Bn**  
5G subscriptions by 2025, accounting for 30% of mobile subscriptions.<sup>6</sup>



## AWS Infrastructure for the Edge

### AWS Outposts



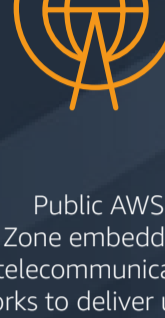
Private AWS rack embedded in the customers' private data centers to run latency sensitive applications on premises

### AWS Local Zone



Public AWS Zone in a large Metro closer to the end users to deliver low-latency applications to users in that specific geography

### AWS Wavelength Zone



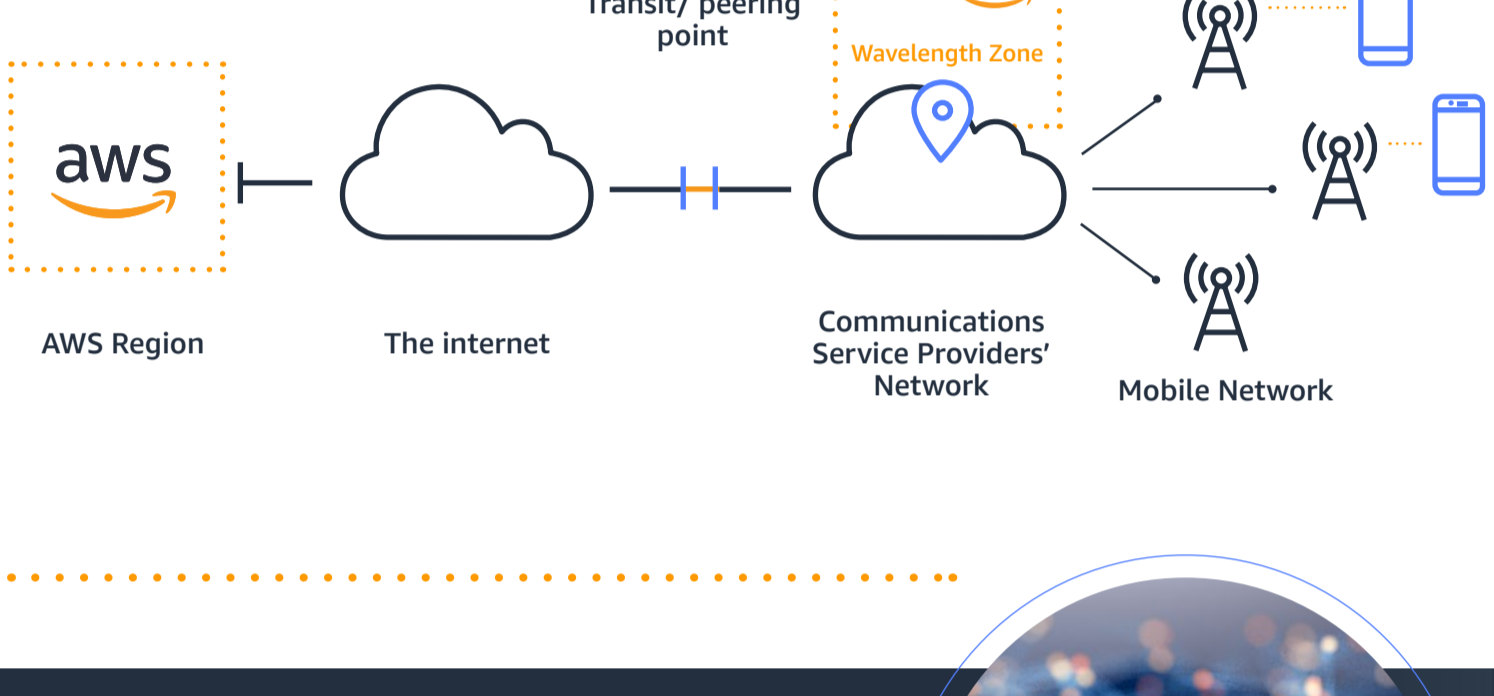
Public AWS Zone embedded in telecommunications networks to deliver ultra-low latency applications to 5G devices

### AWS Snow Family



Highly-secure, portable devices to collect and process data at the edge, and migrate data into and out of AWS

## AWS Wavelength in a 5G Network



## 6 benefits of AWS Wavelength and Wavelength Zones

- 1 Move the cloud closer to end users and devices
- 2 Seamless access to the most extensive global cloud infrastructure from global 5G networks
- 3 Consistent developer experience - same APIs, tools, and functionality as in the AWS Cloud
- 4 Develop applications once and deploy for use with 5G network globally
- 5 Single pane of management across Wavelength Zone and AWS regions
- 6 Cloud business models at the edge - no capital costs, pay-as-you-go pricing

## Enabling a broad range of use cases

AWS Wavelength can enable 5G applications that deliver interactive and immersive experiences, like game streaming, virtual reality, and in-venue experiences for live events. Wavelength also enables offload of data processing tasks from 5G devices to the network edge to conserve resources like power, memory and bandwidth that can help make applications like autonomous vehicles and smart factories possible.

### ML-assisted Diagnostics for Healthcare

AI/ML driven video analytics and image matching solutions help doctors speed up diagnosis of observed conditions, such as recognizing polyps during colonoscopies. The image or video streams from medical devices are processed in a Wavelength Zone and the response is returned to the medical device for the surgeon to use.

### Smart Factories

Industrial automation applications use ML inference at the edge to analyze images and videos to detect quality issues on fast moving assembly lines and trigger actions to remediate the problem. AWS Wavelength enables these applications to be realized without having to use expensive, GPU-based servers on the factory floor.

### Connected Vehicles

Cellular Vehicle-to-Everything (C-V2X) is an increasingly important platform for enabling intelligent driving, real-time HD-maps, road safety, and more. Low latency access to compute infrastructure needed to run data processing and analytics on AWS Wavelength enables real-time monitoring of data from sensors for secure connectivity, in-car telematics, and autonomous driving.

### Interactive Live Video Streams

Wavelength provides the ultra-low latency needed to live stream high-resolution video and high-fidelity audio, as well as to embed interactive experiences into live video streams. Additionally, real-time video analytics provide the ability to generate real-time stats that can enhance live event experiences. Global video stream consumption is expected to reach **136EB** per month by 2024.<sup>7</sup>

### AR/VR

By accessing compute resources on AWS Wavelength, AR/VR applications can reduce the Motion to Photon (MTP) latencies to the <20 ms benchmark needed to offer a realistic customer experience. Wavelength enables offering AR/VR in locations where it is not desirable or possible to run local server systems.

### Real-time gaming

Today more than **2Bn** gamers globally play on mobile.<sup>8</sup> Real-time game streaming depends on low latency to preserve user experience. With AWS Wavelength, the most demanding games can be made available on end devices that have limited processing power by streaming these games from game servers in Wavelength Zones.

## Verizon 5G Edge with AWS Wavelength

Verizon 5G Edge = Verizon 5G Ultra Wideband Network + AWS Wavelength

**The Right Network**

America's most awarded network, mission critical applications realize the best performance possible.

**The Right Cloud Platform**

World's most comprehensive and broadly adopted cloud platform with 175+ full featured cloud services.

## AWS Services that can be used in Wavelength Zones

AWS Wavelength enables you to use familiar and powerful AWS tools and services to build, manage, secure, and scale your applications.

**Amazon EC2**

**Amazon EBS**

**Amazon VPC**

You can create **Amazon EC2 instances**, **Amazon EBS volumes**, and **Amazon VPC** subnets and carrier gateways in Wavelength Zones. You can also use services that orchestrate or work with **EC2**, **EBS** and **VPC** such as **Amazon EC2 Auto Scaling**, **Amazon EKS** clusters, **Amazon ECS** clusters, **Amazon EC2 Systems Manager**, **Amazon CloudWatch**, **AWS CloudTrail**, and **AWS CloudFormation**. The services in Wavelength are part of a VPC that is connected over a reliable, high bandwidth connection to an AWS Region for easy access to services including **Amazon DynamoDB** and **Amazon RDS**.

AWS Wavelength embeds AWS compute and storage at the edge of Communications Service Providers' 5G networks, and enables mobile app developers to deliver applications with ultra-low latencies.

**Learn more**  
<https://aws.amazon.com/wavelength/>

1 [https://www.gsma.com/wp-content/uploads/2019/04/The-5G-Guide\\_GSMA\\_2019\\_04\\_29\\_compressed.pdf](https://www.gsma.com/wp-content/uploads/2019/04/The-5G-Guide_GSMA_2019_04_29_compressed.pdf)  
 2 [https://www.researchgate.net/figure/Internet-of-Things-IoT-connected-devices-from-2015-to-2025-in-billions\\_fig1\\_325645304](https://www.researchgate.net/figure/Internet-of-Things-IoT-connected-devices-from-2015-to-2025-in-billions_fig1_325645304)  
 3 [https://www.gsma.com/futurenetworks/5g\\_services/understanding-5g-5g-innovation/](https://www.gsma.com/futurenetworks/5g_services/understanding-5g-5g-innovation/)  
 4 <https://www.gartner.com/smarterwithgartner/what-edge-computing-means-for-infrastructure-and-operations-leaders/>  
 5 <https://www.globenewswire.com/news-release/2019/07/24/1887135/0/en/Global-Edge-Computing-Market-to-Reach-16-55-Billion-By-2025-AMR.html>  
 6 <https://www.ericsson.com/en/mobility-report>  
 7 <https://www.ericsson.com/en/mobility-report>  
 8 <https://www2.deloitte.com/us/en/insights/industry/telecommunications/future-of-cloud-gaming.html#endnote-13>