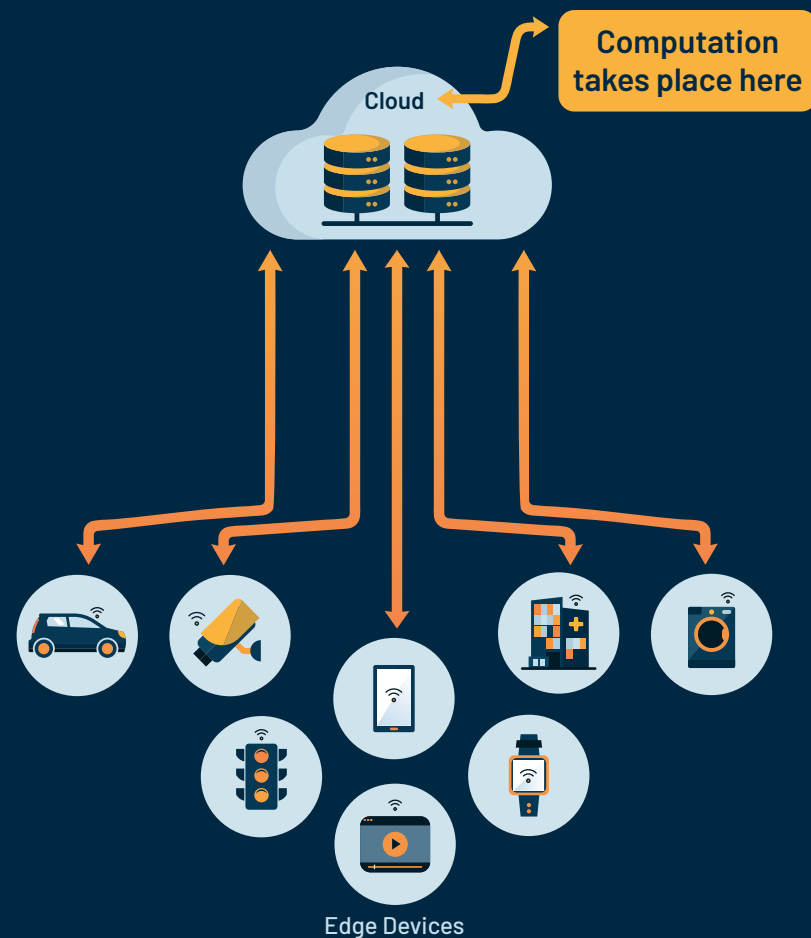


# Creating Solutions for Advances in Technology: 12 Examples of Edge Computing

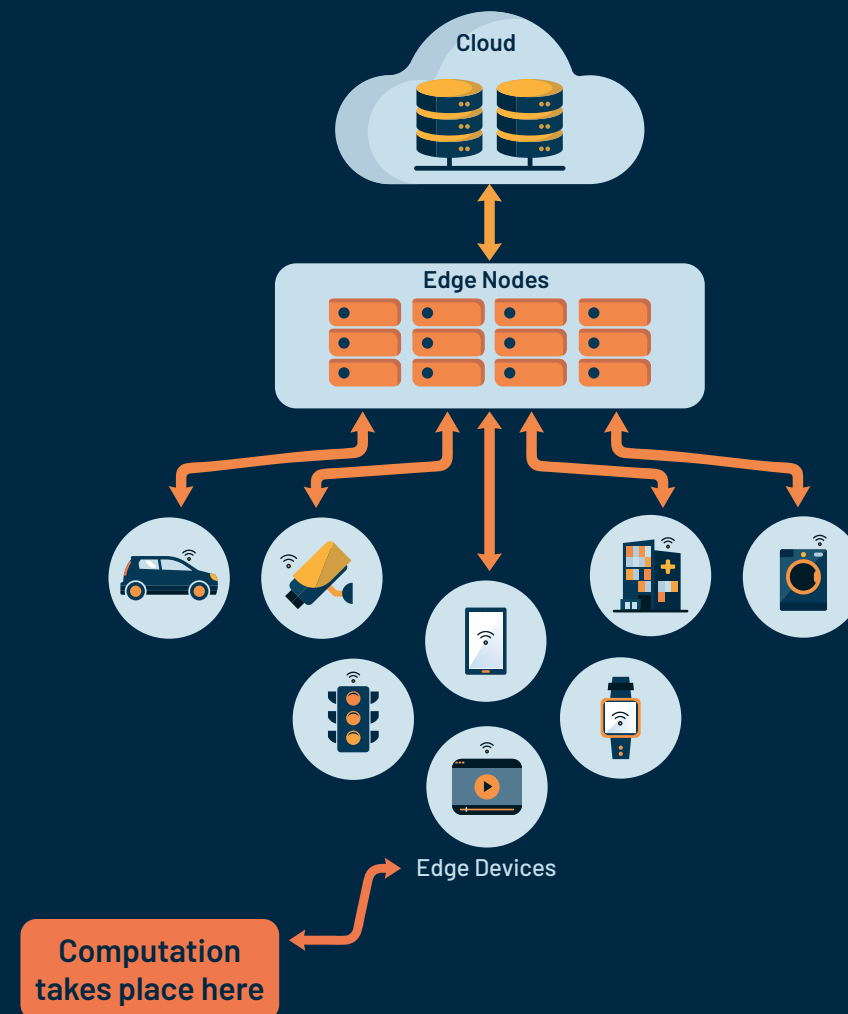


**ZELLA** DC

## Cloud Computing



## Edge Computing



## Edge Computing

Edge computing has the potential to transform technology and take it to the next level. By bringing data processing and storage closer to users, it enables many technologies to work faster and better, including Artificial Intelligence (AI), Machine Learning (ML), and the Internet of Things (IoT).

Almost every business could benefit from edge computing and its ability to make their company faster, more efficient, and more secure. However, some industries are at the forefront of edge computing and using it to overcome their most complex challenges. Edge computing is shaping how these organizations approach business as they harness it in specific ways to gain an edge over the competition.

Let's have a look at the top 12 industries that are using edge computing to get ahead and the top use cases for each one





## Agriculture & Fisheries

Although agriculture may be an ancient industry, it is often at the cutting edge of technology. Farmers are now using AI and automation to reshape the world of agriculture to reduce waste and improve outcomes. Smart farming uses the advantages of sensors, actuators, and data-driven insights. However, edge computing is critical to making the most of these technologies.

Edge computing improves the speed and efficiency of farms so that they can gain insights and be alert to any changes in real time. Since farms are often at remote locations, traditional cloud computing is often too costly and results in critical delays. Edge computing also enables the ecosystem to perform tasks without using a remote server to process the data and make decisions. This enhances the process' reliability and makes agriculture more sustainable by reducing waste.

In addition to farms, the fishing industry also benefits from edge computing. Fisheries increasingly rely on AI, ML, cloud computing, and Big Data to grow and create a more sustainable and accountable industry.

Businesses can store their sensitive and regulated data on secure private clouds with the help of edge computing. They use it to regularly collect the information they need on docks, ports, and fishing vessels, as well as to document the types of fish, weather, and sea level. Because these companies are not operating in one location and are remote by nature, standard cloud computing is not possible.



## Industrial & Manufacturing

Manufacturing practices are critical for companies to lower overhead, improve efficiency, and enhance their overall business. Edge computing is one of the most effective ways that organizations can modernize and streamline their operations. The rise of artificial intelligence and robotics in manufacturing means that companies need edge computing to keep up with the competition and fuel real-time insights.

Industrial and manufacturing organizations rely on rapid decision-making and need to respond in real time to issues that impact the factory floor. Factories must work in real-time, from sophisticated sensors to industrial robots to virtual-reality devices for training purposes. Edge computing is vital to use these next-generation technologies and stay competitive in the industrial revolution the industry is experiencing.

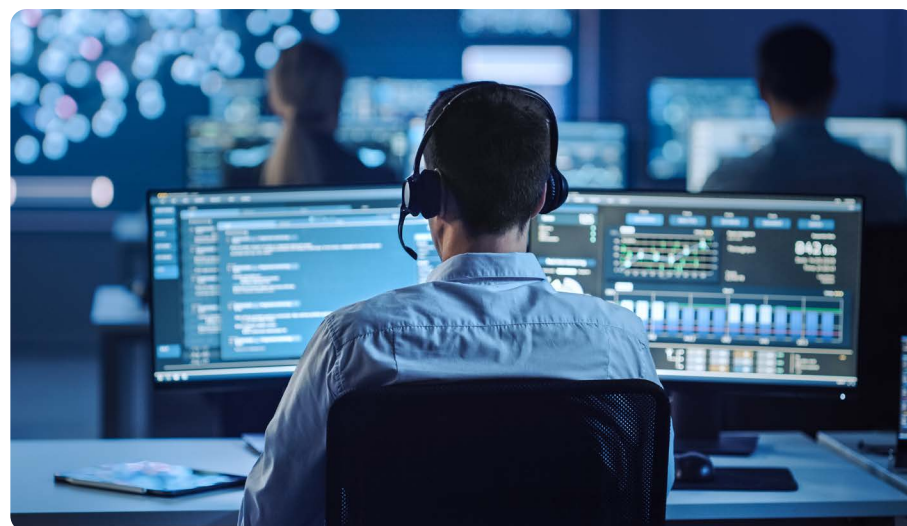
In addition, the edge enables companies to perform predictive maintenance. Because it brings processing and data storage closer to the production line, sensors can monitor machine health in real time. As a result, manufacturers can analyze and detect any changes before a failure occurs.



## Federal & Local Government

Although edge computing has applications for many industries, it is uniquely suited to meet the challenges and objectives of governments around the world. Because it is an intelligent director of complex processes and applications outside the traditional perimeter, it can execute missions such as protecting borders, optimizing transportation, patrolling battlefields, and monitoring environments.

Edge computing helps federal program leaders enrich the data generated from IoT to facilitate more autonomous and intelligent operations. It optimizes the value of smart devices by processing and analyzing data locally instead of a centralized resource. Edge computing promotes the security of sensitive data, reduces latency and network capacity and availability problems.



## Mining & Metal Industry

The mining and metals industry has to grapple with a number of different—and sometimes contradictory—goals: balancing profitability with sustainability. It is no small job to maximize efficiency while still trying to minimize environmental impact. To adapt to a changing—and sometimes volatile—business environment, many companies turn to IIoT.

Many experts now recognize that improving uptime and efficiency requires a large volume of data in real time.

Mining operations often require distributed locations in remote destinations that have limited infrastructure. It makes a pure cloud computing solution challenging to institute when considering factors such as data costs, latency, and cloud architecture in these remote locations.

Companies can gather and store their data nearby, process it and analyze it, and then relay the critical data to higher-level systems. Edge computing is the ideal solution for these companies. It enables them to access, process, and transmit data faster, resulting in effective digital transformation.



## Oil & Gas Industry

As a highly competitive, price-sensitive industry that operates in extreme and potentially dangerous environments, the digital transformation has been crucial for the oil and gas industry.



As organizations are looking for ways to reduce overhead costs and capital expenditure, there has been a rise in IoT and technologies to improve efficiency. While the industry lags behind manufacturing and other industrial sectors in automation and digitization, companies are starting to leverage IoT to cut costs while still increasing productivity.

Edge computing enables oil and gas companies to make the most use of the new technology available to them. It also helps solve their most critical problems when it comes to IoT. One oil rig generates **more than a terabyte of data every day**, but less than 1% is used.



One of the most significant issues is that this data is not available in real time. In a traditional data environment, it takes up to 12 days for one day's worth of data to transmit from an oil rig to a data center. For most businesses, this data is no longer useful.

Edge computing helps businesses solve this problem by enabling the data to be collected and used in real time. It can also be used in a number of environments, including wellbores deep underground, in the intense temperatures of liquefied natural gas (LNG), and oil rigs in remote areas.



## Smart Grid Network

Smart grids (or SG) have grown increasingly critical with the development of new technologies, such as AI, IoT, Big Data, and 5G. Smart embedded devices with decision-making abilities enhance the efficiency of smart grids. These sensors collect data at high resolution but require IoT to manage the significant amount of data made by the sensors. This creates problems with security, latency, and high bandwidth. Edge computing is the best solution to this challenge.

With edge computing, data is processed near the sensors, improving both security and efficiency. The edge enhances storage and communication

between resources, while the smart grid manages the center of things. It helps reduce bandwidth, saving users money and enabling them to collect more data.



## In-Hospital Patient Monitoring



With the rapid changes in healthcare technology, edge computing has many different use cases. However, one of the most significant is the ability to monitor patients in the hospital. Monitoring devices such as oxygen sensors, glucose monitors, and other sensors offer healthcare professionals the ability to respond to issues in real time. The challenge is, though, that most monitoring devices today are not connected to the cloud. In cases where they are, significant amounts of data from these devices are stored on 3rd party cloud providers. It is not only an inefficient use of resources but also a security and privacy concern for providers.

Edge computing can help healthcare professionals and providers make the most use of the available data while maintaining data privacy and HIPAA compliance. It processes the data locally to facilitate real-time notifications of any concerning patient behaviors or trends through analytics and AI. It also helps create a 360-degree patient dashboard for better insights and complete visibility.



## Virtualized Radio Networks (vRAN)

The growing push to build more 5G services has led to a focus on vRAN as the architecture that will connect devices to the cloud. It is now **the fastest-growing cloud investment** for operators as it promises to speed the delivery of innovative new services. It promises to create significant revenue opportunities for industry suppliers and carriers. However, virtualizing parts of the mobile network requires a low latency for fairly complex processing.

Edge computing is critical for the rise of vRAN. It enables operators to virtualize RAN close to their cell towers, lowering latency while still facilitating complex processing.



## Cloud Gaming

Cloud gaming is the next level of gaming that enables players to live stream their games directly to devices while the game itself is processed in data centers. However, cloud gaming is a process highly dependent on latency. Since many multiplayer games require real-time response rates, any lag seriously hampers the ability to play.



Edge computing is essential to overcome the latency that frustrates gamers and hurts the live streaming process. Cloud gaming businesses can reduce any lag and create an immersive gaming experience by placing edge servers close to players. The edge provides flexibility that enables gaming publishers and developers to scale by eliminating the need for dedicated devices like a high-end PC. Plus, players are able to move seamlessly between devices and locations.



## Content Delivery

Latency when catching content, such as watching a live video stream, loading web pages, or listening to music, can significantly hamper the experience. Content Delivery Networks (CDN) were long used for this purpose, but the technology struggles with latency issues and cost-effectiveness.

Edge computing is a faster and more cost-efficient way to deliver content to users. The edge helps improve performance and load times, lowers bandwidth costs, and enhances content availability. Users benefit from enhanced website performance and can accomplish even more over the network.



## Traffic Management

Transportation is the heart of any society. The more effectively city traffic is managed, the more efficiently everything can run. However, analyzing the data output from sensors requires a large amount of data processing. Edge computing facilitates real-time, effective city traffic management by processing this data quickly and efficiently.

As automobile technology improves, edge computing will be even more critical. Autonomous car flows and self-driving cars require large amounts of data to process sensors in real time. Edge computing means that these can run efficiently and safely. Just a few ways that edge computing improves traffic include improving bus frequency that fluctuates based on demand and overseeing the opening and closing of extra lanes.



## Smart Homes

Smart homes rely on significant amounts of data to run IoT devices. These devices help ensure everything runs smoothly, but processing and storing data has long been problematic. The data was sent to a centralized remote server for a while to be processed and stored. This was problematic for many reasons, including issues with latency and security.

Edge computing helps overcome these issues for a faster, more secure smart home. It brings data processing and storage close to the smart home, which reduces the roundtrip time and increases speed. For example, those with a voice assistant can get faster responses and a lower risk of having their credit cards and sensitive data exploited.





# ZELLA DC

Over a decade ago Zella DC pioneered the micro data centre. Since then, our next-generation server room in a box have been proven to work in the harshest environments on earth. The result is a vendor-agnostic approach to software, hardware manufactured to global standards, and partners across six continents. [zelladc.com](https://zelladc.com)

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Clinton is an industry expert on micro data centre construction, edge infrastructure deployments and operating mission critical infrastructure at the edge. He is in charge of all research and development projects and his experience spans from remote environments to metro areas and everything in between.