

What Is Edge Computing and Why Is It So Important in Healthcare?

Digital technology and healthcare go hand in hand. Patients require sophisticated treatment and care, relying on both the skill and experience of the medical professional and on state-of-the-art tech solutions.

In turn, these medical professionals and tech solutions each depend on data, but with so much data to process, problems can begin to arise. A high performance computing system – built upon distributed CPU capabilities – ensures medical teams can rise to the challenges posed by the modern healthcare environment.

This is where edge computing is making a huge difference for teams across the world. But what exactly is edge computing, and why is it so important in healthcare?



What Is Edge Computing?

Edge computing means processing data at the "edge" of the network itself. Data is received from IoT computing components at the source and is processed close to this source for maximum efficiency.

But how is this different from typical data processing? In a typical network setup, data is collected and transferred to a central data center. It takes longer for the central data center to receive this information, and the dataset is larger and more complex, slowing the process down.

The central data center still has a role to play in edge computing. Network devices still send important data through to the central system after utilizing the data they need close to the source. The result is a far more agile and more efficient process with reduced latency.

How Edge Computing Is Deployed in Healthcare

How do high performance computing systems and edge computing devices fit into the broader healthcare environment? Here's how these solutions can be applied in healthcare and how they can benefit patients, medical professionals, and facility managers.

Swift Data Processing from IoT Computing Networks

The healthcare environment brings together a vast array of different data points. These data points may be collected from handheld terminals carried by healthcare professionals, from monitoring systems installed in wards and patient care spaces and from other smart devices deployed around the facility.

As such, the data is highly complex. If all of these data points are transmitted to a central data center, processed en masse, and then relayed to the necessary systems, there is a significant delay. Edge computing eliminates this delay. The key points of data are processed by high performance computing system components close to the source, enabling effective decision-making and treatment delivery in real time.

Powering Artificially Intelligent Technology

Artificial intelligence (AI) is already revolutionizing the field of healthcare. The expertise of doctors and medical professionals will always be the most important aspect of healthcare, but AI systems can support these professionals and enhance their effectiveness.

These AI systems can only operate with a strong and reliable flow of data. Again, the traditional model of sending data back to the central data center for processing and then receiving the processed data where it is required is simply too slow. AI tools and devices cannot run efficiently.

AI edge computing avoids this hang-up. A value edge computing products utilize high levels of processing power, giving them the capability to conduct heavy-duty processing operations without relying on the central data center. This in turn supports deep learning frameworks such as TensorFlow, ONNX, Caffe and PyTorch, giving healthcare providers AI tools they can rely on.

How are these AI tools used in the healthcare environment? Monitoring patient data through AI edge computing components makes the work of healthcare professionals much easier, while osteoporosis, cervical cancer, and bladder cancer screening can catch serious illnesses in their early stages.

A More Streamlined Data Processing Network

The central data center is powerful and highly capable, but it is not unlimited. Healthcare providers must pay for storage space and processing capabilities. Deploying edge computing products within the network reduces the amount of data the center needs to store. By investing in edge computing products, facilities can actively reduce the cost of running their central data center.

It's not just costs that healthcare facility managers need to worry about with the traditional model of processing data. Data points flow into the processing center via a variety of different pipelines, but all converge at the same centralized point.

This can create a blockage. If the facility's bandwidth is not great enough, there may be a backlog that further increases processing delays. Data can even be compromised if it is not processed in time. Edge computing eliminates this risk by significantly reducing the volume of traffic. The healthcare facility is able to process data in a streamlined manner — without increasing their data bandwidth.

Improved System Uptime and Reduced Vulnerability

Edge computing, at its very core, relies on a distributed network. By definition, this means numerous CPUs are performing processing tasks at the same time rather than just a single, centralized server. This achieves significant improvements in terms of security and reliability. While there are failsafes and security elements built into the central data center, teams are still relying upon a single monolithic structure to carry out processing tasks. If this server were to go offline for any reason, crucial healthcare systems could also be compromised.

A data center failure would still be a serious incident for the healthcare facility, but vital processes can continue if they are supported by edge computing components. Patient health and operational viability is safeguarded.

Targeting Scalability in Busy Healthcare Environments

Healthcare facilities need to be able to grow, continuing to attend to patients as their needs develop. This can be difficult to achieve when the facility relies on monolithic data storage and processing.

Edge computing adds a more modular element to the system. While edge computing devices still rely on the central server, they can function with a degree of independence. This makes it easier for healthcare facilities to add edge computing devices to the network as the needs of patients increase over time, without overloading a central data center.



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