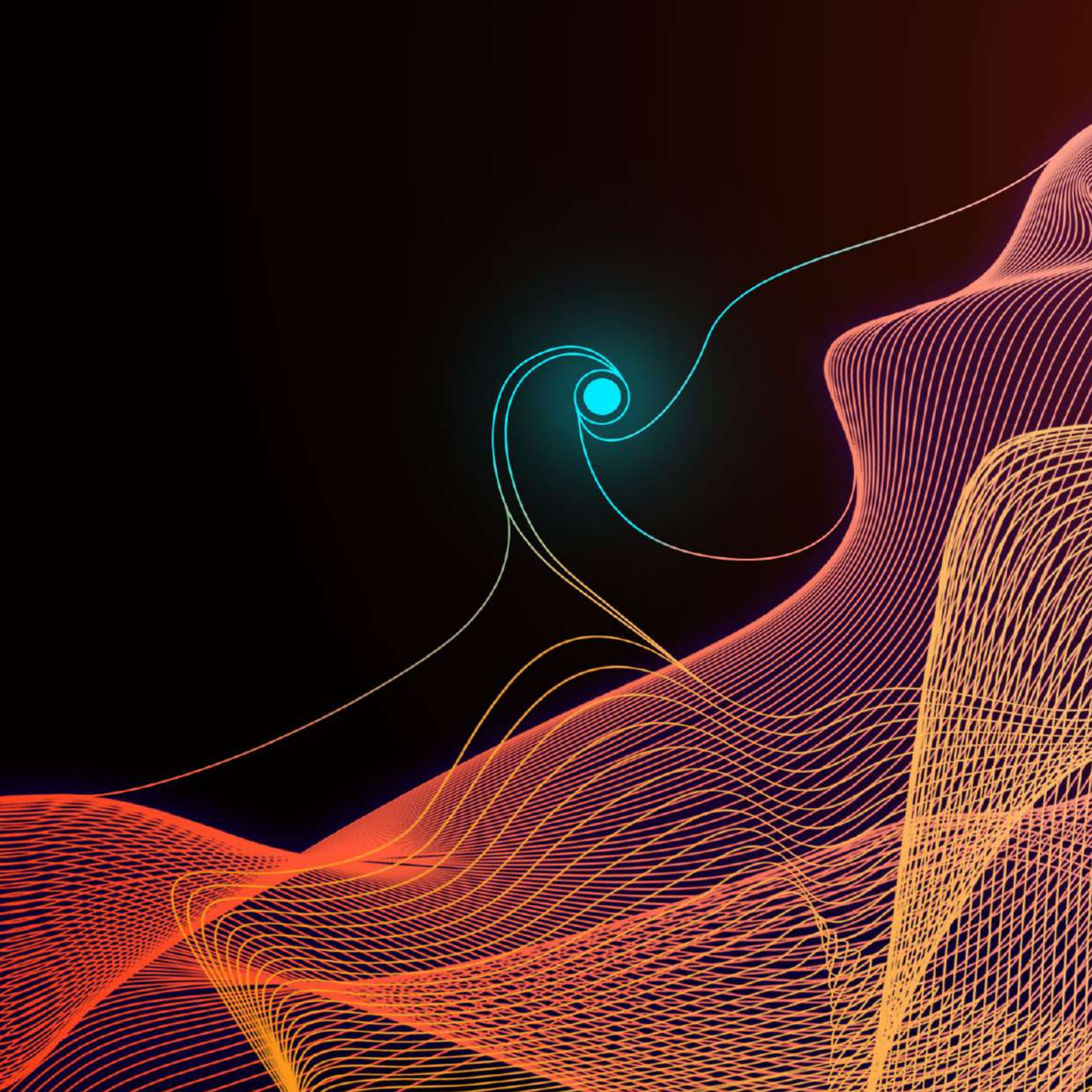# Why are we all shifting to the Edge?

Use cases from different sectors and what you can learn from them.

Edge Computing.

Editorial

75 %

of enterprise data

Gartner estimates will be processed outside the cloud or a traditional centralised data center by 2025.[1]

In a world where everything can be traced back to data, the importance of correctly, securely, and efficiently storing and processing data is beyond essential. The volume of data generated by internet-connected devices is growing far too quickly for traditional data center infrastructures to cope. Gartner predicts that by 2025 75 % of enterprise-generated data will be created outside centralised data centers[1]. Moving such vast amounts of data via the internet is often time- and disruption-sensitive.

With edge computing and the ability to decentralise IT architecture with the growing capabilities of mobile computing and the Internet of Things (IoT), you can gain near real-time insights with a lower demand for cloud server bandwidth.

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[1] https://www.gartner.com/smarterwithgartner/what-edge-computing-means-for-infrastructure-and-operations-leaders
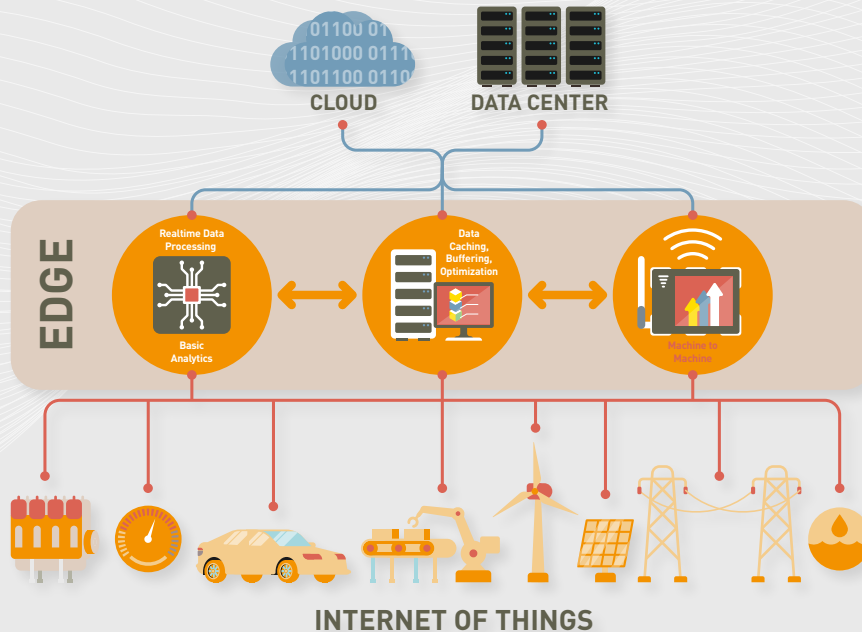
What is Edge Computing?

The least you need to know.

Edge computing is bringing computing closer to where you generate data and execute actions on that data. Collecting input from different data sources provides real-time insights for greater value is a key benefit of edge computing.

It is often inextricably linked to Internet of Things (IoT), the latter refers to devices and sensors that are directly connected to a server on the internet. Their purpose is to perform actions remotely and exchange measurement data. Edge computing makes these devices or sensors less dependent on central data processing in the cloud, because it ensures that data is processed and filtered at the 'edge'. This allows your organisation to automate more complex processes.

Edge Computing

CLOUD **DATA CENTER**

EDGE

Realtime Data Processing

Basic Analytics

Data Caching, Buffering, Optimization

Machine to Machine

INTERNET OF THINGS

What are the benefits of Edge computing?

❙ Faster data processing
❙ Reducing data consumption
❙ Less load on the network
❙ Faster reaction time
❙ Improved network bandwidth
❙ Energy saving
❙ Ability to run operations in areas with little or no internet connection

We are noticing an explosion of data across all sectors. We find IoT devices everywhere, from manufacturing plants and hospitals to transport operators to cities and municipalities. This requires more space for data processing and storage. Edge computing can tackle this challenge. We understand that you may ask yourself how Edge computing looks like in practice. At Bechtle, we believe this is a very logical question. Therefore, we would like to take you through an overview of several case studies on Edge computing.

Edge Computing in practice.

What are the advantages and how is it used?

SECTOR #1 MANUFACTURING INDUSTRY : Increased accuracy on production lines and increased safety for personnel

Did you know that the manufacturing sector is one of the first users of edge computing? This is not a surprise, as this industry has been working on Industry 4.0, simplifying production lines and looking for ways to cut costs for quite some time now. Factories have therefore been using PLCs (programmable logic controllers) to control industrial processes for several years. The downside? These PLCs contribute to enormous processing power on site. Furthermore, factories have a huge number of industrial IoTs also on site for data processing of production lines, device power and finished products. This creates an enormous amount of data, especially if manufacturers only use one central server. And not all data is equally relevant to store centrally - think of all the temperature readings, for example. Furthermore, it can also be very expensive to move data to a central server if the factory is located in a remote location. Edge computing can then help to perform the necessary processing on site and transfer filtered information to a central server or cloud.

PRINCIPLES OF EDGE COMPUTING IN MANUFACTURING INDUSTRY:

❚ Support for preventive maintenance, reduces downtime
❚ Monitor, analyse and manage energy consumption
❚ Predicts errors and risks in production lines

SECTOR #2 HEALTH CARE :
Faster intervention and more protection

As you could read in the previous chapter, edge computing provides faster data processing and reaction time. These are two benefits that are very welcome in the busy, medical world. When a patient ends up in Intensive Care, it is important that their vital parameters are continuously monitored. Edge computing processes this data locally, this way alerts can be automatically sent to the treating doctor or caregiver in case of abnormal observations. By monitoring parameters in this way, medics in the future can use a standard patient model of a given condition. This will allow them to predict complications and disease patterns and better help patients. Another advantage of edge computing in healthcare is that data remains on-site, which only increases patient data protection.

PRINCIPLES OF EDGE COMPUTING
IN THE HEALTH CARE INDUSTRY:
❚ Real-time analysis of parameters
❚ Can predict disease patterns in ICU patients
❚ Better data protection of patients

SECTOR #3 LOGISTICS:
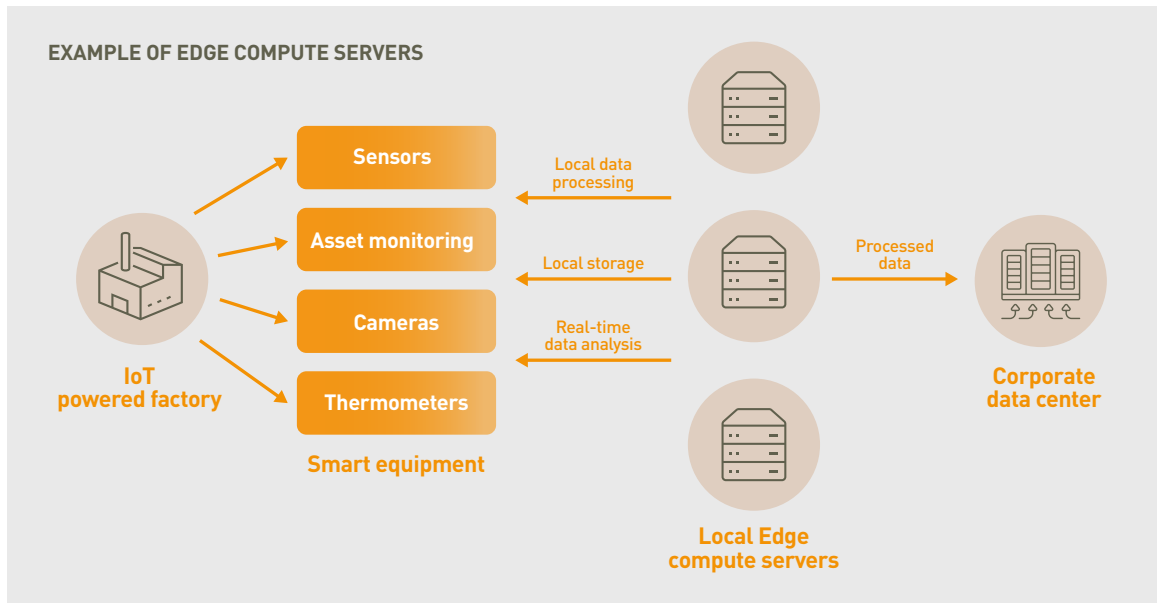## Optimal distribution and fewer delays

The pandemic caused quite a stir in the logistics world. Empty shelves in supermarkets and delayed delivery times were no exception. Organisations had to be creative and improve their logistics processes. For a lot of companies, the combination of Internet of Things devices and edge computing offered answers to their challenges. IoT devices monitor temperature, track real-time location, and watch stock levels to make data-driven business decisions. Furthermore, fewer delays take place and network overloads are avoided. This way, your organisation experience minimal downtime, which in turn ensures that supermarkets and distribution centers are always up-and-running, and orders are always processed. Another advantage is that you do not need IT staff on site, as you can monitor and manage everything from one central location.

PRINCIPLES OF EDGE COMPUTING
IN THE LOGISTICS SECTOR:
❙ Real-time overview of stock
❙ Delivery tracking
❙ Reduced human intervention

EXAMPLE OF EDGE COMPUTE SERVERS

IoT powered factory

Sensors
Asset monitoring
Cameras
Thermometers

Smart equipment

Local data processing
Local storage
Real-time data analysis

Processed data

Corporate data center

Local Edge compute servers

SECTOR #4 GOVERNMENT:
Smart cities for greater security and improved services

According to the United Nations, nearly 68 % of the world's population will live in cities by 2050, an increase of 30 % since the 1950's. This presents many social and geological challenges for cities. With the rise of IoT, cities are also integrating Edge computing. Apart from helping to optimise services, simplify processes and save costs, there are more concrete examples. Having so many people together in one place can cause a lot of challenges. How do you make sure there are not too many people in one place? Imagine having everything at hand via an app: available parking spaces, shops without queues, quick assistance in case of an accident. Edge computing, together with IoT and 5G, contributes to such a "smart city", just think of clear traffic management, disaster relief, but also for digital systems for sustainable and renewable energy. With edge computing, everything can be monitored in real-time, allowing for quick intervention if a problem arises.

PRINCIPLES OF EDGE COMPUTING
IN SMART CITIES:
❚ Responds to geological and social challenges of over-
   population in cities
❚ Rapid intervention in the event of disasters
❚ Clear and real-time overview to ensure safety and
   efficiency in cities

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[1] https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

Edge Computing.

A solution for you?

The relevance of edge computing is present in almost all industries. At Bechtle, we are happy to help you get started in choosing the right edge computing solution.

One of our partners, Lenovo, developed the ThinkSystem SE450 edge server that adds artificial intelligence to the edge. The model includes a 3rd Generation Intel® Xeon® Scalable Processors, a generation with Intel Deep Learning Boost technology. This enables you to count on better prediction, automation and optimisation within your business processes.

Would you like to know more about edge computing? Then contact us – we will be happy to help you further.

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