Edge Computing

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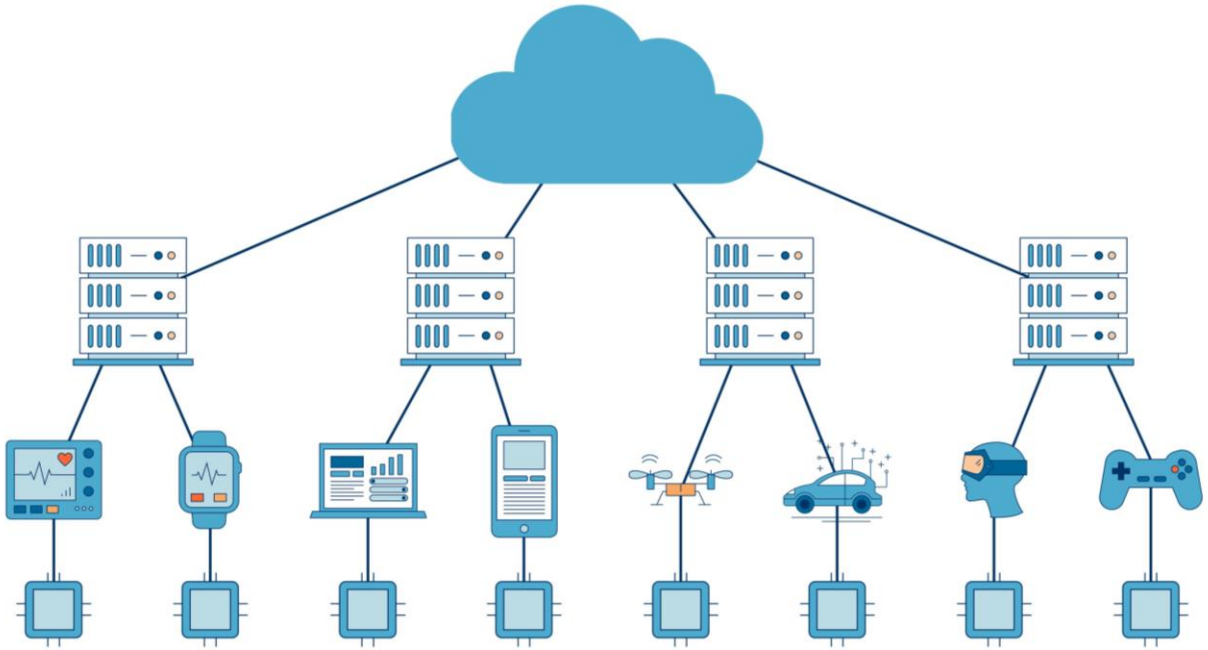
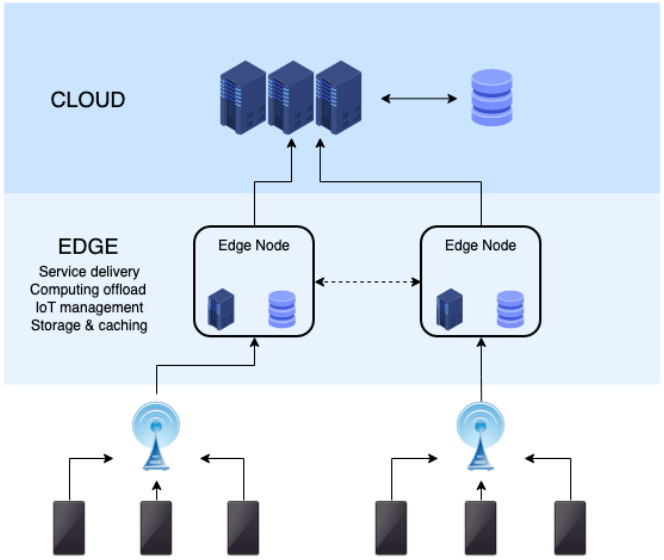
Introduction

With the rapid development of electronic, information, and communication technologies such as the Internet of Things, 5G, blockchain, and sensors, the growth of various types of data has shown an exponential trend, and the requirements of massive data on computing power and speed are also increasing.



What is edge computing?

Edge computing is a distributed information technology (IT) architecture in which client data is processed at the periphery of the network, as close to the originating source as possible.



The edge can be the router, ISP, routing switches, integrated access devices (IADs), multiplexers, etc. The most significant thing about this network edge is that it should be geographically close to the device.

Benefits of Edge Computing

1. Eliminates Latency

Large physical distances between these two points coupled with network congestion can cause delays. As edge computing brings the points closer to each other, latency issues are virtually nonexistent.

2. Saves Bandwidth

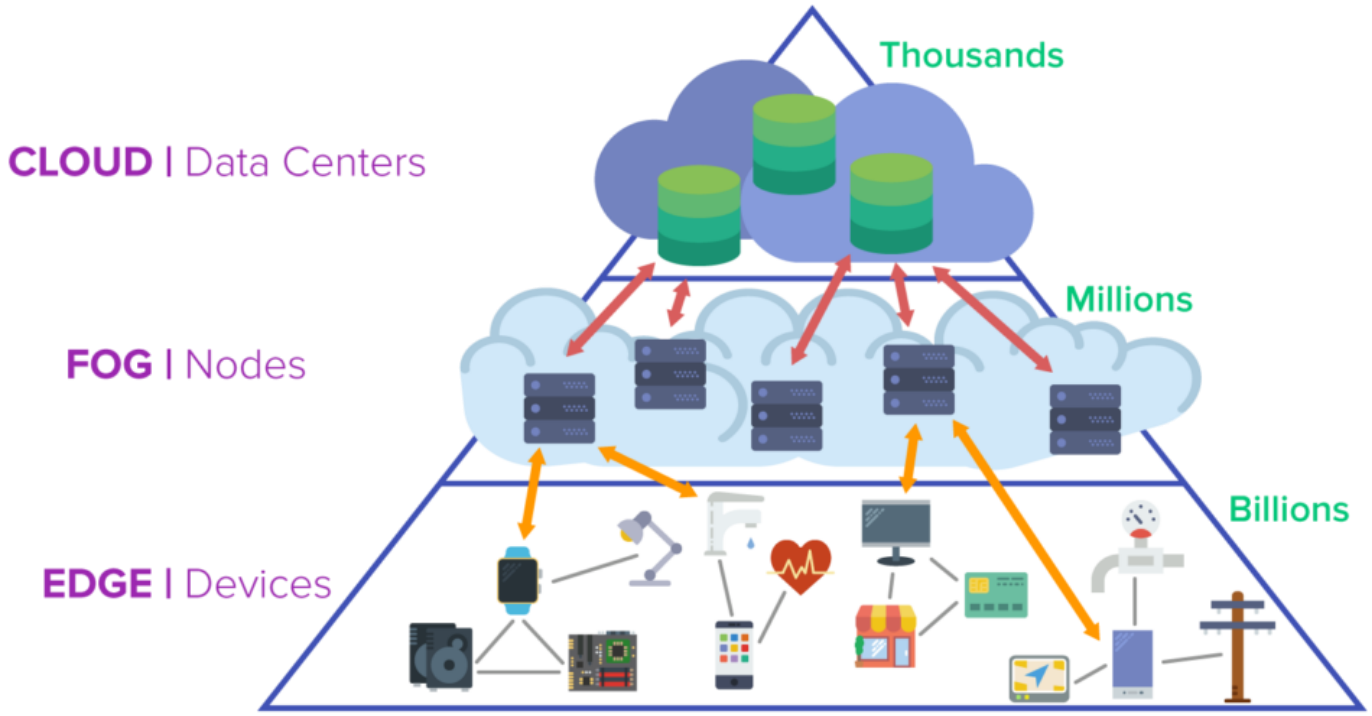
By deploying the data servers at the points where data is generated, edge computing allows many devices to operate over a much smaller and more efficient bandwidth.

3. Reduces Congestion

In edge computing, there is a local storage and local servers can perform essential edge analytics in the event of a network outage.

Edge vs. cloud vs. fog computing

- Location of Data Processing
- Processing Power and Storage Capabilities
- Purpose



Edge computing use cases and examples

- **Manufacturing:**

  An industrial manufacturer deployed edge computing to monitor manufacturing, enabling real-time analytics and machine learning at the edge to find production errors and improve product manufacturing quality. Edge computing supported the addition of environmental sensors throughout the manufacturing plant, providing insight into how each product component is assembled and stored and how long the components remain in stock. The manufacturer can now make faster and more accurate business decisions regarding the factory facility and manufacturing operations.

Edge computing use cases and examples

- **Farming:**

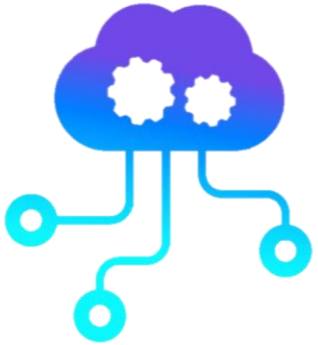
  Consider a business that grows crops indoors without sunlight, soil or pesticides. The process reduces grow times by more than 60%. Using sensors enables the business to track water use, nutrient density and determine optimal harvest. Data is collected and analyzed to find the effects of environmental factors and continually improve the crop growing algorithms and ensure that crops are harvested in peak condition.

Edge computing use cases and examples

- **Workplace safety:**

  Edge computing can combine and analyze data from on-site cameras, employee safety devices and various other sensors to help businesses oversee workplace conditions or ensure that employees follow established safety protocols especially when the workplace is remote or unusually dangerous, such as construction sites or oil rigs.

Challenges of edge computing



- **Limited capability**
- **Connectivity**
- **Security**
- **Data lifecycles**

Conclusion

The ability to analyze data closer to the source will minimize latency, reduce the load on the internet, improve privacy and security, and lower data management costs.

The cloud will continue to play a critical role in aggregating important data and performing analyses on this massive set of information to glean insights that can be distributed back to the edge devices.

While the cloud is crucial to the success of IoT, under certain circumstances, cloud computing alone can’t meet these demands for faster data analysis.

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