



TECHNICAL SEMINAR

Edge Computing

Bringing computation closer to where data is created

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GUIDE
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Agenda

01

Overview

02

Core concepts

03

Applications

04

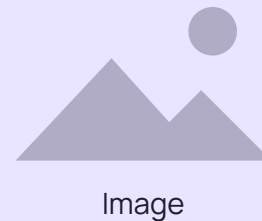
Challenges

05

Future

Introduction

- Billions of devices now generate data at the network edge
- Sending everything to the cloud adds delay and cost
- Edge computing processes data near its source
- It powers real-time apps like autonomous vehicles and smart factories



Evolution

2000s

CDNs

Content cached near users

2016

MEC

Compute inside mobile networks

2012

Fog computing

Cloud extended to the network

2020s

AI at the edge

Models run on devices

Key concepts

1

Latency

Time for data to travel and be processed – the edge cuts it sharply.

2

Edge node

A small server or gateway close to the devices it serves.

3

Offloading

Deciding which tasks run locally and which in the cloud.

How it works



Sense

Devices collect data



Filter

Edge node cleans and aggregates



Decide

Local model acts instantly



Sync

Summaries go to the cloud

Architecture

Three tiers – device, edge and cloud – each doing what it does best.

Devices sense, edge nodes make time-critical decisions, and the cloud handles long-term storage, training and fleet-wide analytics.



Architecture diagram

Applications

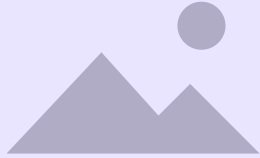


Image 1

Smart factories

Machine faults detected in milliseconds



Image 2

Connected vehicles

Local processing for safety features

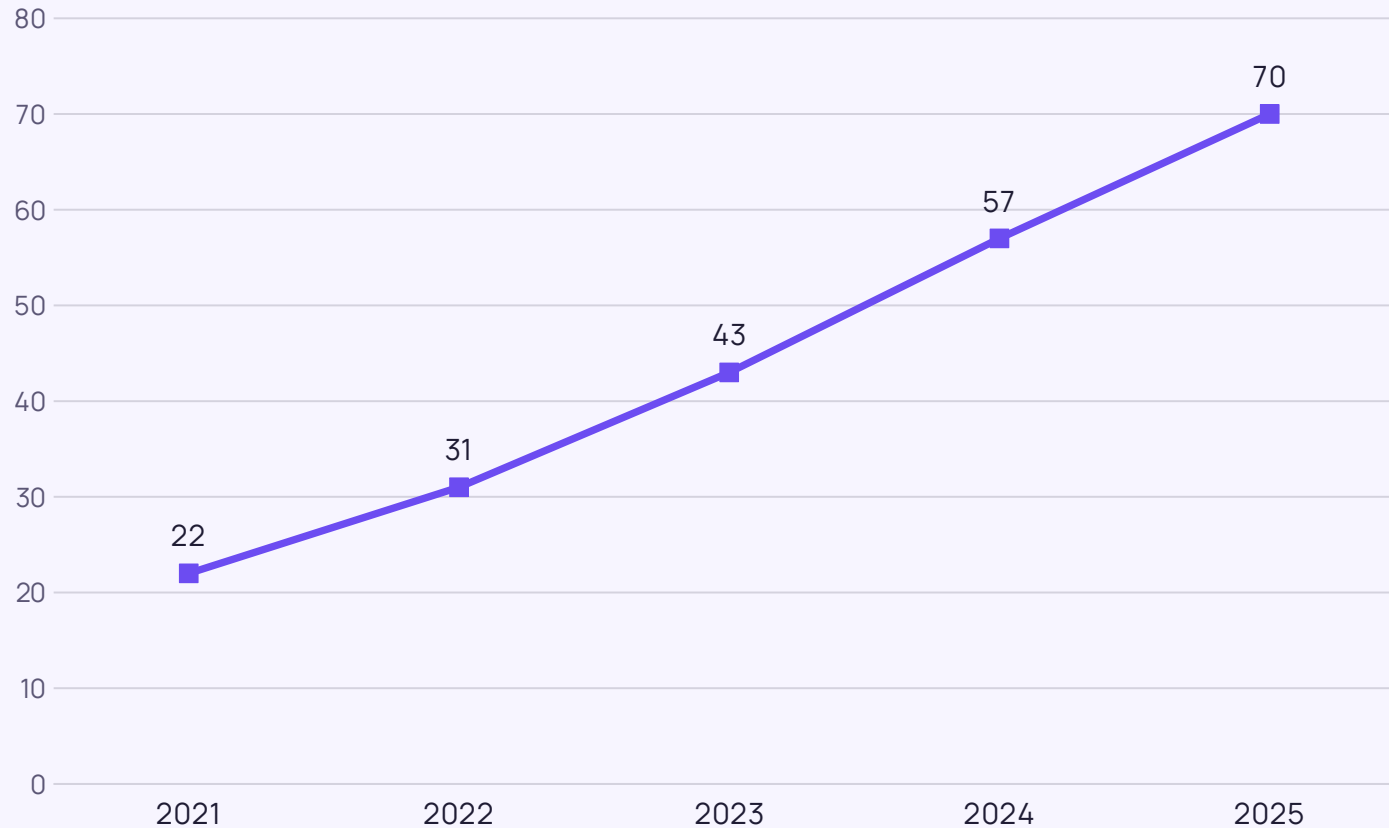


Image 3

Retail

In-store analytics without uploading video

Adoption trend



Adoption has grown steadily as 5G and low-power AI chips matured.

Sample data for illustration – replace with your own figures.

Advantages and limitations

Advantages

- Very low latency
- Lower bandwidth costs
- Better data privacy
- Works with poor connectivity

vs

Limitations

- Harder to manage many nodes
- Limited compute per node
- Physical security of devices
- Standards still evolving

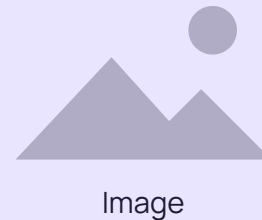


**The future cloud is not
one place — it is
everywhere data is born.**

Looking ahead

References

- [1] Survey paper on the topic, IEEE Access, 2024.
- [2] Textbook chapter covering fundamentals, 2023.
- [3] Recent conference paper on applications, 2025.
- [4] Industry white paper (generic reference).



Questions?

Thank you for listening.

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