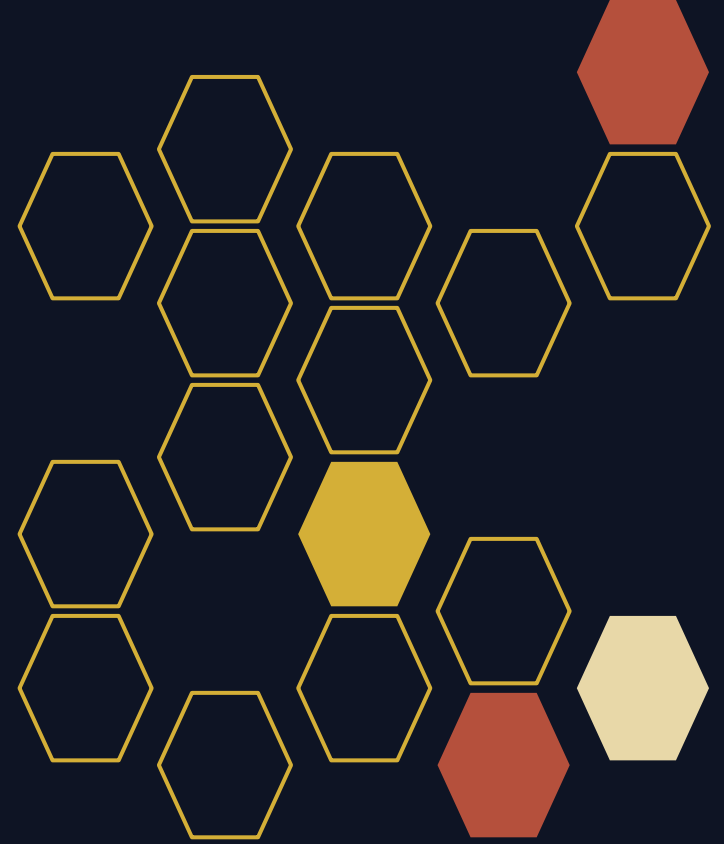


TECHNICAL SEMINAR

EDGE COMPUTING

Bringing computation closer to where data is created



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GUIDE
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02 AGENDA

01 Overview

02 Core concepts

03 Applications

04 Challenges

05 Future



Image



03 | INTRODUCTION

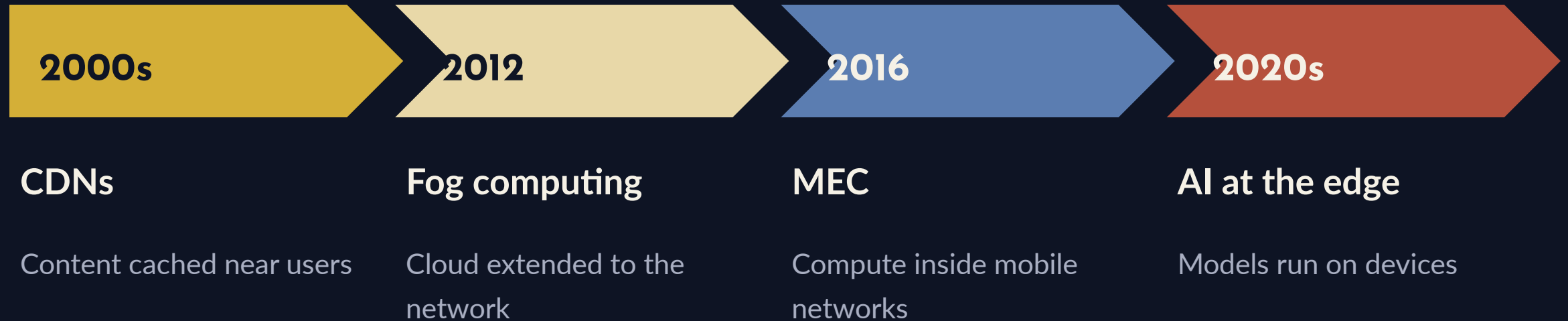
- Billions of devices now generate data at the network edge
- Sending everything to the cloud adds delay and cost
- Edge computing processes data near its source
- It powers real-time apps like autonomous vehicles and smart factories



Image



04 | EVOLUTION





05 | KEY CONCEPTS

01

Latency

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

02

Edge node

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

03

Offloading

Deciding which tasks run locally and which in the cloud.



06 | HOW IT WORKS



Sense

Devices collect data



Filter

Edge node cleans and aggregates



Decide

Local model acts instantly



Sync

Summaries go to the cloud

07 | 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



08 APPLICATIONS



Image 1



Image 2



Image 3

Smart factories

Machine faults detected in milliseconds

Connected vehicles

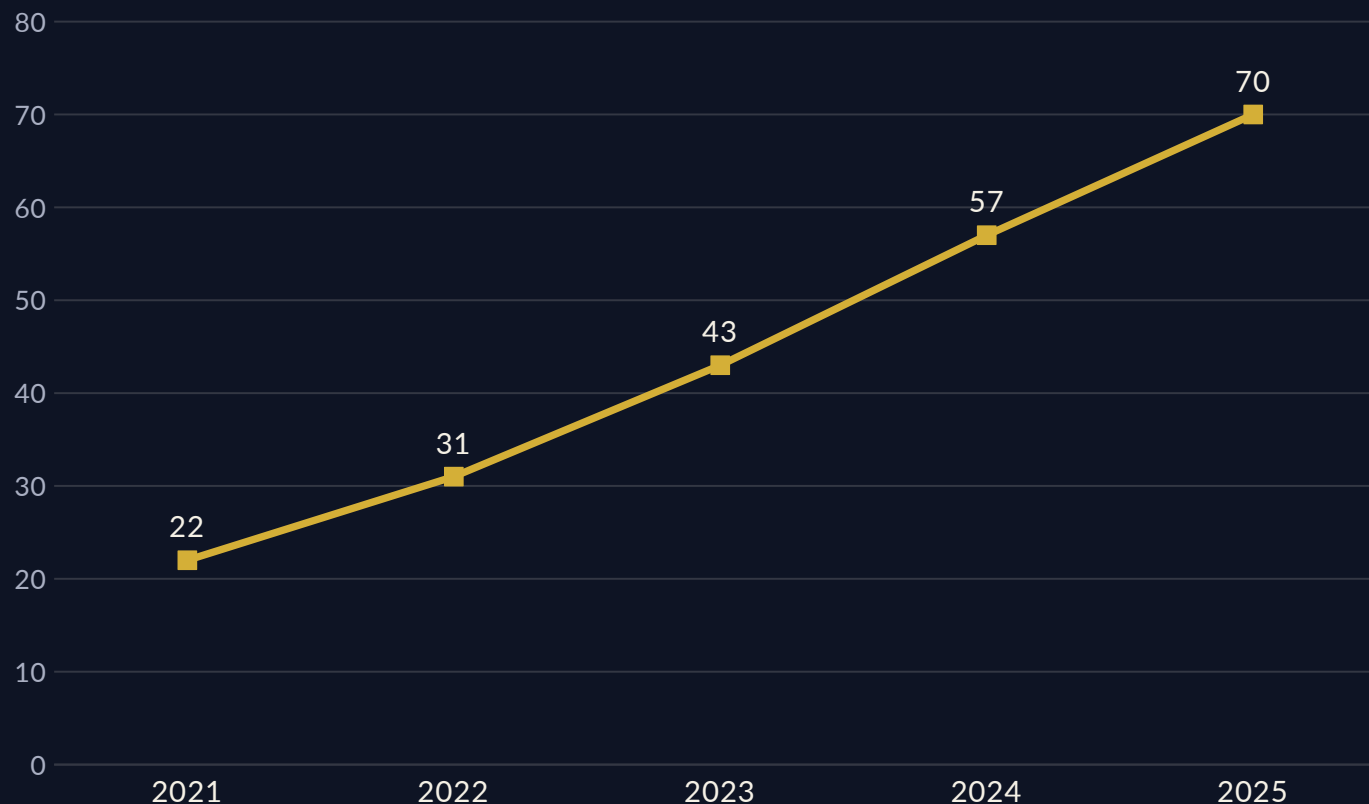
Local processing for safety features

Retail

In-store analytics without uploading video



09 ADOPTION TREND



Sample data for illustration — replace with your own figures.

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



10 | 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



11 | OPEN CHALLENGES

01

Orchestration

Deploying updates to thousands of nodes.

02

Security

Protecting devices in the field.

03

Energy

Running models on tight power budgets.

KEY IDEA

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

Looking ahead



13 | CONCLUSION

- Edge computing complements, not replaces, the cloud
- It is key for real-time, privacy-sensitive applications
- Management and security are the main open problems



14 | 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.