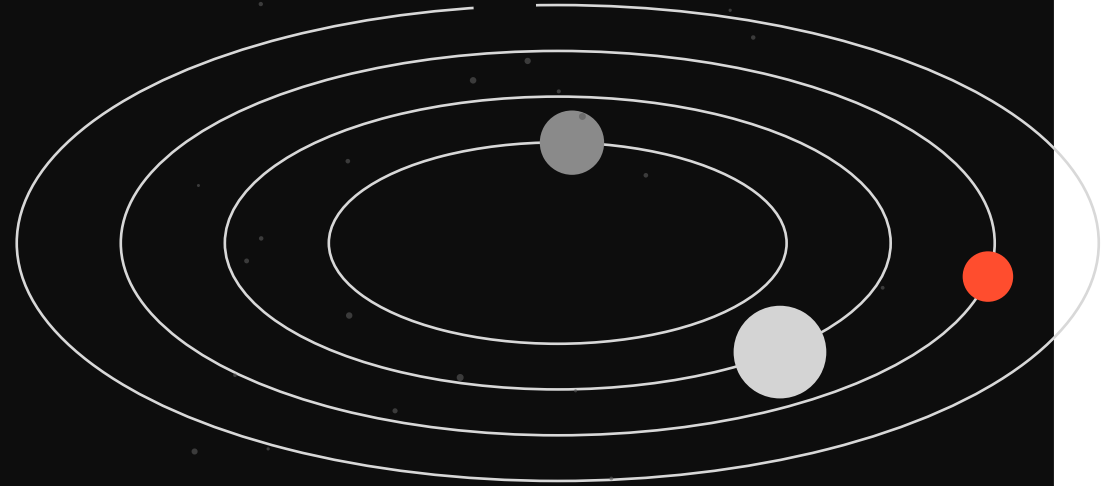


TECHNICAL SEMINAR

5G Technology

The next generation of mobile networks

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Agenda

01 Overview

02 Core concepts

03 Applications

04 Challenges

05 Future



Image

01

OVERVIEW



Introduction

- 5G is the fifth generation of cellular networks
- It offers far higher speeds and lower latency
- It connects many more devices per square kilometre
- It enables new services from smart factories to remote surgery





Evolution

1G

1980s

Analogue voice calls

4G

2010s

Fast mobile broadband

2G–3G

1990s–2000s

SMS and mobile internet

5G

2020s

Ultra-fast, low-latency
networks

02

CORE CONCEPTS



Key concepts

01

mmWave

High-frequency bands with huge capacity but short range.

02

Massive MIMO

Many antennas serve many users at once.

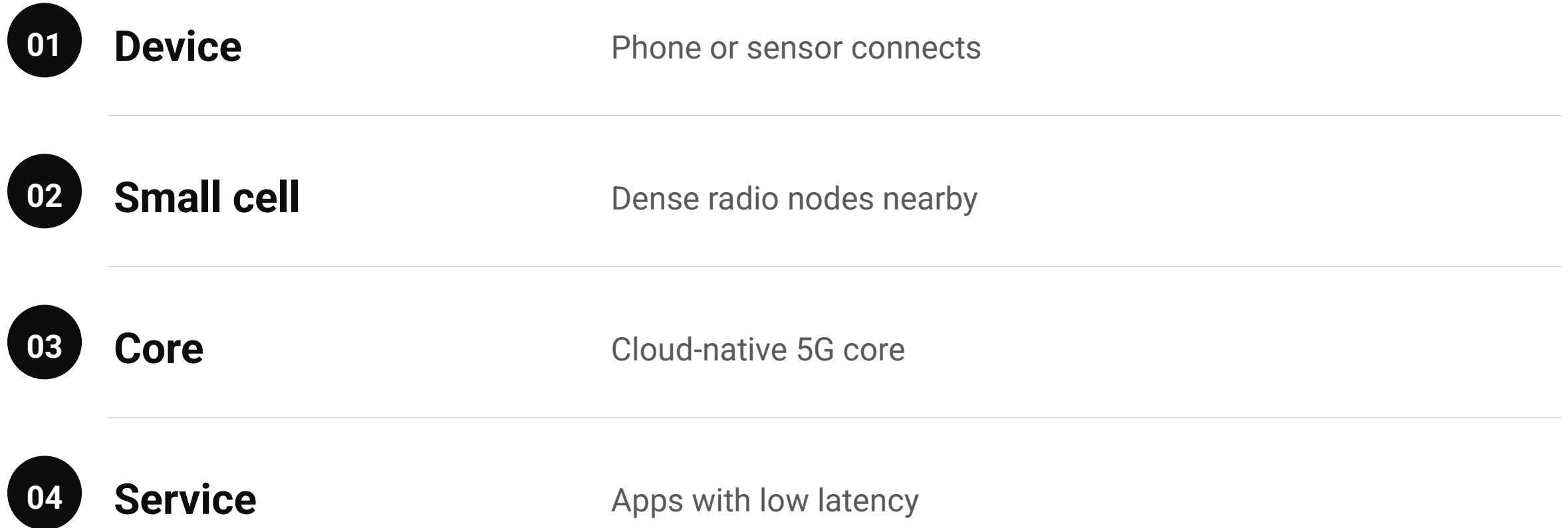
03

Network slicing

Virtual networks tailored for each service.



How it works





Architecture

A cloud-native core and dense small cells.

5G separates the radio from a software-defined core, so operators can create network slices with guaranteed speed and latency for different uses, from video to industrial control.



Architecture diagram

03

APPLICATIONS



Applications



Image 1

Smart factories

Wireless robots and sensors.



Image 2

Telemedicine

Remote consultations and monitoring.



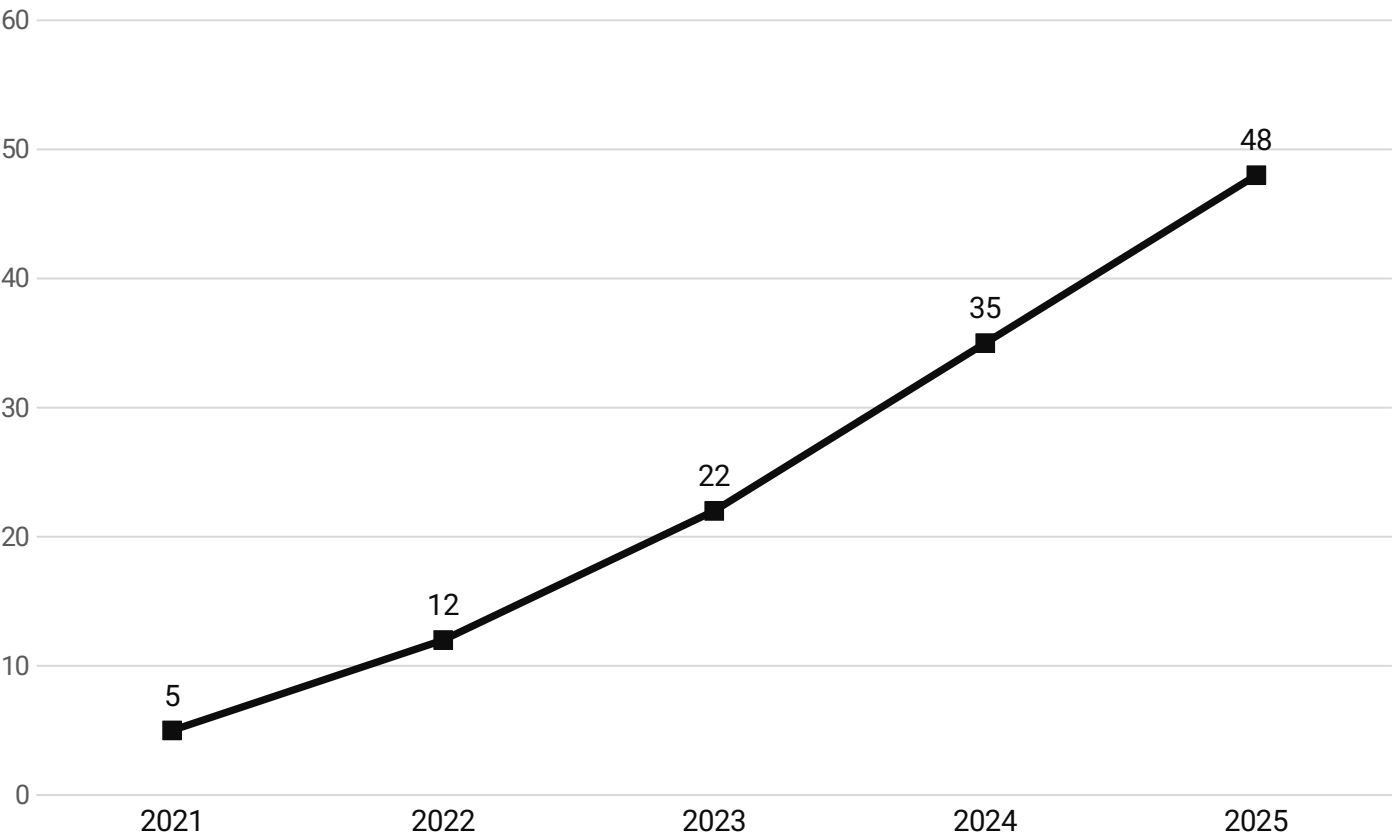
Image 3

Connected vehicles

Real-time traffic data.



Adoption trend



Share of mobile connections on 5G (sample data).

Sample data for illustration — replace with your own figures.



Advantages and limitations

Advantages

- ✓ Very high speeds
- ✓ Latency of a few milliseconds
- ✓ Huge device capacity
- ✓ Flexible network slices

Limitations

- Expensive rollout
- Short range at high bands
- Device costs
- Energy use of dense networks



Open challenges

01

Coverage

Dense cells needed in cities.

02

Cost

Spectrum and equipment investment.

03

Security

More connected devices to protect.

04

FUTURE

**5G-Advanced and 6G research
are already under way.**

Looking ahead



Conclusion

- 5G is more than faster phones
- It unlocks industrial and civic use cases
- Coverage and cost remain the key challenges



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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