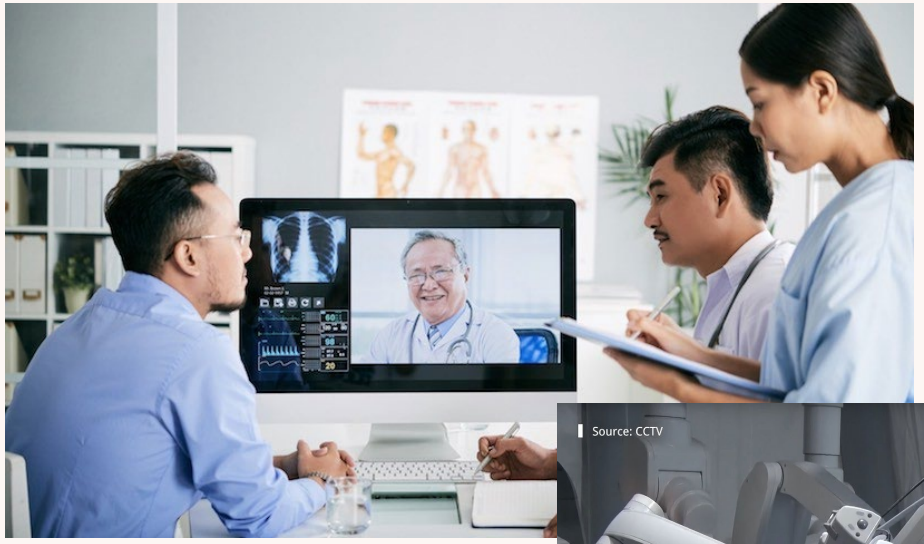
D. 5G and AIoT Technologies

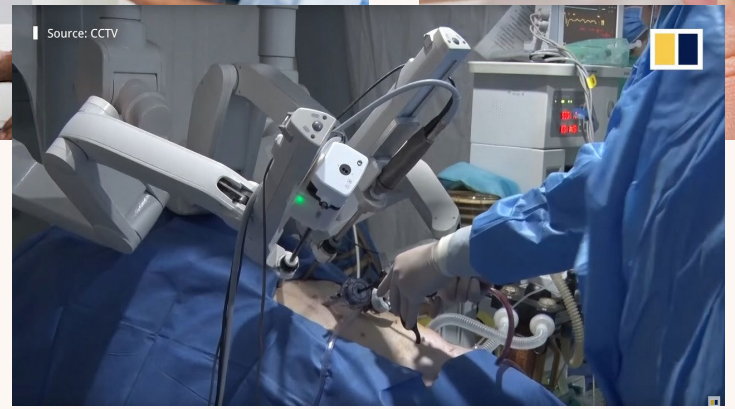
Chapter #4: 5G and AIoT Use Cases Part #2

With sincerest thanks to: Lucas CHEONG Wai

Healthcare and AIoT



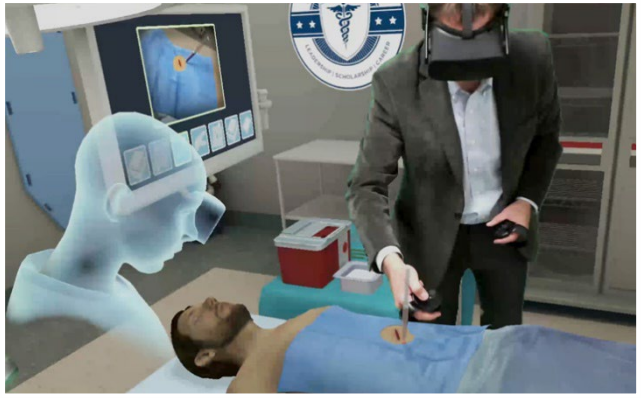
Telemedicine



Personal Health Systems

Source: https://dgtlinfra.com/5g-use-cases-in-10-different-industries

Smart Healthcare



Trends:
Increasing data-heavy applications, for example, ultra-fast content transfer ➡ AR / VR

Current Solution:
Traffic optimisation and offload (e.g. to other networks)

5G enables eMBB:
High data rate, with high security and reliability

Healthcare Applications:
AR/VR for Remote Education, Diagnosis and Surgery

Trends:
IoMT: an ecosystem of connected devices that facilitate communications between patients, medical devices and monitoring equipment

Current Solution:
Connected devices on 4G/IoT networks, limited or no connections between robots and IoT devices

5G enables mMTC:
Continuous monitoring, predictive analytics and thus personalised and effective (cost per bit) healthcare through IoMT

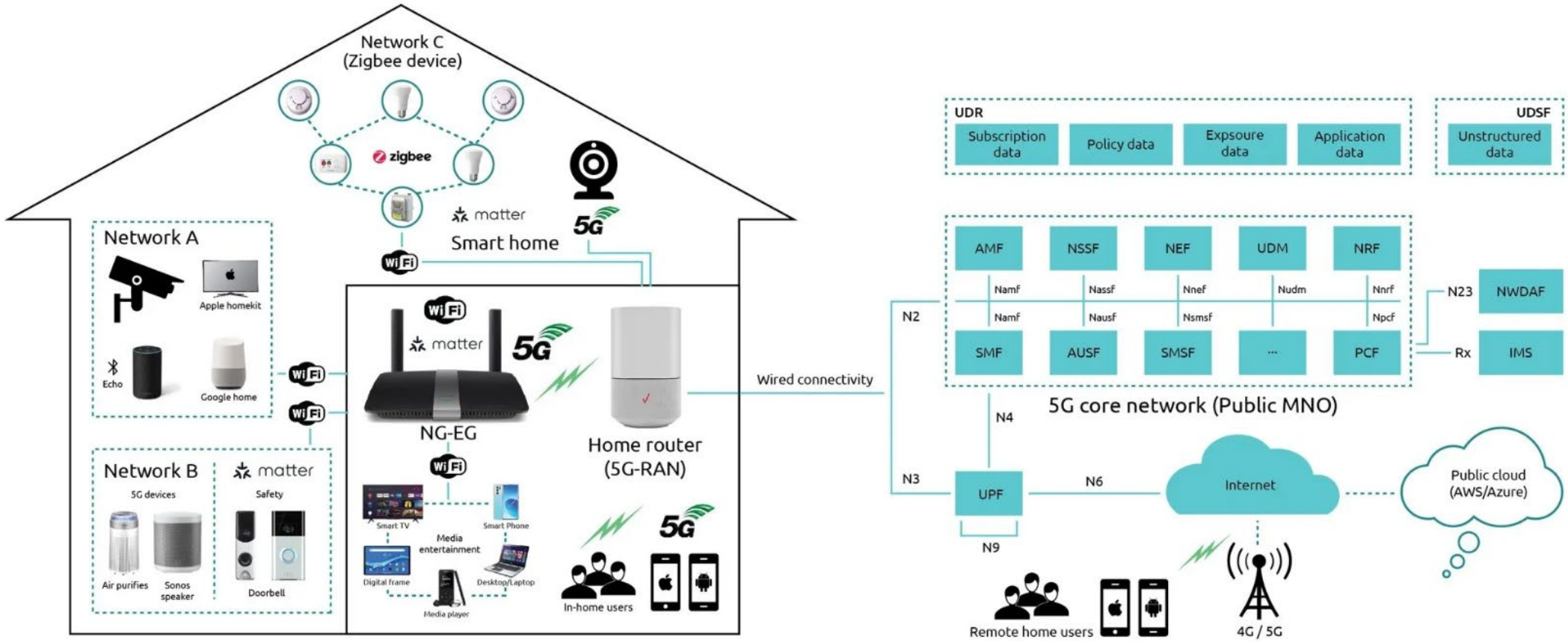
Healthcare Applications:
Preventive care and health surveillance for long-term remote monitoring of chronic conditions or lifestyle improvements and Hospital IoMT

Trends:
Aging population (UN: by 2025, 21% - abt. 2bn people over age of 60), healthcare costs, long-term care. Growing demand of medical robots, remote delivery of medical interventions (e.g. remote surgery)

Current Solution:
Non-feasible; or through relatively expensive industry-specific or proprietary networks and IT systems

5G enables uRLLC:
1ms or Sub-ms vs. 20-40ms with 4G

Healtcare Applications:
Mission-critical operations, e.g. Remote / Robotic Surgery, human-robots collaborations (“Co-bots”)



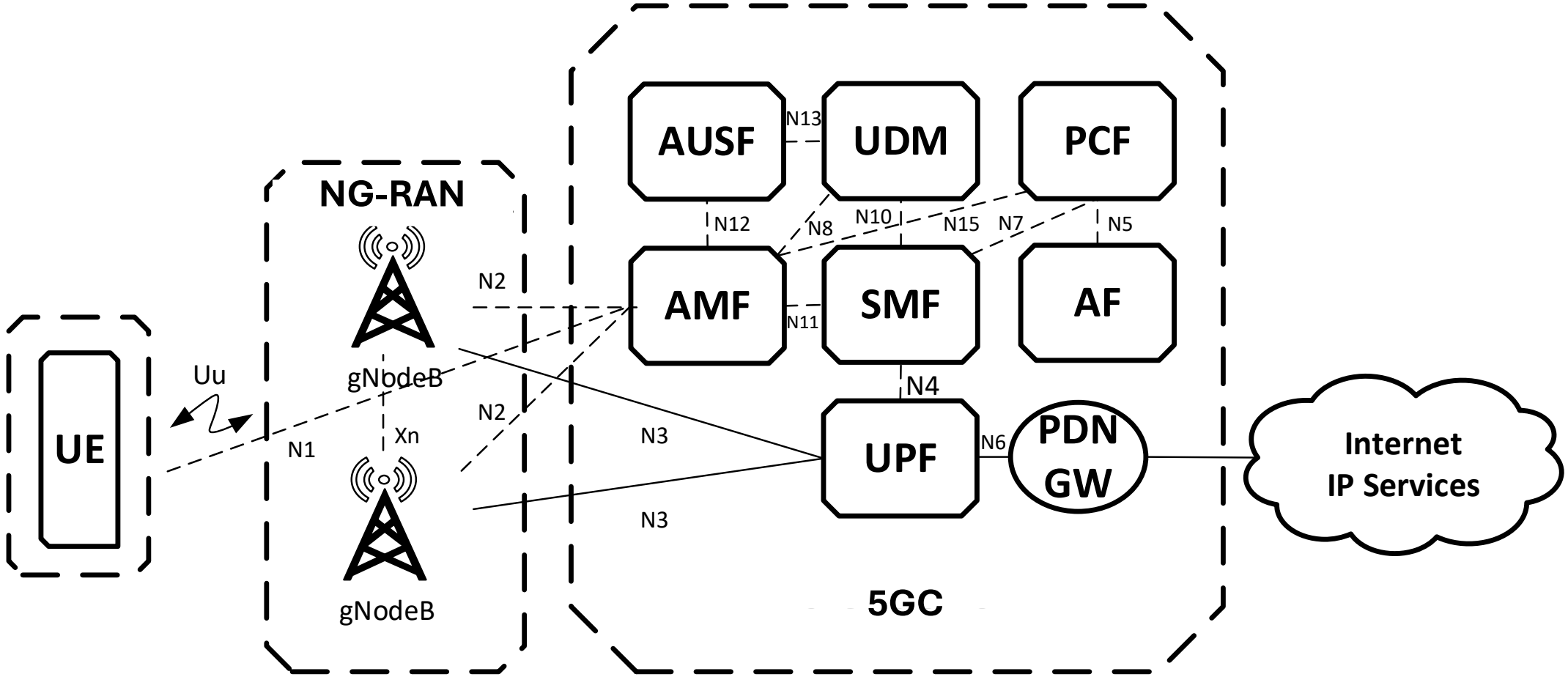
Smart Home

Source: https://www.capgemini.com/insights/expert-perspectives/the-need-for-next-gen-edge-gateway/

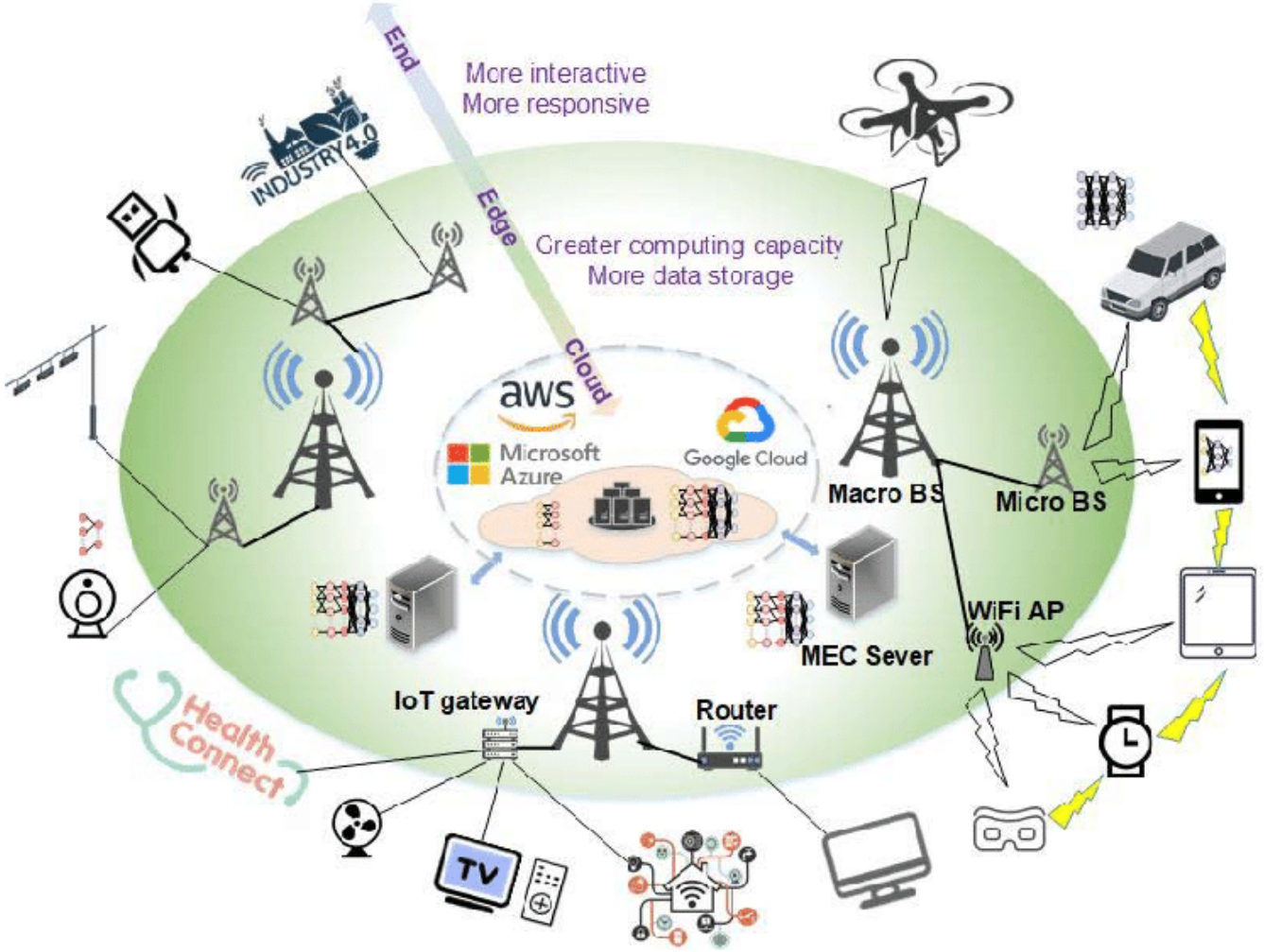
Smart Buildings

Source: https://www.sciencedirect.com/science/article/pii/S2666546821000653

5G Infrastructure: a revisit

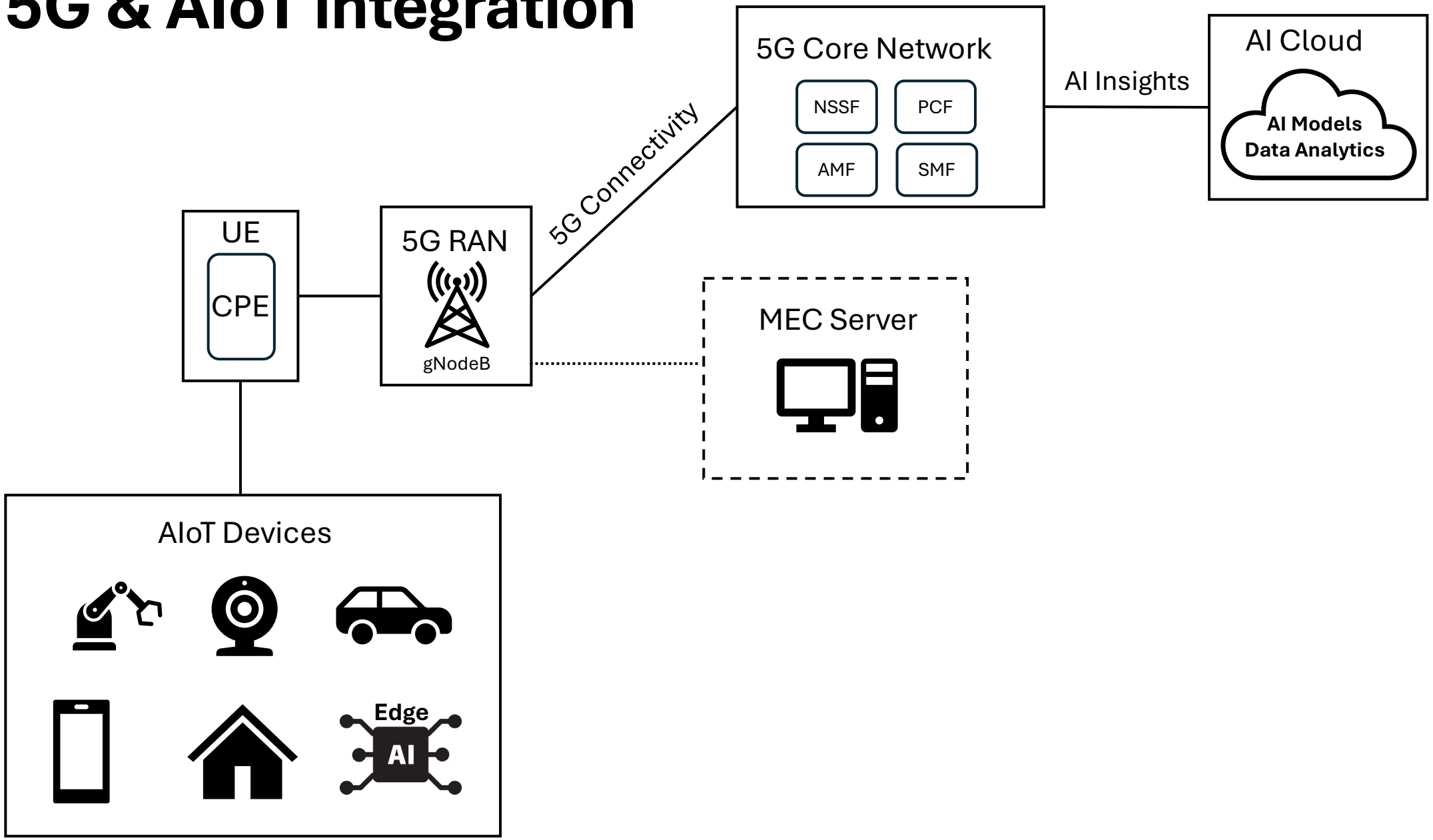


AIoT Infrastructure



Source: https://www.researchgate.net/figure/Overview-of-an-AIoT-architecture_fig4_352386275

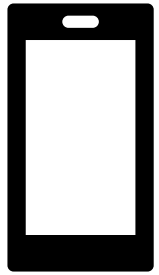
5G & AIoT integration



5G & AIoT integration Challenges And Solutions

5G

Infrastructure Cost and Deployment

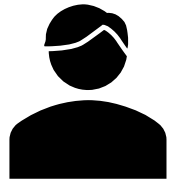


Interoperability Issues

Data Security and Privacy

Latency and Reliability

Power Consumption



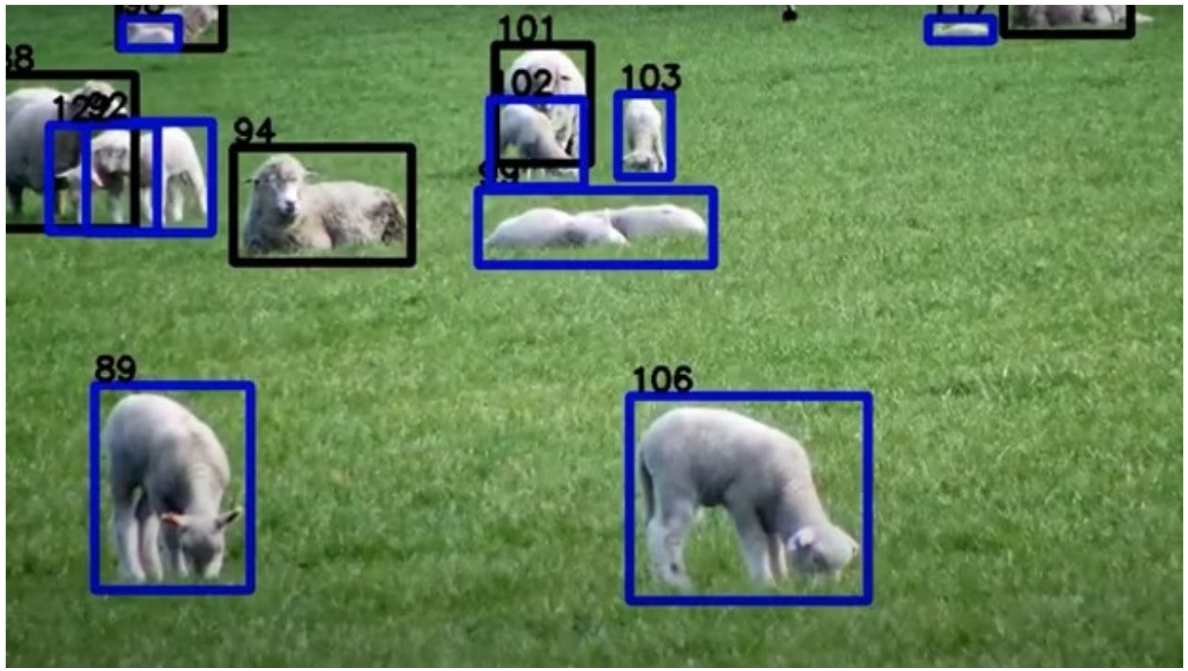
Algorithmic Bias and Discrimination

Apply, Integrate, and Implement 5G & AIoT solutions that align with the objective of UNSGD goals

Source:

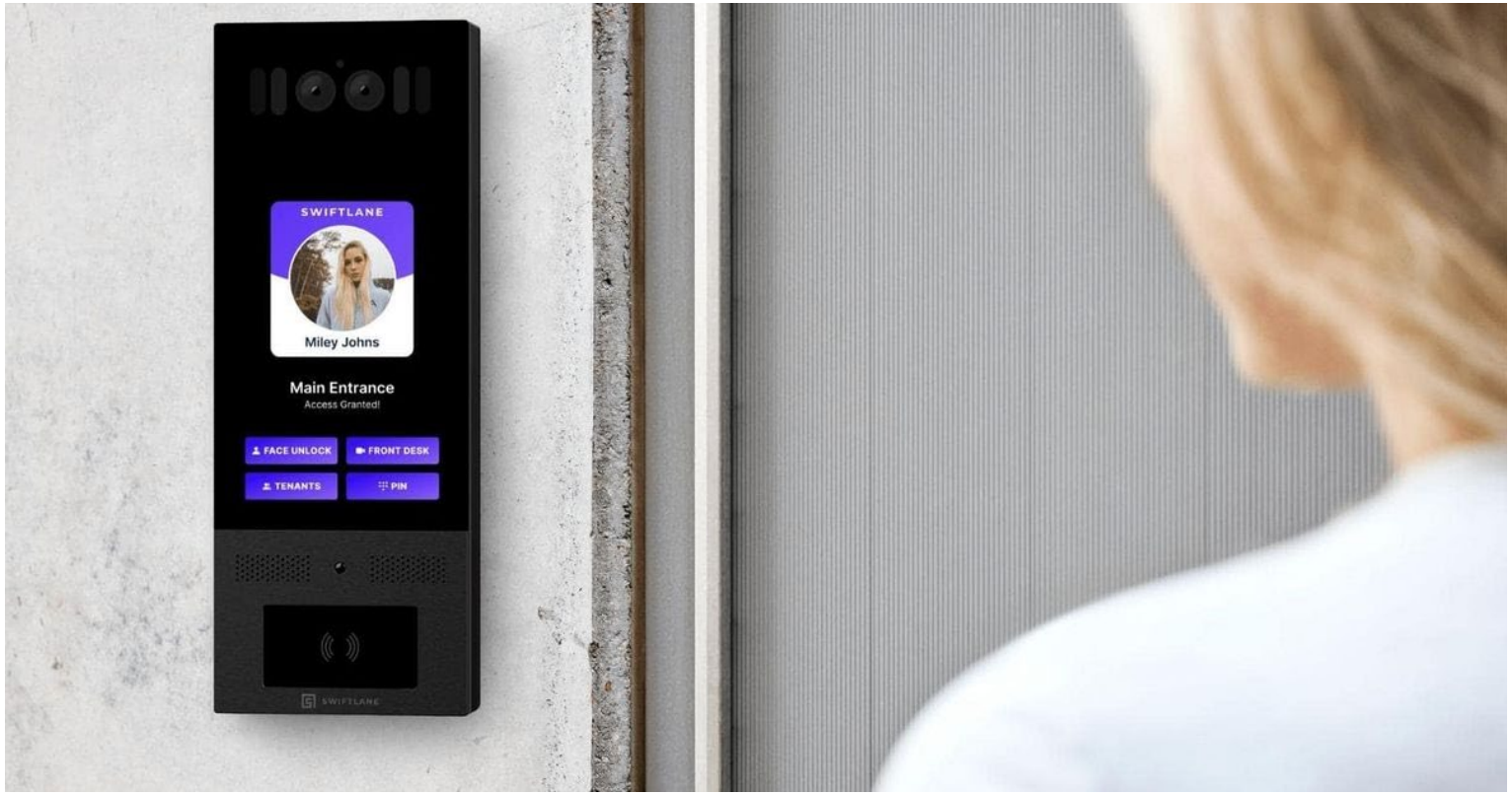
https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals

Apply, Integrate, and Implement 5G & AIoT solutions that align UNSDG GOAL 2 – Zero Hunger



Sources:
https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals,
https://www.abc.net.au/news/2023-06-06/sheep-face-recognition-trial-arrives-in-australia-genesmith/102414936

Apply, Integrate, and Implement 5G & AIoT solutions that align UNSDG GOAL 9 – Industry, Innovation and Infrastructure



Sources: https://swiftlane.com/blog/face-recognition-door-access-control/, https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals