5G and Industry 4.0

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New user demands – with extremely diverse requirements

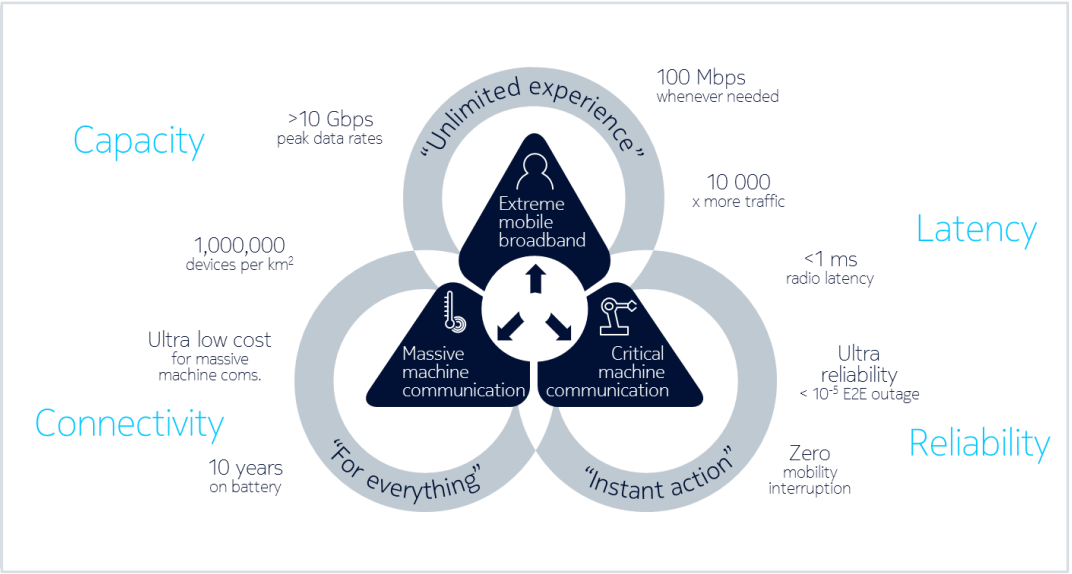
5G is more than 1 generation ahead of LTE

Devices
1.5 GB/day

Smart Factories
1 PB/day

Billions of sensors
connected

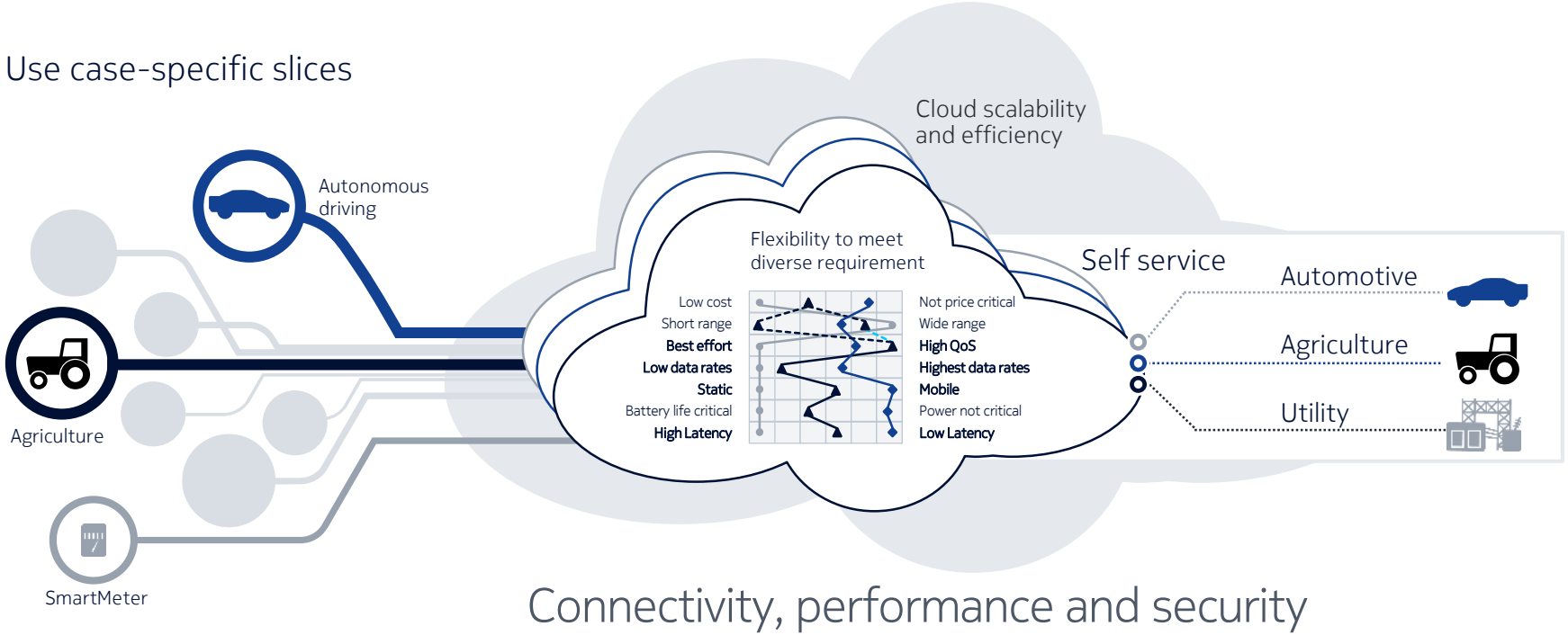
Autonomous driving
1ms latency



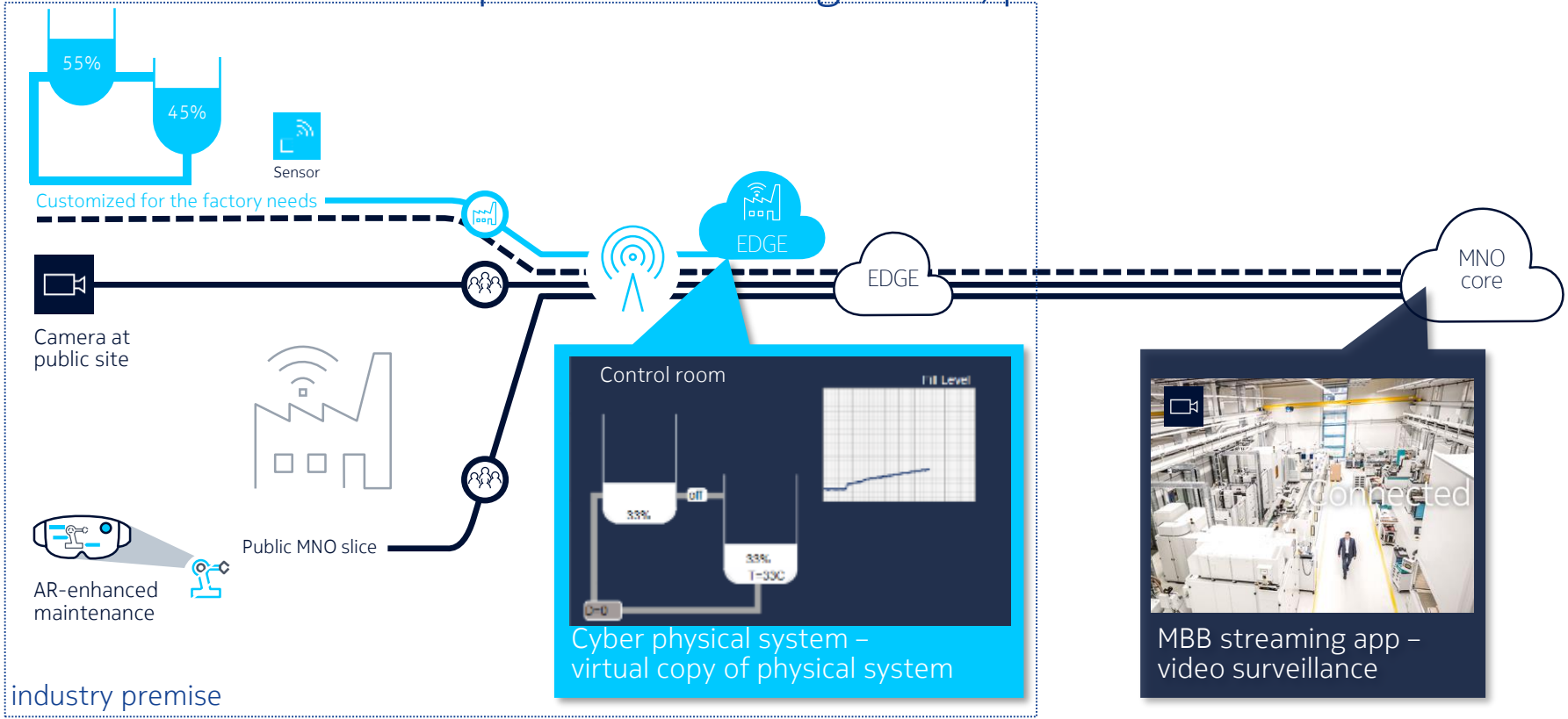
Design and architecture principles:
flexible | scalable | automated | cloud native
software centric | dynamic network slicing

Example: Enabling distributed cloud and automation

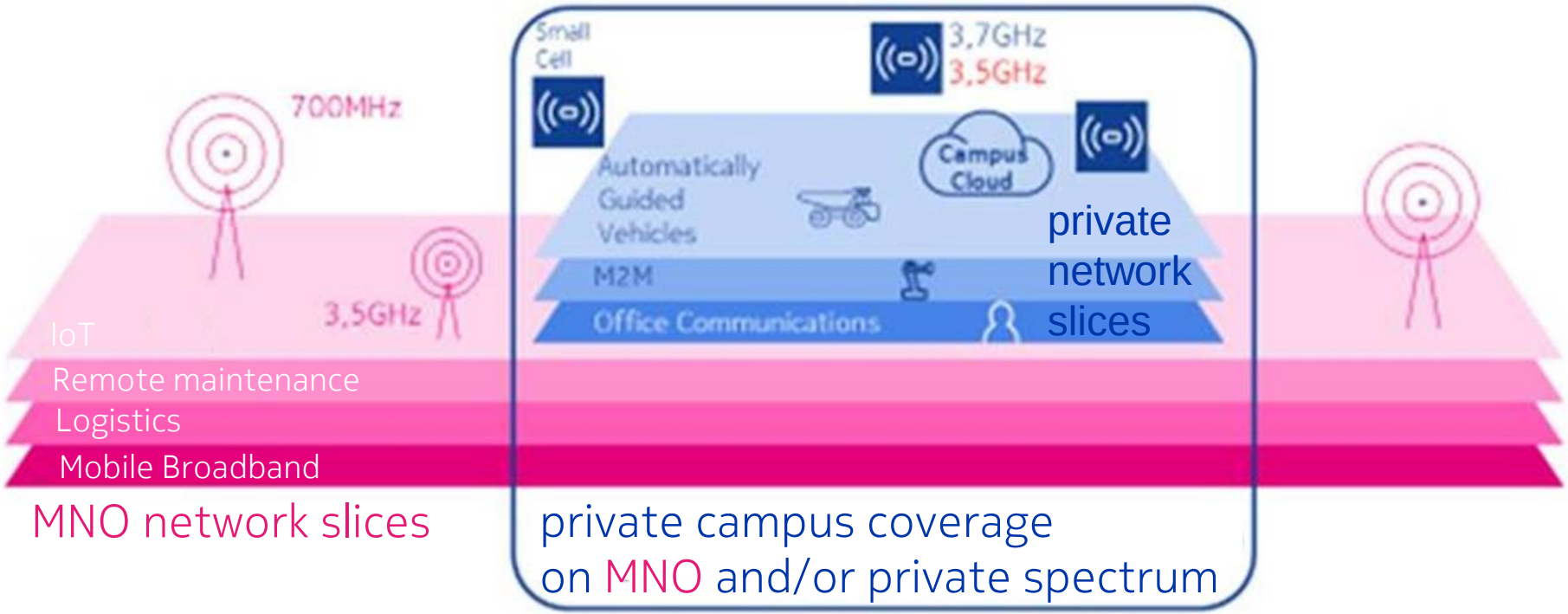
e2e Network Slicing - across radio, transport, core edge and central clouds



Industrial network slicing in one RAN, one spectrum
Local slices terminate in private mobile edge cloud, public slice in MNO core



Network slicing on industry campuses for verticals
MNO can leverage private enterprise CAPEX for network slices to indoors



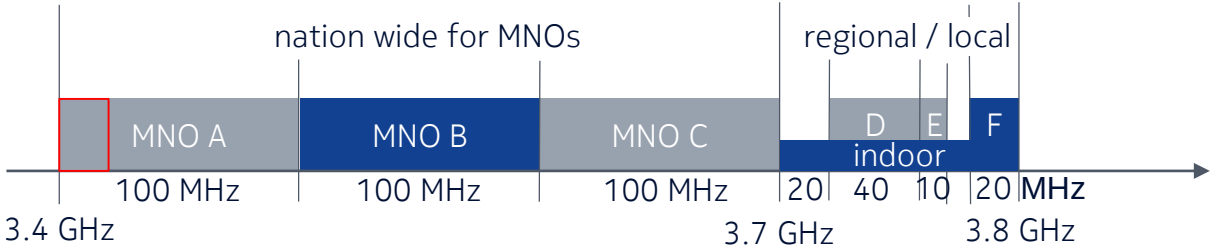
campus network designed to industry requirements
enterprise data remains local

Network slicing in combination with proposed BNetzA rules for C-Band *)
Local co-operative model between MNO and local enterprise

BNetzA proposal for 3.4-3.8 GHz
- 3.4-3.7 GHz in nation wide „Vergabeverfahren“1H19, auction, nationwide
- 3.7-3.8 GHz in local and regional application procedure for local indoor, local outdoor and regional, expected 1H19
- Mutual obligation to allow use of others´ spectrum if unused

Possible spectrum assignment scenario in e.g. an industry campus in 3.4-3.8 GHz ~2019
- 3 nation wide MNO licensees own 100 MHz each (subject to auction outcome)
- Several local and regional license owners of e.g. 40, 10 & 20 MHz

Possibly limited use of lowermost 20 MHz due to CEPT requirements on protection of services below 3400 MHz



Local enterprise could own local indoor and outdoor license F and approach MNO B for joint use of 120/200 MHz bandwidth
Bandwidth would be dynamically shared between public network slices of MNO B and private campus network slices
Local RAN ownership (e.g. small cell in-factory network) could be with local enterprise, their IT provider, or with MNO-B

BNetzA model shall allow for flexibility in roles and business models

*) www.bnetza.de/mobilebroadband
www.bnetza.de/mobilesbreitband

5G-ACIA

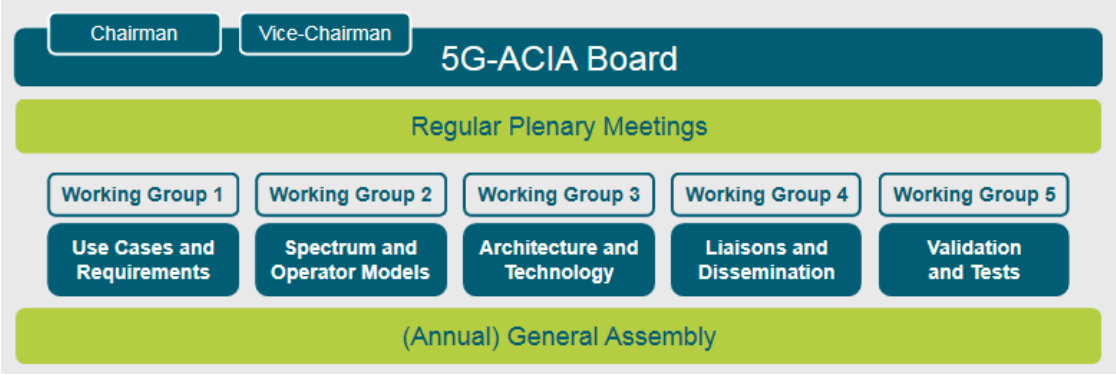
5G ACIA

5G Alliance for Connected Industries and Automation

5G-ACIA mission

- Bring together OT and ICT industry
- Establish a common language
- Assure requirements of OT are considered in standardization
- Address spectrum needs of OT in 5G
- Provide a suitable evaluation framework

- Founded in 04/2018
- 39 members (09/2018)
  16 from operational technology (OT)
  15 from ICT
  academia/others



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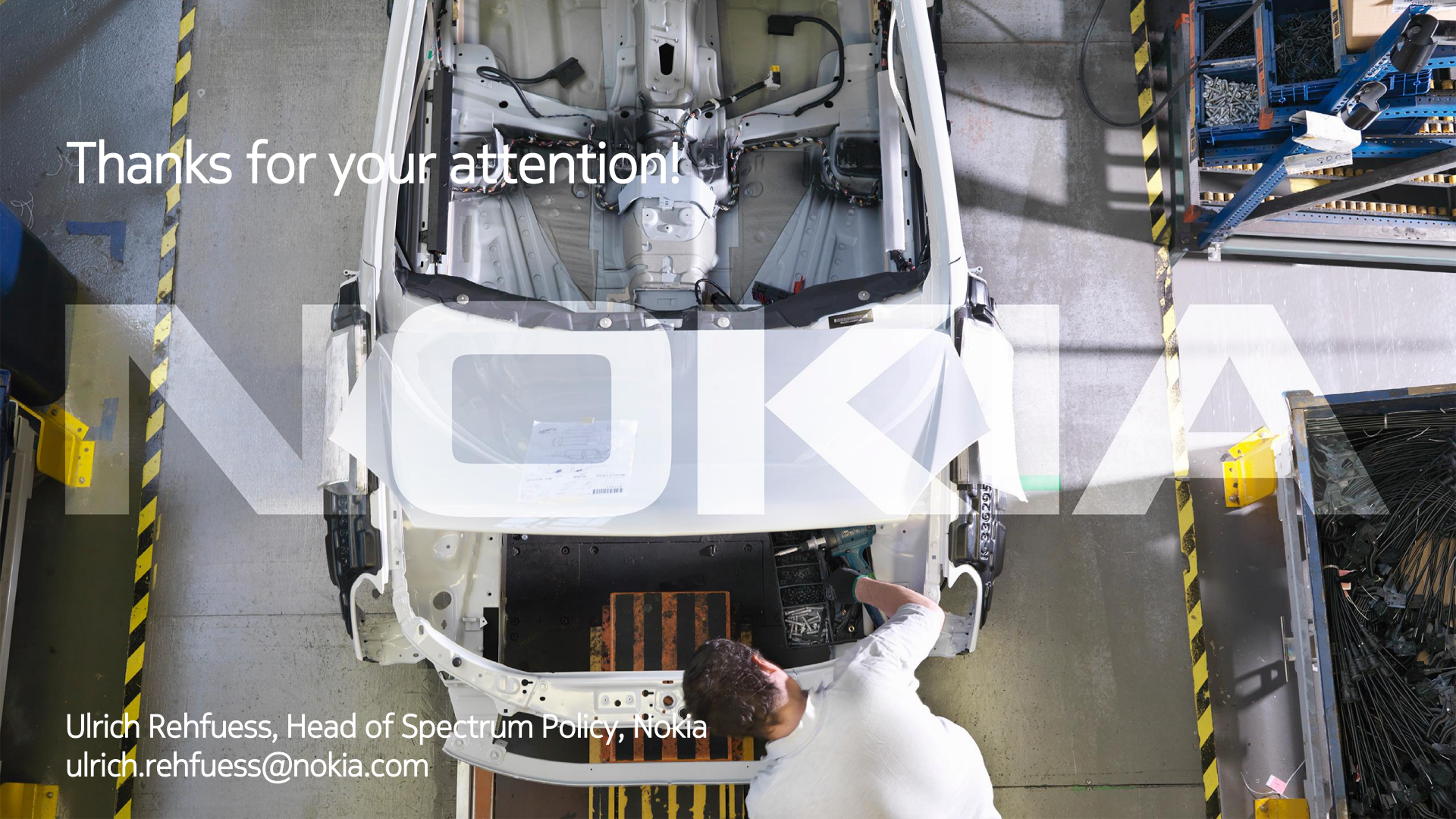
Thanks for your attention!



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