Dr. Andreas Müller
Senior Expert and Project Manager
Bosch
Network Slicing for Industry 4.0
– Expectations and Opportunities

Dr. Andreas Mueller
Robert Bosch GmbH
Network Slicing for Industry 4.0 - Expectations and Opportunities

The Role of 5G for Industry 4.0

Industry 4.0

- Increase the **flexibility, versatility, productivity, resource efficiency & usability** of industrial production
- **Connectivity as a key enabler** for cyber-physical production systems

Future Industrial Connectivity Infrastructures

5G

- Strong focus on **machine-type communication** and the IoT
- **URLLC** \(^1\) + **mMTC** \(^2\) enable completely new applications, also in industry
- 5G is **more than wireless**

Enabler for new applications & use cases and for lifting Industry 4.0 to the next level

\(^1\)Ultra-Reliable Low-Latency Communication \(^2\)Massive Machine-Type Communication \(^3\)Human-Machine-Interfaces
Network Slicing for Industry 4.0 - Expectations and Opportunities

Why Network Slicing Is Needed (Selection)

1. Highly demanding QoS requirements
2. Many different use cases with very diverse requirements
3. Well-isolated integration of third parties in own infrastructure
4. Shift of intelligence to the network
5. Remote access/control with well-defined QoS & security
6. Application-specific network functions (e.g. mobility mgmt)
## Expectations / Requirements from the I4.0 Perspective

### Use Case-Specific Slices
- **“Subslicing”**
  - MNO\(^1\) I4.0 Service Provider

### Integration of Existing Technologies
- **5G**
- **TSN**
- **End-to-End QoS**

### Cross-Operator/-Country Slices
- **MNO\(^1\) 1**
- **MNO\(^1\) 2**

### Accurate SLA Monitoring
- In real-time
- Fine granularity
- Third party I/Fs

### Open Interfaces
- **Public / private infrastructure**
- **Own VNFs\(^2\)**
- **Own equipment**

### “Deep Slicing”
- **App-to-App Slicing**
- **5G**
  - APP
  - OS
  - HW

### Highly Dynamic Slicing
- \(<10\) min for generation & release

### Simple & Attractive Pricing
- $
Network Slicing for Industry 4.0 - Expectations and Opportunities

Take-Away Messages

1. 5G may be disruptive for the manufacturing industry
2. Many different use cases w/ highly diverse requirements
3. Network slicing as a key enabler to support Industry 4.0
4. Many industrial requirements not addressed yet
5. Close interaction of the whole ecosystem needed
6. Industry 4.0 may become THE killer application for 5G 😊
Thank you