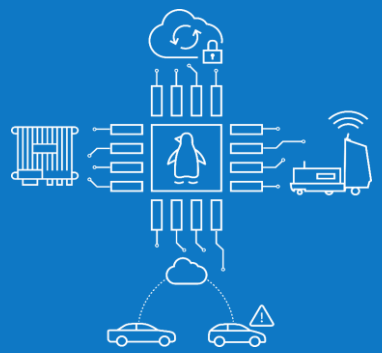
FROM IDEA TO PROTOTYPE WITHIN DAYS

-

WITH OUR ALEN PROTOTYPE PLATFORM



ALEN

BOSCH

ALEN based Proof of Concept
Mastering the Fourth Industrial Revolution

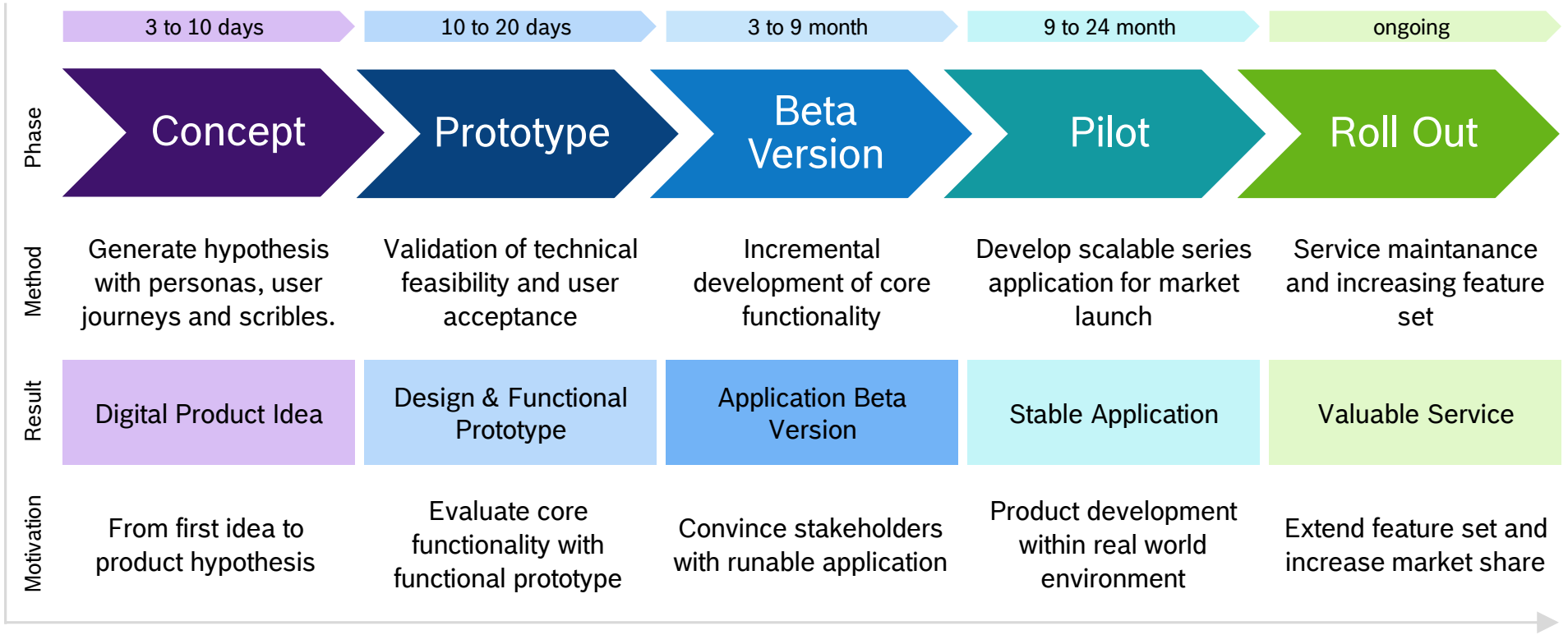
Ideas for new business models, digital products and services

- Fast, iterative prototypes
- Stage less from prototype to market
- Costumer centric approach
- Unique technology stack

ALEN based Proof of Concept
Speed as success factor for successful market entry

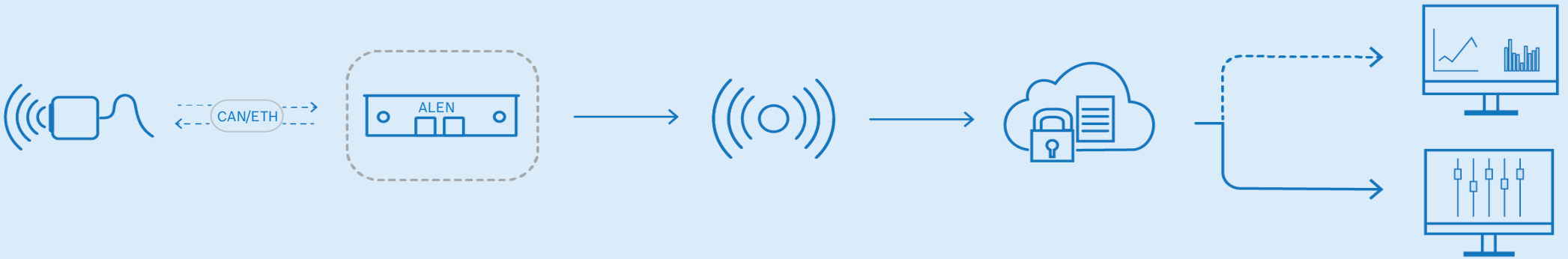
Speed is the key for new business models, products and services on the path of the digitalization

ALEN based Proof of Concept
The ALEN development approach



ALEN based Proof of Concept
Proof of Concept – Technology Stack

ALEN is a End-to-End rapid prototyping and development platform



Data Input

Depending an your application, data acquisition can be done with CAN/ETH/RS232/USB or other interfaces.

Integration of a broad spectrum of Bosch Sensors is possible.

ALEN Gateway

Our ALEN Gateway is based on a linux which is optimized for connectivity and data acquisition purposes.

Due to a scalable approach other HW variants e.g. high performance are possible

Data Transfer

Due to a modular concept the data can be transferred world wide with LTE. For high data volumes WiFi is available.

Our unique technology stack allows also real-time task execution on the device.

ALEN Cloud

Device management, measurement and data storage over the air. Generic services as fundament for application specific extensions.

ALEN devices are Firmware-over-the air capable.

Applications

On base of our generic frameworks a fast prototype for your application is possible. Generic and domain specific frameworks for automotive, I4.0, robotics, autonomous vehicle control center and data acquisition/monitoring are available.

ALEN based Proof of Concept
Technical Details – Multi Purpose Gateway

ALEN IOT Gateway	
Processor	NXP i.MX 7Dual ARM Cortex-A7 1 GHz
Main memory	1 GB
Flash memory	16 GB eMMC flash (+ Micro-SD slot)
Operating Temperature	-40° to 85° C
Dimensions	108 x 83 x 24 mm
Weight	500g
Connectivity and Interfaces	
LTE	Region specific LTE module with MIMO
Wi-Fi / BT	Dual-band 2x2 801.11a/b/g/n / 4.1 BLE
Ethernet	10/100/1000 Base-T
CAN High-Speed	1
USB	4x USB 2.0 host, type-A connectors
GPS	GPS/GLONASS/Galileo
Power Supply	
Power Supply	8V to 24V

Core of our technology stack is a IoT Gateway with worldwide LTE.

Base for a lot of application with the help of standard interfaces e.g. USB, ETH, I/O, CAN, RS232 and RS-485.

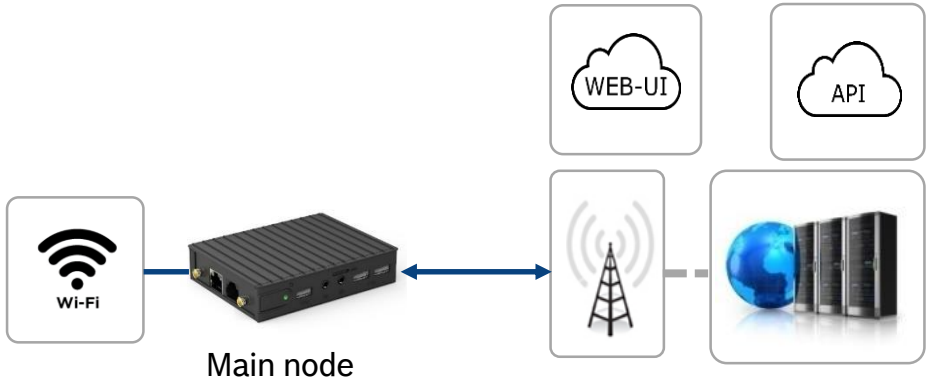
In addition to our Multi Purpose Gateway a lot of industrial and automotive grade control units and sensors are for the prototypes available

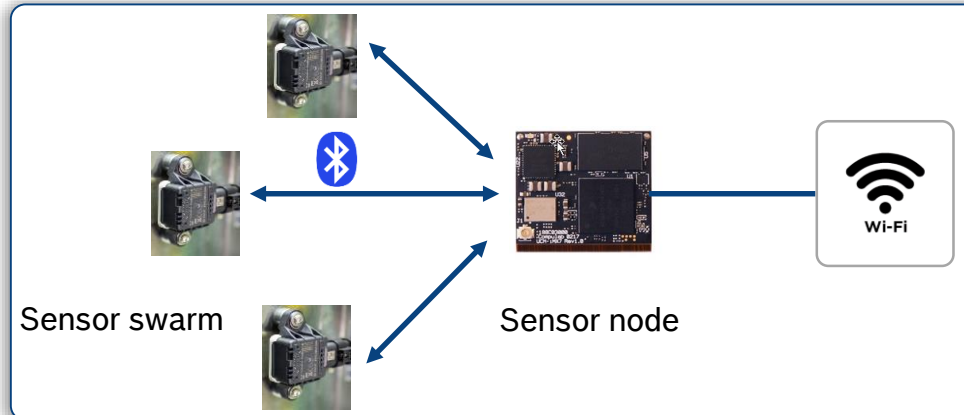
ALEN based Proof of Concept
Sensor swarm

Application:
- Sensor swarm in production or other facilities.
- Scalable swarm and backend technology.

Scope:
- Big Data in production and facilities. Use case specific data mining.
- Monitoring and predictive maintenance.

Usage:
- Retrofit online monitoring of machines and facilities.
- Minimal installation effort, usage of existing WiFi infrastructure.





ALEN swarm:
- Embedded Linux
- Unlimited sensor nodes
- One main node each facility
- BT, WiFi and LTE
- FOTA capability
- PCIe for specific application

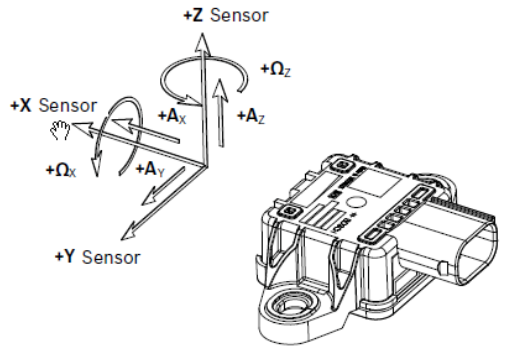
ALEN backend:
- Scalable backend
- Platform as a Service (PaaS)
- Service deployment on devices
- Device management
- Application specific API
- Optional: WebUI

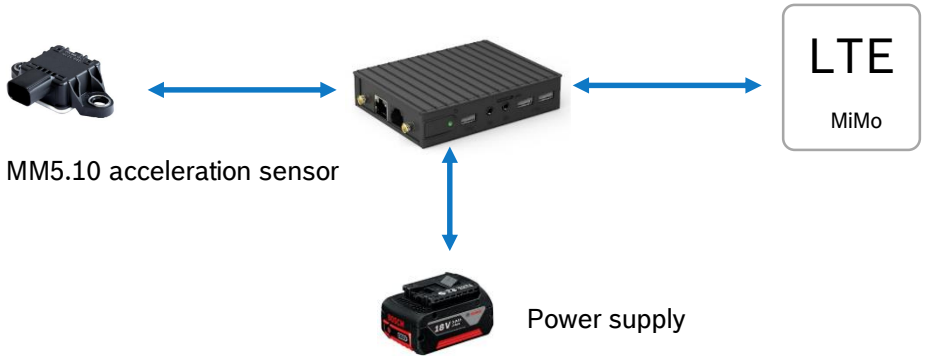
ALEN based Proof of Concept
Sensor swarm

Application:
- Acceleration and yaw rate sensor.
- Measurement of vibration, movements and rotation.

Scope:
- Industrial and off-highway applications.

Usage:
- Retrofit online monitoring of machines and facilities.
- Prototypes in IP67 housing with Li-Ion standard accu possible.





ALEN node:
- Embedded Linux
- BT, WiFi and LTE
- FOTA capability
- Power consumption 300mA
- For prototype and proof of concepts

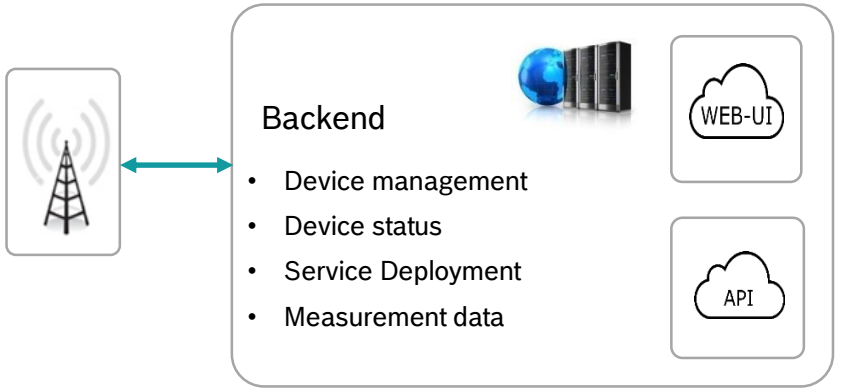
MM5.10:
- 3-D acceleration sensor
- 2-D rotation rates
- All signals via CAN
- Type of protection IP6K7
- Operating temperature: -40 to +85 °C
- Small size
- Bosch Automotive Quality

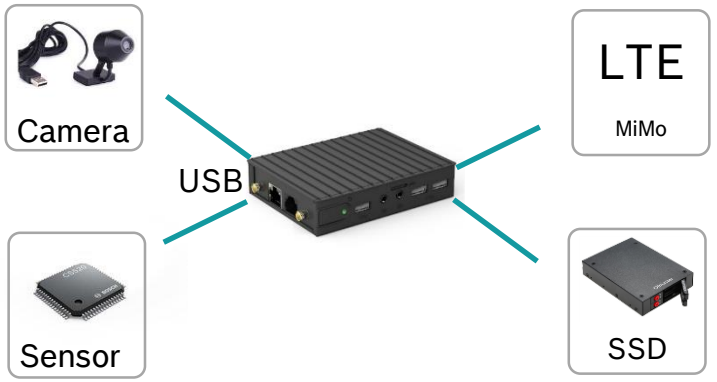
ALEN based Proof of Concept
Data aquisition

Application:
- Big Data Acquisition.
- Storage of measurement data on 2 TB SSD drives in a rack.
- Online Device Management e.g. Failures or full memory

Scope:
- Big Data acquisition e.g. camera data

Usage:
- User observance for development of new services and improvement of user experience





ALEN device:
- Embedded Linux
- USB for Sensors/Cameras
- FOTA capability
- PCIe for specific application
- LTE for device management

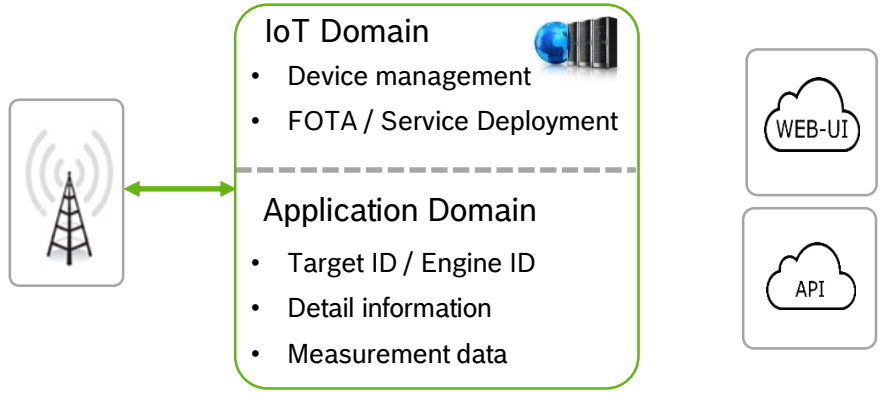
ALEN backend:
- Scalable backend
- Platform as a Service (PaaS)
- Service deployment on devices
- User/Usage statistics
- Measurement API
- Optional: WebUI

ALEN based Proof of Concept
Predictive maintenance I4.0

Application:
- Predictive maintenance of engines
- Avoidance of unplanned standstill of engines

Scope:
- Vibration data acquisition for abnormality detection
- Monitoring of measurement data and notification of events

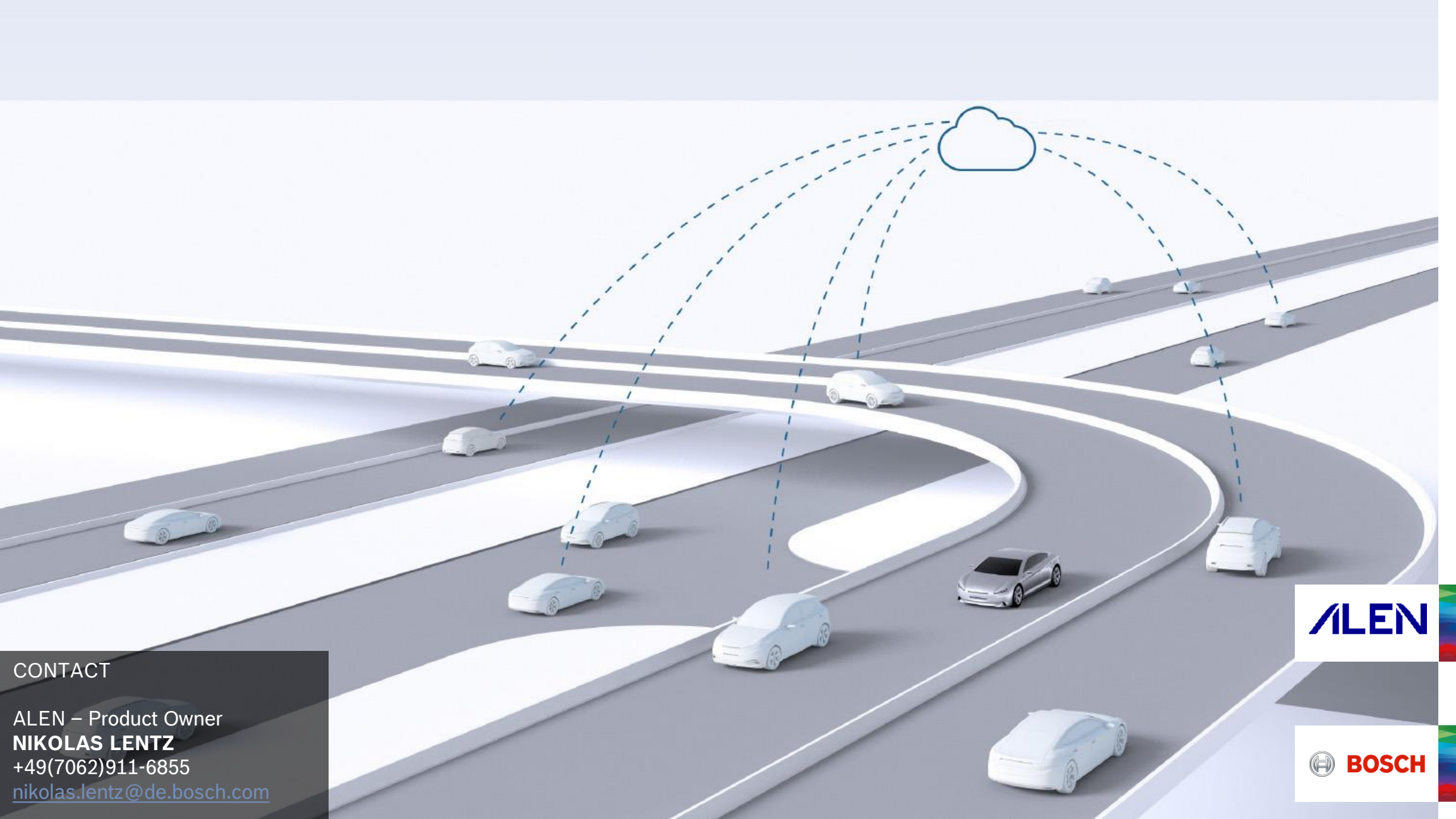
Usage:
- Remote monitoring of engines with acceleration sensor
- Data transfer via LTE mobile network



Acceleration sensor

ALEN device:
- CAN and ETH interface
- USB for additional DAQ
- FOTA capability
- CAN interface
- PCIe for specific application

ALEN backend:
- Device management
- API for fault codes
- API for CAN data
- Optional: WebUI
- Optional: Data analytics



CONTACT

ALEN – Product Owner
NIKOLAS LENTZ
+49(7062)911-6855
nikolas.lentz@de.bosch.com