Rundum vernetzt:
das Internet der Dinge aus Sicht eines Zulieferers
Dr.-Ing. Rainer Kallenbach
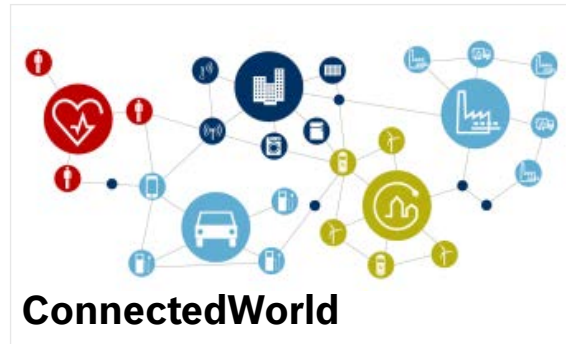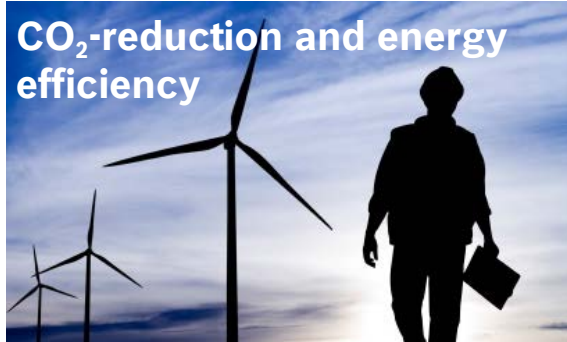
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Megatrends in a fast changing world ...

CO_2-reduction and energy efficiency

New mobility concepts

Demography

Urbanization

ConnectedWorld

Individualized production

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… a highly connected world

of 5.7 billion people...

... 0.7% are online

1995

of 6.5 billion people...

... 15% are online

2005

of **7.3 billion** people...

... **75%** are online

2015

● World population ● People with internet access

Connected devices

0.04 billion   0.75 billion   **6.6 billion**

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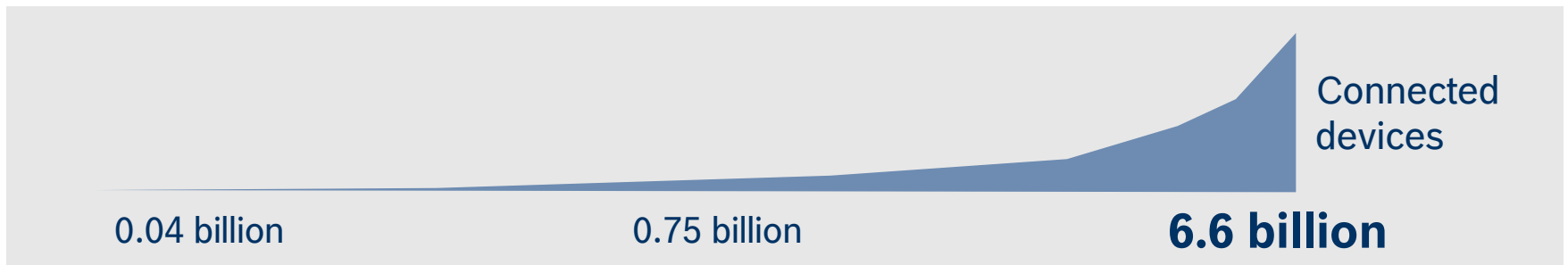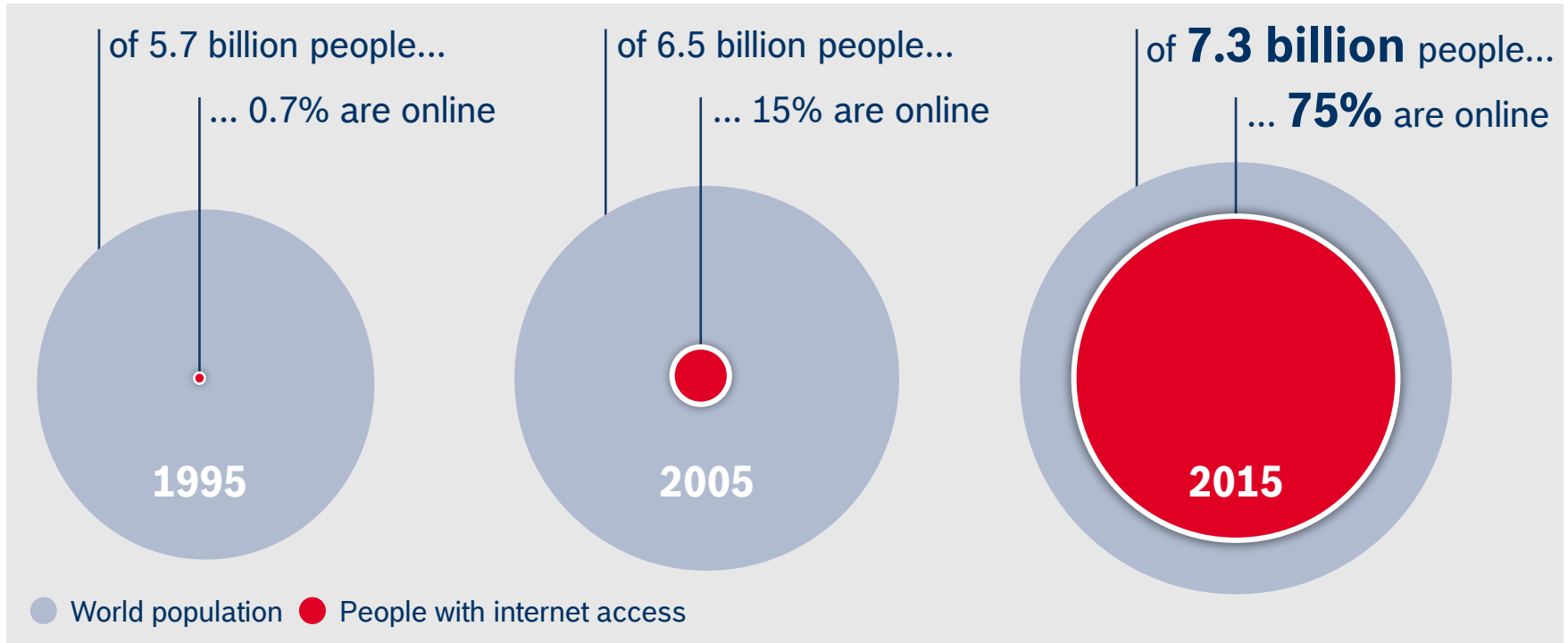
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Smart Things: more than just "function"...

„Thing"   IT
[HW | SW]

+ = Thing-based **FUNCTION** **+** IT-based **SERVICE**
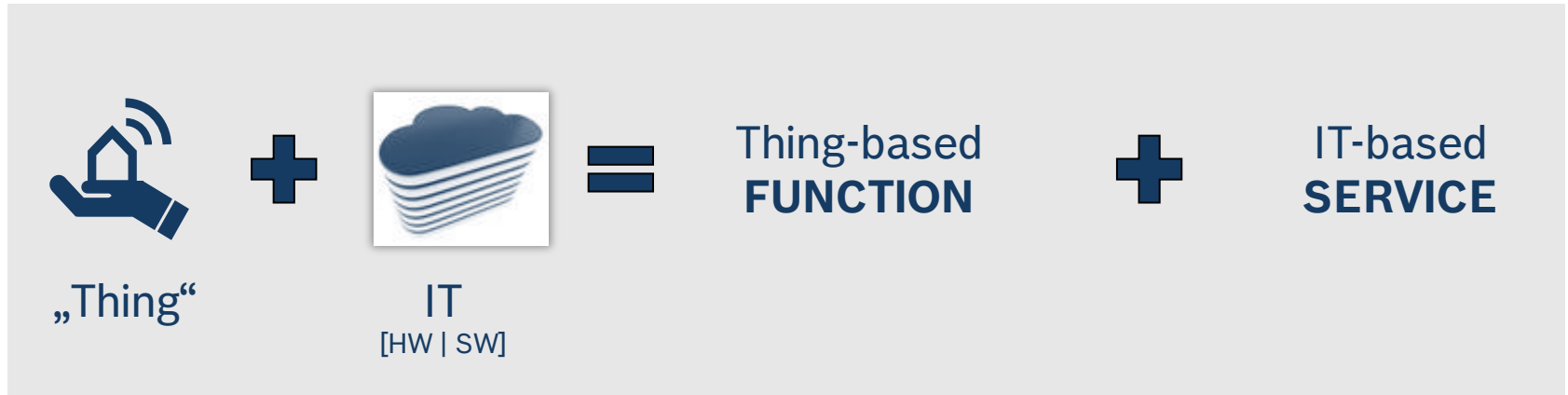
Source: University of St. Gallen, Prof. Dr. Elgar Fleisch

Example FUNCTION:
Drive from A to B

Example SERVICE: Send ambulance
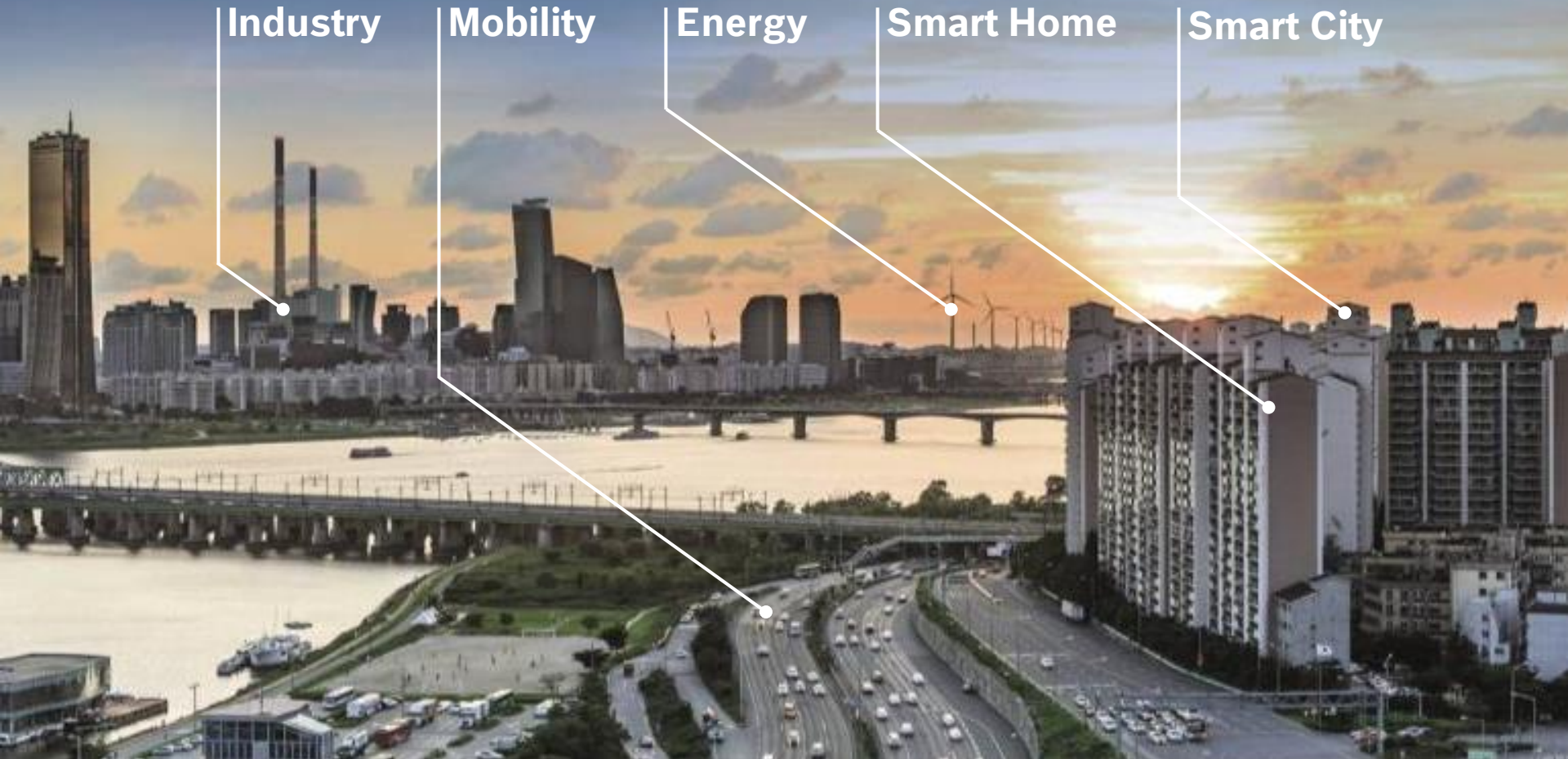in case of accident (detected by sensors)

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IoT Vision: Connected World

Industry   **Mobility**   **Energy**   **Smart Home**   **Smart City**

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Future Mobility − electric, automated, connected

Connected mobility

Electric driving

Multimodal transport systems

Automated driving

Parking management

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Connected World Solutions cover 4 areas

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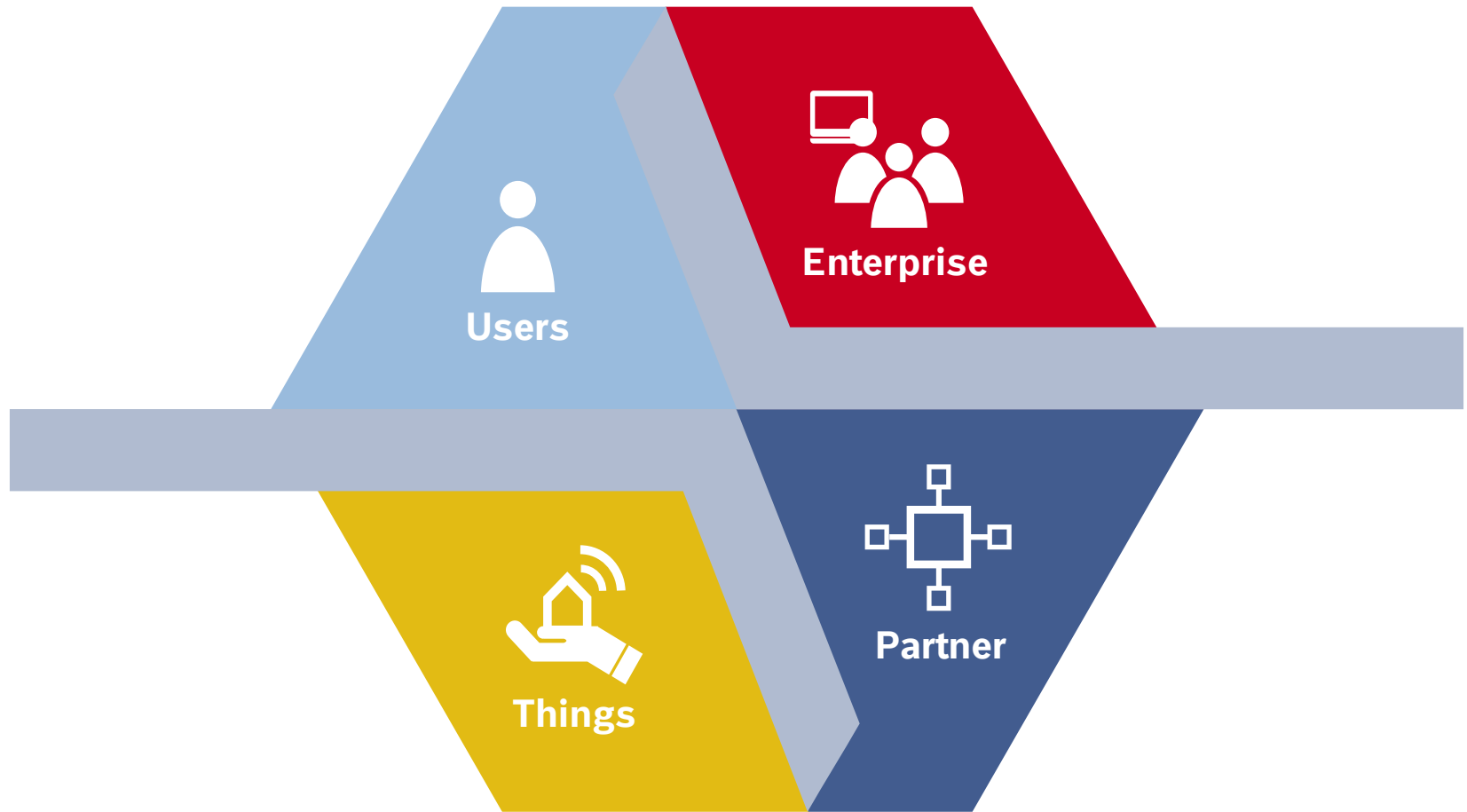
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Example: 4 Areas of eMobility Charging Services

Driver

Enterprise

Car

Partner

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eMobility (Singapore): "Bosch's pioneering technology in Singapore"

eMobility Solution
Bosch is technology and service provider

➔ Openness to 3rd party vendors
➔ Integration of new business models
➔ Local operation of infrastructure

Project figures
➔ **2011:** Launch of Charging Service
➔ **2012:** 59 electric vehicles (EV), 47 charging stations
➔ **2014:** 1,500-3,000 EVs (ca. 2% of vehicles)

Singapore
➔ Second highest population density
➔ Top ranked on Innovation Index
➔ Living city lab and talent hub (AP)

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Next Step to Future Mobility: eMobility Roaming

EV driver

Roaming system and services

HUBJeCT

intercharge
e
everywhere

OEM

EMP

CPO

Electric Vehicles Charging stations
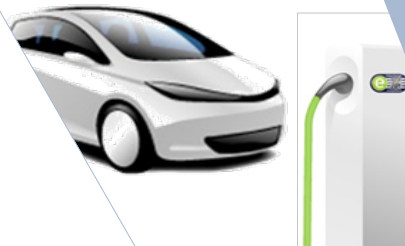
Utilities (CPO), Mobility provider (EMP), Automotive supplier (OEM)

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Path to Connected City – Monaco 3.0

City platform

- Improves mobility, security and quality of life in Monaco

- Connection of multiple systems within the city and better interaction with citizens

- Fast creation of new services

Energy
Mobility
Communication
Monaco 3.0
Health
Security
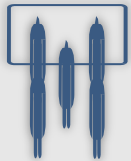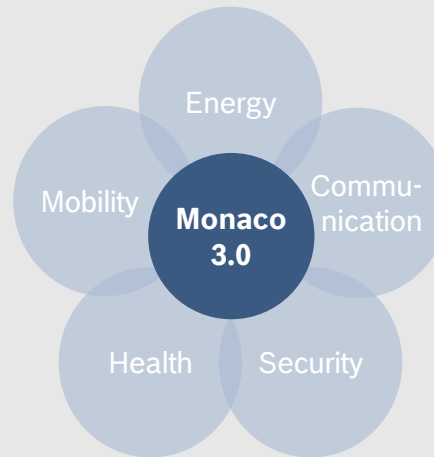
Example: Crowd management

- Automatically detects presence of people

- Manages peaks and avoids congestions

Example: Fleet management

- Improved traffic flow

- Service time optimization

- Better resource planning

Example: mobility app M3.0

- Routing assistance

- Easy use of public transport

- Real time information

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Manufacturing − Service Portal

Machine Operator

→ One portal for all maintenance applications

→ Integration of existing processes and systems

→ Comprehensible and accurate accounting of warranty services

Enterprise

→ Maximize uptime

→ Better planning of maintenance activities

→ Use maximum lifetime of spare parts and products

→ Increased productivity

Machines & Components
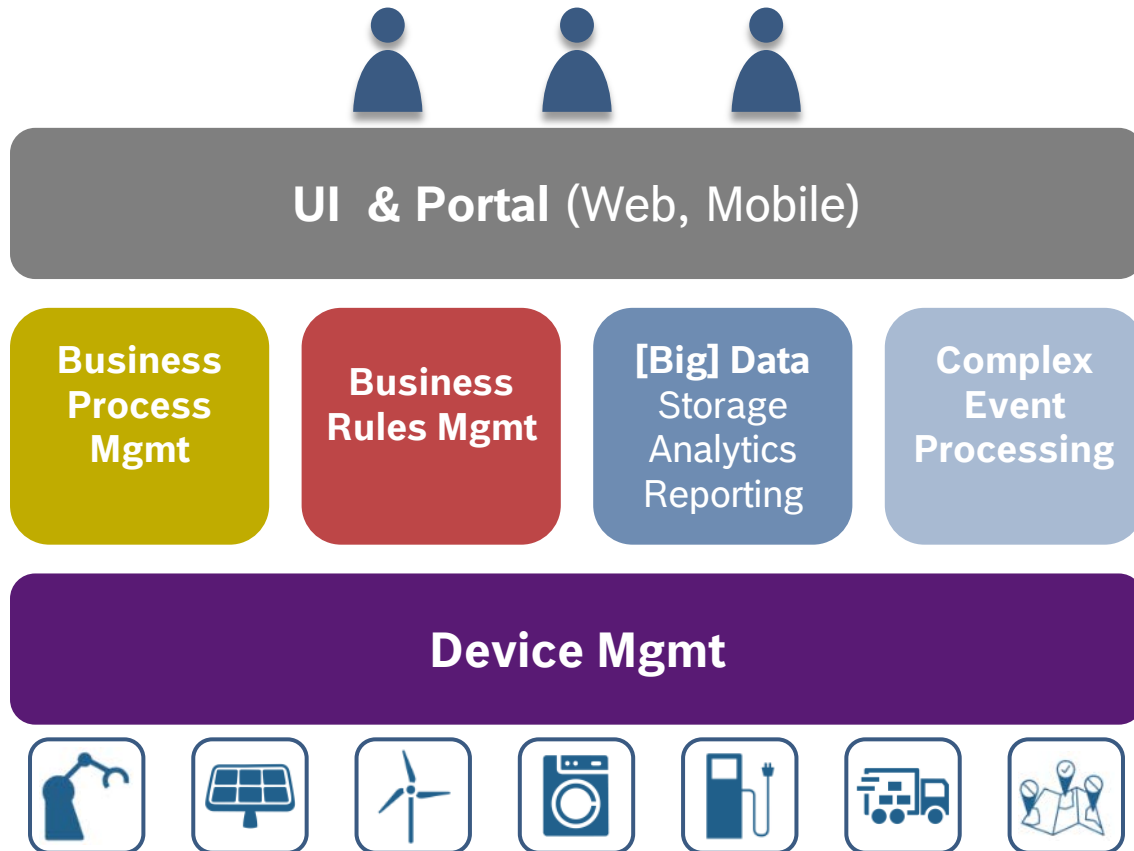
→ Real-time compilation of machine and sensor data

→ Rule-based analysis of machine data to create mal-function prognosis

→ Mapping of maintenance processes

Service Partner

→ Optimize services offered for customers

→ Revenue through new services

→ Increase margins by offering services remotely

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Required Software Capabilities

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The Bosch IoT Software Suite 1.5

M2M — **Machine2Machine** (Device Management)

→ Agent Hub concept with local autonomy
→ Based on MongoDB NoSQL Big Data Base

BRM — **Business Rules Management** (Visual Rules)

→ High-performance rules with code-compilation
→ Execution-server and Batch capabilities

BPM — **Business Process Management** (inubit)

→ Active/Active Clustering for high scalability and availability

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IoT Spearhead: Bosch Software Innovations

Energy
Smart Metering
VPP (Virtual Power Plant)

Mobility
Fleet Management
eMobility Solutions

Manufacturing
Service Portal

Smart Home
Intelligent Solutions

Bosch Software Innovations Suite

M2M   BPM   BRM

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Bosch Software Innovations Worldwide

Chicago

Sales
Marketing
Prof. Services

Berlin

Corporate Functions
Sales & Marketing
Product Development
Professional Services

Waiblingen

Sales
System Technology
Systems Projects
Professional Services
Product Development

Shanghai

Sales

Immenstaad

Corporate Functions
Sales & Marketing
Professional Services
Product Development

Singapore

Sales & Marketing
Professional Services
Product Development
Systems Projects

Melbourne

Sales

Overview

- Software & systems services for the IoT
- Experience range from embedded electronics to complex systems
- 600 people worldwide

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Selected References − Bosch Software Innovations

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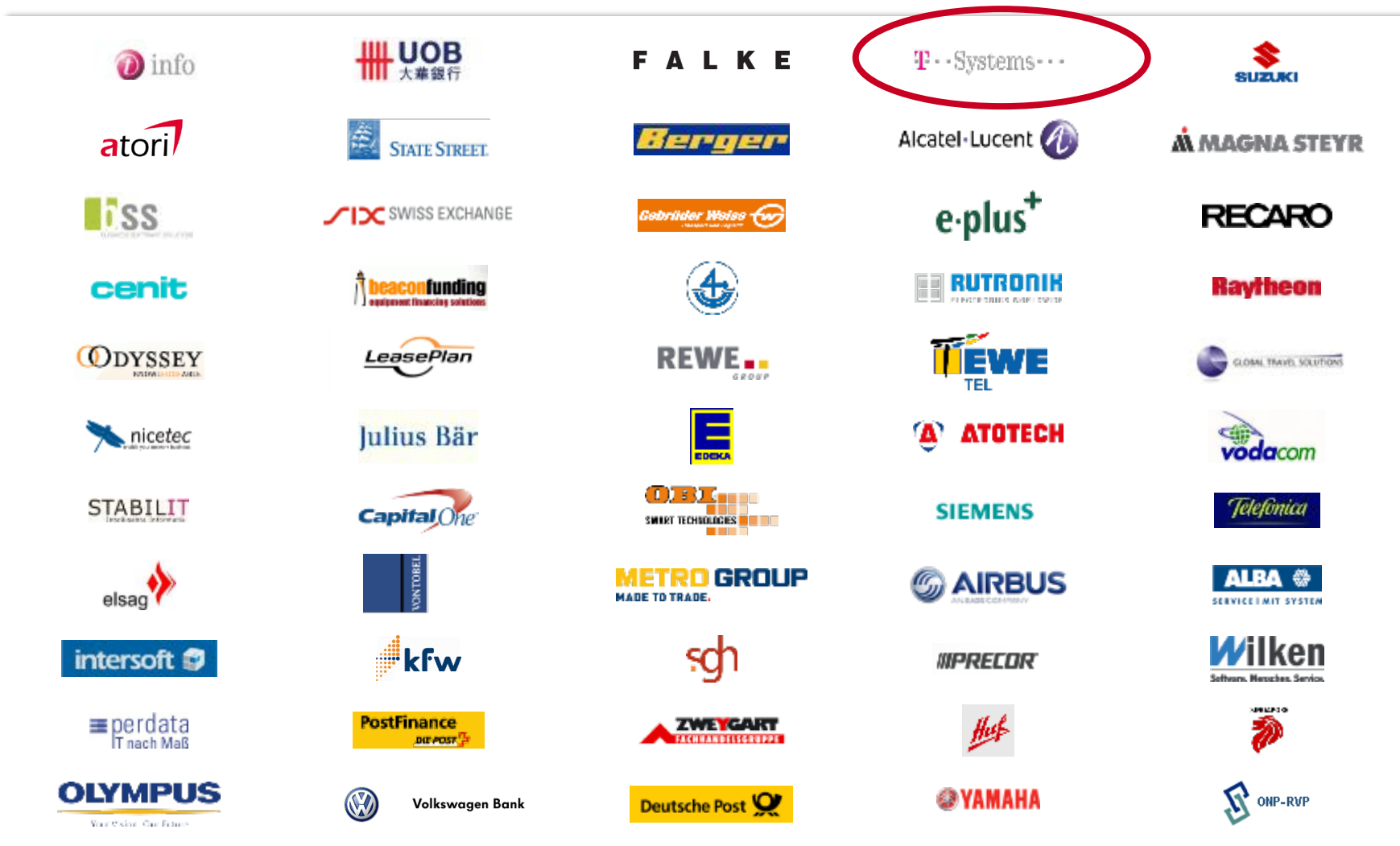
Internet of Things: Nobody can do it alone...

Value Chain

Business Ecosystem

Component & Device Manufacturer			**Telcos**	**IT Companies and System Integrators**			
Chipset	Module	Equipment	Connectivity	Platform	Application	Integration	Cloud Services

2016: 4,6 Mrd. EUR[2]

Market Size[1] 2011: 15 Mrd. EUR
2017: 70 Mrd. EUR

?

Source: 1) MAM Research 2012; 2) Infonetics Research 2010

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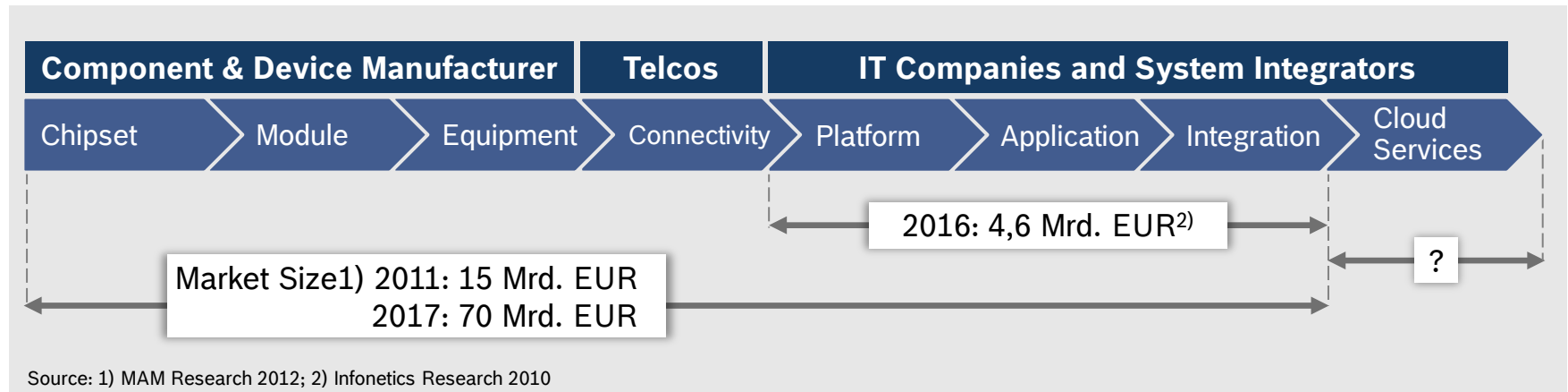
Vielen Dank –
haben Sie Fragen ?

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