Digital Transformation

Challenges for the Manufacturing Industry

3rd International Conference on System-Integrated Intelligence

Paderborn, June 15th 2016

Ulrich Ahle

Trusted partner for your Digital Journey

Atos Worldwide IT Partner

Agenda

1 Challenges

2 Architecture

3 Building blocks and use cases

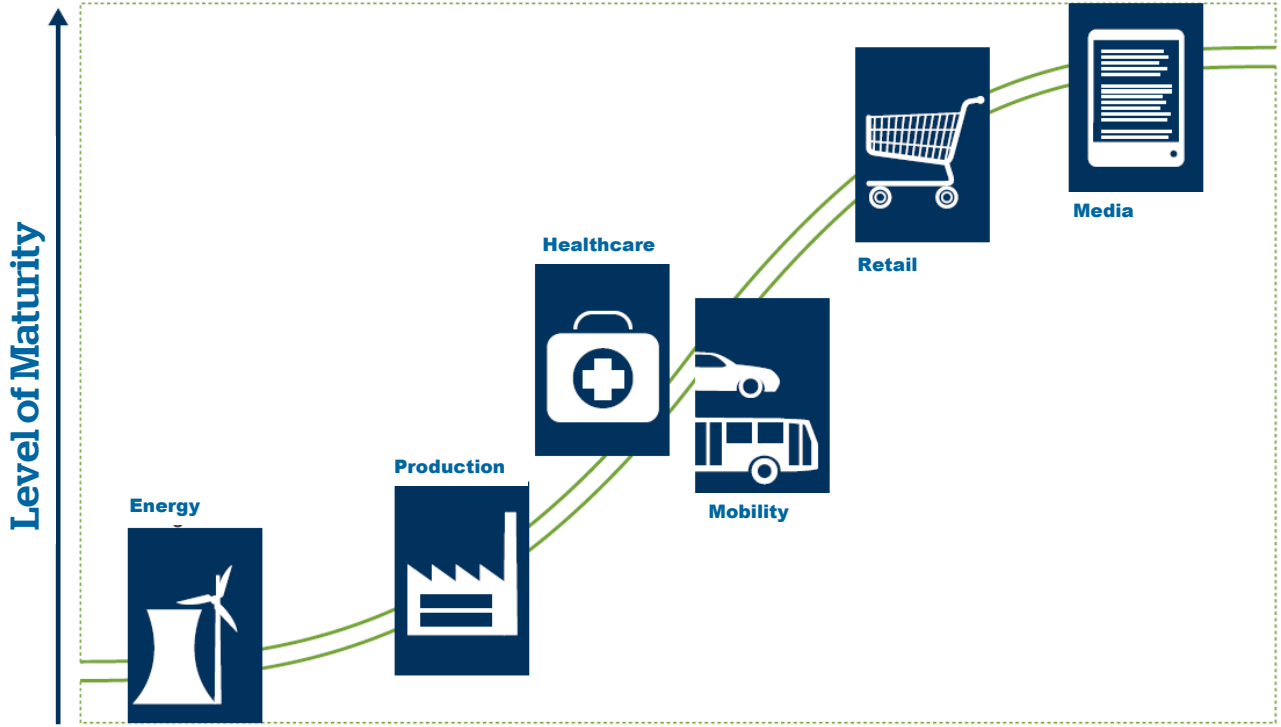
4 Methodology

Challenges

Digital will be highly disruptive to most industries, affecting not only revenue and cost structures but also shaking up the core business and operating models

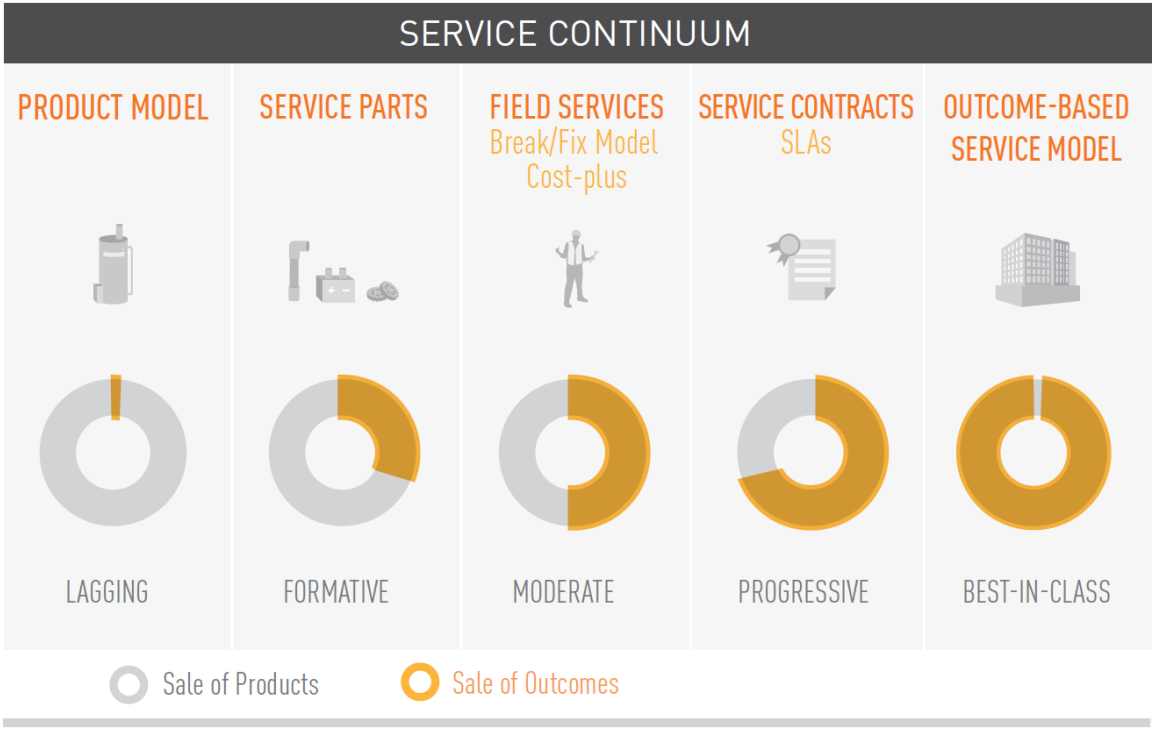
Digital Disruption will be cheaper, stronger and faster

Level of maturity of digital business models



Source: Accenture

70% of the companies in manufacturing are in the first three stages of the Service Continuum



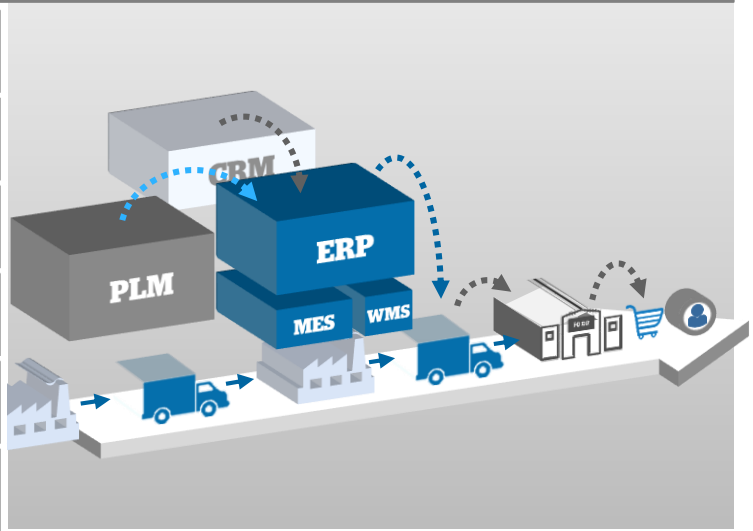
Source: Oxford Economics

Moving from single, siloed systems and organizations to an industrial network of capabilities

PAST

While todays production is linearly organized and optimized within the boundaries of organizational and system siloes…

- Siloed systems
- Centralized
- Layered
- Monolithic
- Interfaces
- Licensed



FUTURE

… manufacturing of the future will fulfill individual customer needs by a collaborative and agile network of capabilities

- Interoperability
- Virtualization
- Decentralization
- Real-Time Capability/ Responsiveness
- Service Orientation
- Modularity

Internet of Things – Atos Industrie 4.0

Atos on the Forefront

Research

Atos

Fraunhofer IOSB
Fraunhofer IPT
Fraunhofer IML
TU WIEN TECHNISCHE UNIVERSITÄT WIEN Vienna University of Technology

IPT (IEM) → Augmented Reality
IML → Industrial Data Space
IOSB → Consulting

Atos' scientific community

Atos

Thought Leaders
Focus on techno-logical challenges, new trends & standards.
+ I4.0 solutions …
With customers

Solutions for Smart Analytics, Big Data, I- ,P- ,SaaS, Augmented Reality, Security, etc.

Gemini Project

GEMINI 4.0
Geschäftsmodelle für Industrie 4.0

Development of sustainable business models for Industrie 4.0 / smart factory
BMWi Program

c-lab

Standards for connectivity, Security, Models, Reference Architecture, Definitions

Industrial Data Space

INDUSTRIAL DATA SPACE

Creating a virtual data room to enable secure exchange and usage of data.

Security, standards, data governance, conectors

HORIZON 2020 Factories of the Future

European Commission

FIWARE
Open APIs for Open Minds

European open Platform for future Internet & smart factory

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INDUSTRIAL DATA SPACE
ROBOTIK
RFID
TELEMATIK
SERVICES
CYBER PHYSICAL SYSTEMS
AUTONOMIK
DIENSTE
ASSISTENZSYSTEME

The Industrial Data Space aims at a »Network of Trusted Data«

Decentralization
Federated Architecture

Trustworthiness
Certified Members

Sovereignty
Data and Services

Openness
Neutral and
User-Driven

Security
Data Exchange

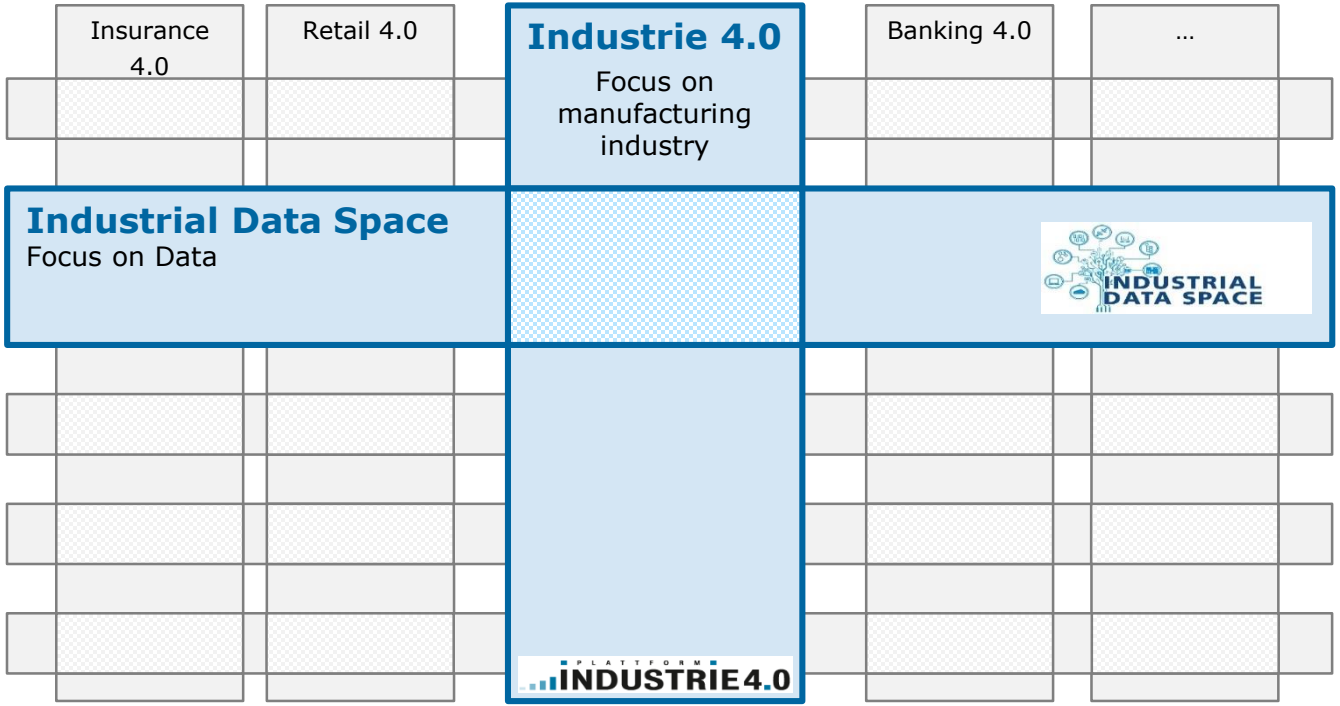
Governance
Common Rules of
the Game

Scalability
Network Effects

Ecosystem
Platform and Services

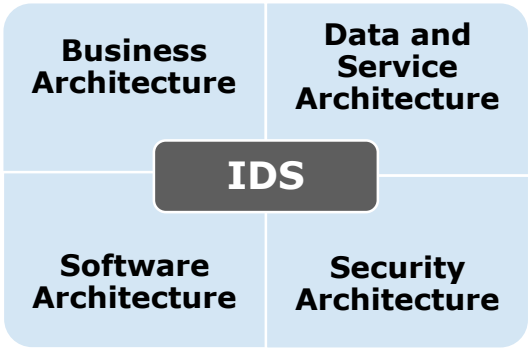
Source: Fraunhofer / IDS

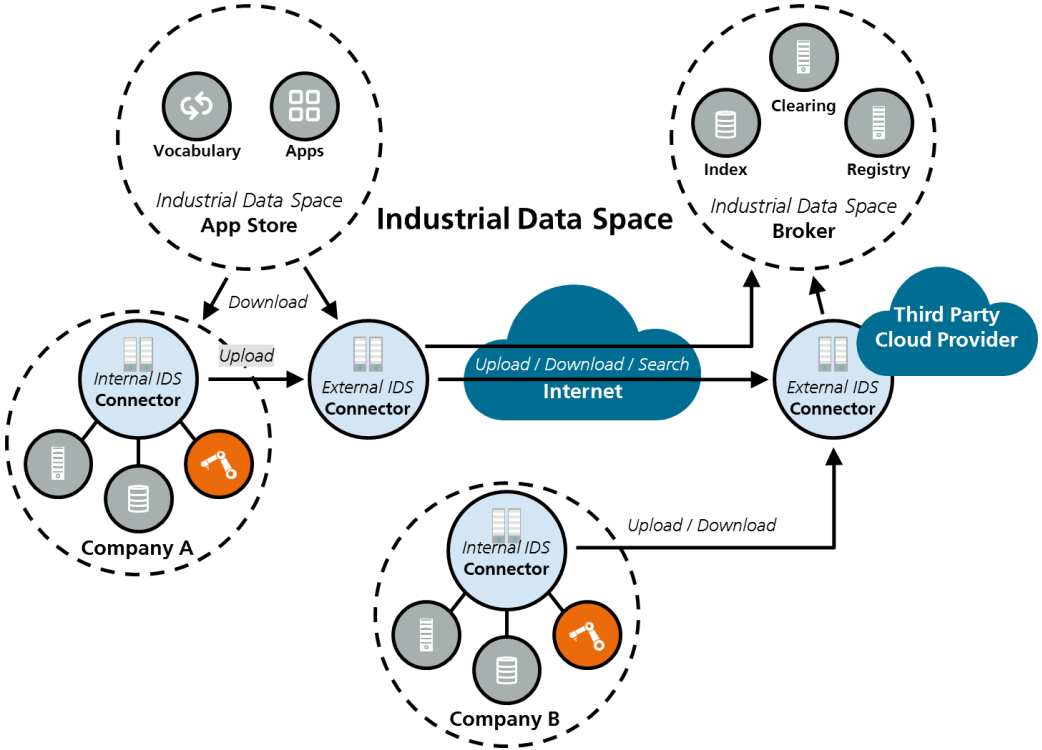
Industrial Data Space is complimentary to the platform Industrie 4.0



Source: Fraunhofer / IDS

Ecosystem of the Industrial Data Space





Members of the Board of Industrial Data Space e.V.

left to right:

Markus Vehlow, PwC
Dr. Ralf-Peter Simon, KOMSA AG
Dr. Robert Bauer, SICK
Heike Niederau-Buck, Salzgitter
Dr. Ralf Brunken, Volkswagen
Prof. Dr. Boris Otto, Fraunhofer IML
Prof. Dr. Reimund Neugebauer, Fraunhofer-Gesellschaft
Dr. Reinhold Achatz, thyssenkrupp
Ulrich Ahle, Atos

With Siemens, a unique technological Proposition

Atos & Siemens a Strategic Partnership

SIEMENS

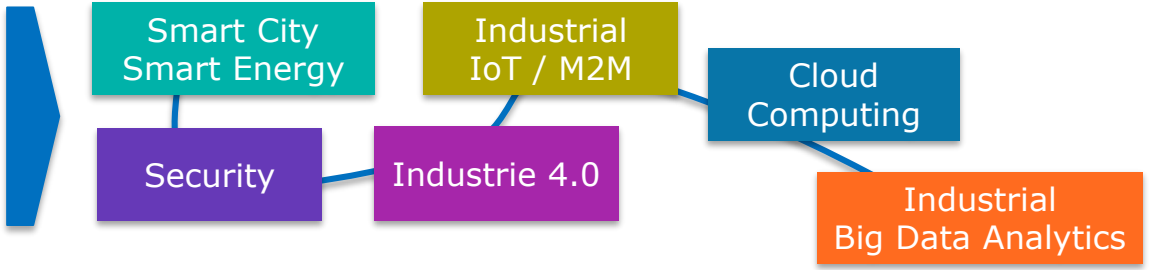
JOE KAESER

President and CEO of **Siemens** AG

"This **partnership** forms one of the largest strategic relationships ever between a **global engineering company** and a **global IT provider**. The value of our combined strength enables our **customers to take full advantage** of the next wave of industrial IT in order to maintain competitiveness and deliver outstanding services."

150 m€

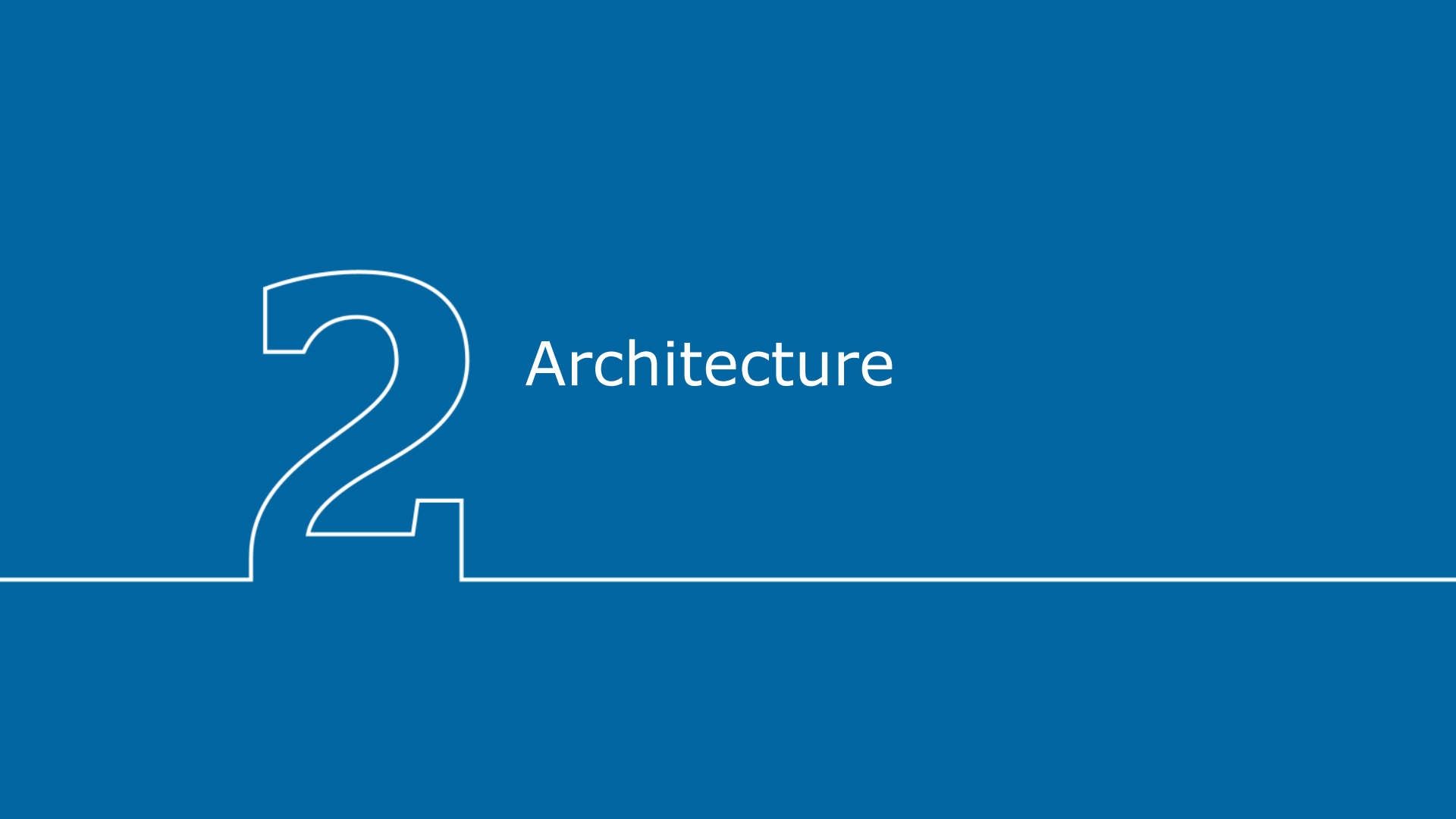
Joint Investments
to shape the future
& **shared value creation**



Atos Worldwide IT Partner

Strategic joint investment projects with Siemens Defining the future of IoT Services

Universal Tolling Solution	Low Emission Zones	Energy Trading & Risk Management	Data Center Infra-structure Management	Industrial Data Analytics
Satellite and Microwave tolling integrated with back-office and central system to provide end to end system 	A end to end cloud-based LEZ solution with integrated ANPR and roadside technology, and Atos back-office services 	Integration Siemens JROS and Atos PTRS allows integrated view of production scheduling and energy market trading 	A new joint solution to enable end to end Data Center wide (Facilities & IT-Infrastructure) reporting, analysis and optimization. 	A comprehensive program to build both the analytics platform and 9 use cases in preventive, predictive and prescriptive analysis for Industry & Manufacturing, Energy, Mobility and Healthcare 
MES Just In Time, Just In Sequence	**PLM Supplier Connect**	**Data Analytics for Smart Grid**	**Industrial IoT Platform**	**Innovation PoC's**
Seamless integration between OEMs and their first tier suppliers at production and assembly time 	Seamless integration between OEMs and their first tier suppliers at the design phase 	A comprehensive program with 5 use cases for Data Analytics in Smart Grid management. 	An elaborate scalable and cost effective communications platform to facilitate connecting millions of devices and support the remote management services. 	Running: Spare Part Identification Additive Manufacturing Security Incident & Event Management In preparation: Internet of Systems Future Networking 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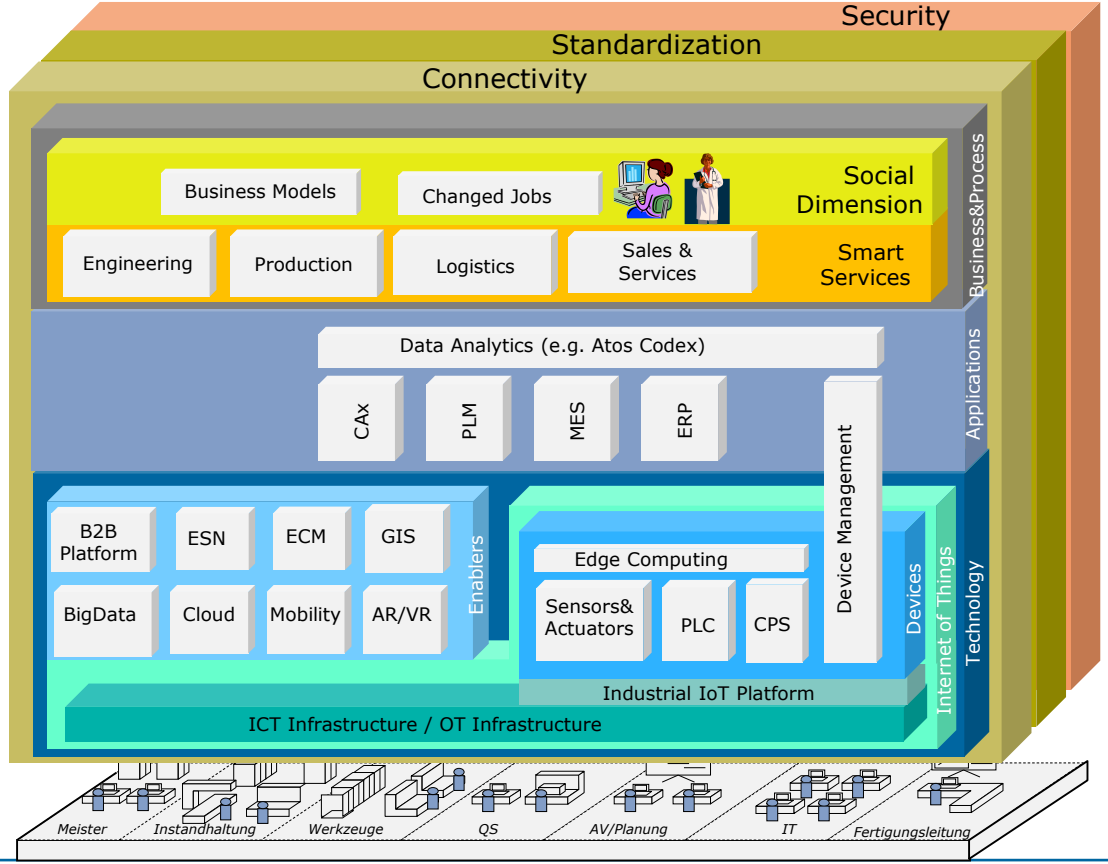
Architecture

Atos Industrie 4.0 Reference Architecture



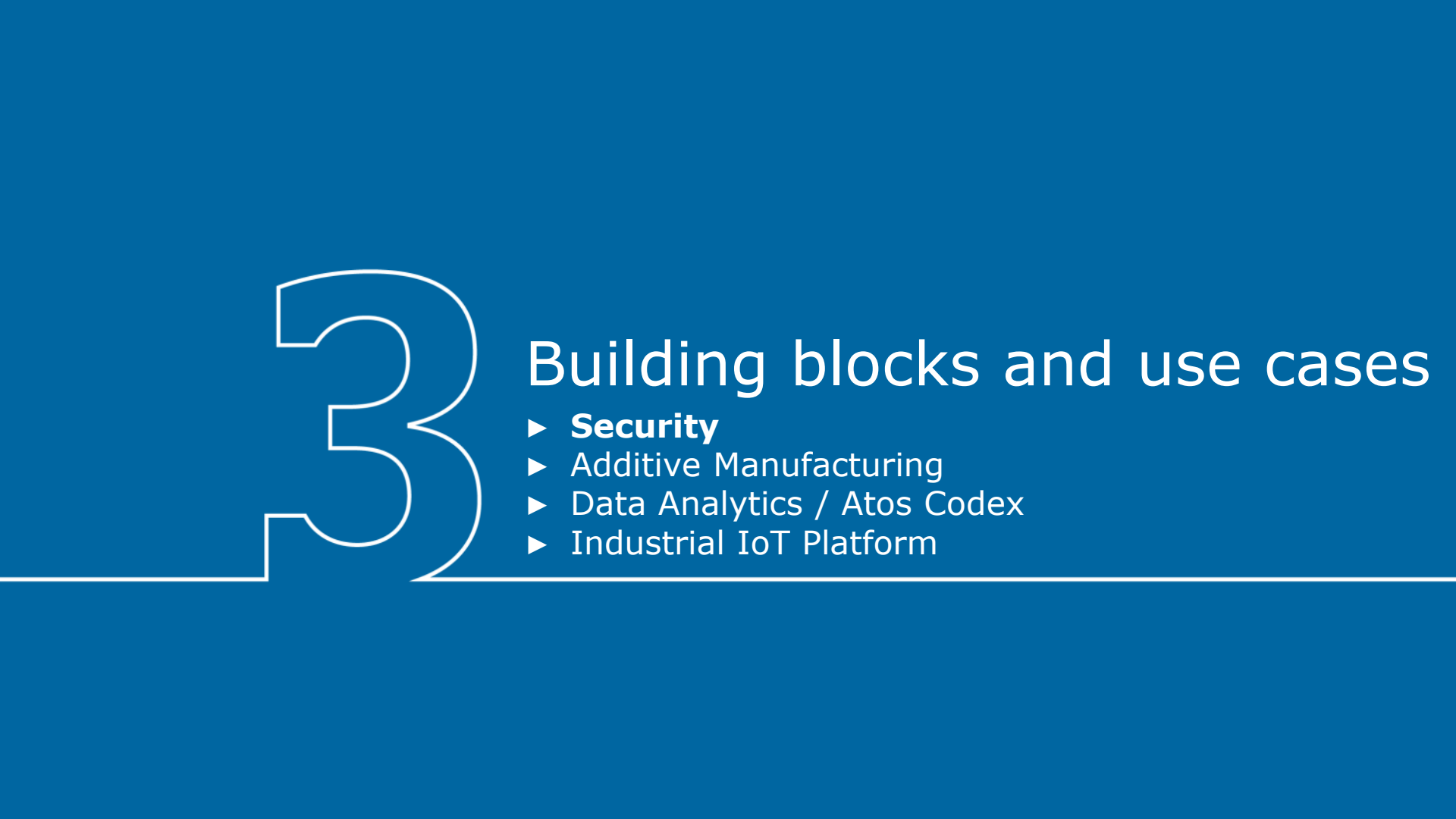
Efficiency

Effectivness

Industrie 4.0

Agility

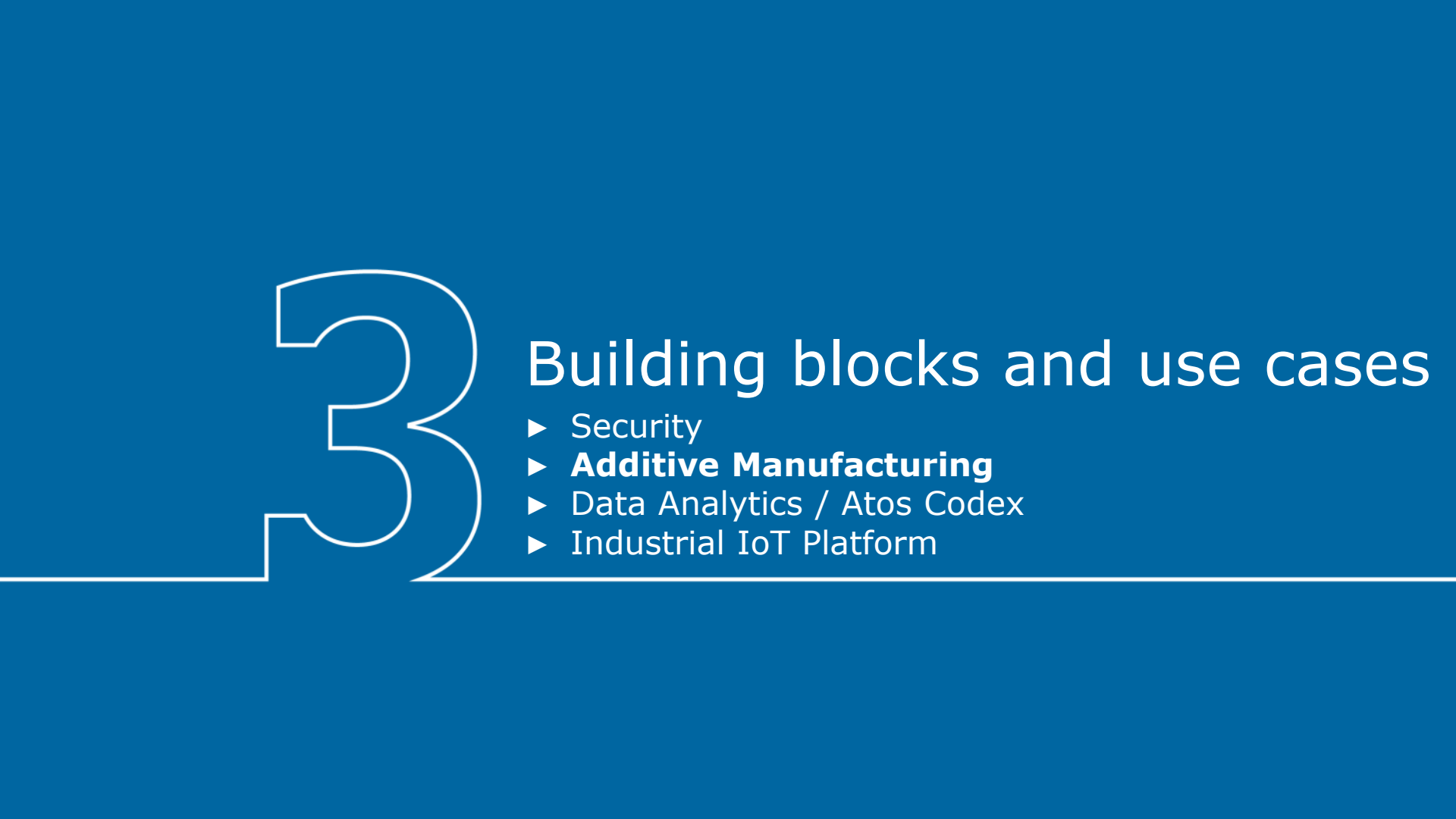
Quality


3
Building blocks and use cases
Security
Additive Manufacturing
Data Analytics / Atos Codex
Industrial IoT Platform

Internet of Things – Atos Industrie 4.0

Road to Security

- Target: Reaching a security level sufficient for Industrie 4.0
- As-is analysis: Security maturity assessment
- Technical assessments via penetration tests performed by Certified Ethical Hackers
- Security concept with proof of implementation for BSI (esp. required for KRITIS)
- Security Monitoring and alerting / notification
- IS audit performed by a certified IS service provider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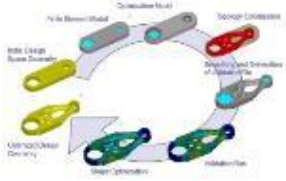
Additive Manufacturing in Atos

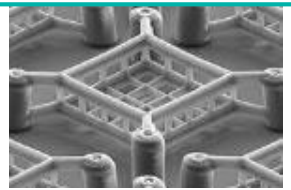
Design and Analysis of AM manufacturable parts

Reverse Engineering, Parts Integration



Topological Optimization Studies

Test Programs: Development of material data and allowables



Microstructure and Thermo-Mechanical Modeling

Business Integration | Technological Platform | Industrialization

Distributed Production environment

Reverse Traceability: Tracking & Tracing

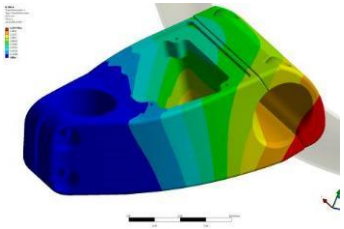
SW Adaptation and Integration (MES, PLM, SCM)

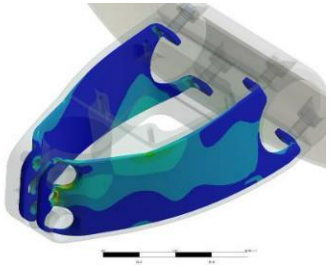
Analytics to predict component properties

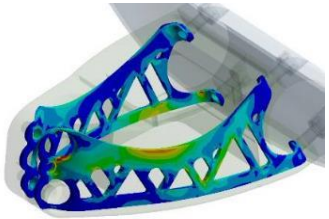
Intellectual Property Rights and Cybersecurity

Additive Manufacturing (3D Printing)

“RepAIR” – Focused in a Predictive Maintenance System







RepAIR

Onsite Maintenance and Repair of Aircraft by integrated Additive Manufacturing

The main objective of RepAIR is to shift the “make” or “buy” decision towards the “make” decision by cost reduction in the remake and rework of spare parts and therefore **improve cost efficiency for maintenance repair** in aeronautics and air transport.

RepAIR Members (Extract):

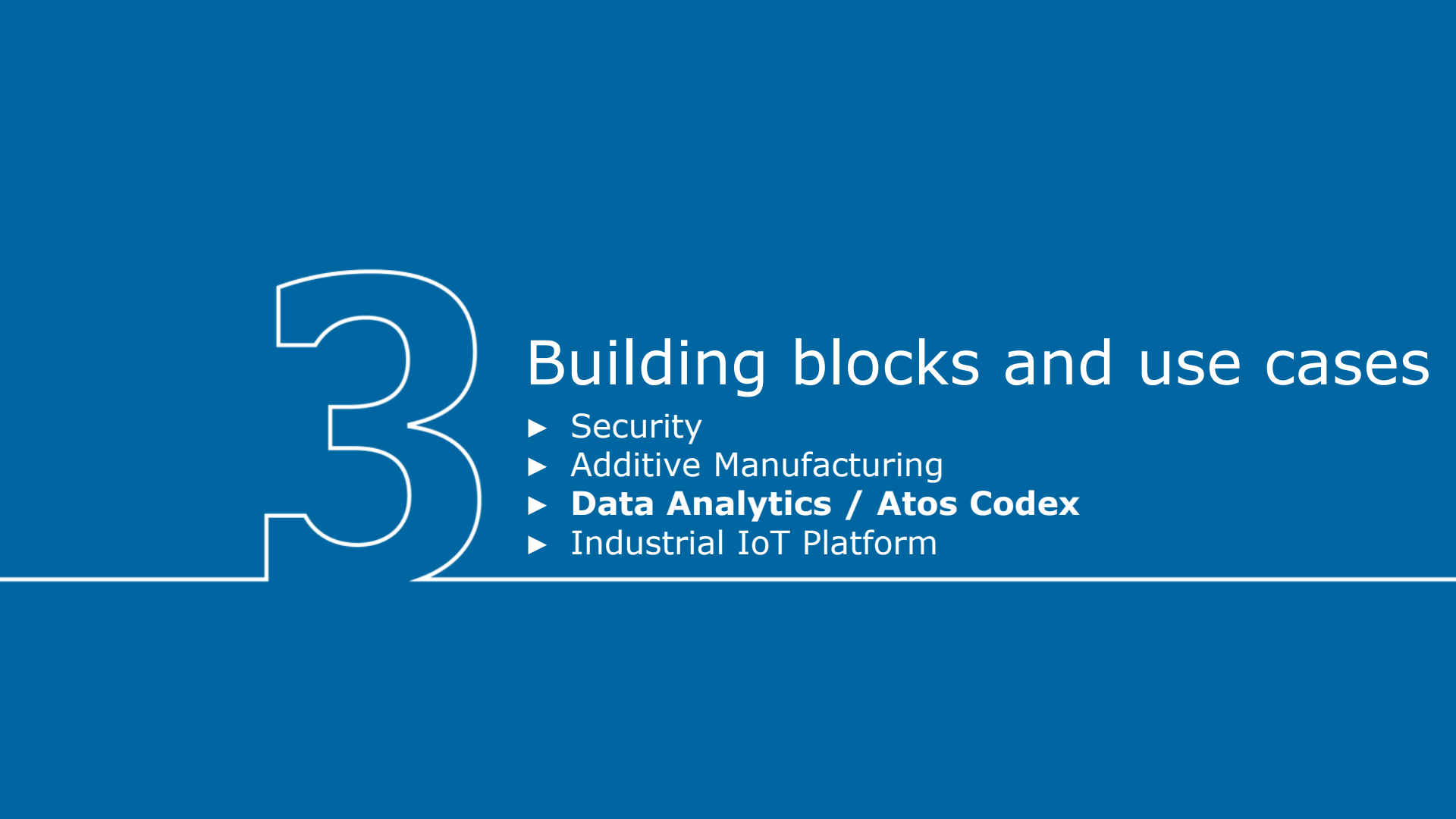
Atos

Lufthansa Technik

UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

BOEING

AIMME
INSTITUTO TECNOLÓGICO METALMECÁNICO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Building blocks and use cases
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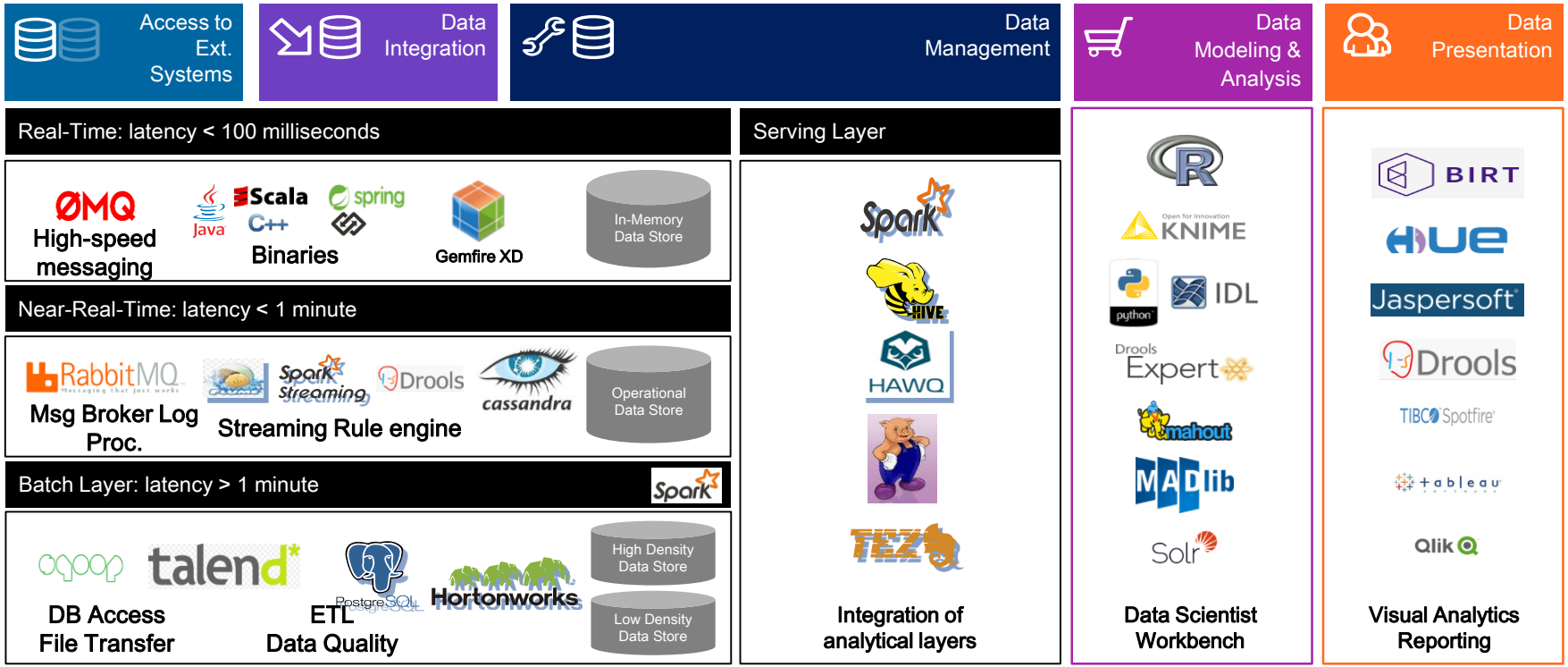
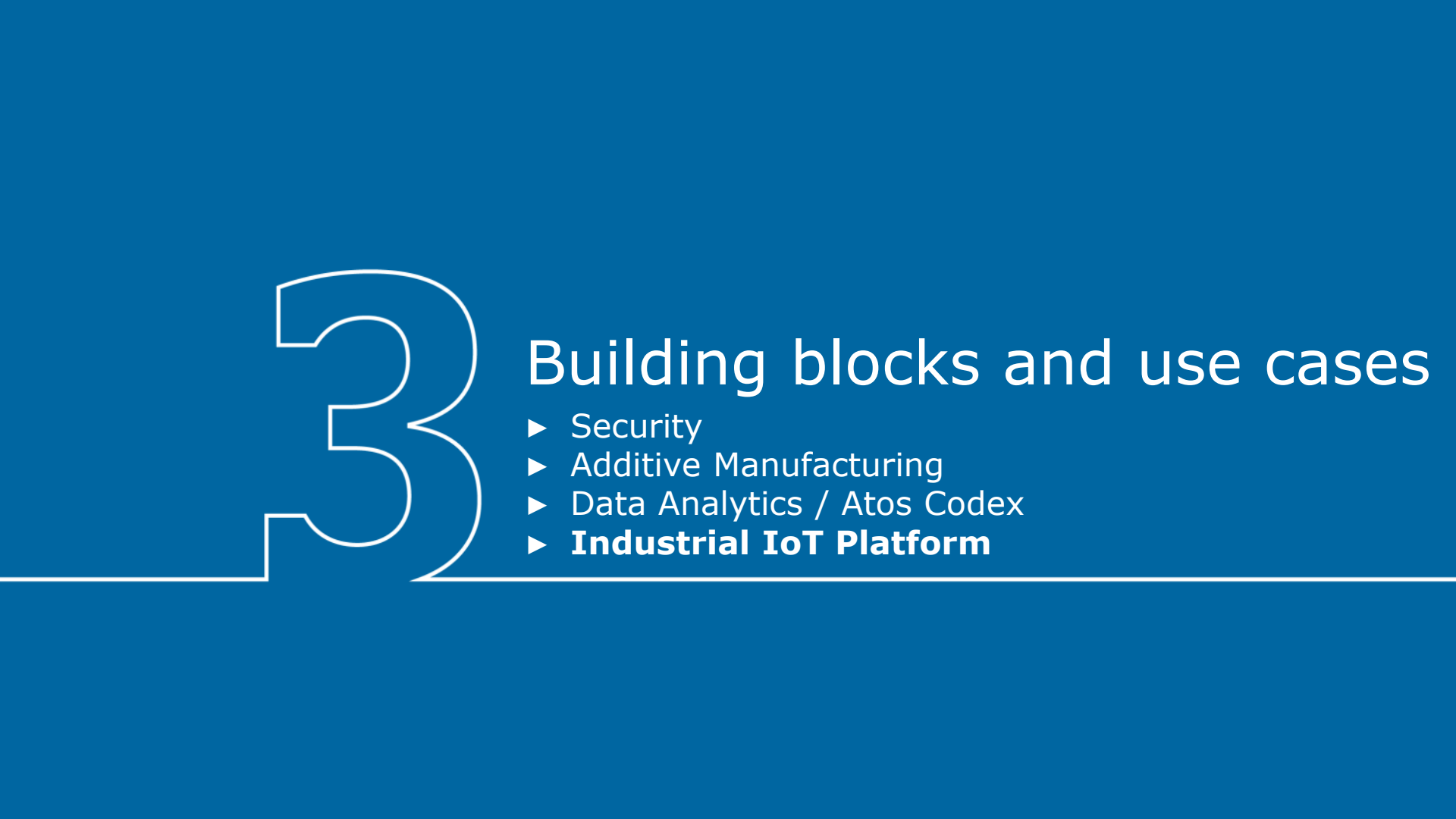
Data Analytics / Atos Codex
Industrial IoT Platform

Atos Codex Framework Architecture

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Atos's Industrial Internet of Things Platform

Service Center

Service Techn. EU

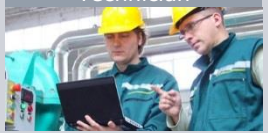
Service Techn. US

Service Partner

External Specialist

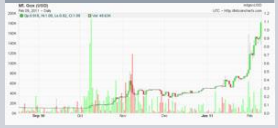
Customer

Technician



Industrial Data Analytics Applications

Data Scientists



Web Portal / Web Services

Industrial IoT Platform

- Authentication & Authorization
- Remote Access | Collaboration | Secure Data Transmission
- Logging
- Reporting / Analysis

Secure Network Connection / Wireless

CCP Service Agent

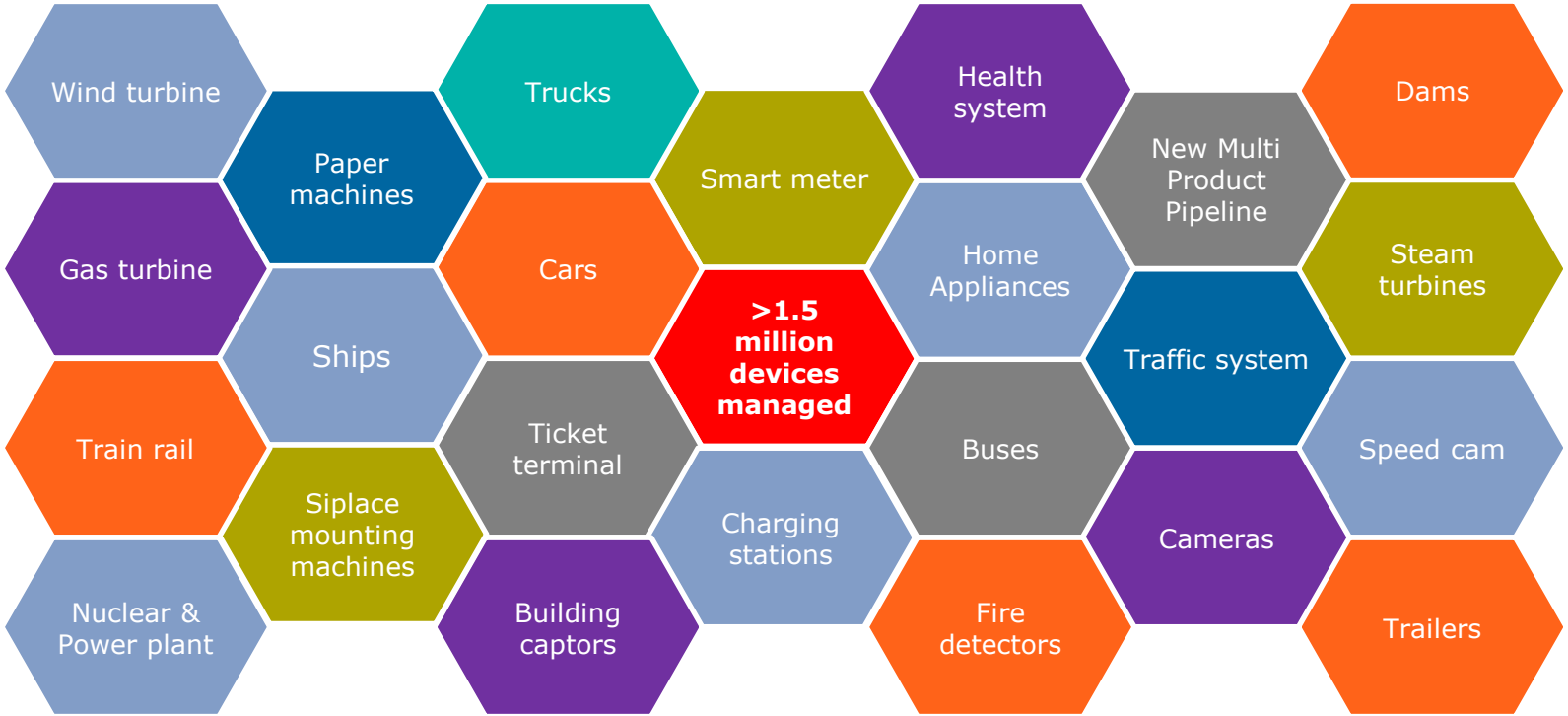
- Condition & Usage Data Monitoring
- Alarming & Alerting
- Asset Management
- Intelligent File Transfer

Machines and Devices

Customer spec. Services

- ...

Atos manages the communication platform for more than 1,5 million devices



Today, more than 300,000 systems are serviced with our platform at Siemens

SIEMENS

Industry

- Paper machines
- Ships
- Cranes
- SIPLACE mounting machines
- Building technology
  (e.g. building automation systems, fire detectors, cameras)
- Traffic systems
  (e.g. traffic computers, traffic light systems, traffic management systems)
- GAS Analysis
- Train Rail Automation

Energy

- Gas turbines
- Steam turbines
- Power plant control systems
- Wind power plants
- NMPP New Multi Product Pipeline in South Africa

Healthcare

- X-ray systems
- Ultrasound systems
- Magnet resonance tomography systems
- Hospital information systems
- Diagnostic systems
- Particle Therapy

Atos Worldwide IT Partner

Our business impact: **we deliver Business Reinvention**

Providing enhanced functionality and increased comfort to the consumer

Creating valuable customer and product insight through data collection

Providing a multi-sided-marketplace for the smart home ecosystem

What we have realized for B/S/H/:

Create a **risk- and revenue-sharing** business partnership for the "Home Connect" program

Support B/S/H/ from vision to requirements to realization, including **end-to-end** system test

Design, develop and operate the **central communication platform**, capable to support millions of devices

The mission: Monetizing the data

Home connect

HOME AWARDS 2014 1. PLATZ Smarte Haushaltsgeräte Siemens-Electrogeräte GmbH

HOME AWARDS 2014 1. PLATZ Smarte Haushaltsgeräte Robert Bosch Hausgeräte GmbH

B/S/H/

Our business impact:
we ensure Business Reinvention

Transforming Manufacturer into the Digital Mobile World

What we have realized for our client Michelin:

- New Michelin Service
- 30 countries availability
- 10-15% after market business boost
- For Michelin's clients:
  - 10% Fuel savings
  - Improved Fleet Uptime up to 5%

Our business impact:
we ensure Customer Experience

Renault granted its Innovation Award to Atos in 2013 for the R-Link project

What we have realized for our client Renault:

Renault R-Link solution, awarded as most innovative solution, with seamless integration of multimedia connectivity and infotainment services

Global Roll-out in more than 35 countries

E-Commerce for onboard , & off-board functionalities

The in-dash R-Link Multimedia Tablet (7 inch Android based) allows a seamless smartphone OS integration)

RENAULT

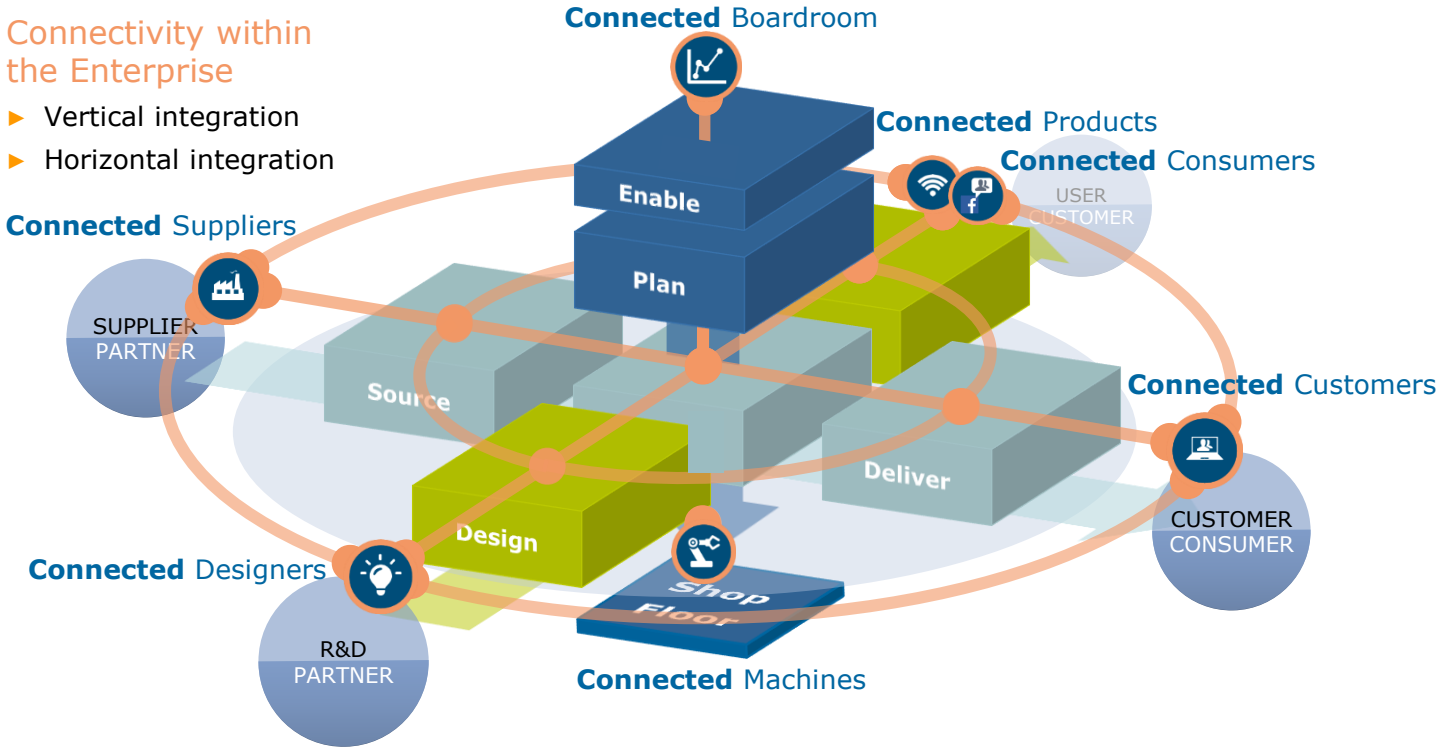
Methodology

The Connected Enterprise in the Digital Age

New business and collaboration models within the manufacturing industry

Connectivity within the Enterprise

- Vertical integration
- Horizontal integration

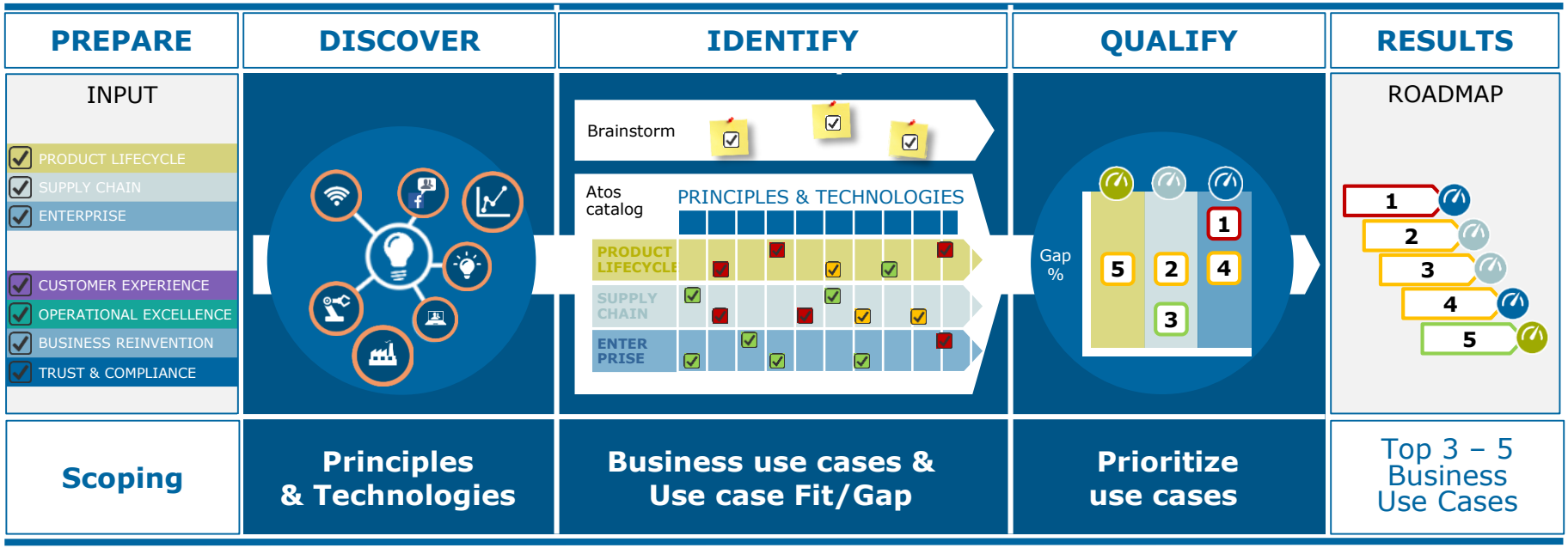


Connectivity to the outside world

- Consumers providing direct feedback to products designers
- Products providing online customer/product profile data
- Individual customized products & services
- Smart Products generating usage data
- Suppliers becoming Co-designers
- Customers designing (part of) their own products

Industrie 4.0 Opportunity Discovery workshop

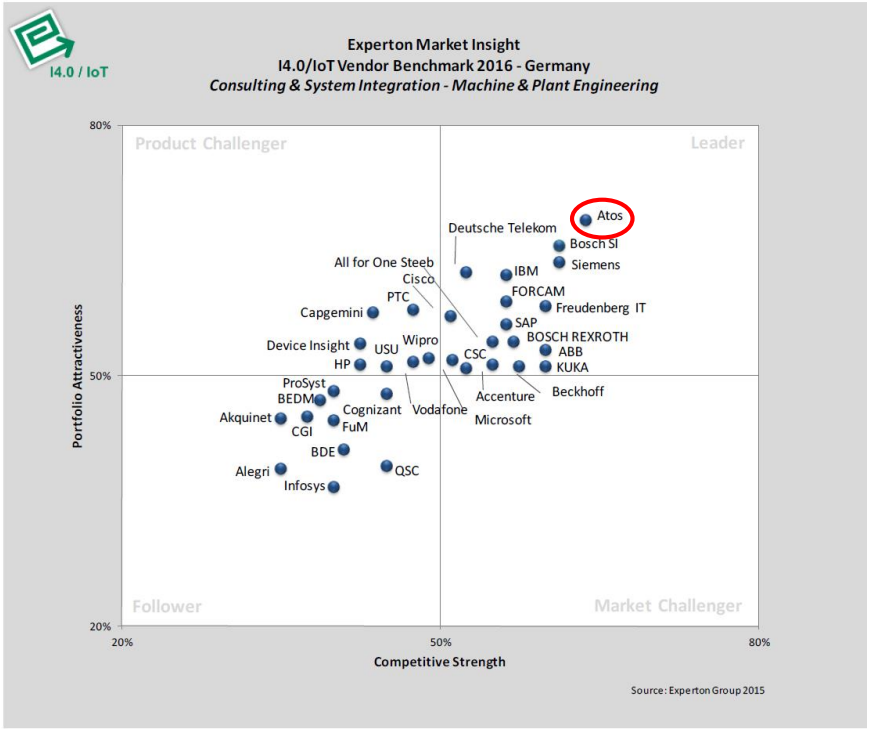
Workshop approach

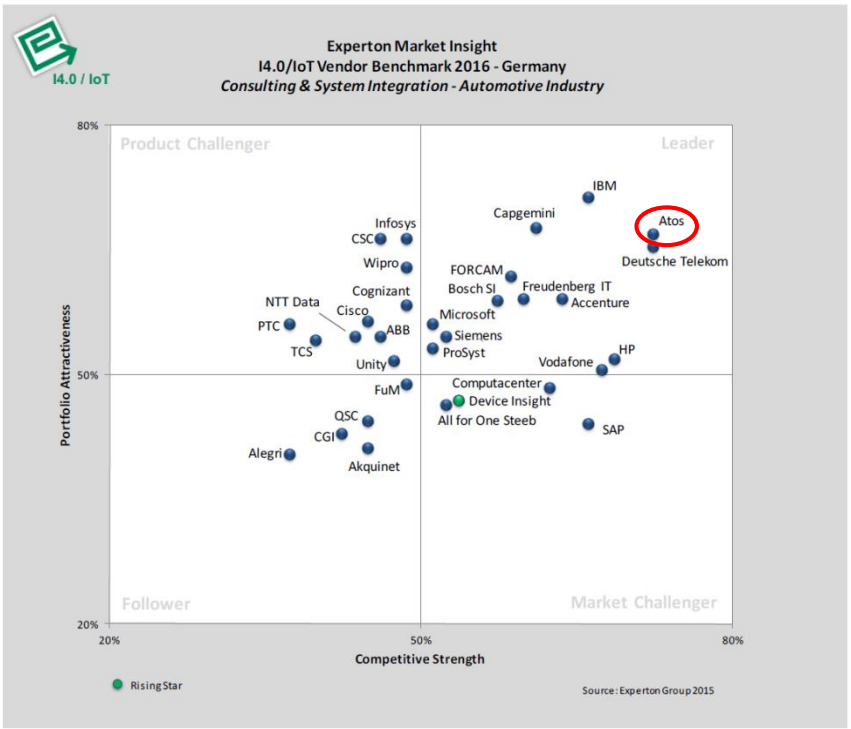


Topics

Conclusion

Experton Industrie 4.0 / IoT Vendor Benchmark 2016

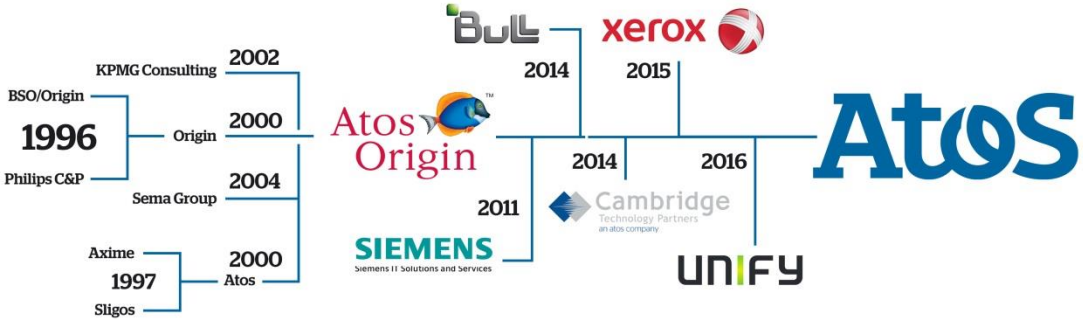




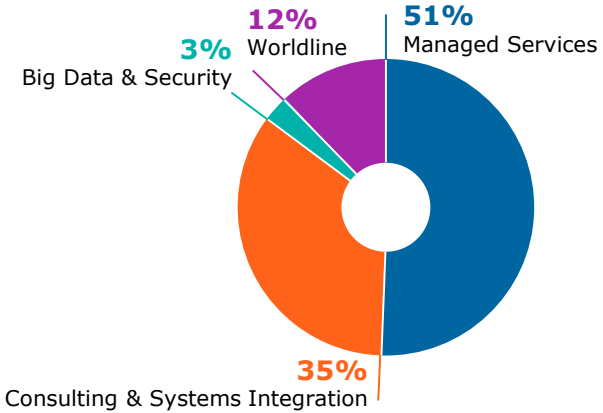
Atos at a glance

Revenue 2015 (M EUR) *	Employees 2015 (Global)	Employees 2016 (Germany)	Countries
12.000	100.000	12.000	72

"Our vision for the future: to accelerate progress by uniting people, business and technology."



Revenue distibution (in %) per **Business Unit**



* Partially pro forma Revenue 2015

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Thank You

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