Industry 4.0 – Discover IOT Opportunities in an Automotive Context

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Atos, a global company

About Atos

Atos is an international technology services company with a pro forma annual 2014 revenue of EUR 10 billion and 100,000 employees in 68 countries, listed at the Paris Stock Market.

Serving a worldwide client base, we deliver hi-tech transactional services, consulting and technology services, systems integration and managed services.
“Atos is a global leader in providing integrated digital manufacturing solutions and services across the entire product value chain. PLM is nowadays becoming an enterprise transformation program, going well beyond engineering, spanning from R&D, manufacturing and maintenance to global sourcing, sales & after-sales, finance as well as innovation.”

Atos end-to-end PLM portfolio: Our fields of PLM Competence

PLM Consulting & Consolidation, (M4PLM)

PLM Industry Solutions

PLM Portfolio

PLM Technology Services & Alliances

PLM Global Outsourcing PLM in the cloud
Industry 4.0 is not just “PLM” – The Atos Industry 4.0 reference architecture.

- Efficiency
- Effectiveness
- Agility
- Quality
Industry 4.0 is not just “PLM” – The Atos Industry 4.0 reference architecture.

- **Efficiency**
- **Effectiveness**
- **Agility**
- **Quality**
Why Industry 4.0 – today’s Automotive challenges: Product Design

THE INCREASE OF PRODUCT VARIANTS AND FUNCTIONS LEADS TO AN EXPONENTIAL COMPLEXITY GAIN.

Product Program

2005    2015    2020

Functional Complexity (Options)

Other Requirements
- local Regulations
  - Emission regulations
  - Pedestrian safety regulations
- Market requirements
- New Technologies
- Powertrain variants

Product Complexity

Source: BMW, PROLAMAT 2013
A global call for “produce everywhere” – adding to the complexity to be managed

The combination of product variance, carry-over usage, number of plants and global supply chain leads to an exploding network of dependencies while planning the manufacturing events.
We understand today’s automotive challenges: Major Pain Points

- managing exploding product complexity, driven by functionality and engine concept (plugIn-Hybrid, e-Engine, hydrogen fuel cell): in product design, manufacturing and maintenance & service
- dealing with a variety of local regulations, fast reaction to changes (pedestrian safety, CO2 emissions …)
- product data security, especially when designing and producing in environments that miss proper legal protection
- new sales concepts (car sales via internet and not dealership: BMW i3)
- dealing with new type of competition (Tesla, Apple, Google)
- sell mobility services instead of cars
  - CarLease in city hubs (e.g. BMW DriveNow)
  - connected Drive (e.g. used for smart navigation)
  - parking assistance (offering private parking lots in hubs)
- managing data volume connected to these services (big data analytics)
Managing complexity by new degree of interdisciplinarity

Characteristics of „smart products“
• increase of software share
• need of interdisciplinarity
• distributed and specialized systems
• Integration of the whole organization

Source: Trippner, dreiconsult. Strategy, Design & Coaching
The Industry 4.0 message is simple...
...the realization is not!

PAST

While today's production is linearly organized and optimized within the boundaries of organizational and system siloes...

FUTURE

...manufacturing of the future will fulfill individual customer needs by a collaborative and agile network of capabilities.
Industry 4.0 – How can it help me beside buzzwords?
## Industry 4.0 Opportunity Discovery workshop

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<td>Prioritize use cases</td>
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**Roadmap:**
1. Scoping
2. Brainstorm
3. Gap
4. Prioritize use cases
5. Top 3 – 5 Business Use Cases

**Atos catalog:**
- PRODUCT LIFECYCLE
- SUPPLY CHAIN
- ENTERPRISE

**Principles & Technologies:**
- 1
- 2
- 3
- 4
- 5

**Scoping:**
- Principles & Technologies

**Business use cases & Use case Fit/Gap:**
- Prioritize use cases

**Prioritize use cases:**
- Top 3 – 5 Business Use Cases
Industry 4.0 – Connectivity as the critical business ability.

Connectivity within the Enterprise
- Vertical &
- Horizontal integration

Connected Boardroom

Connected Suppliers

Connected Designers

Connected Machines

Connected Customers

Connected Products

Connected Consumers

Connectivity to the outside world
- Consumer Feedback
- Predictive maintenance
- Smart Products generating usage data
Enterprise – Applications – People – Things

CONNECTED ENTERPRISE
Suppliers
Manufacturers (plants)
Retailers
Service providers

CONNECTED APPLICATIONS
Business applications
Embedded software
Mobile apps

CONNECTED PEOPLE
Designers/engineers
Operators/workers
Customers/users
Service engineers

CONNECTED THINGS
Machines & assets
Mobile devices
Products
IT infrastructure
Intra- and InterConnectivity

**IntraConnectivity** is the collaboration or integration between entities within one and the same domain:
- Machine2Machine
- Designer2Engineer
- Manufacturer2Supplier
- ERP2MES

**InterConnectivity** is the collaboration or integration between entities in different domains:
- Machine2MES
- Engineer2Supplier
- Supplier2PLM
- Planner2ERP

At typical Automotive plants there is no office WLAN available. For realizing realtime M2M communication new connectivity standards e.g. based on radio technology are necessary: high performance, low latency, insensitive against interferences .. example IEEE 802.
Industry 4.0 Opportunity Discovery workshop

**Preparation (Prepare)**

**Discover (Discover)**

- Input
  - Prod. Lifecycle
  - Supply Chain
  - Enterprise
  - Customer Exp.
  - Op. Excellence
  - Bus. Reinvention
  - Trust & Compl.

- Scoping
  - Principles & Technologies

**Identify (Identify)**

- Brainstorm
  - Atos catalog
  - Principles & Technologies

- Prioritize use cases
  - Gap %
  - Top 3 – 5 Business Use Cases

**Qualify (Qualify)**

- Business use cases & Use case Fit/Gap

**Results (Results)**

- Roadmap
### Structure your use cases according to business impact: Example Enterprise level

<table>
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<th>Use cases</th>
<th>Technologies</th>
<th>Design Principles</th>
<th>Use cases</th>
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<td>Connected Machines/M2M Connected Worker</td>
<td>Cyber Physical Systems</td>
<td>Interoperability</td>
<td>Vertical Integration</td>
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<td>Core Communication Platform M2M</td>
<td>Internet of Things &amp; Services</td>
<td>Virtualization</td>
<td>Plant/Process simulation</td>
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<td>Predictive Maintenance Advanced Analytics</td>
<td>Big Data analytics</td>
<td>Decentralization</td>
<td>Global Plant (&quot;Make Anywhere&quot;)</td>
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<td>Enterprise Social Network/ Knowledge management</td>
<td>Social (collaboration)</td>
<td>Real-Time Capability/ Responsiveness</td>
<td>Connected Machines/Worker + Manufacturing Intelligence</td>
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<td>Cloud computing</td>
<td>Cloud</td>
<td>Service Orientation</td>
<td>SOA/ESB</td>
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<td>Augmented operator</td>
<td>Mobility/Wearables</td>
<td>Modularity</td>
<td>Agile Enterprise Architecture</td>
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**Connected Machines** – is that part of a Cyber Physical System in manufacturing which is about the connectivity of manufacturing equipment (machines) into the IT landscape as well as the interconnectivity between equipment (Machine to Machine or M2M).

M2M refers to technologies that allow both wireless and wired systems to communicate with other devices of the same type. M2M is a broad term as it does not pinpoint specific wireless or wired networking, information and communications technology.

M2M is considered an integral part of the Internet of Things (IoT) and brings several benefits to industry and business in general.

**Connectivity** – Connecting Shop Floor equipment to each other (M2M) and to a central control system (MES)

**Process impact** – the Shop Floor

**Business opportunities** – real-time and decentral communication and decision making eliminates delays and avoids waste and rework
Industry 4.0 Opportunity Discovery workshop

PREPARE

INPUT
- PROD. LIFECYCLE
- SUPPLY CHAIN
- ENTERPRISE
- CUSTOMER EXP.
- OP. EXCELLENCE
- BUS.REINVENTION
- TRUST & COMPL.

Scoping

DISCOVER

Principles & Technologies

IDENTIFY

Brainstorm

Atos catalog

PRINCIPLES & TECHNOLOGIES

QUALIFY

Gap %

Prioritize use cases

RESULTS

ROADMAP

Top 3 – 5 Business Use Cases
Not just theory – The Industry 4.0 Pilot factory in Vienna - Seestadt

- start: Q4/2015
- duration: 7 Jahre

Atos is the exclusive IT Service provider in the Austrian KIC consortium
Not just theory – The Industry 4.0 Pilot factory in Vienna - Seestadt

Safety eye

Connected e-Bike

3D printers

augmented reality
One of the 1st fully integrated Industry 4.0 production facilities
One of the 1st fully integrated Industry 4.0 production facilities

Dynamic PLM / TC
- Supply Chain Management
  - Procurement
  - Sourcing
  - Schedule & BOM
  - SC capacity & delivery schedules
- Partners
  - Product collaboration
  - Supplier collaboration
- Contractors
  - Recipes Quality Engineering
  - Data & events
  - EDW/BI
- Suppliers
  - Supplier 1, 2, 3
- Logistics execution
  - Transport & logistics
  - Transport & trace

SAP HANA
- Customer demand & order management
  - Customer service
  - Marketing
  - Sales
  - Multi Channel access
  - Product Data & BOM
  - Demand Forecast
  - Capacity WOW
  - Order Delivery

SAP ME 15.1
- Procurement strategy
  - Inventory management
  - Production planning
  - Procurement
  - Order management
  - Capacity planning
  - Annual Quarterly
  - Weekly Real time
  - Production planning

SAP HANA
- Quality manufacturing plants
  - Maintenance
  - Energy
  - Track & trace
  - Delivery schedule
  - Logistics execution
  - Delivery
  - Transport & logistics
  - VMI Collaboration

Stakeholders
- Wholesale
- Retail
- Customers
Conclusion

Discover what Industry 4.0 can do for you
Use a structured approach to discover how Industry 4.0 can heal your pain points. Identify what use cases are relevant for your business.

REUSE INDUSTRY 4.0 TECHNOLOGY WITH YOUR DATA
Bring your business into an Industry 4.0 environment to unlock the potential for product design, manufacturing and service.

VISIT & GET EXCITED
Visit the Pilot Factory 4.0 to get deep insights how new technologies will change the way of manufacturing and drive your efficiency.
Thank you for your attention!