Uncover hidden potential of your operations with robotics digital services

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Josep Rius - Global Product Manager Digital Services
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Agenda

- Overview on value-added life cycle services
- ABB Ability™ Connected Services
Vision: We want to be the reason why customers and Value Providers continue to buy from ABB

Global support organization with more than 1,600 service professionals

Present in 53 countries in more than 100 locations
- Regional Spare Part Distribution Centers
- Global Remanufacturing and Workshop Repair Centers
- Local Remanufacturing and Workshop Repair Center
- Global Service Intelligence Unit
- Regional Training Competence Center
- Regional Training Competence Center Satellite
Robotic Customer Service
Overview: ABB is a pioneer in Digitalization

Yesterday – Remote Services
Today – ABB Ability™ Connected Services
Tomorrow

Increasing uptime, reliability and efficiency over the lifecycle
Robotics Customer Service
Value-added life cycle services

4. Lifetime Extension Phase
- Secured production
- Maximized ROI
- Latest technology
- Safety

1. Start-up Phase
- Faster ramp-up
- Risk reduction
- Secured long equipment lifetime

3. Production Improvement Phase
- Reduced cycle time
- Improved productivity
- Increased production output
- Reduced costs

2. Production Phase
- Production continuity
- Increased uptime
- Increased availability
- Cost control

World class services for the entire lifecycle
Robotics Customer Service
Value-added life cycle services

1. Start-up phase

Features:
- Simulation and off-line programming with RobotStudio®
- Installation and Commissioning
- Technical Support and Remote Assistance
- Training
- Spare part packages

Benefits:
- Faster ramp-up
- Risk reduction
- Secured long equipment lifetime
Robotics Customer Service
Value-added life cycle services

2. Production phase

Features:
- Service Agreements and ABB Ability™ Connected Services
- Maintenance
- Repairs

Benefits:
- Rapid response
- Increased uptime
- Increased availability
- Cost control

“The combination of a standby robot, training and shortened response time for our palletizers ensures highest possible availability of our production”
Maintenance Mngr., Franz Wiltmann GmbH & Co. KG
Robotics Customer Service
Field Service: Robot Care Service Agreement Packages

An offer designed to meet your needs
Based on our experience and customer needs, ABB has developed four standardized packages, with ABB Ability™ Connected Services:

- **ABB Basic Care**
  - Service included with robot delivery
  - Free during warranty period

- **ABB Preventive Care**
  - Service securing high reliability

- **ABB Express Care**
  - Service for reliability and availability

- **ABB Extended Care**
  - Extended warranty and predictability

Condition Monitoring & Diagnostics is included
Robotics Customer Service
Value-added life cycle services

3. Production improvement phase

Features:
- Upgrades on products and processes
- **ABB Ability™ Connected Services - Asset Optimization**
- Remanufacturing

Benefits:
- Reduced cycle time
- Improved productivity
- Increased production output
- Reduced costs
Robotics Customer Service
Value-added life cycle services

4. Lifetime extension phase

Features:
- ABB Ability™ Connected Services - Fleet Assessment
- Remanufacturing
- Replacement
- Simulation and off-line program conversion with RobotStudio®

Benefits:
- Secured production
- Maximized Return On Investment
- Safety
# Robotics Customer Service

System and Application Services for Lifetime Extension

## Customer needs

- Minimized maintenance costs
- Add new product features
- Maximized reliability
- Low CAPEX
- Retain factory standard
- Use existing competencies
- Resuse existing spare parts stock

## Manipulator

<table>
<thead>
<tr>
<th></th>
<th>Controller</th>
<th>Process equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace with new robot system</td>
<td>Keep Controller</td>
<td>Adapt (New technology)</td>
</tr>
<tr>
<td><strong>New Manipulator</strong> (Mechanical Arm upgrade)</td>
<td>Keep Controller</td>
<td>Adapt (Latest design)</td>
</tr>
<tr>
<td>Keep Manipulator</td>
<td>New Controller (Stand Alone IRC5)</td>
<td>Adapt (Latest design)</td>
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<tr>
<td>Remanufacturing</td>
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**ABB Ability™ Connected Services**
Proactive maintenance with measurable productivity increase

**What is it?**
Services for interpreting, managing and converting robot data into actionable insights as well as for minimizing both maintenance and production costs.

**Elevator pitch**
ABB Ability™ Connected Services let users remotely monitor, troubleshoot and optimize entire robot fleets for maximum performance together with minimum maintenance and total lifetime costs.

Providing data driven proactive maintenance, faster issue resolution and typically 2 additional monthly production hours per robot.
Customer Values

- Fast recovery
- Status monitoring and troubleshooting
- Optimum mechanical preventive maintenance
- Fast expert support anytime, anywhere
- Highest robot fleet performance, availability and lifetime

ABB Ability™ Connected Services
Fast recovery

1. Backup Management

- Fast and easy recovery from fatal crash or unwanted changes
- It decreases downtime dramatically in critical situations
- Avoidance of re-programming

“Firefighter” level
Status monitoring and troubleshooting

- Control over the current fleet status
- Fast notification and identification of failure and low performing robots ➔ It highlights quickly where to act
- Possibility of Proactive Monitoring by ABB for taking care of it
Status monitoring and troubleshooting

Real case with ABB customer

Who is the customer?

- Global Manufacturing Company
- It produces mechatronic components and systems in 63 locations in more than 20 countries
- Headquarters based in Germany

How was the situation?

- 3 factories with more than 70 ABB robots, mainly in machine tending and arc welding applications.
- Although the Maintenance Manager was convinced that all ABB robots worked very well and practically had no problems, he agreed to connect all the robots to analyze their operational status.

What did we find out?

- After a month of testing, ABB Ability™ Connected Services detected around **700 events in a month** from 15 robots only that represented robot stoppages. This translates into a loss of productive time per month!!!
- The Condition Monitoring and Diagnostics service helped the customer to identify the existing problems in its installation.
Optimum mechanical preventive maintenance

- Optimized maintenance intervals as well as better asset management
- More efficient maintenance with less costs (and less effort) and data driven decisions about robots to be reused or replaced.
- It allows a better spare parts management
Optimum mechanical preventive maintenance

Real case with customer

Conclusions:

- If possible, reduce speed and accelerations on robot group with very high utilization
- Shorten TTNM (“time to next maintenance”) in the robot group with very high utilization
- Spare parts possibly needed for axis 1 and 6 of robot 66-67827
- During preventive maintenance of robot 66-67827, have special focus on axis 1 and 6
Highest robot fleet performance, availability and lifetime

- Avoid unplanned downtimes and improve operational performance by using ABB insights and recommendations
- Prescriptive maintenance, ABB tells you what to do for avoiding failure and also for having a smoother production without micro-stoppages and other issues
- It allows customer to react before critical situations occur
- Highest robot fleet performance, availability and lifetime which means, more production and less costs
Highest robot fleet performance, availability and lifetime
ABB Ability™ Connected Services cost savings contribution

Real case with customer
ABB Ability™ Connected Services cost savings contribution

Real case with customer

Main robot alarm & events coming out from 15 robots during 30 days **BEFORE**

- Motion Supervision
- Joint Collision
- Lost communication with I/O device
- Joint load too high
- Missing scheduled backup
- No Contact With I/O Device
- Joint Speed Error
- Externam Manual Request

**TOTAL: 697 alarms & events**

Main robot alarm & events coming out from 15 robots during 30 days **AFTER implementing Asset Optimization recommendations**

- Max Force or Torque reached
- Motion supervision
- Joint collision
- Lost communication with I/O device
- Joint load too high
- No Contact With I/O Device

**TOTAL: 237 alarms & events**

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| Slide 23 |  |
ABB Ability™ Connected Services cost savings contribution

Real case with customer

Typically 2 hours of additional productive time per robot per month

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**TOTAL: 237 alarms & events**
Fast expert support anytime, anywhere

70% of incidences can be solved remotely with Remote Access
## What services do I need?

<table>
<thead>
<tr>
<th>Customer benefit</th>
<th>ABB Ability™ Connected Services</th>
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<tbody>
<tr>
<td></td>
<td>Condition Monitoring &amp; Diagnostics</td>
</tr>
<tr>
<td>1) Fast recovery</td>
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<td>2) Status monitoring and troubleshooting</td>
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<td>3) Optimum mechanical preventive maintenance</td>
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<td>4) Fast expert support anytime, anywhere</td>
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<td>5) Highest robot fleet performance, availability and lifetime</td>
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Heat Map 2019
Connected robots in relationship with installed base

<table>
<thead>
<tr>
<th>Region</th>
<th>Total # of connected controllers on Jan'2019</th>
<th>Total # of connected controllers on Dec'2019</th>
<th>% growth in number of robots</th>
<th>Total # of customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>101 of 19'000 (0,5%)</td>
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<tr>
<td>Europe</td>
<td>7093 of 100'000 (7%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>325 of 77'000 (0,5%)</td>
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<tr>
<td>South-East Asia</td>
<td>949 of 21'000 (4,8%)</td>
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<tr>
<td>Americas</td>
<td>376 of 8'200 (4,5%)</td>
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<td></td>
<td></td>
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<tr>
<td>South Africa</td>
<td>30 of 750 (4%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>23 of 1'900 (1,1%)</td>
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</tr>
</tbody>
</table>

Total # of connected controllers on Jan'2019: 6,089
Total # of connected controllers on Dec'2019: 8,653
% growth in number of robots: +39%
Total # of customers: 1,075
And what about security and data policies?

**Ability™ GT&Cs**
- We do not either share or sell data to other companies.
- We only use it for the purpose of the contracted services.
- ABB will not take any IP out of such data (data belongs to customers)

[https://ability.abb.com/terms](https://ability.abb.com/terms)

**Legal**
Ability™ follows:
- Regulations (GDPR, Trade compliance, etc).
- International standards (ISO27000, IEC62443, etc).
- Guidelines (NIST and IIC frameworks, etc).

It is also based on Azure with largest compliance portfolio in the industry (Huawei Cloud for China in the future)

**Anonymized data**
We upload only technical anonymized data and never personal data.

**Technical security**
We use all technical means for enhancing security:
- Encrypted data,
- Certifications,
- Firewalls,
- Etc.

**Whitepaper**
You can also find a technical cybersecurity whitepaper in:

Within the “Internal material” chapter, among many other documents.
ABB Ability™ Connected Services…

• ...help you in maximizing the **availability** of your robot fleet

• ...provide the **smoothest run** of your production while saving on **maintenance** and specially production costs

• ...range from a **support tool** to a **peace of mind** service bundled in one of our ABB Service Level Agreements (SLA)
ABB to make key software services available free of charge to our customers until the end of 2020

ABB Ability™ Connected Services
Condition Monitoring & Diagnostics

RobotStudio®

Virtual Technical Support
Q & A

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