

2020

Uncover hidden potential of your operations with robotics digital services

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Presenter introduction: Francesco Piccioni, Josep Rius



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Agenda

- Overview on value-added life cycle services
- ABB Ability™ Connected Services

ABB Robotics Customer Service

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

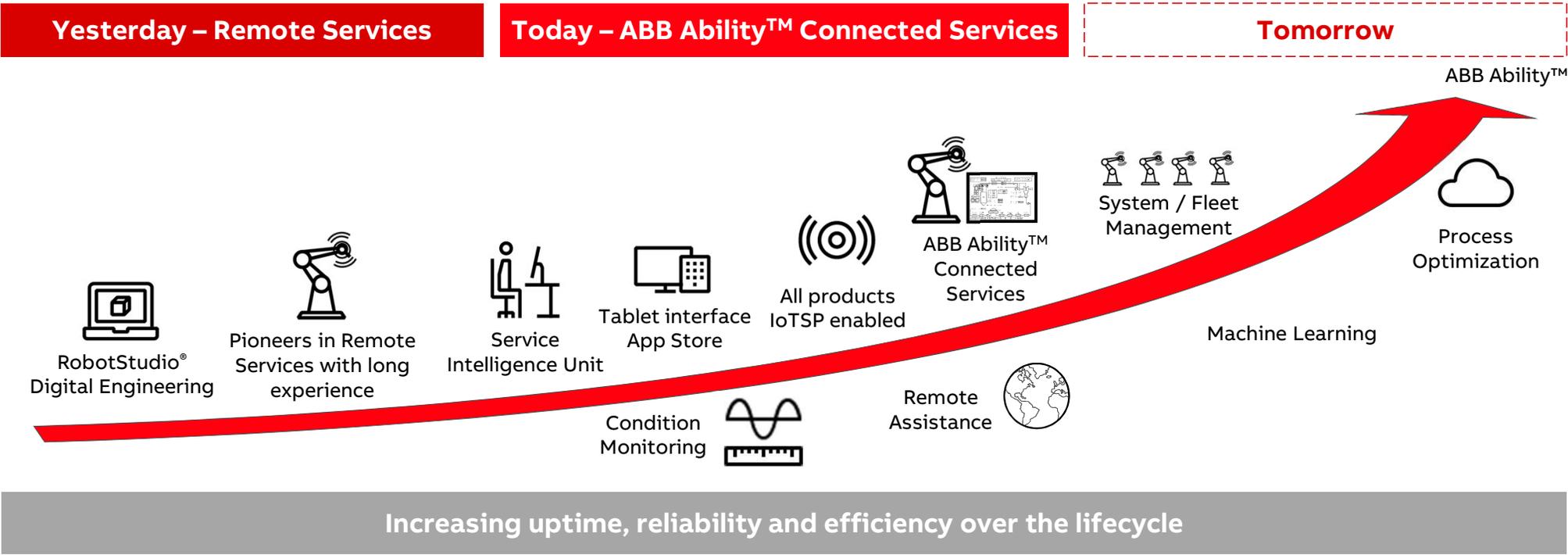
Present in 53 countries in more than 100 locations

- 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



Robotics Customer Service

Overview: ABB is a pioneer in Digitalization



Robotics Customer Service

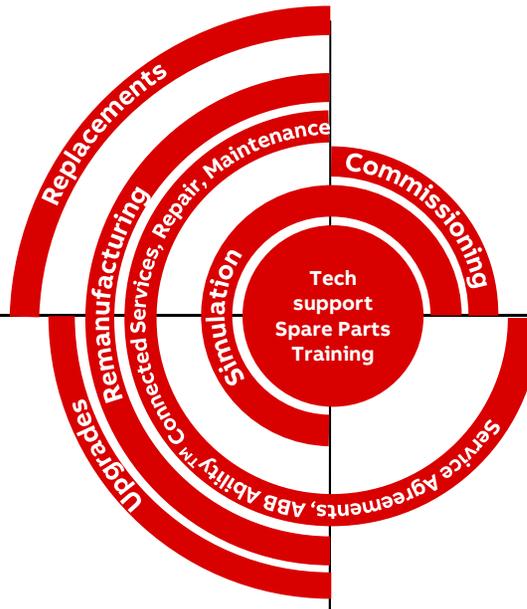
Value-added life cycle services

4. Lifetime Extension Phase

- Secured production
- Maximized ROI
- Latest technology
- Safety

3. Production Improvement Phase

- Reduced cycle time
- Improved productivity
- Increased production output
- Reduced costs



1. Start-up Phase

- Faster ramp-up
- Risk reduction
- Secured long equipment lifetime

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

Original  Wiltmann
Die Marke für Genießer.



“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

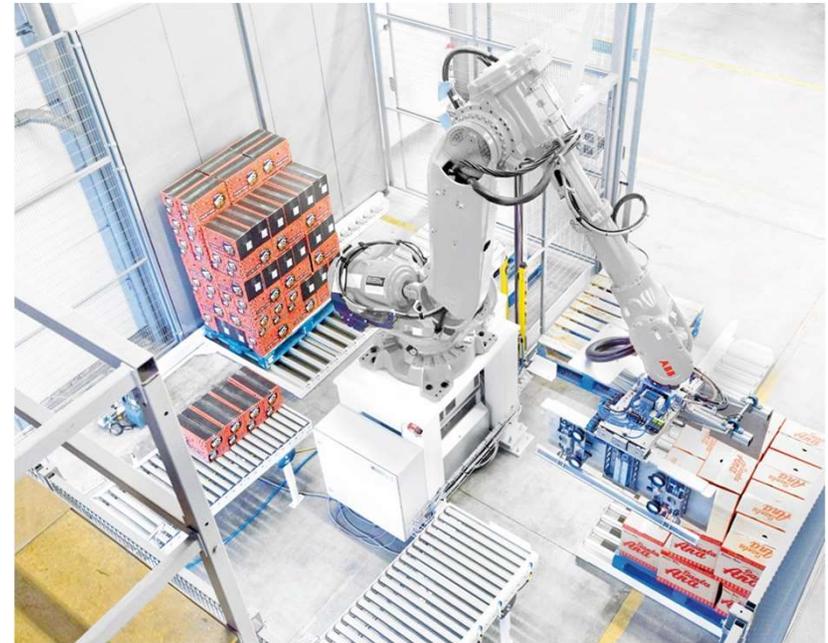
3. Production improvement phase

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

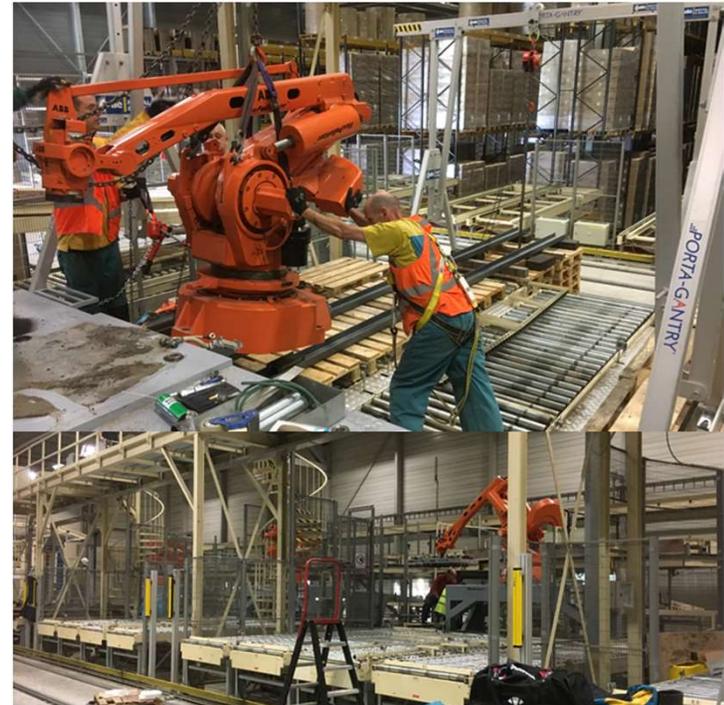
4. Lifetime extension phase

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

Reuse existing spare parts stock

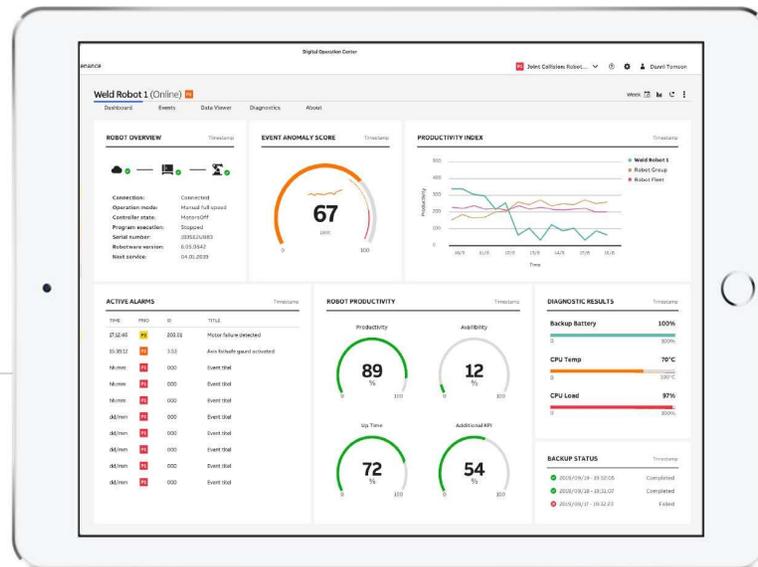
	Manipulator	Controller	Process equipment
	Replace with new robot system		Replace/Keep (New technology)
	New Manipulator (Mechanical Arm upgrade)	Keep Controller	Adapt (Latest design)
	Keep Manipulator	New Controller (Stand Alone IRC5)	Adapt (Latest design)
	Remanufacturing		Adapt (Latest design)
	Remanufacturing	Keep	

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

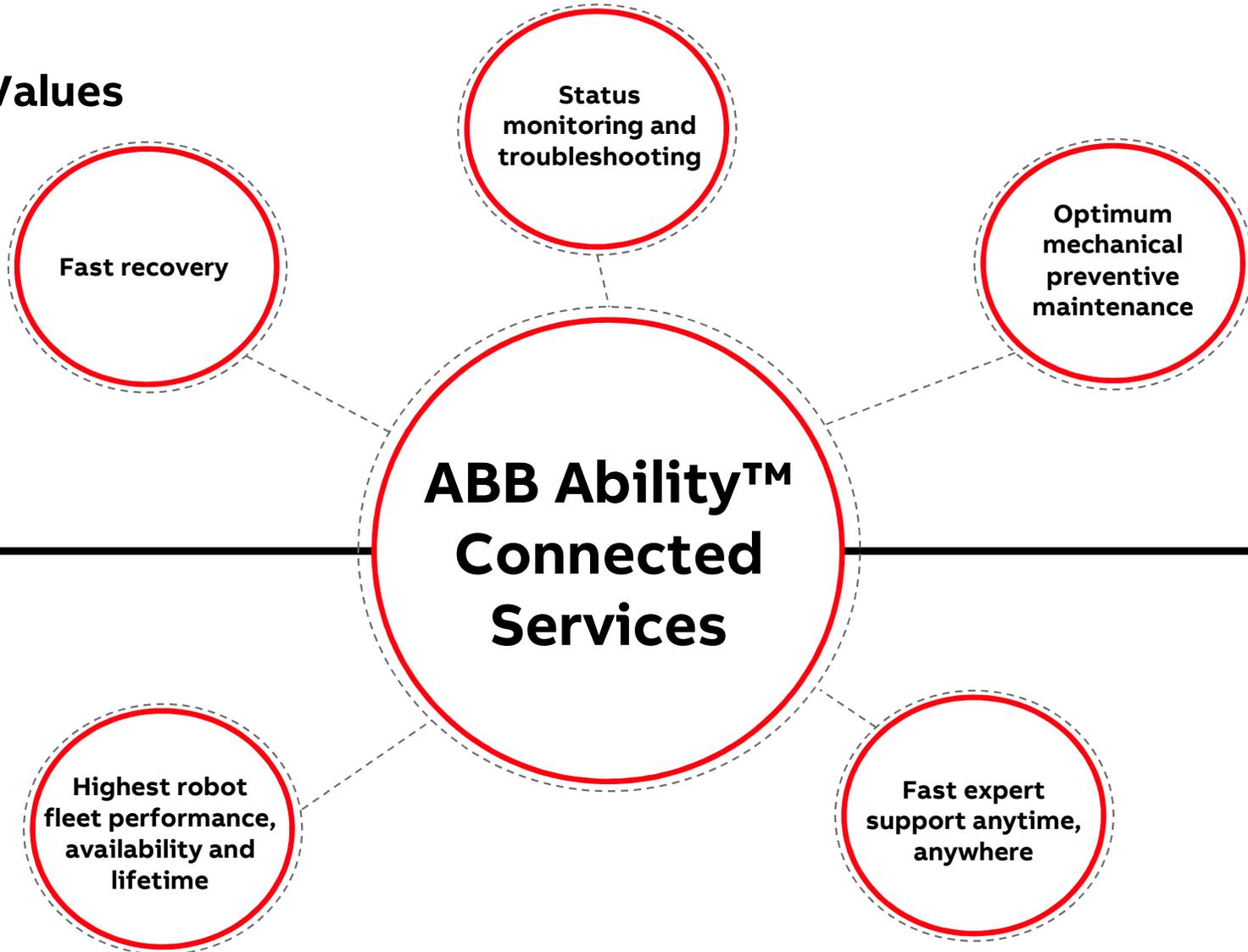


Elevator pitch

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.

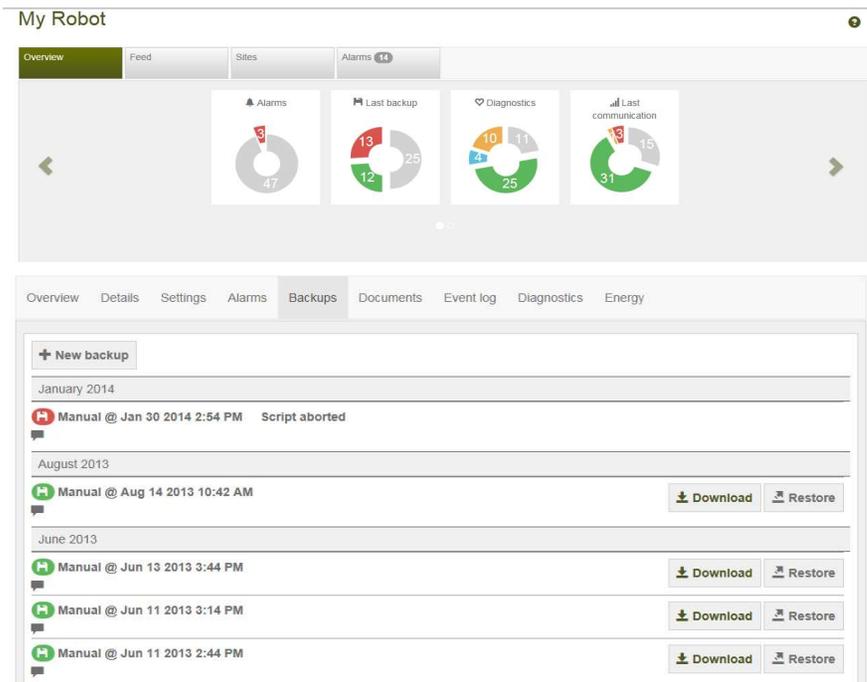
Providing data driven proactive maintenance, faster issue resolution and typically 2 additional monthly production hours per robot

Customer Values



Fast recovery

1. Backup Management



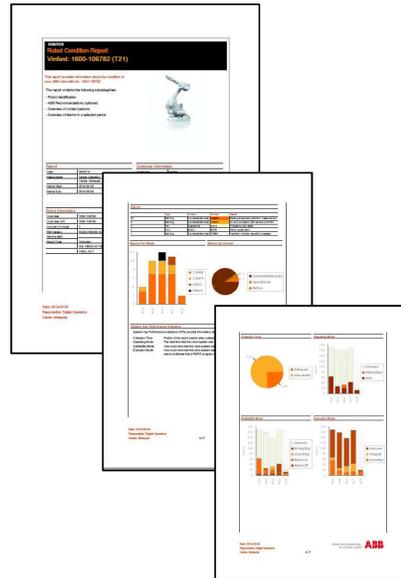
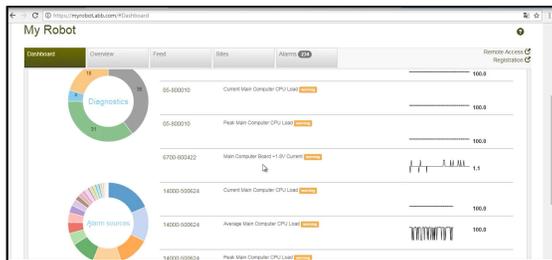
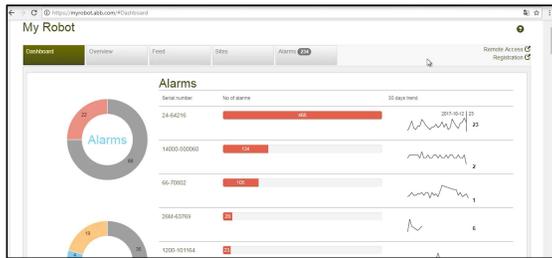
- Fast and easy recovery from fatal crash or unwanted changes
- It decreases downtime dramatically in critical situations
- Avoidance of re-programming



“Firefighter” level

Status monitoring and troubleshooting

Condition Monitoring & Diagnostics



- 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



Investigator level



“Firefighter” level

Status monitoring and troubleshooting

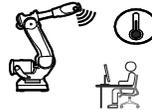
Real case with ABB customer

Who is the customer?



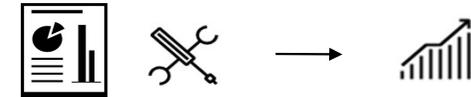
- Global Manufacturing Company
- It produces mechatronic components and systems in 63 locations in more than 20 countries
- Headquarters based in Germany

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.

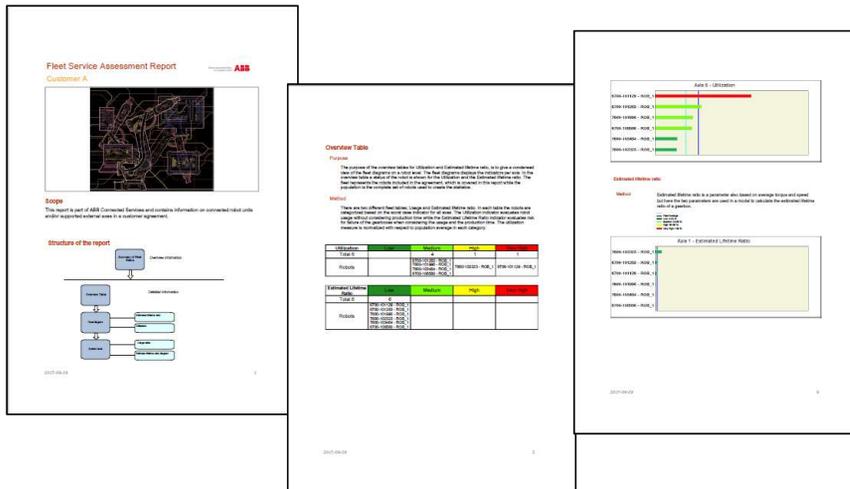
What did we find out?



- 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

Fleet Assessment



- 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**



Preventive Maintenance team

Optimum mechanical preventive maintenance

Real case with customer

Utilization	Low	Medium	High	Very High
Total 20	10	3	1	6
Robots	46-64729 - ROB_1 66-67828 - ROB_1 66-72482 - ROB_1 6640-100089 - ROB_1 6640-100091 - ROB_1 6640-100090 - ROB_1 6640-100094 - ROB_1 6640-100097 - ROB_1 6640-105462 - ROB_1 6700-102431 - ROB_1	6640-100093 - ROB_1 R52 - ROB_1 6640-105461 - ROB_1	R60 - ROB_1	46-64726 - ROB_1 66-67826 - ROB_1 66-67825 - ROB_1 66-67827 - ROB_1 66-73137 - ROB_1 6640-100092 - ROB_1
Estimated Lifetime Ratio	Low	Medium	High	Very High
Total 20	18	2		
Robots	46-64726 - ROB_1 46-64729 - ROB_1 R60 - ROB_1 66-67826 - ROB_1 66-67828 - ROB_1 66-72482 - ROB_1 66-73137 - ROB_1 6640-100089 - ROB_1 6640-100092 - ROB_1 6640-100093 - ROB_1 6640-100091 - ROB_1 R52 - ROB_1 6640-100090 - ROB_1 6640-100094 - ROB_1 6640-100097 - ROB_1 6640-105461 - ROB_1 6640-105462 - ROB_1 6700-102431 - ROB_1	66-67825 - ROB_1 66-67827 - ROB_1		

66-67827 - ROB_1
 Calculation Date 2019-05-30
 Mechanical Unit 66-67827 - ROB_1
 Robot Type IRB 6640
 RW Version ROBOTWARE_5.15.2005
 Production Time (hours) 30767
 Duty Factor (%) 78
 Population average duty factor Duty Factor (%) 20

Parameter	Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6
Activity (%)	32	37	36	33	35	35
RelativeDistance (%)	17	13	10	16	16	28
Accumulated distance (motor rotations)	18360863	13374632	11038371	17137141	17345170	29697433
Estimated Lifetime Ratio (%)	9	31	29			0
Average speed relative to population (%)	263	171	154	190	210	217
Average torque relative to population (%)	91	104	116	115	97	63
Average activity relative to population (%)	157	164	161	187	166	179

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

Asset Optimization



- 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**



Investigator level

ABB Ability™ Connected Services cost savings contribution

Real case with customer

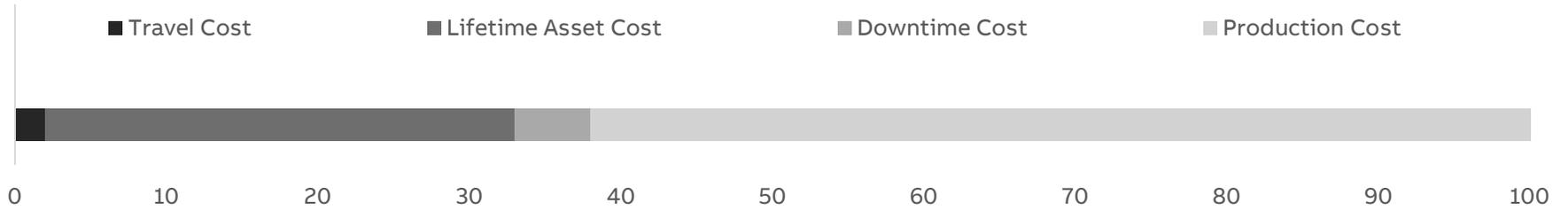
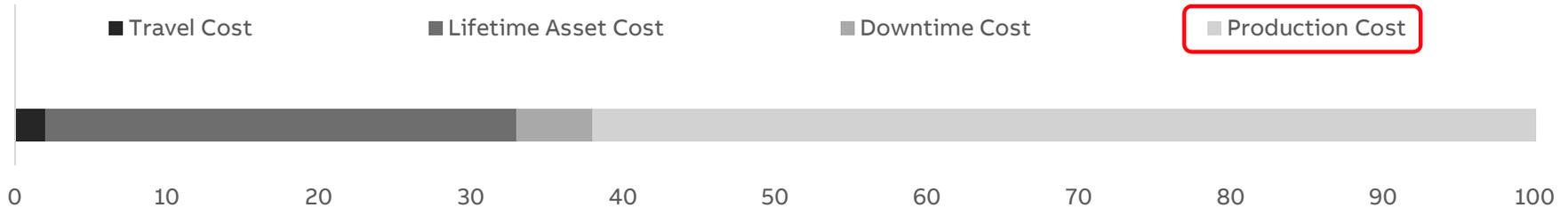
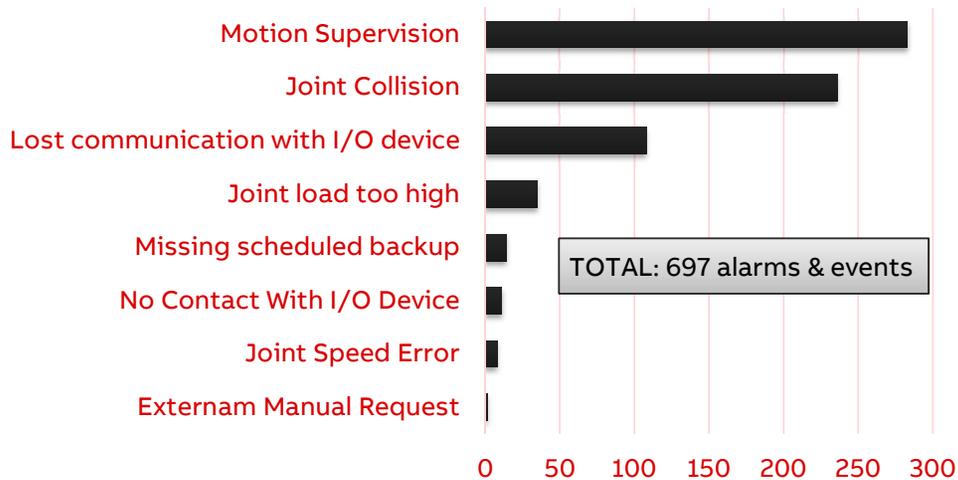


ABB Ability™ Connected Services cost savings contribution

Real case with customer



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



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

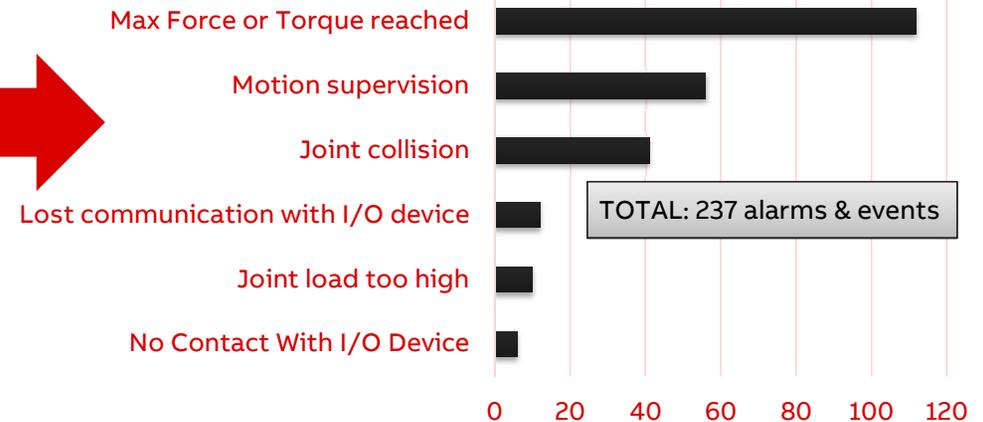
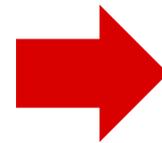
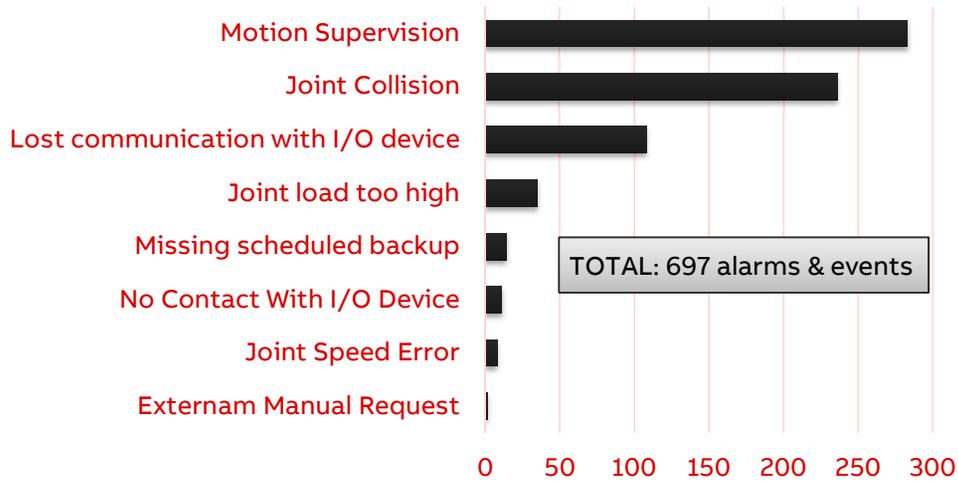


ABB Ability™ Connected Services cost savings contribution

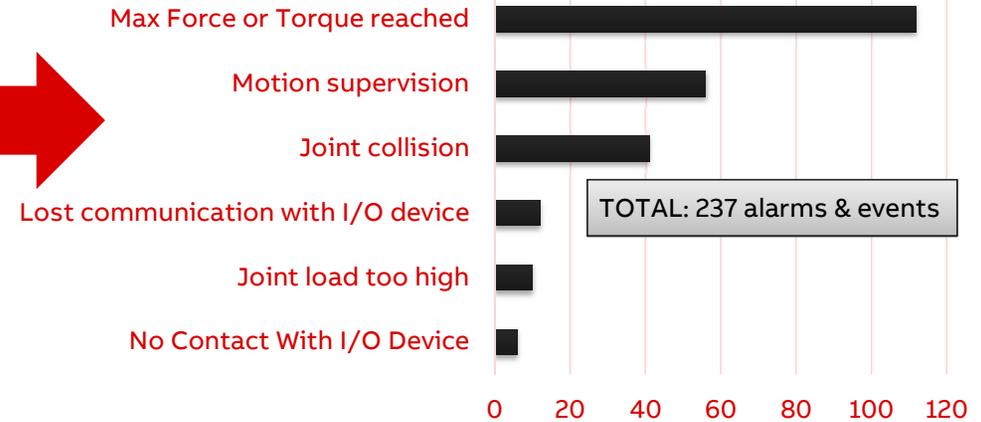
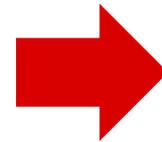
Real case with customer



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



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



Fast expert support anytime, anywhere

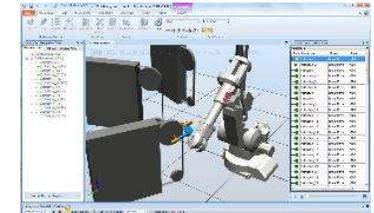
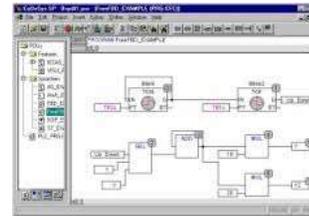
70% of incidences can be solved remotely with Remote Access



End customer

Integrator

ABB



“Firefighter” level

What services do I need?

ABB Ability™ Connected Services

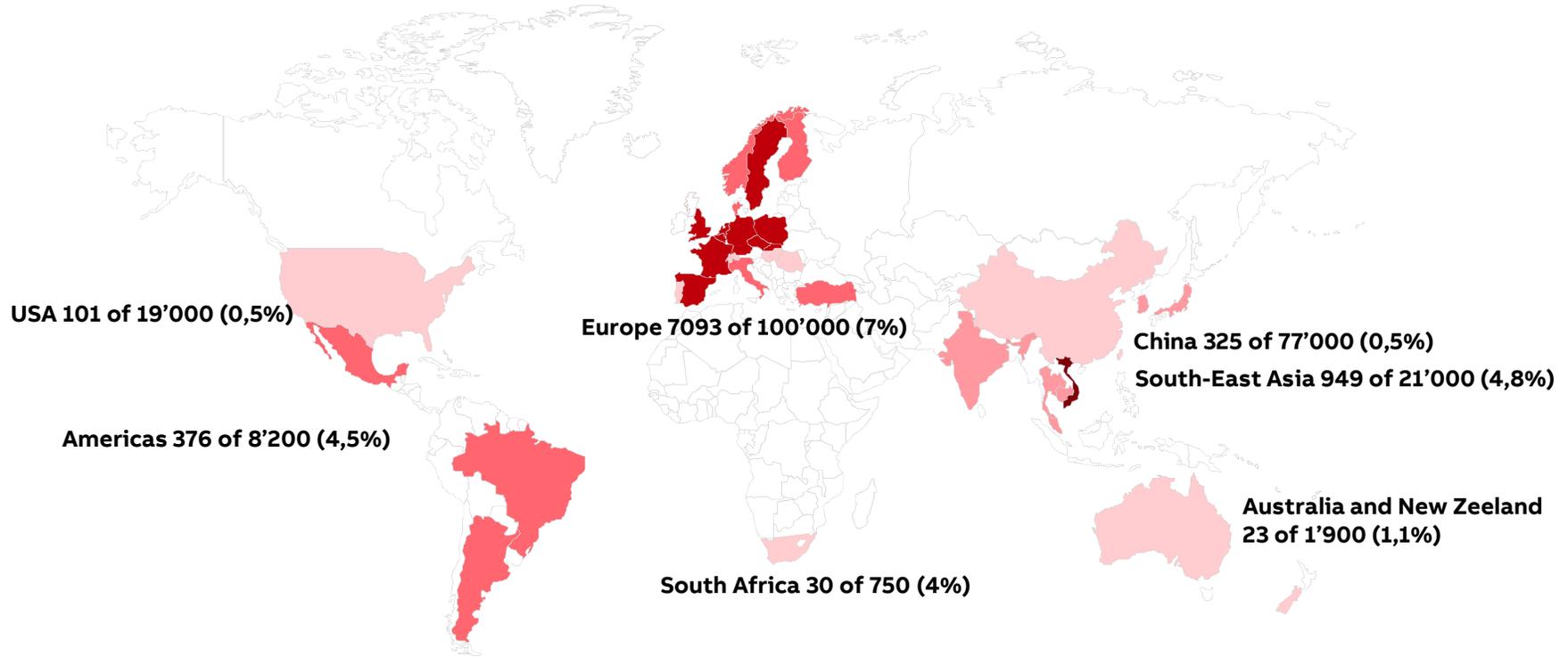
Customer benefit

	Condition Monitoring & Diagnostics	Backup Management	Fleet Assessment	Asset Optimization	Remote Access
1) Fast recovery	Red	Red	White	White	White
2) Status monitoring and troubleshooting	Red	White	White	White	White
3) Optimum mechanical preventive maintenance	Red	White	Red	Light Red	White
4) Fast expert support anytime, anywhere	Red	White	White	White	Red
5) Highest robot fleet performance, availability and lifetime	Red	White	Red	Red	Light Red

Heat Map 2019

Connected robots in relationship with installed base

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	1075



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>

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:

<https://go.insideplus.abb.com/businesses/robotics-discrete-automation/business-lines/pg-robotics-customer-service/service-lines/field-service-training/service-agreements-with-connected-services/connected-services-marketing-material>

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

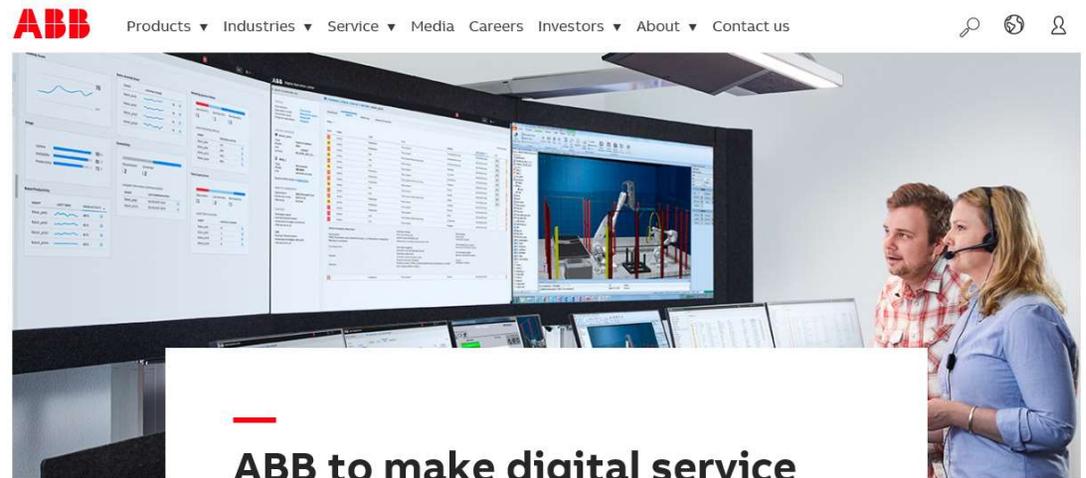


ABB to make digital service available free of charge to help customers maintain production

Q & A



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ABB