# Predictive Analytics: Definition, Functionality and Benefits

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6th Workshop on Innovative Engineering for Fluid Power
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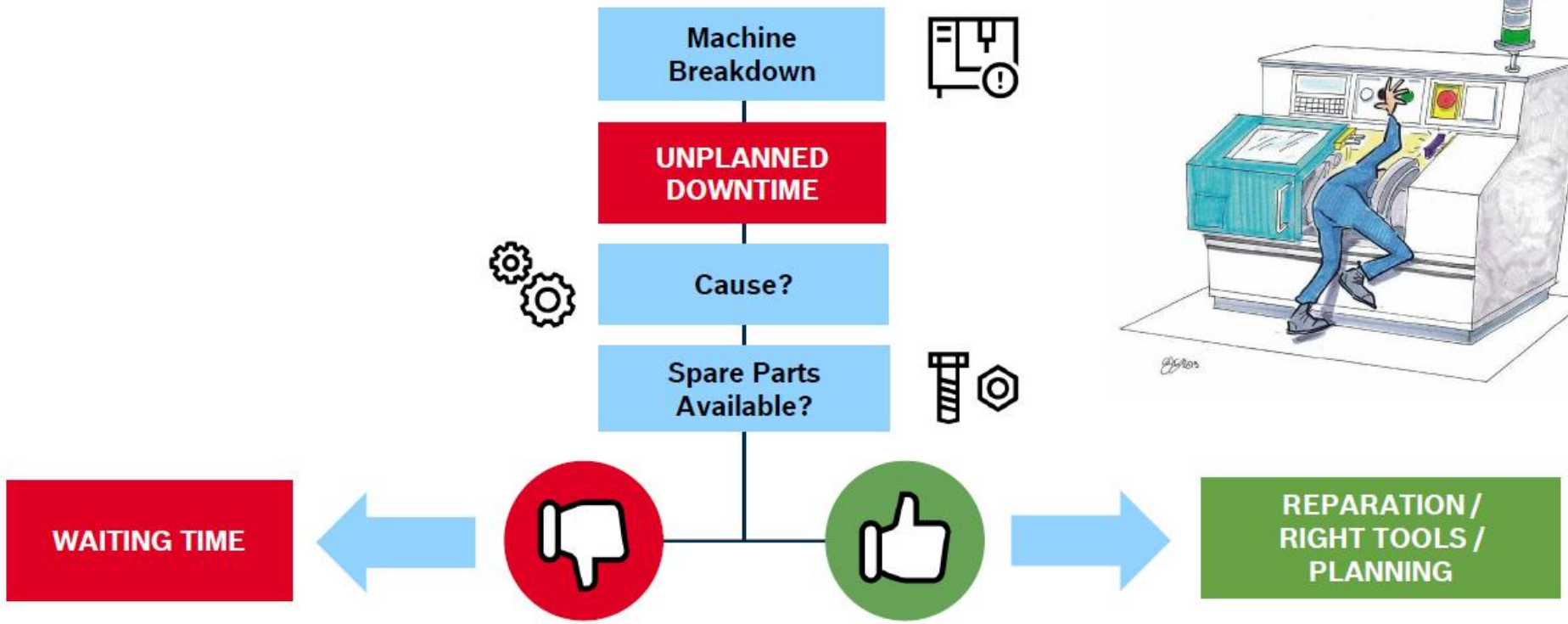
# Predictive Analytics: Definition

## Customer requirements

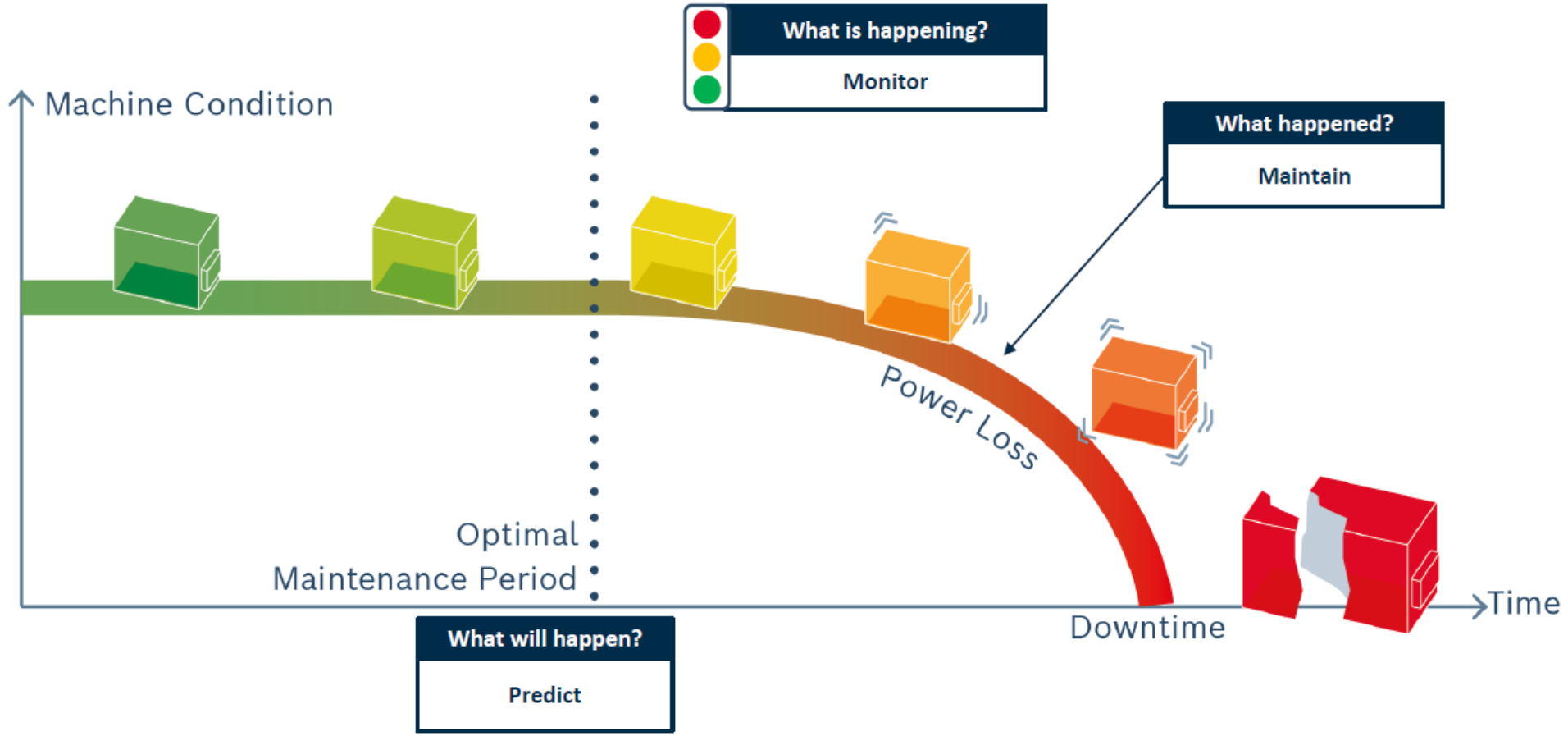
# Predictive Analytics: Definition

## What to do if the machine breaks down unexpectedly?

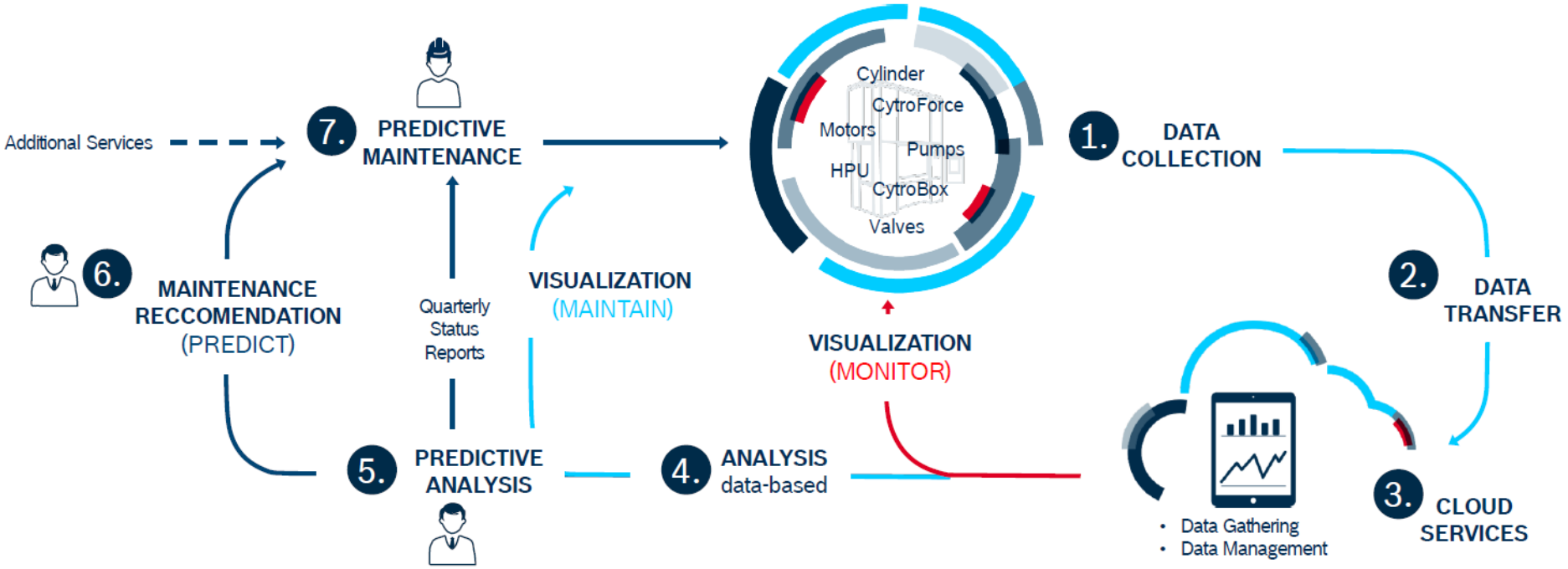


# Predictive Analytics: Definition

## Machine Condition x Time



## System structure



# Predictive Analytics: Functionality

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## Sensor solutions

### Electric Motor

Motor current

4 Packages

### Oil Cleanliness

Particle & Water Humidity
MP-Filtri ICM-W-M-2.0
or OPM II + WGM-B*

2 Packages

### Cooling unit

Water side
Oil side
Water and Oil side

9 Packages

### Hydraulic Pump

Pressure in Pressure Line
Volumetric Flow Leakage Temperature Leakage
(Temperature Suction Line)

16 Packages

### Filter

Dynamic Pressure Filter 1
Pressure Difference Filter 2

13 Packages

### Valves

Pressure in A and B
(Valve Stroke Command-valve & Actual-valve
Current Consumption)

4 Packages

### Hydraulic Motor

Pressure in A and B
Volumetric Flow &
Temperature Leakage
Temperature Pressure
& Tank Pipe

8 Packages

### Accumulator

Gas Pressure & Temperature
Oil Pressure & Temperature at the memory block

6 Packages

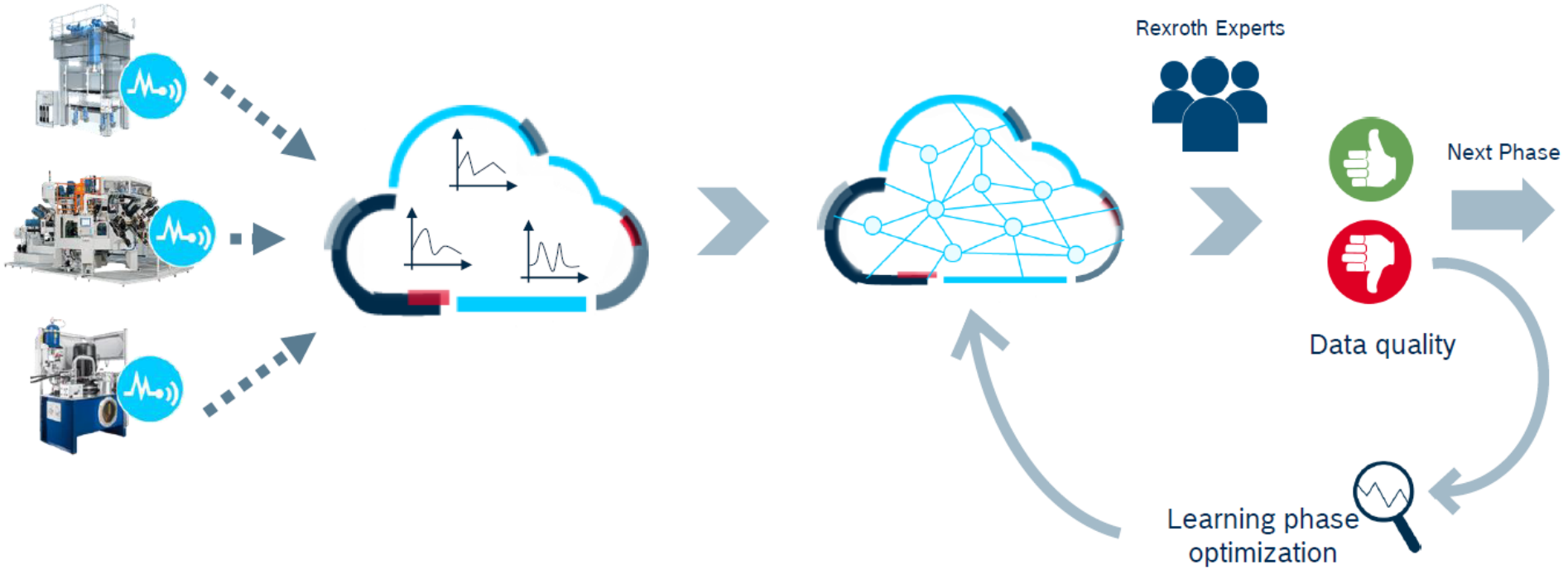
### Cylinder

Chamber pressure
Oil temperature

4 Packages

# Predictive Analytics: Functionality

## Learning phase



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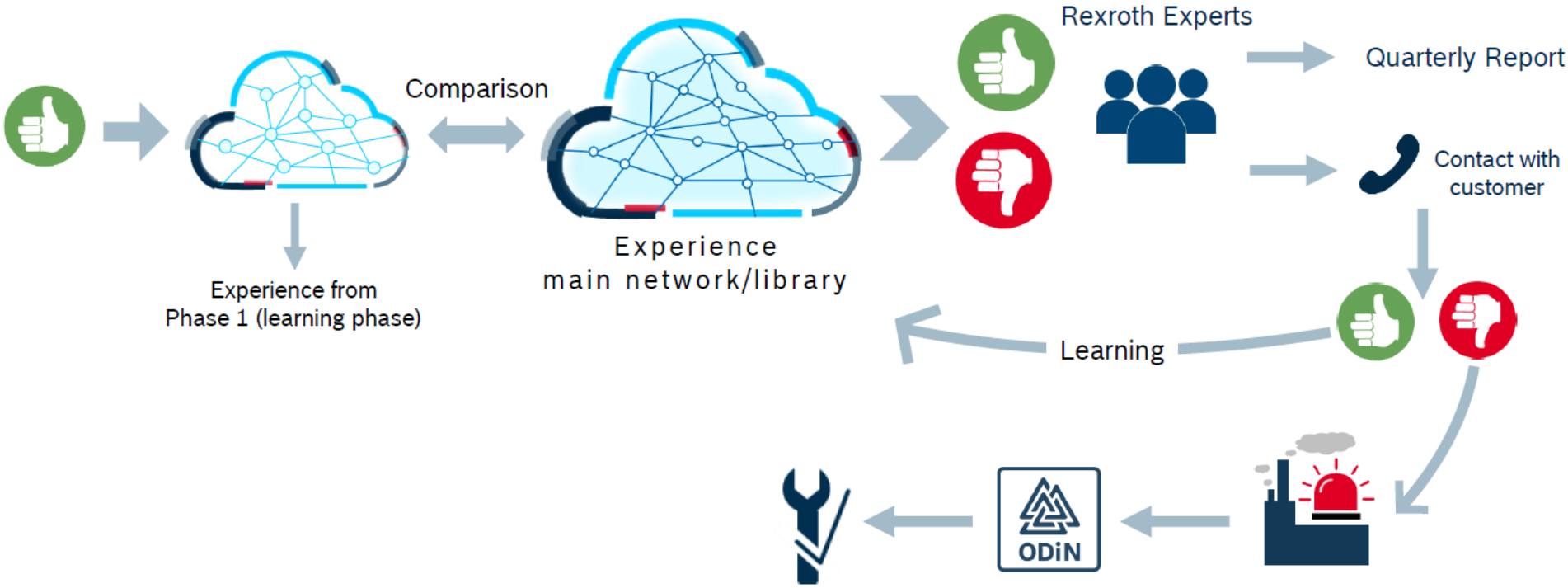
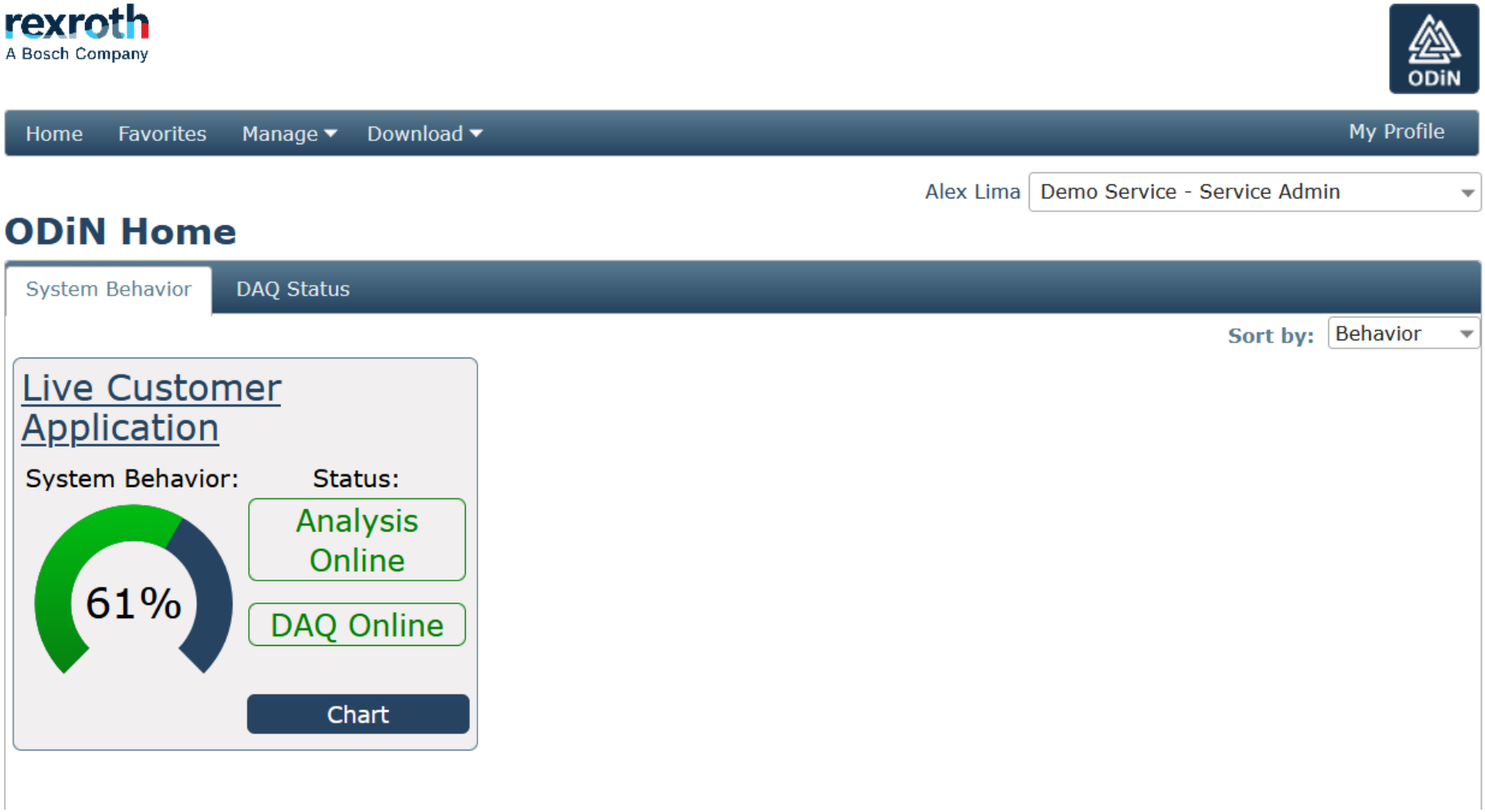
## Monitoring phase



# Predictive Analytics: Functionality



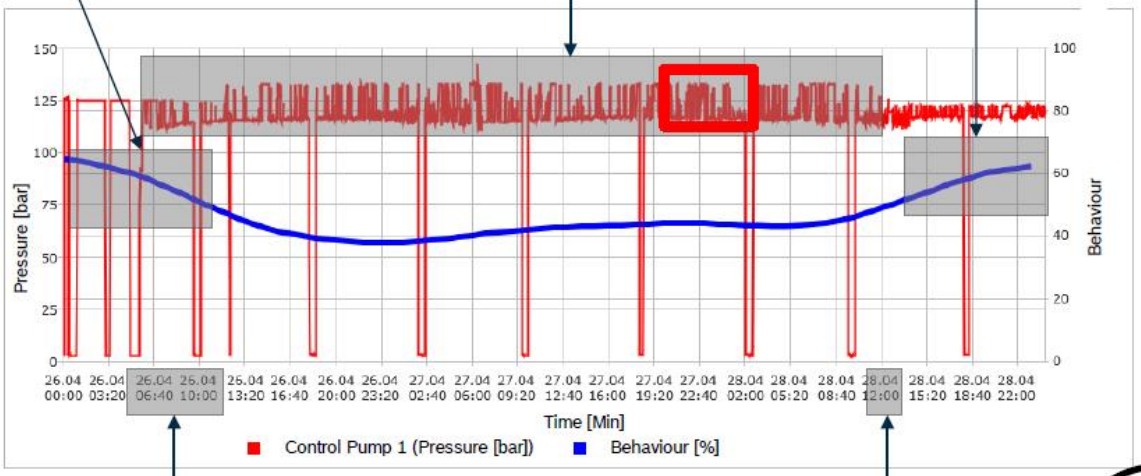
# Predictive Analytics: Functionality

## Example

- System detect an anomaly
- Changed system behavior

- Control pump shows abnormal pressure peaks

- Back to the normal work



**Recommandation**
- Inspection of the pressure relief valve
- Inspection of the standard control settings of the pump

**Feedback**
Loose safety nut found on pump pressure control system
Nut secured by customer

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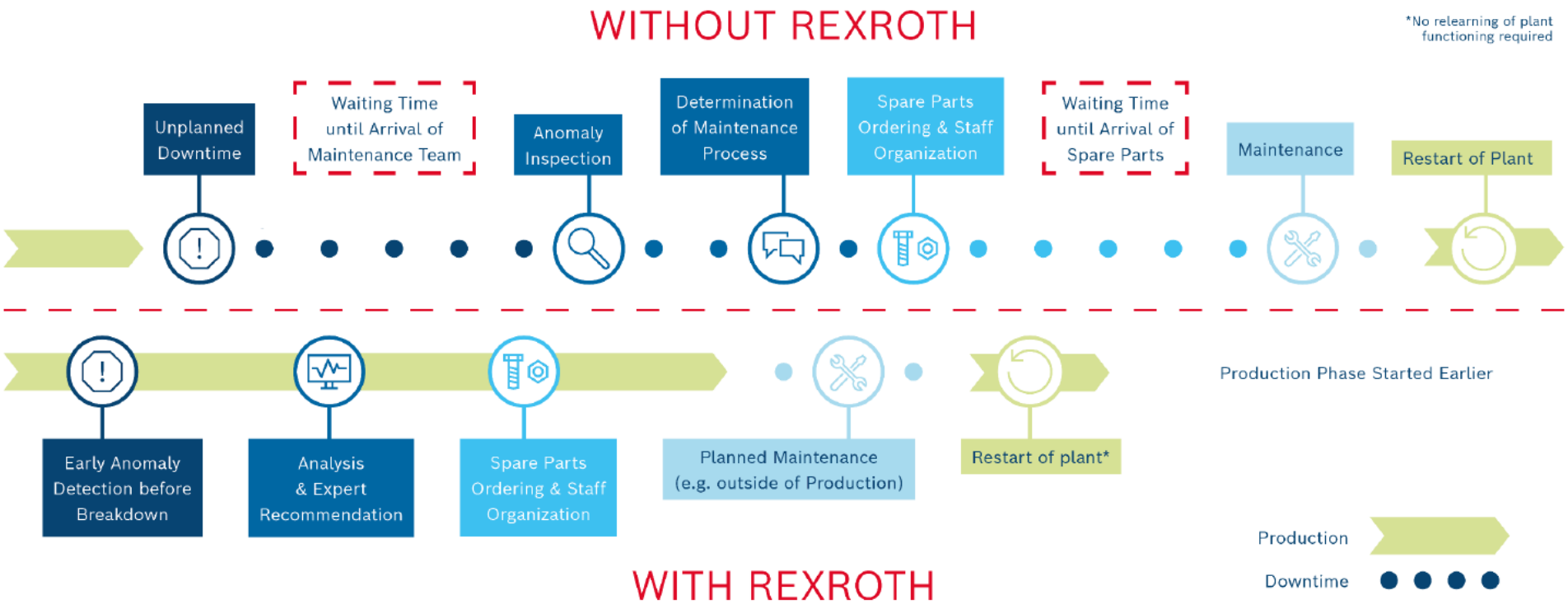
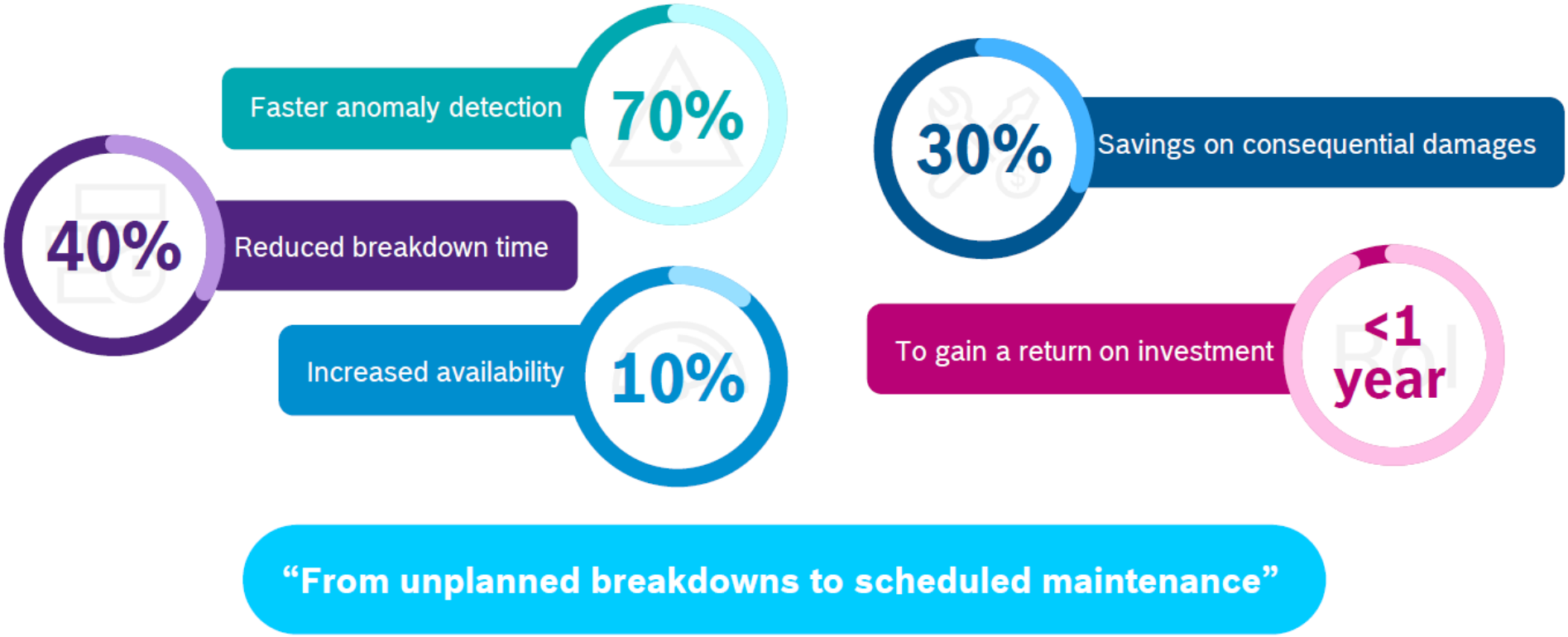
## How is downtime reduced?



# Predictive Analytics: Benefits



# Predictive Analytics

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