

IoT for rotating assets from hardware to an open ecosystem

Barrie Rodgers – PLM Mobile Solutions



SKF[®]

Topics of the day

- Why is IoT so strategically important for rotating assets?
- IoT versus predictive maintenance as we've always done it.
- The importance of an open ecosystem.



**Why is IoT so
strategically
important for
rotating assets?**



4th industrial revolution, Industry 4.0, Smart manufacturing, Industrial Internet... many words for an ongoing change in society



What is a Factory?

Raw Material



Factory



Product

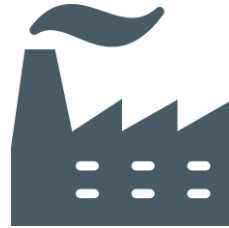


What is a Digital Platform?

Data



Digital Platform



Information



What is a Digital Platform?

Data



Digital Platform

- Connectivity/IoT
- Integration
- Storage
- Compute
- Analytics
- Rules
- Visualization
- Deployment
- Management
- Security

Information



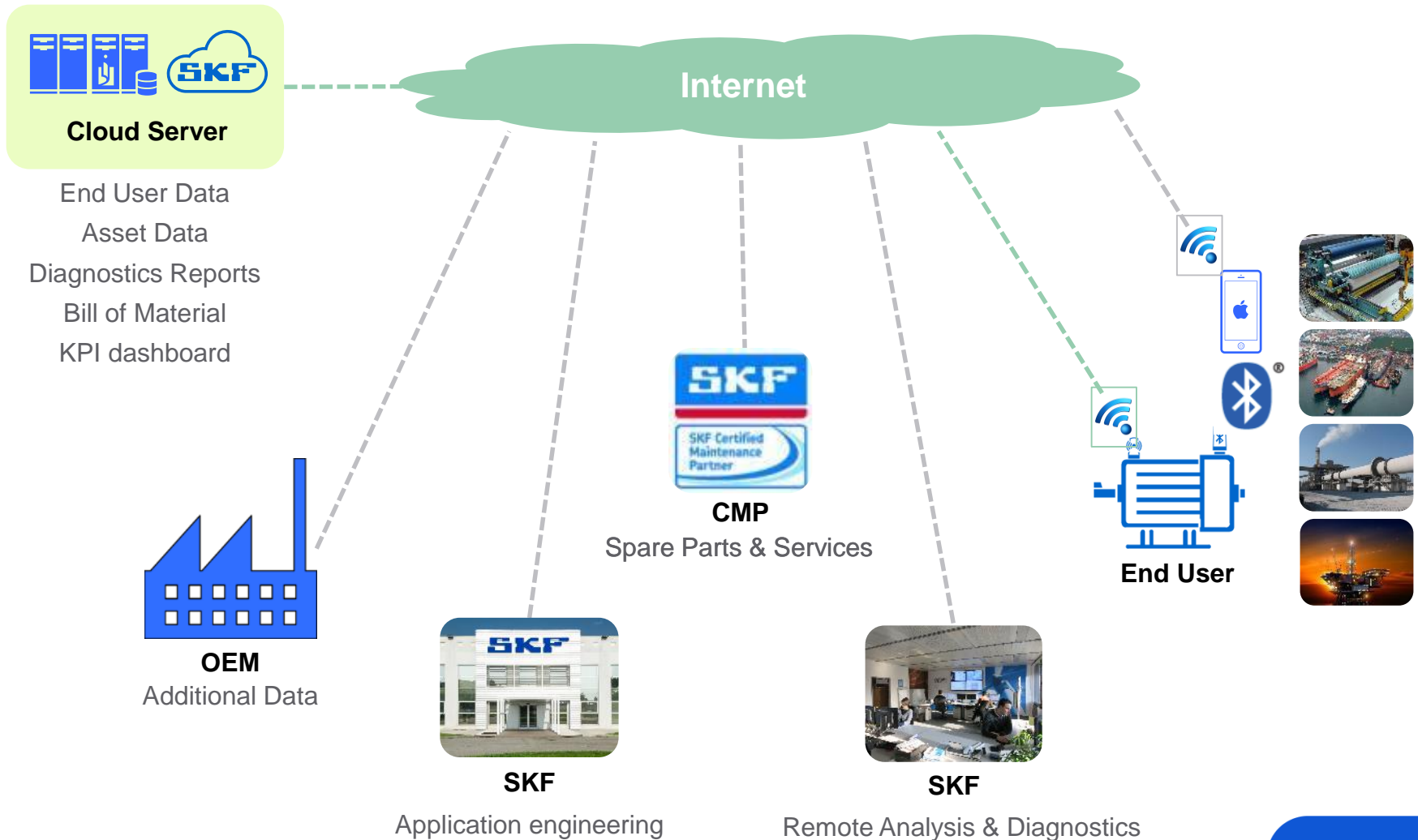
Bearings: the ideal IoT point for machinery



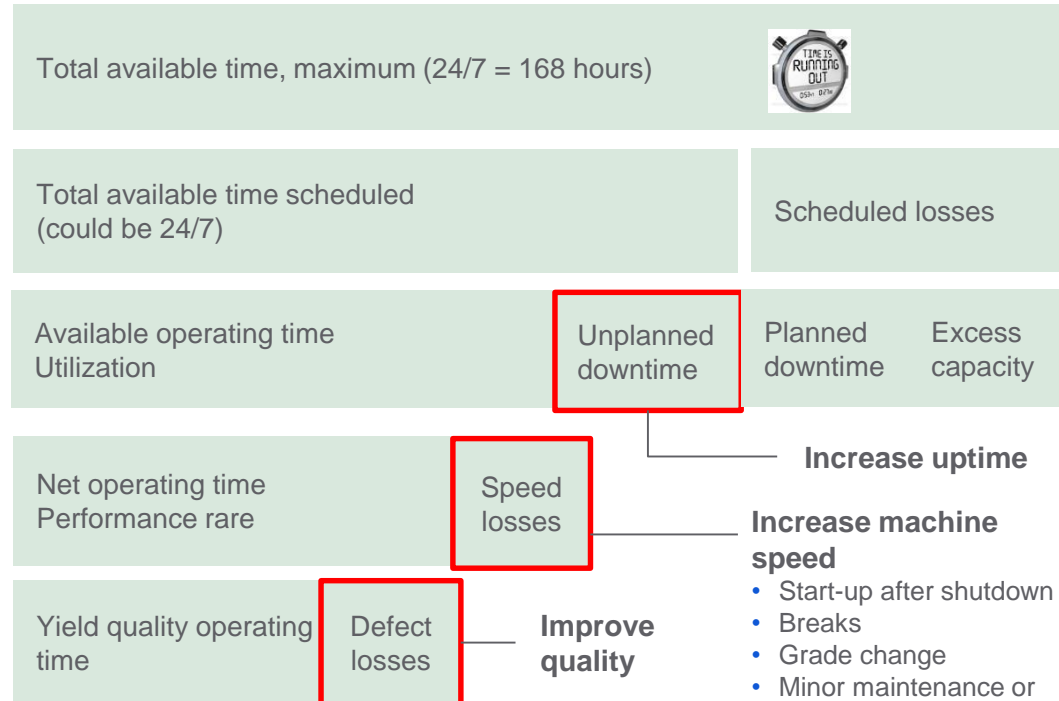
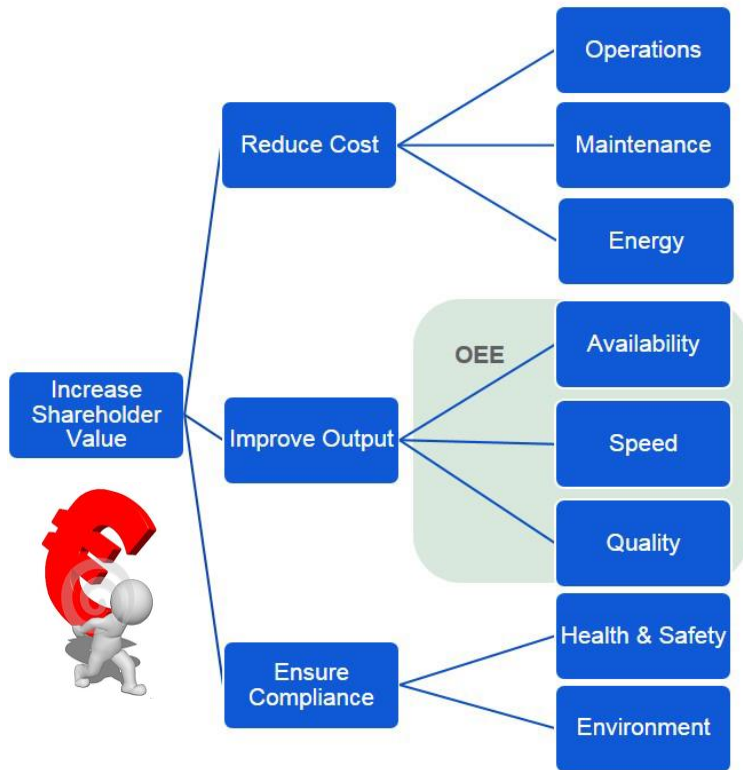
2.000.000.000 bearings manufactured per year

- **Some 2.000.000** installed sensors
- Active in condition monitoring and performance forecasting since 1986
- ...and this is certainly not enough

Industrial Internet True Life Cycle Management



Challenges of our customer



- Start-up after shutdown
- Breaks
- Grade change
- Minor maintenance or production work with stock on the wire



Wouldn't it be great if you knew what was coming?

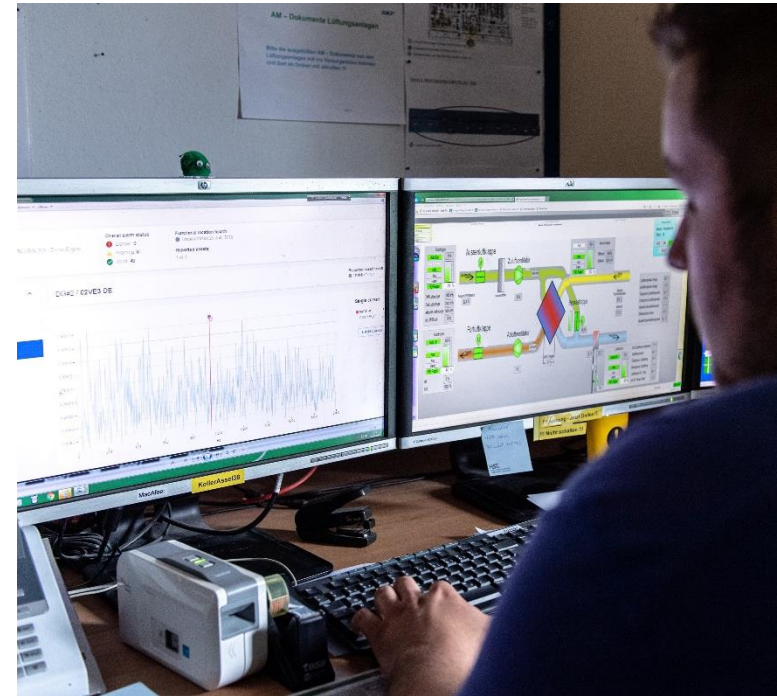
Replace during coming stop

Keep going/
defer action

Unexpected failures?



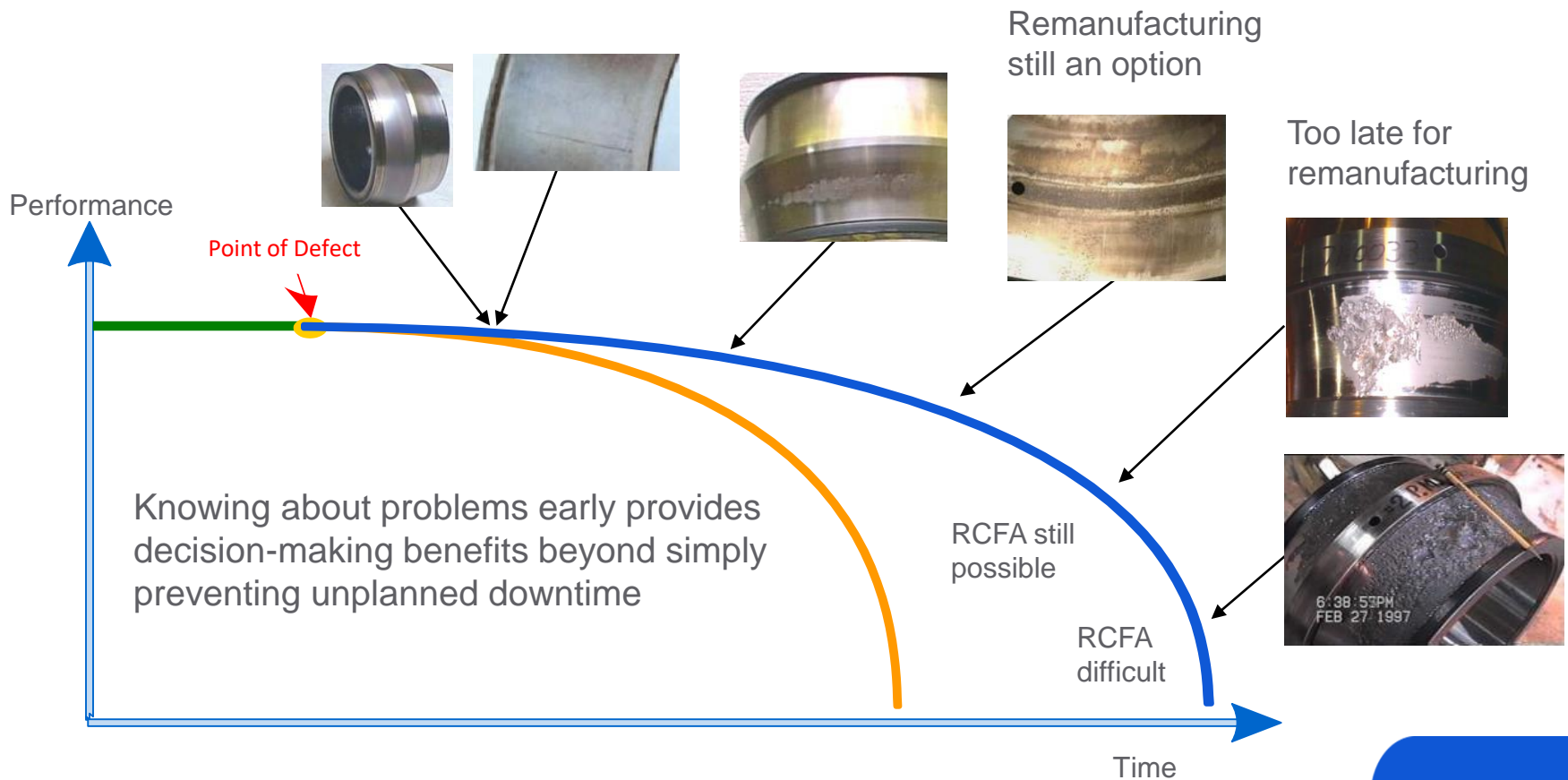
"I need information on my equipment not just data"
Pulp Mill Maintenance Manager



The P-F Curve

More time to react

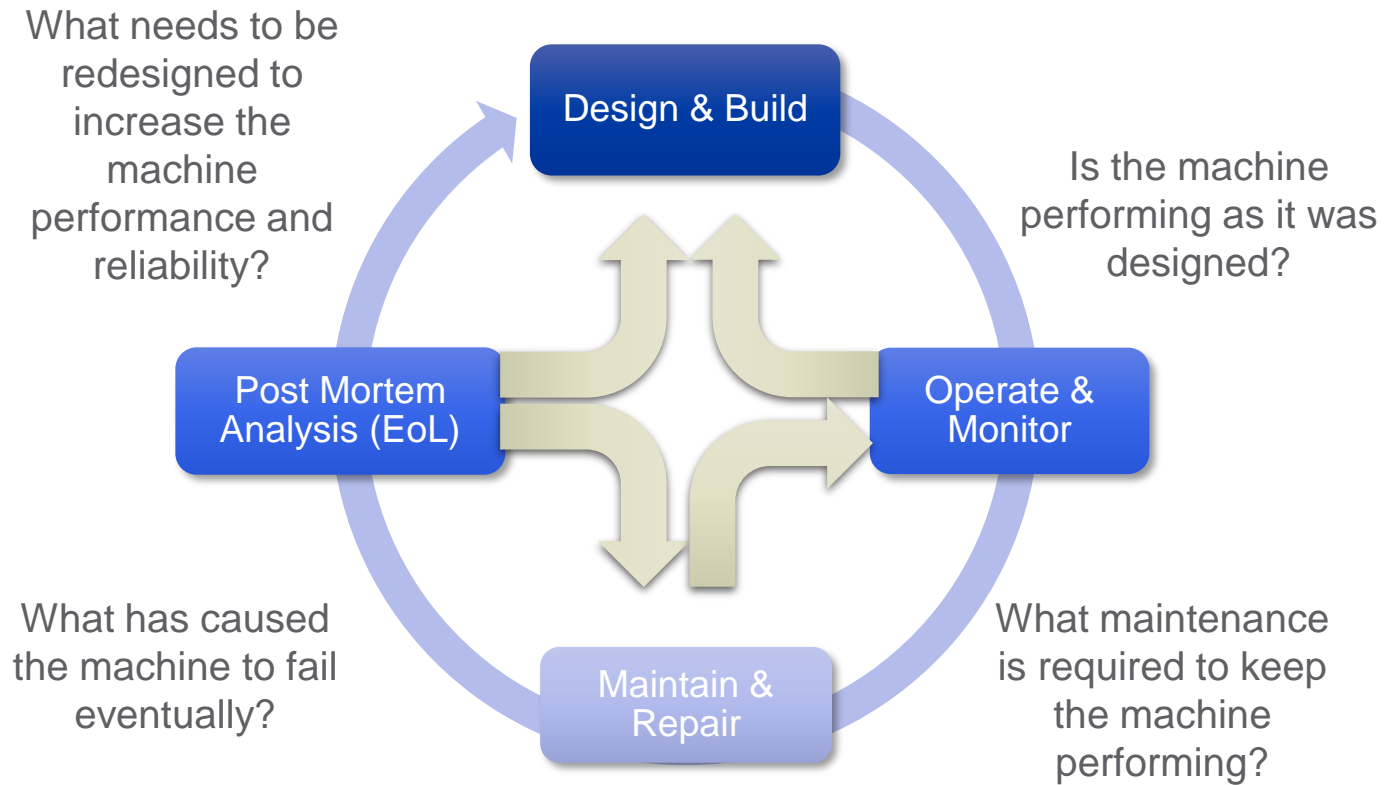
- To be prepared to fix
- To minimize collateral damage
- To be able to remanufacture and reuse
- To be able to perform RCA



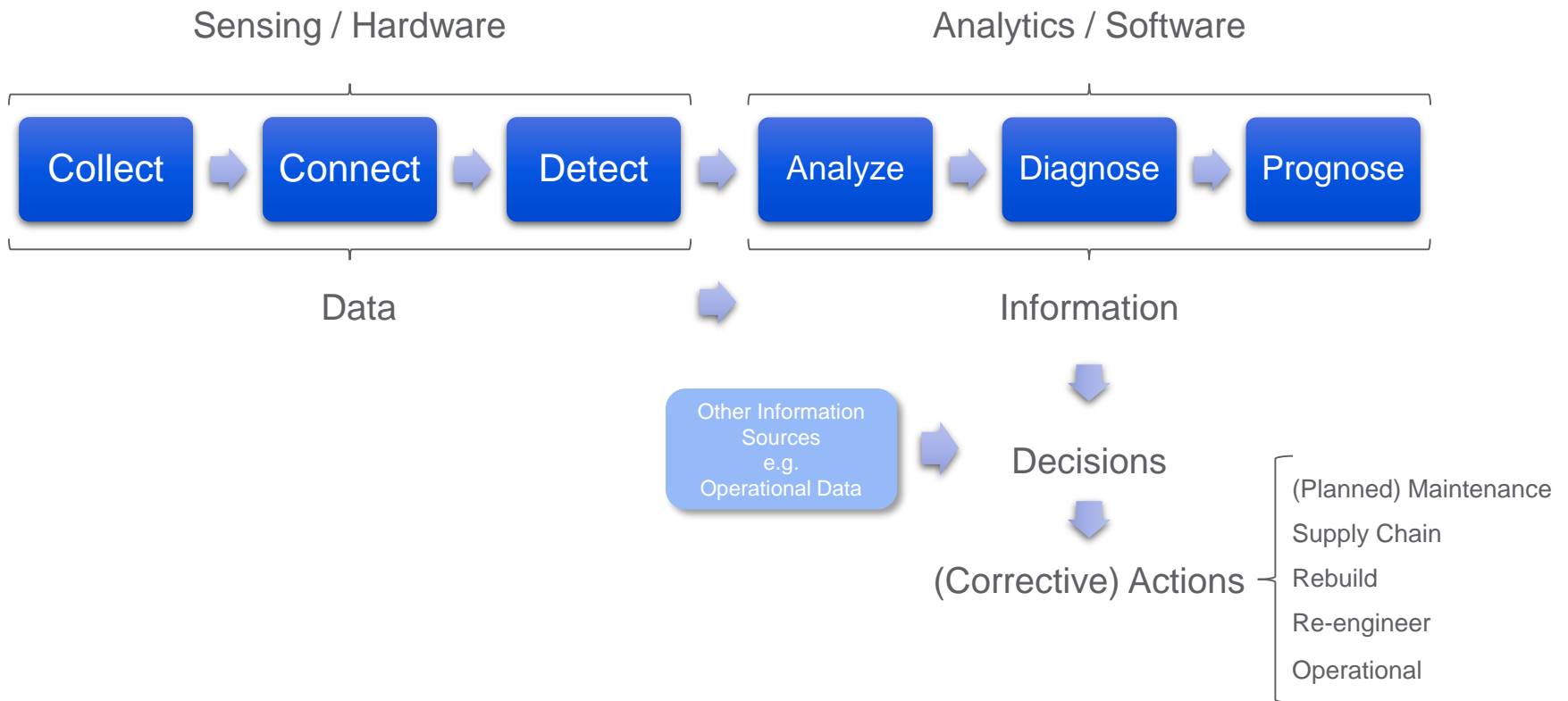
But where to get started?



The value of data throughout the complete lifecycle



Industrial digitalization: from data to decisions



Digitization – Innovation in Connectivity



Remote Diagnostic Services



SKF Insight™ Wireless sensors



Insight Apps



Wireless systems



Lubrication system



Grease Gun



On-line systems



SKF Enlight Centre



Microsoft HoloLens



ProCollect app



Enlight Quick Collect Sensor



Expert Portable devices

Maximizing Asset Performance by bringing Operational and Maintenance Data together



Bringing maintenance and operations information together in one view.

- Real time automated data collection (sensors and hardware)
- Connection to corporate systems beyond maintenance (Interfaces)
- Correlation of many different types of data (Digital platform)

To gain insights that help our customers make the **most optimal decisions**.

Supporting SKF product development of today and tomorrow to enable scale and growth.

**IoT versus
predictive
maintenance as
we've always done it**



Simple machine monitoring

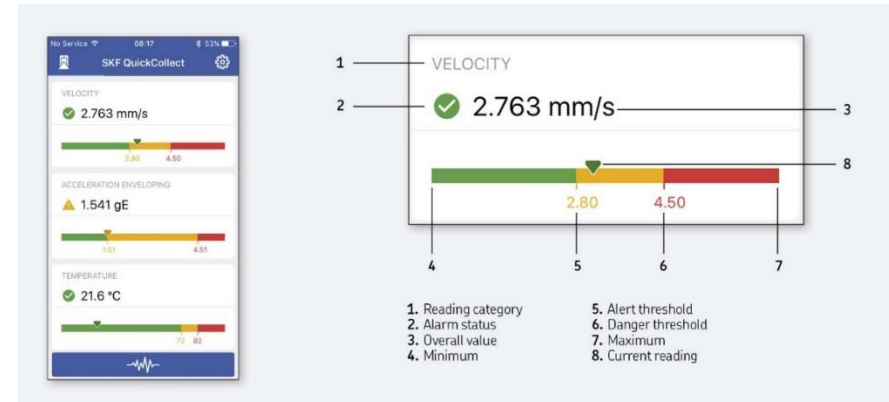
SKF Machine Condition Advisor



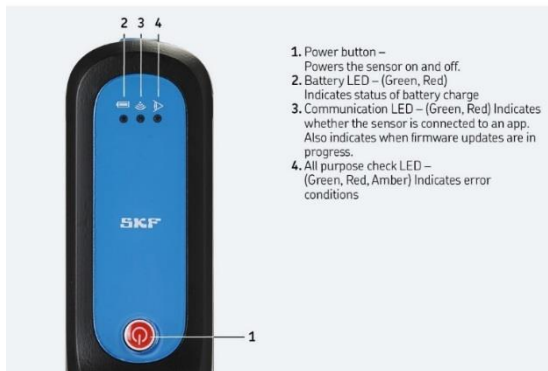
Today maintenance made easy through one app

The SKF Enlight QuickCollect system

- Increase machine uptime
- Reduce maintenance
- Improve safety
- Save energy
- Lower total cost of ownership



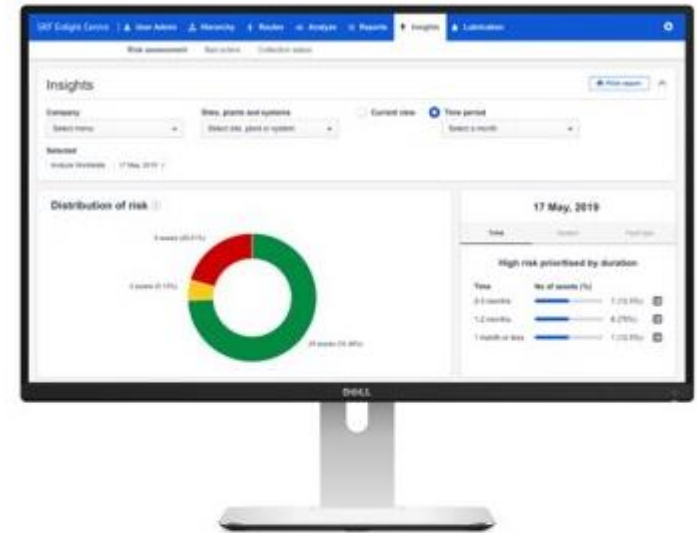
Controls and indicators



One easy step. Several advantages

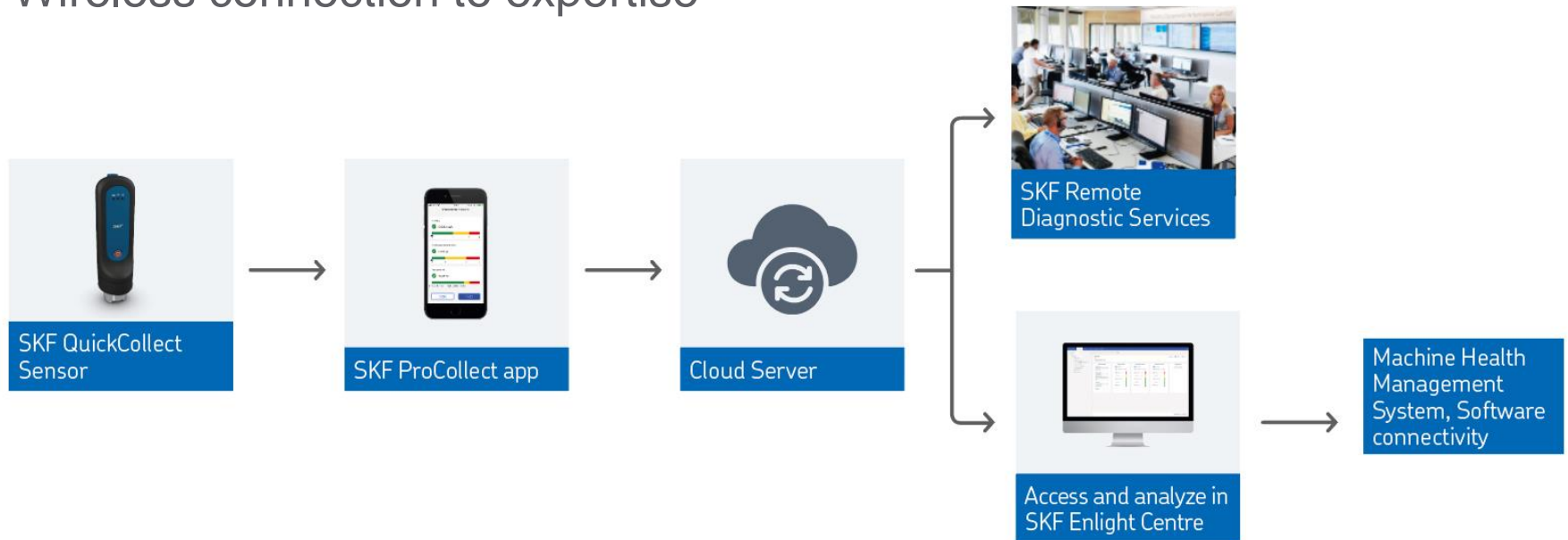
The SKF Enlight ProCollect system:

- Easy to start and easy to scale
- Customized questions, work instructions
- Automates routine and advanced tasks
- Simplified inspection, process and machine health data collection, and analysis
- No need for extensive training or diagnostic knowledge
- Connectivity with cloud-based SKF Enlight Centre & Remote Diagnostic Services

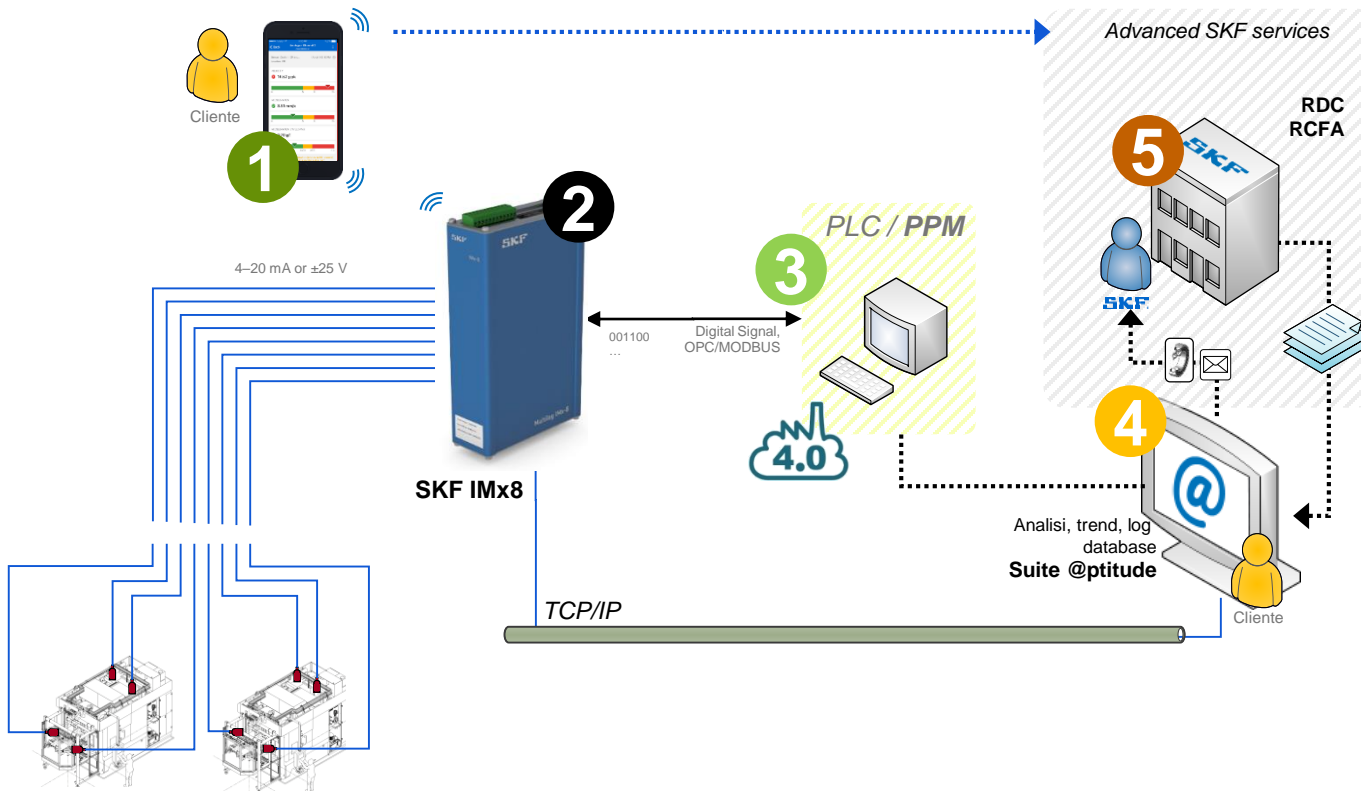


The SKF Enlight ProCollect system

Wireless connection to expertise



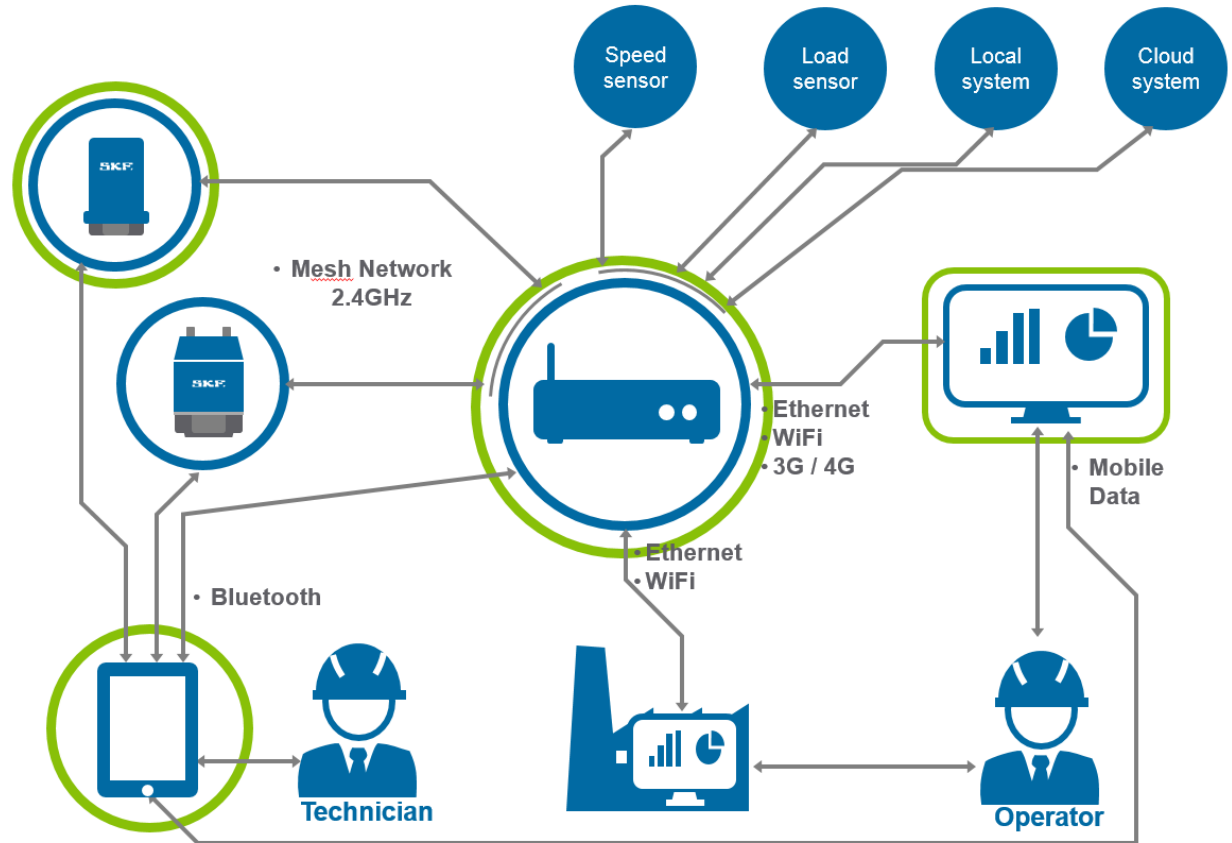
SKF Machine Health - different levels



Different diagnostic levels

- 1** Quick analysis (smartphone)
- 2** Black box, allarm
- 3** Feeding big data I4.0
- 4** Customer Diagnostic through SKF software
- 5** Remote Diagnostic

SKF Enlight Collect IMx-1



'We have so much data; we are now more confused'

What data is even **relevant**?

- 'Domain knowledge' = knowing your process and machinery, and what makes sense

Do you need **real-time signals** from sensors and control systems?

- Domain knowledge, again

Is the **quality** of the relevant data OK?

- Categorized, comparable and available

Are necessary IT systems **compatible** and **allowed to interact**?

- IT security consequence analysis



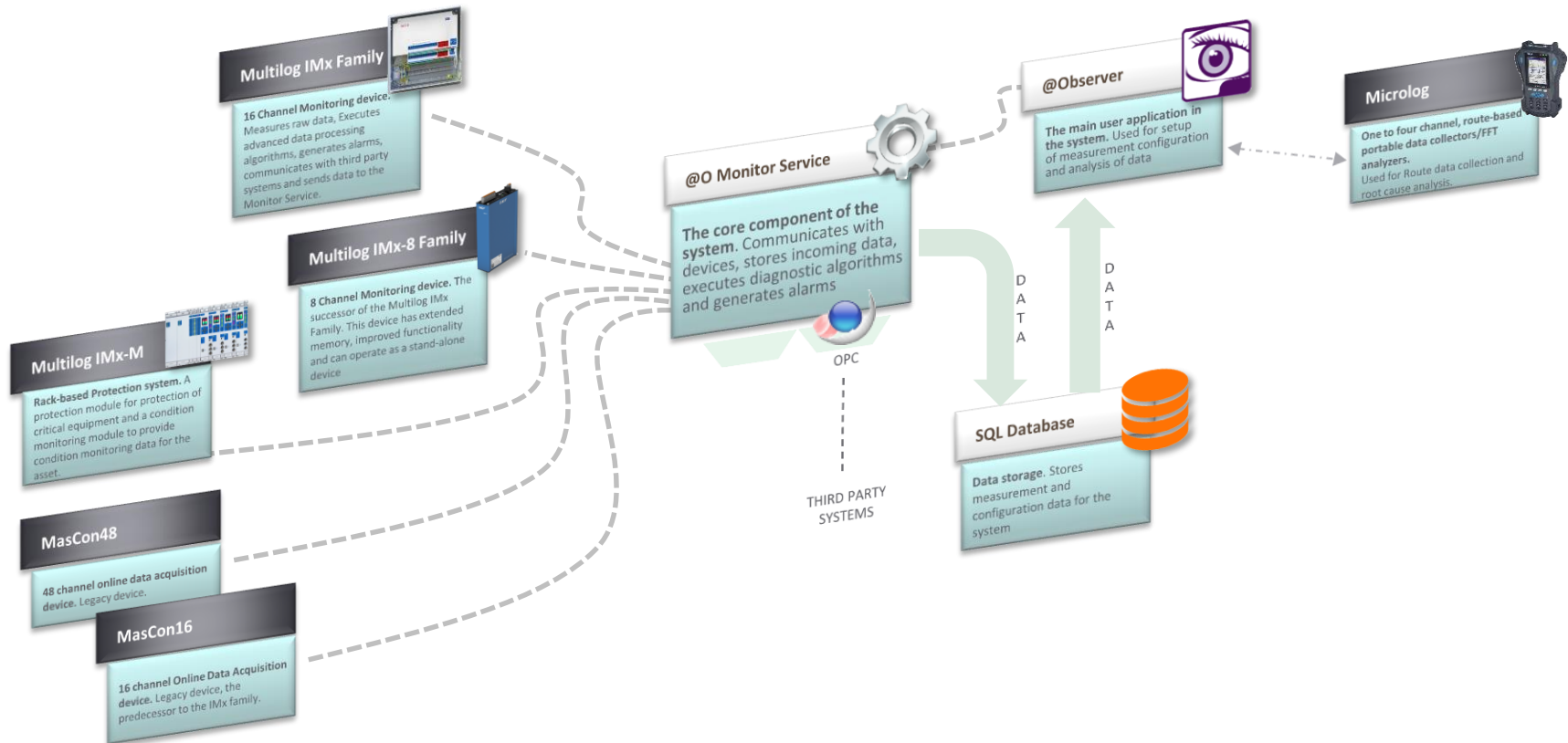
The importance of an open ecosystem



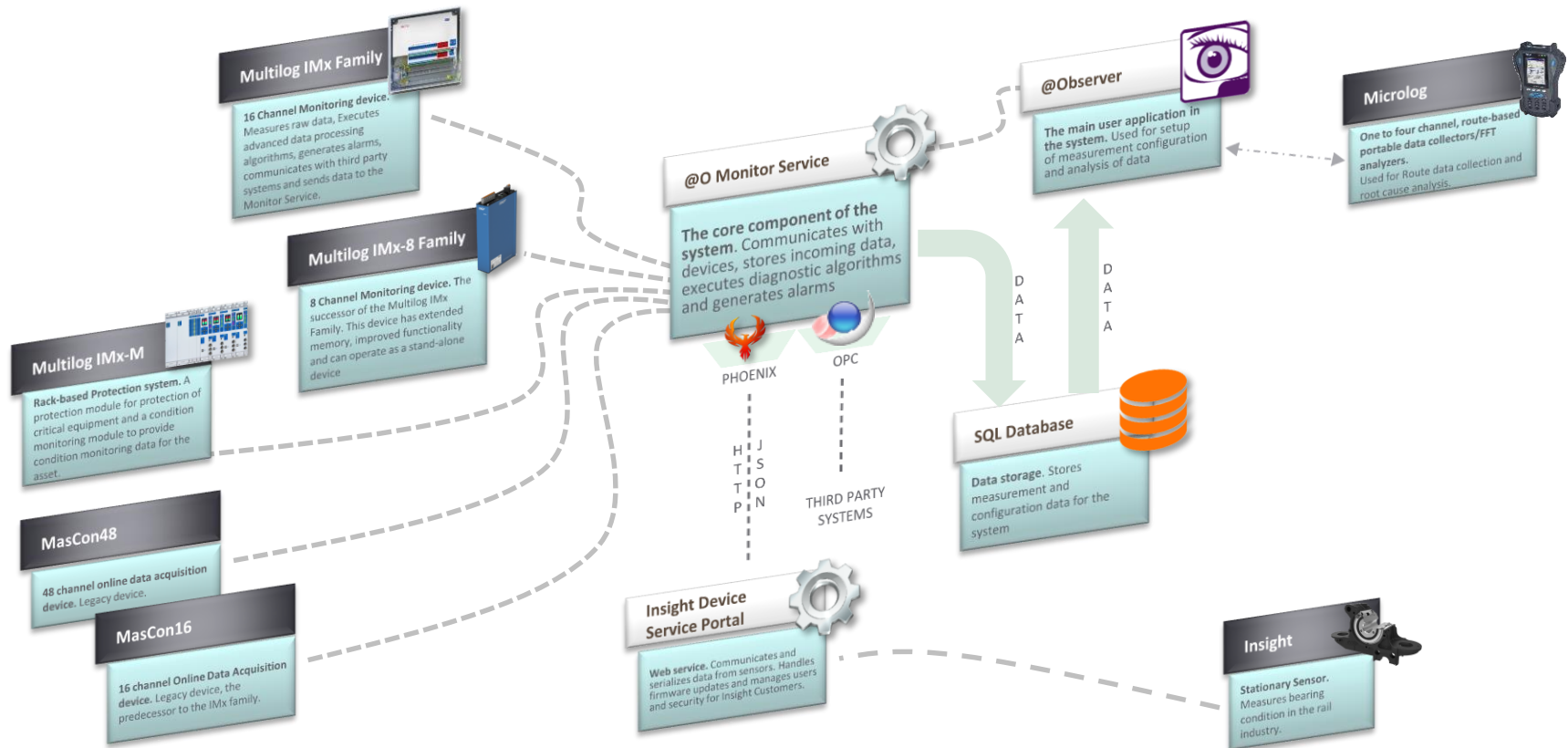
© SKF Group



How it was done



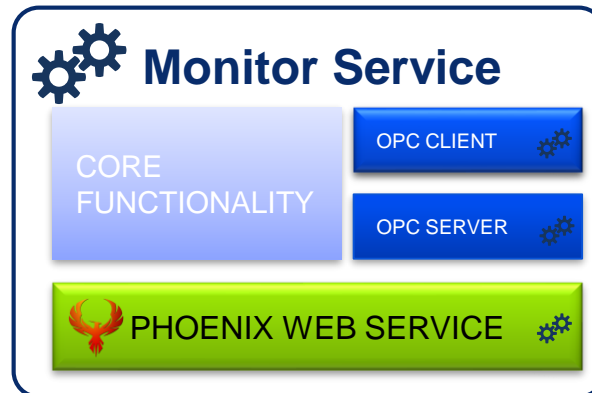
How it can be done now



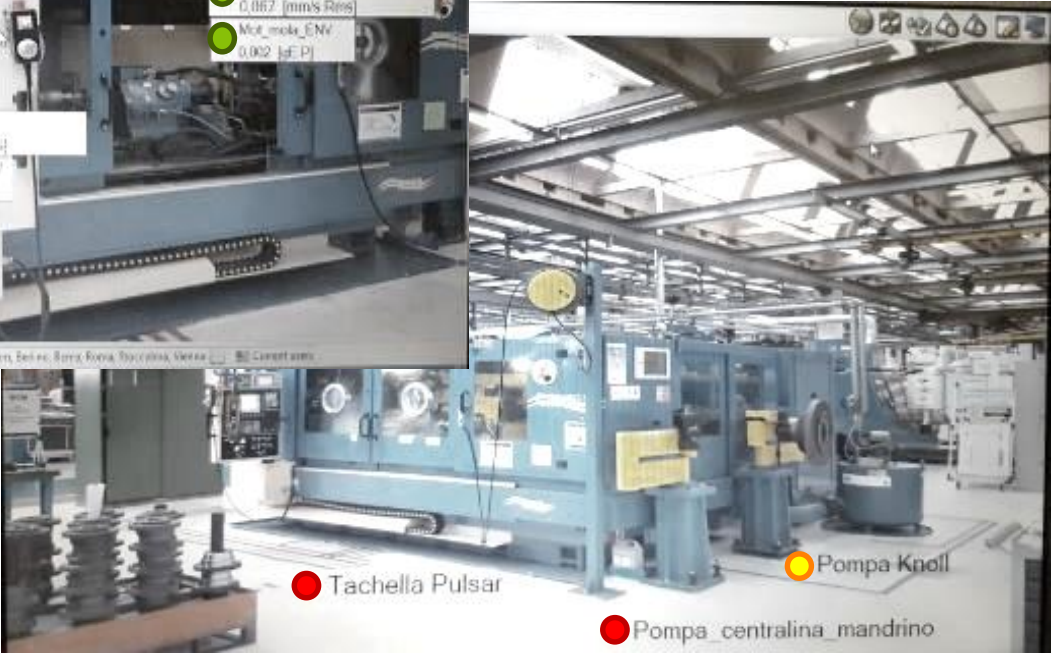
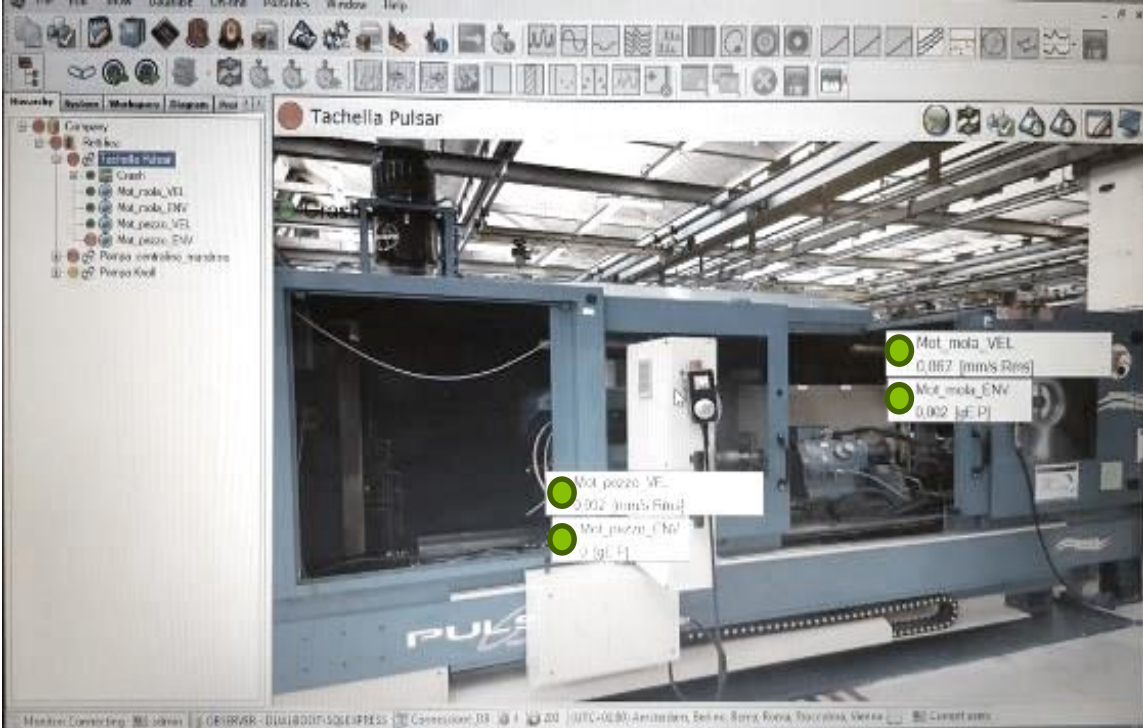
Difference ?

Application Programming Interface or API

The Phoenix Internal Web Service is an **API** that allows the user to access the data from the @ptitude Observer system. The use of an API provides a well-defined method for data sharing to other systems and is not affected if the Observer version is upgraded.



Custom made dashboard



Remote Monitoring Dashboard

Company

 Select All
 ABO
 Acciona Energia...
 Aleris Aluminium
 ArcelorMittal Ge...

Machine Type

 Select All
 1.3MW
 9232840
 9410507

Machine

 Select All
 80041 - ATLAS
 80043 - COSMOS
 A410 ContiRoll
 A410 Vorpresse

Component Type

 Select All
 Bearing
 Fan wheel
 Fixed coupling

Component

 Select All
 <Not selected>
 2. Pl. stage
 A410 Conti AOL Kegeldritzel

Closed ?

 Yes
 No

Report Type

 Event Report
 System Report

255
Machines

Summary of Machine Severity

| Machine Type | Machine Name | Max. Severity | Component Count |
|--------------|-----------------|---------------|-----------------|
| V66 | Extruder Line 3 | 9 | 3 |
| 1.3MW | GOF 11 1301097 | 8 | 3 |
| D6 | LIN 03 60047 | 8 | 3 |
| ECO80 | WTG 22 | 8 | 1 |

Severity

Top Component Events

| | |
|------------|----|
| GEN NDE | 45 |
| GEN DE | 43 |
| MB | 13 |
| Pump | 11 |
| HSS gs2 | 10 |
| HSS pinion | 10 |
| IMS gs | 10 |

157
Components

Selected Machine Events

| Machine | Component | Component Image | Last Report | Recommendation | TBRR (Days) | RUL (Days) |
|-------------|-----------|-----------------|-------------|---|-------------|------------|
| CH11 SGP | Motor | | 24/07/2018 | Please check the sensor at the grinding motor. Please provide feedback of changes at the motor or SGP at the 15.07.2018. | | -128 |
| IHL 19 1075 | Pump | | 09/05/2016 | Wir empfehlen die elektrische Pumpe zu überprüfen. Bitte informieren Sie uns über alle Aktivitäten. | | 0 |
| IHL 03 1102 | Pump | | 07/11/2016 | Wir empfehlen die elektrische Pumpe zu überprüfen_x000D_ | | 0 |

481
Events

More information

Your Regional Sales Managers

Sales & Technical:

SKF Regional Sales Managers (see map)

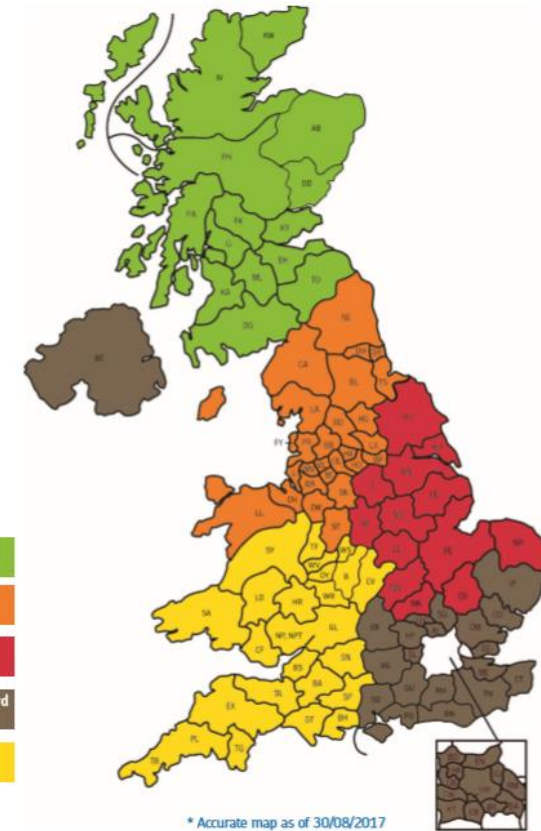
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Hubie Piron
Sally Cooper
Michael Stewart-Lord
John Casey

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hubie.piron@skf.com
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michael.stewart-lord@skf.com
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Marketing (brochures, video, recording webinars)

Ringo van Voorst

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Tuesday 23 June

SKF Insight Rail

Thursday 25 June

SKF Smart Industry Solutions

Tuesday 30 June

SKF Online (Calculation) Tools

Thursday 2 July

Maintenance Products – Good tools are half the job

Tuesday 7 July

Mounting & dismounting of bearing /preventing
preliminary bearing failure