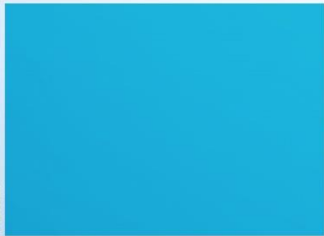
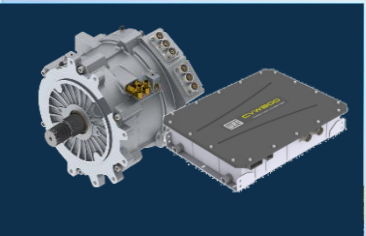


WDS

WEG Digital & Systems



Driving efficiency and sustainability



WEG Digital Solutions

Business Unities & WDi

Electric Motors & Gearboxes

Complete line of electric motors and gearboxes meeting and exceeding efficiency levels.
Main products:
Low and high voltage induction motors, Synchronous motors, DC motors and Gearboxes.

Automation Technologies

Complete range of low voltage and medium voltage electric and electronic products and systems enhancing productivity. Manufacturing of automation solutions to meet the demand of several industrial and building segments such as Drives, Controls, Electrical panels, Automation systems, Machine safety, Building technologies, etc.

WEG Digital & Systems

A new way to combine people, companies and smart products. Formatting all our experience to provide to the market intelligent software and products, producing a global solution to make industries more reliable, efficient and intelligent.

WEG Digital & Systems
(since 1st Sept 2022)

Transmission and Distribution

Supply of solutions for Substations, Power and Distribution Transformers, Dry Transformers and Power Reactors.

WEG Digital Solutions
(since 2019)

Energy

Manufacturing of large Machines such as Turbo, Hydro and Wind Generators, Alternators and Hydro and Steam Turbines which integrate the key industrial projects around the world.

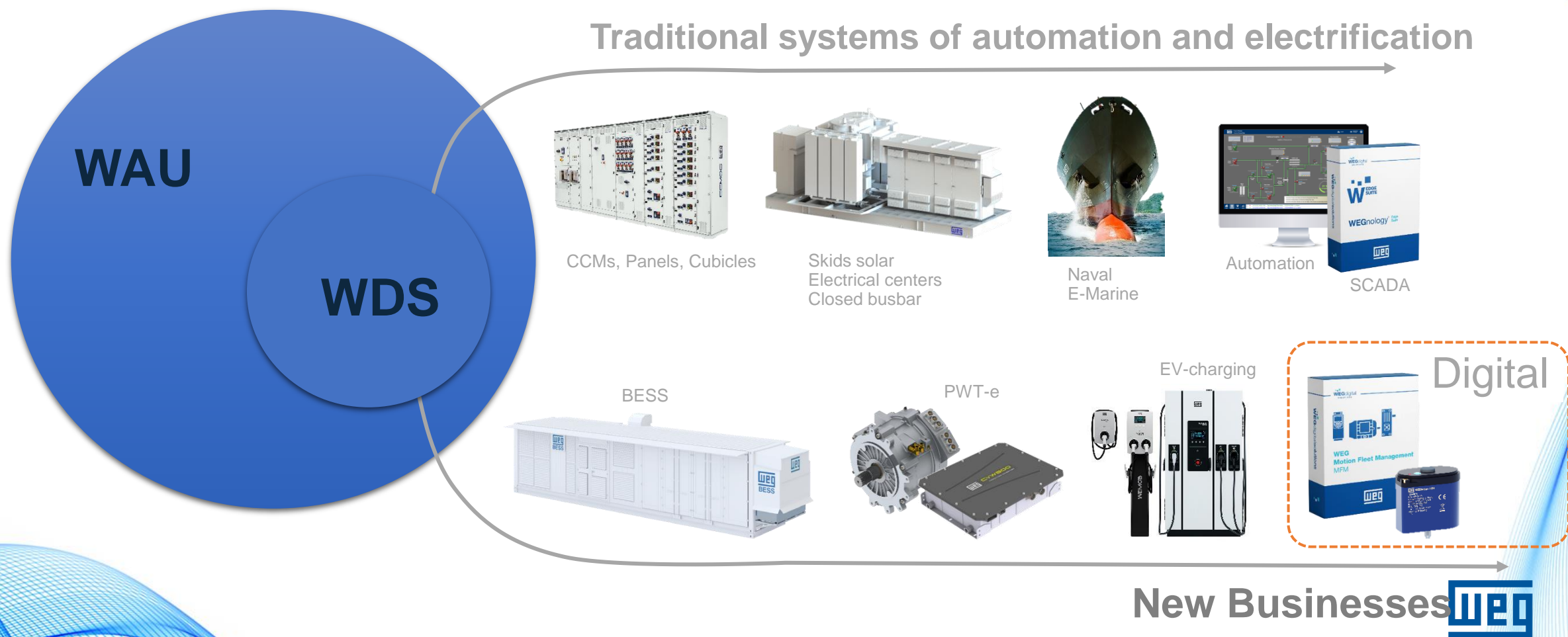
Industrial Coatings and Varnishes

Production of industrial liquid and powder coatings and insulating varnishes for industrial, marine, anticorrosion and automotive applications.



WEG Digital & Systems

WDS is a “spin-off” of WAU to promote the traditional systems and new businesses



WEG Digital Solutions

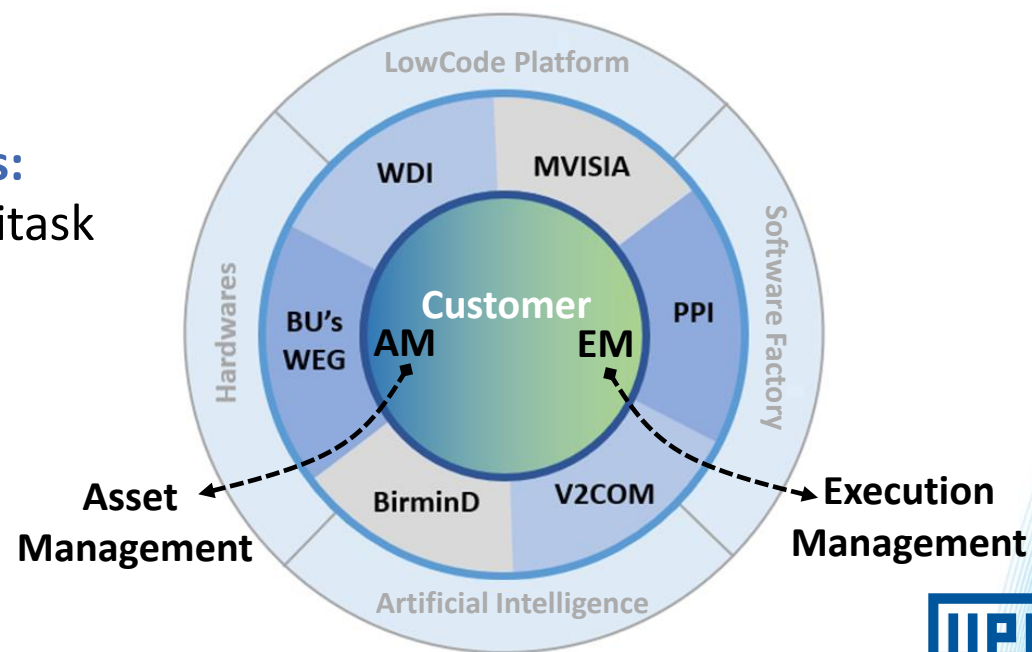


WEG Digital is a division of the WEG group that aims to bring solutions to our customers to **gain productivity, quality and operational efficiency**, with the offer and specification of solutions, using our **hardware, software and services**. The performance is focused especially on industry and more specifically on manufacturing and transformation activities. Our main solution focuses are on **asset management and execution management**.



Today we are an ecosystem formed by **6 business forces**:

- WEG Digital HQ (WDI)
- Products of the 5 WEG business units
- PPI-Multitask
- BirminD
- MVISIA
- V2COM



WEG Digital Solutions

WEGdigital

(Software factory at WAU)

WEGnology®

IoT Platform & Edge Suite

Asset Management



BirminD
WEG Group

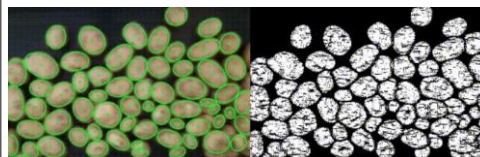
Advanced Analytics
Artificial Intelligence
Auto Machine Learning



Edge Data Log and
Integrated AI
Numeric data mining

MVISIA
WEG Group

Computer vision
Artificial Intelligence



IoT with
Computer Vision

PPI-Multitask
WEG Group

MES - Manufacturing
Execution System



Lean & Manufacturing
consulting



IT + Automation integration
for F&B and CPG industries

V2COM
WEG Group

Utilities IoT metering,
management softwares
& Communication



IoT Indoor & Outdoor
Massive & Reliable

5G NB-IoT CAT-M1
LTE Radio Satellite

WEG Digital Solutions



WEGdigital
SOLUTIONS

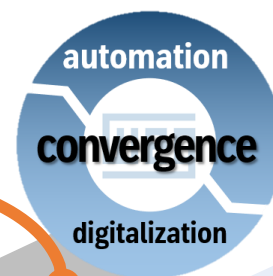


WEG Digital Solutions

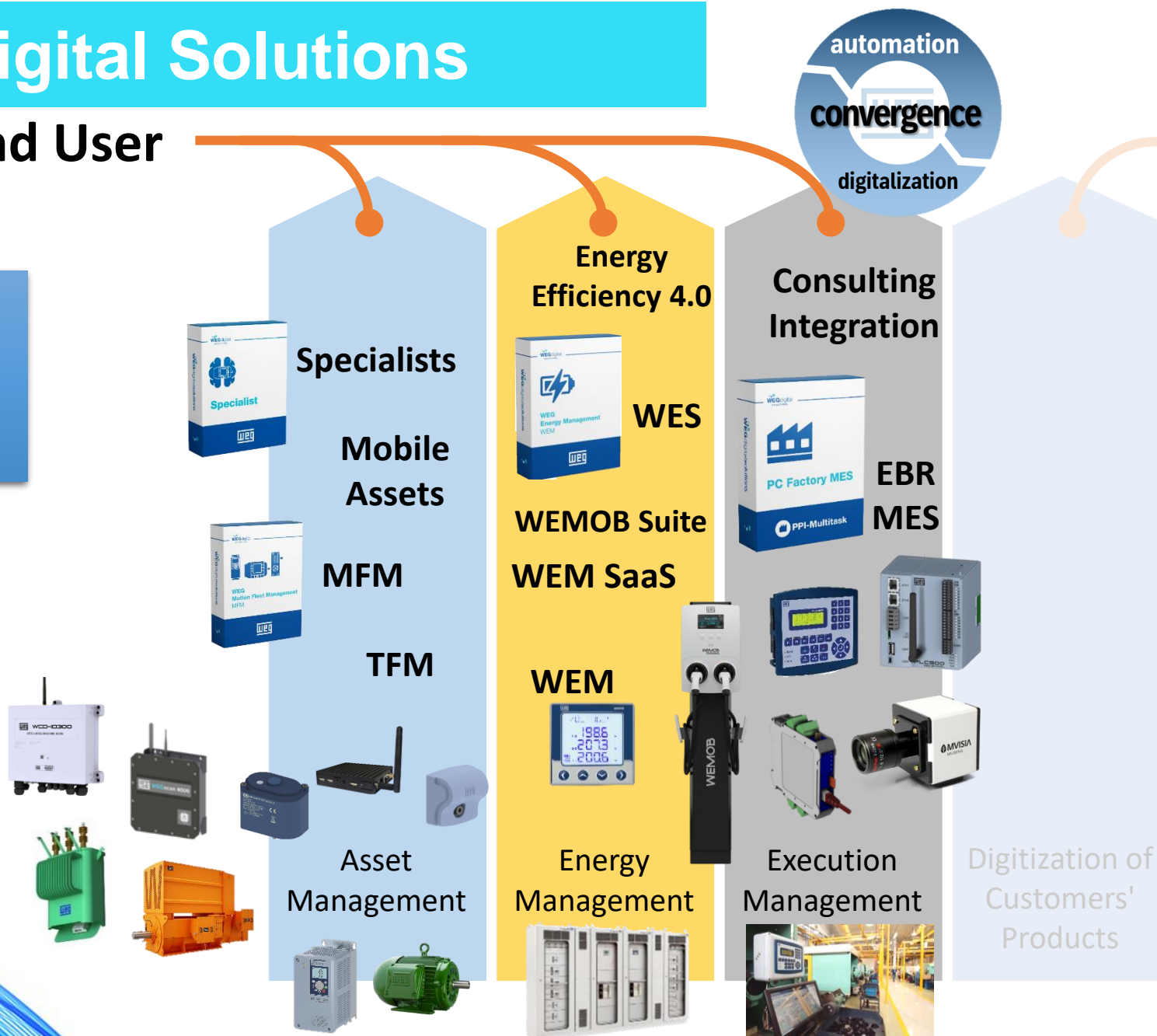


WEG Digital Solutions

End User



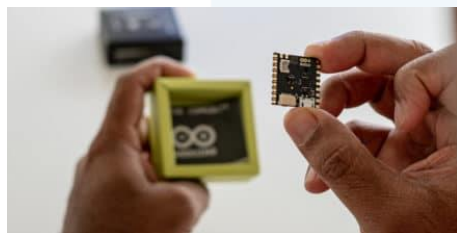
OEM



WEG Digital Solutions

End User

OEM



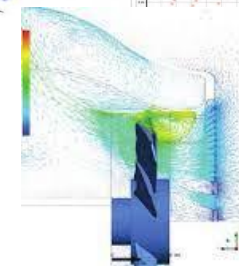
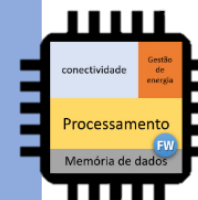
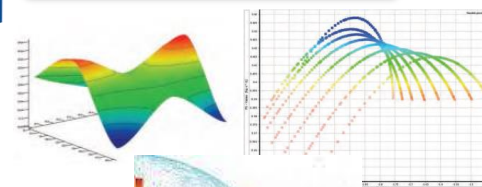
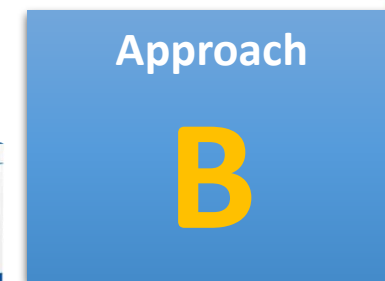
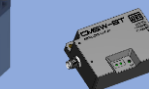
Asset



Energy



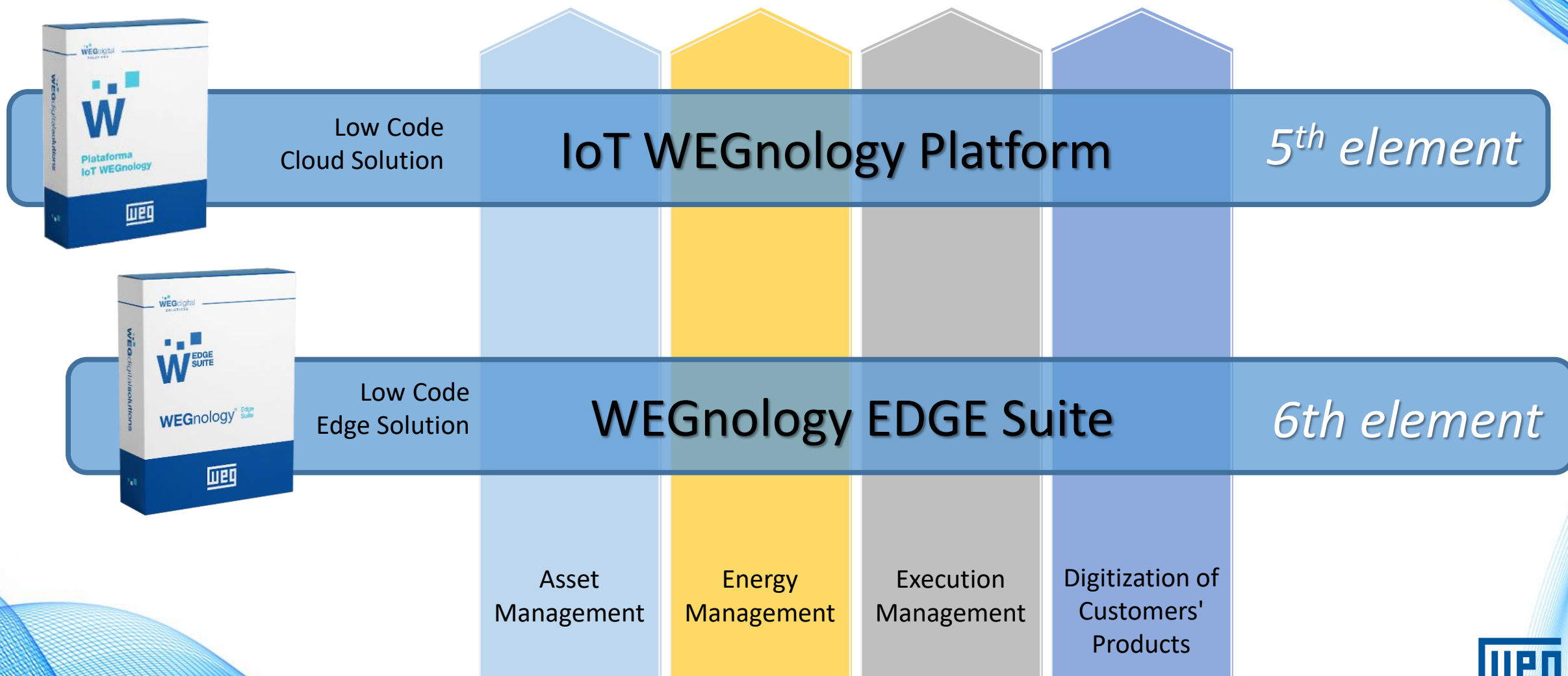
Digitization of
Customers'
Products



V2COM
Grupo WEG



WEG Digital Solutions



WEG Digital Solutions



WEG Motion Fleet Management



Evolution of Asset Condition Monitoring

ISO 55000 - Asset management - Overview, principles and terminology.
ISO 20816 - Mechanical vibration



In the old days



Electronic
Technology



80's up today



IoT
Technology



Today and future



Proactive
Services



New Market

- Manually
- Sound hearing and feeling
- Low diagnosis capability

- Manually routines (**their pain**)
- Vibration measurement based on human expertise
- Diagnosis capabilities

- Autonomous and on-line monitoring
- Condition-based asset management
- **Multiple** asset digitalization (wirelessly)
- Artificial Intelligence algorithms for diagnosis
- Reliability approach with IoT technology

MFM for asset monitoring and management

Continuous
Development

One solution only for entire Plant Fleet

Diagnostics &
Integration

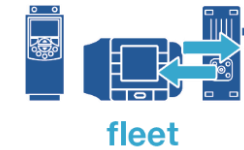
Specialist

Advanced diagnostics algorithms
for failures and consumption analysis



Exchange

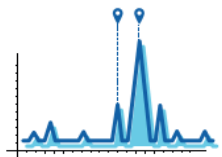
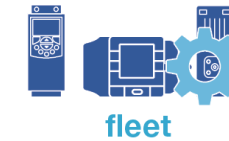
Integration with third party systems and
platforms via REST API



Main
Application

Management

Asset online monitoring and management.
Data storage, maintenance notifications, reports, intuitive dashboard...



Vibration Analysis



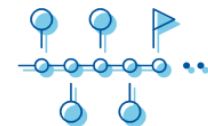
APP Digital Notify



Parameter Backup



Maintenance
Management Module



Asset timeline



Data acquisition
for diagnosis



Asset three



APP WEGscan

WEGscan
& Gateway



Motor Scan



WEGscan 100



WEGscan 101



X2000



WEGscan 1000



WEGscan 1001



WEGscan 4000

Motion Assets



Electric Motor, Gearbox, Pump, Compressor, etc.



VFD, Soft-Starter, Relays etc.



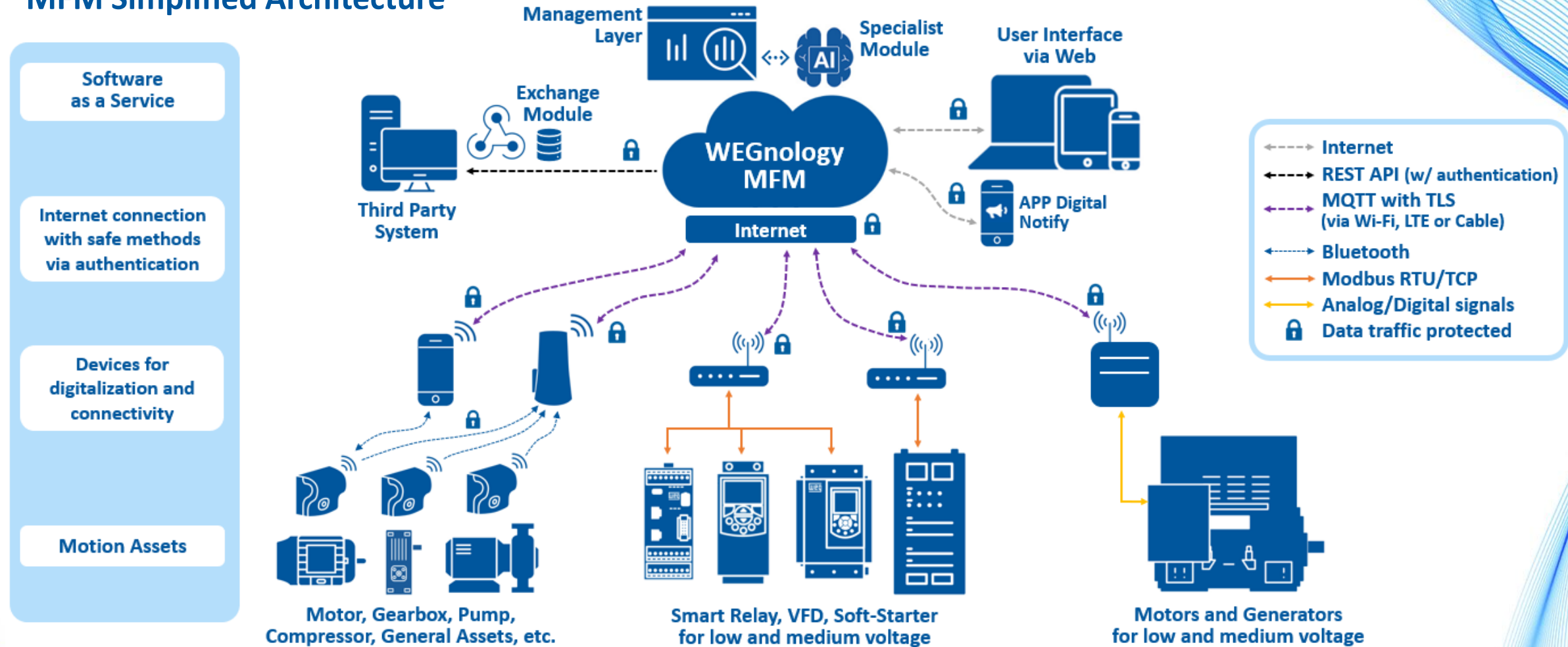
Motors and Generators

Cloud Software

Hardware

WEG Motion Fleet Management

MFM Simplified Architecture



WEGscan

Technology driving the best results



Market
Availability

Out/2022



Q1-2023



www.weg.net



WEGscan

Technology driving the best results

Good results are achieved with technological intelligence. That's why we developed WEGscan, which meets the needs of companies and industries with maximum precision and reliability. Modular, versatile and multi-application, the sensor can be coupled to different types of equipment and assets, automatically collecting data and performing online monitoring.

- Remote operation for update, measurement and configuration
- Integrated with WEG digital solutions
- Versatile and multi-application solution
- WEGsync: synchronized measurement of multiple sensors for structural vibration analysis
- WEGsense: technology to detect incipient mechanical failures, such as inefficient lubrication
- With WEG Motion Fleet Management, intelligent management is possible



WEGscan

Technology driving the best results



Designed to transform technology into a strategic advantage, WEGscan carries WEG's technological expertise by integrating hardware and software, which connect its production line to Industry 4.0, optimizing the use of assets, increasing operational efficiency and boosting its growth.

WEGscan can be applied to gearboxes, geared motors, pumps, compressors, electric motors, fans, exhaust fans, conveyor belts, mills, planetary gearboxes, bearings in general, among other equipment and assets, in any type of industry or installation.

MFM condition monitoring technology

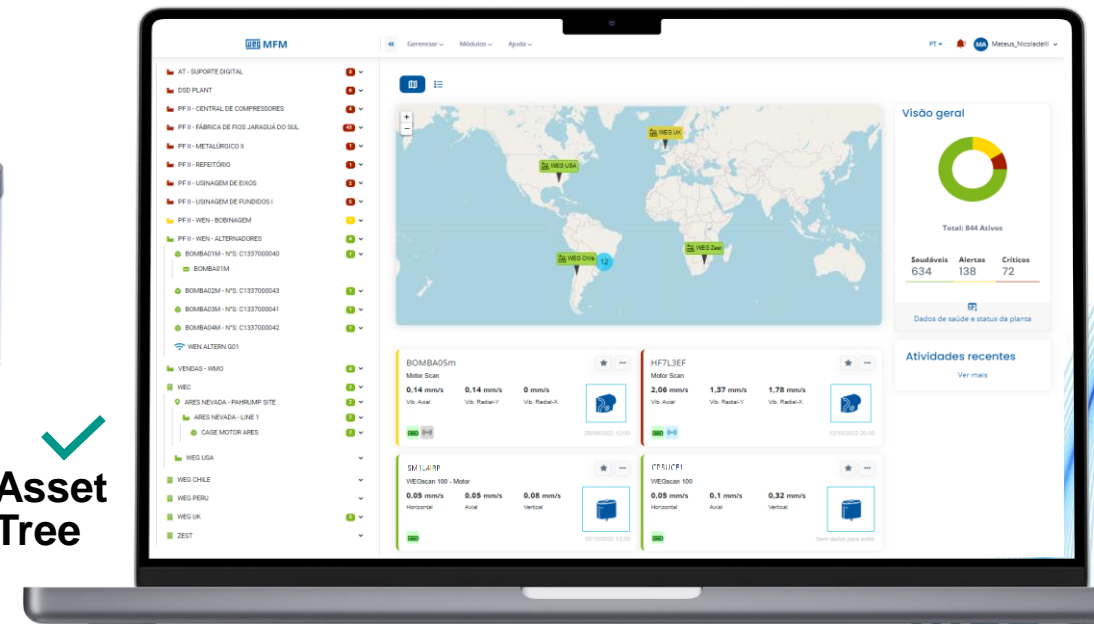
The **WEG Motion Fleet Management** is a cloud-based solution composed by **hardware** and **software**, to perform the on-line monitoring and asset management, for **general equipment and assets**.

- Module for advanced analysis of vibration signals¹;
- Asset trees for hierarchy organization;
- Advanced alert configuration, by trend and spectral band;
- Maintenance module, with CMMS² functionalities;
- Fleet reports for technical and management;
- WEG Specialist (AI algorithms);
- WEG Exchange modules;
- WEG Digital Notify app;
- WEGscan app;
- (and much more)



✓
Asset Tree

Broad View of the Plant Condition ✓



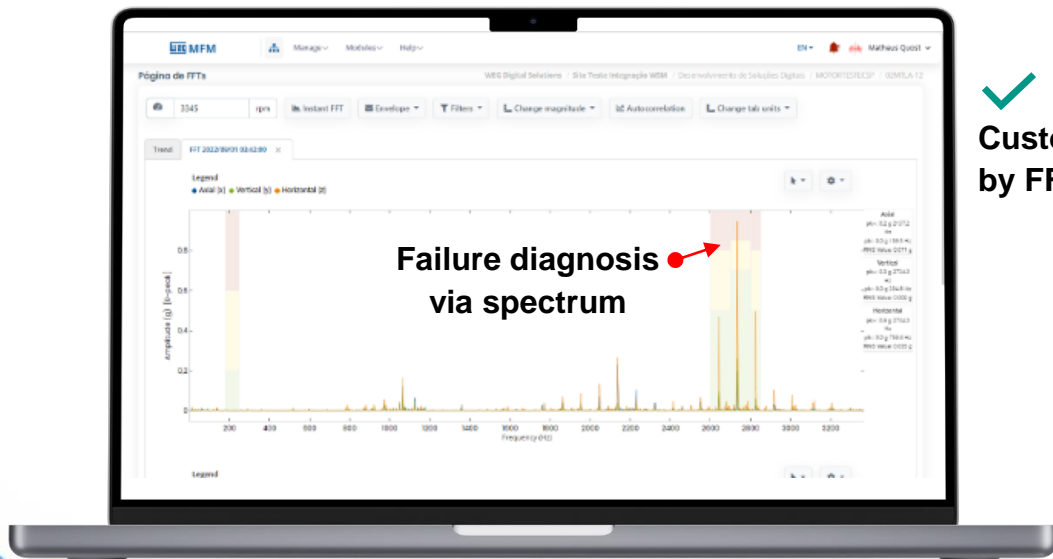
¹ Applicable standard for vibration analysis: ISO 20816.

² Computerized maintenance management system.

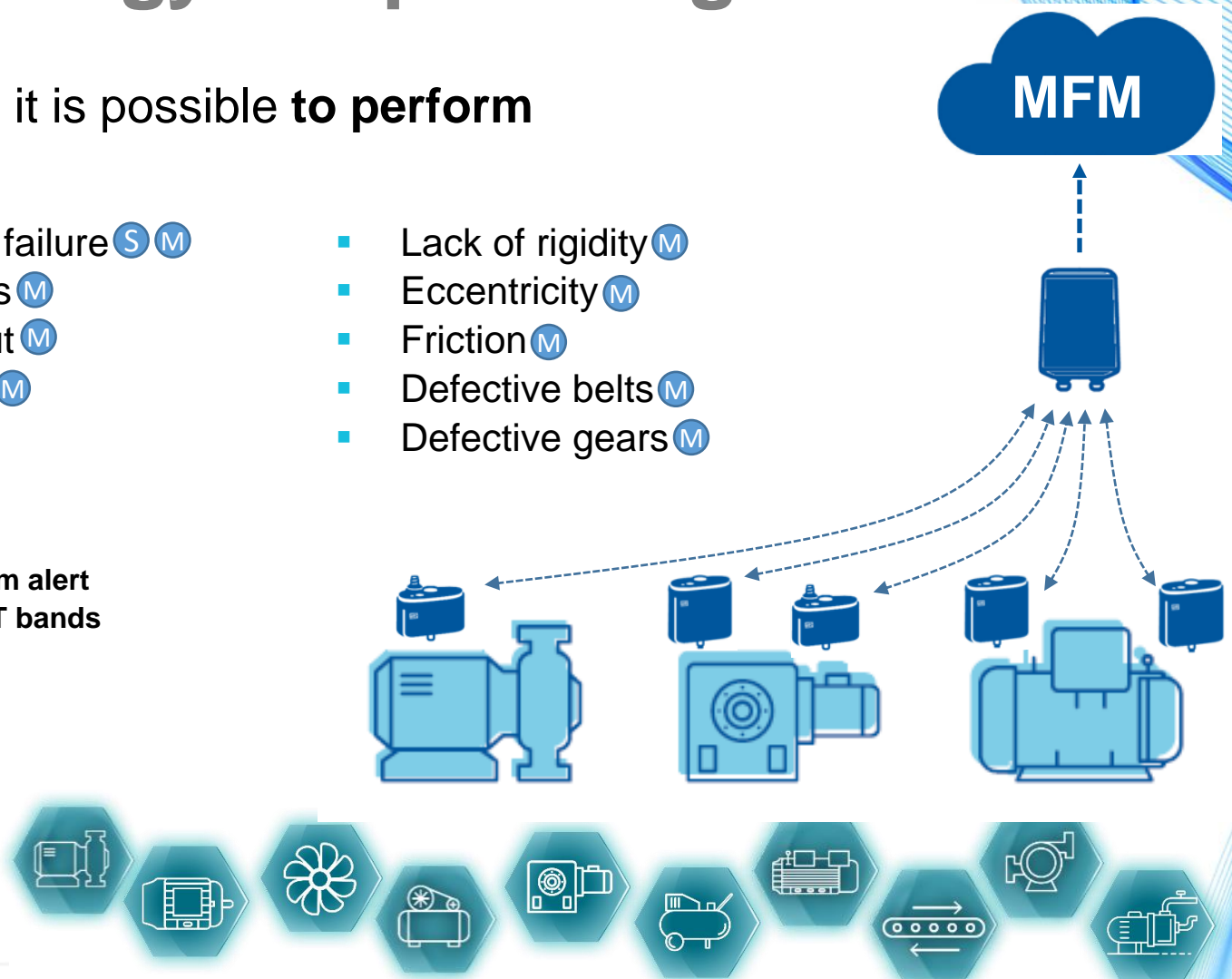
WEGscan & MFM technology for quick diagnoses

Using the **WEGscan** and the **MFM** tools it is possible to perform **advanced diagnoses**, such as:

- Bearing failure **S** **M**
- Misalignment **S** **M**
- External vibration **S** **M**
- Unbalance **S** **M**
- Lubrication failure **S** **M**
- Broken bars **M**
- Shaft runout **M**
- **Cavitation** **M**
- Lack of rigidity **M**
- Eccentricity **M**
- Friction **M**
- Defective belts **M**
- Defective gears **M**



✓
Custom alert
by FFT bands

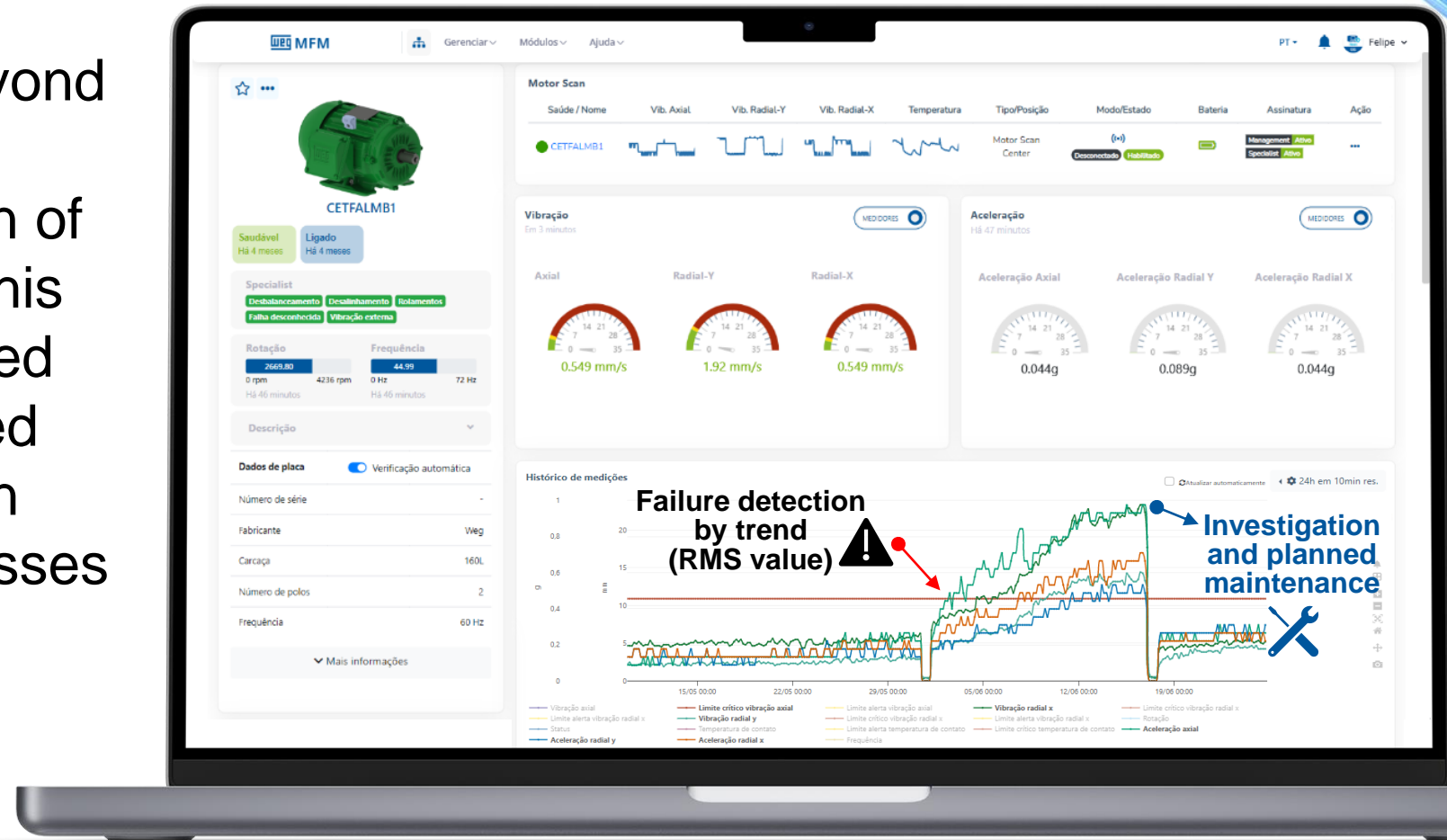


- S** WEG Motor Specialist - Autonomous diagnosis via WEG Motor Specialist for electric motors.
M WEG Management layer - Advanced analysis module for vibration signals - Diagnosis by spectrum band alert feature, observing ISO 20816 standard.

WEGscan & MFM online reliability

Modern dashboards and graphics for vibration trend analysis ✓

In this real case, the vibration elevation beyond the limits was noticed through the notification of the MFM solution. In this occurrence, the planned maintenance prevented unexpected production downtime, avoiding losses in production and maintenance.



WEGscan & MFM advanced and autonomous analysis

Module for Advanced Analysis ✓
of Vibration Signals

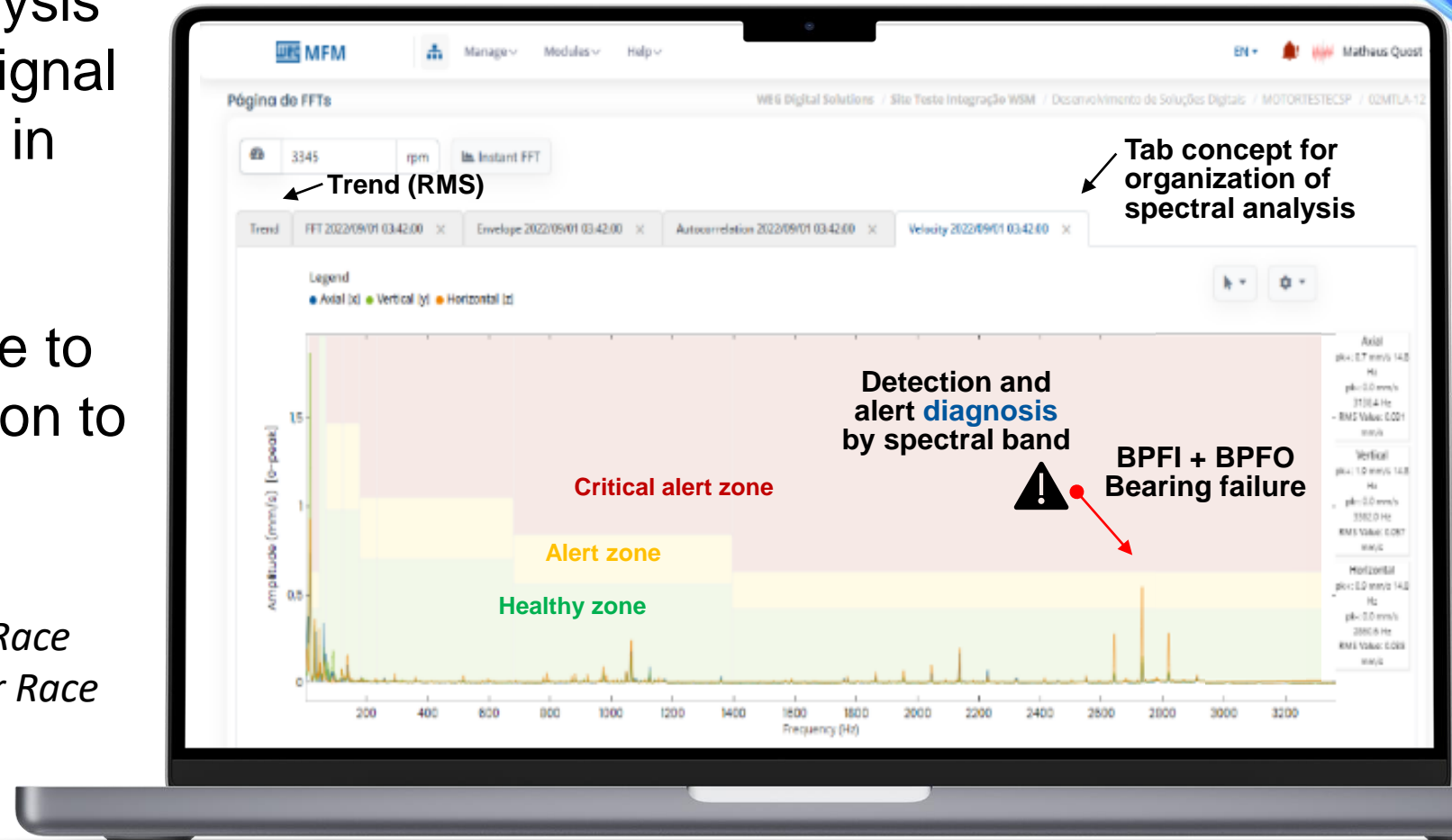
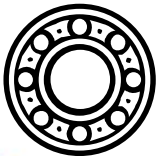
With an advanced analysis module, the vibration signal (spectrum) is analyzed in depth, thus allowing to diagnose the fault.

In this way, it is possible to determine the best action to solve the problem.

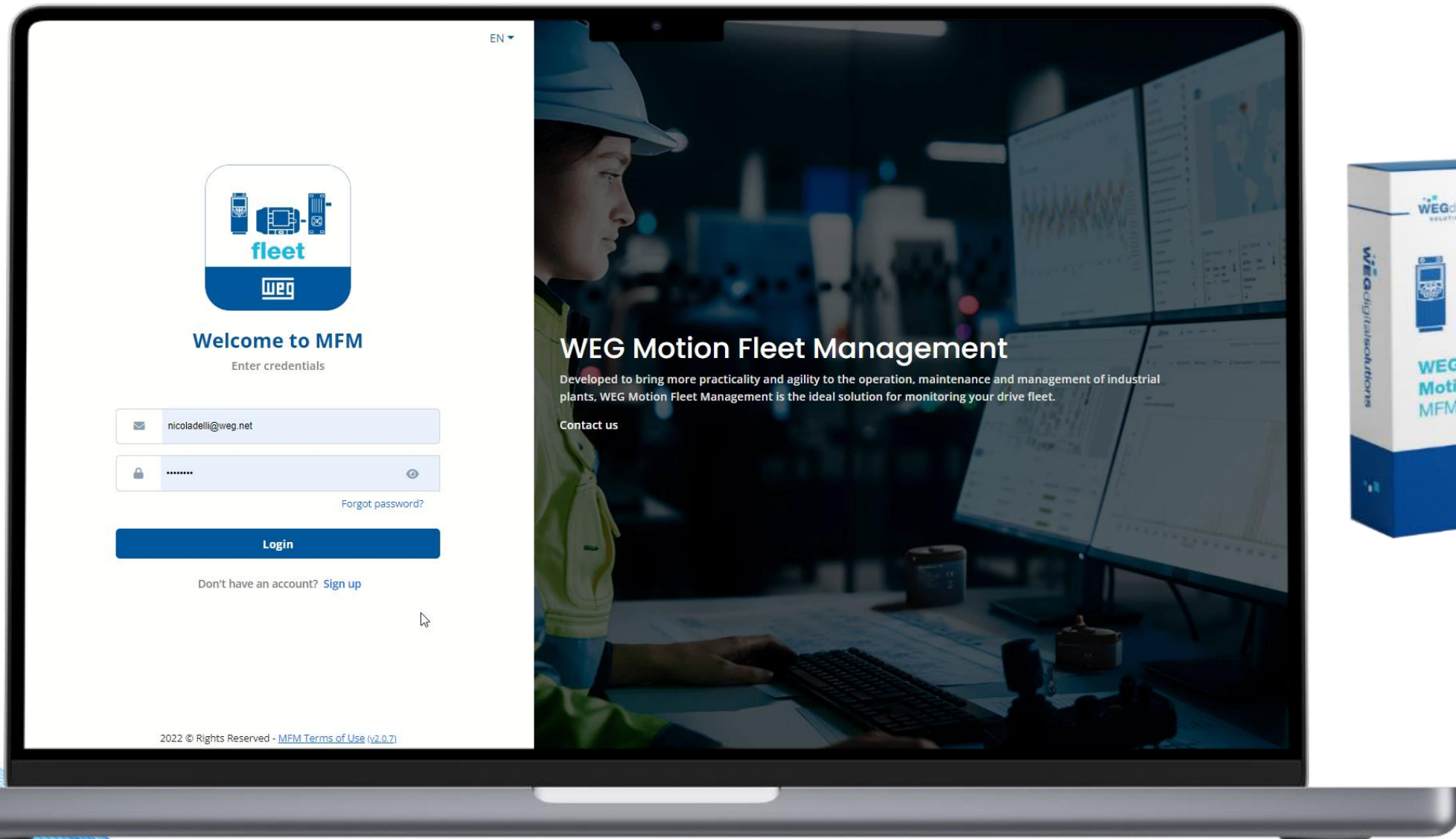
Bearing Failure

BPFI - Ball Pass Frequency Inner Race

BPFO - Ball Pass Frequency Outer Race



MFM condition monitoring technology



WEGscan 100 online asset monitoring

WEGscan 100

- **3-axis** vibration measurement up to 16 g ($\sim 145 \text{ mm/s}^2 \text{ RMS}$)
- Maximum spectral frequency of **13.3 kHz** and **12,288** resolution lines
- Surface temperature measurement **-40 °C to 135 °C** (with ventilation)
- Sensor ambient temperature (electronics): -40 °C to 80 °C
- Power supply with **replaceable Lithium-Thionyl Chloride (Li-SOCl₂) battery¹**
- Data storage: 1 month in the sensor and 1 year in the MFM software
- Gateway communication: **Bluetooth 5** connected mode
- Measurement interval and modes: **customizable**
- Protection rating: **IP66**
- Cloud software: **WEG Motion Fleet Management** with subscription plans
- Advanced functions: **WEGsense, WEGsync and WEG Motor Specialist**
- Patented technologies
WEGsync synchronized measurement for structural analysis (ODS)
WEGsense detects incipient mechanical failures via measurement up to 48 kHz



¹ two 1.65 Ah 3.6V cells, estimated life of 3 years (depending on the application)



WEGscan 101 online equipment monitoring

WEGscan 101

- Sensor with **external power supply**
- Ideal for applications with a **high number of daily measurements**
- Power supply: external power supply via cable¹ with M8 connector
- Minimum source capacity: **100 mA**
(maximum consumption 25 mA per sensor)
- Functional characteristics similar to the **WEGscan 100**
- Protection rating: **IP66**

Measurements via Gateway

- Communication with MFM (cloud server) via internet²:
 - Wi-Fi
 - 3G/4G Modem/Dongle (LTE)
 - Ethernet cable

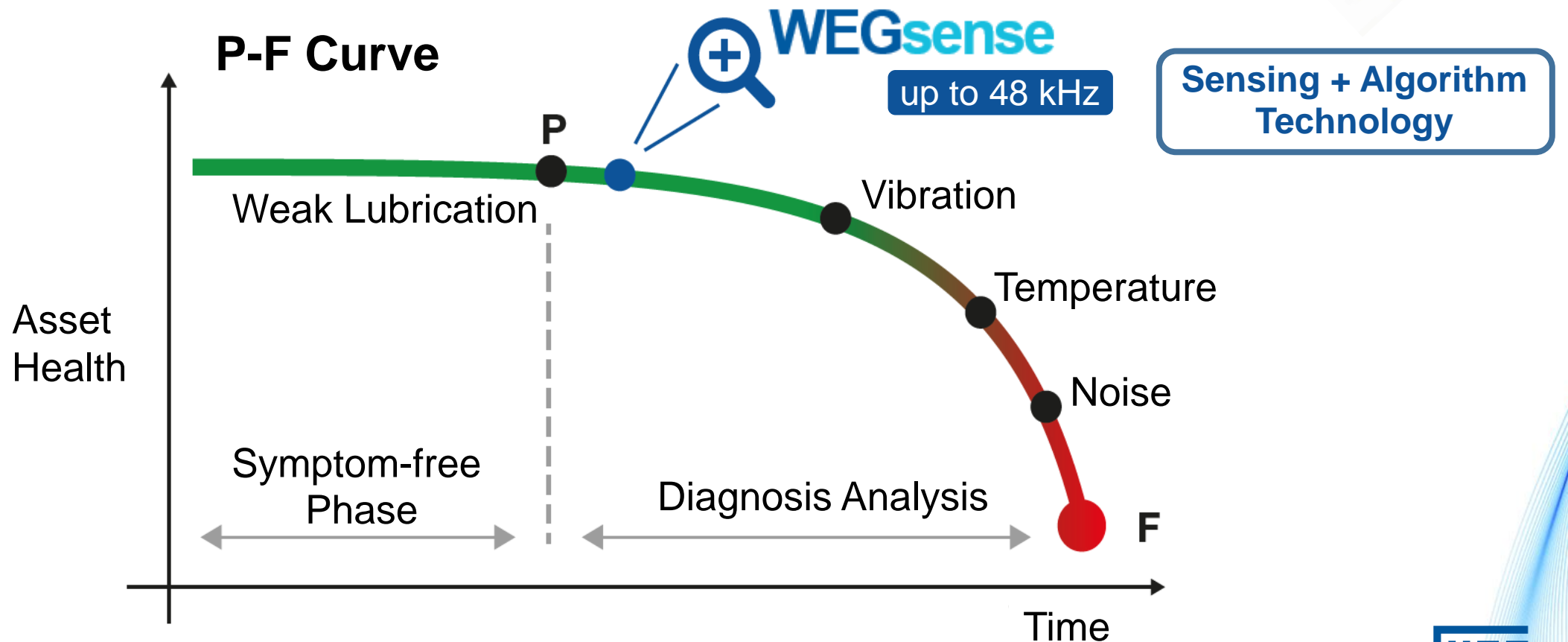


¹ not included in the sensor package

² requirements for connecting the gateway to the MFM server: ports and addresses configured at firewall and network without proxy/VPN

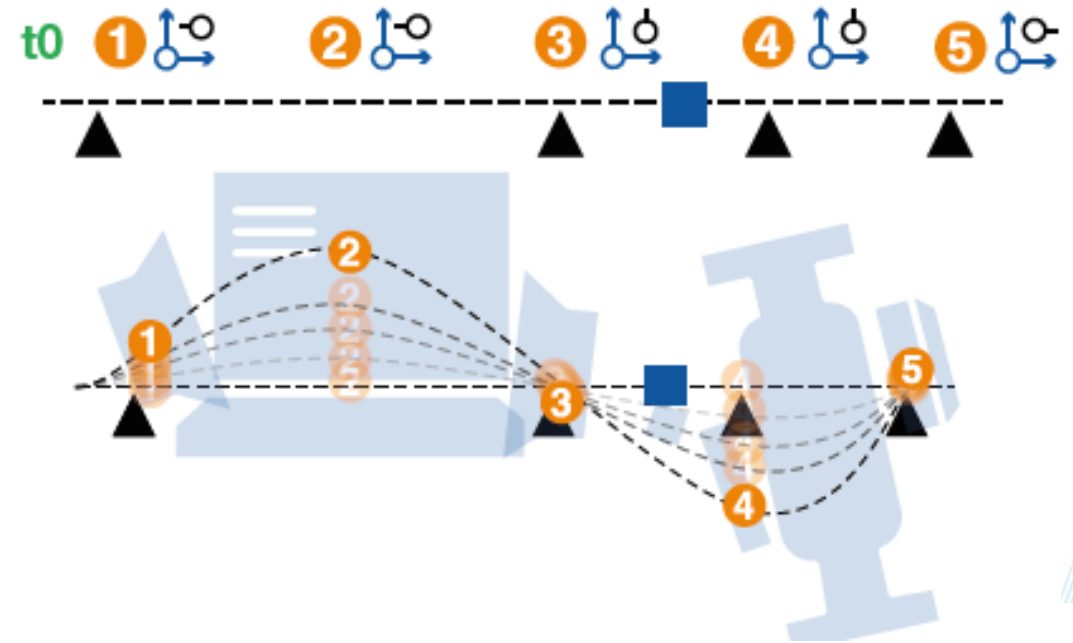
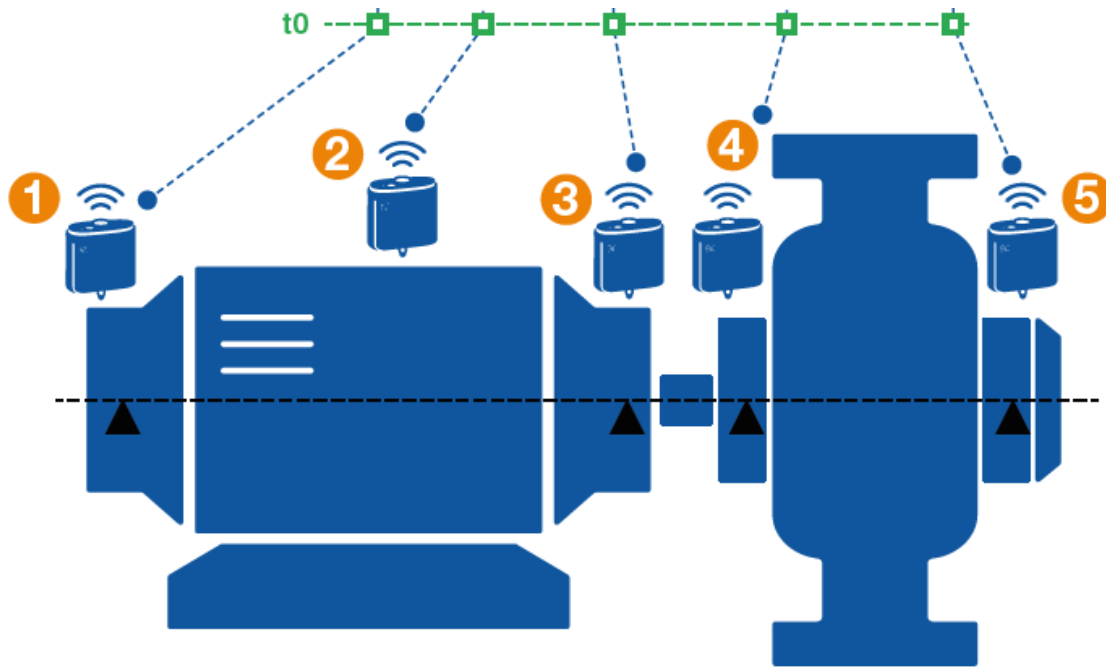
WEGsense incipient fault detection

Technology for detecting and diagnosing incipient mechanical failures, measuring up to 48 kHz.

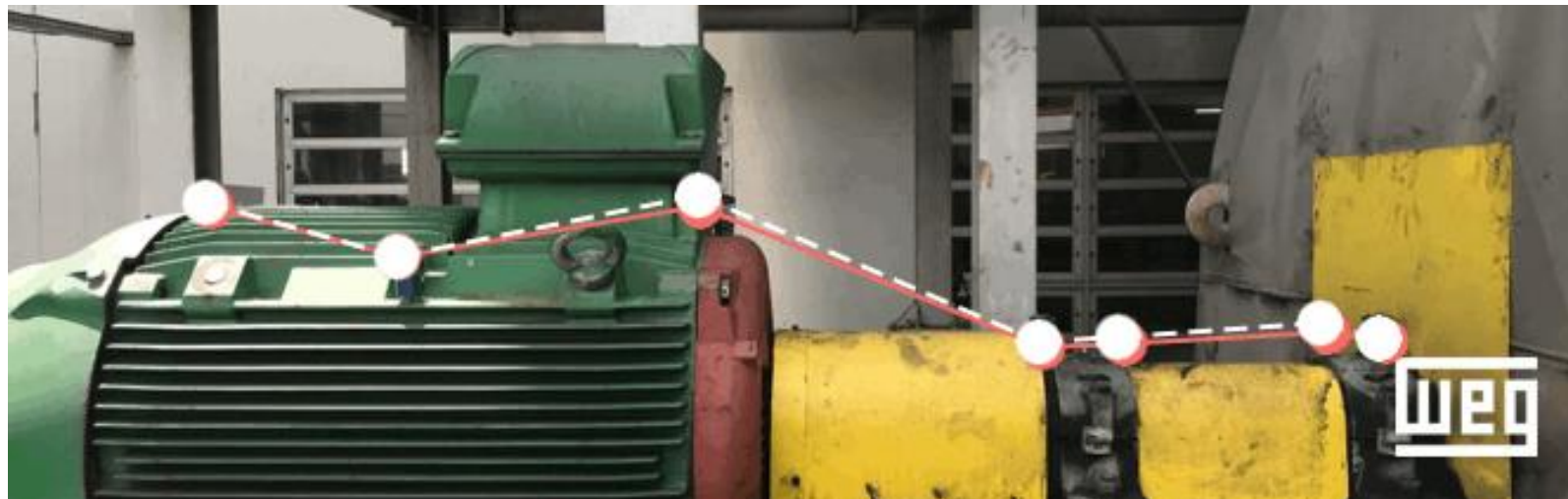


WEGsync synchronized measurement for structural analysis

Synchronized measurement technology with multiple sensors for advanced structural vibration analysis such as phase analysis and ODS analysis (*Operating Deflection Shape*).



WEGsync synchronized measurement for structural analysis

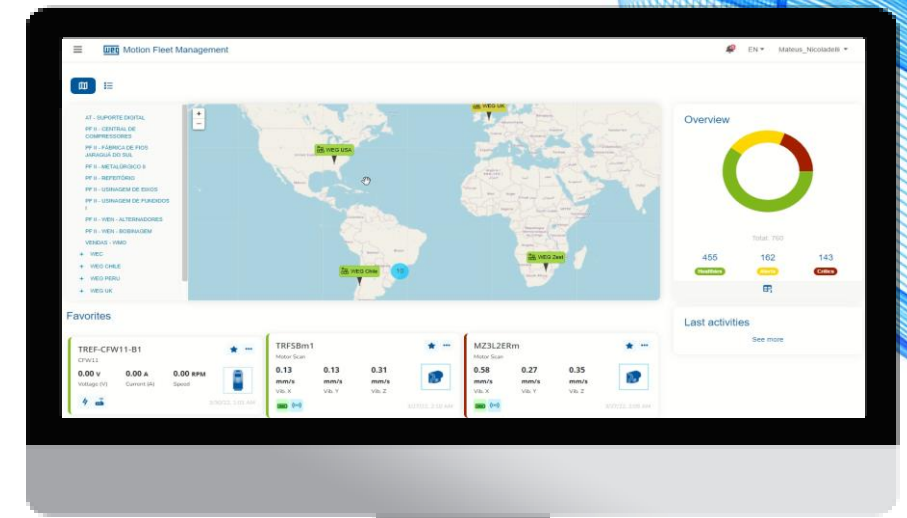


WEGsync synchronized measurement for structural analysis



MFM Benefits and Advantages

- Leveraging the condition-based maintenance;
- Supporting the operational decision-making;
- Reducing the TCO (Total Cost of Ownership);
- On-line monitoring of entire fleet using one solution;
- Effective communication via notifications and fleet reports;
- Mitigation of unexpected failures and shutdowns;
- Workforce safety.





WEGdigital SOLUTIONS

Thank you !

Mateus Nicoladelli de Oliveira - WDS
nicoladelli@weg.net

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