Bonfiglioli and IoTwins

Bologna, October 1st 2020

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From our roots, to new challenges

SINCE

1956

"FULL SPEED **AHEAD!**"

Clementino Bonfiglioli

We have a relentless commitment to excellence, innovation and sustainability.
Our team creates, distributes and services the world-class
power transmission and drive solutions that keep the world in motion.

Mobility and Wind

Gearboxes and gearmotors for applications in **Mobile Machinery**

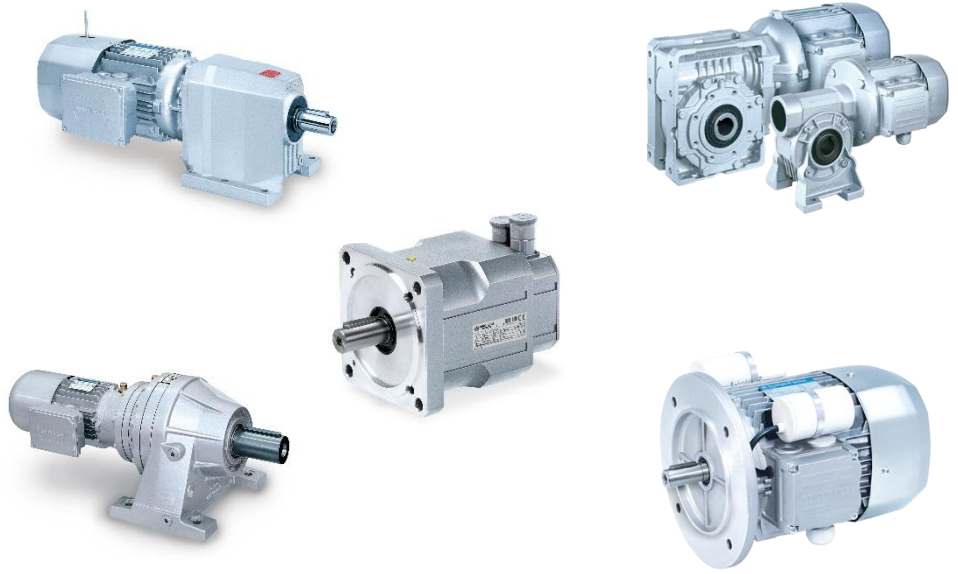
(wheels, slews, winches, cranes, concrete mixers) and **Wind applications**

Wind
36% Market share worldwide

Construction
60% Market share in Europe

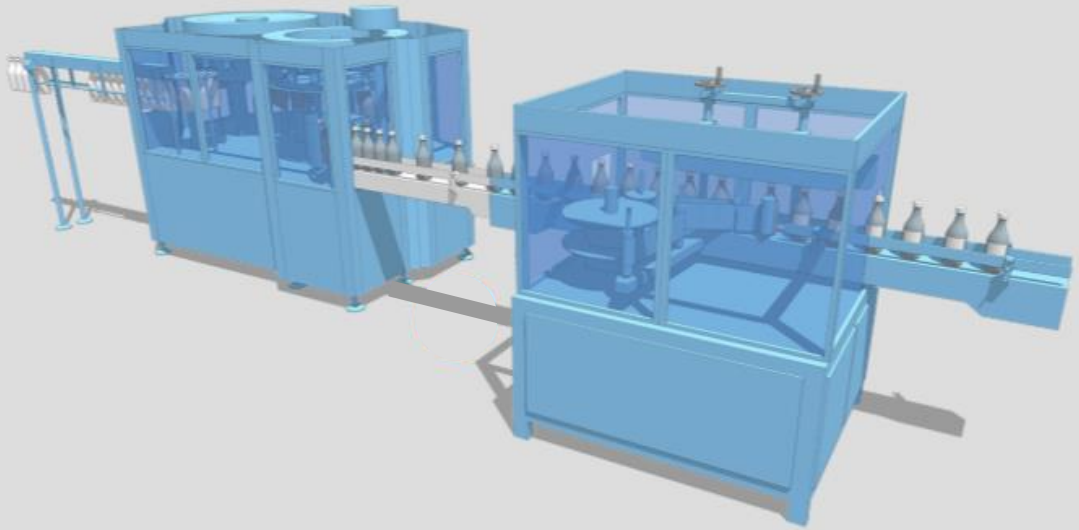
Industrial applications

Gearboxes, gearmotors and electric motors
for Industrial applications
in more than 20 different sectors.



Mechatronics

Integrated mechatronics packages
(Precision gearboxes, Servo motors and Drives,
Motion and HMI)
for Industrial applications.



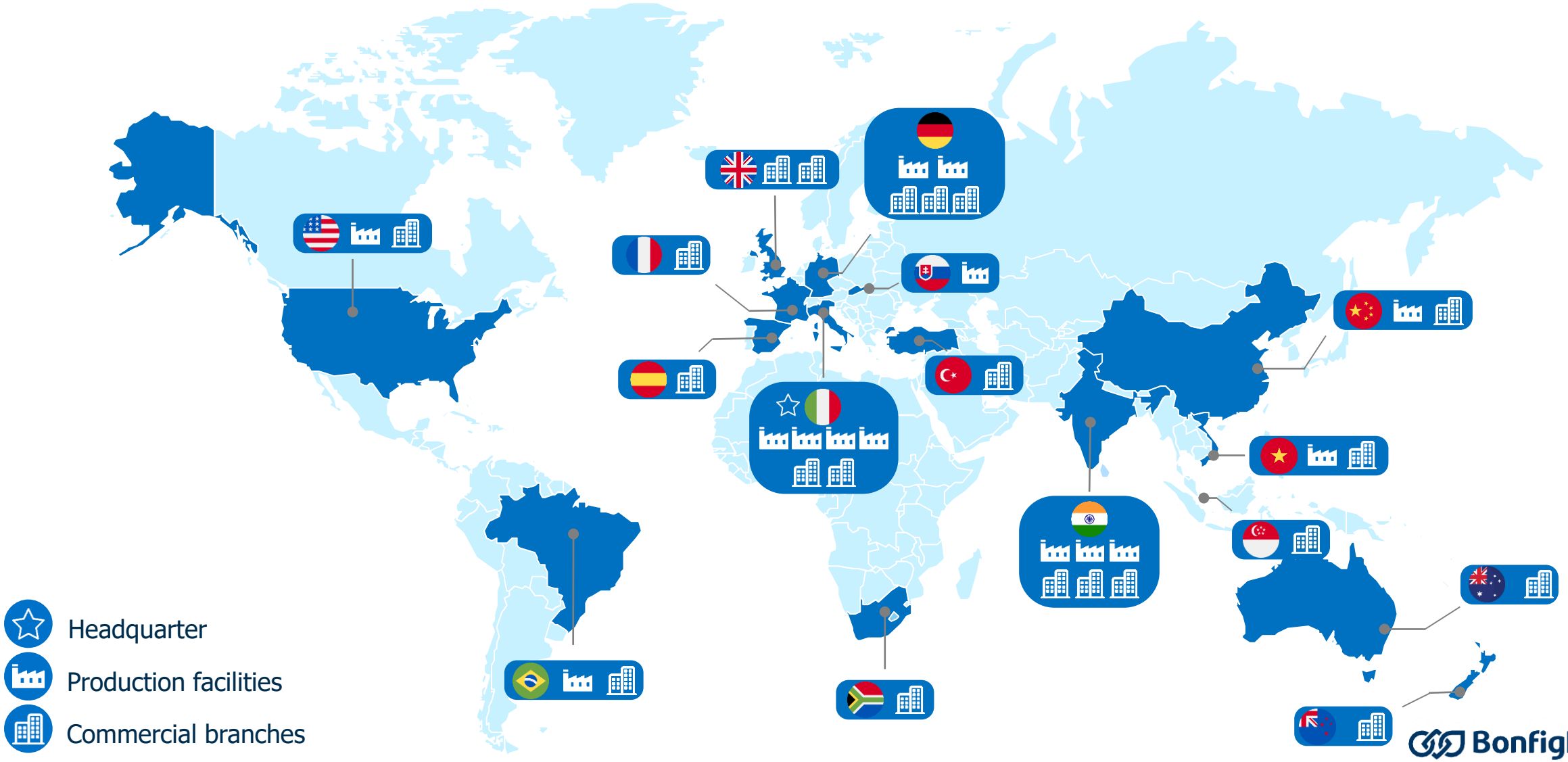
Marine

Gearboxes, gearmotors for Marine applications
(winch drives, planetary drives, steering gears, jacking gears)

Electromobility

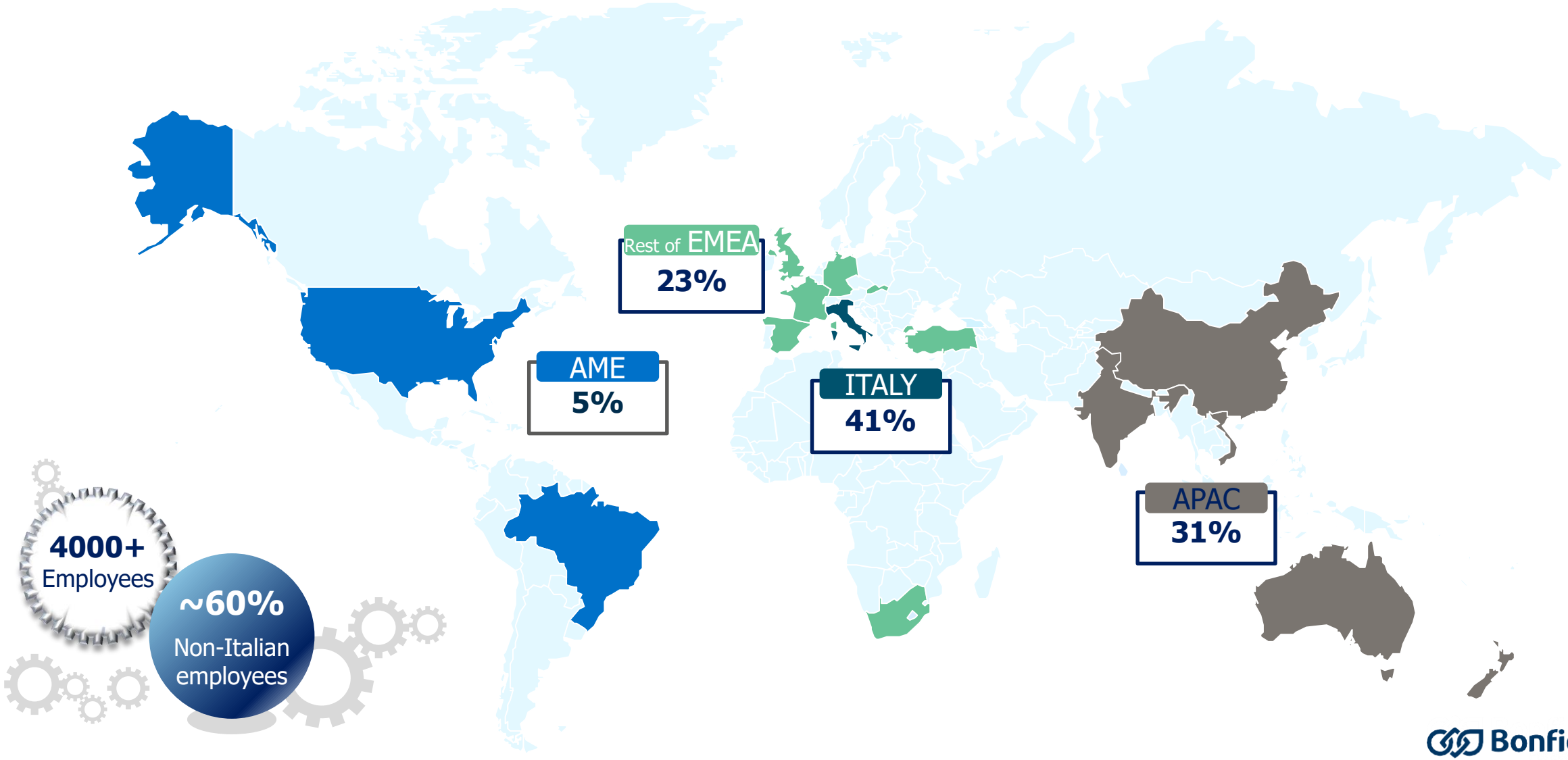
Gearboxes, gearmotors
for applications in Electromobility

Bonfiglioli Global footprint: 14 Production facilities and 21 commercial branches

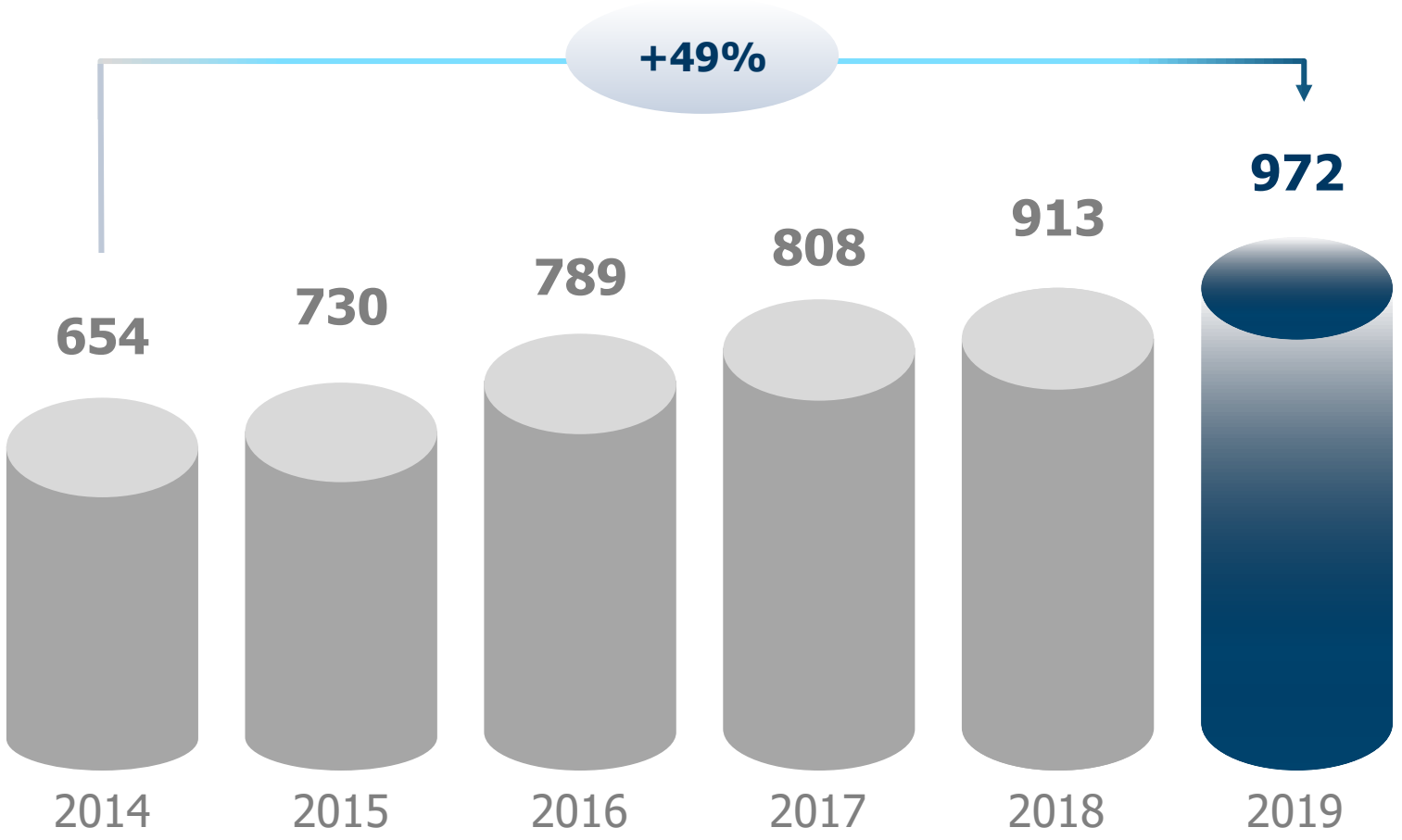


Bonfiglioli
Forever Forward

We have ~4 000 employees around the world, of which 60% abroad



In 6 year our sales grew by ~50%, reaching almost 1Bn€



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Forever Forward

Bologna, October 1st 2020

IoTwins Project

Distributed Digital Twins for industrial SMEs: a big-data platform

Francesco Millo

Bonfiglioli Riduttori (Project Coordinator)

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020
RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT № 857191

IoTwins

BIG DATA OPTIMIZE INDUSTRY AND SERVICES

TYPE OF ACTION
INNOVATION ACTION

PROJECT REFERENCE
857191

START/END
SEPTEMBER 2019 – AUGUST 2022

TOTAL COSTS
€ 20,029,818.75

EU CONTRIBUTION
€16,422,552.01

CALL IDENTIFIER
H2020-ICT-2018-2020

TOPIC
ICT-11-2018-2019 - HPC AND BIG DATA ENABLED LARGE-SCALE TEST-BEDS AND APPLICATIONS

COORDINATOR
BONFIGLIOLI RIDUTTORI

IoTwins

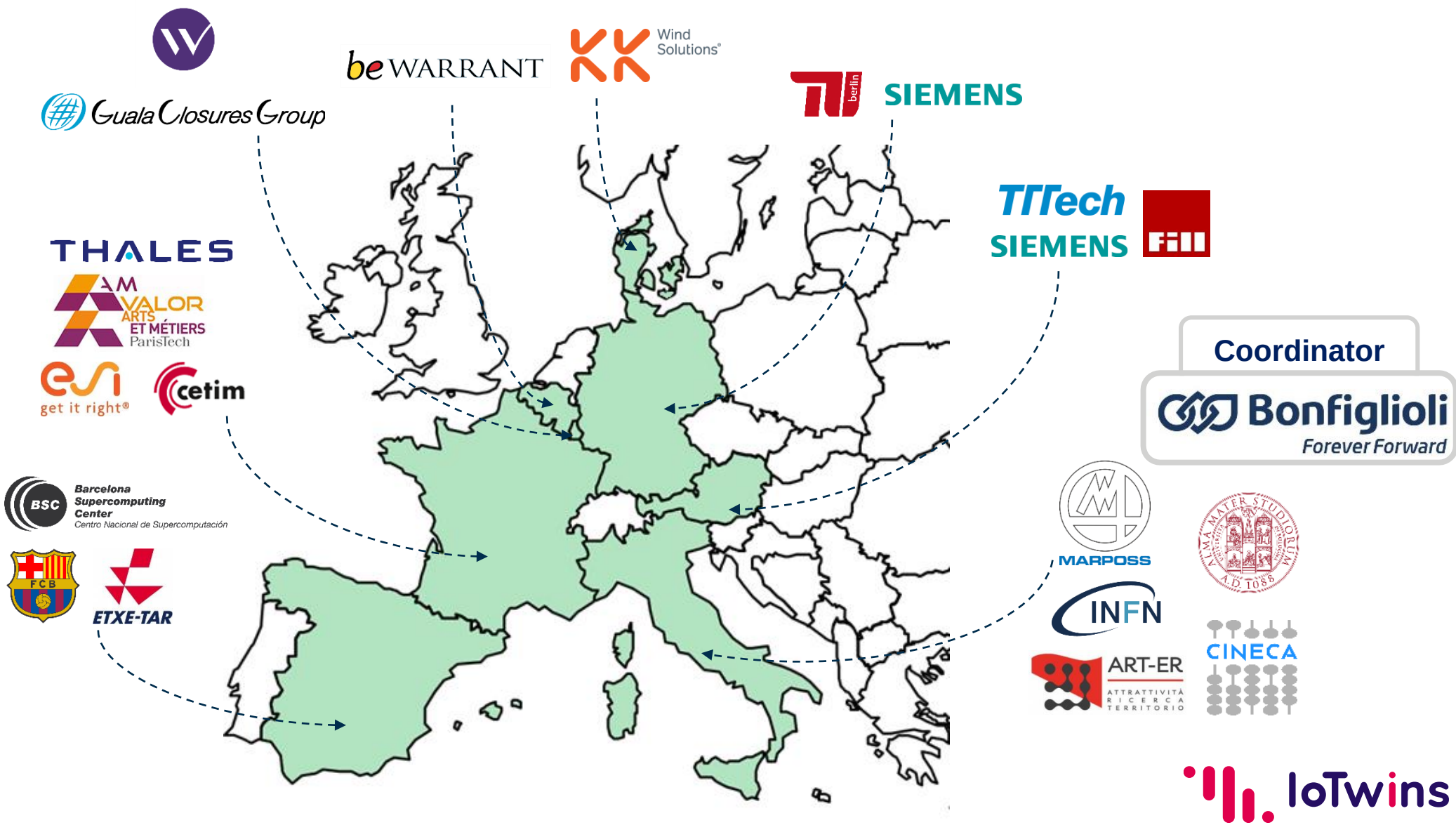
Concept and approach.

- IoTwins is an European project that will work to **lower the barriers for the uptake of Industry 4.0 technologies** to optimize processes and increase productivity, safety, resiliency, and environmental impact.
- IoTwins approach is based on a **technological platform** allowing a simple and low-cost access to big data analytics functionality, AI services and edge cloud infrastructure for the **delivery of digital twins in manufacturing and facility management sectors**.
- The approach is demonstrated through the development of **12 large scale testbeds**, organized in three application areas: **manufacturing**, **facility management** and **replicability**/scale up of such solutions.

20	16	23	1	12	3
M€ total value	M€ EU Funding	Partners	Platform	Testbeds	Application areas

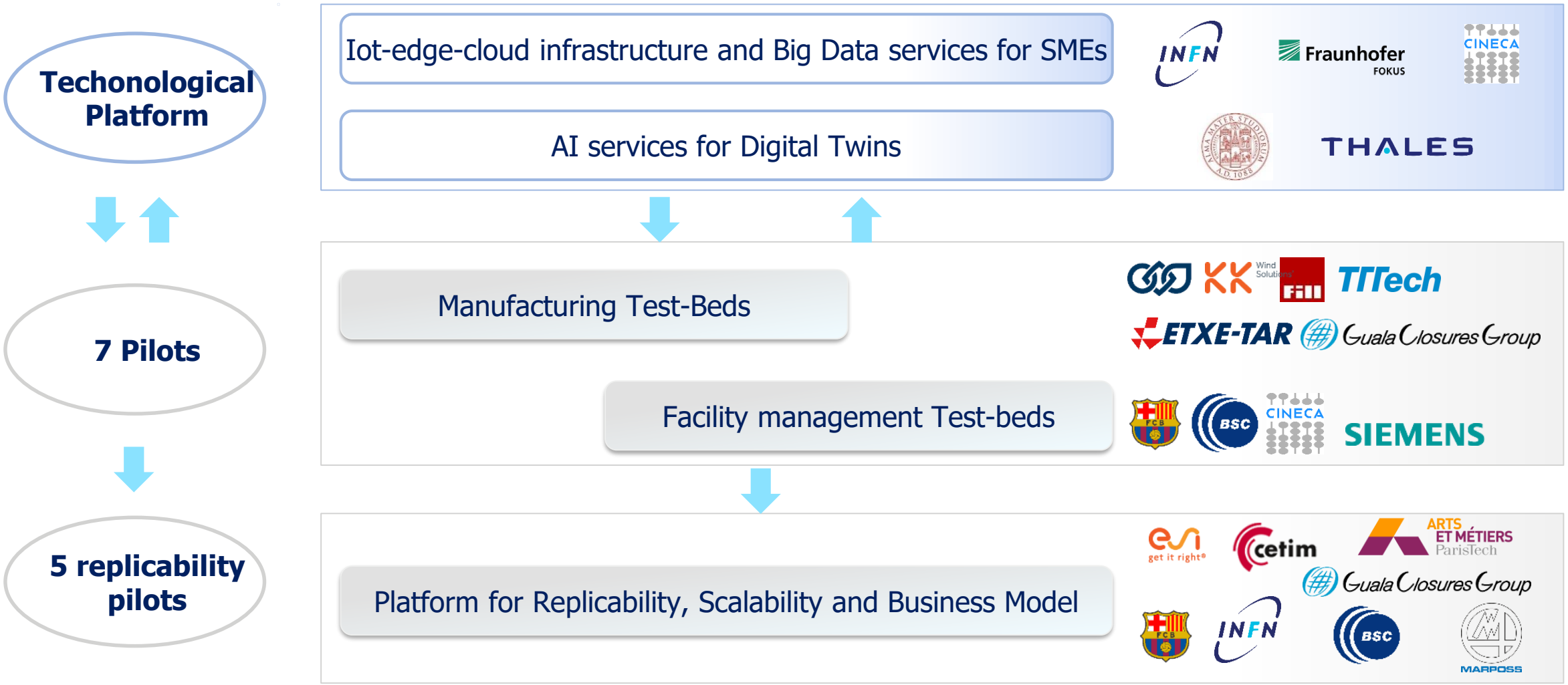
IoTwins

Our consortium in a snapshot



IoTwins

The project: a technological platform to feed 12 pilots



IoTwins

The Tech platform will feed 12 test beds

WP N°	Title	Participants	Short Description	Activity
2	IoT-Edge-Cloud infrastructure and big data services for SMEs	INFN, Fraunhofer FOKUS, CINECA	Definition of the technology and user requirements to design the IoTwins platform	**Platform**
3	AI services for distributed Digital Twins	Alma Mater Studiorum, THALES	Development of AI services (Machine learning, simulation…) and methodologies for the application on the Test-beds	**Platform**
4	Manufacturing test-beds	GMV, KK Wind Solutions, FILL, TTTech, ETXE-TAR, Guala Closures Group	1. Predictive maintenance of **wind turbines** 2. Monitoring the behaviour of **machines for automotive** 3. Optimization of **crankshaft manufacturing systems** 4. Predictive maintenance of **closure systems**	**4 Pilots**
5	Facility management test-beds	FCB, BSC, CINECA, SIEMENS	5. Management of crowd flows in the **Camp Nou** facility 6. Improving the environmental footprint of **Data Centers** 7. Management of a wide-scale **Smart Grid** in a living lab	**3 Pilots**
6	Platform replicability, scalability and business models	esi, cetim, ARTS ET MÉTIERS ParisTech, Guala Closures Group, BSC, INFN, FCB, BSC, MARPOSS	8. Identifying **patterns for reuse** for manufacturing SMEs 9. **Performance homogenization** over different plants 10. Testing Test-bed 6 on other **IT facilities** (BSC and INFN) 11. Testing Test-bed 5 on **smaller stadiums** 12. Testing an innovative **business model** to exploit the Platform	**5 Pilots**

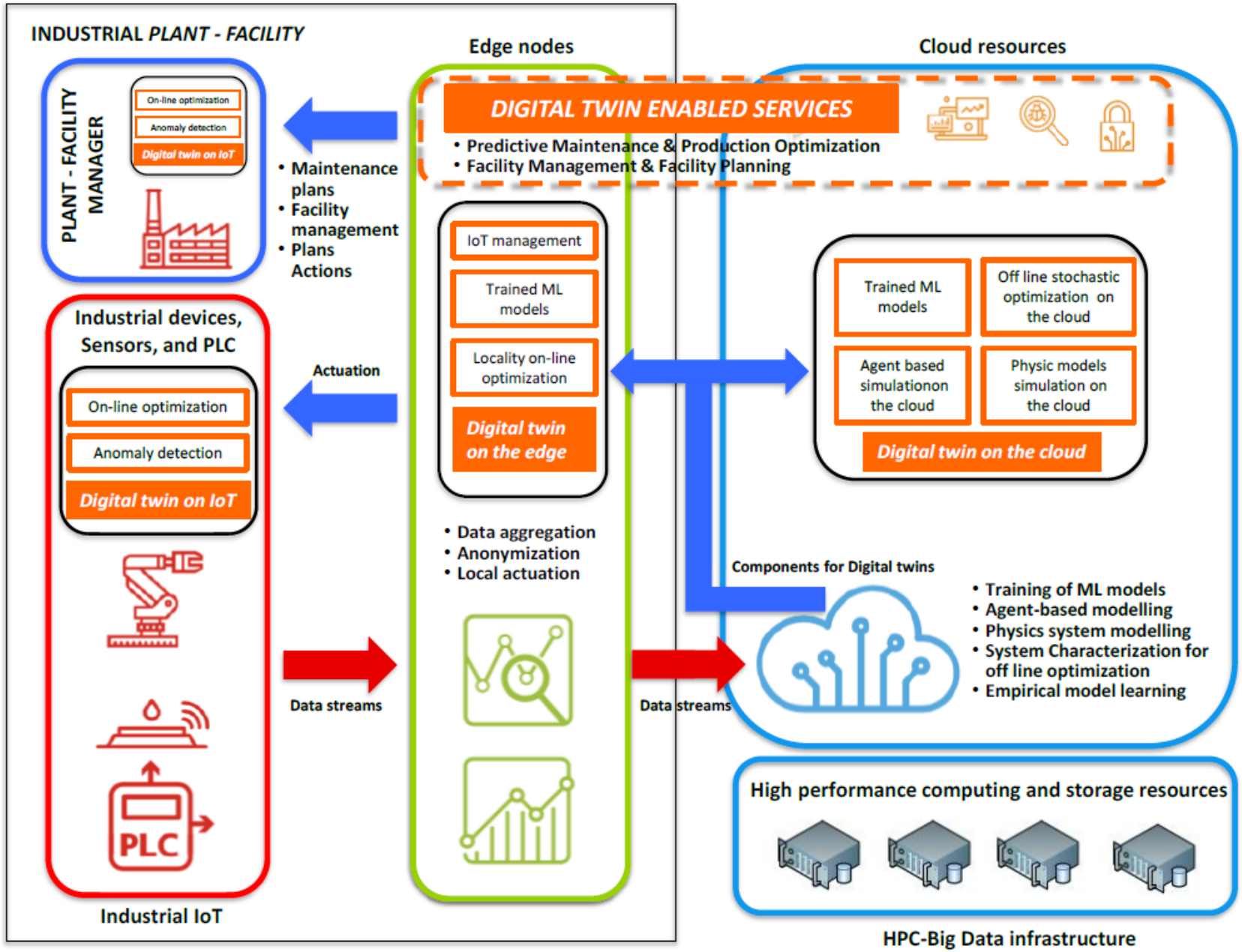
IoTwins

WP 1, 7 and 8 will deal with the Coordination of the Consortium, the Exploitation and the Dissemination of the results generated by IoTwins

WP N°	Title	Participants	Short Description	Activity
1	Project Management	Bonfiglioli, Università di Bologna, beWARRANT	Coordinating and monitoring the activities of Partners, administrating European funds	**Coordination**
7	Exploitation of the project developments and knowledge management	beWARRANT	Defining business models to adopt the IoTwins platform/methodology, managing IPR and exploitable results	**Exploitation**
8	Outreach activities – dissemination and communication	ART-ER Attrattività Ricerca Territorio	Communicating and disseminating project Results: - Events, international conferences, workshops, open days, exhibitions…	**Dissemination**

IoTwins

Digital Twins concept in IoTwins



Platform and services.

All the IoTwins testbeds share the same methodology, grounded on the concept of **distributed IoT-/edge-/cloud-enabled hybrid twins, to replicate complex systems,** with the ambition of predicting their dynamics and temporal evolution

Key elements:

- A **full-fledged platform** enabling easy and rapid access to heterogeneous cloud HPC-based resources for advanced big data services.
- **Intelligent services** to simplify and accelerate the integration of advanced Machine Learning algorithms, physical simulation, on-line and off-line optimization into distributed digital twins
- Advanced edge-oriented mechanisms, tools, and orchestration to support **Quality of Service** in the runtime execution of the distributed digital twins

Testbeds.

manufacturing

4 industrial testbeds providing predictive maintenance services that exploit sensors data to forecast the time to failure and produce maintenance plans to optimize maintenance costs

- Wind turbine predictive maintenance | **Bonfiglioli Riduttori, KK Wind Solutions**
- Machine tool spindle predictive behaviour | **FILL**
- Predictive maintenance for a crankshaft manufacturing system | **ETXE-TAR**
- Predictive maintenance and production optimization for closure manufacturing | **GCL International**

Testbeds.

facility management

3 testbeds for identification of criticalities, optimization techniques to provide efficient facility management plans, operation optimal schedules, and renovation/maintenance plans

- NOU CAMP - Sport facility management and maintenance | **Futbol Club Barcelona**
- EXAMON - Holistic supercomputer facility management | **CINECA**
- Smart Grid facility management for power quality monitoring | **SIEMENS**

Testbeds.

replicability

5 testbeds to demonstrate the replicability and the scalability of the IoTwins platform and of the former manufacturing and facility management testbeds

- Patterns for smart manufacturing for SMEs | **Centre Technique des Industries Mécaniques**
- EXAMON replication to other datacentres facilities | **Istituto Nazionale di Fisica Nucleare, Barcelona Supercomputing Center**
- Standardization/homogenization of manufacturing performance | **GCL International**
- NOU CAMP replicability towards smaller scale sport facilities | **Futbol Club Barcelona**
- Innovative business models for IoTwins PaaS in manufacturing | **Marposs**

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Thank you