



# Jornada PLANETIC de espacios de datos federados

Sep 2021

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WHERE  
TECHNOLOGY  
IS AN ATTITUDE





MÁS DE  
**375**  
PERSONAS



**48** TESIS  
DOCTORALES  
EN MARCHA



**ELECTRONICS,  
INFORMATION, AND  
COMMUNICATION  
TECHNOLOGIES**

**Dependable  
embedded systems**

- Dependable software
- Real time systems

**Industrial  
cybersecurity**

- Cybersecurity in  
embedded systems
- Cybersecurity on  
digital platforms

**HW and  
communication  
systems**

- Communication systems
- HW systems

**ICT**

- IoT and digital platforms
- Data analytics and  
artificial intelligence



**ENERGY  
AND POWER  
ELECTRONICS**

**Energy storage  
and management**

- Electrical energy storage
- Electrical and thermal  
energy management

**Power electronics**

- Electromagnetism and  
electrical machines
- Power converters



**ADVANCED  
MANUFACTURING**

**Applied  
mechanics**

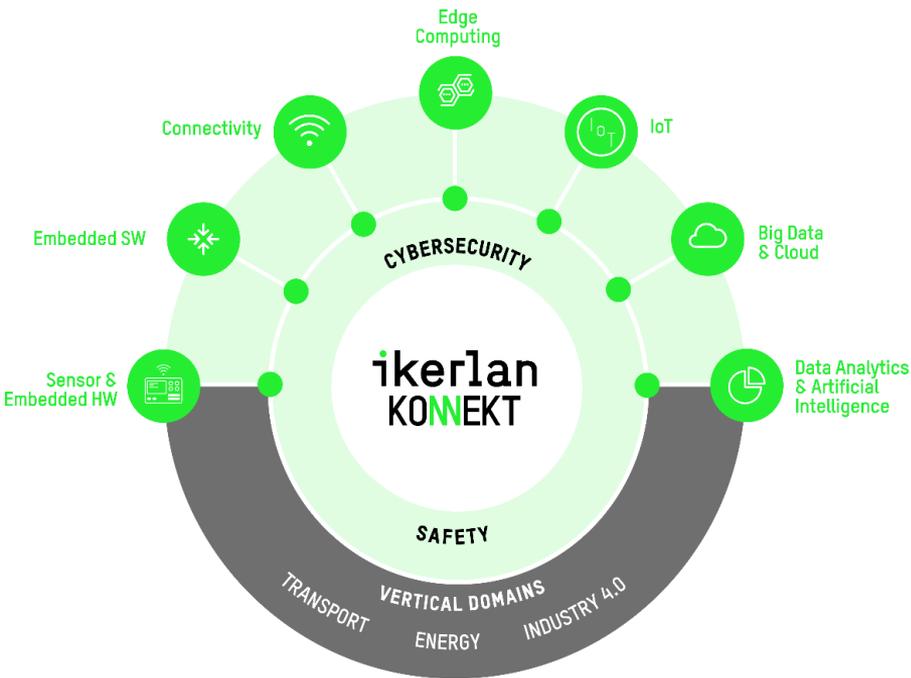
- Structural reliability
- Mechanical system design

**Control,  
monitoring  
and O&M**

- Intelligent control and  
condition monitoring
- Operations and  
maintenance technologies



TEIC: Tecnologías de Electrónica,  
Información y Comunicaciones



**+175** INGENIEROS Y DOCTORES  
especialistas en TEIC

Cloud + IA



**+35**

INVESTIGADORES Plataformas Cloud,  
Data Analytics & Artificial Intelligence.

Edge  
computing



**+20**

INVESTIGADORES Senior especialistas  
en el Edge.

IoT + 5G



**+35**

INVESTIGADORES Senior en Sistemas  
de conectividad de corto y largo  
alcance: OSI-layer1 ... OSI-Layer7.

Security  
en IoT



**+20**

INVESTIGADORES Senior en  
Ciberseguridad.

Casos de éxito de **transformación digital** en diferentes sectores:





Proyectos de I+D Europeos.



Pertenencia a asociaciones de referencia.

INTERNATIONAL DATA  
SPACES ASSOCIATION

AI@TI

Alliance for Internet of Things Innovation



Asociación Española para la Inteligencia Artificial (AEPIA)



DEPARTAMENTO DE DESARROLLO  
ECONÓMICO Y COMPETITIVIDAD

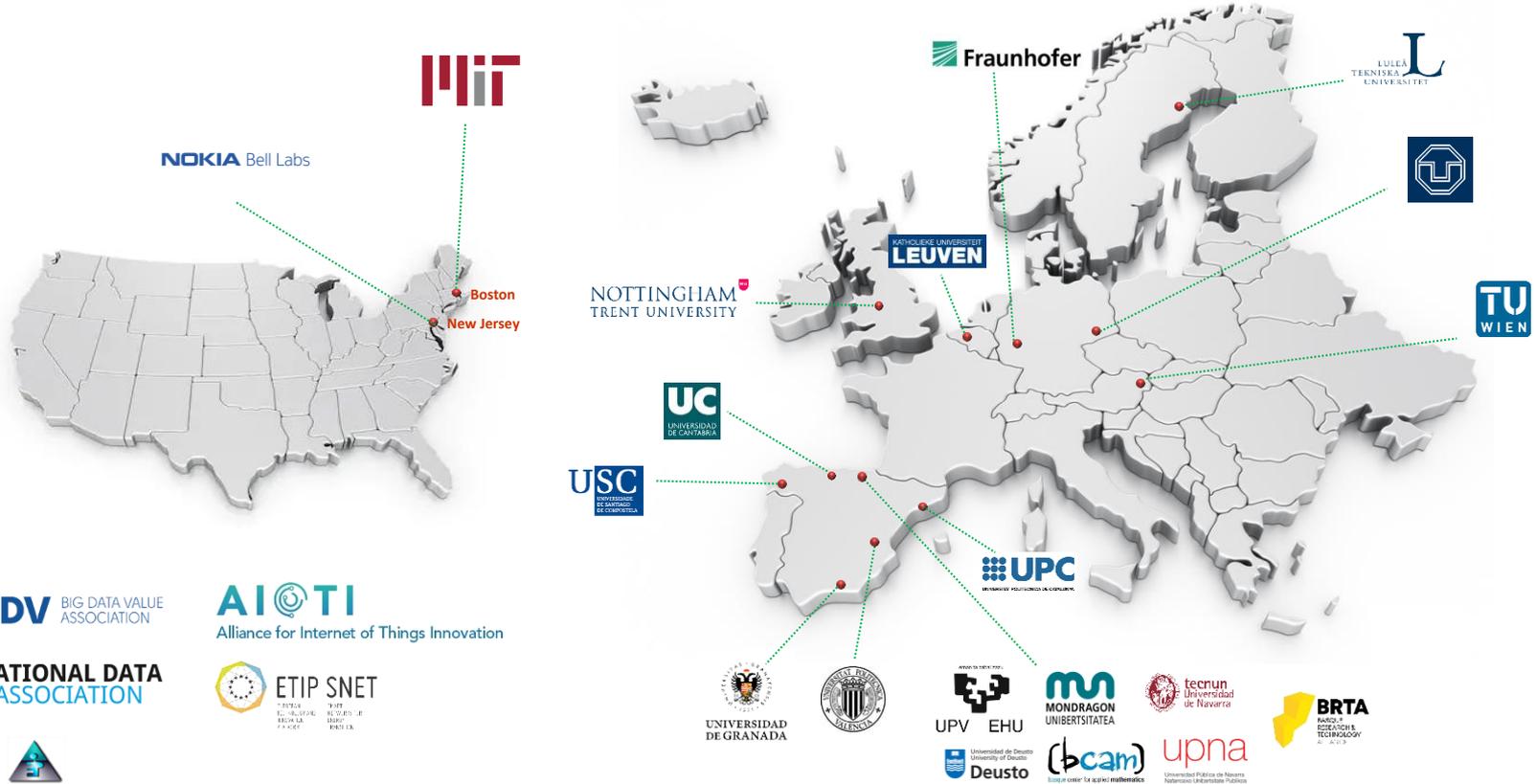
GRUPO  
spri

Proyectos Elkartek (Analítica, Edge, IA, IDS, Gaia-X,...).

Colaboración Público-Privada.



Tesis doctorales en el ámbito (*long-term research*).



Asociación Española para la Inteligencia Artificial (AEPIA)

- 1. Overview**
- 2. Use case.**
- 3. Federated Learning.**
- 4. New business models.**

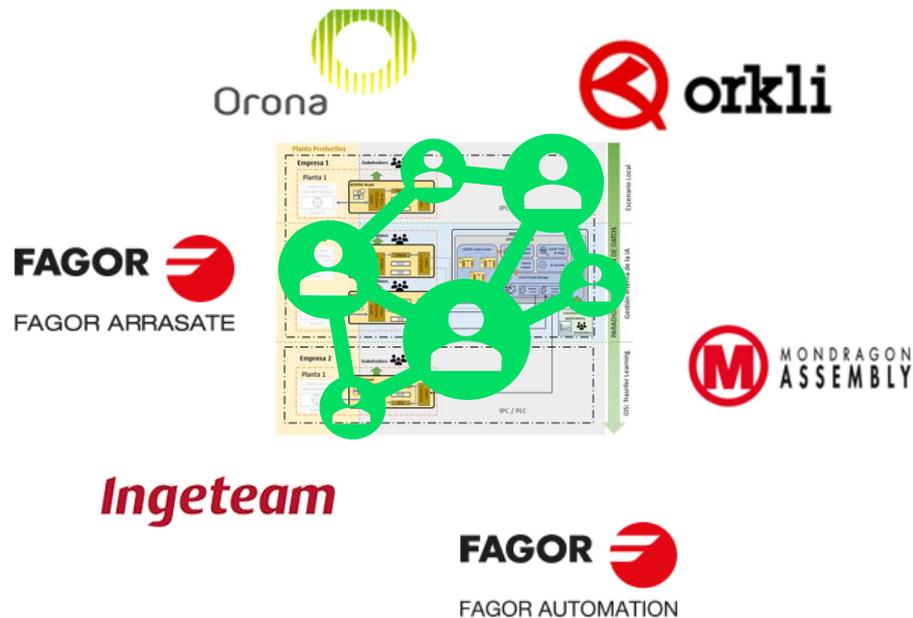


# OVERVIEW

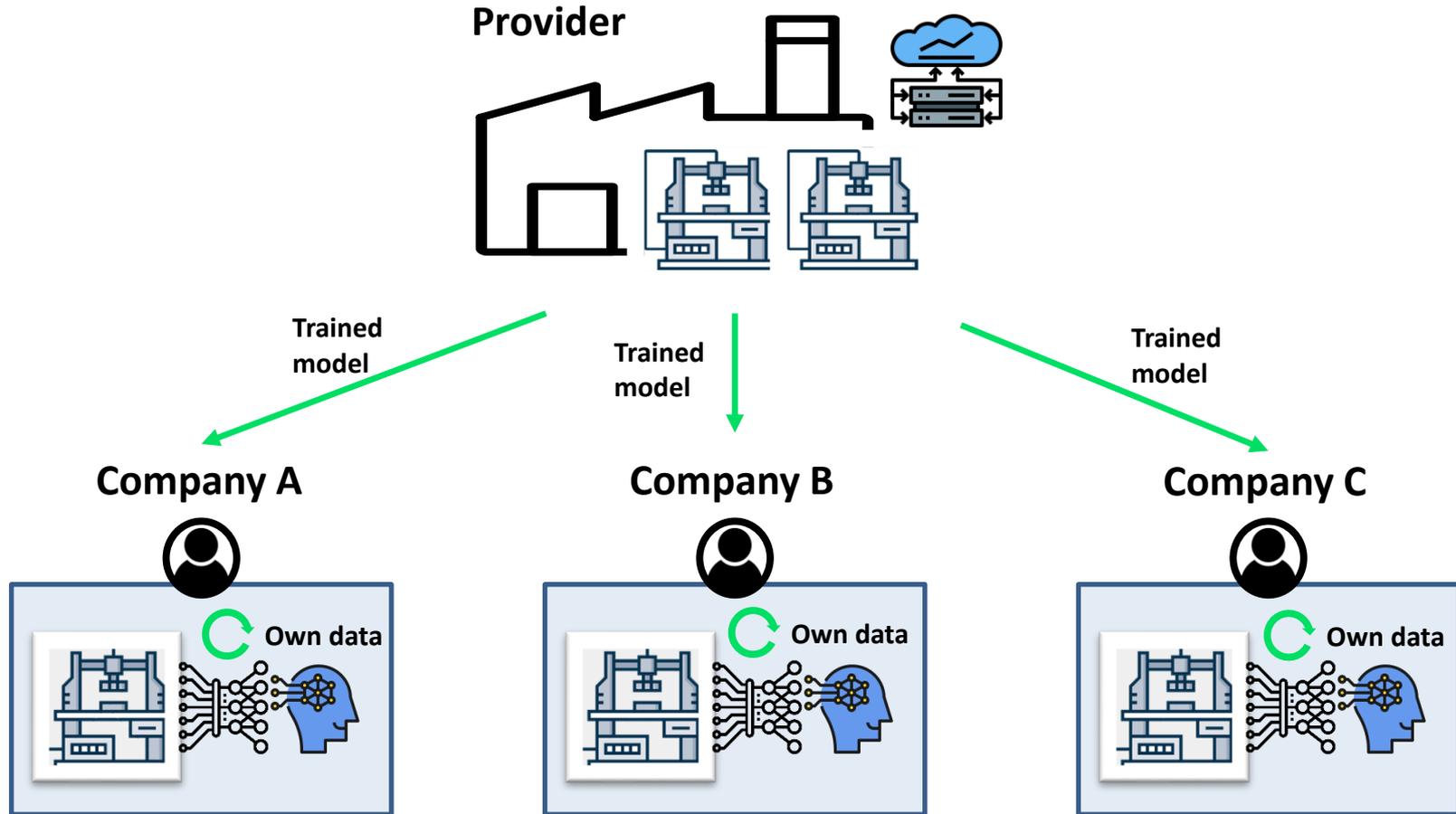
Collaborative learning is a new paradigm to build high-quality ML models.

It is applied on distributed systems, where each agent is autonomously and independently contributing to learning the model.

The obtained models will be high-quality since they aggregate the knowledge provided by all the agents.



# USE CASE



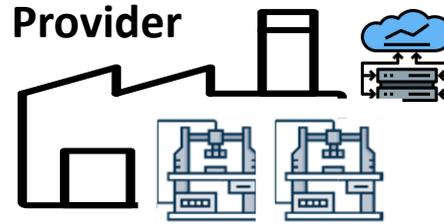


Providing **these services** gives the provider a **differential factor against its competitors.**

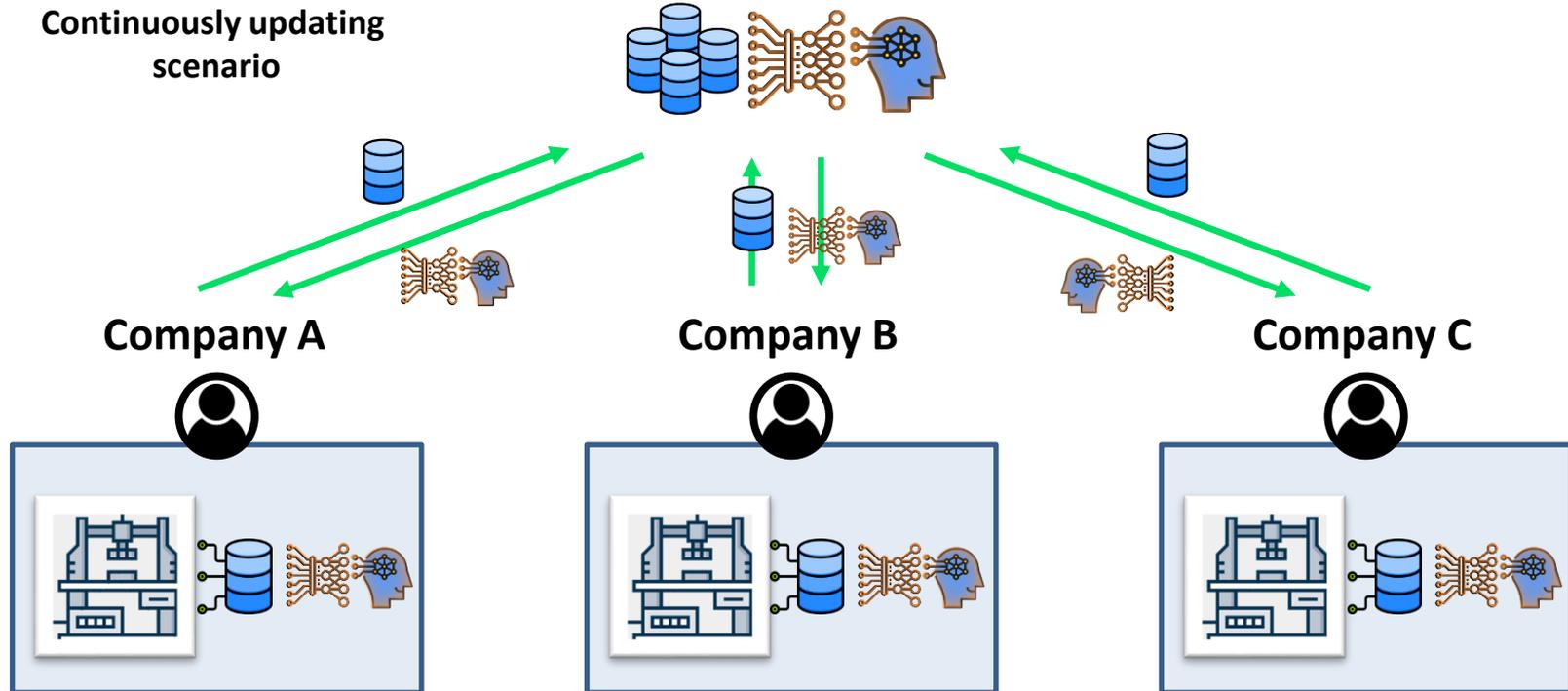
- Preventive maintenance.
- Smart monitoring.
- Offer a longer product warranty.
- Increase customer confidence.

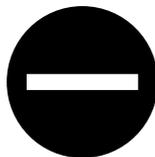


1. There is not enough data to train the models. Specially, failure data.
2. Companies do not have enough knowledge about data analytics.
3. Maintaining a private data analytics platform is expensive.



**Continuously updating  
scenario**



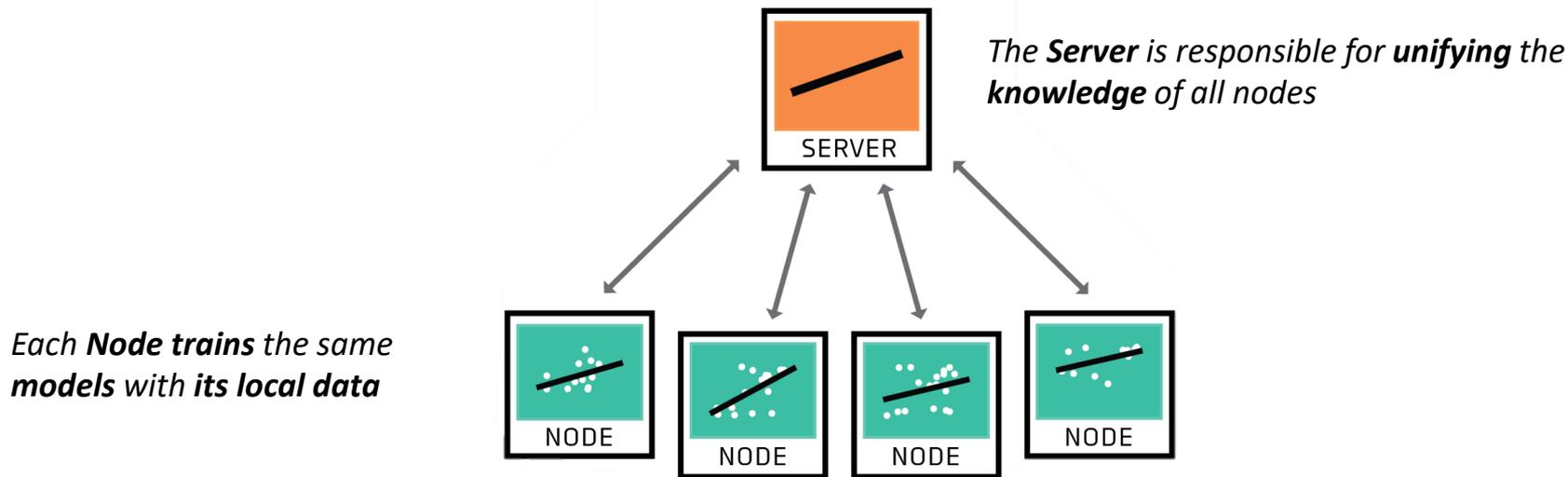


1. Share private information with other companies.
2. Privacy, data access rights.
3. Possible data losses or security breaches in data transmission.
4. The models deployed are generic and may not be specifically adjusted to the company's scenario.

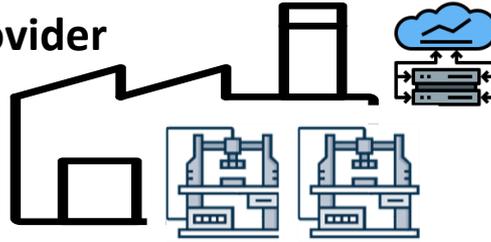
# FEDERATED LEARNING

## Federated Learning: Collaborative Machine Learning without Centralized Training Data

- **Decentralized** learning where the **model** is **trained** in **multiple nodes** with **local data**.
- Then, **all models** are **merged** into a **single model**.
- **Collaborative** learning by **sharing knowledge** between different scenarios.

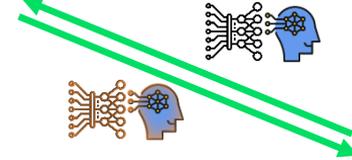
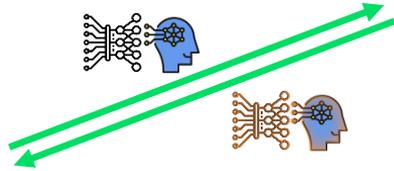
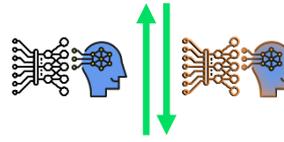
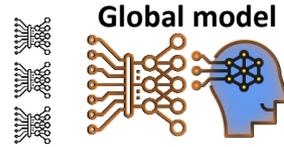


Provider



# Federated learning

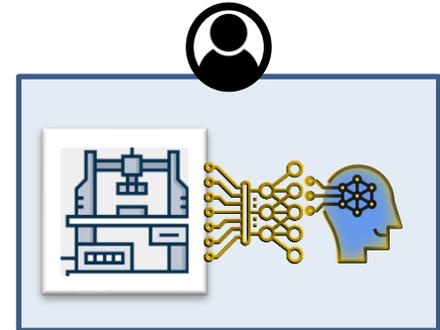
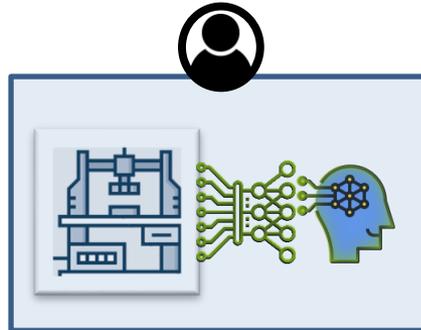
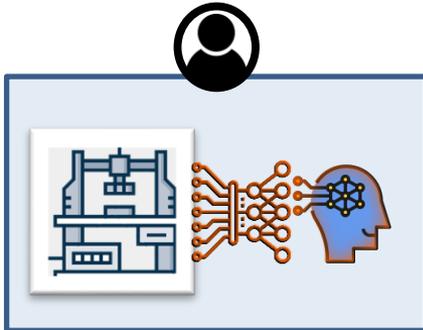
Continuously updating  
scenario



Company A

Company B

Company C





1. No private data exchange between companies and providers or other companies.
2. Share knowledge while maintaining data privacy.
3. Avoid transmission of huge volumes of data.
4. Enable clients to get more accurate models by retrieving knowledge from other scenarios.

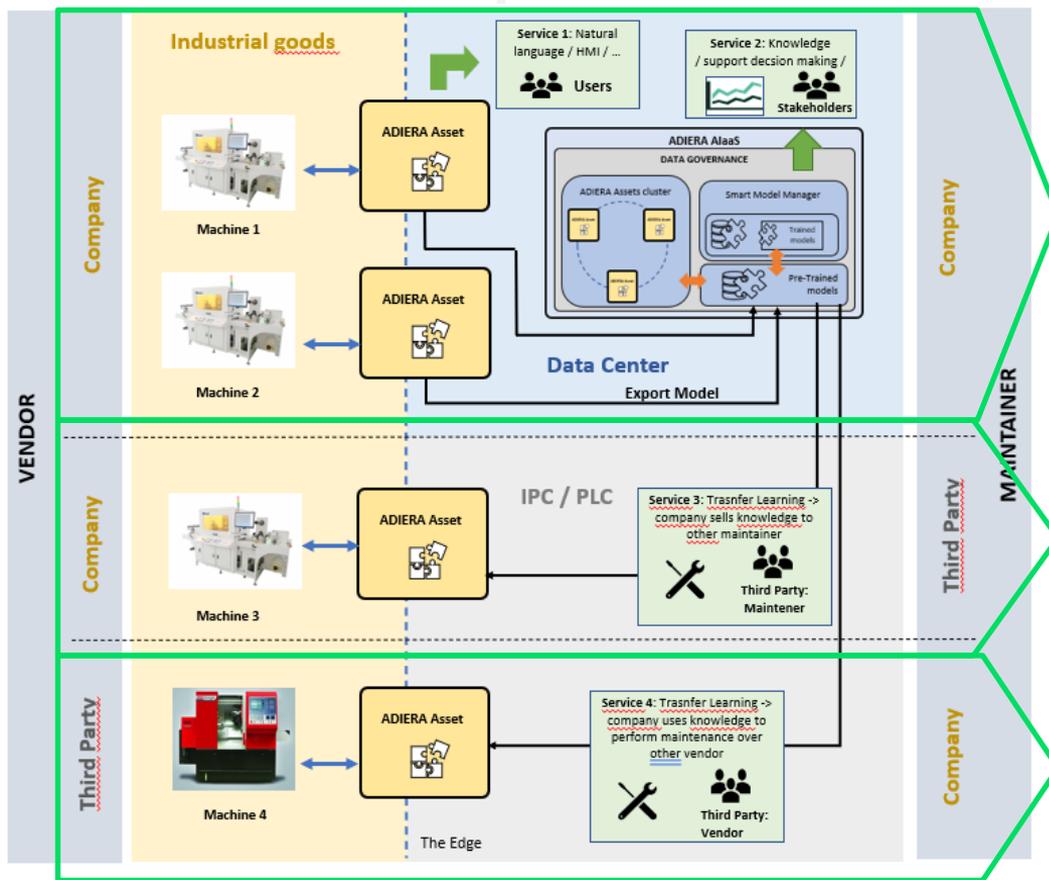
# NEW BUSINESS MODELS



1. Business between Vendors and Collaborative Companies.
2. Business between Vendors and External Companies.
3. Business between Vendors and Maintainers.
4. IA Marketplace.



# New Business Models



Our company sells industrial goods and provides maintenance taking advantage of ML models.

Our company sells ML models (anomaly detection, predictive maintenance,...) to an external maintainer thanks to the federated environment.

Third party sells ML models (anomaly detection, predictive maintenance,...) to our company (maintainers) so that we can provide more efficient service.

# THANK YOU

IKERLAN

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**ikerlan**

MEMBER OF BASQUE RESEARCH  
& TECHNOLOGY ALLIANCE

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