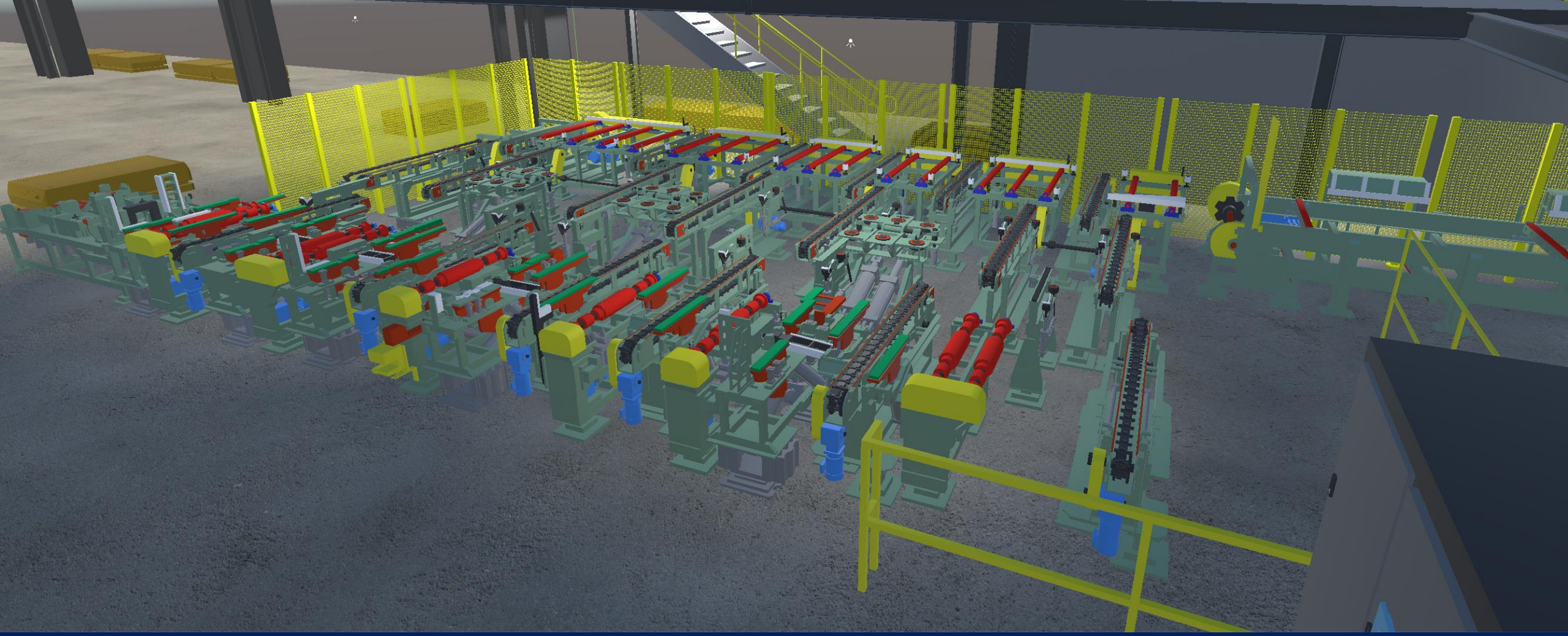

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3D Digital Twin for Industry

3D Digital Plant Framework

In order to obtain an **excellence production** typical of an Industry 4.0 factory of the future, **processes and structures must change to adapt** the PLM [1] to the market needs and make products **more competitive**.

For this, it is necessary to consider what is the best **technology one should apply, digital business models one should follow and new methodologies one should use**.

The 3D Digital Plant solution comes to **simplify this decision making**, allowing to known the **performance** of the factory, helping to **simulate** new production realities and facilitating the **virtual training of employees**.

[1] **PLM - Product life cycle management, from its conception, to the design, manufacture, distribution and incorporation of customer feedback.**

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The 3D Digital Plant allows you to view in real time the performance of your factory's production process through an exact 3D model of your factory floor (3D Digital Twin).

Improve industrial production efficiency by virtually sensing the root cause of problems and running simulation scenarios to optimize your factory and operation previously tested on your 3D Digital Twin. Prepare your workers for the new production scenario through virtual reality training, thus increasing their productivity.

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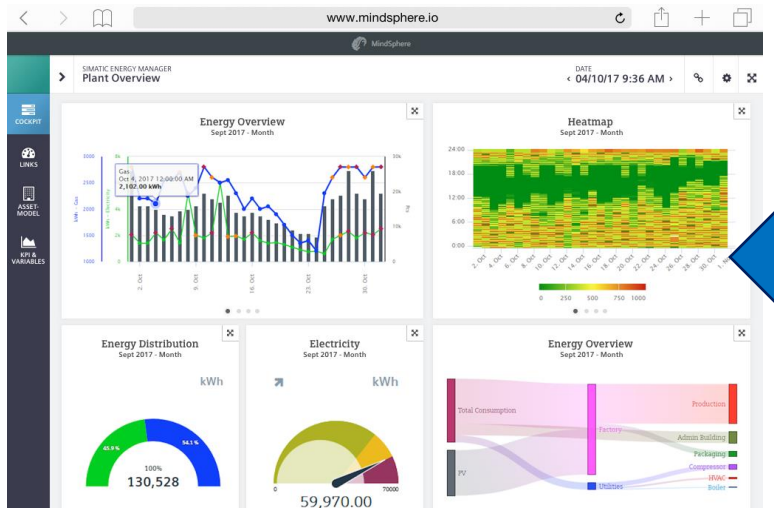
3D Digital Plant

Market Positioning

Online IoT Dashboard

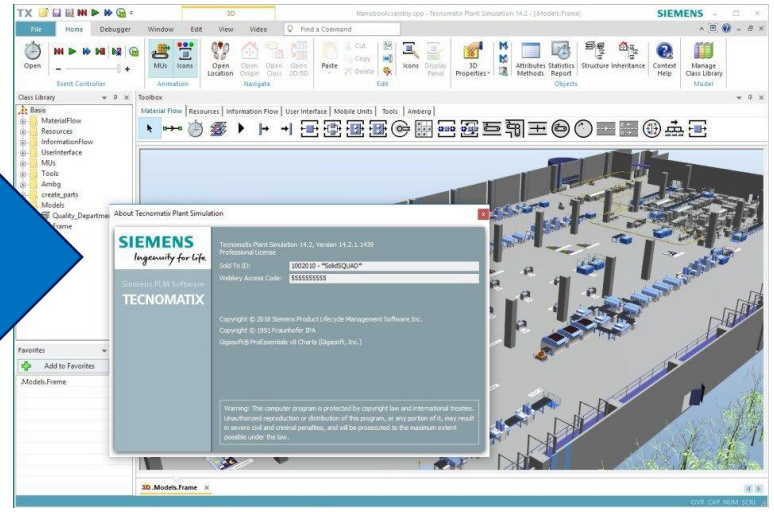


Monitor production in real time using data only from physical sensors is limited and causes that just 20%[1] of industrial implementations are translated in savings

Links Real-Time IoT & 3D Mapping for Virtual Sensing of Hidden Factory Areas

3D virtual environment that integrates **in real-time** all production data to increase precision of virtual sensing models ensuring production is always operating at its optimum

Offline 3D Simulation Legacy Software



Manually input data to simulate production systems and processes, the flow of materials and logistic operations, means it can only be used to plan new factories

[1] Source: Gartner

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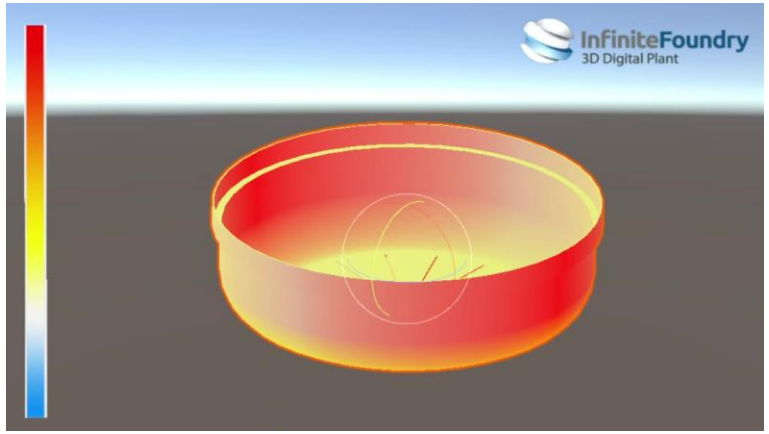
3D Digital Plant

Virtual Sensor

3D Digital Twin Production Machine

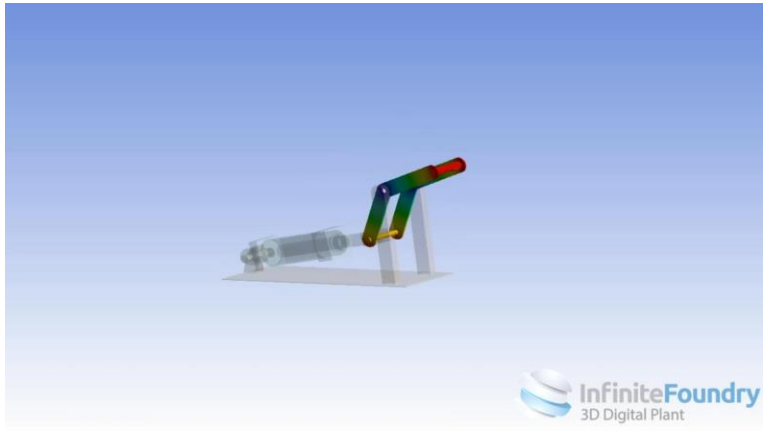
3D real-time replica of production machine during operation allows to visualize all areas, including zones with difficult access and without physical sensors

Virtual Sensor Product



Virtual sensorization calculates in real time the quality parameters of the manufactured product to automatically detect any anomally in the production process

Virtual Sensor Machine



Virtual sensorization of components in the machine to determine physical parameters like deformation and temperature that can cause maintenance problems

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3D Digital Plant

Features

Virtual Commissioning

Ensure the production requirements are met by providing seamless integration, test, verification and validation

Remote Monitoring

Monitor manufacturing operation by the 3D digital twin to be able to detect the cause of anomalies and performance degradation

Virtual Sensor

Process control with virtual sensing that monitors in real-time all areas of production to adapt to its dynamic environment

Efficiency Optimization

Simulate multiple different processing parameters and layouts of a production line to detect commissioning faults and find the configuration that maximizes efficiency

Feedback to Engineering

Capture production characteristics with virtual sensing to inform engineering of needs to change designs in order to minimize manufacturing risks

Industrial Collaboration

Interactive display of the production process and its capabilities, for all departments in a factory to understand root cause of problems and how to solve them

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3D Digital Plant

Industrial Targets

Not exhaustive

- Food industry
- Automotive industry
- Energy Industry
- Petrochemical industry
- Aerospace Industry
- Industrial Equipment
- Civil Construction and Architecture

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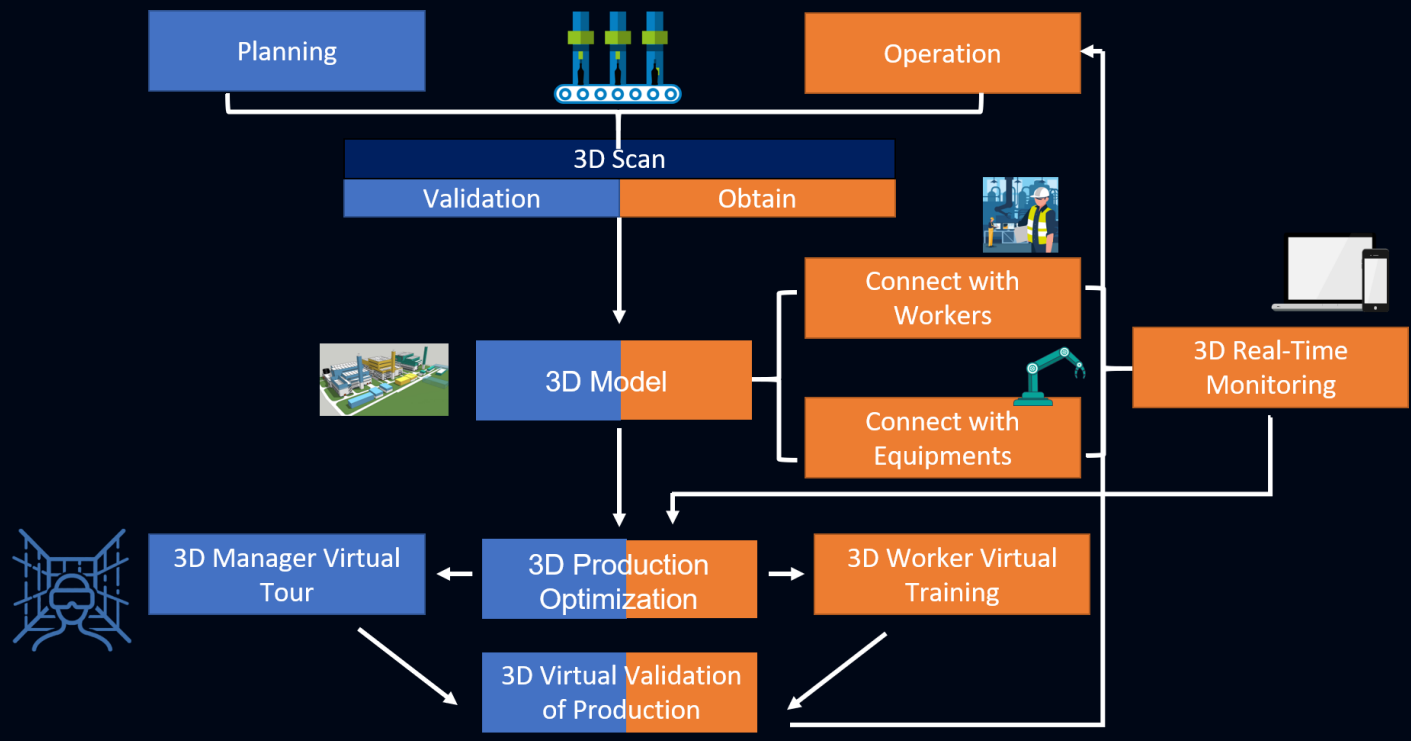
3D Digital Plant Architecture



We aggregate data from your machines, processes and employees and replicate your factory in 3D.

We give you access to a portal with **performance analysis** your factory, where you can **identify problems and simulate optimization scenarios.**

Apply feasible scenarios to your real plant and **train your teams via a Virtual Reality (VR) APP.**

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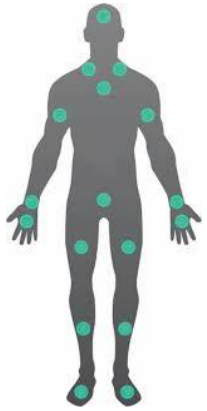
3D Digital Plant

Components

Equipment / API | **Production Management Portal** | **Worker APP**



Ergonomic suit with sensors

Gateway with connectivity fixed or IoT

Collect Data

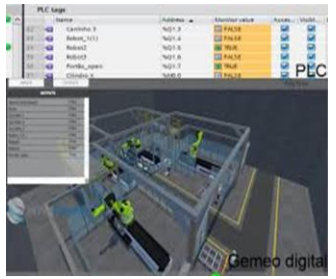
We collect data from your machines, data centers and human intervention.

3D Modeling

We place infrastructures, production equipment and people with precision in a virtual 3D scenario.

Monitoring

Monitor performance of your factory, control production in real time and identify problems in the production process.



Optimization

Run 3D optimization scenarios to quickly improve your processes.

Virtual training

Replicate effective changes in the virtual environment in the real factory and ergonomically train your employees through interactive virtual training for new tasks.

Video of each component: https://youtu.be/WtNU-F0GGQ8

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3D Digital Plant Modeling

We place infrastructures, production equipment and people with precision in a 3D virtual scenario in 3 steps:

1. **3D scan of the factory**
   Held during the night to obtain the 3D model of all infrastructure and equipment.

2. **Creation of the digital model of the factory**
   Use industrial component libraries allows you to obtain the digital model 70% faster.

3. **Data integration**
   Integration of automatic machine data and human manual production processes in the 3D digital model.

Video 3D Modeling: https://youtu.be/gXZIlOZcPuU

InfiniteFoundry

3D Digital Plant

Data Collection

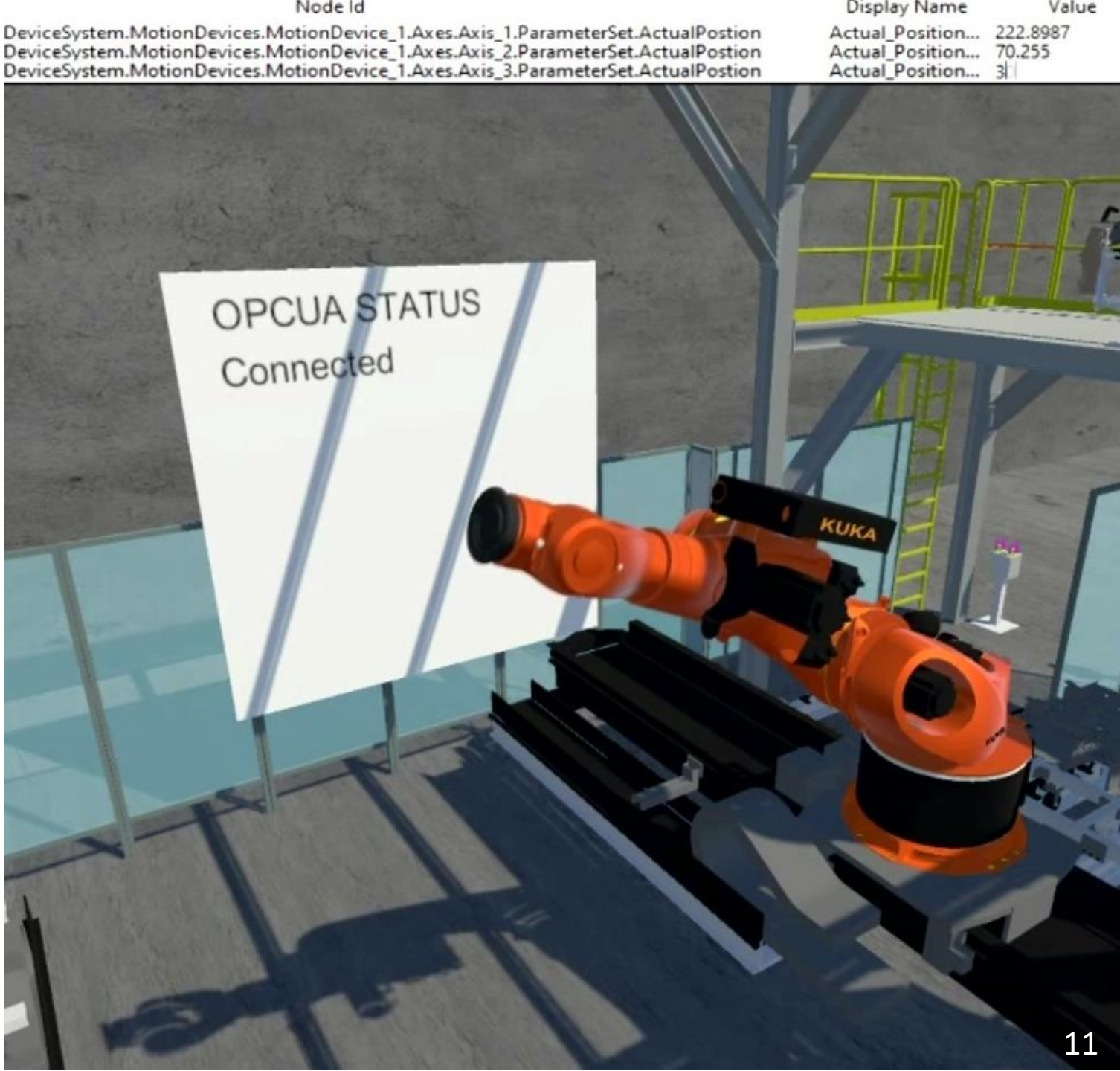
We collect data from your machines, data centers and human intervention.

Obtaining real manufacturing data

Integration of data from date lake or machines (via SCADA equipment or by PLC, through gateways).

Incorporation of human intervention data

Performed using ergonomic suits to monitor the activities of workers in the processes.



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3D Digital Plant

Monitor & Control

Know the performance of your factory, monitor production in real time and identify problems in the production process.

Monitor machines and operators

The production process of the real factory is replicated in the digital factory in real-time to allow 3D monitoring of machines and manual processes.

Virtual sensor and control

Get real-time indicators of all areas of production, including inside equipments and any hidden areas without physical sensors, to be able to take actions that promote its efficiency.

Democratizes solution of problems

3D production monitoring democratizes the identification of technical and procedural constraints in production

Video Monitoring & Virtual Sensor: https://youtu.be/so8GKh6ZwL0

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3D Digital Plant

Optimization

Run 3D optimization scenarios to quickly improve your processes.

Choose what you want to modify

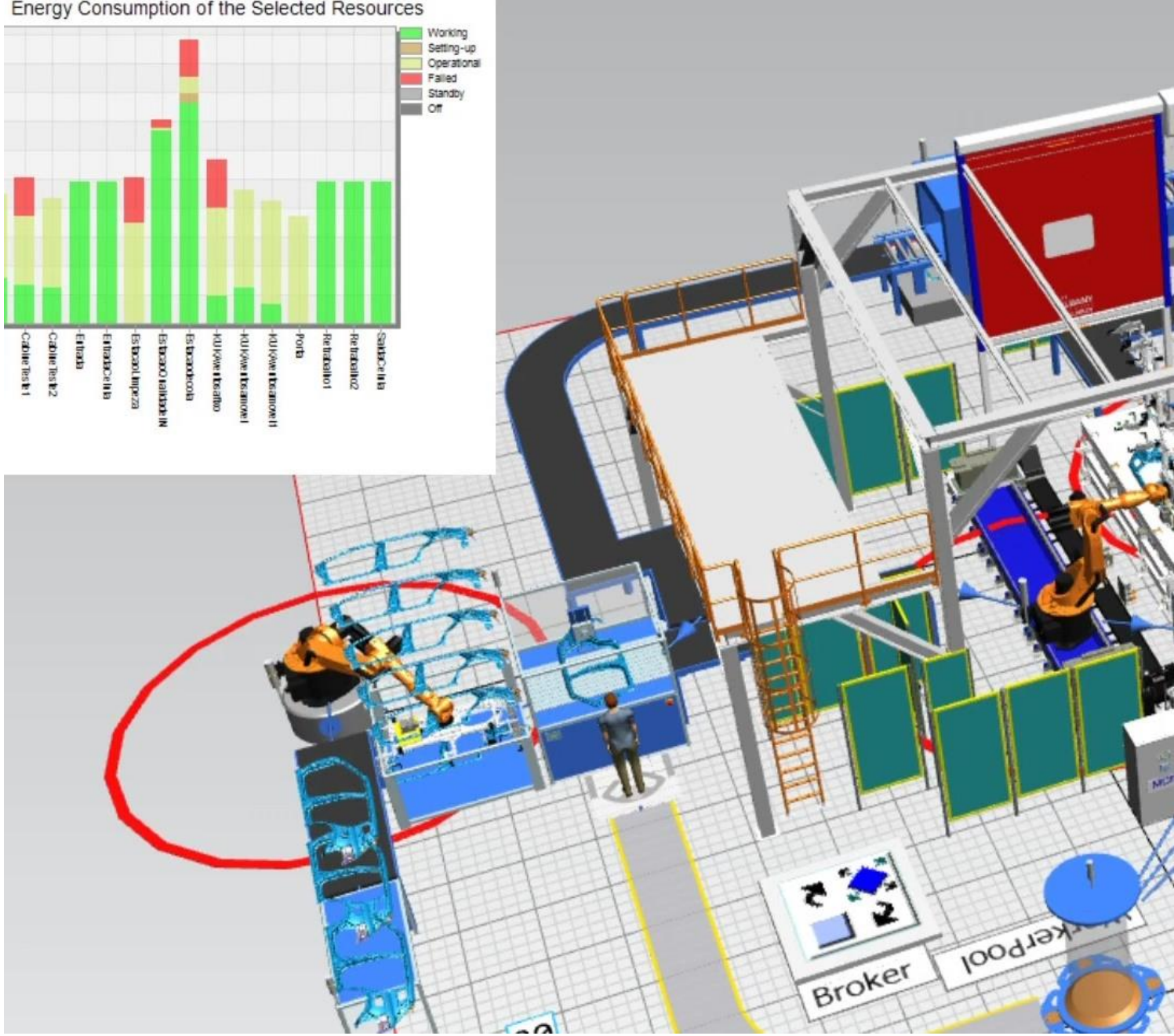
Change the factory layout, introduce a new machine, change parameters of existing equipment or change human intervention in the processes.

Simulate the impact of changes

For the simulations carried out, the 3D digital twin factory allows analyzing the impact on the production process as a whole including logistics or the behavior of a specific process.

Optimize through physics informed deep reinforcement learning (RL)

Artificial intelligence learns from batch virtual simulation of factory's 3D digital twin to quickly predict the behavior of infrastructure, machines and people.



Video Optimization: https://youtu.be/llke3z_iqHw

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3D Digital Plant

Virtual Training

Replicate in the real factory the changes that have proven effective in the virtual environment and ergonomically train your employees through interactive virtual training for new tasks.

- Train stakeholders in new optimized processes.
- Increase the speed of learning and reduce the variability of work teams.
- Ergonomically adapt production tasks that can cause absenteeism.
- Detects early onset of occupational diseases.

Video Virtual Training: https://youtu.be/ZT0M6ltdtMY

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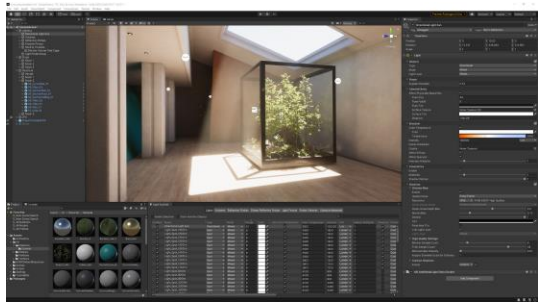
3D Digital Plant Technology

3rd Party Technology

3D laser scanner

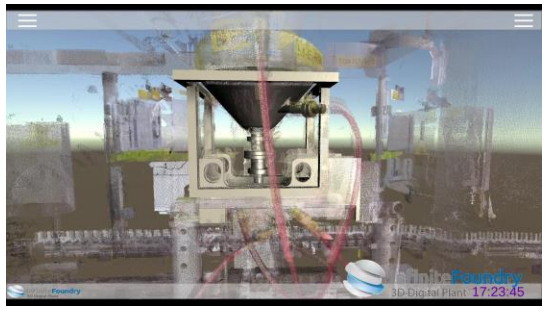
3D motion tracking



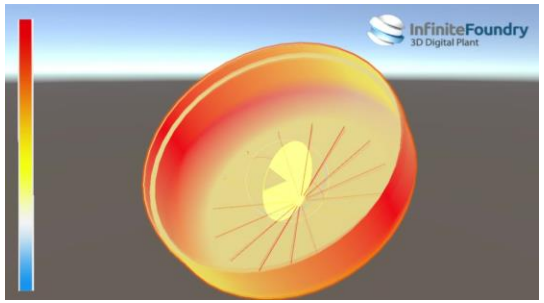
3D rendering engine

Virtual reality headset

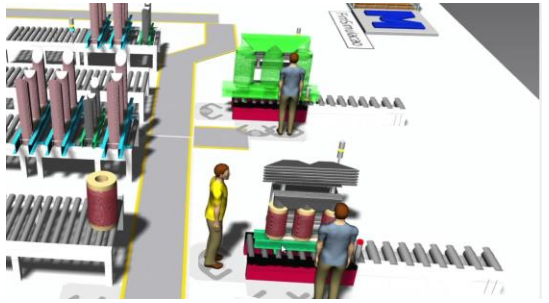
Infinite Foundry Technology



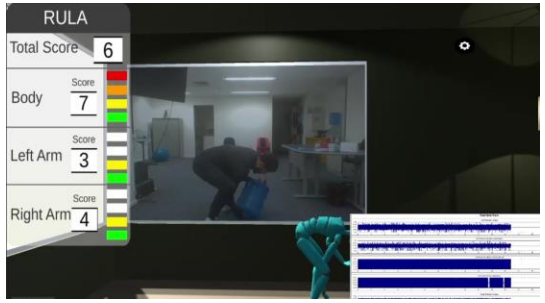
Automatic 3D modeling



3D virtual sensing & control



Physics reinforcement learning



3D real-time ergonomics

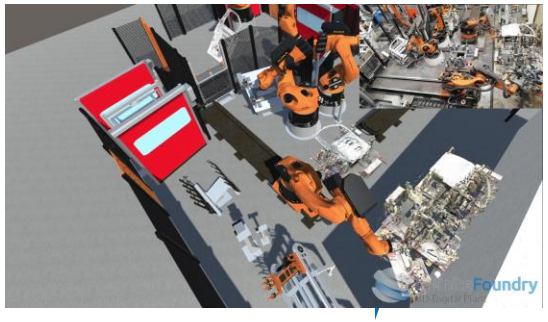
3D Digital Plant Implementation

Offline Commissioning

3D laser scan the factory

3D digital twin to identify bottlenecks

Online Troubleshooting



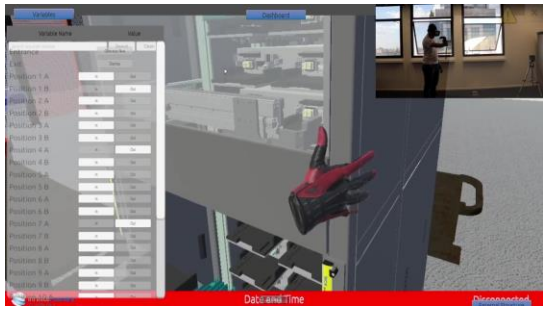
Module

Production line is divided into easy-to-setup repeatable 3D digital twin modules to minimize issues related with latency, connection, bandwidth, and security

Workbench

All the 3D digital twin modules are aggregated in one 3D portal that we call workbench, allowing the user to virtually access any area of the factory and quickly act on insights

Collaboration



3D digital twin is an easy-to-use no-code environment that allows all departments in a factory (technical and non-technical) to virtually collaborate and deliver operational savings, improved up-time, reduced waste and lower energy consumption

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3D Digital Plant

Benefits

Profitability

- Reduces downtime by about 50%[1] due to quick identification of cause of production problems.
- Increases availability of production machines by about 25%[1].
- Improves production quality by reducing defects and waste.

Operational Efficiency

- Decreases by about 80%[1] the time needed to identify production constraints.
- Eliminates trial-error optimization cycles in a productive environment.
- Improves by about 35%[1] the production efficiency through virtual sensor.

Safety

- Improvement by about 90%[1] of detection time for occupational diseases.
- Reduces absenteeism by about 70%[1] with virtual training of tasks that cause occupational diseases to correct ergonomic posture.

[1] Average results obtained

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Reference Customers

Industry loves our 3D digital twin platform

Automotive

Other Industries

InfiniteFoundry

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3D Digital Plant

Thank You

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