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Rediscover
the meaning of technology

Microsoft

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Agenda

- The power of Digital Twins
- Artificial intelligence and Digital Twins
- Data Integration
- Preditions and simulations
- Model your digital twins
- Digital Twins Insights
- Digital Twin Architecture Sample
- Solar Farm Digital Twin Demo

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The power of Digital Twins

Virtual replicas of entire physical environments

- Unique representation and source of truth
- Bring down data silos and enable data-awareness
- Represent the current status and behaviour of an environment or system

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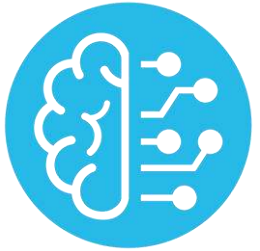
The power of Artificial Intelligence



Artificial intelligence and digital twin improve one another

- Run experiments and simulations to represent potential status and behaviour under circumstances that might not be easy to reproduce.
- Predictive maintenance and anomaly detection (outliers)
- Comprehensive way of representing data.
- Improve operations and efficiency
- Minimize costs

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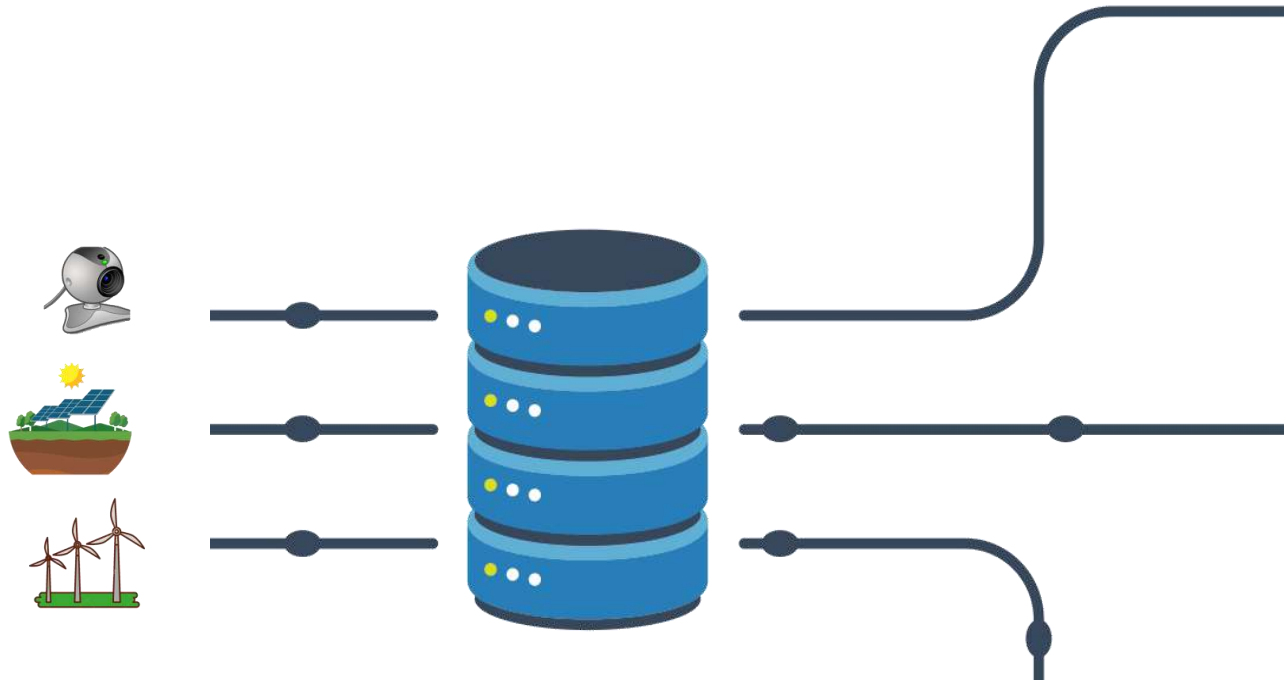
Data Integration

- IoT Devices and Sensors Telemetry
- Configuration Management database (CMDB)
- Device Logs
- Time Series Databases
- External Systems and Datasources
- Machine learning algorithm outputs
- Historic Data
- Simulated Data



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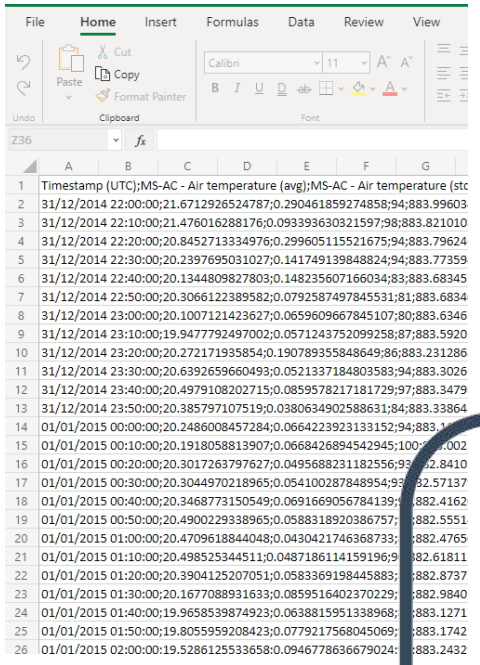
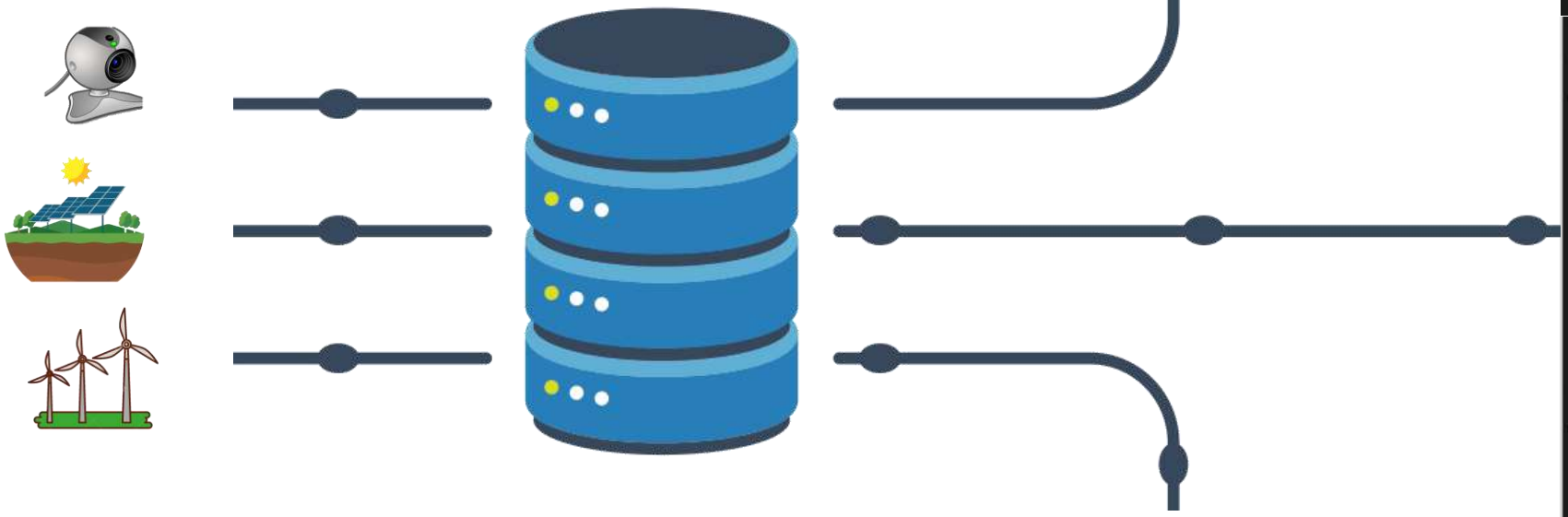
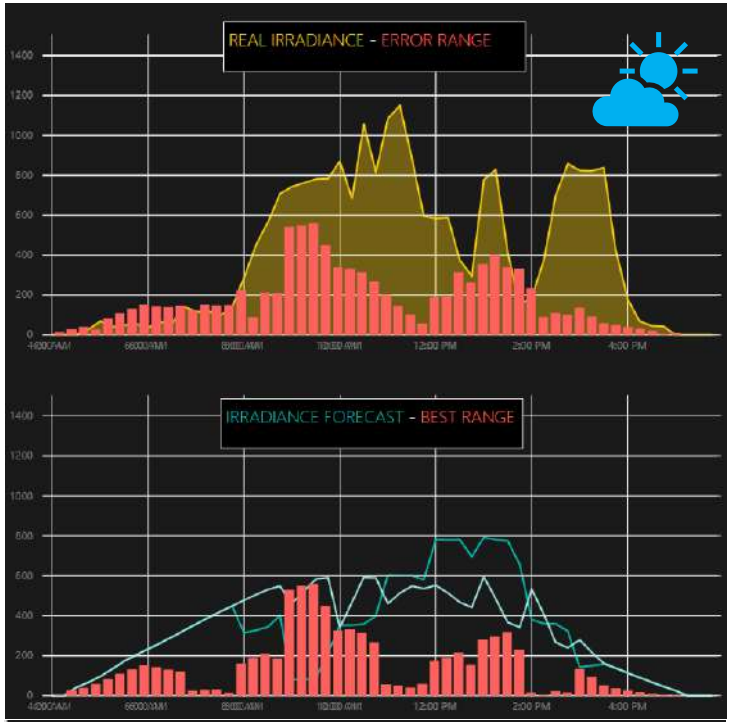
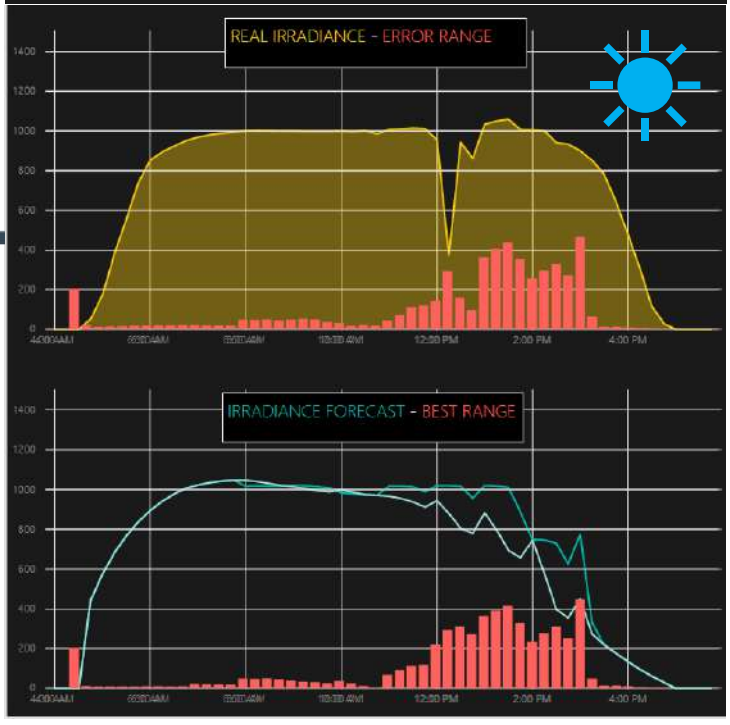
Insights → Predictions









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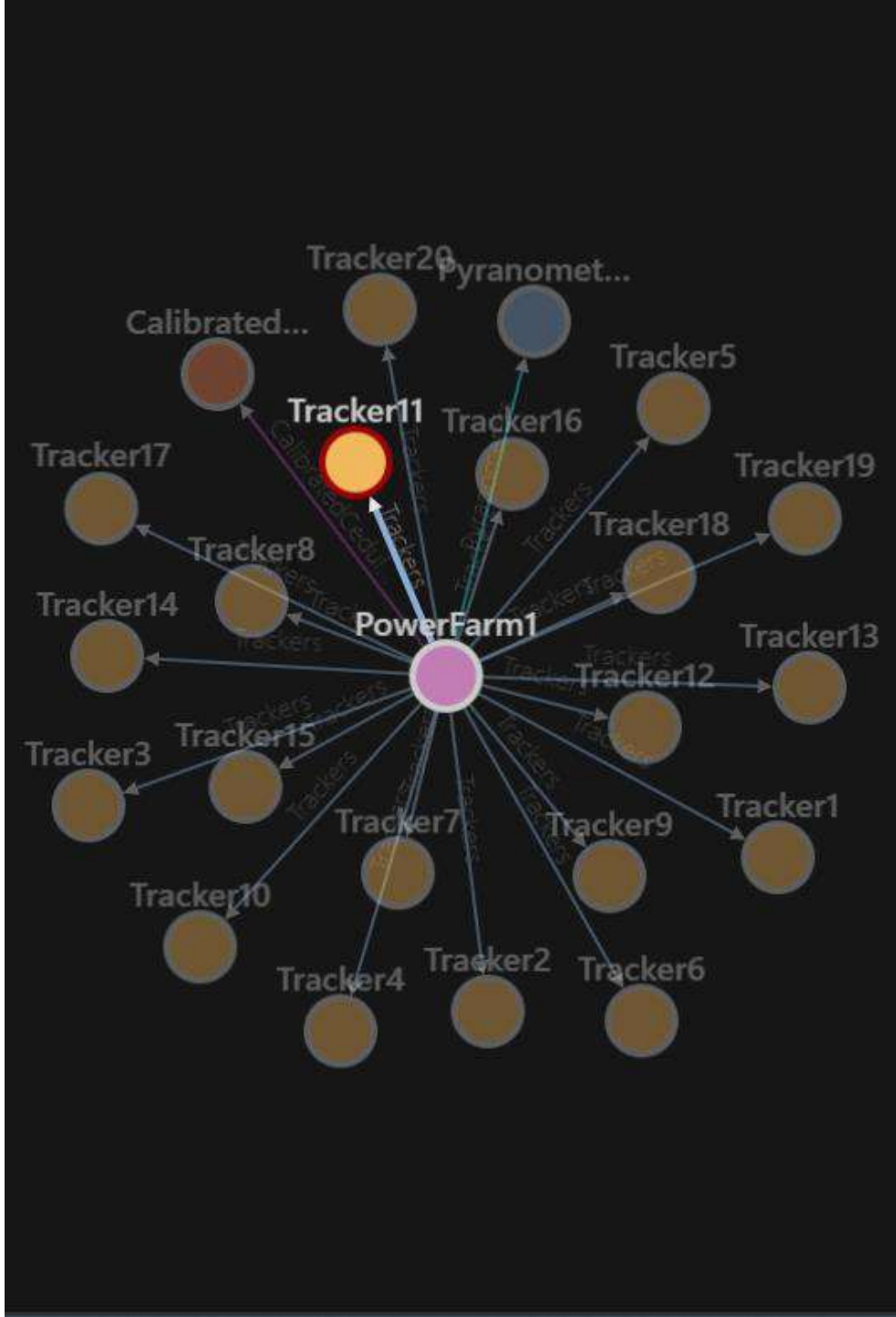
Model your Digital Twins

- Open modeling language to create custom Business models using Digital Twins Definition Language (DTDL)
- Represent your Business with Digital Twins instances, relationships, properties and telemetry.
- Powerful query mechanisms to obtain desired information from the graph
- Seamlessly integrate Digital Twin in your systems
- Highly scalable live execution environment to bring digital twins to life in a live graph representation



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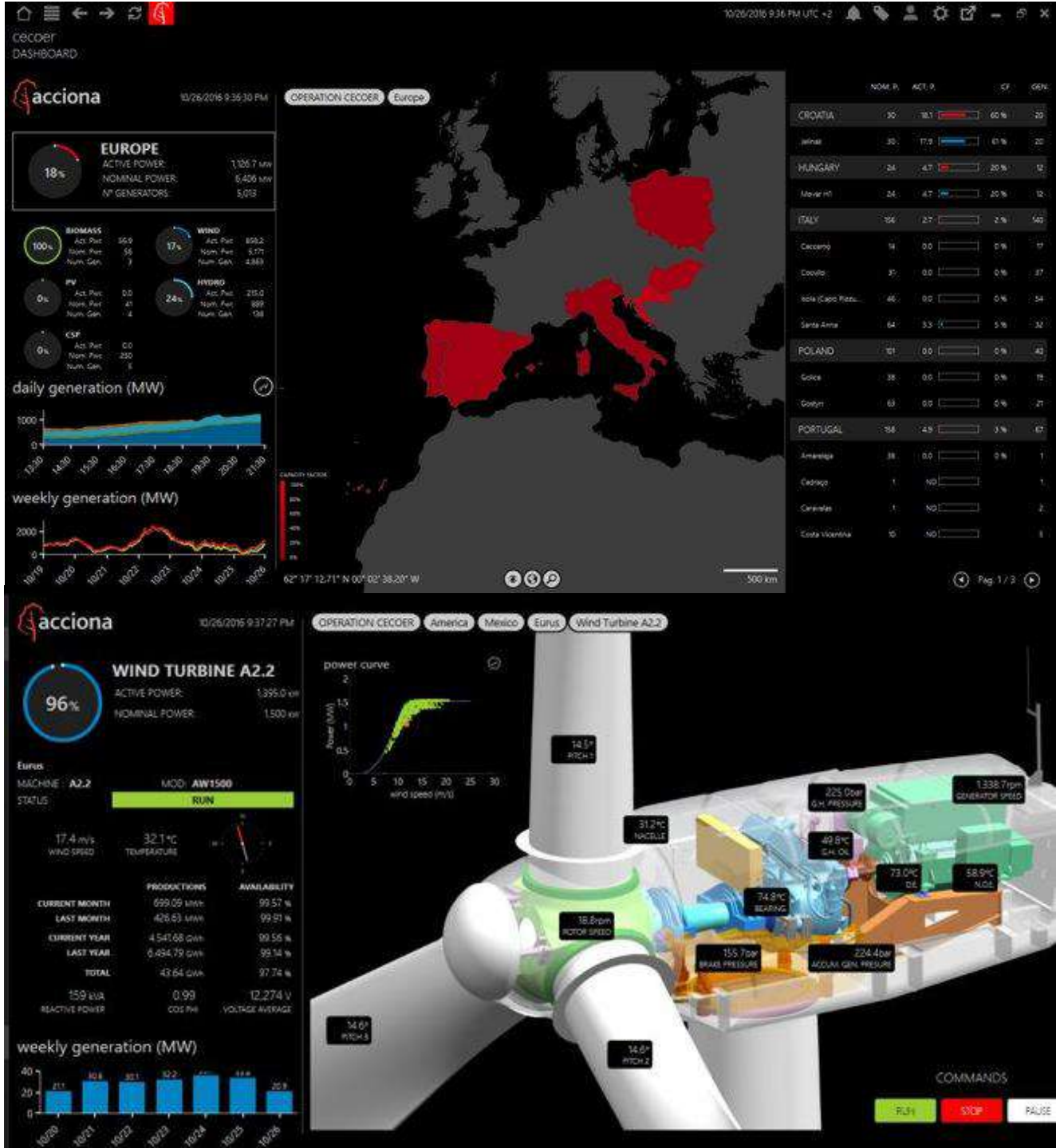
Insights
Digital Twins

Use the representation that best suits your Business and get immediate insights

- SCADA
- Maps
- Hierarchy Graphs
- 3D Model representations
- BIM, Autocad
- Augmented Reality
- All of them!



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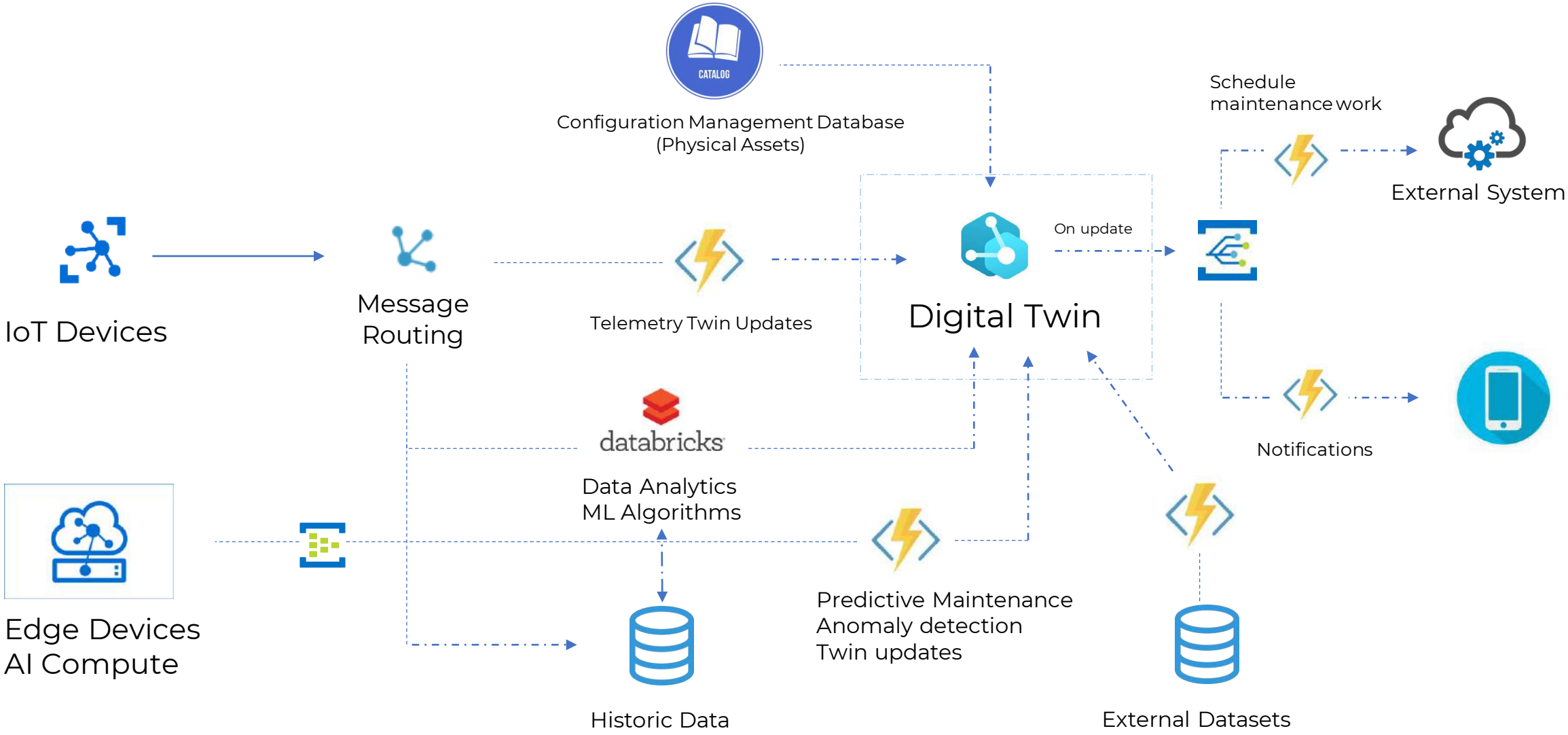
Digital Twin Architecture Sample



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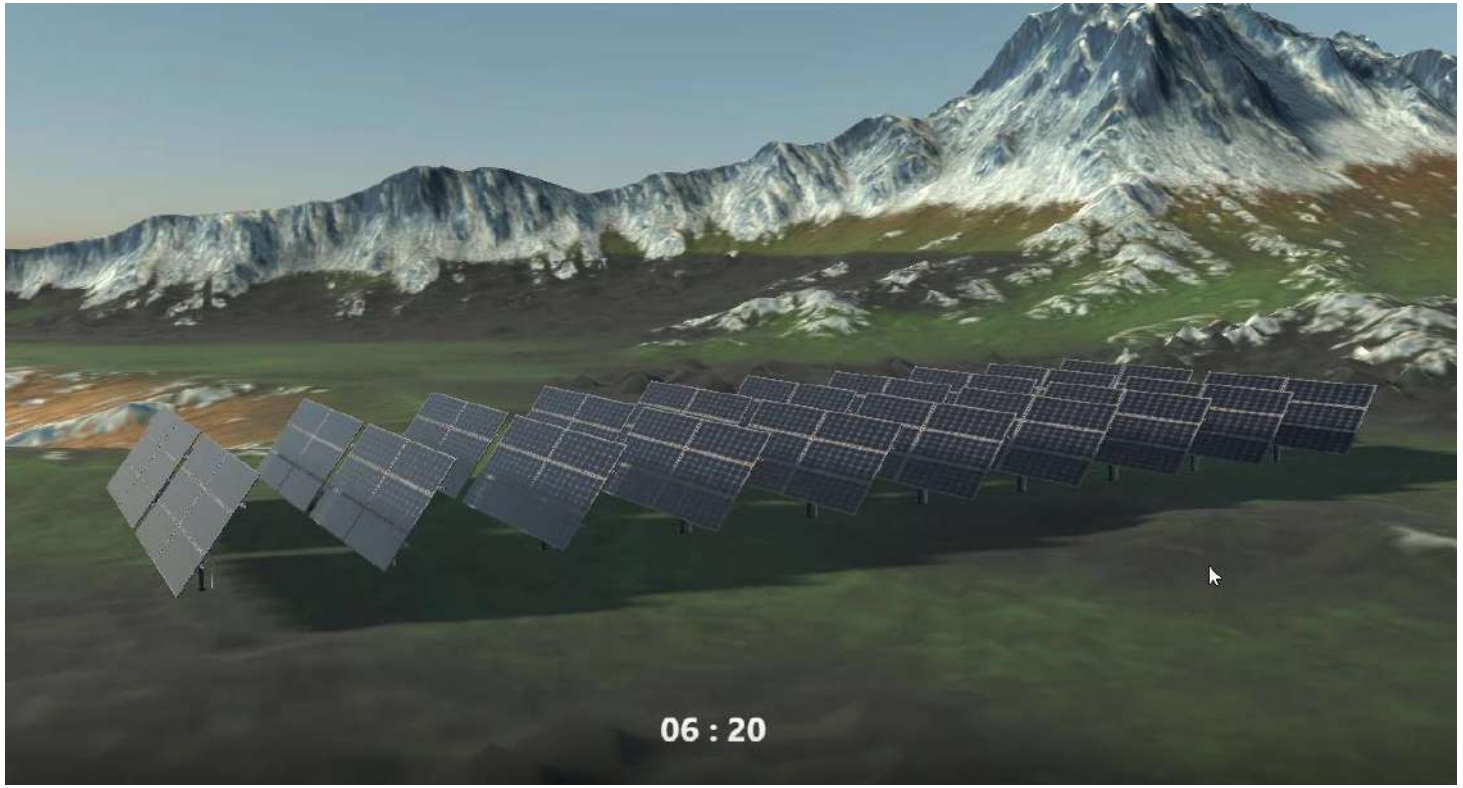
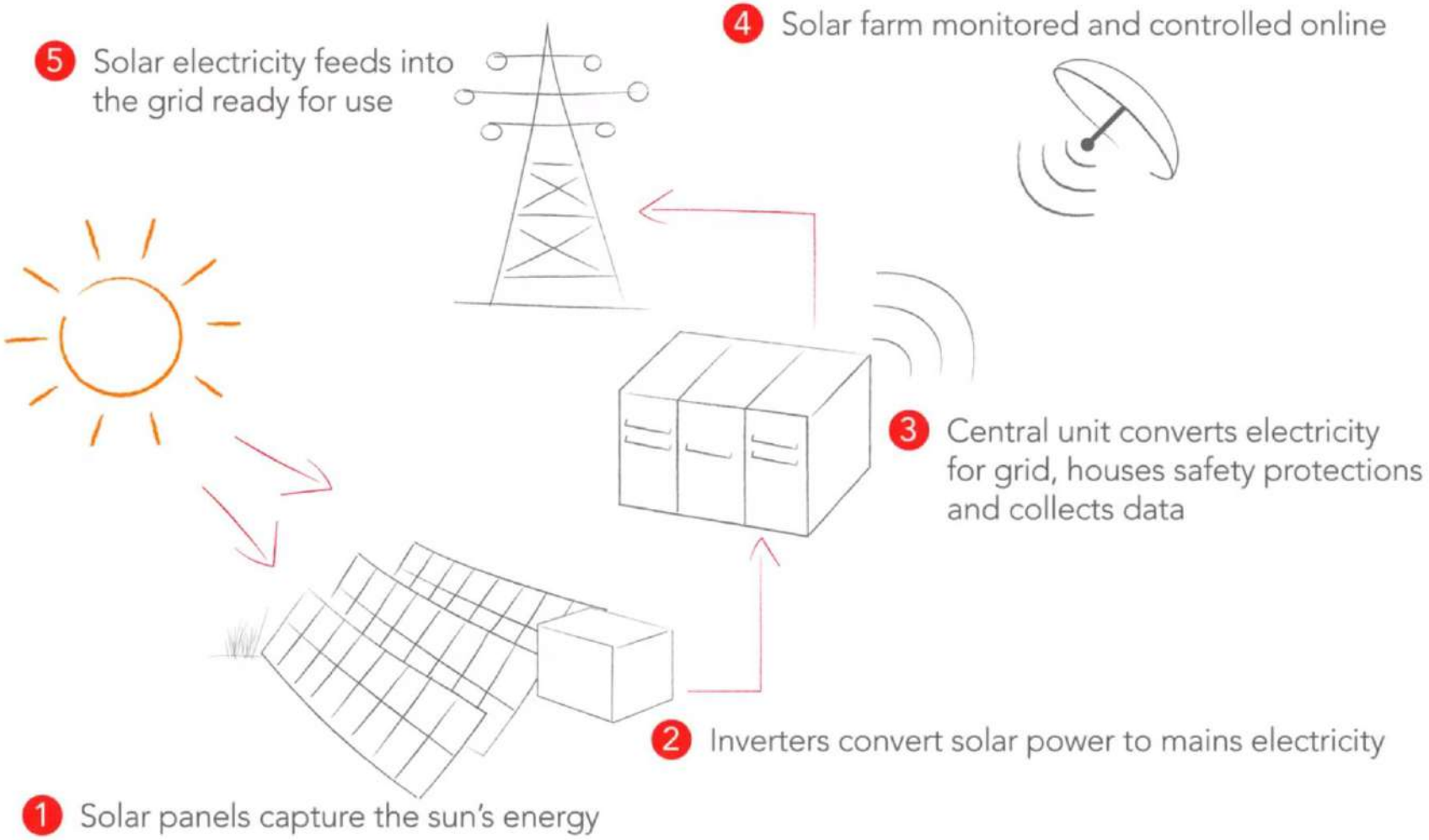
Digital Twin Demo
Solar Power Farm

Facts:

- Lack of monitoring often leads to wastage of solar energy
- Lack of information on energy generation and forecast depending on the plant, weather conditions, solar panels, etc.
- Energy prediction can help better plan the energy consumption (more efficient operations)
- Detecting outliers help operators to perform predictive maintenances anticipating to absolute failure



How does a Solar farm work?



Source: Solarcentury

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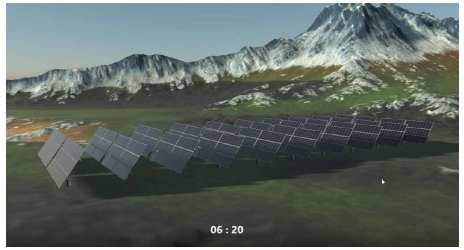
Digital Twin Demo Architecture

Power Farm
OPC Server

Real Data

Streaming Units



Real time 3D
representation

Simulations

Data Ingestor
(Speed
Control)
**10 minutes in
0.5 seconds**

Historic Datasets

Streaming Units

Digital Twin


Calibrated cedule
Solar Position 89.99716
Irrandiance Fuzzy:
Irrandiance Horizontal:
Pyranometer
Air Temperature: 15.02755297
Humidity: 51.89929692
Temperature: 20.42685
Wind Direction: 95.30585578
Wind Speed: 5.885412718
02 : 30