Forum TERATEC 24

Oracle/NVIDIA sur le jumeau numérique

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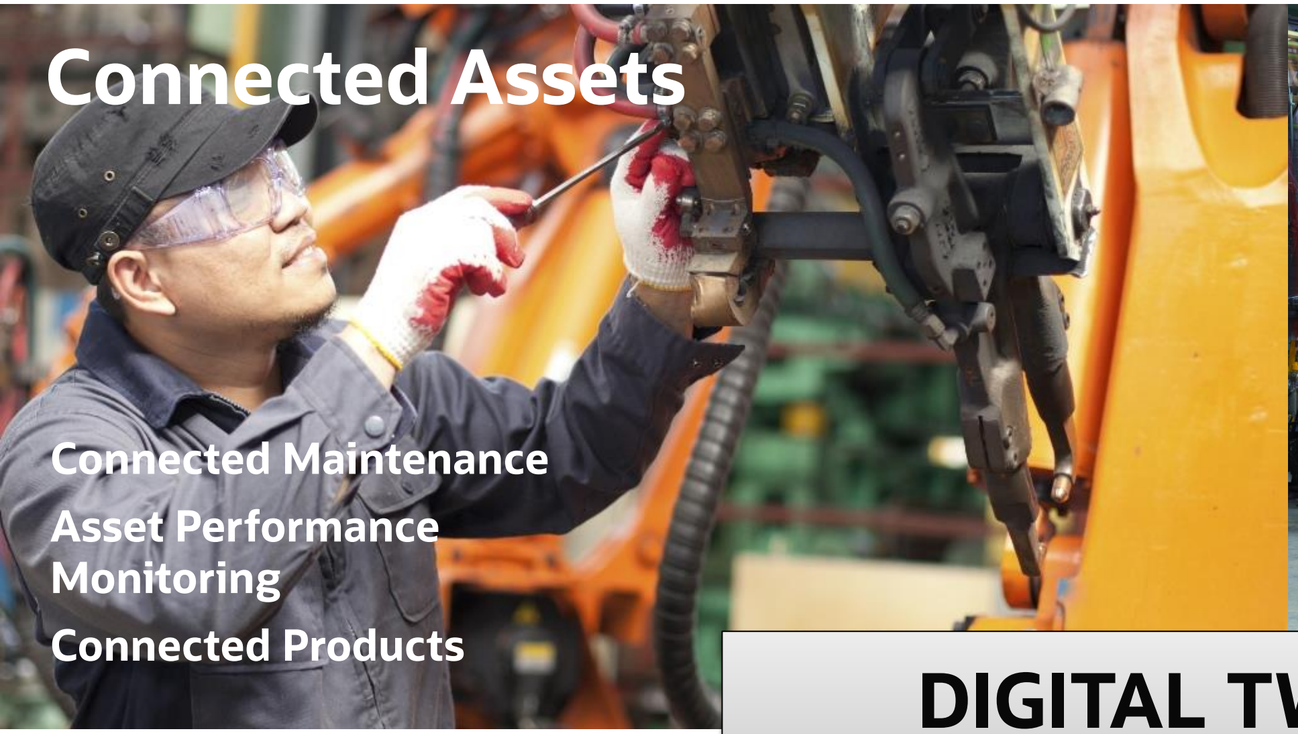
DIGITAL TWINS : FIELDS OF APPLICATION

Connected Assets

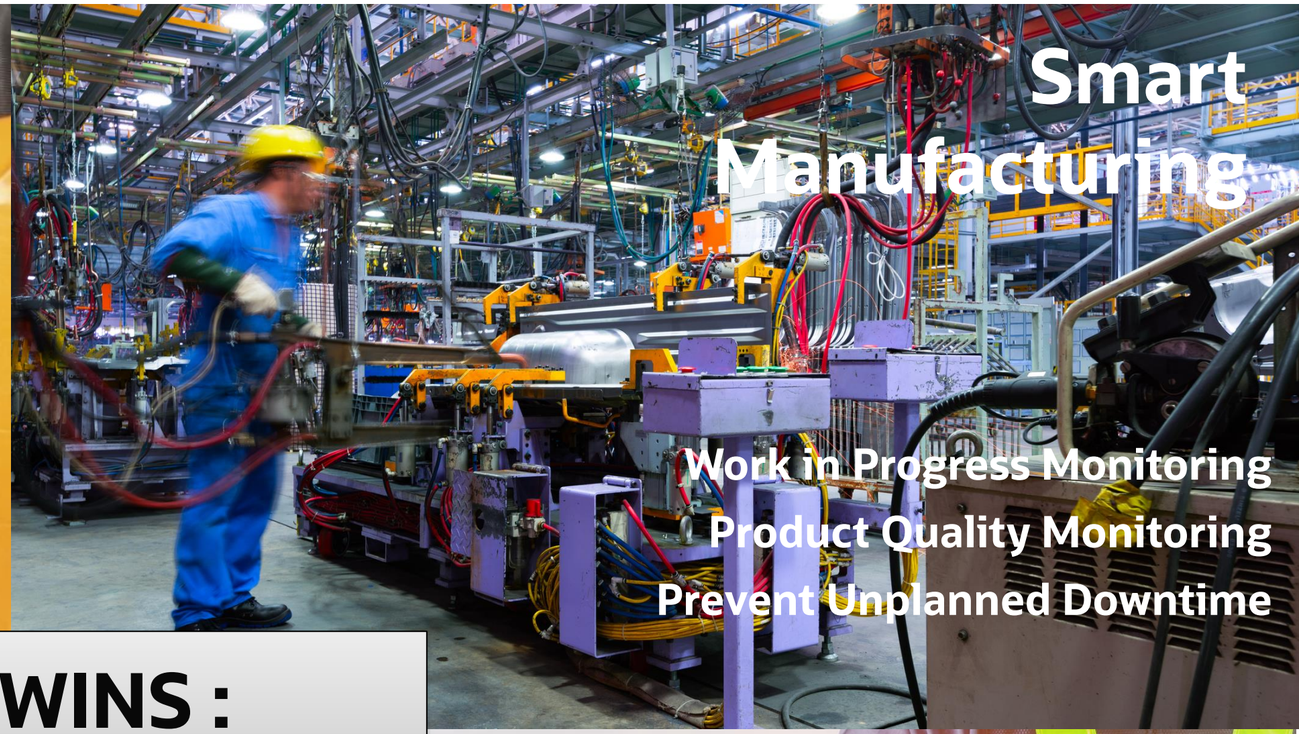


Connected Maintenance

Asset Performance Monitoring

Connected Products

Smart Manufacturing



Work in Progress Monitoring

Product Quality Monitoring

Prevent Unplanned Downtime

Connected Logistics

Shipment Tracking

Cargo Condition Monitoring

Warehouse Yard Monitoring

Workplace Safety

Commercial

Industrial: manufacturing, utilities construction & engineering

Digital Twin – Implementation Lifecycle

Envision

Identify the value you want to see by using Digital Twin.

Focus on processes that can be improved by using Digital Twin.

Step 1: Plan a strategy to implement digital twin for your business.

Select

Pick your pilot - a simple project with scope to scale.

Broader projects have high potential to scale across the organization, applying to different equipment and processes.

Step 2: Select machines or assets to render a digital twin version.

Implement

Make the pilot a reality and focus on your initial ROI objectives.

Identify the type and amount of data to ingest in the digital twin, define KPIs and metrics.

Step 3: Use the IoT Intelligent Apps simulator to create a digital twin that replicates the behavior of the machine. Tweak the process until desired results are achieved.

Industrialize

Transition from from pilot to production.

Improve processes based on results of pilot. Expect improvements in performance and allow leverage of new twin-derived resources, such as a new data lake.

Step 4: Replicate the pilot on real machines and assets.

Scale

Identify opportunities to scale the digital twin to a larger production scenario.

Remove the limits originally set to control the scope of the twin so that it can add value across the enterprise.

Step 5: Deploy the digital twin model across factory floor using real machines, sensors.

Analyze

Assess your Digital Twin against tangible IoT benefits such as improvements in yield, quality, efficiency, and cost.

Use this analysis to provide a springboard for further tweaks to the twin, and its relationship with the enterprise.

Step 6: Set up metrics and rules to analyze benefits.

Digital Twins Through Asset Lifecycles

Driving Business Growth at ACEM Corp

Product Design

Identify quality issues and reliability to continually improve product design

Installation & Operation

Is the equipment properly installed and working fine?

Field Service

Diagnostics and troubleshooting to analyze, identify faults and resolve

Field Trials

What-if trials to test solution behavior by simulating system faults

Customer Experience

Improved interaction with equipment using AR, with instructions to act when problems occur

Digital Twin – Template Structure and Workflow

1

- Metadata
  - Name
  - Description
  - 3D Model, Images, Attachments
- Attributes
  - Custom Attributes — Contextual data for Digital Twin
  - Sensor Attributes — Sensor data for Digital Twin
  - Control Attributes — Actions for Digital Twin
- Associations — Associations with other Digital Twins

2

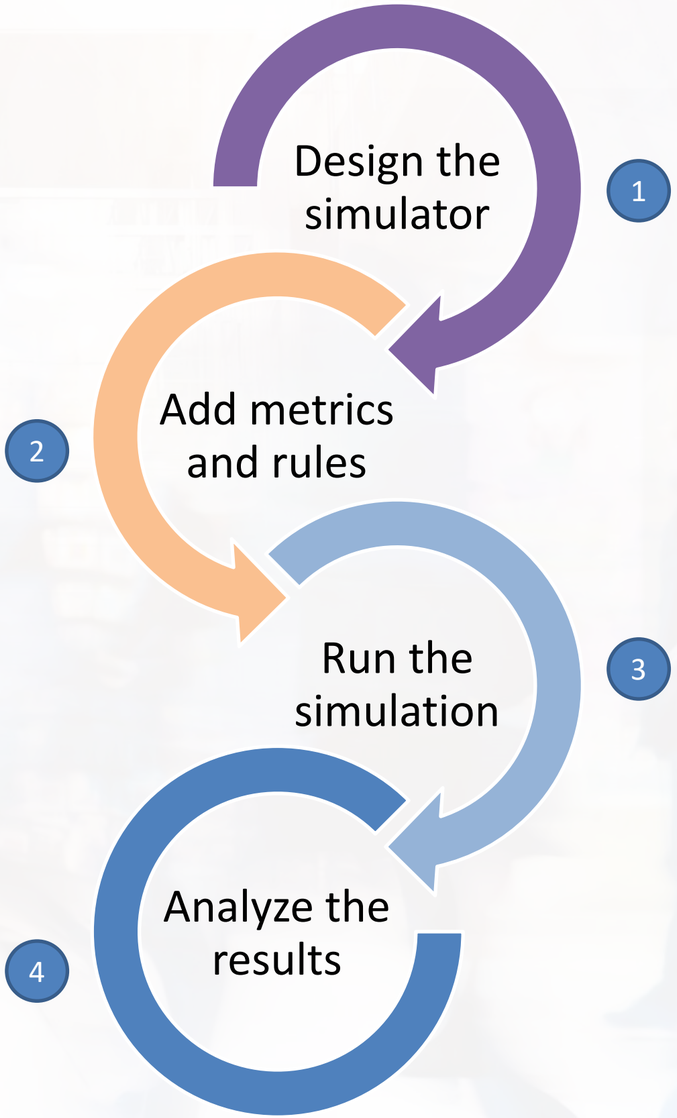
- Analytics
  - Metrics
  - Behavior models
    - Rules
    - ML models
    - Trends
    - Anomalies
    - Predictions

3

- Simulations

4

- Charts and Dashboards



Digital Twin – ACME Corp use case

Evaluate the outcome of the analysis to know the most stable slurry mixture

The Challenge

Active Powder

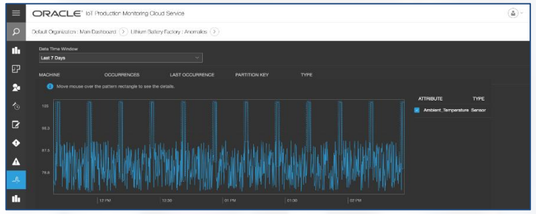
Binder

Solvent

The Solution

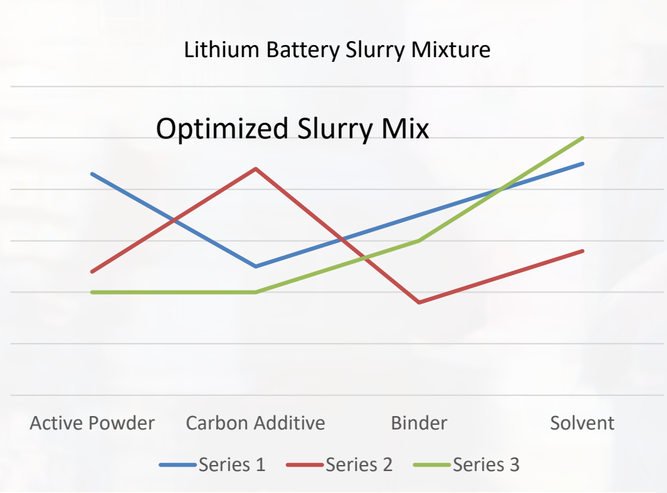
1, 2 Create simulation model and add rules

3, 4 Run the simulation
Analyze anomalies…
Get dashboards



Digital Twin powered analysis

The Result



Stable Slurry Mixture

Digital Twin – Connected Logistics

- Out-of-the-box simulation model of a truck in Fleet

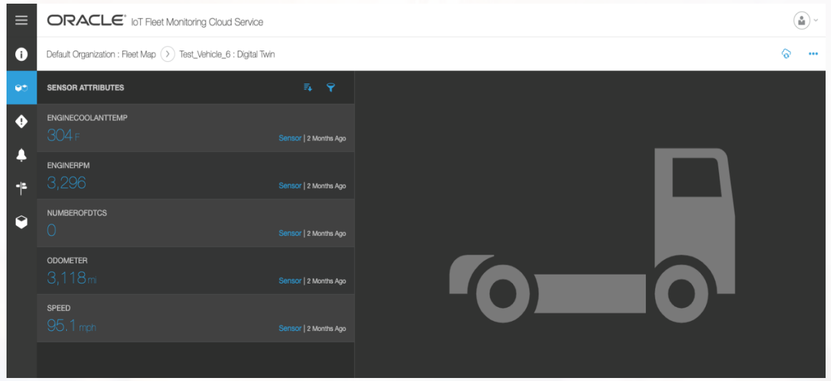
Use the simulation model to:

- Set up stops
- Control speed

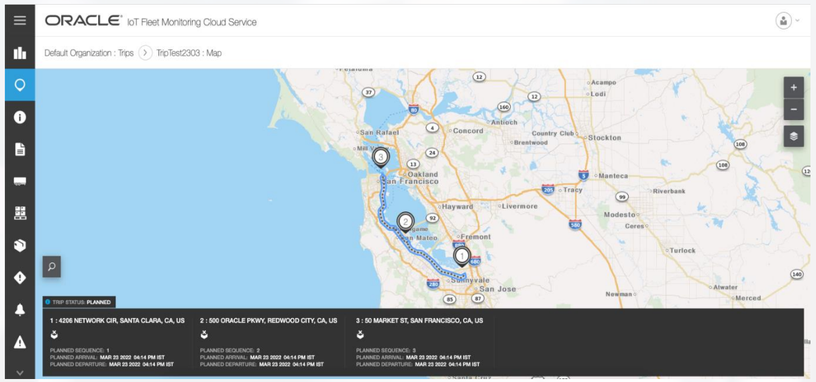
View sensor data for:

- Speed
- Engine RPM
- Fuel Used

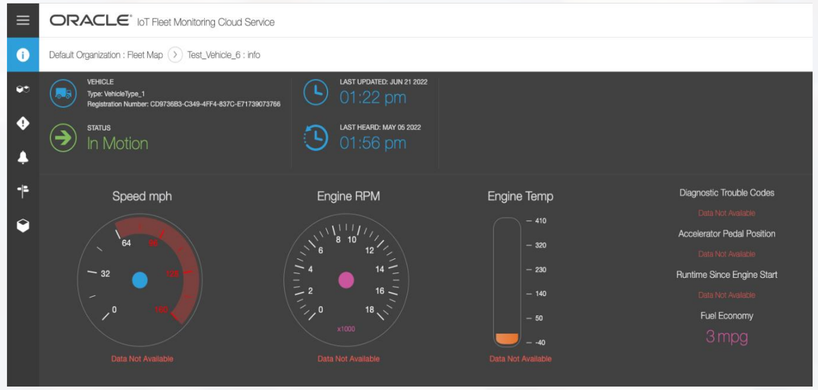
View sensor data from the digital twin of vehicle when you run the simulation model of the vehicle.



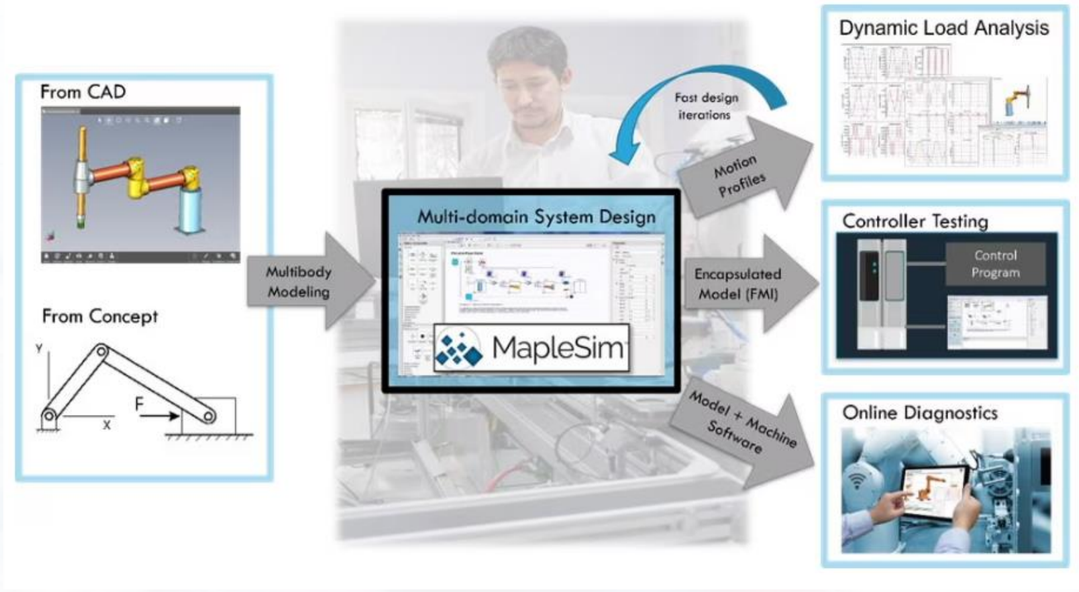
View the trip details of the digital twin vehicle on the move from one stop to the next.

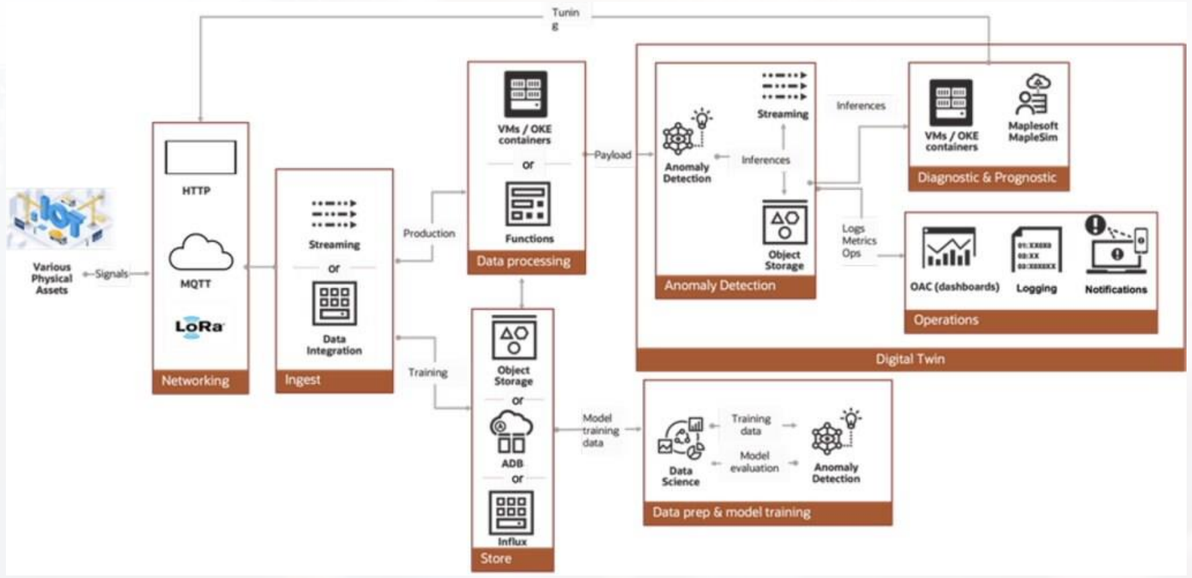


View critical information on the digital twin vehicle.



Digital Twin – Asset monitoring

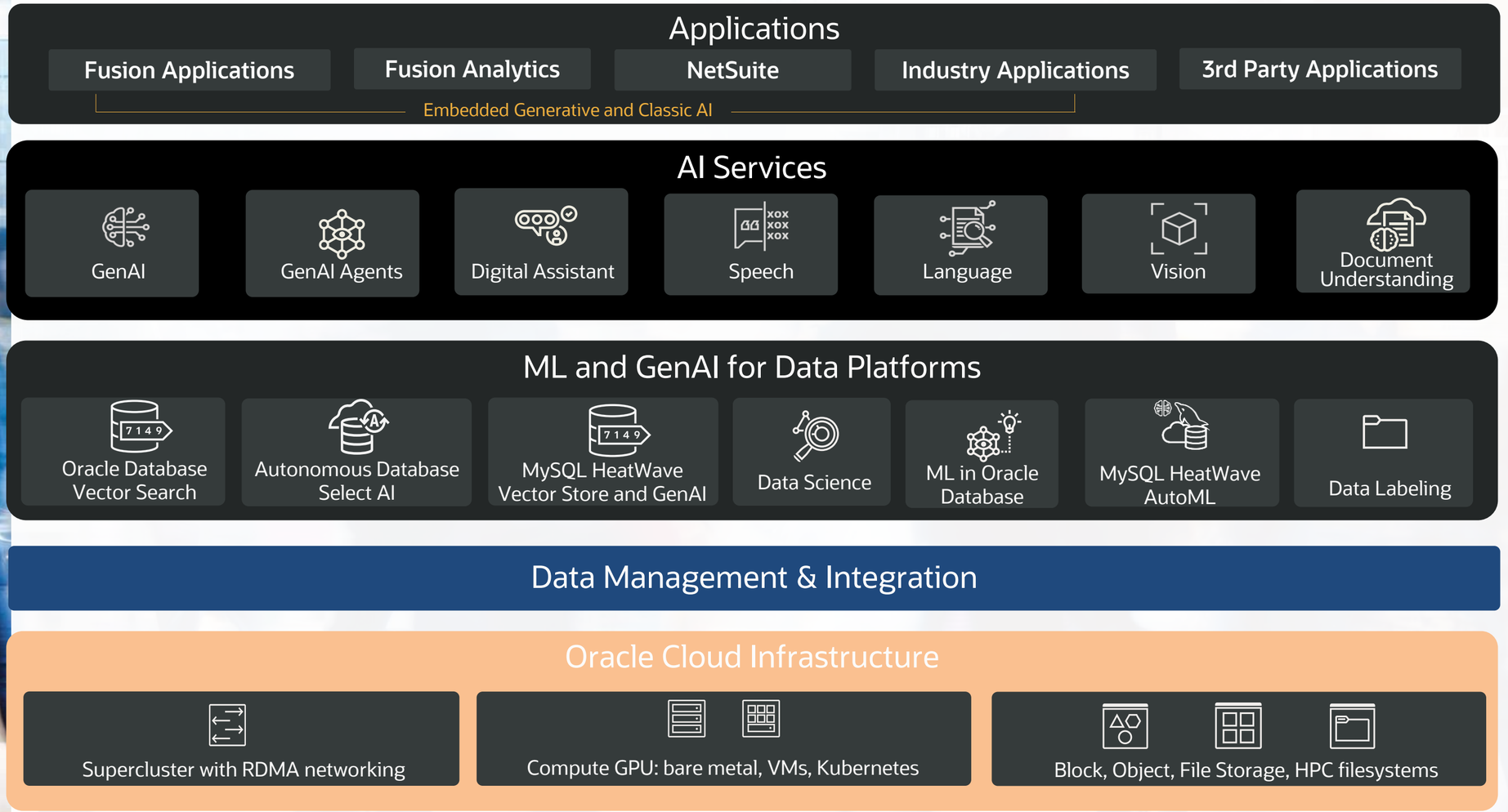




"With Oracle's cloud technology and Maplesoft's simulation software, our customers can now combine operational data at scale with physics-based models to create extremely versatile digital twins. When production assets are being monitored, these twins can provide physical meaning to a detected anomaly and immediately point towards the appropriate corrective action."
Chris Harduwar, VP, Business Development, Maplesoft

www.oracle.com/customers/maplesoft-case-study/

Oracle offers a breadth of services to build Digital Twins' capabilities



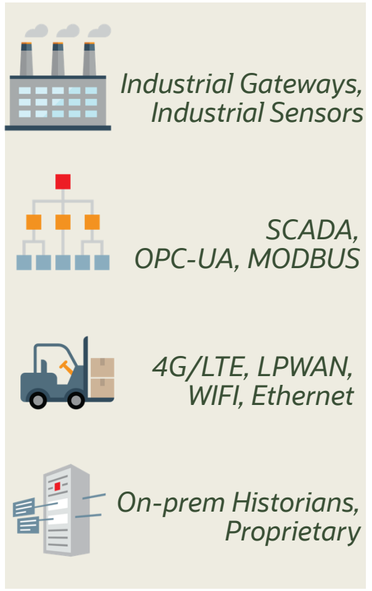
Ready to Consume for Business users

Ready to Work for Developers, Data Scientists, …

Ready to Build for Data Engineering, Operations, …

Infrastructure for the **best price / performance**

Oracle IoT Intelligent Applications



Oracle Intelligent Applications

Assets	Manufacturing	Logistics	Worker	Products
Asset Performance	Smart Factory	Connected Logistics	Worker Safety	Remote Diagnostics
Predictive Maintenance	Work Order Tracking	Intelligent Warehouse	Worker Productivity	Product as a Service

Insights & Intelligence

Digital Twins | Situational Awareness | Trends & Anomaly Detection | Predictions & Forecasts | Recommended Actions | Intelligent Workflows

Foundation

Device Connectivity | Real Time Analytics | Time Series Data Management | Machine Learning Pipeline | Application Integration

Oracle IoT Edge

Connectors

Client Libraries

Edge Gateway

Edge Database

… with a breadth of deployment models

Gartner 2023 Strategic Cloud Platform Services
Distributed and sovereign cloud: *"Oracle is out-innovating the market in the areas of distributed cloud and sovereign cloud computing."*

@Oracle

EU Sovereign Regions

2 Cloud Regions in EU

Government Regions

8 Cloud Regions in Australia, UK and US

@Customer

Cloud@ Customer

Exadata and Compute cloud@ Customer

Dedicated Region

Complete cloud region in customer DC

Isolated Region

Complete cloud region in customer DC

@Partner

Alloy

Complete cloud region in partner DC

Built on the same foundations and offering the **same products and services at the same per-consumption unit price**