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Oracle IoT Intelligent Applications for Energy and Water

View, track, and predict the performance of your assets before the real issues happen with Oracle IoT Intelligent Applications for utilities.

Visualize the real-time health and performance of your assets

Oracle Energy and Water offers a set IoT applications that help operations and asset managers prevent downtime by using data from connected devices, systems, and sensors to provide real-time visibility, maintenance, and efficiencies of field assets. This highly flexible solution optimizes asset availability and utilization through predictive analytics, continuous remote tracking, and visualization of usage, condition, performance, operating environments, and modelling digital twins. Oracle IoT Intelligent Applications provides the insight asset managers need to work on equipment proactively and avoid major issues.

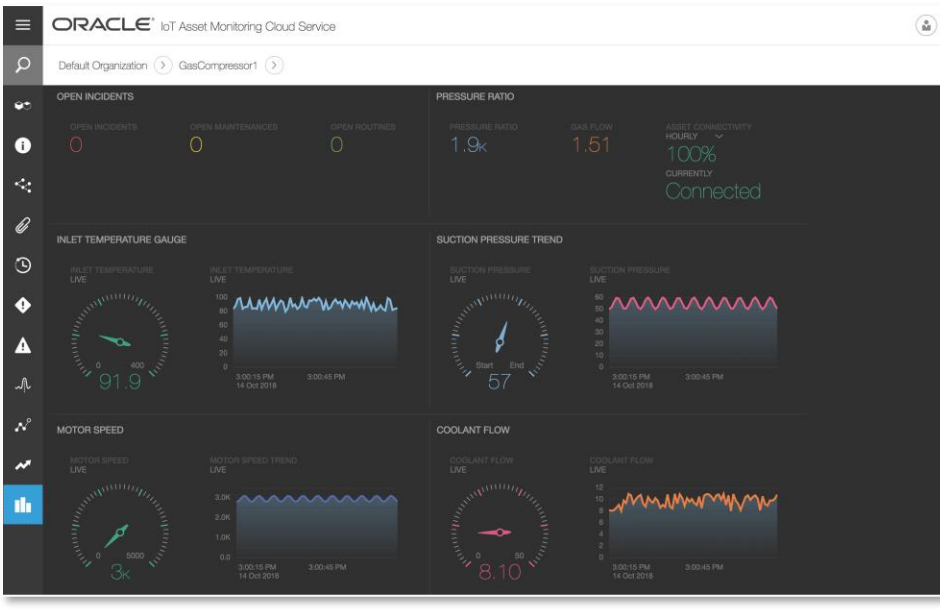

Figure 1 Oracle IoT Intelligent Applications – View the real-time state of your assets and devices.

Real-time, end-to-end visibility with IoT

Improve profitability and drive real-time operational efficiencies through automated monitoring of assets. Empower your line-of-business users with ready-to-use IoT applications to achieve business outcomes that were previously hampered due to interoperability gaps between operations technology and information technology. Built with highly scalable, robust, proven IoT technology

Key Features

- View the real-time state of assets and devices
- Use sensor data to create business intelligence
- Automate gathering operational data
- A complete application and cloud infrastructure solution in one secure package

Key Benefits

Oracle IoT Intelligent Applications helps utilities

- Visualize the health and performance of assets in real time
- Build real-time operational intelligence
- Enable coordination in monitoring, repair, regular and condition-base predictive maintenance of assets
- Unlock the operational data that will extend asset life
- Eliminate the need to install software and build a separate cloud infrastructure
- Fast time to value

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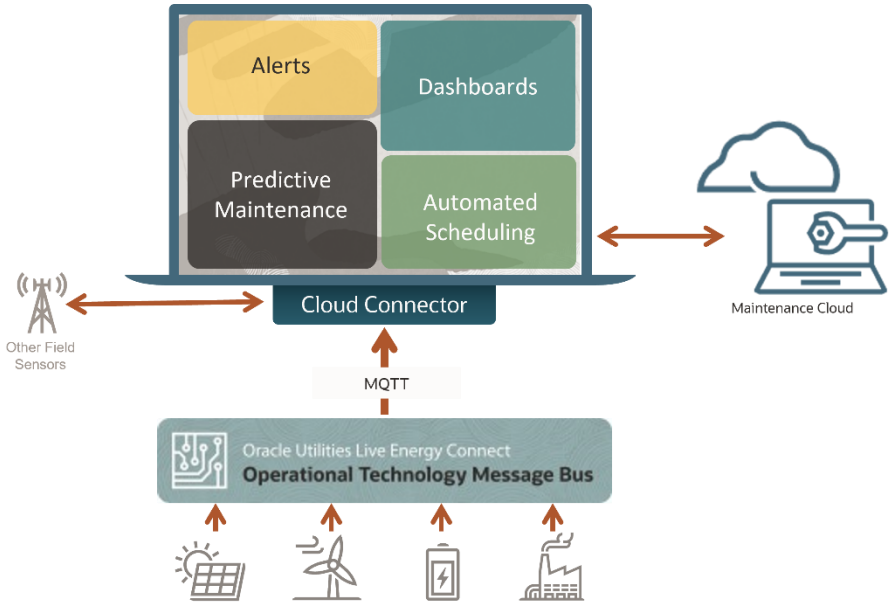
running on Oracle Cloud Infrastructure. Oracle IoT Intelligent Applications provides the tools and technologies to integrate, analyze, build, and deploy IoT solutions that deliver analytical insights from real-time IoT data into your existing business applications, all backed by Oracle's value-added ecosystem of partners and experts that help you rapidly scale and realize business value.

How it Works



Oracle IoT Intelligent Apps fulfill operations customers' demands for an integrated cloud application to operationalize real-time data and enable coordination in asset monitoring, repair, regular and condition-base predictive maintenance.

Figure 2 Oracle IoT Intelligent Applications architecture for energy and water companies

Oracle IoT Intelligent Applications centralize the data operations and field maintenance needs to ensure assets run smoothly.

In the cloud and ready-to-deploy for fast time-to-value

Use live data from connected devices and systems to monitor and ensure uptime, reduce loss and understand utilization of equipment. Achieve reduced deployment and lifecycles costs by employing the included prebuilt integrations between **Oracle Cloud IoT Asset Monitoring** and **Oracle Cloud Maintenance** and adaptors for on-premises and third-party applications.

Predictive Maintenance

Unplanned asset downtime can have a significantly detrimental impact on grid operations. Optimize asset availability and utilization through real-time remote tracking and visualization of current and predicted asset usage, condition, environmental conditions, and operational anomalies to predict and optimize maintenance and increase asset lifetime value. Improve the capabilities, reach and productivity of the maintenance and field service teams through auto-generation of alerts and maintenance work orders, remote diagnostics and maintenance, and adjustment of scheduled maintenance to reflect actual and predicted asset condition.

Digital Twins for Assets

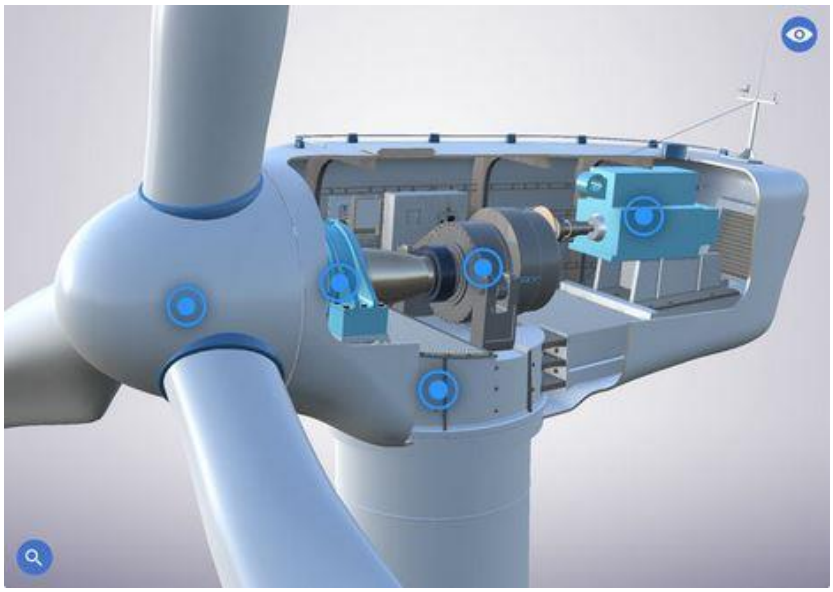


Figure 3 Oracle IoT Intelligent Applications *includes digital twin capabilities*

Oracle IoT Intelligent Applications includes digital twin capabilities as standard functionality and consists of three different areas:

Virtual Twin: This refers to a software representation of a physical asset, including things the set of attributes and controls that the physical device supports and software-synthesizable simulators that allow the creation of simulated assets to test out an IoT value-proposition before connecting physical devices.

Predictive Twin: This describes the behavior of an asset such as a predictive model that can be evaluated to forecast a future state of the asset or its environment.

Twin Projections: Digital twins are integrated in manufacturing, maintenance, field-service, supply chain-planning, transportation, utilities, and warehousing products.

In addition, the digital twin supports integrated what-if analysis capabilities using a tool to create synthetic conditions to validate end-to-end business processes for safety, compliance or audits.

3D Visualization with IoT context

The digital twin enables users to get a complete, contextualized view of their asset in a single place, including the hierarchy of asset components and the relevant functional aspects or “state” of the asset as represented by real-time values of key variables.

Exploded views of the asset and its component hierarchy are available, along with the ability to rotate the asset and examine it from different angles. Contextual data relevant for each subsystem is displayed.

This capability requires a subscription to **Oracle IoT 3D Digital Twin**, which is an optional SKU for Oracle IoT Intelligent Applications.

Key Business Benefits

- Pre-built interoperability with several enterprise applications including Manufacturing, Maintenance, Transportation, Warehouse Management and Worker Health and Safety Management
- Purpose-built, ready-to-use applications to achieve clear business outcomes
- Built on a proven, robust and scalable IoT technology foundation running on Oracle Cloud Infrastructure
- Incorporates latest innovations in the IoT space, including digital twins, ML and AI for streaming time-series machine data, and edge computing
- Extensive global partner ecosystem of IoT device and implementation vendors

Upload Industry standard 3d file formats

Subscriptions of Oracle IoT that include the optional 3D Digital Twin SKU provides users the ability to upload 3D CAD models in a variety of file formats which are standard in the CAD industry. These are then converted to web-viewable forms. Supported 3D CAD file formats include commonly used file formats such as STEP, 3DS, AutoCAD DWG, AutoCAD DXF, CATIA, OBJ, STL, among others.

Technical details

Device to cloud connectivity protocols

- MQTT over SSL
- HTTPS

Built-in industrial IOT connectivity

- OPC UA
- Historians
- OBD II
- SAE J1939

Supported IOT message data formats

- JSON
- Binary

Certified partners based on IOT device connectivity

- MODBUS
- Bacnet
- Ethernet/IP
- Many others

Supported platforms for Oracle IOT client software

- Java SE 5 and above
- C/C++ (POSIX, Linux)
- iOS
- Android
- Python
- JavaScript

Proven, robust IoT technology foundation

Oracle IoT Intelligent Applications helps you easily assimilate IoT concepts and technologies into your digital strategy to create innovative services with less risk.

Manage and analyze the enormous amount of real-time data generated by the multitude of IoT-connected devices demands a multi-faceted robust IoT solution that incorporates latest innovations such as digital twins, machine-learning (ML), artificial intelligence (AI), and edge computing.

Oracle IoT Intelligent Applications includes a full featured IoT technology stack that incorporates:

- **Digital twin modeling** and a wide range of device connectivity and edge processing capabilities.
- **Analytics** capabilities customized for time series data, spatial-temporal analysis and real time data processing with built-in domain specific dashboards and metrics. A highly scalable industry-standard big data analytics stack based on for operationalizing AI and ML-based algorithms for anomaly detection, predictive analytics and recommendations is included as part of the standard subscription.
- **Pre-built digital threads** with enterprise applications such as manufacturing, maintenance, transportation, warehouse management, and human capital management make it easy to quickly deploy preconfigured business workflows that automate exception management. Integrations with third-party applications can be easily established using REST API or Oracle Integration Cloud (OIC).
- Secure and reliable **edge computing** components enabling bidirectional communication between IoT devices and the cloud, and advanced edge analytics to conserve bandwidth and reduce latency for actions. IoT devices may connect to the cloud directly, or indirectly through a certified partner gateway over a variety of supported IoT protocols.

Be Assured with Proven Reliability

Oracle IoT Intelligent Applications for Energy and Water is backed by Oracle and supported by experienced, OT savvy professional services engineers who provide a quick path to getting your solution online. Oracle IoT Intelligent Application for Energy and Water is part of a suite of high-availability solutions and services for the energy and water industries.

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