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Oracle IoT Intelligent Applications

Oracle IoT Intelligent Applications uses data from connected devices and systems to provide you with more visibility, insights and efficiencies using prebuilt applications, embedded analytics, a SaaS delivery model and a wide range of uses cases including smart manufacturing, connected assets, connected logistics, workplace safety and connected customer service. Our applications have built-in predictive analytics and integrations with SCM, ERP and HCM to help you drive better business outcomes across your organization.

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

Improve profitability and drive real-time operational efficiencies through automated monitoring of assets, logistics, production, and workers. Digital supply chains will enable businesses to detect, analyze, and respond to IoT signals, then translate those signals to practical, actionable insights.

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 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.

Ready-to-deploy IoT business use cases for fast time-to-value

Oracle IoT Intelligent Applications use cases include:

Oracle IoT Intelligent Applications | **Smart Manufacturing**

Use live data from connected devices and systems on the factory floor to provide work in progress monitoring, help prevent unplanned downtime, and maximize product quality for manufacturing. To enable faster time-to-value, Oracle includes prebuilt integrations between **Oracle Cloud IoT Production Monitoring, Oracle Cloud Maintenance, Oracle Cloud Manufacturing** and Oracle Supply Chain Planning applications as well as adaptors for on-premises and third-party applications.

- **Smart Manufacturing — Work In-Progress Monitoring:** Gain real-time visibility of work-in-progress for just-in-time production operations to maximize production line utilization and avoid shipment delays. Continuously tracked built-in business metrics include; percentage behind plan for work orders and production quantity, overall equipment efficiency (OEE), production completions at each operation including good units, scraps and rejects, and the number of operations pending for each work order or batch.

- **Smart Manufacturing — Maximizing Product Quality:** Benefit from real-time visibility to production completions at factory and equipment level. Monitor product item specific scrap and rejects in an operation to minimize cost and achieve on-time customer deliveries.

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- **Smart Manufacturing — Preventing Unplanned Downtime:** Avoid unplanned downtime with real-time monitoring of current and predicted machine health. Machine maintenance schedules can be optimized to maximize factory's production by using standard and user-defined machine and factory health metrics, automated detection of anomalies and trends, machine-learning based failure predictions and performance deterioration forecasts.

- *Oracle IoT Intelligent Applications |* **Connected Assets**
  Use live data from connected devices and systems to monitor and ensure uptime, reduce loss and understand utilization of equipment. Reduced deployment and lifecycles costs are achieved through the use of the included prebuilt integrations between **Oracle Cloud IoT Asset Monitoring** and **Oracle Cloud Maintenance** and adaptors for on-premises and third-party applications.

  - **Connected Assets — Predictive Maintenance:** Unplanned asset downtime can have a significantly detrimental impact on business goals and outcomes. 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.

  - **Connected Products— Product-as-a-Service:** In business models where the product is an expression of a service, revenue and return is directly linked to asset availability, usage and customer value. Key metrics to be measured focus on product and service team returns. These include product performance, efficiency, usage, availability and condition along with the costs of service such as number of service trips per incident, incident duration, and overall efficiency of the service operation such as first-time fix. The use of custom metrics can further extend the value for the service provider and their customers providing insights into areas such as product usage (e.g. % of asset capacity utilization, asset performance and efficiency, duration of asset being in certain conditions), asset lifetime – actual and predicted, and rental revenue – actual and predicted.

- *Oracle IoT Intelligent Applications |* **Connected Logistics**
  Use live data sourced from vehicles, equipment and packages within own fleet and third-party logistics providers to monitor cargo and shipments across transportation and warehouse systems for a single, comprehensive view across each step of the shipment life cycle. Reduced deployment and lifecycle costs are achieved through the prebuilt integrations between **Oracle Cloud IoT Fleet and Shipment Monitoring, Oracle Cloud Transportation Management** and **Oracle Cloud Warehouse Management Systems** and adaptors for on-premises and third-party applications.

  - **Connected Logistics — Cargo Condition Monitoring:** Monitor conditions of cargo in-transit with a wide range of sensory signals and user-defined condition thresholds. Gain real-time insights for in-transit items at risk of spoilage or damage, due to factors such as temperature excursions, high humidity and excessive shock.

  - **Connected Logistics — Shipment Monitoring:** Monitor shipments on your third-party party carriers and/or private fleets for early visibility to unforeseen situations leading to delayed deliveries. Gain real-time visibility to shipment locations, shipment milestones and route deviations. Benefit from dashboards with exception widgets providing real-time insights for in-transit movements such as delayed or untraceable shipments.

  - **Connected Logistics – Transportation Asset Monitoring**: Improve operational efficiencies by monitoring the location and condition of transportation assets such as vehicles, trailers, containers, pallets, and totes.

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Monitor and track the return movement of high value Returnable Transport Items (RTI) post-delivery. Gain real-time visibility to equipment with unplanned detachments.

- **Connected Logistics — Warehouse Yard Monitoring:** Streamline warehouse yard operations with dynamically updated drop off appointments and automatic load check-in and dock assignment. Gain real-time visibility to incoming vehicles and in-transit delays. Benefit from dashboards with exception widgets (KPIs) that provide insights into yard operations, such as excessive dwell or delivery turnaround times.

- **Connected Logistics – Fleet Monitoring:** Proactively monitor private fleets and drivers. Global fleet dashboards track vehicle locations, availability status and utilization metrics to support reducing fuel costs and idle times. Vehicle maintenance is monitored with real-time fault detection using on-board diagnostics parameters. Driver behavior, such as excessive speeding or aggressive braking, can be managed by exceptions to predefined thresholds.

- *Oracle IoT Intelligent Applications |* Workplace Safety
Using live data from connected employee wearables and facility systems to track worker locations in real-time and ensure regulatory compliancy. Gain a better understanding of environmental conditions and reduce safety violations using environmental sensors. To enable faster time-to-value Oracle includes prebuilt integrations between **Oracle IoT Connected Worker and Oracle HCM** and adaptors for on-premises and third-party applications.

  - **Connected Worker – Safety Monitoring:** Gain real-time visibility to incoming vehicles and in-transit delays. Benefit from dashboards with exception widgets (KPIs) that provide insights into yard operations including excessive dwell or delivery turnaround times. Gain real-time monitoring of worker movement to prevent unsafe acts such as entering hazardous or unauthorized areas. Reduce time-to-respond in case of accidents and monitoring compliance by automated rules-driven enforcement of safety policies.

The prebuilt specific applications named below support the defined use cases that make up IoT Intelligent Applications and can be purchased using one convenient IoT Intelligent Applications SKU . .

IoT Production Monitoring: Continuously track and predict production performance across factories, products, lines and machines.

IoT Asset Monitoring: Gain real-time visibility of asset health, location and utilization, and predict maintenance needs.

IoT Fleet & Shipment Monitoring: Optimize end-to-end logistics operations with proactive detection of anomalies and deviations.

IoT Connected Worker: Ensure worker health and safety, improve compliance, and automate time and labor tracking to improve productivity.

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.

Managing and analyzing 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:

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- 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.

Digital Twins for Industrial Assets

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.

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.

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Key business benefits

- Pre-built interoperability with a number of 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

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

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