

## XYZ IoT Asset Performance



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Head of Product

### What is XYZ IoT Asset Performance?

XYZ IoT Asset Performance is an end-to-end solution to manage and monitor indoors, outdoors, and on the move business assets in real-time. With an automated system of reports, alerts, and insight data retrieval, the entire management process will be easier.

As of now we are specializing to provide asset performance management for vaccine monitoring, ensuring stable temperature during distribution to the end users.

#### Why IoT Asset Performance is the right solution for your business

- Total visibility: Real-time monitoring of product conditions indoors, outdoors and during delivery.
- Notification and Alert: Identify anomalies through the notification system for analysis.
- Prevent Theft and Loss: Keep products safe by knowing their real-time location.
- Supply Chain Optimization: Monitor the product delivery process more optimally.

### How it works

To manage vaccines, XYZ IoT Asset Performance focuses on monitoring and maintaining optimal storage, transport conditions, and equipment to ensure vaccine efficacy. Given the sensitivity of vaccines to environmental factors like temperature and humidity, APM solutions help prevent degradation, ensure compliance with regulatory standards, and optimize cold chain operations.

Here are the key components required for XYZ IoT Asset Performance for vaccine management:

#### 1. IoT Sensors and Edge Devices

- Purpose: To monitor the environmental conditions where vaccines are stored or transported.
- Types of Sensors:
  - Temperature Sensors: Critical for maintaining the cold chain. These sensors monitor temperature in real time, ensuring that vaccines are kept within the required range (typically 2°C to 8°C for many vaccines, and even lower for some like mRNA vaccines).
  - Door/Proximity Sensors: Track when storage units (e.g., refrigerators, freezers) are opened to ensure minimal exposure to ambient conditions.
  - Power/Voltage Sensors: Detect power interruptions or failures in cooling units that could compromise vaccine safety.
  - CO2 and Oxygen Sensors (optional): In special storage environments like ultra-low temperature freezers, these sensors ensure that the gas composition remains safe.
- Edge Devices: Edge computing devices process sensor data locally to detect anomalies (e.g., temperature breaches) and send data to the cloud. This reduces latency and allows for immediate action in case of critical changes in storage conditions.

#### 2. Cold Chain Monitoring Systems

- Purpose: To monitor vaccines throughout the supply chain, from manufacturing to distribution and administration, ensuring they remain within strict temperature ranges.
- Features:
  - Data Logging: Continuous tracking and logging of environmental conditions, providing historical records of the vaccine's storage conditions throughout its lifecycle.
  - Temperature Thresholds: Configurable settings for acceptable temperature ranges, with alerts triggered if the temperature moves outside the safe zone.
  - Real-Time GPS Tracking: For vaccines in transit, GPS-enabled devices provide real-time location tracking and environmental condition monitoring.

#### 3. IoT Gateways

- Purpose: Connect sensors to the cloud platform for real-time data transmission and aggregation.
- Functionality:
  - Communication Protocols: Gateways typically use cellular (4G/5G), Wi-Fi, or LoRaWAN networks to transmit data, ensuring reliable connectivity even in remote locations.
  - Edge Computing: Gateways with edge processing capabilities can analyze temperature or power anomalies locally, triggering immediate alerts or corrective actions before data is sent to the cloud.

#### 4. Cloud Platform

- Purpose: To store, process, and analyze sensor data, providing a centralized system for vaccine monitoring.
- Features:
  - Data Storage: Historical data is stored for audits, compliance, and performance tracking of storage equipment (e.g., refrigerators, freezers).

- **Real-Time Monitoring:** Cloud-based dashboards allow users to monitor conditions across multiple storage sites in real time, ensuring a constant overview of vaccine conditions.
- **Integration with Supply Chain Systems:** Cloud platforms can integrate with vaccine management systems, enabling end-to-end tracking from production to administration.

## 5. Predictive and Prescriptive Analytics

- **Purpose:** To analyze data collected from sensors to predict potential equipment failures and ensure preventive actions are taken before vaccines are compromised.
- **Predictive Maintenance:** By analyzing temperature fluctuations, power data, or equipment performance trends (e.g., compressor cycles in refrigeration units), the system can predict when a cooling unit is likely to fail, enabling maintenance to be scheduled before a critical failure occurs.
- **Prescriptive Maintenance:** The system can also suggest optimal actions, such as adjusting temperature settings or recalibrating sensors, based on historical data and current conditions.

## 6. Digital Twins

- **Purpose:** A digital twin is a virtual representation of the physical vaccine storage environment (e.g., freezers, refrigerators, transportation units). It allows operators to simulate and analyze real-time conditions.
- **Functionality:**
  - **Simulation:** The digital twin can simulate how changes in temperature or power outages will affect vaccine storage, enabling operators to take preemptive actions.
  - **Risk Mitigation:** It provides insights into potential risks, helping to optimize storage conditions and prevent costly vaccine spoilage.



## Values to our customers

- 1. Reduced Downtime and Increased Availability:**
  - By predicting failures before they occur and scheduling maintenance only when needed, APM systems minimize unplanned downtime and ensure that assets are available for production or service.
- 2. Optimized Maintenance:**
  - Shift from **reactive** (fixing equipment after it breaks) to **predictive and prescriptive** maintenance, reducing unnecessary maintenance activities and focusing resources on areas of actual need.
- 3. Extended Asset Lifespan:**
  - Monitoring performance in real-time and addressing issues early helps to extend the operational life of assets by avoiding excessive wear and damage.
- 4. Improved Efficiency and Productivity:**
  - Insights from real-time data allow operators to optimize how assets are used, ensuring maximum efficiency in production processes and reducing energy consumption.
- 5. Cost Savings:**
  - Reduced downtime, optimized maintenance, and improved asset performance lead to significant cost savings, both in terms of maintenance expenses and operational inefficiencies.
- 6. Enhanced Safety and Compliance:**
  - APM solutions monitor for safety-related issues (e.g., overheating or excessive vibration), ensuring compliance with industry regulations and improving worker safety.

## Pricing

### MQTT and HTTP messaging pricing

Up to 1 billion messages: \$1.00 (per million messages)  
Next 4 billion messages: \$0.80 (per million messages)

Over 5 billion messages: \$0.70 (per million messages)

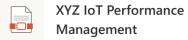
### Sidewalk messaging pricing

Up to 1 billion messages: \$2.30 (per million messages)  
Next 4 billion messages: \$1.50 (per million messages)  
Over 5 billion messages: \$1.20 (per million messages)

### LoRaWAN messaging pricing

Up to 1 billion messages: \$2.30 (per million messages)  
Next 4 billion messages: \$1.50 (per million messages)  
Over 5 billion messages: \$1.20 (per million messages)

### Tools and Resources



### Key Contacts



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