REAL-TIME AIR QUALITY MONITORING

REAL-TIME ANALYTICS RUNNING ON ORACLE CLOUD INFRASTRUCTURE DETECTS ANOMALIES

About the Customer

SS Global offers consultancy and Internet of Things (IoT) integration services to implement complete supply chain solutions and develop unique, innovative applications for clients engaged in managing virtually any kind of resource, including personnel, vehicles, raw materials, manufacturing processes, logistics systems, and customer service teams. The firm's asset monitoring tools support real-time access to time-critical data and provide in-depth visibility into key performance indicators, location data, and operational anomalies throughout the entire ecosystem.

> "
> The combination of Panopticon's real-time visualization capabilities with OCI Anomaly Detection Service enables SS Global IoT solutions to provide immediate, actionable insight to our customers."

Sunil Sharma
CEO
SS Global LLC

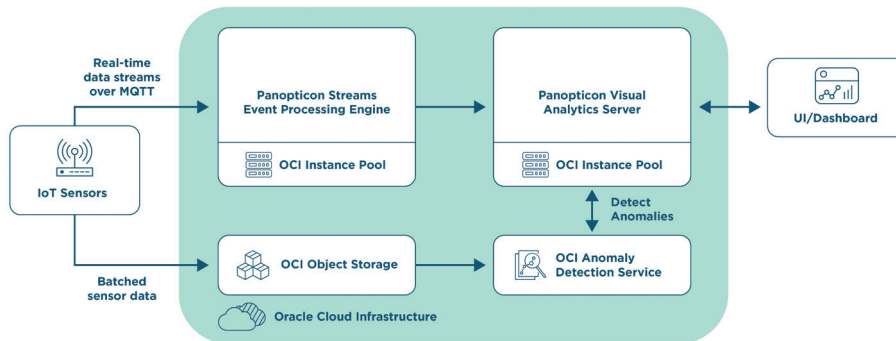Try Altair® Panopticon™ Today:
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Their Challenge

Utilizing IoT sensor data on temperature, humidity, and concentrations of particulate matter (PM) and atmospheric gases like carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and ozone (O_3), SS Global wanted to develop a detailed — and real-time — picture of the Air Quality Index (AQI) throughout a metropolitan region. SS Global engineers needed the ability to play back historical data in real time or faster to examine and understand trends and causal relationships between weather, AQI, and other factors. Additionally, it was critical that the system flag irregularities and anomalies in AQI and atmospheric changes that indicate future problems that can affect people in the area.

Our Solution

Altair teamed up with Oracle to develop a solution using Oracle Cloud Infrastructure (OCI). The engineers used the MQTT messaging protocol to bring in data from IoT sensors in the field. The data stream contained both latitudinal and longitudinal values for each sensor, along with data on PM, atmospheric conditions, and gas concentrations. The team recognized the need to handle large volumes of streamed, high-velocity data and at the same time prevent data congestion from creating artificial (false) anomalies that could present a confusing picture to operators.

Altair Panopticon data visualization software provided the native data connectivity and required dashboarding tools, while OCI provided cloud-based compute and storage infrastructure and AI Services (Anomaly Detection Service) to generate accurate predictions and produce alerts when sensor metric values exceeded normal values. The team built a series of dashboards that allowed users to view AQI as time series graphs and filter by time intervals and regions of interest.

The first practical application of the analytics system is fleet management for municipal buses. Panopticon dashboards track and display all drivers in real time, including locations, driving patterns, driving behaviors, and routes. Using Panopticon's API functions, the team embedded Google Maps in the dashboard to route drivers alongside MapQuest, which provided real-time information on traffic congestion, construction delays, crashes, roadblocks, and more. The system helped managers alter routes as needed to optimize operations and reduce pollution-related health risks to drivers and passengers.

TOP: This dashboard displays real-time data collected from IoT sensors and processed by OCI to detect and flag anomalies in air quality and atmospheric conditions. Clients use this information to manage fleets of municipal vehicles and reduce public health risks associated with air pollution. **BOTTOM:** This dashboard displays detailed real-time data and historical trends for individual fleet vehicles and drivers, including behavior, time on the road, delays, and route selection efficiency.
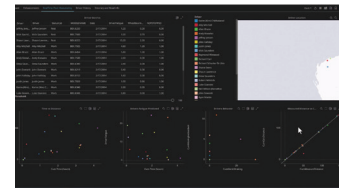

The SS Global IoT solution collects and processes real-time data, makes comparisons, and applies statistical functions with historical data on the fly. More importantly, it uses advanced machine learning models exposed by OCI Anomaly Detection Service to identify anomalies and display the information in easy-to-comprehend data visualizations.

Results

The Altair solution empowers SS Global personnel to visualize massive amounts of real-time streaming data without any data congestion. Additionally, they can configure alerts for anomalies before they cause major disruptions. The SS Global team can also use Altair's code-optional tools to modify and add capabilities to the system as required. OCI Anomaly Detection Service allows them to monitor road conditions to manage vehicle fleets more efficiently, which means they can alert their drivers to route changes, analyze driver behavior to ensure compliance with traffic laws and safety rules, and more.

Click here to learn more about how Oracle and Altair work together:
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