Predictive Asset Management for smart airports

How Predictive Asset Management can transform airport operations

wipro

As airports adopt the path to digital transformation, some of the most progressive ones have become pilot sites for evaluating next gen digital technologies. Airports not only house a huge asset base, but also run very complex operations (24x7x365) with little scope for error. While the majority of airports these days have aging infrastructure and limited revenue resources, they still have to ensure a top notch passenger experience in order to remain competitive. This paper describes how the implementation of predictive maintenance solutions powered by IoT can benefit airports and turn them into true “Smart Airports”.

What’s the challenge?

More than 10,000 drives operating Dubai International Airport’s baggage handling system at Terminal 3 provide only a glimpse into the massive scale and complexity of assets across airports globally. Here are some key figures from Terminal 3 that showcase how crucial the predictive maintenance program could be for airports:

Baggage claim carousels:	Conveyor belt system:	Sorting capacity per hour:	Drives for baggage handling:
14	**17,000** m	**15,000** pieces	**10,702**

In August 2017, a glitch in the baggage handling system at Toronto Pearson International Airport’s Terminal 3 caused flight delays of several hours, resulting in severe reputational damage for the airport. Many passengers took to social media to vent their anger and frustration with the airport management authority.

A sound maintenance program is critical for extending the life of airport facilities and keeping the airport as safe and efficient as possible. The lack of predictive maintenance efforts at airports can not only result in premature failure of infrastructure and unplanned downtime, but also lead to an emergency situation with major cost implications.

Reimagine airport operations with maintenance insights – driving efficiency and passenger satisfaction

What is Predictive Maintenance (PM)?

The tremendous technological advancements in sensor and communication technologies over the last decade have made it possible to monitor assets in near real time. Asset performance data analysis can help predict potential failures so that timely actions can be initiated to avoid unplanned downtime. This approach of Predictive Maintenance leveraging IoT and data analytics ensures a minimal element of uncertainty in airport operations.

Predictive maintenance solution components

Assets: Airport assets can be broadly categorized into airside assets and landside assets. Based on the role these assets play in airport operations, they can be classified as critical or non-critical assets.

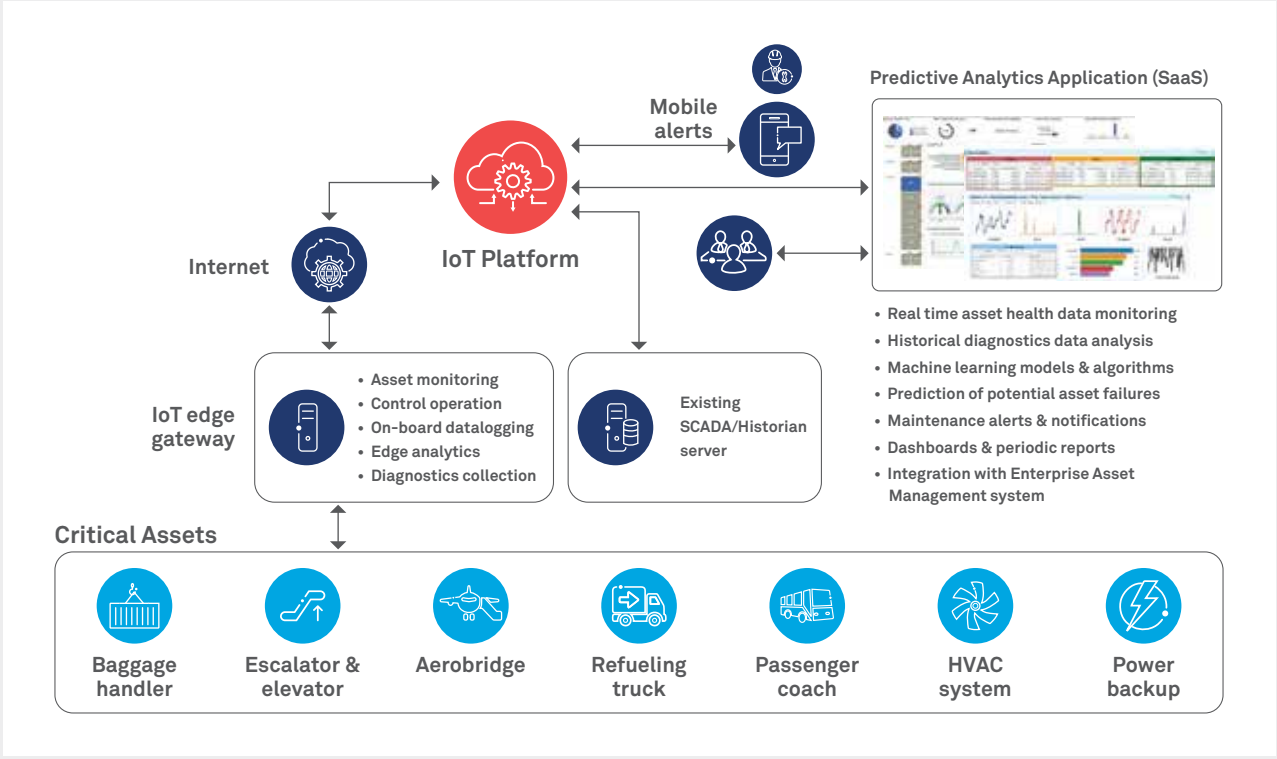
- Airside Assets
  (Aerobridges, passenger coaches, cargo vehicles, refueling trucks, etc.)
- Landside Assets
  (Baggage handling systems, elevators and escalators, building facilities like lighting, HVAC, security and surveillance, power back-up systems, etc.)

Sensors and gateways: Assets are evaluated for their sensing and connectivity capabilities, i.e., their ability to measure and publish data on their health conditions. The asset data is streamed through an edge gateway periodically via IT infrastructure to an on-premise or cloud hosted remote server. Assets which don't have native support for such capabilities are enhanced either through re-engineering or through add-on external sensors and networking modules.

Enterprise Asset Management platform: An Enterprise Asset Management (EAM) platform plays the pivotal role of acting as a central data repository by ingesting asset performance data and aggregating data from other airport systems. When advanced data analytics engines with machine learning models are executed over this reference asset data set, they offer critical insight to the airport managers on real time asset health, an asset's propensity to fail, and related maintenance requirements to avoid asset failures and outages. These insights can further trigger alerts and notifications to concerned technicians, and lead to automated work orders for proactive maintenance jobs and to manage the complete operational workflow.

Traditionally, Enterprise Asset Management platforms have been offered as an on-premise solution only, leveraging historical data to offer limited descriptive analytics. However, going forward, cloud-based options and hybrid (on-premise and cloud-based) options with seamless support for advanced data analytics and machine learning capabilities are expected to be the norm.

Typical solution architecture



Key benefits

- Higher operational efficiency due to reduced unplanned downtime
- Lower cost of operations due to better energy efficiency
- No financial impact due to disrupted operations
- Improved passenger experience
- Better airport star ratings

How Wipro's Predictive Maintenance solution will transform airports?

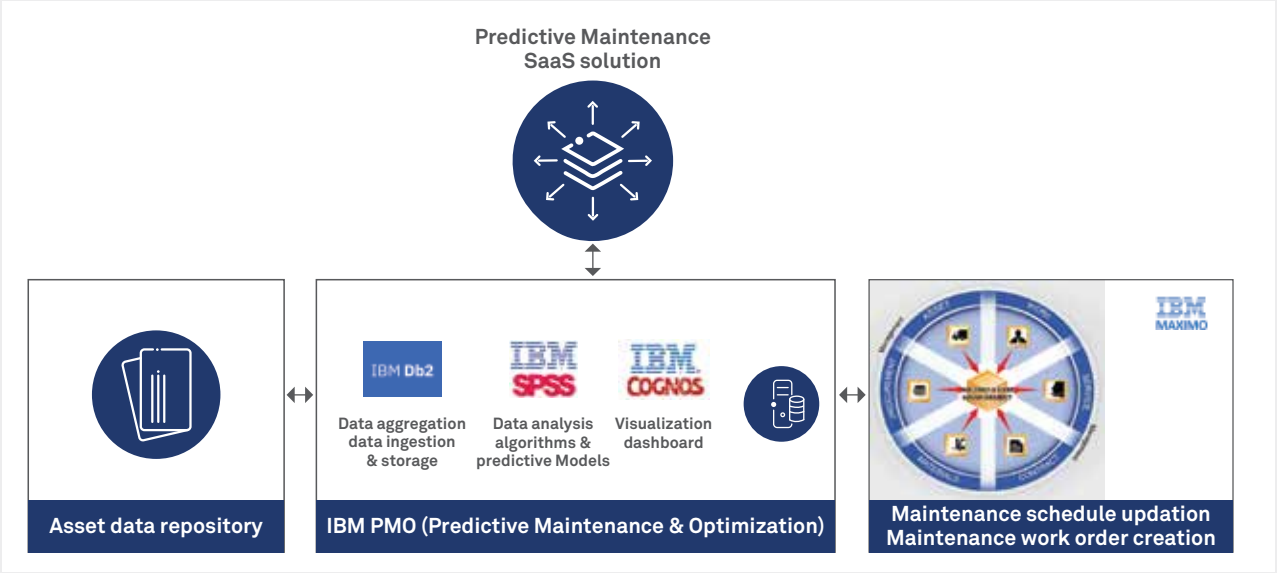
Wipro's Predictive Maintenance solution, powered by IBM's industry leading IoT and analytics technologies, addresses the requirements of asset intensive industry segments with a deep focus on airports. This cloud-based solution offered in the SaaS model leverages the following underlying IBM technologies

IBM PMO

IBM Predictive Maintenance and Optimization is a truly holistic platform that bundles together capabilities of IBM DB2, SPSS and Cognos to offer a unique proposition for predictive asset maintenance.

IBM Maximo

IBM Maximo is a comprehensive solution for managing physical assets on a common platform. It offers capabilities to maintain all asset types, check their health in real time and streamline global operations from procurement to contract management.



Potential Benefits

Improve asset health and performance
Monitor, maintain, and optimize assets for better availability, utilization, and performance

Optimize maintenance schedules
Access multiple data sources in real time to help predict asset failure or quality issues and minimize unnecessary maintenance

Reduce excess maintenance cost
Avoid costly downtime with improved maintenance schedules, get early warnings on asset failure, plan maintenance with higher efficiency and reduce costs

Conclusion

Predictive Asset Maintenance will be a key enabler solution in the digital transformation of airports across the globe, leading to immense benefits in terms of opex savings as well as operational efficiency improvement. Wipro, as a leader in the global IoT marketplace, is well positioned with its solutions, domain expertise and partner ecosystem to help airports succeed in their Operations 4.0 journey.

About the author

Gopakumar Nair
General Manager & Global Head of Sales – IoT,
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Heading up sales and solutions for IoT, Gopa helps customers transform their digital business through connected world initiatives and technologies to drive unprecedented growth and efficiencies. Gopa brings a broad perspective with 22 years of combined sales, solutions and delivery experience that have taken him across borders (India, Saudi Arabia, Singapore, Japan and USA) and industries (Energy, Chemicals, Automotive and IT).

Anand Kumar
Solution Architect – IoT,
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Leading the IoT solution proposals to support customers across all industry segments and geographies, also responsible for joint IoT solution development proposals with strategic technology partners like Microsoft, IBM, Dell, etc. Leveraging his previous roles at GE and Schneider Electric, Anand brings strong IT/OT expertise of 10 years covering industrial solutions across Power, Oil & Gas and Manufacturing.

Samir Vyas
Director – IoT Partner Engineering,
Wipro Limited.

Recognized as an evangelist for digital technologies, Samir has extensive experience in enabling asset intensive organizations across various industries to achieve their digital transformation objectives by leveraging the power of asset data and predictive asset maintenance. As Program Owner for the development of an innovative predictive asset maintenance solution for airports, Samir is also responsible for incubating and executing a go-to-market strategy that drives revenue for Wipro and its strategic business partner IBM.

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