Evolution of field service industry

Connected field service and intelligence

wipro

Organizations are under immense pressure to provide service excellence and state-of-the-art services to their customers to stay ahead of the competition. Digital transformation around IoT, RPA, augmented reality, predictive analytics, machine learning, and cognitive intelligence is reshaping business operating models and customer experience. The services industry is already experiencing a wave of predictive maintenance and it is going to move toward the prescriptive model of operation.

Organizations that are prepared or have started their journey to move their business operation from being only efficient to truly strategic will certainly get a leg up on the competition. Have you started yours?

Here's everything you need to know about connected service intelligence and how technology is driving business. We have extended the Microsoft connected field service solution to appreciate the future and map user journeys.

Key business drivers for connected field service/intelligence are:

- Reduced downtime with proactive monitoring from connected devices
- Address issues faster by remotely monitoring devices and keeping customers informed

- Reduced maintenance costs by dispatching a technician with the right expertise, availability, and location to the job
- Technical expertise support to front line/Junior staff using remote assistance
- Enabling customers with self-service/fix with guidance

Let us understand how technology is complementing and enabling front-line employees and organizations deliver excellence and be productive. They are impacting both organizations/businesses as well as the end consumer, and it would be interesting to observe the relevance of technology adoption in each case.

RefroVolts is a home appliance manufacturing company, which sells home appliance products across the globe. Recently, they have observed that their production is not meeting demand for few manufacturing plants. Also, customer satisfaction is diminishing due to frequent service requests for the appliances in the 'connected appliances' category.

RefroVolts is trying to resolve the issue for frequent and unscheduled downtime of production assembly line resulting in not meeting the delivery schedule. RefroVolts was advised to move from condition based Preventive Maintenance(PM) to intelligence-based Prescriptive Maintenance(RxM) using IoT, analytics on Azure.
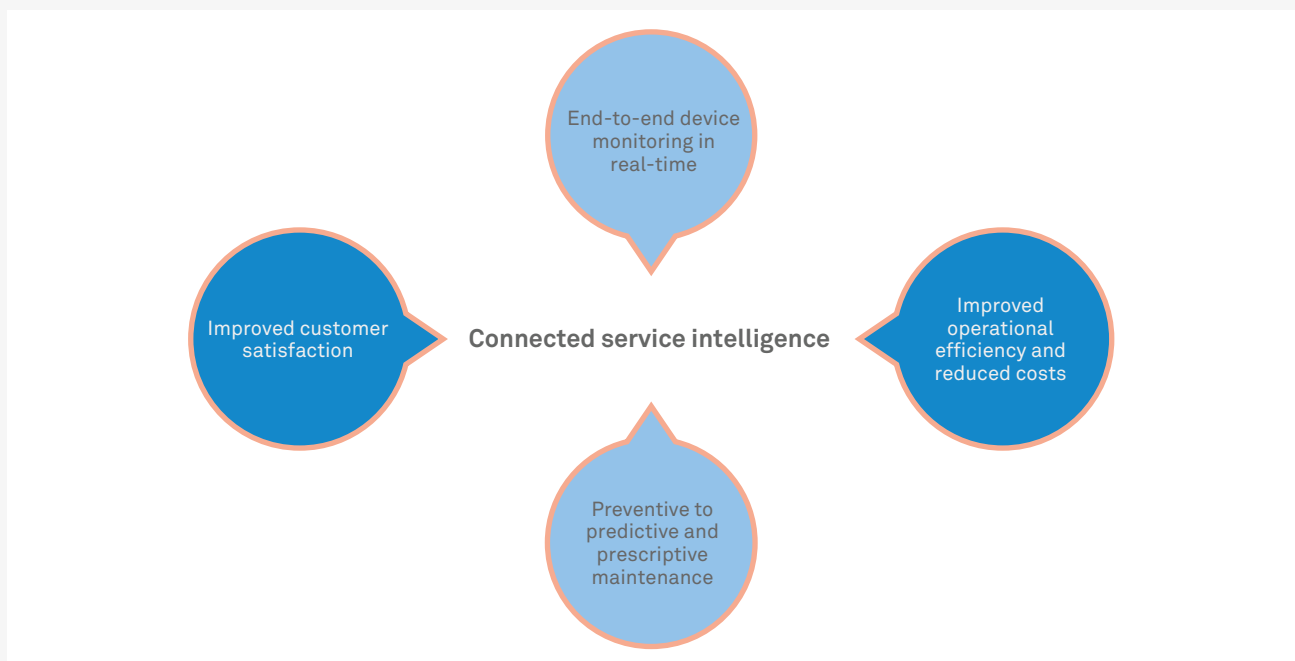

Figure 1: Key benefits of connected service intelligence

Based on the advice, RefroVolts quickly added vibration sensors, temperature sensors, pressure sensors and motion sensors to their production assembly line. Now all the 'things' in the assembly line become 'smart' and they start sending telemetry data to Azure IoT.

Predictive analytics is applied on telemetry data received and it generates actionable insights like Remaining Useful Life (RUL) or Time to Failure (TTF) or if a device is going to fail in a certain timeframe or in a window (next 15 days, 30 days and 45 days). Prescriptions are generated by combining predictions with orders, forecasts and inventory dataset with the help of rules engine defined. Finally, prescriptions are applied to the devices by sending them as commands from IoT hub to device. This preemptive measure ensures to identify issue occurrence and manages assembly lines operation well in advance with no business disruptions or loss.

Insight • {RUL:100, Device: XMST-10 FailIn2Weeks:N,FailInWindow1:N, FailInWindow2:N,FailInWindow3:N

Command • {DeviceID:XYAT-7, Output: 50%}

Insight • {RUL:12, DeviceID: XYAT-7 FailIn2Weeks:Y,FailInWindow1:N, FailInWindow2:Y,FailInWindow3:Y

Command • DeviceID:XMST-10, Output: 150%}

Apply predictive analytics

Apply prescriptive maintenance

Device to IoT hub communication: Telemetry data collected from different assembly lines across the plants are available in Azure IoT. Initial study helped to identify the assembly line and plants that are having frequent downtime for maintenance.

Predictive analytics on azure: Models are created, trained and evaluated in Azure machine learning using regression, classification and multiclass classification algorithms. Insights RUL or TTF, device to fail in a timeframe, device to fail in a window (next 30, 60 or 90 days) are derived from telemetry received.

Prescriptive analytics on azure: Insights generated from 'predictive analytics' are then combined with orders, forecasts and inventory dataset with rules engine to derive the prescriptions. Generated prescriptions can be reducing output from a assembly line or limit the operating hours or increase in the other assembly line.

IoT hub to device communication: Prescriptions will be sent to device in the form of commands and device will respond to those commands. This could be as simple as 'reduce output' or 'increase otutput' command.

Data collection from 'things'

Apply prescriptive analytics

Telemetry • {DeviceID:XMST-10, AL:1,Temp:75, Pressure:13, Vibration:98}

Prediction • {DeviceID:XYAT-7, Prediction: Reduce Output by 50%}

Telemetry • {DeviceID:XYAT-7, AL:2, Temp:98, Pressure:13, Vibration:98}

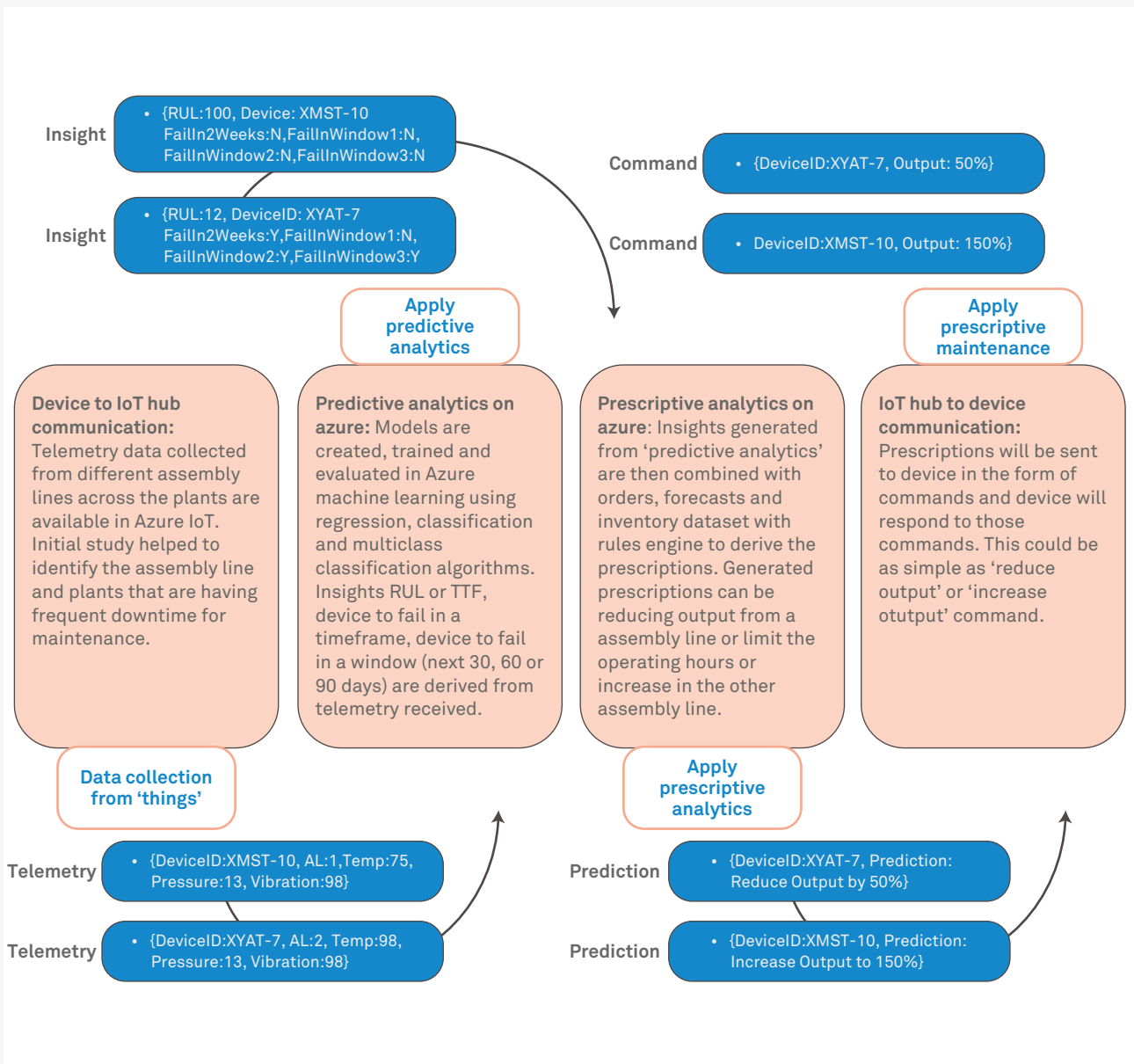**Prediction** • {DeviceID:XMST-10, Prediction: Increase Output to 150%}

Figure 2: 'Things' to prescriptive maintenance

Let us consider a scenario where customer Rob Johnson has bought a RefroVolts IoT-enabled digital refrigerator. Now, Rob receives a notification on his mobile about an anomaly detected in his refrigerator with respect to temperature and gas leakage. He is informed that since it is under warranty, his refrigerator thermostat has been adjusted with a remote patch but would need a service engineer to address the issue of gas leakage and is advised to schedule this at the earliest.

This becomes possible due to seamless information flow between IoT-enabled devices, IoT Hub and finally enabling IoT alerts to auto-generate and schedule work orders for the customer. Connected field service helps to register a customer asset in Dynamics 365 and receive an alert when there is an anomaly from a device using Azure IoT. The system is enabled with intelligence and has customer interaction history with purchase history to determine whether to charge for service or parts replacement or not.

In the world of prescriptive maintenance, predictive machine learning is applied to telemetry data to derive the health and predict the failure of a device. It also helps to preempt resolution with some measures to avoid any failures. Resource Scheduling Optimizations (RSO) in Dynamics 365 will take into consideration RUL and other parameters, and auto-schedule a work order for service activity.
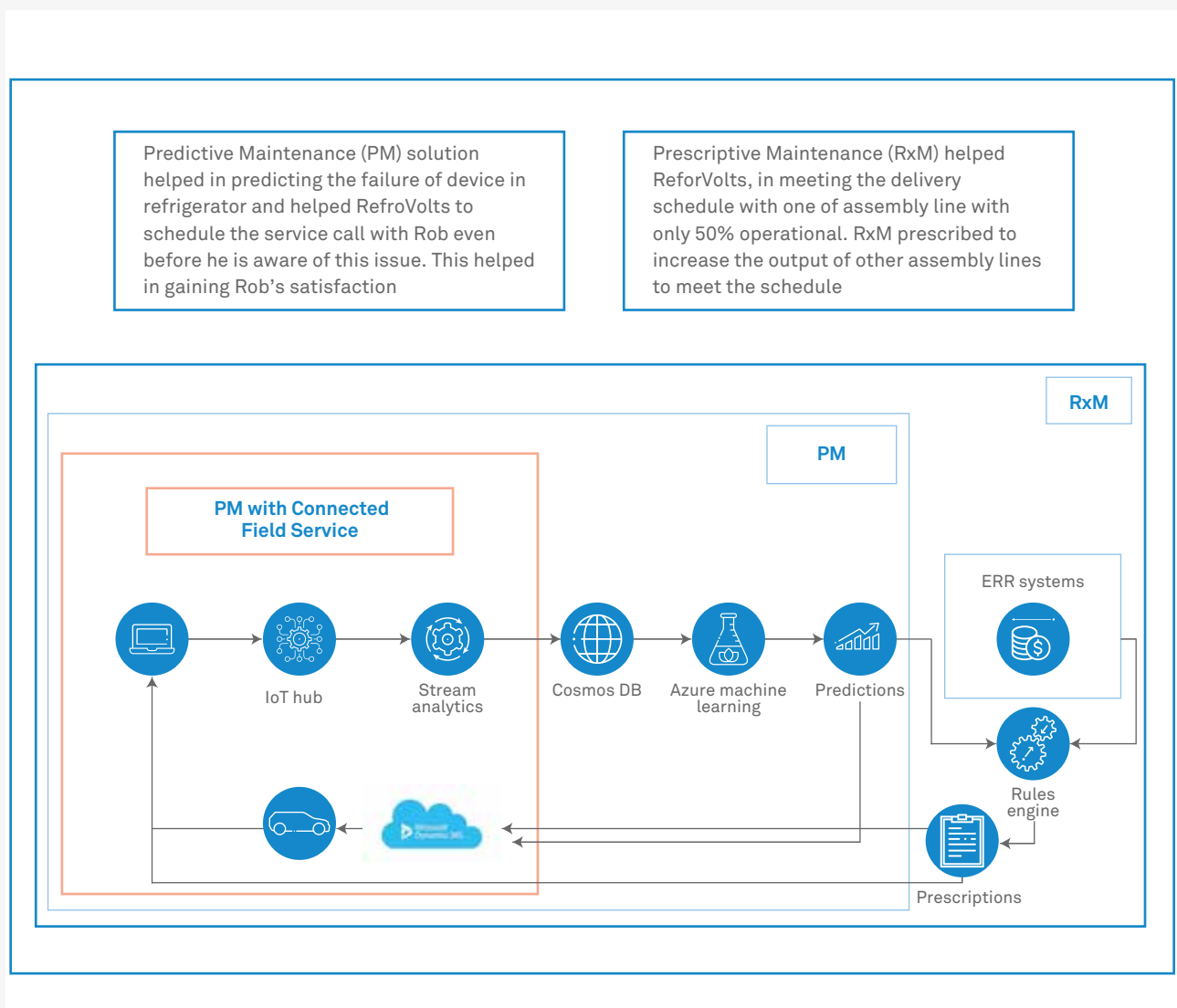

Figure 3: Predictive maintenance to prescriptive maintenance with connected field service

The Dynamics 365 platform enables a complete ecosystem, right from the consumer to third-party partners involved, to provide service excellence and achieve operational efficiency. By leveraging the Azure platform and connected field service application, organizations can remotely monitor their customer-enabled devices, preempt failures and provide a resolution well ahead of time, even before the customer notices it.

In an extremely competitive service industry, organizations outsourcing their service businesses to third-party providers or partners is common. However, liaising with these partners becomes imperative to portray a common face to the customer. Dynamics 365 portals provide flexibility to these partners to interface with the organization and customers to provide seamless support. Customers can view IoT alerts, track health and view case details for their appliances using portals or mobile apps.

While we understand the relevance of the connected field industry in the manufacturing world, there are other industries like Healthcare, Energy and Utilities, Government, Automobiles etc. that have a lot of scope to use and extend its capabilities to their business model. Common examples include:

- Remote monitoring and connected care for patients
- Smart meters and conditional billing
- Digital oil fields and maintenance
- Smart cities and traffic management
- Connected vehicles and smart cars

In a nutshell, the industry is moving forward rapidly toward a connected world of things and services. It is up to organizations to hop on to the bandwagon sooner rather than later.

Wipro helps onboard clients on to their respective user journeys and determine their future roadmap. Wipro's Microsoft practice has expertise in delivering these services to many global customers. We are also in the process of delivering Next-gen forward-looking solutions for the connected world.

About the authors

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Gavaskar has 18+ years of experience in architecting CRM solutions across Manufacturing, Banking and Insurance domains using Microsoft Dynamics 365, .NET and Azure. He is passionate about leveraging Microsoft technologies to solve business problems for our clients. Gavaskar has built point solutions for enhancing time to value, some of which are available on Microsoft marketplace.

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Moneet has 12+ years of experience in helping businesses envision their CRM/ CX goals, harmonizing requirements across groups and leveraging technology to meet those business needs. She is passionate about customer journey mapping and its impact on customer delight. In her current role, Moneet helps clients in realizing the value from their CRM investment in Microsoft Dynamics 365 product suite.

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