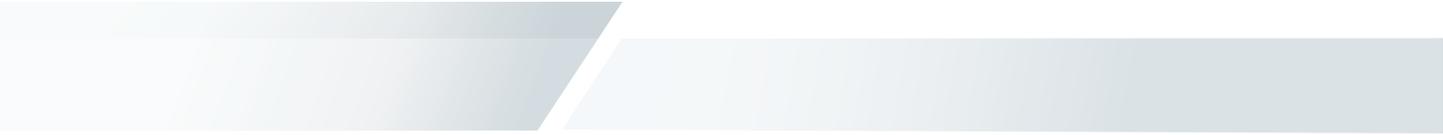# Remote Monitoring and Maintenance: Mission-Critical Operations at the Competitive Edge

Connect, Analyze, and Integrate with Oracle Internet of Things Cloud Service

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Businesses are facing greater competitive challenges than ever before. If they are to thrive, they must make the most of their mission-critical operations, from plant machinery to products.

Organizations have always had to innovate, control costs, and ensure the highest levels of customer service, but the current pace and scale of change is unprecedented, as are the challenges presented by globalization and commoditization.
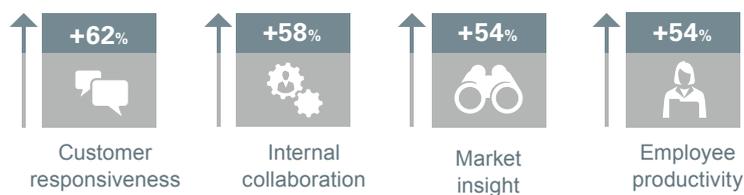
Commoditization is even affecting luxury brands, with some estimates suggesting 20 percent of high-end products and services can be easily substituted.[1] IIn the face of these challenges, businesses must find new ways to differentiate, grow, and make money. Ensuring customers have the best possible experience is therefore essential to reduce churn and create new business opportunities.

Some organizations have flourished in this new environment by creating digital- and mobile-centric business models that are disrupting entire industries. Established brands must now adapt and innovate to keep pace with these digital disruptors. The prize for success is huge: According to IDC, one-third of the top 20 market leaders across almost every industry will be significantly disrupted by new digital-centric competitors and reinvented incumbents by 2018.[2] The race is on.

Innovation Is Everything

In the face of these challenges, businesses from industries as diverse as manufacturing, utilities, agriculture, and construction are actively evaluating Internet of Things (IoT) and smart product strategies. This is part of a bigger trend in the industry to do all in their power to innovate, gain competitive edge, and provide a better service to their customers. For these asset-rich businesses, this increasingly means utilizing their mission-critical assets to the greatest extent, making products smarter and connected; extracting every last ounce of value from crucial investments, and thinking about them in new ways to create compelling and innovative services.

Increased competitive advantages seen by early IoT adopters include:

+62%	+58%	+54%	+54%
Customer responsiveness	Internal collaboration	Market insight	Employee productivity

Harvard Business Review, Internet of Things: Science Fiction or Business Fact?, 2014

As businesses adapt to the new realities of the digital market, the smallest of competitive advantages will be absolutely crucial. In this environment, cloud-based remote monitoring and maintenance has an important role to play in businesses with the insights they need to succeed. This includes not only giving businesses the ability to better monitor the proper functioning of their products and plant machinery, but also enabling them to prevent costly breakdown and fixes, improve customer service, and create new business opportunities and service-level agreements.

[1] Roland Berger and the International Controller Association (ICV), "Escaping the Commodity Trap," April 2014
[2] IDC, "IDC MaturityScape: Digital Transformation (DX)," March 2015

Many companies are seeking competitive differentiation and higher profitability by transforming their business models from a focus on products to services. Service-led business models can provide a number of competitive benefits including dramatically improved customer experience, increased customer loyalty, products and service bundles that are harder to copy, new business models and revenue streams, and ultimately higher profit margins.

For example, a manufacturer of heavy construction and excavation machinery can use IoT to remotely monitor not only the location of its assets, but also the condition of equipment and spare-part availability. A tyre manufacturer can offer the ability to pay for tyres through a pay-per-use model, rather than selling the tyres outright. A commercial heating ventilation and air-conditioning manufacturer, meanwhile, can offer guaranteed service-level agreements, by remotely monitoring their equipment and environmental conditions.

The Maintenance Challenge

Asset-intensive industries face a range of challenges when it comes to ensuring mission-critical plants and equipment operate at maximum efficiency and uptime, and customer service commitments are met, as even the smallest disruption to service can lead to costly penalties, or worse, churn. Businesses must understand how their products and assets are performing so that they can optimize their use and better anticipate issues and failures.

But reactive maintenance is not the transformational solution businesses require in today's competitive environment. The costs associated with reactive maintenance are prohibitive and, in our fast-moving world, by the time a fault has occurred customers are likely already frustrated.

Remote monitoring and predictive maintenance provides a solution to these challenges and is one of the primary capabilities enabled by IoT. The market offers a multitude of powerful, connected devices at a low cost, which can be used to provide real-time data on the performance of assets. If integrated with the enterprise systems associated with customer service models, this data can increase their value to the business. When it comes to remote monitoring and maintenance, for example, IoT data integration enables lower costs, reduced time to repair, and even completely new business models and revenue streams—ideal for meeting the competitive challenges of the digital age.

#1 Remote monitoring lets businesses upgrade and control products in the field.
Connected smart products can be designed with innovative new capabilities, such as the ability to download new features and capabilities. Software patches can be downloaded rather than an in-person service call. Also, different product parameters and attributes can be remotely adjusted to achieve optimum performance.

McKinsey explains it well: "Currently, most Internet of Things data are not used. For example, on an oil rig that has 30,000 sensors, only 1 percent of the data is examined. That's because this information is used mostly to detect and control anomalies – not for optimization and prediction, which provide the greatest value."[3]

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[3] McKinsey & Company, "The Internet of Things: Mapping the Value Beyond the Hype," January 2015

"Connected products can even reduce or avoid having to dispatch service engineers to fix the product in the first place. The cost implications of this for businesses cannot be overstated, helping businesses add to the bottom line through greatly improved profit margins."

#2 Remote monitoring along with predictive analytics can reduce outages and improve uptime.

Connecting devices in this way enables near real-time monitoring of equipment, meaning engineers can remotely identify faults more quickly and reduce time to repair—or head them off completely.

Sensor data acquired through remote monitoring can be leveraged through analytical models to provide predictions about impending product failures, and the ability to identify root causes of issues. Predictive, condition-based maintenance can therefore reduce maintenance-related outages and costs.

Take the example of a broadband provider: Through analysis of operational data from thousands of telecom network sensors, operators can see when a problem occurs in real time as it starts to present, allowing them to dispatch the closest engineer to the fault— based on GPS data—and get it fixed before customers start complaining.

#3 Remote monitoring reduces the cost of delivering service.

Connected products can speed up the time to resolution for product issues by linking sensor data and existing knowledge bases, and providing service engineers with accurate information that can speed up problem diagnosis and resolution.

In fact, network data can give engineers so much information that they will often know what the fault is before they arrive, allowing them to arrive at the scene with the right tools to fix it in one visit, saving money and time. Connected products can even reduce or avoid having to dispatch service engineers to fix the product in the first place. The cost implications of this for businesses cannot be overstated, helping businesses add to the bottom line through greatly improved profit margins.

Moreover, by linking self-service applications with IoT-enabled devices, customers are able to report service issues to businesses; the devices can then report back to customers when normal operations have resumed. This removes the need for engineers to visit, or even talk to the customer, enabling a more efficient service and one that is tied to the trend for customer empowerment.

#4 Remote monitoring enables businesses to transform the customer service experience.

Through remote monitoring, customer service can go from reactive to proactive. Instead of just reacting to product failures, organizations can start anticipating and fixing problems proactively.

Products can phone home to report problems. In cases where fixes can be made through software, corrections can be made even before the customer is aware of those problems. Remote monitoring can dramatically reduce the MTTR (mean time to resolution), by providing service engineers with precise information of when the failure occurred, conditions under which product was operating, components affected, and so on. Further, this information can be used to search electronic knowledge bases to identify precise solutions. Through direct visibility to the performance of their products in the field, manufacturers can continuously improve the performance and capability of their products.

To unlock the full potential of remote monitoring and maintenance as a strategic business process, there needs to be a fundamental rethinking of its role within organizations. To be absolutely clear: Remote monitoring and maintenance can no longer simply be about detecting anomalies and faults. Rather, businesses must view remote monitoring and maintenance as a tool for gathering operational data, using this to discover valuable insights, and then employing these insights in the service of new business models and customer services.

Build New Revenue Streams

Ultimately, the value proposition of IoT-enabled remote monitoring and maintenance goes well beyond simply reducing service costs; it can also help businesses launch entirely new revenue streams. And the scale of this opportunity is huge.

Take the example of a printer company. In the manufacturing plant, machine-based sensors can keep the manufacturer apprised of whether there are any faults along the line, allowing them to fix faults as—or even before—they occur. They might also use sensors in an assembly line to collect data about each step in the production process, and then analyze the data to improve efficiencies and reduce errors. But what if sensors are also placed in the printer units? The data provided by these millions of machines would provide a vast operational and performance record of the printers.

This data would allow the manufacturer to do three things. Firstly, it can continually enhance its products at the design stage to ensure commonly reported faults are weeded out. Secondly, it could use the data to predict where and when faults might occur, allowing them to sell an ancillary maintenance service to their customers. Thirdly, it will gather usage data that was previously unavailable, allowing the manufacturer to pursue new business models; for example, new opportunities to charge customers not only for service in case of failure, but also paying for usage where service is now included.

Nor are such opportunities one-off events. IoT-enabled remote monitoring and maintenance allows businesses to continuously deliver data from connected products and other assets to revenue tracking and generating systems (for example, product lifecycle management). The opportunities for growth are clear.

As mentioned, businesses can offer ongoing service contracts to monitor for and resolve faults. For customers without such contracts, businesses can offer ad hoc repair services through which they can generate new leads for product/service replacement or upgrade. For every interaction with a customer without a service contract, successful or failed sales attempts can be fed back into the business' recommendations engine to increase dynamic maintenance and upgrade its sales approach, ensuring products and sales campaigns better chime with customers' needs.
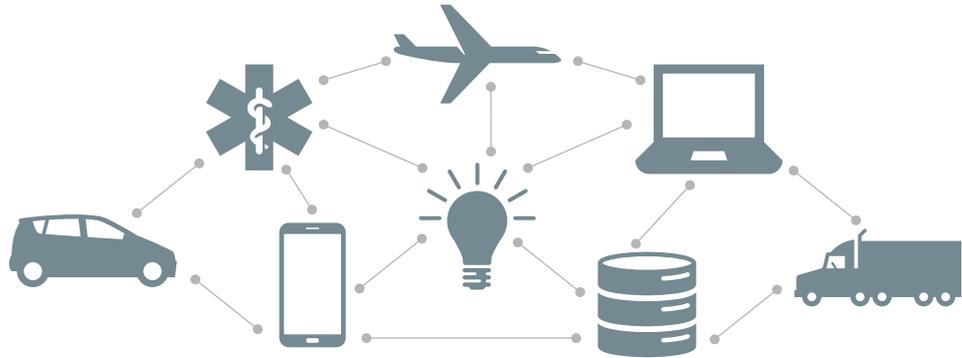
Moreover, information on product failures or new service sales can directly impact raw material and inventory management and so should also be fed back to the relevant business units. In short, the data collected through remote monitoring and maintenance can connect the entire business to ensure it is optimized for revenue generation, margin, customer service, and competitive differentiation.

Start Transforming Your Business to Drive Growth and Value

The fact is IoT has moved beyond the hype. Businesses today are already using it to enhance their operations and come up with valuable new insights. The clear message to businesses is that they should look to embrace it today if they don't want to find themselves on the losing end of business competition. Key to this process is the ability of businesses to integrate remote monitoring and maintenance into enterprise processes to secure competitive advantage—whether that is faster time to repair and reduced maintenance costs or the creation of innovative customer services.

IoT – BUSINESS OUTLOOK

96% OF BUSINESSES
ARE READY TO ADOPT INTERNET OF THINGS

Forrester Consulting/Zebra Technologies, Harvesting the Benefits of the Internet of Things, 2014

Here are three things all businesses need to know about embracing remote monitoring and maintenance:

1. Businesses must embrace a cloud-driven solution: The growth of IoT technology is being supported by the increased use of the cloud, as the two technologies grow hand in hand. Cloud technology is well suited to enable IoT, offering high degrees of agility and the ability to collect huge volumes of data from the enterprise and beyond. Additionally, as a highly scalable platform, the cloud is ideal for the "burst and peak" nature of IoT traffic. Moreover, cloud technology offerings lower the bar to entry, permitting organizations to start small and scale up.

2. It's all about the data: IoT generates a very high volume of data at high velocity, all of which needs to be processed and contextualized on the fly. Organizations will achieve the business advantages of IoT only when they can capture, sort, piece together, and make sense of that data. That means they need to be able to collect, store, and retrieve data from a variety of devices representing many different operating systems, protocols, and standards.

3. Integration is key: IoT data must be brought directly into business applications for the benefit of improving them and removing blind spots from how the business runs. The data generated by IoT devices can add to the effectiveness of major enterprise applications like CRM, ERP, and supply chain.

Connect, Analyze, Integrate

To derive value from Internet of Things, enterprises need not only to collect this data but also to secure, analyze, and integrate it with enterprise applications and processes, generating the actions that define and drive the value proposition. Oracle IoT Cloud Service lets organizations connect, analyze, and integrate IoT data..

Connect -- Securely and reliably connect any device in any market to bidirectionally transact data, accelerating your time to market with an open, secure, and scalable platform.

Analyze -- Perform real-time, big data, and predictive analytics to deliver the enriched enterprise data that enables you to identify new services and improve customer satisfaction.

Integrate -- Ensure the right data is available to the right application at the right time using open interfaces and preintegrations with Oracle's platform-as-a-service (PaaS), software-as-a-service (SaaS) and on-premises enterprise application offerings to reduce total cost of ownership for IoT data-enriched applications and processes.

Why Oracle? Because with more than 400,000 customers—including 100 of the Fortune 100—and with deployments across a wide range of industries in more than 145 countries, Oracle offers a comprehensive and fully integrated stack of cloud applications, platform services, and engineered systems. Oracle also has decades of expertise in managing and extracting value from data.

What's more, Oracle IoT Cloud Service empowers companies to unlock even greater business value from the many Oracle technologies and applications they already rely on to run their businesses.

For example:
• Oracle's JD Edwards' customers can leverage Oracle IoT Cloud Service to drive real-time condition-based maintenance. Oracle IoT Cloud Service can monitor assets in real time, detect exceptions, and trigger alerts in JD Edwards' application or initiate maintenance processes.

• Real-time manufacturing floor data provides customers with improved insights into processes, inventory, and product quality. With Oracle IoT Cloud Service, EAM/Mfg BI Analytics customers can get real-time sensor-based data into their dashboards, enabling end-to-end visibility into operations from production to delivery.

• Using Oracle IoT Cloud Service, Oracle RightNow/TOA customers can enhance customer service operations using real-time equipment data. Repair tasks are quickly assigned to field service engineers. Oracle IoT Cloud Service will deliver full details on the equipment and error messages to ensure the right engineer is in the right location with the right part at the right time.

The Future is IoT

IoT has moved beyond hype to business reality. Increasingly, businesses that have deployed an effective cloud-based IoT platform to enable remote monitoring and maintenance and other IoT applications will find they are best placed to succeed in our fast-moving digital world. From producing innovative products and refining existing ones, to delivering the best possible customer service while reducing operational costs, IoT-enabled remote monitoring and maintenance is fast becoming a must-have for asset-rich businesses.

Oracle IoT Cloud Service enables all such organizations to address their customers' needs. The Oracle platform has been designed to IoT-enable an organization quickly and with low risk and Oracle is uniquely positioned to help line-of-business managers simplify their IoT planning and implementation. Oracle IoT Cloud Service can integrate new IoT systems with enterprise applications. And it empowers organizations to generate value from IoT devices by correlating and integrating the right data at the right time. With Oracle IoT Cloud Service, your company can deliver innovative products, services, and business models to transform your digital business.

If you would like to find out how Oracle IoT Cloud Service can transform your approach to asset monitoring and maintenance, visit oracle.com/iotdiscoveryworkshop to sign up for a complimentary IoT Discovery Workshop.

For more information on Oracle IoT Cloud Service,
please visit it **cloud.oracle.com/iot**

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