



REDRAVEN™



REDRAVEN IOT TECHNOLOGY AND SERVICES PLATFORM

Scalable IoT solutions for your plant





RedRaven IoT Technology and Services Platform

A revolution in flow motion IoT

Flow control equipment is the lifeblood of your plant. Flowserve designed its RedRaven platform to give you the insights and tools you need to monitor, analyze and predict equipment performance — so you can respond to problems quickly and minimize disruptions and downtime.

The Flowserve RedRaven platform includes a suite of solutions, including equipment sensors, secure communication, performance analytics and trend reporting tools. It also includes a range of offerings that can be customized to meet your plant's unique needs. Options include condition monitoring services, which allow you to capture asset performance data for analysis, and predictive monitoring capabilities, which apply data analysis software and algorithms to identify and diagnose equipment problems.

With access to advanced analytics and trend data, you can identify the slightest changes in equipment performance, variations that can indicate a problem is looming. The RedRaven platform uses engineered analytics, diagnostic and predictive capabilities that tell you how your flow control equipment is performing. You won't just receive data, you'll also get real insights needed to make more informed decisions to improve your plant's efficiency, productivity and bottom line.

By combining Flowserve's innovative IoT products, analytics technology and expert service, you can:

Predict equipment behavior. Respond to problems quickly and minimize disruptions and downtime.

Use trend analysis data to make informed decisions about plant-wide reliability improvements.

Refocus maintenance efforts. Focus on those assets that require attention, thus avoiding unplanned downtime and optimizing maintenance efforts so you spend less time evaluating healthy equipment.

Enhance equipment efficiency. By knowing where all your assets are on their respective pump operating curve, you can optimize for maximum efficiency.

Reduce costs. Reduce total cost of ownership by easily recognizing when to schedule equipment maintenance and reducing spare part inventories.

Improve safety. By alerting technicians to a problem and what the failure mode might be, the RedRaven platform helps them respond to performance issues quickly, limiting the time they spend in hazardous environments.

Knowledge drives action

Predict.

Use detailed insights to predict why your critical assets might experience issues.



Act.

Make informed decisions to minimize disruptions and downtime and improve plant performance and reliability.

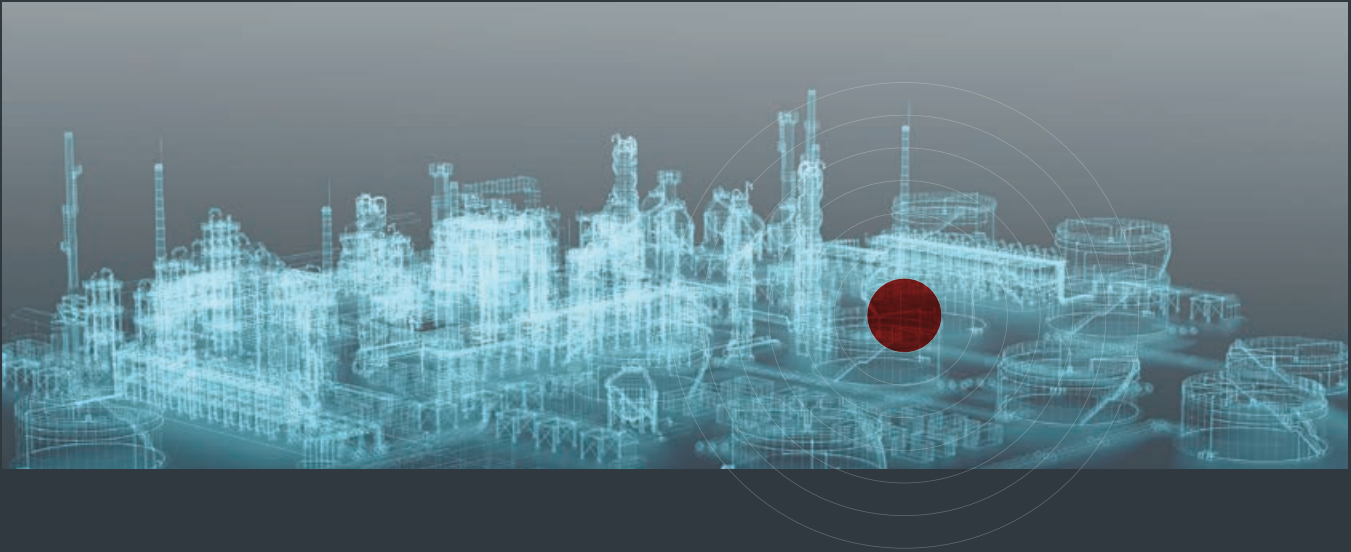


Protect.

Protect your operation against equipment downtime and production impacts.



The Flowserve approach



Data collection

Our innovative sensors (wired and/or wireless) reliably and securely collect and transmit detailed performance data from your equipment, even over long distances. They collect key equipment parameters such as vibrations, temperatures, pressures and more, allowing you opportunities to evaluate your assets and address equipment problems before they negatively impact your organization.

We transmit this encrypted data to the cloud, where you can access it in an easy-to-interpret format from anywhere via the Insight portal. From data collection to analysis to reporting, you'll have the tools and insights to easily monitor and respond to equipment performance issues.

Data analysis

Flowserve is unique in the industry because we develop data analysis software and algorithms based on our unmatched pump and fluid motion expertise. Unlike other offerings, our software and analytics are based on physics and engineered models to identify the most critical failure modes, diagnose equipment problems at a very early stage, and recommend the next steps to fix them.

Dedicated monitoring

Flowserve has a dedicated team of specialists focused on monitoring and data analytics. When critical and noncritical assets deviate from standard performance threshold limits, Flowserve will alert you of a potential problem via the Insight Portal. Working together, we can help you to diagnose the issue and recommend necessary repairs.

Expertise when you need it

When it comes to repairing and maintaining pumps, seals and valves, you need access to qualified engineers, technicians and parts — and you need it fast. Flowserve engineers and technicians who have experience servicing flow control equipment can not only help customers around the world solve equipment-related problems, but also identify ways to get the most out of their rotating equipment and reduce operating costs.



RedRaven IoT Technology and Services Platform



IoT solutions for your entire plant

RedRaven services

Condition monitoring

Condition monitoring combines wireless sensors and an advanced visualization portal to detect changes in performance that could be an early indicator of failure. You can proactively identify equipment issues and uncover insights to improve your plant's efficiency, productivity and profitability.

Predictive analytics

Predictive analytics provide near real-time equipment monitoring and analysis, enabling you to estimate and help you to understand why your critical assets could fail and take preventive action before it happens. You can identify potential issues earlier than with route-based equipment monitoring and respond to problems before they lead to downtime.

The knowledge to improve plant performance and reliability

Flowserve is unique in this space. We've always led the way in manufacturing and service. Now we are taking the lead in creating new technologies to detect, diagnose and optimize flow-related equipment, giving customers end-to-end solutions that improve the overall performance of their operations. With our unmatched service capabilities, we now have the technology to help our customers detect, diagnose and quickly respond to problems and all the resources, tools and knowledge it takes to solve them. It is a continuous effort to provide the best possible solutions for our customers.



RedRaven IoT Technology and Services Platform

Technology, services and capabilities

A proven process

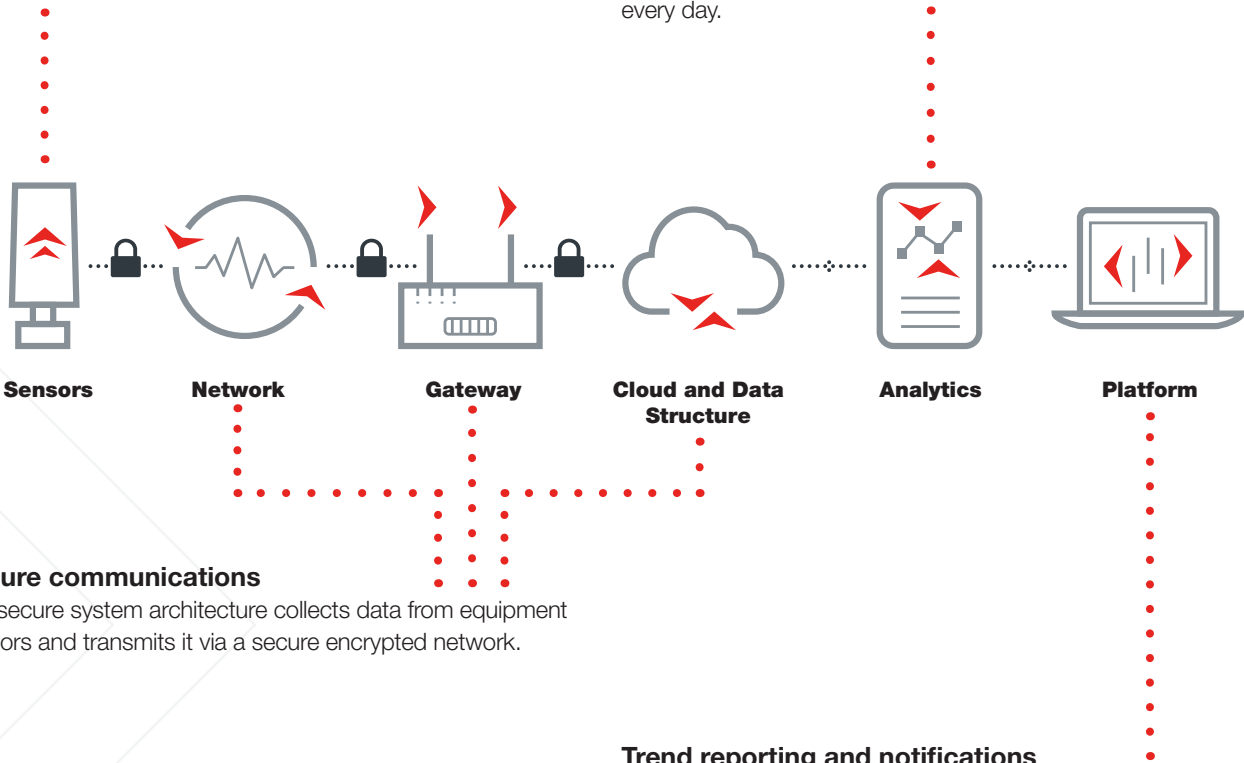
Flowserve's IoT solutions follow a comprehensive and proven process to advance your existing capabilities and improve reliability. Our solutions are scalable, so they'll grow with your needs. Our approach includes solutions for critical, key and balance-of-plant equipment, and it is in continuous evolution and expansion.

Innovative sensors

Wired and/or wireless sensors collect vibration, pressure and temperature data for analysis. Long-range wireless sensors enable cost-effective monitoring of thousands of assets over sprawling facilities.

Application-specific analysis

Equipment performance data is analyzed with technology designed specifically for pumps, valves and seals, so you can gain a clearer understanding of how to increase the efficiency, productivity and reliability of the particular equipment you use every day.



Secure communications

Our secure system architecture collects data from equipment sensors and transmits it via a secure encrypted network.

Trend reporting and notifications

Trend reports provide insights into equipment performance over time, while emails and alerts inform you when an asset experiences a problem, so you can take immediate action to address it.



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