





IOT Solutions for Valves





IoT Overview

WHAT IS IOT?

The term IoT (Industrial Internet of Things or Industry 4.0) refers to the abilities to collect, store, transmit and analyze industrial equipment performance data.

These abilities are essential to gain a complete view of asset performance.

WHAT TO DO WITH IOT?

- Prevent equipment failures
- Minimize downtime and improve productivity
- Reduce total cost of ownership
- Lower maintenance costs
- Improve safety





Industry Trends : Reactive to Proactive



Typical challenges

Sustain production while faced with:

- Aging equipment
- Complex data
- Need for support

Reactive



Proactive

Key Needs:

Avoid unexpected downtime | Planned intervention | Support ASAP

Move away from reactive to data driven proactive asset health management & maintenance.



Common Plant Issues

The current state (a **reactive** approach) leads to common issues.

30% of equipment failures are attributed to:

- High-cyclical valves
- Mechanical damage
- Packing leaks
- Process fluid damage

15% of **severe** equipment failures are attributed to:

- Hydrodynamic noise
- Cavitation
- Mechanical failures due to vibration
- Massive pressure spikes

A **proactive** approach can prevent these issues.



Knowledge Drives Action

Predict.



Act.



Protect.





How does Flowserve's IoT work?

Complete IoT Solution for the entire plant:

1. PREDICT.

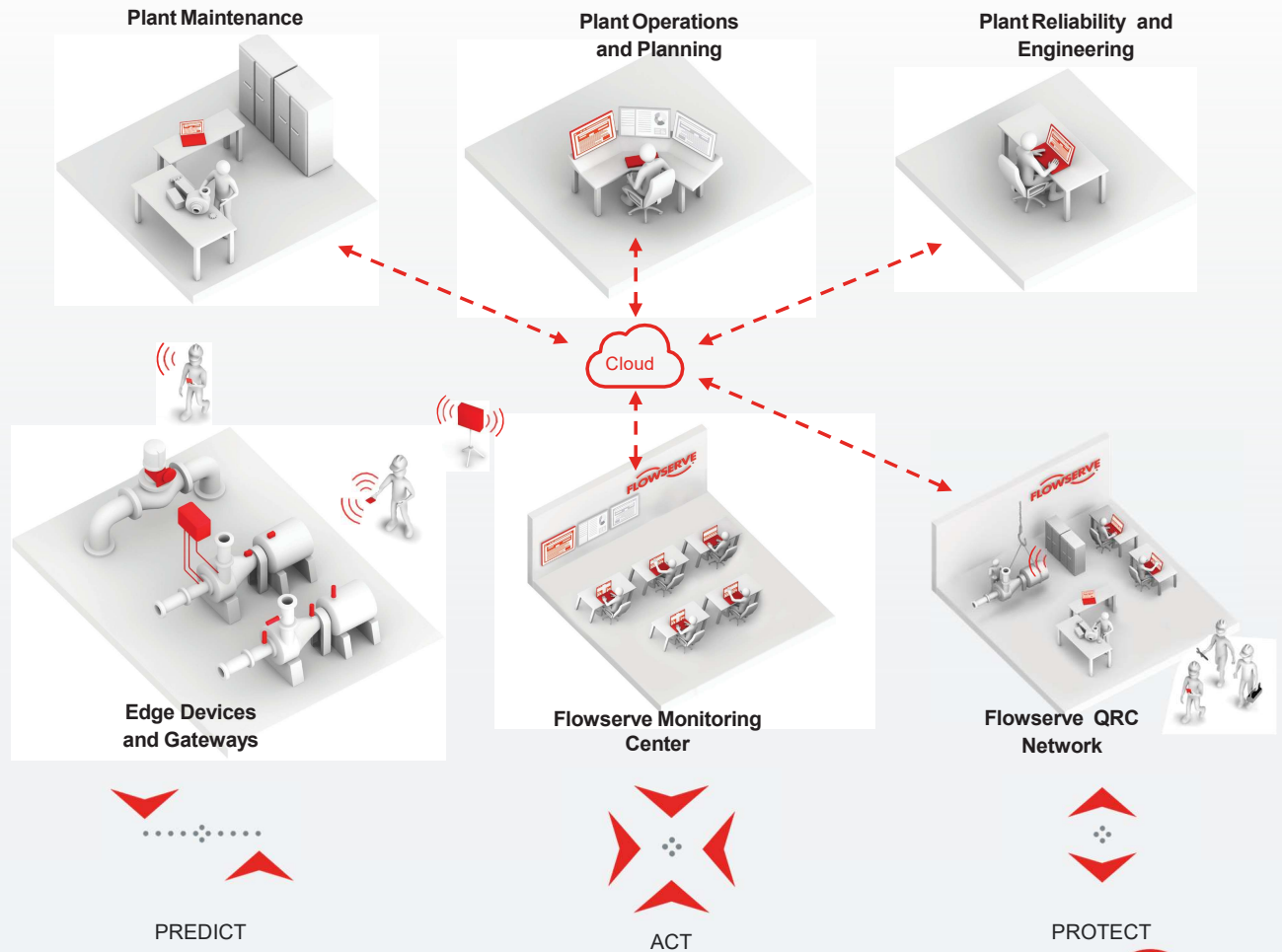
- Innovative Sensors
- Secure communication
- Condition Monitoring / Analytics

2. ACT.

- 200 years of Flow Motion Experience
- OEM competence
- Flowserve Monitoring Center

3. PROTECT.

- Improve equipment
- Energy advantage
- Maximize production

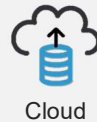




RedRaven for Valves – Service Offerings

Insight Monitoring

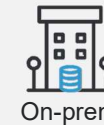
- Portal on cloud
- Online Monitoring
- System Upgrades



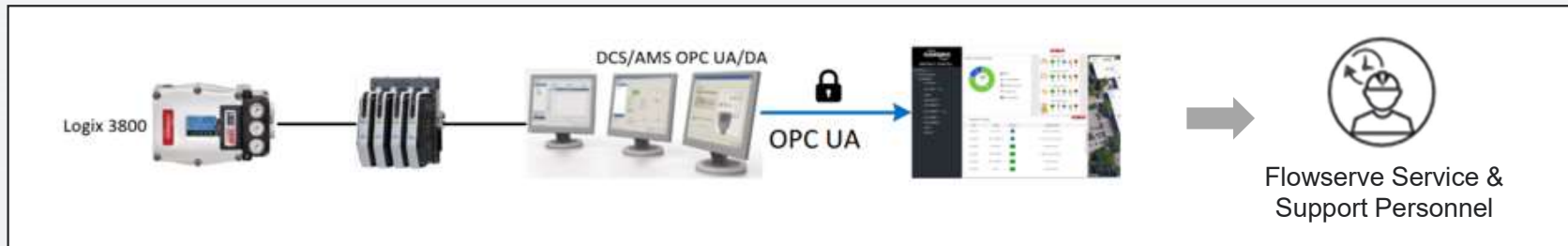
Cloud

Access Monitoring

- Portal on a server at site
- Access to the on-prem server for monitoring
- Additional hardware*



On-prem

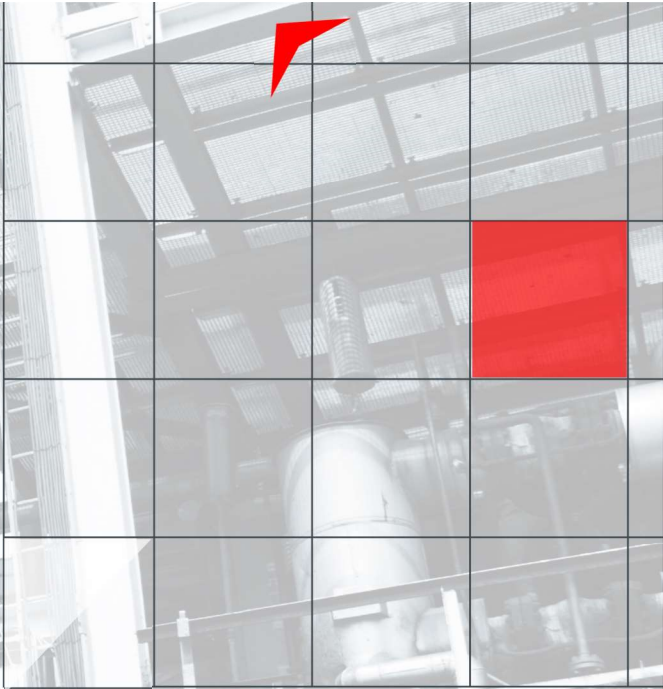


* Excludes wireless/wired adapters

Cloud and On-Premises based offerings



RedRaven solutions for Control Valves





RedRaven Condition Monitoring Solution Prevents an Unplanned Shutdown in a Burner Management System

- RedRaven detected a **major leak coming from pneumatic actuator** in an industrial gas plant.
- Without RedRaven, the unnoticed leak **would have cost the customer between \$500K-\$2M USD** in production downtime
- Instead, they were proactively notified and **were able to fix the issue before it impacted their operations.**

The industrial gas plant company is now planning to expand RedRaven services to other applications and other plants

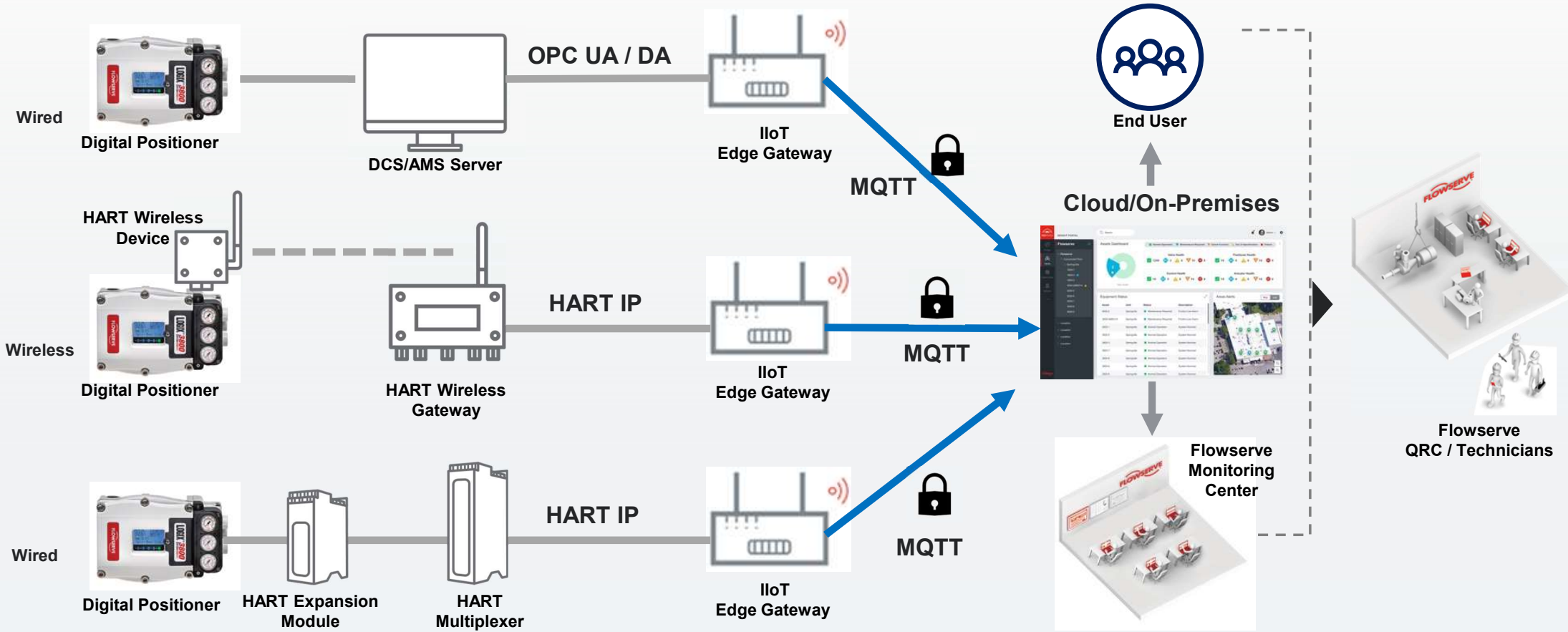


Multiple connectivity options

SITE LEVEL

END USER INTERACTION

SERVICES



Logix 3800, 3200, 520MD, 520 MD+

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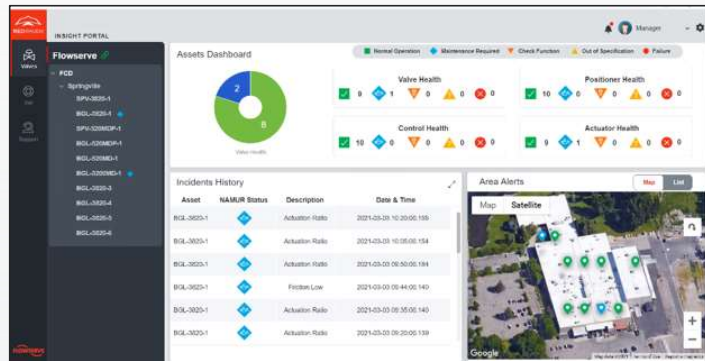
Various connectivity options for RedRaven



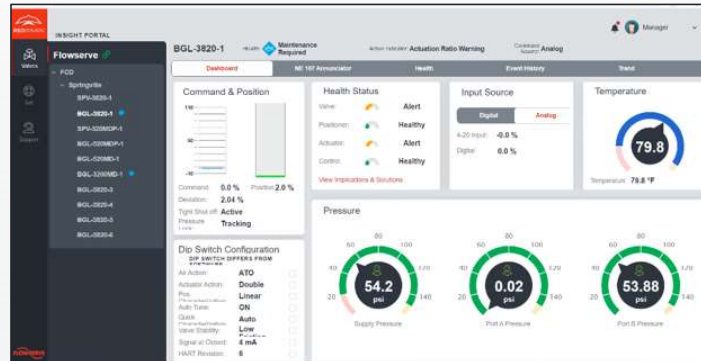


A Differentiated End-to-End Solution

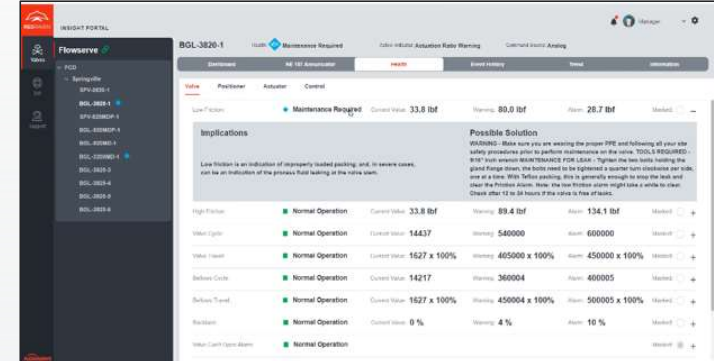
Overview of asset health



Detailed Valve Health



Failure Modes and Solutions



Platform Agnostic

- Existing plant control systems
- Standard industry protocols – FDT, OPC UA, MQTT, PA DIM

OEM Vendor Agnostic

- Aggregate and standard parameters
- More detail for Flowserve equipment

Insights and Solutions

- Mouse over detailed information
- Can build in analytics in future

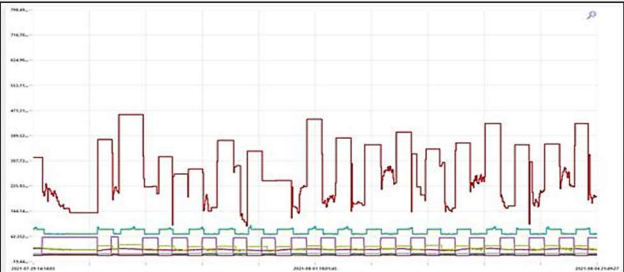
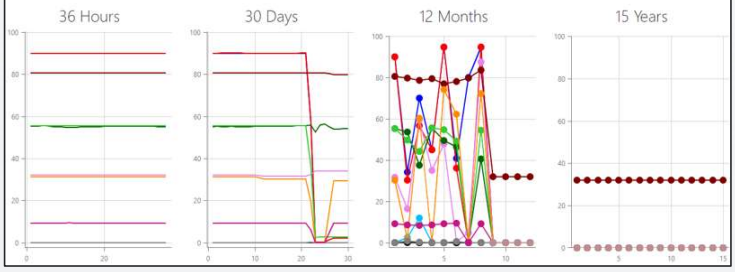
End-to-end Solution

RedRaven is an end-to-end solution to support you throughout your entire IoT journey

Agnostic: Connection, Protocol, Platform, Vendor



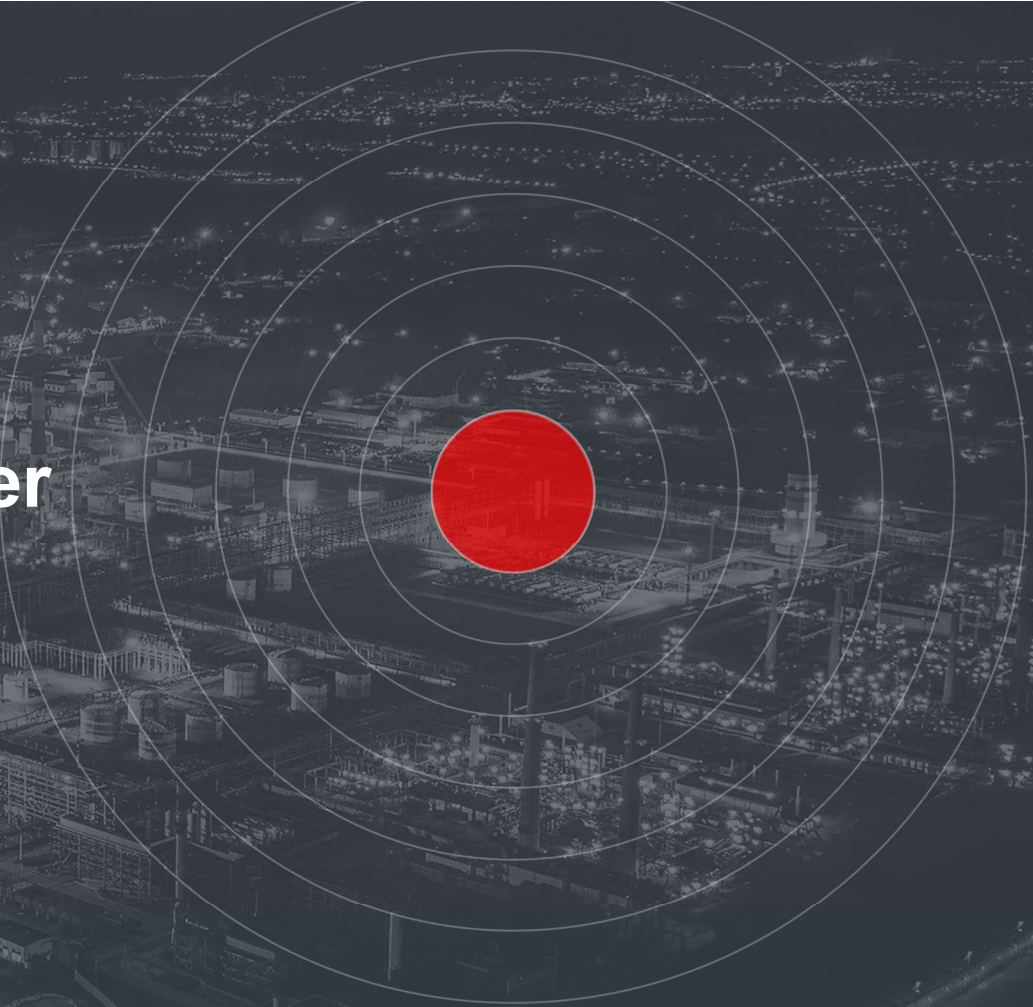
Key differentiators

Feature	RedRaven	Other Asset Management System Platforms
Expertise on demand	<ul style="list-style-type: none"> • Remote Monitoring • Failure notification, enabling serviceability • Global Quick Response Center (QRC) footprint 	-
Visibility – Multiple sites	<ul style="list-style-type: none"> • One package –Notifications (emails / NE107) • Comprehensive asset health view across multiple sites and asset management system platforms 	<ul style="list-style-type: none"> • View a single site with only one asset management system • Incompatible with multiple sites across different asset management systems • Multiple packages / add ons \$\$\$\$
Data	<ul style="list-style-type: none"> • Resolution intact • Continuous capture and storage • Detailed historical information captured  <p data-bbox="1086 965 1209 1077">More than 500 Data Points in a few days</p>	<ul style="list-style-type: none"> • Loss of resolution with limited parameters captured / trended • Overwritten on a 30-, 60- or 90-day cyclical basis • Positioner has limited memory and is overwritten via first in, first out (FIFO) log  <p data-bbox="2004 1021 2184 1077">15 Years (78 Data Points)</p>
Failure detection and analytics	<ul style="list-style-type: none"> • Packing leaks in control valves • Signature comparison 	-
Valve information	<ul style="list-style-type: none"> • Ability to connect to asset documents - IOM, images, links to birth certificate 	-
Pumps, valves & seals	<ul style="list-style-type: none"> • Detailed, holistic information on a flow loop 	-



Flowserve Monitoring Center

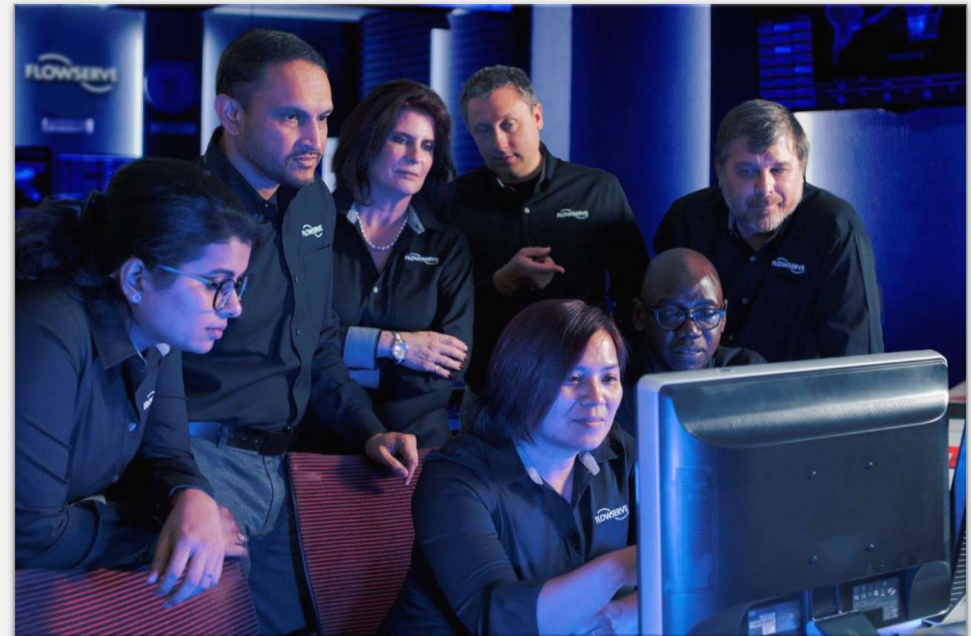
Insight Portal





What is Flowserve Monitoring Center (FMC)?

- A state of the art facility with a dedicated monitoring team to analyze Customer's asset performance
- The FMC will alert operators of equipment anomalies to reduce unplanned downtime
- The FMC provides remote technical support and deploys resources as required to address equipment issues before impacting Customer operations
- A staff of experienced vibration engineers, technicians, data analysts, and project managers guide Customers and keep their equipment online; running at peak efficiency
- With several years of aggregate data, in conjunction with vibration engineering principles, the FMC can provide Customers with deeper insights to drive optimization

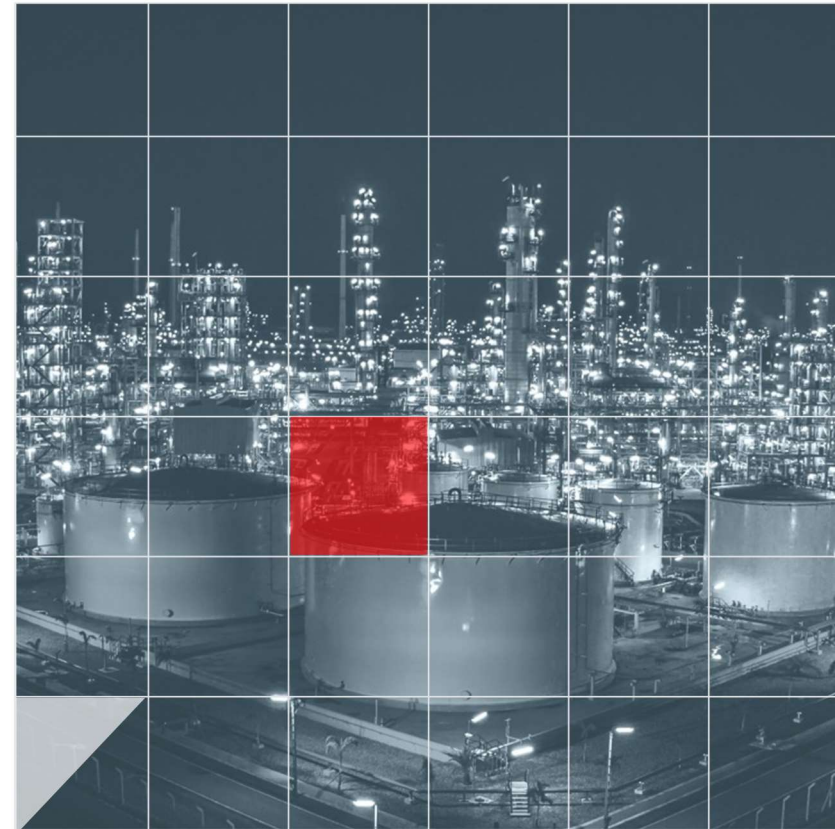
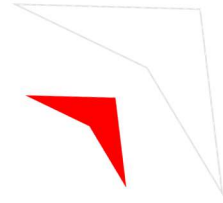




Summary

RedRaven enables you to transition from a **reactive** to **proactive** approach to:

- **Reduce costs** by avoiding unexpected downtime and emergency repairs
- **Empower maintenance staff** via “expertise on demand”
- **Improve plant efficiency, productivity and profitability** through more optimized equipment
- **Reduce equipment lifecycle costs** through improved equipment efficiency
- **Engage Service & repair support**





Knowledge Drives Action

Predict.

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



Act.

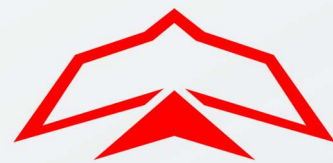
Make informed decisions to minimize disruptions and downtime and improve plant performance and reliability.



Protect.

Protect your operation against equipment downtime and production impacts.





REDRAVEN™

PREDICT. ACT. PROTECT.

Thank You!

