Live Demonstration: Cloud Based Rotating Machinery Fleet Wide Condition Monitoring

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Abstract: Fleetwide Monitoring (FWM) is the implementation of applications for monitoring, maintaining and optimizing assets from a centralized location. Fundamentally, FWM involves monitoring assets within a fleet of assets to detect operational and equipment problems earlier enough to mitigate damage, manage risk, identify performance problems, and manage business and market conditions or risks. A key part of FWM involves the use of advanced online monitoring technologies. The goal of FWM is intelligent top-down approach to plant maintenance and scheduling. The goal is accomplished by the move toward centralized monitoring and diagnostic centers, with the integration of advanced monitoring applications.

Description and Technical Specifications

The NI InsightCM™ Enterprise Server running in the cloud is connected to multiple cRIOs (running in the National Instruments office in Austin, Tx). Each cRIO is hooked up to a DSA demo box. We utilize the tachometer signal directly from the demo box to acquire the speed wired to the first channel of the 9232 module in slot one, there are two accelerometers mounted in the X & Y direction to the "bad or broken" fan connected to channels one and two of the second 9232 module, and a thermocouple wired to the 9211 module in slot 4

Specifications

- 1 Amazon Cloud in Santa Rosa (Ca)
- 4 CompactRIO running in Austin (Tx)
- 1 S&V DemoBox simulating good and bad fan's
- Vibration signals + tacho speed
- 1 Laptop running in Milan
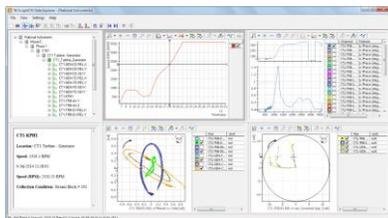
Software equipment

NI InsightCM™ Enterprise

NI InsightCM™ Enterprise is a deployment software solution with tightly integrated hardware options for online Condition Monitoring

Utilization

This setup represents a Balance of Plant or ancillary piece of equipment typical in many industries and plants. The system is designed to not only monitor vibration data, but to monitor a wide range of other sensor types which will be encountered in a typical plant/application. This includes displacement, speed, temperature, pressure, oil particulate analysis, etc.

The system allows maintenance and equipment specialists to perform in-depth, interactive visualization and analysis of real-time and historical condition monitoring data. With this application subject matter experts have the ability to:

- Connect remotely to InsightCM servers and visualize the raw time waveform data and historical feature trends
- View transient streaming events in real-time
- And use industry-standard vibration plots to perform comparative analytics.

References

[1] Preston Johnson*, "Smart monitoring and diagnostics: new technologies, new challenges" Comadem 2014, 27th International Congress of Condition Monitoring and Diagnostic Engineering*