Shedding Light on “Dark Data”

Compressor Data with OMF and Monico’s mCore®SDR at MPLX Gathering & Processing
MPLX Gathering and Processing

- Subsidiary of Marathon Petroleum
- Midstream Gas Gathering and Processing Business
- 45 facility locations
- 7.5 BCF/Day processing capacity
- 325,000 BPD Fractionation Capacity
Monico is a supplier to end users and their integrators for industrial data acquisition, protocol conversion, data analysis, and custom monitoring solutions.

About US

- We’re in the business of Industrial Data communications
- Monico is a Preconfigured Solutions Company
- We offer superior Customer Service and Support
**History with OSIsoft**

**MPLX G&P History with PI System**

- Customer since 2012
- Non EA License Agreement
- 350,000 tag license (always growing)
- 70 OPC Interfaces
  - All plant facilities
  - All Field SCADA systems
- 115 individual compressors via Modbus
Monico’s **History with PI System**

- OMF Protocol embedded into mCore® SDR
- **MonicoLive™** Remote Monitoring
  - Web Based OSIsoft PI System Solutions
  - Cloud Analytics Capability
  - Subject Matter Expertise
**Business Case**

**What we wanted to do:**
Capture operational data from compressors
Leverage our existing OSIsoft PI System Solution

**Why we wanted to do it:**
Improve reliability management
Increase utilization and efficiency

**What we needed to do:**
Determine how to get data from all of the compressor sites
Integrate compressor site data into OSIsoft PI System
Different models of engines and compressors, with varying industrial protocols made capturing data from the edge environment a challenge.

- 850+ compressor units across large geographic footprint
- Different systems (e.g., engines, controllers) report different data
- Most compressor data not reported at all
- Need consistent data across the fleet to improve efficiency and utilization
- Don’t burden SCADA network!
Solution Details - Expectations

• Provide **consistent data** from all units (~250 tags)
• Utilize **modern protocols**
• Provide **consistent calculations** for all units
  • 12 AF compressor templates
  • 20 unique analyses, 3,000 total and growing
  • 150 instances, growing to 850
Solution Details - Expectations

- OMF creates AF structure and PI server tags
- Solution is tolerant of data connection outages
- All compressors have identical tags and AF structure
- AF SDK will be used to incorporate manufacturer compressor calculations
mCore®SDR is Monico’s Flagship Next Generation hardware platform for remote monitoring, telematics applications, and edge analytics.

mCore®SDR is a:
- Protocol Translator
- Secure Edge Device Gateway
- Edge Analytics Device

Features:
- Industrial Cybersecurity
- a Rugged Package (IP66 and IP67)
- Haz. Loc. Approved (Class I, Div II) Maximum
- Computing Power, Speed, and Efficiency
Solution Details – Data Acquisition

What does mCore® SDR provide?

mCore® SDR provides a gateway for collecting multiple sources of data through physical ports and routing that data to the appropriate places.

**Physical Ports**

1. Proprietary CAT Data Link (CDL) Port
2. CANbus Ports
1. RS-232 Serial Port
1. RS-485 Half Duplex Serial Port
2. Physically separated Ethernet Ports

**MULTIPLE PROTOCOLS INPUT AND OUTPUT SIMULTANEOUSLY**
Solution Details – Data Acquisition

What does mCore® SDR do?

Supported Protocols

- Cat® Data Link input with Write Capability
- S.A.E. J1939 Input and Output
- Modbus RTU and RCP / Master and Slave
- OSI Message Format (OMF) for OSIsoft PI System
  - Supports Data Buffering for Data Fidelity and Compression
- MQTT Sparkplug B
  - Supports Data Buffering for Data Fidelity
- MQTT for Amazon Web Services
  - Supports Data Buffering for Data Fidelity
- Rockwell Allen Bradley Controller Tag Read and Write
Solution Details – Data Acquisition

How was mCore®SDR used?

MPLX G&P Data Stream
- 262 Engine Parameters
- 94 Compressor parameters
- 10 Event Codes
- 10 Diagnostic Codes
- Compressor First Out Code

Report Parameters
- All parameters sent at startup
- All parameters evaluated for Exception each second
- Each Parameter Time-Stamped and Buffered
Solution Details - Topology
Data generated on the Asset can be collected from multiple sources.

**Step 2: Edge Data Transmission**

- **mCore® SDR Data Flow (Compression)**

  **Edge Networks/Sensors**
  - External Sensors
  - Compressor PLC
  - Engine Network
  - RS232 (Analog/Digital)
  - RS485 (ModBus)
  - J1939
  - Cat® Data Link (CDL)

  **Data Haul Options**
  - Antennae
  - Wireless Client
  - Ethernet (TCP/IP)
  - MQTT
  - OMF

  **Data Collector/Aggregator**
  - Protocol Convertor
  - Edge Analytics
  - Data Prep for Transmission
  - Data Logging

  **Data Buffering**
  - Data buffering is imperative when remotely monitoring over potentially inconsistent network connections to minimize the risk of data loss.

  **Data is transmitted using Bi-Directional Authentication, Encryption and Compression.**

  **Data is sent for storage in the OSIsoft PI System.**
What’s the future of ICS Network Security?

1. mCore®SDR collects data from various source devices in the field, then publishes requested data at the desired rate to multiple destinations.
2. Multiple Data Streams: The same data streams can be sent to multiple subscribers.
3. mCore®SDR is capable of 100+ simultaneous Ethernet connections.
Solution - Benefits

- Consistent data across fleet
- Consistent analysis of unit data
- Improved utilization and efficiency of units
- Integration with existing OSIsoft Solution
- Improved visibility of compressor site operations
- Reduction in field equipment required to collect data

Replaced industrial PCs, Protocol convertors, etc.
### CHALLENGES
- 850+ Compressors with stranded data
- No visibility into performance
- Sporadic visits to tune performance
- Separate reliability data from control

### SOLUTION
- Monico mCore on each unit
- Radio network at station
- Dedicated cell APN data backhaul

### BENEFITS
- Consistent data across fleet
- Consistent analysis of unit data
- Improved utilization and efficiency of units

*Provide **consistent data** from all units utilizing a solution which is **tolerant** of data connection outages*
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Questions?

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