



WHAT'S THE QUICKEST WAY TO CONNECT FIELD DEVICES AT THE EDGE TO SYSTEMS AND SOFTWARE WHERE THEIR DATA IS NEEDED?

Using Opto 22's *groov* RIO, INS engineering teams have helped implement secure, connected automation and monitoring for many distributed systems like public utilities and oil and gas producers. *groov* RIO modules are standalone, remote, Ethernet-based edge I/O that combine sensing, communication, storage, and computing power.

- 8 multifunction, multi-signal channels + 2 relays
- 2 Ethernet ports with support for Power over Ethernet (PoE)
- Browser-based configuration and IoT programming
- 4 PID control loops
- 4 GB of user storage on industrial eMMC
- Class 1/Div 2, UL Hazardous Locations, UL approved, and ATEX compliant
- MQTT Sparkplug, Modbus, and Node-RED connectivity
- User management, device firewall, SSL/TLS encryption



Past INS Projects with *groov* RIO

PUMP SYSTEMS IOT

Objective:

- Record vibration, pressure, vacuum, temperature, and flow data on pumping systems
- Model system performance at the edge and send to the cloud for visualization, monitoring, and historization

INS captured sensor data using *groov* RIO's integrated I/O, then prepared and transmitted data using the embedded Node-RED programming environment. INS used Node-RED to calculate performance metrics, format the data for use with the customer's IoT platform, and transmit data to Microsoft Azure, which hosts the service.

REMOTE WATER/WASTEWATER

Objective:

- Replace expensive, telephone-based infrastructure
- Add remote alarm monitoring to field assets
- Send notifications to field technicians' smartphone

INS installed *groov* RIO modules at each of the 17 lift stations, pump stations, and water towers throughout the city; connected them to local I/O signals; and used Node-RED to define and monitor alarm limits. When alarms occur, the modules send SMS messages to technicians over a Verizon cellular connection containing the location and type of each alarm.



CONNECTED OIL & GAS

Objective:

- Integrate four flow gauges on a pipeline system into a cloud historian
- Send data to local digital flow recorders via Modbus

groov RIO modules provide a native Modbus mapping of all I/O data. INS configured four channels to read the 4-20 mA signals from the flow sensors and then configured the chart recorders to read directly from the module. In parallel, the Node-RED program running on the module publishes flow data directly to Microsoft Azure, where it is historized.

PROOF OF CONCEPT

Objective:

- Design an end-to-end IoT solution to capture KPI data on pump equipment
- Display data, trends, graphics, and alarms on an easy-to-use IoT cloud platform
- Make data accessible via a standard web browser or smartphone application

Using a *groov* RIO in combination with a Digi WR31 cellular modem, INS can securely broadcast up to 10 I/O signals to internet-connected applications, like the IoT platform Exosite. With an Exosite instance running on Amazon Web Services, INS wrote a Node-RED program for the *groov* RIO to communicate the pump KPI to Exosite directly from the edge. To provide stability and fault tolerance, INS also wrote a store-and-forward routine to historize data directly on the module and publish it to Exosite only when the connection is stable.



SCADA MODERNIZATION

Objective:

- Modernize municipal water distribution
- Minimize disruptions to customers and well owners
- Install new SCADA systems with room to expand

At each of the 65 well sites, INS replaced the existing relay-based controls and buried electrical circuits with *groov* RIO modules and PepLink cellular routers. Each site wirelessly connects to the central plant over a private Verizon network, which is not accessible to anyone outside of it. INS also installed an Ignition SCADA system to provide visualization and monitoring of the well water system and monitoring of the well water system to operators in the water plant and in the field, on their smartphones.



About INS

INS is a pioneer in the Industrial IoT space and is one of the largest VARs in the world solely focused on this rapidly growing market. In addition to stocking and selling the leading industrial and Enterprise M2M/IoT products, we also have an experienced engineering team, which assists our customers with troubleshooting existing networks, as well as designing and implementing new industrial IT infrastructure.



About Opto 22

Opto 22 designs and manufactures industrial control products and internet of things platforms that bridge the gap between information technology (IT) and operations technology (OT). Based on a core design philosophy of leveraging open, standards-based technology, Opto 22 products are deployed worldwide in industrial automation, process control, building automation, industrial refrigeration, remote monitoring, and data acquisition applications.