Devon Energy Implements XetaEdge9 and Node-RED for Flare Deluge

At oil and gas extraction sites, it is common to see gas flares or flare stacks. Flare stacks are used for several start-up, maintenance, testing, and safety purposes as well as to dispose of unwanted petroleum gas. One automation application is Flare Deluge. Flare Deluge is the process of injecting natural gas to displace the oxygen in the flare line.


Equipment typically used for Flare Deluge consists of a programmable logic controller (PLC) or remote terminal unit (RTU), solenoid valve, temperature sensor, and a wireless device. The PLC or RTU is programmed to accept input from the temperature sensor, control the state of the solenoid valve, and communicate with a SCADA system. The temperature sensor is used to measure the temperature within the flare line while the solenoid valve is used to control the injection of natural gas. A wireless device is the mechanism for communicating between the SCADA system and the PLC or RTU.

Issue – Obsolete RTU
The RTU that Devon Energy Company used for their Flare Deluge application was no longer available. They had three options to replace it: (1) install another RTU, (2) install a PLC, or (3) pursue a different solution involving edge computing and Node-RED.

Solution – XetaEdge9 Edge Computer w/900 MHz Radio & IO
A XetaWave XetaEdge9 edge computer with integrated wireless capability and programmable input/output (I/O) signals was the selected as the ideal solution. The XetaEdge9 provides a platform to host and run Node-RED, offers the programmable I/O necessary for the application, and provides the wireless connectivity to its existing SCADA system with an integrated 900 MHz IP/Ethernet radio.
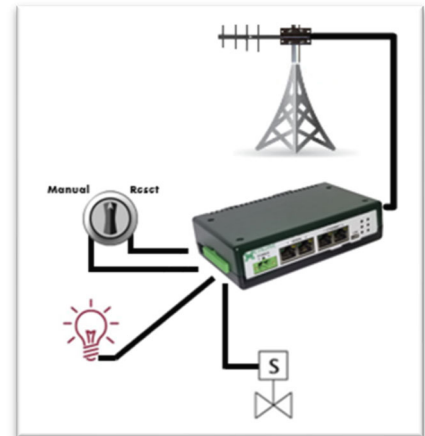
Node-RED Application Developed for Flare Deluge
Devon Energy developed the complete Flare Deluge application in Node-RED which mirrored the exact performance and functionality supported by the now obsolete RTU.

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The Flare Deluge application consists of the following six Node-RED flows:

1. System Info collects information on the XetaEdge9, including IP address and up time, and configures NTP.
2. Startup initializes the application, sets the programmable I/O, and reads the XetaEdge9 operating voltage.
3. Deluge monitors the temperature sensor and momentary switch, performs necessary calculations, and controls the solenoid valve.
4. Deluge Setpoints stores the various set points to files.
5. MQTT reports changes back to a MQTT broker and publishes to Devon's control application.
6. Modbus Server allows Devon's Cygnet SCADA application to monitor performance of the Flare Deluge application.

Remoting Monitoring using Modbus and MQTT

The implementation enables Devon Energy to monitor the system remotely by using both Modbus and MQTT. In addition, a web user interface (UI) running on the XetaEdge9 allows local control and monitoring of the application.
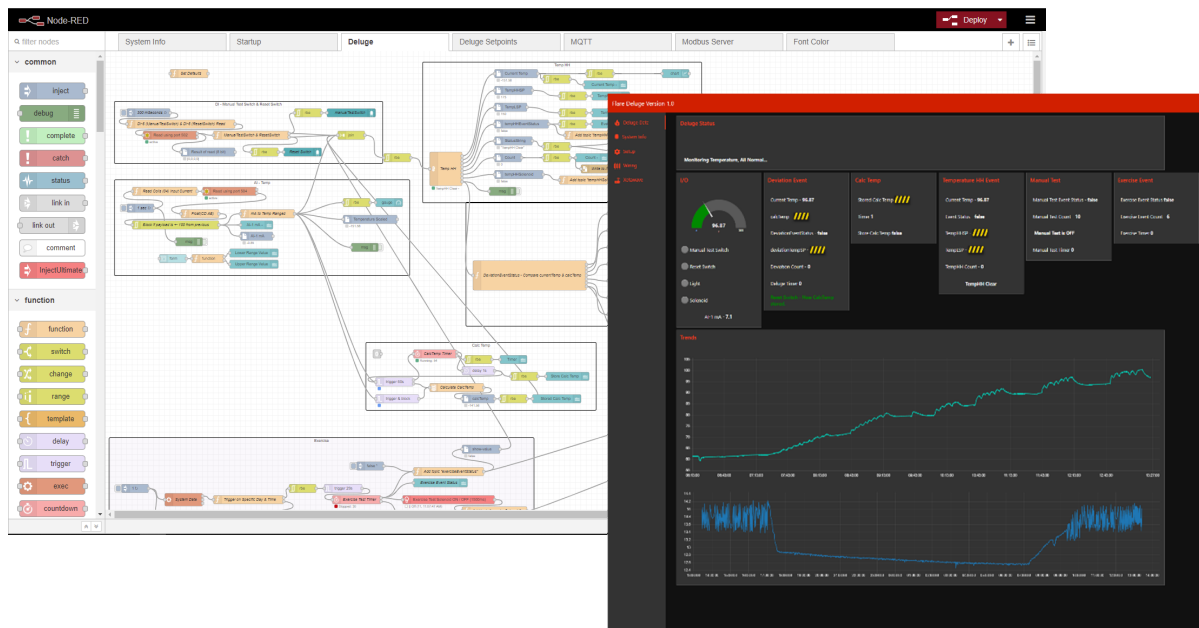
XetaEdge – Lower Cost Solution to Implement & Maintain

Once the Node-RED application was completed and the other applications installed and configured, the end user was able to mirror the internal FLASH to a micro-SD card and use the micro-SD card to replicate to other XetaEdge9 units which reduces setup and deployment time. In addition, using XetaEdge9 with programmable I/O and Node-RED provided Devon Energy with a lower cost solution that uses state of the art technology and fewer products to implement and maintain.