

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.

One automation application is Flare Deluge. The purpose of the Flare Deluge is to cool the flame arrestor while displacing any 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. The wireless device is the mechanism for communicating between the SCADA system and the PLC or RTU.

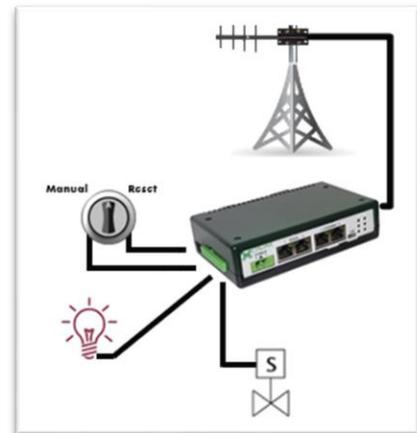


Issue The RTU Devon Energy used for its Flare Deluge application was no longer available. Devon Energy was left with the decision to replace the RTU with another, a PLC, or to pursue a different solution involving edge computing and Node-RED.

Solution A XetaWave XetaEdge edge computer with integrated wireless capability and programmable input/output (I/O) signals was an ideal solution. The XetaEdge9 provides a platform that can host and run Node-RED, offer the programmable I/O necessary for the application, and interact wirelessly with the SCADA platform.

Node-RED Implementation

Devon Energy developed the complete Flare Deluge application in Node-RED, which mirrored the exact performance and functionality supported by the now obsolete RTU.

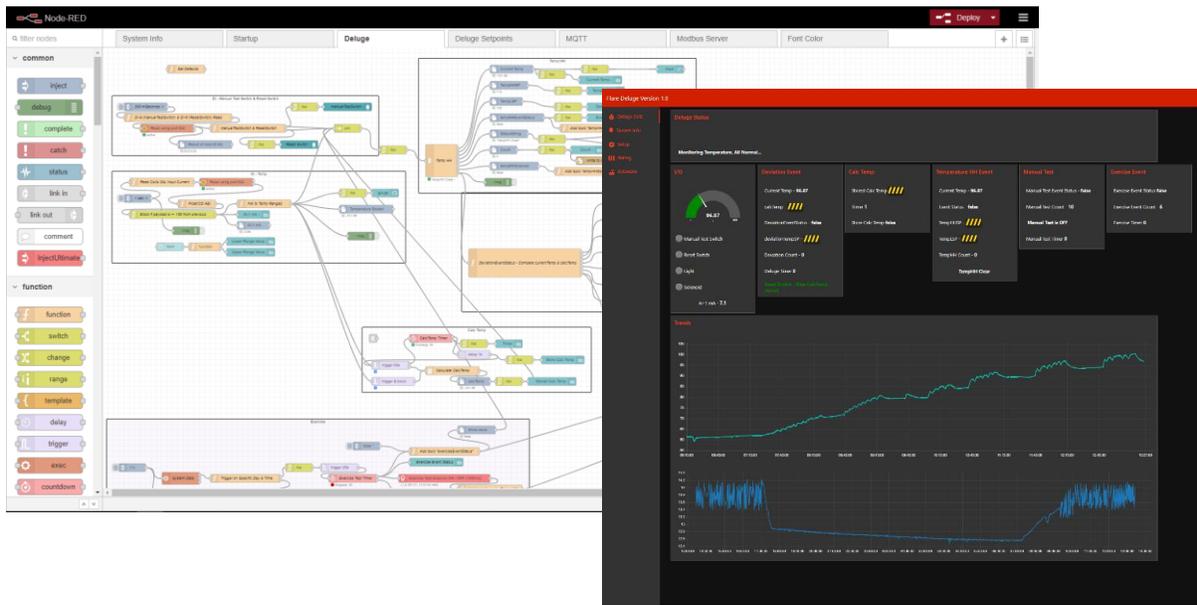


The Flare Deluge application consists of the following six Node-RED flows:

1. System Info collects information on the XetaEdge9 to include IP address and up time as well as 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.

Case Study: Flare Deluge Using the XetaEdge and Node-RED

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.



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