Saint John Energy SCADA SYSTEM OVERVIEW

Request for Information

SCADA Systems

Tuesday, May 1st, 2018

Contents

1. Company Profile

Saint John Energy is officially known as "The Power Commission of the City of Saint John". It was formed in 1922 as a Commission of the City to distribute electricity to the citizens of the City of Saint John. Saint John Energy presently serves approximately 36,400 customers. Saint John Energy operates and maintains approximately 590 km of overhead and 170 km of underground distribution lines with 63 - 12.47 circuits that have operating control at the substation level through SCADA. We have a total of thirteen substations, five (5) served from a 138kV transmission system, and eight (8) from a 69kV system. Our total substation capacity is 341 MVA with a peak load of 233 MW. Power purchased accounts for 85% of the annual budget. Saint John Energy does not own or operate transmission or generation assets.

At Saint John Energy, we are passionate about providing value to our stakeholders. Our customers, in particular, are central to every aspect of our operations as Saint John's premier provider of energy, excellent service and value.

Saint John Energy has obtained the CEA Sustainable Electricity Company ™ Brand and have identified core sustainability issues that are important to us and our stakeholders as per ISO 26000 guidance.

Our mission: We provide innovative customer-centered energy and utility solutions

Our vision: To be recognized as an evolving energy and utility leader

2. RFI Intent

Saint John Energy (SJE) wants to compare its current SCADA system that is described in the following sections with typical industry installations. SJE wants to modernize the system and ensure that it is able to utilize emerging technological opportunities such as those listed in section 7.0.

In responding please provide pertinent information including architecture, budgetary costs, and schedule that would include the recommended components that would comprise a SCADA system supporting a distribution utility of the future. Please include feature product and feature enhancements that are in the development funnel as well.

3. SCADA System Basic Operation

Our SCADA system is made up of dual redundant Masters communicating to remote terminal units (RTU) installed at the13 distribution substations. The SCADA Master polls each RTU for status and analog data to update the Master's point database. Each RTU collects data by polling connected station intelligent electronic devices (IED) and other connected input devices. All communication is currently done using the distributed network protocol (DNP).

SCADA operators using graphical user interface (GUI) client software connected to the Master can view data or alarms and interact with the system to operate controls. Typical control interactions include opening and closing of switches or breakers, resetting peak demands and disabling or enabling breaker reclosing.

SCADA data is replicated to a separate SQL server database for enterprise level consumption and archiving. A web client allows corporate users to read the replicated data and see a near real-time view of the system.

4. SCADA Master Features and Applications

1. Communications & Point Database

The point database is comprised of stations, communication channels, RTU's & IED's.

Stations – There are a number of stations setup for internal use (server and other processes using non-telemetered points) and remote use (representing substations or other locations using telemetered points). RTU's are children of stations and hold a database of telemetered points. RTU properties include the communication settings and addressing.

Communication channel – There are multiple lines of communication used to reach remote devices via serial data radios and Ethernet cell communication devices. RTU's or Single IED's could be linked to any communication channel.

Points – Status points (digital and analog input) are the majority of the points used in our SCADA system. Controls (digital outputs) are also used and are part of the Status point. Point properties are fully configurable including point naming command, status state strings and alarm priority levels.

2. Automated Routines & Automated Calculations

A major component of our SCADA is the use of custom scripts. Scripts are used to perform commands and perform various logic & algebraic calculations. Some custom scripts are written to automate processes such as peak load monitoring, carrying out voltage reduction functions or resetting monthly peak demands values.
Automated calculations are used for basic functions like continuously calculating total MW loads or calculating a demand value. Calculations can use either metered, non-telemetered or just numerical values. Calculations use basic mathematical or other functions.

Our system allows the use of a command sequencing scripts. During times of peak demand commands of this type are issued through the SCADA system automatically to substation power transformer's containing tap changers. The objective is to reduce voltage until the overall system demand is lower than the predicted peak.

3. Remote Annunciation

Remote annunciation is used in instances where the SCADA system is unattended. It is scheduled to be used by the system after hours and provides notification to a list of users by SMS text or email when a database point reaches alarm level.

4. Tagging, Guarantees & Switching Orders

Tags and guarantee types are fully configurable in SCADA to accommodate our work protection code. Guarantees can associate tags to points or tags alone can be created and attached to a point. Tags applied to status points with control can prevent SCADA control of that point. For example, a "Do Not Operate" tag will apply this functionality.

SCADA operators create step by step switching orders that include a list of apparatus operations, apparatus descriptions and their location. Switching orders are checked by a second qualified person before they are accepted and implemented. Switch operations can be configured to perform the actual command if the switching plan sequence line is attached to a telemetered point. SJE commonly uses open and close switching operations that physically performs the open and close on the substation breaker. All Guarantees and switching orders are created via the GUI client software and stored on the SCADA master. They are available to be viewed in the GUI client at any time.

5. Outage Management System

We do not have an OMS application installed on our SCADA system. See Section 7.4.

6. Multi-Speak (Data Sharing/Exchange)

Multi-Speak 4.0 Tomcat is installed but is not interfacing with any other systems.

7. Access and Control

SCADA user accounts are setup under the access section of the SCADA server software. User accounts are configured to limit the amount of control individuals have. Some users have read only access to the system while others have full control including modification of the SCADA system.

8. Historical Data Tables

Local historical data tables are used for short term retention of collected data (typically analog values). The tables are configurable with settings for the frequency and duration of data collection. For example a table can be setup to collect voltage data from one station every 10 minutes for 200 Days. Tables are also used within the GUI for trending graphs. The tables supporting the graphs can be opened and display values by selecting specific dates ranges. Any point in the database can be used in the tables (telemetered or non-telemetered) along with a number of filters that can be applied to each point such as maximum or minimum values between the collection intervals.

9. Reporting

The SCADA system provides a number of customizable reports such as events, tags, operational logs, outages, etc. Generic reports can also be created on any specific SCADA item such as notes, points, etc. Reports can be printed in PDF format to be distributed out.

10. Graphical User Interface (GUI Client)

Our client software provides the operator a customizable view of SCADA alarms and event logs. Operators use a schematic map to view status, analog values and control software macros. The map is fully customizable with available standard symbols as well as custom symbols. Other features include links to trend graphs, guarantees & tags and switch order creation & viewing. Currently GIS maps are not incorporated into the SCADA GUI client.

5. Station RTU

Remote RTU's are located at all SJE substations. The SCADA Master communicates to the RTU via serial (RS232) data radios as well as Ethernet connected cellular modems. A number of station IED's are connected to the RTU and polled for data via an RS485 serial network on different serial ports. Digital input boards are also connected to the RTU to monitor other

alarms such as battery charger status or door entry. DNP 3.0 is used as the protocol for all communications, both serial and Ethernet. IED mapping in the RTU is accomplished via an IED wizard application on the SCADA Master which builds the mapping tables automatically when the point database is created. The mapping file is transferred to the RTU through the Master to RTU communication channel. Current RTU's only support a single Master and DNP on all ports. All RTU's and associated equipment are powered by the station battery bank for uninterrupted operation.

6. SCADA Replication Service

The SCADA Replication Server provides replicated historical data tables, a system point database and other resources for the Archiver and SCADA web service.

The SCADA Archiver takes selected short term historical datasets and stores the data in a SQL database for long term historical data storage. Our system can store at least 10 years of historical data such as feeder and station loading (Amps, Voltage and Mega Watt values).

The SCADA web server provides a way for non-control room personnel to view SCADA without having to access the actual SCADA servers. Using a web browser connecting to the web server the user can see near real time data. The user interface on the web server is similar to the interface used by the system operators except control functions are disabled.

7. Future SCADA Requirements

1. Geographical Information System (GIS)

SJE has an electric geometric network built in ArcGIS / ArcFM 10.2.1. SJE wants the GIS map to be integrated into the SCADA system with minimal rework of the existing GIS network. The GIS network must be able to be used as a base map in the SCADA system. Please describe the use of GIS in your system solution.

2. Distributed Energy Resources (DERS)

With the onset of new technology SJE must future proof its SCADA system. We are in the process of connecting DER's to the system and need to have visibility into these systems through a connection to the SCADA system. Please describe the how visibility to DER's is achieved in your system solution.

3. Demand Response (DR)

Demand response is very important to SJE because of a large demand cost applied by our wholesale supplier. Demand response software must be included in the SCADA system that will enable SJE to reduce its coincidental monthly peak demand. Please describe how demand response is achieved in your system solution.

4. Outage Management System (OMS)

SJE is interested in deploying an OMS over the next four years. Please describe the OMS ability of your system solution. Can it easily be incorporated with our IVR system NuVoxx?

5. Automatic Vehicle Location (AVL)

SJE currently uses Kerr Global as its AVL provider. Please describe how your system solution incorporates AVL. Can our current AVL provider be easily incorporated into your proposed solution?

8. RFI Response Information

SJE will use the response information to make decisions for SCADA implementations. This information may assist us in the development and issuance of an RFP. If possible, please include in your response:

- Budgetary Pricing for each deliverable
- Quality of work and modelling methodologies
- Experience from similar projects
- Timeline for Deliverables

Your proposal is in response to a request for information and not a tender call. SJE does not intend to and does not assume or owe any contractual or other duties or obligations as a result of this invitation.

Please send any questions concerning this RFI to Sherry Ingersoll via email at supplyandservices@sjenergy.com We will be accepting responses to this RFI until **May 17th, 2018** by email or mail.

Our mailing address is:
325 Simms Street
Saint John, New Brunswick
E2M 3L6

Proposals for the work and the Deliverables should include the following information:

- A brief overview of your company
- Examples of previous engagements of a similar nature as the Deliverables
- Statement of services, scope, activities, and deliverables that could be provided
- Budgetary cost for each Deliverable, in Canadian Dollars
- Estimate timeline and work plan for each Deliverable
- Requirements and responsibilities of SJE during the work plan
- Any other information that you feel we would be interested in.