Bridging Cattron Remote IQ with SCADA

A White Paper by:

Seth Goldstein, IT Engineering Manager

Avanti Control Systems Inc.

sgoldstein@acsautomate.com

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Summary

Remote IQ provides an API to retrieve data coming from its Aquavx and EliteIQ devices that is stored in the cloud. Most SCADA systems use a Microsoft SQL database to store and retrieve data. There is no direct way to bring the data from Remote IQ to SCADA so we needed to build a bridge. To build this bridge we needed functions to pull the data down from the API and put it in the database and the second to pull the data from the database and put it into a tag. Some SCADA systems have integrated database read functionality, others do not and work arounds need to be created.

Introduction

Although Remote IQ provides a visual reference through its online dashboard it creates another location and window that needs to be open to view the current values of various devices that are attached to the Cattron devices. SCADA operators want to be able to see those values in a single pane of glass. We built a bridge that makes this possible.

Core Concepts

APIs (Application Programming Interfaces): Interfaces allowing software components to communicate.

Cattron RemoteIQ: A cloud-based telemetry monitoring platform developed by Cattron for real-time asset tracking, alarm notifications, and remote control of dispersed industrial equipment fleets, such as pumps, compressors, generators, and water/wastewater systems.

FactoryTalk View Site Edition (SE): A scalable HMI/SCADA software solution from Rockwell Automation designed for enterprise-wide monitoring and control of industrial processes, supporting distributed applications across multiple computers and users in site-level environments.

FactoryTalk View Machine Edition (ME): A dedicated HMI software from Rockwell Automation for machine-level operator interfaces, offering superior graphics, runtime user

management, and language switching, typically deployed on embedded panels like PanelView Plus for single-machine control.

FactoryTalk Tags: Fundamental data elements in FactoryTalk View applications that represent real-time variables or I/O points from PLCs, databases, or other devices; used for visualization, alarming, and control, with types including direct (device-linked), memory (internal), client (runtime-specific), and derived (calculated) tags.

Ignition: An integrated software platform for SCADA, HMI, MES, and IIoT applications developed by Inductive Automation, featuring unlimited licensing, modular architecture, SQL database-centric design, and cross-platform web-based deployment to enable scalable industrial automation and data connectivity across enterprises.

Microsoft SQL Server: A relational database management system (RDBMS) developed by Microsoft for storing, retrieving, and managing data in enterprise environments.

Single Pane of Glass (SPoG): A unified management console or dashboard that aggregates and displays data from multiple disparate sources in a single, centralized interface, providing comprehensive visibility, monitoring, and control to streamline operations and decision-making in IT, industrial, or observability environments.

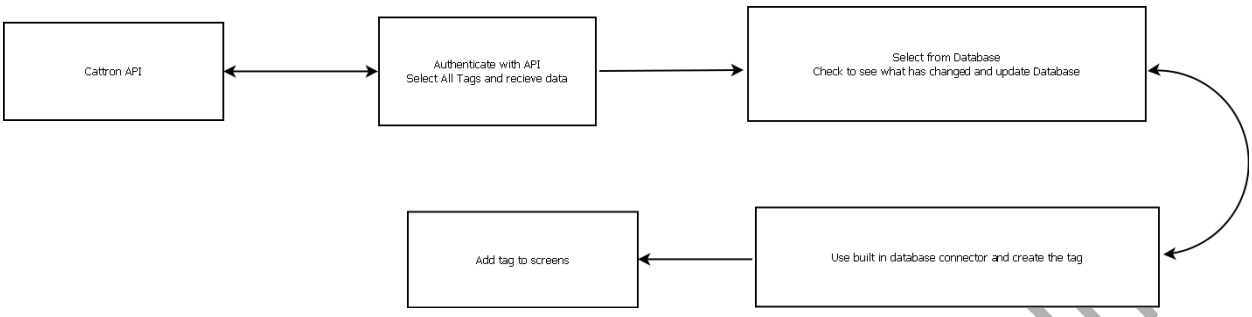
SCADA (Supervisory Control and Data Acquisition): A control system architecture comprising computers, networked data communications, and graphical user interfaces for high-level supervision of machines and processes, enabling real-time monitoring, data acquisition, and remote control in industrial automation environments.

VTScada: A comprehensive SCADA software platform developed by Trihedral, providing intuitive HMI/SCADA solutions for industrial monitoring and control, with features like scalable architecture from single-user to multi-million tag systems, advanced alarming, reporting, trends, and seamless integration with diverse hardware and protocols.

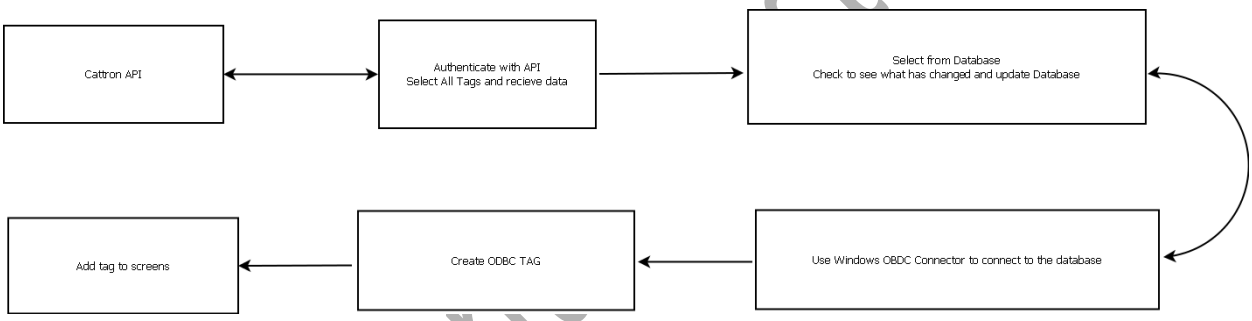
Fundamentals of the bridge

We use a database to make a bridge between the API and the SCADA system. There are 3 different methods of completing the bridge. They all use the same initial method of receiving the data from the API and inserting it into the database using a python script. From there then it is a methodology of connecting the SCADA to the database and getting the data into the tags.

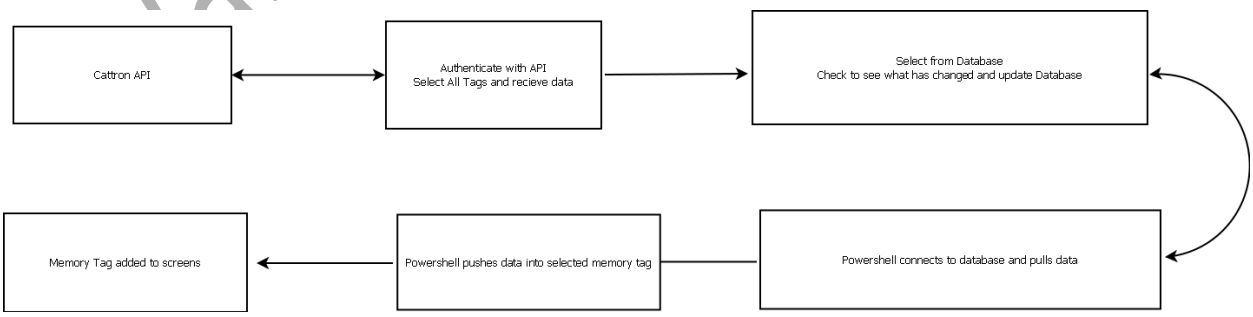
The first method is the most direct and uses the integrated database connector like is available in Ignition.



The second method uses a pull via a the built in Windows ODBC connector. This brings the data directly into the SCADA and can be associated to the tag and then it is easly monitored. VTSCADA and IFix are examples of SCADA systems that use this type of methodology. Other SCADA systems that have this type of functionality should work as well.



The third method is slightly more involved because the Rockwell Factory Talk SCADA system does not have a native ODBC connection that allows for custom table reading, nor can it use the Windows ODBC connector. We had to create a custom powershell script that reads the database then uses the internal Rockwell cmdlets to put data into a memory tag at regular intervals. That script then needed to be added to the startup macros so that it would load and start running when the Factory Talk client started.



Best practices and Security Concerns

When setting up the python script, it is important to note that the username and password for the RemoteIQ API and the database user is stored in plain text. It is important that you do not use your administrator credentials and use a read only api user credentials for the API. It is also important to use restricted user credentials that only have update / read access to the table in the database that data is stored. This also goes for the FactoryTalk powershell script. This methodology also requires internet access for the script to have access to the internet. To mitigate this, firewall rules should be used to limit outgoing access to API addresses and ports.

Future Development to remove the need for a bridge

If API reading functionality was implemented within the SCADA programs this bridge will become unnecessary. Cattron is working with VTSCADA to develop a MQTT solution to bring the data in directly, but this does not address other SCADA systems.

Conclusion

While some programming is required to complete the bridge once the bridge is established minimal user intervention is required. It is a valuable time saver for operators as they no longer need to view RemoteIQ to see data in a different interface.

Acknowledgments

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