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Integrating SCADA and Sap Operations for Electricity Process Automation

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ABSTRACT

Industry has made some of the cities to associate with the highly developed cities where SCADA has gained its importance. Its remote system for power management promises to reduce failure rectification time by over 60 per cent. Delhiites have long suffered problems in electricity distribution. However, their worries now seem to be almost over with industries managing the supervisory act by acquiring data (SCADA).

KEY WORDS: SCADA, Electricity.

1. INTRODUCTION

SCADA is a giant leap in automating the total process of electricity management. It integrates geographical information system (GIS), and distribution management system this will cause enormous quality in operation of the system.

To make a reliable and secured and efficient supply of power, the automated SCADA and GIS systems have been put in place. The entire electrical network is being mapped through GIS. This along with SCADA is leading to quicker fault locations and speedy redressal of faults. The management system, utilizes GIS, to locate areas that are affected and allocate the maintenance team to achieve a speedy response

What does SCADA do: A SCADA system is used for supervising a chemical, physical or transport process? Integrated with power system management application functions, it provides an integrated distribution management system to improve the reliability of power supplies, manage the load effectively, reduce restoration times and increase the utilization efficiency of the network equipment.

The functions of SCADA are:

- Real-time data exchange
- Real-time data processing
- Tagging
- Supervisory control
- Switching orders
- Load shedding and restoration.

Its DMS functions are:

- Operational monitoring
- Fault isolation and system restoration
- Variable reactive power (VAR) control.
- Voltage control
- Distribution power flow
- Load forecasting
- Calculation of quality service indices.

The Concept: The term 'SCADA' usually refers to a centralized unit that completely supervises the entire area. The centralized site is supervised and controlled automatically by a remote terminal unit (RTU). Supervising capability is limited to Host control functions

Data's that are captures are initialized at the terminal unit and logic control unit. They contain values taken from meters and the status of the device are communicated .Controlling operations of the data are analyzed and modified by human machine interface. It is authorized to decide factors related to supervisory act .These informations are essential that may be required to supersede controls issued by terminal and logic control units.(SCADA is an integration of HMI, controllers, input/output (I/O) devices, networks, software, etc.)

Human – machine interface.HMI assembles data from the rationale controllers or remote units utilizing by means of some type of specialized strategy, and consolidates and configurations the data to perform more operations naturally. A refined interface may be utilized for the database to give moment inclining, indicative information, planned upkeep methodology, logistic data, and elaborated schematics for a specific sensor or machine, and master framework inconvenience shooting aides.

Hardware solutions: For SCADA usage, commercial enterprises has worked with a percentage of the best names in the business including:

- ABB (Sweden) for fundamental SCADA innovation and essential hardware adjustment.

- Barco Control System (Belgium) for substantial video screens.
- Honeywell Automation for essential hardware adjustment.
- Reliance Infocomm for fiber-optic correspondence.
- HECL for move down correspondence framework utilizing V-Sat correspondence.

SCADA arrangements regularly have conveyed control framework segments. Utilization of "efficient" RTUs or PLC, which are prepared to do self-rulingly executing straightforward rationale forms without including the expert PC, is expanding. A functional programming dialect, IEC 61131-3 is used for programming which keep running on these RTUs and PLCs. This permits SCADA framework specialists to perform both the outline and usage of a system to be executed on a RTU or PL perform both the design and implementation of a program to be executed on an RTU or PLC.

Framework segments: The essential segments of the framework are

- Multiple RTUs
- Master station and HMI PCs.
- Communication base.

Remote terminal unit: The RTU is attached with physical gear and peruses status information. For example, the open/shut condition from a switch or a valve, quantities like pressure, stream, voltage or current. By sending signs to gear, the unit can control the switching operations.

It can read computerized information and simple estimation information, to convey advanced summons or simple set points.

A vital piece of the SCADA usage are alerts. Alert is a computerized indication point which indicates the quality "typical" or 'caution'. Alerts are given when their criteria's are met. The SCADA administrator's consideration is attracted towards the piece of the framework requiring attention.

Master station: It refers to the servers and their corresponding programming concepts which in turn is used to transfer information to the hardware units and then to the HMI programming running on workstations in the control area, or at other places. In littler SCADA frameworks, the Master station might have only a PC. In bigger SCADA frameworks, it might incorporate various servers, conveyed programming applications and debacle recuperation locales.

Correspondence base and techniques: A definitive motivation behind the correspondence capacity in procedure observing and control is to accomplish most extreme framework consistency. The information transmission system might bolster updated solid and proficient data throughput specifically for short and dire messages with restricted transfer speed.

SCADA frameworks have generally utilized blends of radio and direct serial or modem connections that meet the necessities. Industry SCADA framework depends on fiber-optics and V-Sat to meet the prerequisites.

System used for SCADA communication include:

- Metallic cable
- Two-way land mobile radio
- Trunked radio
- Multiple address system
- Spread spectrum
- Microwave
- Satellite
- Cellular telephony
- Power line carrier
- Fiber optics

Benefits of SCADA system: The benefits of SCADA include monitoring and control from one place. The various trends and reports can be generated from the SCADA system.

Single view of entire network: In the HMI, the grids are represented by single-line diagrams. Similarly, over-view diagrams are prepared that show the entire network connectivity. These can be viewed on a large screen. This helps the operator in finding alternate paths in case of a fault in a particular section of the network.

Remote monitoring: Acquiring data at the central place helps in close monitoring of the system and fast decision making. As the data is available at one place, it gives a much clearer view of the system performances and any discrepancy can be removed. Also, with this centralized data acquisition, preventive actions can be planned and implemented.

Reduced outage downtime*:* As the operator at the central control room is immediately intimated through alarms and events of the SCADA system, the outages can be restored faster, thereby reducing the downtime.

Better voltage quality: As the voltage parameter is one of the telemetered parameter, any discrepancy, viz, low voltage or high voltage, can be improved and a good-quality voltage profile maintained.
Pinpointing and isolation of faults: The DMS software module identifies the exact location of faults and suggests alternate paths for the affected areas, which can be restored immediately. This reduces the number of customers affected due to a fault.
More accurate information: As the data of the entire network is available at the control centre, with very precise information of the location and type of fault that has occurred, the customer can be fed with accurate information of the nature of fault and probable time of restoration.
Reduced technical losses: Input energy from the DTL and the energy received at the grid station are measured and the difference of the energy is known as transmission losses. Once the data is available at the control centre, steps are taken accordingly to reduce the losses.

2. CONCLUSION

Industrial automation technology is certainly progressing at a fast and furious pace, but not without caution. No discussion on trends in the automation space can be complete without speaking of the security concerns therein.

Machines often work at such high speeds that it becomes difficult for humans to intervene and bring them to a halt. This is especially so in the case of processes that gains momentum very swiftly. Should something go wrong, these also race at an equal or greater speed towards catastrophe! The Three Mile Island, Chernobyl and Bhopal disasters are examples.

Therefore building sufficient security into automated systems is a perpetual challenge, given that security measures need to be as sophisticated as the processes and machines they monitor. So we must always keep in mind that automation needs to be trusted only to an extent, and a 'hand brake' should be entrusted with the users!

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