



# **Improve Data Transfer Speed for Plant Controlling and Monitoring**

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**ABSTRACT:** Data manager is designed to accept various process inputs (Current, Voltage, RTD, and Thermocouple) simultaneously with facility of all inputs. A gateway is used to convert one protocol to another. In this paper, it proposes a design for high data transfer rate and length for data monitoring and reporting. This can be used in industry. Gateway used for long data transmission. Modbus TCP/IP have higher data transmission rate than serial RS-485. I am using NT-50 RS-EN gateway with Modbus TCP/IP communication for connecting it with SCADA. SCADA is used for monitoring and reporting purpose.

**KEYWORDS:** Modbus TCP/IP, Gateway, Increase data transfer rate, Reporting in SCADA.

## **I. INTRODUCTION**

Information (data) is key parameters for controlling any industrial plant. If we are not sending data to control centre at right time then it will cause difficulties. So we must have to transfer data as fast as we can for taking corrective decision and also save that data for future use to the upper management level. All Instruments have different scan rate means all instruments take data from plant with various scan time. So if we are using very high speed protocols at field side for transferring data, then it will take only same data from plant. So it will not appropriate solution for high speed and higher length data transmission. So we have to find solution which is fulfilling our scan time specification and also data transmission problem. Here we are giving solution for both problems.

In this paper, it proposes design of fast data transmission for higher length for monitoring and controlling purpose. We are transferring data from field side to control centre. Instruments using in field side are compatible with RS-485 (Serial) communications. RS-485 has slow data transmission speed for long distance so it is not used in monitoring and controlling purpose. For fast data transmission, we have to convert one protocol to another protocols using Gateway. It is also known as protocol converter. By using gateway we achieved fast data transmission speed for long distance. Here in this paper I am converting serial communication protocol into Modbus TCP/IP. There are also other protocols which have higher transmission speed compared to serial like Profibus. So we can use any gateways for fast data transmission and send it to control centre for controlling and monitoring.

In this paper, it proposed design of making report of instruments data using SCADA for future use. If we are making report system, when any event occurred in plant, then it will also use in future when same types of event occurred and taking corrective decision for controlling. These report system also use to send it to upper management level by mailing features of SCADA. When any events occurred according to our logic, then automatically report is generate and also send it using E-mail features.

## **II. RELATED WORK**

For the design of monitoring and reporting system, knowledge related to the gateway and configurations between instruments and SCADA is required. For the study of Gateway, various gateways manufactures manual is referred. Also study about how to make SCADA screen in SCADA software. For more details related to SCADA, [www.iconics.com](http://www.iconics.com) website is referred.

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## II.SYSTEM MODEL AND DESIGN

The data from sensors acquired to Data manager. Sensors attached with data manager as per numbers of channels. A data manager netIC is programmed with appropriate protocols according to gateway. Data manager's output is taking in RS-485 and it is connected to gateway. Here it is use NT-50 RS-EN gateway for serial to Modbus TCP/IP conversion. Data manager's netIC programmed with Modbus TCP/IP protocols. Input for gateway is RS-485 and output is Modbus TCP/IP. This output is connected through Ethernet cables to the Ethernet HUB.so by using gateway we are enhanced speed and length of data transmission from field side to control centre.

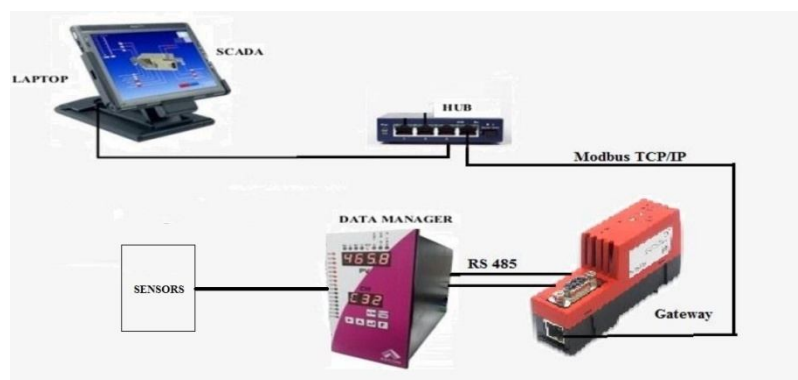


FIG.1 Diagram of proposed system

Now our PC system is also connected with Ethernet HUB. Now for data monitoring, controlling and reporting it is used ICONICS SCADA. This SCADA supports both 32 bit and 64-bit.It has features like GraphWorx, TrendWorx, AlarmWorx.By using GraphWorx, we can control the plant and also monitoring the plant data by using real time graph. Here we can also see the historical data on graph and record the data for future use.ByUsing TrendWorx, we can also generate the excel report file according to our specification. It is also give event based report generation and send it by E-mail features of ICONICS SCADA.For automatically event based report generation we have to give condition and also make an configuration in Microsoft outlook for e-mail of excel report. Thus using gateways we can speed up the data transmission for controlling of plant over long distance.

## V. RESULT AND DISCUSSION

Here we are testing different types of gateways for fast data transmission speed for long distance.Also take all the data on SCADA screen and make evenet based report in excel file.We can monitor the real time data as well as historical data on GraphWorx.Also successfully sent report file through E-mail features of SCADA.

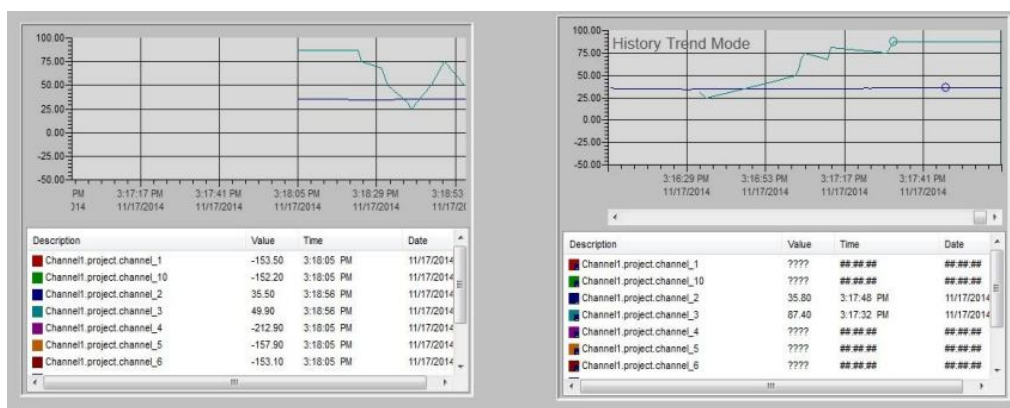


Fig.2 Real-time and historical time data on GraphWorx



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In FIG.2 data in the GraphWorx is shown. When you are going to runtime mode you can see the screen as shown in FIG.2. Left part of figure shows the real time data and right part of figure shows the historical data of system. Here in channel 2 RTD is input and on channel 3 manual 4-20 mA is given.

5	Report Name:	report					
6	Source DB:	pro3					
7	DB Group:	pro2					
8	Source Group:	pro4					
9	Report Type:	Hourly					
10	Data Filter:	Last					
11	Process Every:	0:00:15					
12	Date and Time:	5:27:00 PM,11/17/2014					
13	Data Start:	5:25:00 PM,11/17/2014					
14	Data End:	5:27:00 PM,11/17/2014					
15							
16	Date	Time	Msecs	Channel1.gateway.channel_1	Channel1.gateway.channel_2	Channel1.gateway.channel_3	Channel1.gateway.channel_4
17	17-11-14	5:25:00 PM	0 0	0	0	0	0
18	17-11-14	5:25:15 PM	0 0	0	0	0	0
19	17-11-14	5:25:30 PM	0 0	0	0	0	0
20	17-11-14	5:25:45 PM	0 0	0	0	0	0
21	17-11-14	5:26:00 PM	0 0	0	0	0	0
22	17-11-14	5:26:15 PM	0 0	0	0	0	0
23	17-11-14	5:26:30 PM	0 0	0	0	0	0
24	17-11-14	5:26:45 PM	0 0	34.90000153	0	0	0
25	17-11-14	5:27:00 PM	0 0	34.70000076	24.89999962	0	0

Fig. 3 Excel data report of system

In FIG.3. Shows the excel report datasheets of system generated in TrendWorx configuration. Also shows the value of channel 2 & 3 according to date & time.

## VI.CONCLUSION

Thus by testing all the process, we conclude that Modbus TCP/IP and Profinet is better than RS-485 serial communications in both speed and length. Thus for better controlling over long distance in plant we can use gateways and also send event based smart reporting system using SCADA for future use to maintenance and Quality-control department cause improve in quality and accuracy of plant. Report is automatically generated and sent it to authorised person by E-mail features.

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