



PROCESS INFORMATION SYSTEMS AND DATA INTEGRITY

System Wide Synchronised Data

Background

Data repositories for process information systems require not only a degree of respect but constant maintenance attention for devices and systems that feed the system with data. Typical automation systems may have very large amounts of transactional data per database element for a given day. For example, it would not be uncommon for a water reticulation system to have 2000 entries for a single flow meter in any given day. This is a stark contrast to the volume of data recorded as transactional data for business applications, for example records for billing accounts may change on a monthly basis and only have one entry.

In addition to the volume of data being recorded per database element, the following list highlights a few of the issues to be considered when managing data repositories for process systems.

Considerations for process data:

- Volume per period of time
- Where is the time and date stamp applied, at the field device or on arrival to the data concentration device?
- (If data is time stamped by field equipment and if the data processing system retains the original time of event, are all remote devices synchronized in time?
- Are raw process variables being measured or are they preprocessed. For example does the system measure every change to pressure or is it averaged every 10 seconds and then recorded only if changed by a specific percentage?
- Is a system of quality flags employed to assist in verification of suspect poor data? At what point in the system are the quality flags introduced? Is it available in the transport layer as well as the historical database?
- Is there any relationship between single element samples in the historical database? Typically the rate of change, change of values and time of day contain information not obvious by the process value when the value is read in isolation. Is there any relationship with other database elements? Sometimes this type of information is not known without in-depth analysis, however simple relationships may exist from instruments in the same geographic location or connected to the same asset or device.

Maintaining Historical Data Integrity

Several fundamental steps can be followed to help build process data user's confidence in the information presented. Information may be presented in the form of process reports, engineering tools or carefully presented Key Performance Indicators...

- Understand any preprocessing performed on sampled process variables.
- Understand if the data being logged is stamped in the field device or on arrival at the data concentrators. This will help identify what data should be flagged as "bad data".
- Have a program for periodic calibration of measurement instrumentation.
- If equipment fails, repair it immediately particularly if a non zero process value is being recorded. Remember that while instruments are failed either a bad value is being recorded which is over riding the historical trend information.
- As per the instrumentation equipment above, if control equipment fails it should be repaired immediately. It is common that monitoring equipment continues to hold the last known good value. This is done as the control equipment itself has no intimate knowledge about the quantity it is sampling and measuring. User intervention is usually required to either clear hold values temporarily or repair the faulty device.
- Use delta storage devices that support the original time stamp information so that there is no confusion as to why field information is not correlated with historical records.
- Check time synchronization of inter-field measurement equipment. Check that the field equipment is synchronized to the historical data repository and ensure the repository systems are synchronized to the correct time.

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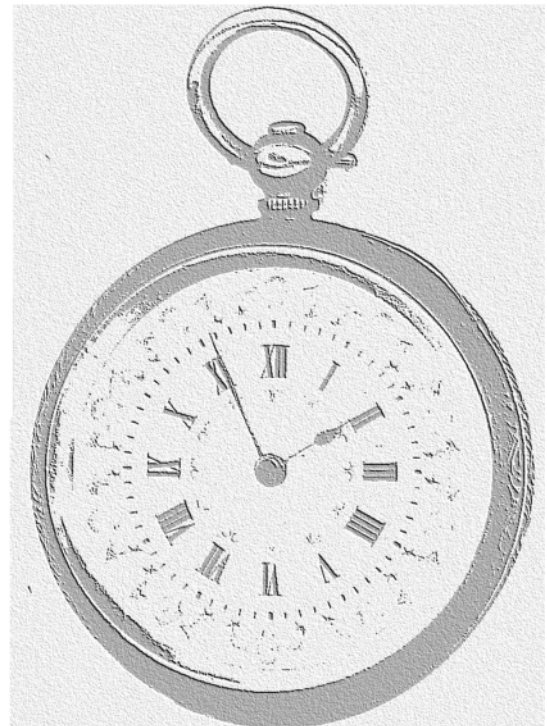
The price for good information

There is always a price for good information. In Process Information Systems it is paramount that good design approaches are adopted for:

- Instrumentation
- Sampling and Preprocessing of data at the measurement equipment
- The methods used to stamp the data in the field or on arrival at the data concentrator
- Synchronisation of data
- Understanding the type of data and its correlation with other database elements
- Equipment maintenance.

Ignoring any of these areas is fraught with danger. Data user's confidence is so difficult to restore once eroded by what appears to be poor data. Sometimes the presentation of the data itself is the only factual problem and understanding the data types and how to present it would very simply overcome any misconceptions.

Process Information gathered from automation systems distributed over wide area networks or on the factory floor is rich with embedded information not always evident to the naked eye. There is no substitute for good tools, good design, quality software systems and reliable measurement equipment.



PARASYN Controls Pty Ltd
ABN 26 093 009 379
45 Millennium Place
Tingalpa Qld 4173
PO Box 400
Cannon Hill Qld 4170
AUSTRALIA

(www.parasyn.com.au)
T: +61 7 3396 6388
F: +61 7 3396 6299
E: projects@parasyn.com.au

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