How HMI Users can Benefit from a Process Historian

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Introduction

Today, a person with a smart phone has immediate access to a tremendous amount of information. If a question pops up in your brain you can have the answer in seconds. It's an amazing time.

If you work in an industrial facility, however, it is often difficult, or even impossible, to find the detailed data needed to solve a problem or improve a process. Even operators with access to real-time data streaming in from control and automation systems often struggle to understand problems they are observing. Why is this the case?

The Problem

Many industrial facilities use human machine interface (HMI) applications to display real-time process data and control modern industrial processes. Capturing and storing process data is often done on a spotty basis. When problems come up, and they always do, a complete process history is often not available. Without a complete process history everyone is less effective and the ability to improve processes is difficult. In an ever more competitive world being slow to improve is not a good strategy.

The Solution

Today, process data historians provide a proven way to capture and store data coming from HMI systems and closing gaps in the process history archive. There are many reporting and analysis tools available to access process data stored in historians. Historian data can help industrial companies:

- Troubleshoot problems faster
- More easily spot improvement opportunities
- Cost effectively manage regulatory requirements

Process data historians and integrated data analysis clients have been commercially available for over twenty five years. Coming out of the electric power and heavy process industries, process historians are specialized database applications tailored for capturing data from high speed industrial processes.

There are three primary reasons that historians are better suited for industrial applications than relational databases:

1. **Total data volume** – modern control/supervisory systems generate huge volumes of data; several months of data can easily reach hundreds of gigabytes.
2. **Data storage rates** – tens of thousands of data values per second are common in industrial environments and are beyond the abilities of common relational database systems.
3. **Time series data** - continuous physical properties such flows and temperatures are measured periodically over time. Storing and retrieving this type of data is not easily accomplished by relational databases.

Process historians are designed to overcome each of these significant relational database shortcomings. Historians are now available for every size and type of industrial process – from collecting data on a single machine, process, to an entire plant, and even covering multi-site global enterprises.

Things to Consider

Connectivity

If you can't connect to your data you can't capture a complete process history. Today's historians that are integrated with HMI systems, like the Wonderware® Historian, allow you to capture data on essentially every parameter displayed on the HMI. Additionally, look for historians that offer broad connectivity to third party data sources and have OPC connectivity.

Implementation

With any software application proper implementation is a key success factor. It is no different for process historians. However, historians that are integrated with HMIs can save large amounts of configuration time along with significantly reducing implementation risk. An example of this is the Wonderware Historian, which can use the Wonderware InTouch® tag list to automatically configure itself. The process is automated so it takes less time and reduces the risk of configuration errors.

Scalability

As mentioned earlier, today's historians can be scaled for a wide range of industrial applications but historians that allow "tiering" offer a significant advantage. With multi-tier historians, lower level historians (tier 1) collect data at the local level. Data is made available to workers at the this level but all or some of the tier 1 data can be sent to a higher level, tier 2, historian for archiving or can be automatically summarized for easier analysis by corporate workers. When looking for an historian a broad range of scalability, including tiering, should be a requirement.

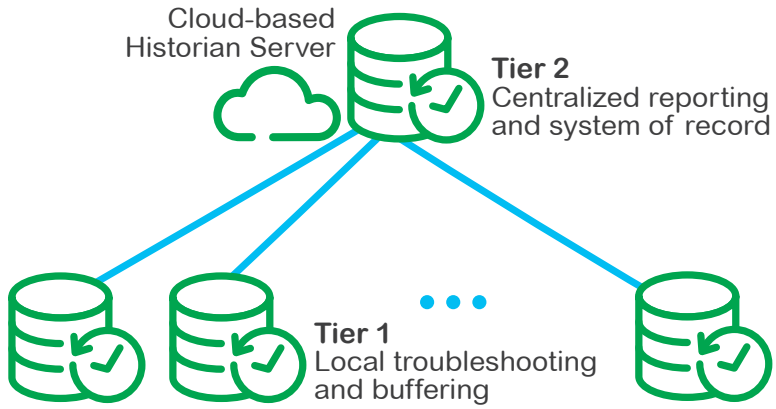

Figure 1
Historian tiering

High Availability/Disaster Recovery

As workers become use to easy access to process history the need to make these systems highly available becomes a priority. Some historians are designed to "store and forward" data coming from their data sources if the primary data communication network goes down. Once communications are re-established, data is forwarded to the historian so no process history is lost. Store and forward is an important capability that any process historian should have.

Virtualization has become a corporate standard at many companies. Integration with virtualization platforms offered by VMware® and Microsoft® (Hyper-V) are another way to take much of the risk out of deploying highly available historian solutions, as well as disaster recovery solutions. In the latter example, duplicate historians are located in physically separated facilities to ensure data integrity even in the case of a natural or human disaster.

Reporting and Analytics

Workers need reports and other data visualization tools to turn historian data into actionable information. Historians need a variety of data analysis trending and reporting tools that are integrated with the historian to ensure the right data is available to workers when they need it. Web based tools allow users an easy to access collection of plant information, and new mobile devices help today's workers to stay fully informed on plant performance. Analytics software can also be used, such as Wonderware Intelligence, to do more in-depth process analysis and performance dashboarding.

Figure 2
Access analytics software from tablets and other mobile devices

Mobile Solutions

Workers are on the move today. With the ubiquitous of smart phones and tablets industrial workers can have information at their fingertips, regardless of their physical location. Mobile reporting applications like Wonderware SmartGlance® allow workers to be pushed reports to their smart phones. Management and engineering workers can analyze processes with the use of enterprise manufacturing intelligence products such as Wonderware Intelligence. They can deep dive on a particular problem or simply author performance dashboards that others can use to keep informed.

Figure 3
Wonderware SmartGlance sends workers Push Notifications on their smart phones

Workflow

It is great to have access to your process history, but what do you do if you find something you want to take action on? Ad hoc actions are useful but what if you want to track the work activities related to a problem discovered after viewing historian data? Workflow management applications, like Wonderware Workflow®, are integrated with applications such as HMI, historian, MES, and notifications such as SMS, email, and other systems to help ensure that specific work tasks are executed properly every time. Each work task is tracked so management has a record of what was done when for future improvement. Using workflow management solutions are particularly important when dealing with regulatory or safety issues.

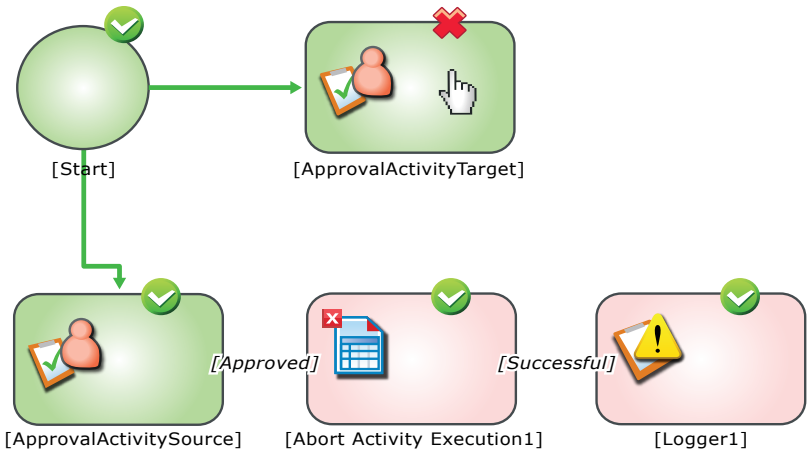

Figure 4
Wonderware Workflow screen example

Common Configurations

Adding a historian to a HMI solution is usually fairly straightforward, particularly if the historian is integrated with the HMI application. Often in smaller applications the historian is installed on the same computer as the HMI solution. However, the typical historian is installed on a separate server for performance and reliability reasons. Below are common historian configurations based on the size of an industrial enterprise.

Single Site

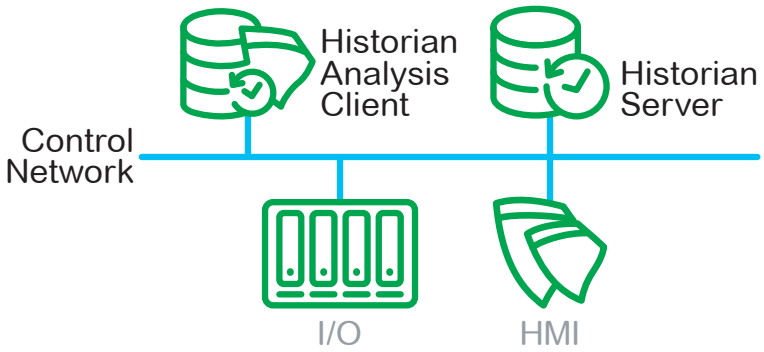

Figure 5
Single site configuration

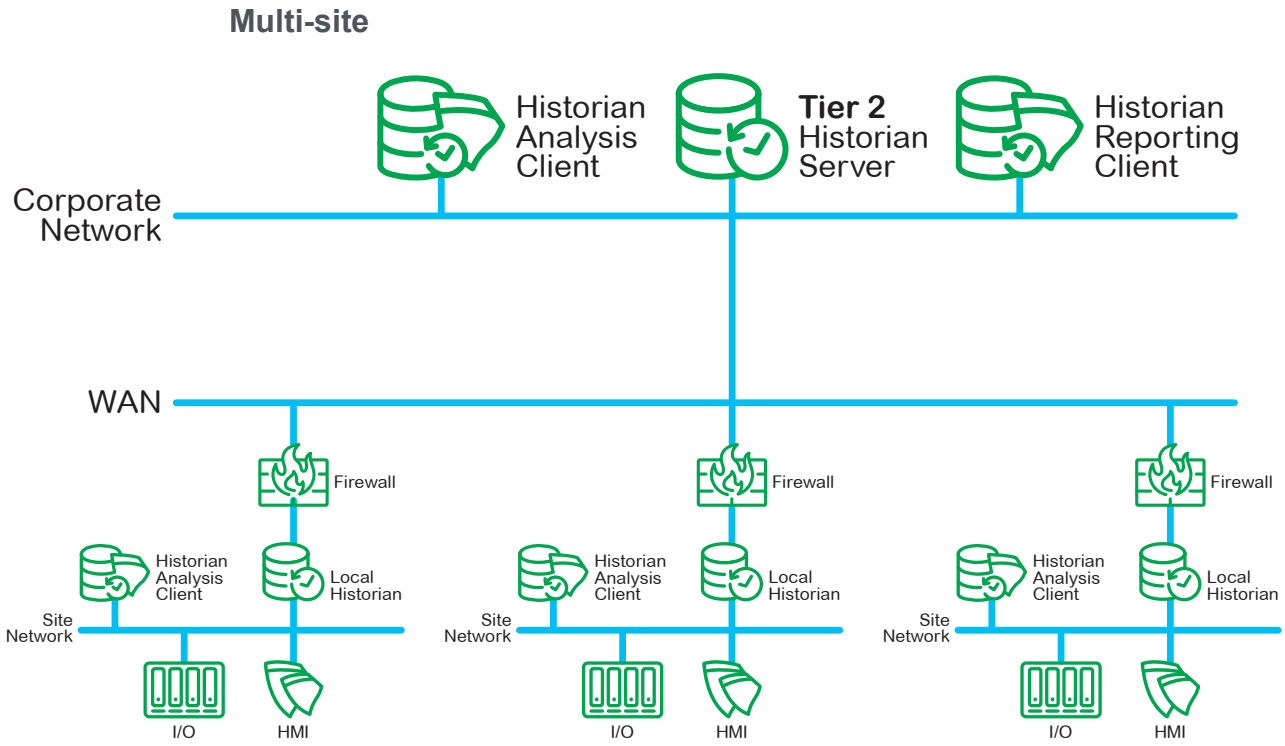

Figure 6
Multi-site configuration

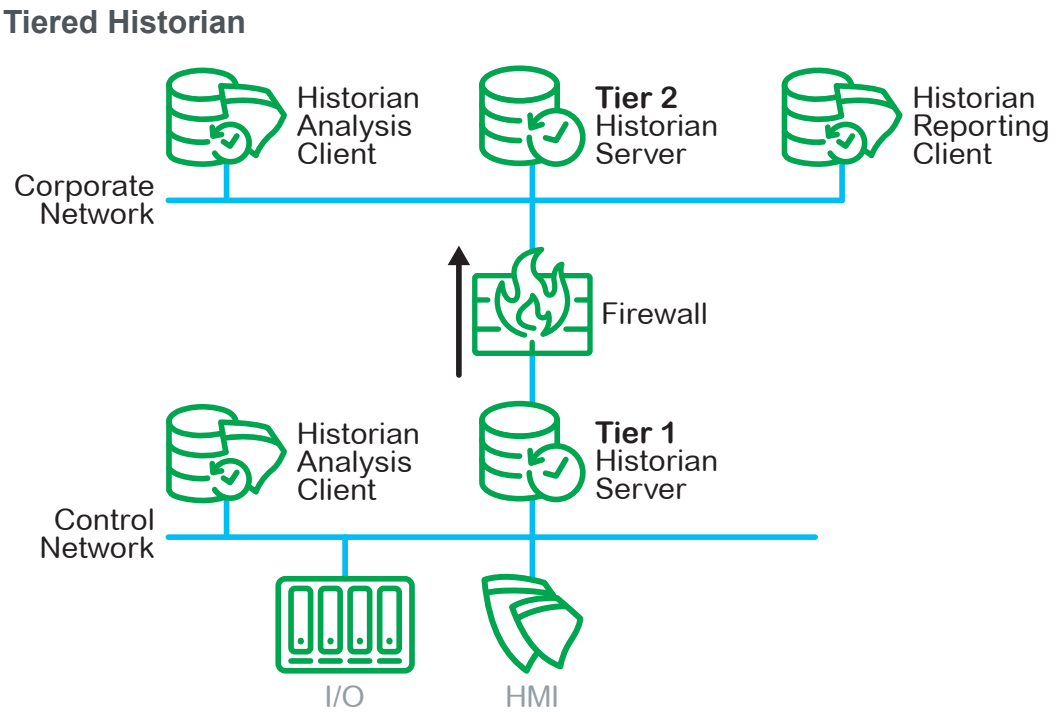

Figure 7
Tiered configuration

Summary

A complete process history is vital to modern industrial companies if they want to minimize cost, maximize productivity, reduce waste, and maintain safety and environmental compliance. Historians are software applications that can be added to any HMI application to provide a complete process history for later troubleshooting and analysis. They are highly scalable, secure and can provide useful information to any type of worker through a broad selection of desktop and mobile reporting and analysis clients. Historians and HMI applications provide an ideal solution to any industrial company looking to optimize their operations and maximize their results.

For more information on historians, please visit http://software.invensys.com/products/wonderware/production-information-management/historian/

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