Effective Data Communication and Management with Process Automation

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Abstract:

OSI PI is a Server and client-based software programs that automate the collection, storage and presentation of plant information. Many businesses realize that there is a need to take closer control of their production processes. Instead of weekly reports rolled up monthly, CEOs are now requesting timely situation reports so that efficiencies are introduced to ensure the profitability of the company. Therefore, the objective of the selected program is to aim at the task of getting the key performance indicators and process data to the CEO more quickly than is currently the case. The site will be used as a pilot and when proven, the solution will be rolled out across the enterprise.

Keywords: PI OSI Soft, SCADA, AF Server

Introduction:

The PI System is a suite of software products that are used for data collection, historicizing, finding, analyzing, delivering, and visualizing. It is marketed as an enterprise infrastructure for management of real-time data and events. Your data sources connect to one or more PI Interface nodes. The PI Interface nodes collect data from your data sources and store into the PI Data Archive. OSI soft PI System has the potential to bea large enterprise level system to support whole corporate data management needs. Just because it can handle the big data doesn't mean the program should immediately start big - ensure success with an easy incremental road map. The PI System collects, stores, and manages data from your plant or process. You connect your data sources to one or more Data Collection computers. In turn, the Data Collection computers get the data from yourdata sources and send it to the PI Data Archive. The PI Asset Framework (PI AF) server is one method of accessing the PI Data Archive server, and there may be other PI and non-PI servers. Users request data from the PI AF Server or PI Data Archive for display in the client tools.

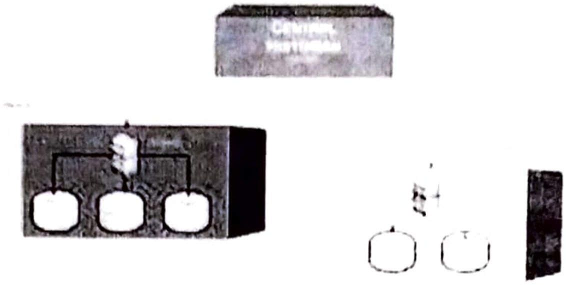
Research Methodology:

What is the Real-time and Historical Data

- Unlike a DCS or HTMI that can display real-time data within a short-term time horizon, PI allows manufacturing sites to view data real-time as well as easily look back at data from years ago.
- There are times when it's useful to graphically overlay or compare tabular data from multiple time ranges

- Ex compares a current production campaign against a known good production run from a year ago
- This is possible with PI Process Book and PI Data Link tools

Basic Historian Architecture:



Data Collation from external Data Sources:

a. **External Files Data**: File (csv, xls, Xlsx ,txt etc) based data used to store into the pi server by using the UFL interfaces and UFL connectors We able to insert the formatted file based data into the OSI PI.

b. **SQL Server Data**: SQL Server data used to store by using the PI RDBMS interface. This interface used to store the SQL Query views data into the PI Server.

c. Other Connectors: OSI PI having many connectors which are used to communicate with the different data sources like SAP , PeopelSoft etc.

PI Server/System

1. The PI Server license depends upon the No. of points.
2. The data is stored inside the PI server using Archive files(.arc Files)
3. The default archive size: 128Mb can be altered at the time of PI Server installation.
4. Provides security features as read / read-write.
5. Provides security to access the server: Trusted user / Interactive user etc.
6. The different services, such as pinet manager, archive manager etc. get installed at the time of server software installation, which play vital role in functioning of PI server system.

End to End Process of the PI Historians.

Collect: Collect the real-time data from field instruments like PLC, DCS and SCADAsystems. We have the option to get the data from the various data sources

Historize:

1 Store large volumes of data for a long period of time with the least amount of disk space possible

2 Allows retrieval of any data. No matter how old in seconds

3 Scale up and scale out support growing business needs

4. Proven Technology
5. High Availability

Find:

1. Asset centric view of your assets via elements and attributes
2. Templates for standardization and reuse
3. Use Hierarchies, categories and connectivity models
4. Data references to time series (PI Points) and other data such as asset data.
5. Configuration, Analysis and Reporting gets easier through templatizing of assets.
6. Event Frames allow to track any kind of incident and alarm

Analyze

1. Combine data elements together
2. Aggregate totals and averages
3. Filter out irrelevant data
4. Includes both configured and programmed analytics
5. Enables organizations to continually improve by analyzing data and obtaining insight into their operations.
6. Excel reports with PI Data Link Reports ex: Outage Reports.
7. Advance pattern recognition/Advanced Analytics ex Matalab, Analytics

Deliver

a. **PI Notifications** – deliver exceptions to humans or push to other systems.

b. **PI Data Access** – allow applications to pull data from the pi system SQL Data Access

c. **Web Server** –used for the web environment to visualize the PI Data

d. **OPC Server** – used to communicate the instrument data into PI

e. **Software Development Kit** – Helped to enable the communication with PI Server.

f. **Visualize:**

g. PI Process Book –Operational awareness using easy to build process graphics and data analysis displays.

h. PI Web parts for SharePoint –Collaborate, Share Information, KPI's

i. PI Data Link for Excel and Excel Services –Build and Publish Reports.

j. PI and MS Excel and Power Pivat, Power View –Build and Publish Drill Down Reports.

k. PI Data Access Technologies –Integrate with standard off the shelf tools.

l. PI Notifications Delivery Channel for Microsoft Lyne– Deliver a Notification viainstant massage.

m. PI Vision – Visualize the data as Dashboards / Reports.

n. PI Manual Logger –Feed data into PI from non-automated data sources.

PI AF (Asset Framework):

Asset Framework (AF) is a component of PI Server™ that makes it easy for users to organize, and share their PI System® data. This repository allows users to create hierarchical, asset-centric models of objects, and equipment grouped by specific relationships (parent-child, connectivity). Asset Framework (AF) organizes and enhances

the data. Below is the basic diagram of the PI Asset Framework.

PI Asset Framework (PI AF) is a single repository for asset-centric models, hierarchies, objects, and equipment. It integrates, contextualizes, refines, references, and further analyses data from multiple sources, including one or more PI Data Archives and non-PI sources such as external relational databases.

Result/ Discussion:

a. It is used to capture, collect, connect centralize the process data, search and analyze, instantly compare historical and real time information.

b. The PI system can interface with many different real –time data streams such as from automation control system ERP, systems, IT systems, telemetry systems, vehicles and more.

c. PI can give the information need to make data driven decisions in real time, it helps strengthening customer collaborations.

Conclusion:

a. We establish tags to avoid the restrictions for PI points transfers

b. PI to data server does not support high availability (HA)

c. Features or connecting to a PI data achieve collect. AF elements are attributes that reference a collective name instead of one of the nodes are not supported. We are going to mitigate this issue is proposed system.

d. Directly not supporting the forecast details in the reports from the PI system.

e. We are going to mitigate this issue and going to generate for forecast analysis and forecast reports.

f. Directly not available to generate the events frames (System help) Daily, weekly, monthly reports. We are going to mitigate this issue to send the reports.

g. Instantly, provide the appropriate report values to the customer with excel calculations dynamically. In-build calculations not available in PI except AF analysis functions

Suggestions: The word –improvement‖ should make the business better. But, when we understand how many benefits process improvement can provide, then it is even clearer why you should adopt one of the techniques for the organization

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