The Advantages Of Enterprise Historians Over Relational Databases (Part 1)

GE

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Look for part two in tomorrow's IMPO Insider.

In an increasingly competitive environment, industrial businesses such as utilities and manufacturers need to gain a sustainable advantage by achieving operational excellence, a journey that begins with data for process visibility. The volume of data creation continually increases, and it is imperative for companies to truly understand and control their operations by efficiently collecting critical data and maximizing its value.

Relational databases (RDBs) have helped many companies gain more information about their operations by supporting simple operator queries, answering questions such as “What customer had the largest energy demand?” or “What customer ordered the largest shipment?” They are built to manage relationships and are ideal for storing contextual or genealogical information about processes, but are rarely the best approach for vast amounts of process data collection and optimization.

On the other hand, enterprise historians are designed for production and process data acquisition and presentation. They maximize the power of time series data and excel at answering questions that companies typically need to address real-time decisions in production such as “How much fuel did gas turbine #1 use per MWh of output today?” or “What was today’s hourly unit production average compared to where it was a year ago or two years ago?”

RDBs have a place in industrial applications, drawing relationships between contextualized data collected by enterprise historians. But to allow industrial businesses to leverage raw data from devices such as sensors, intelligent electronic devices (IEDs), meters, and other real-time systems, enterprise historians enable key advantages over RDBs.

Efficient data collection increases operational visibility

RDBs do not offer built-in data collection capabilities; therefore, custom code has to be written to insert and update records, which involves development costs and continual enhancements that can be very expensive and time consuming. In addition, the source of development is limited to your company’s experience and expertise instead of leveraging the collective knowledge and technologies of other

industry players.

However, enterprise historians include built-in data collection capabilities and can capture data from multiple sensors and systems. For example, GE's Proficy Historian can collect large volumes of real-time process information from various control devices at incredibly high speeds of up to hundreds of thousands of samples per second. It is ideal for capturing data from sensors and other real-time systems because it uses standards such as Object Linking and Embedding for Process Control (OPC), which facilitates communications by providing a consistent method of accessing data across devices.

Instead of having to build custom software for every type of data source as you would for an RDB, Proficy Historian does not need to know any of the detail regarding the propriety data sources. It can instantly connect to any OPC-enabled solution to collect data—storing up to 15 million tags per server, thus eliminating additional servers for RDBs along with the customer software build for each tag.

High-speed data capture ensures optimal analysis and decision making

The modest performance of RDBs is suitable in terms of supporting simple operator queries such as viewing recent value trends in flows, temperature, or other analog values. But RDBs can require significant custom engineering for each defined access and have comparatively slow performance when the queries cover large data sets or associated periods of time.

In contrast, an enterprise historian provides a much faster read/write performance over a relational database and "down to the microsecond" resolution for true real-time data. This capability enables better responsiveness by quickly providing the granularity of data needed to analyze and solve intense process applications.

Efficient data storage and compression enables high performance

With an RDB, the maintenance alone can be a full-time job because you have to continually manage archives and disk space due to the lack of compression; performance can be severely undermined, even with proprietary, pre-compressed data workarounds. Additionally, there's no online maintenance so tag imports and maintenance must be performed during scheduled downtime—requiring additional resources, time and costs.

However, the powerful compression algorithms of enterprise historians enable you to store years of data easily and securely online, which enhances performance, reduces maintenance and lowers costs. For example, you can configure Proficy Historian without the active maintenance and back-up routines that a traditional RDB requires. It enables archives to be automatically created, backed up, and purged—with up to 256 GB in a single archive with no hard limits on the number of archives—enabling extended use without the need for a database administrator.

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