Data Storage | Time-Series Data Management

GRID PROTECTION ALLIANCE

*open*Historian 2

High-performance Data Storage and Retrieval

The *open*Historian is a high-performance, no-sql database that stores time-series data efficiently and retrieves data quickly.

*open*Historian Benefits

- Lossless compression reduces data storage costs and preserves full data precision.
- APIs, adapters and web services all serve as data layers for real-time applications and visualization tools. The .NET API provides the fastest data access layer.
- Extreme time precision, down to 100 atto (10^{-16}) seconds.
- Supports data backfilling and out of sequence data insertion.
- Multiple data types supported.
- Tight integration with GPA's Grid Solutions Framework and the performant STTP / GEP protocol.
- Self-hosted web visualizations via Grafana (grafana.com).
- Direct input support for MODBUS, DNP3, COMTRADE files and most any synchrophasor protocol: IEEE C37.118, IEEE 1344, SELFast Message, UTK FNET, BPA PDCstream and Macrodyne

For those who already have a commercial historian solution, the openHistorian is a good option for tertiary storage or as a short-term parallel historian in cases where fast extraction of data is a requirement. Additionally, the openHistorian can directly send data to both OSIsoft-PI and eDNA historians.

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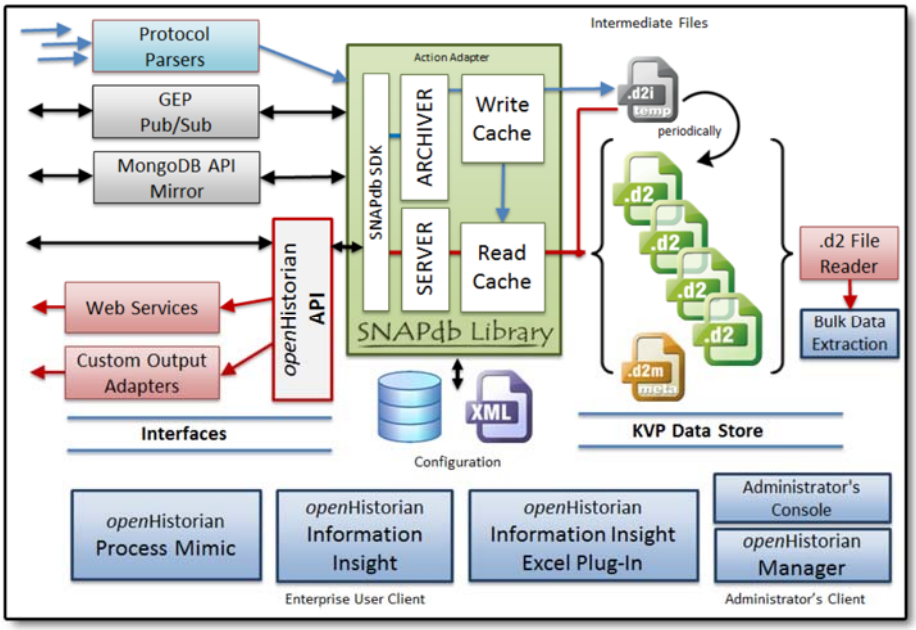
The openHistorian is a time-series implementation of GPA's SNAPdb, a key-value database that stores data using a B+ tree — data access is fast with measured read speeds up to 15 million points per second. Archived time-series data is stored in an extremely compact format using lossless compression algorithms.



High Performance –

- 14 million points per second sequential writes
- 12 million points per second non-sequential writes
- 15 million points per second sequential reads

High Availability – Supports redundant and/or clustered deployment

Scalable – Horizontally scalable to accommodate any volume of data

Proven – Version 1 has been in production use for over two decades. Version 2 has been in production use since 2013 supporting some of the largest synchrophasor data systems .

Data Extraction Flexibility – data exported in a variety of formats including CSV and COMTRADE

Massively Parallel Distributed Computational Support – Can be integrated with the Hadoop framework for fast data mining over many Petabytes of archived data

Lowest Cost – The dominate implementation cost of the *open*Historian is for physical storage. There are no licensing fees required.

Open Source – Source code is fully available on GitHub with a commercial friendly MIT license

http://www.openHistorian.com/

openHistorian — Open Source Solutions for Data Management

Helper Tools

- Web-Services API — archived data can be requested via various restful web services (REST). These web services implement actions such as requesting real-time or historic data for sets of points matching a filter expression. The REST services are applied to each hosted instance of the openHistorian. The web services support a variety of formats, including XML, SOAP, JSON and WS-Security.
- Data Extraction Tools — available from both GUI and web based interfaces, export tools are used to select a set of points over a time range of archived data to export—various formats, including CSV and COMTRADE, are available.
- Trending Tools — available from both GUI and web based interfaces, the trending tools are used to select a set of points over a time range of archived data to plot. Any data can be selected, including measured or calculated values.
- Administrator's Console — service can be remotely monitored with the admin console monitor. Access to this application requires authentication and is secured through TLS. This low-level application monitors messages and operation including system health, usage statistics and errors. Log messages are constantly updated with support for optional commands, where rights are available, on individual adapters and system components.

The Benefits of Open Source

All GPA software is Open-Source Software (OSS) published on GitHub under the permissive MIT license.

With OSS, risks and costs are reduced. There is no vendor lock-in, software can be tested in-situ prior to making business commitments, and systems can be easily adapted to meet changing requirements. Unlike commercial software, OSS is peer reviewed to assure reliability, stability, and security.

Analytic Features

- Alarming and notification services
- Device availability and correctness reporting — daily PDF reports available for download or e-mail
- Dynamic expression-based calculations for new values, alarms and notifications

Product Maturity

The *open*Historian and its companion products have been in production use supporting large-scale deployments for over two decades. The openHistorian 2.0 has been in production use sine 2013.

Related GPA Products

- The open Phasor Data Concentrator (*open*PDC) is a high-performance platform for managing streaming synchrophasor and other time-series data in real-time.
- SIEGate significantly improves security while reducing the administrative burden and cost to exchange grid data.
- The substationSBG is a phasor data gateway purpose-built for use in substations.
- *open*ECA, the Extensible Control and Analytics platform, enables the rapid development and deployment of phasor data tools in production environments.
- The Open PQ Dashboard is an enterprise grade, browser-based disturbance data visualization system that enables users to get an overall perspective on disturbances and then easily reduce information to focus on trouble spots.
- *open*SEE is an interactive browser-based wave-form display and analysis tool used to display data from the openXDA database.
- *open*MIC (Meter Information Collector) is a head-end system to automatically poll disturbance meters and other substation monitoring equipment and download file-based and real-time data.
- *open*EAS is an easy-to-use wrapper to enable use of third-party, proprietary analytics with the openXDA automation platform.

Visualization Layer— Grafana®

- Version 2.4 released in January 2018 allows Grafana displays to directly access *open*Historian data via the *open*Historian's self-hosted web site.

See: openHistorian/releases on GitHub

openHistorian Hosting Requirements

- Hardware: Mid-level server or workstation—can be virtualized

  64-bit hardware with 8-GB memory minimum to support Windows OS
- Operating Systems: (64 bit) Windows Server 2008 R2 (or later) with the .NET 4.6 framework is preferred

  Builds for Linux and Apple OS are available

Maintenance and Services

GPA offers annual product maintenance agreements to cover typical business hours or 24x7 for critical systems that require high availability. Customized services tailored to meet the needs of individual utilities are also offered.

For more information

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