**Time Series Data Optimization for Sensor Data**

* Describe your approach to optimizing time series data specifically for sensor data. *Optimizing how? By what metric? Read speed? Write speed? Storage space efficiency? Built-in Analytic functions on large data sets? Compression algorithms? User workflows with out-of-the-box features? The development workflow to build on top of their ecosystem? (Much of these questions covered in later sections)*
* Highlight any unique features or technologies that set your solution apart (including any pre-built interfaces to well-known vendors and technologies).
* Provide examples of sensor data types your technology has supported in typical utility implementations. *Good to know, but would also add ‘supported protocols’ and ‘pre-built and supported interfaces to well-known vendors and technologies’. Do they have an interface to Monarch or GE? Do they support getting live DNP data or Synchrophasor data out of the box? Can they interface with SSMS, Hadoop, read in flat files? I want to be able to take just about any data source and shove it into this thing.*

**Cloud and/or On-Premises Solutions**

* Provide details on your cloud-based and/or on-premises offerings or preferred method of implementation; discuss the advantages and disadvantages of each option.

Our applications are designed to be deployed on-premise at the utility.

* Explain how your solution can be tailored to meet specific utility requirements.

**Platform/Software as a Service (P/SaaS)**

* Explain your P/SaaS model and how its scalability helps support the needs of your utility customers.

GPA offers annual support and maintenance contracts for both business day (10x5) and 24x7 support needs on a per-operating-environment basis, where an “operating environment” is defined as one or more instances monitoring the same data in the same context (e.g., Substation vs. Control Room, Transmission vs. Distribution, etc.), and an “instance” is defined as a separate installation (e.g., failover nodes; production, acceptance, and test; etc.).

These agreements include a perpetual, non-exclusive, non-transferable license for the latest version of the Enterprise Edition of the software released during the term of the contract at no cost.

* Include information on subscription plans and support including typical pricing.

See attached quote.

**Cyber Security Requirements**

* Outline your cybersecurity measures and compliance with industry standards.
* Describe how you protect data integrity and privacy.
* Provide details on your approach to securing time-series data in utility environments.

**Built-in Custom Analytics Environments**

* Describe the visualization tools included with your solution and how they are geared towards engineers with varying data skills.

An openHistorian Grafana data source plugin is included with openHistorian installations.

* How does your solution support operationalizing data innovations created by front-line engineers?
* What tools and capabilities should be afforded to non-expert data consumers including low-code/no-code analytics?
* What programmatic analysis tools should be included for data-science focused engineers?
* Provide information on any GIT capabilities that may support the environment

**Ingress/Egress Management**

* Explain your data ingress management capabilities, specifically, around industrial systems such as an EMS, ADMS, or OpenPDC.
* Provide details on your API capabilities.
* Include information on data transfer speeds, security, and reliability.
* Describe how your solution handles large volumes of sensor data in utility settings.
* What options do you have for bulk egress and what are associated costs?
* How does your systems handle out of order events? *Out of order events has always been an issue for PI. Might be worth spelling out? Maybe not worth spelling out in the RFI, but make sure you get info on any ridiculous character limitations for fields. Also, ideally there’s a hierarchical system, where higher level groups can be made with associated meta data, and points can be assigned to these higher level groups, removing the need to update every point for small changes compared to updating the group meta-data.*
* Provide examples of use cases and supported protocols.

**User-Based Authentication and Access Reporting**

* Describe your user authentication mechanisms and reporting features.

openHistorian supports database, Windows AD, and Azure AD authentication. All login attempts, whether successful or unsuccessful, are stored in the openHistorian SQL database with the time of attempt, the user name, and whether the attempt was successful.

* Provide examples of how user roles and permissions are managed across your solution (front-end, back-end, API).
* Explain how your solution supports user-based reporting.

**Backup Capability**

* Outline your backup solutions and disaster recovery plans.
* Highlight the frequency and reliability of backups.
* Provide details on how your backup capabilities ensure data integrity for utilities.

**Reliability**

* Provide metrics on system uptime and reliability.
* Discuss any redundancy mechanisms in place.
* Explain how your solution ensures continuous operation in utility environments.

**Meta Data Management**

* Explain how your solution handles metadata, including any specific limitations (i.e. character limits).
* Include information on metadata tagging, searching, and management.
* Describe how metadata management supports utility operations.

**Volumetric and Horizontal Scaling**

* Discuss your solution's ability to scale both in terms of performance (volumetric) and size (horizontal).
* Provide examples of how your system handles high-frequency data (minimum 1 kHz sample rate).
* Explain how your scaling capabilities support large-scale utility deployments.

**Vendor Viability**

* Provide information on your company's size, business model, and market presence.

GPA is a not-for-profit corporation established in 2010, specializing in software and services for the electric utility industry. We are a small but dedicated team who take pride in our personalized approach in supporting our products. We specialize in providing custom tailored solutions to utilities looking for functionality and workflows that support their specific system.

Given that the majority of GPA’s software has a publicly available open-source version, our true market presence is difficult to

* Discuss your approach to turnkey solutions and long-term support.
* Describe your maintenance and support model, including response times and service levels.

See support and maintenance details included in the attached quote.

* Provide your vision for the industry and your role in creating that vision.

GPA is focused on helping maintain a robust, reliable, and resilient power grid by providing utilities with the tools for collecting, managing, augmenting, and storing high fidelity power system data.

**Implementation & Support Model**

* Provide details around implementation strategy for a large scale utility such as Dominion. How can Dominion re catalog nearly five million digital/analog signals with as much as 10 years of stored historical data?
* Post implementation: what does continuous support look like? In your response, consider whether support model is turnkey vs adhoc. Also consider items such as: fixes vs enhancements, patching/upgrades, and training.

Support is provided throughout deployment, including installation, configuration, and training. Thereafter, support, including continued configuration assistance, bug fixes, and feature/enhancement requests, is offered on an as-needed basis.

The maintenance aspect of the agreement covers continued patching and upgrades of the software, regardless of whether the utility has requested the support or not. GPA will notify the utility POC(s) of any new bug fixes, enhancements, and other patches or upgrades upon release and will be scheduled for deployment at the utility’s convenience. Release cycles are targeted at 6 months, though they may be shorter or longer depending on the urgency or scope of the release.

See support and maintenance details included in the attached quote.