SOLUTION BRIEF

Exara Chronicle for Intel® IoT Gateways

High-Fidelity Data Services for the Industrial Internet of Things

Exara Chronicle software transforms complex and remote machine sensor output into direct, extensible, and application-ready data services at user-defined fidelity.

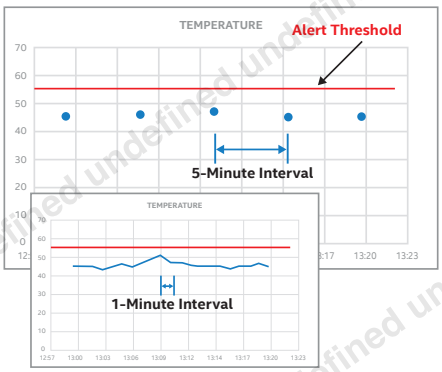


Figure 1. Limited Sensor Data Resolution

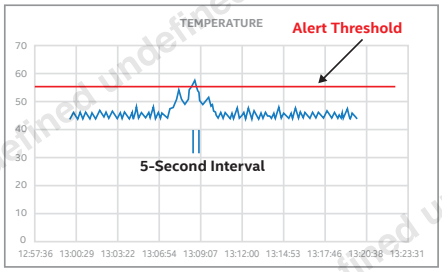


Figure 2. Higher Fidelity, 48x More Data

Industrial IoT Solutions Demand Next-Generation Information Systems

Centralizing telemetry from existing industrial control systems to cloud-based services or traditionally managed infrastructure provides rigid and limited data access and fidelity for advanced digital IoT applications across industrial fleet and field environments.

Control Systems Inherently Limit Data Fidelity

Industrial control systems are designed to monitor machine assets for changes to standard operating and warranty thresholds. For assets deployed in remote fleet and field scenarios, these systems must work over intermittent, low-bandwidth connections in harsh environments and deliver reliable basic control services (e.g., on/off).

The charts in Figure 1 show temperature data from an industrial drive deployed in a remote oil field. Typically the remote telemetry system provides one sensor reading every 15 minutes. The data in this example was logged locally by a field technician using a direct laptop connection allowing much finer granularity.

Sensor data shown in all three use cases covers the same 30-minute time period with the only difference being the polling frequency.

Figure 2, at 5-second polling frequency, demonstrates a threshold violation that was not visible in the prior lower fidelity trend. This insight (potentially correlated with other trace events) can comprise a digital fingerprint that indicates high probability for system failure and trigger actions such as preventative intervention.

This basic example highlights why machine data fidelity is essential to the value case for asset monitoring strategies across Industrial Internet of Things (IIoT) applications.

The Evolution of Information Systems Tailored to the Industrial Edge

Digitalization of industrial fleet and field assets promises a myriad of new applications for advanced data analytics. These solutions will require expert analysis and modeling based on extensible historical access to machine data at any level of granularity in any combination of attributes, filters, and time. For industrial assets in beyond-the-datacenter fleet- and field-based

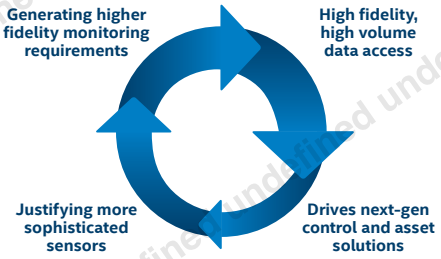


Figure 3. Industrial Edge Information Lifecycle

installations, this capability will depend on the development of new edge-centric data management technologies. These new capabilities will need to both coexist with and extend traditional control system infrastructure.

As depicted in Figure 3, development of information-driven asset strategies can be modeled as an evolutionary process. Extensible, high-quality data can be seen driving value-based improvements in production and maintenance procedures, justifying improvements in technology which begets ever more data.

This evolutionary cycle for "edge" data management will drive significant new data creation and corresponding data volume challenges across a wide range of IIoT applications. Perhaps not surprisingly, the challenges will not be addressable solely from a central repository fed by control system telemetry—there is just too much data, growing too rapidly, across a geographically diverse and mobile footprint.

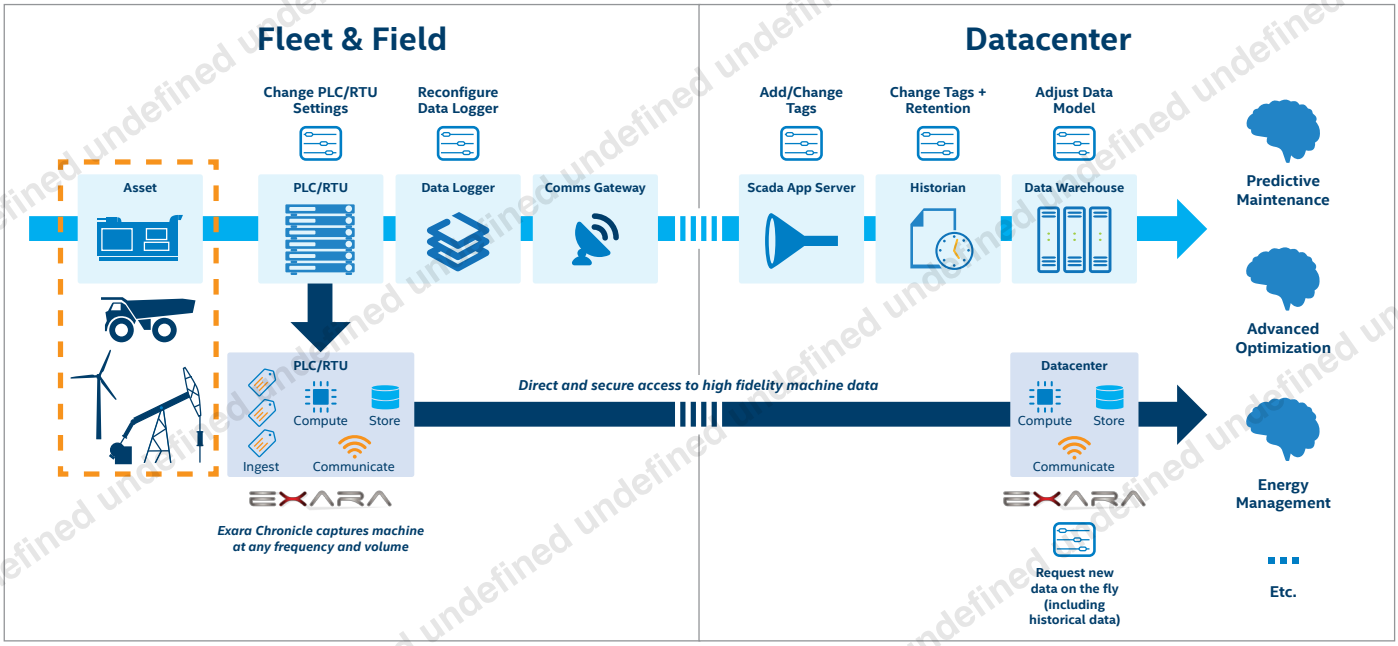


Figure 4. Exara Direct Sensor Data Services Parallel Existing Control Systems

Exara Chronicle software uniquely addresses data volume challenges

Exara gives enterprises the ability to manage high volumes of field-based machine sensor data as an extensible data service, independent from legacy control systems—abstracting the complexities and limited, inconsistent communications of local machine protocols. Exara software deploys directly to field- or fleet-deployed assets on a new class of Remote Terminal Server (RTS) devices certified by Exara in cooperation with Field Service Integration partners who bring industrial domain expertise. Exara RTS devices are based on proven Intel® IoT Gateways, and deploy on the Wind River Intelligent Device Platform* featuring Wind River Linux*, leveraging multicore processors and solid-state storage.

As depicted in Figure 4, Exara Chronicle software provides asset-local storage and data management services, paired with an enterprise agent that enables direct connectivity to existing central data platforms or applications. In addition, Exara agents enable point-to-point data compression and push-down query projection and filtering.

Intel® IoT Gateways are ideally suited to evolving demands at the industrial edge

Intel® IoT Gateways make it easier to turn edge data into real value. With a proven combination of hardware and world-class software, Intel IoT Gateways allow organizations to quickly establish and future-proof their IoT strategy, connect legacy and new systems, help data flow seamlessly and securely between edge devices and the cloud, and save money now and for years to come.

Connectivity Security Manageability

And because enterprises must balance several factors when deploying processing power to the edge—including value, performance, and power—they need the flexibility to select the right processor for their unique application. That's why Intel IoT Gateways extend a common software stack across a broad range of silicon, including the Intel® Quark™, Atom™, and Core™ processor families. This flexibility allows Exara software solutions to rapidly scale with broadening demand for quality data and intelligence from the edge.

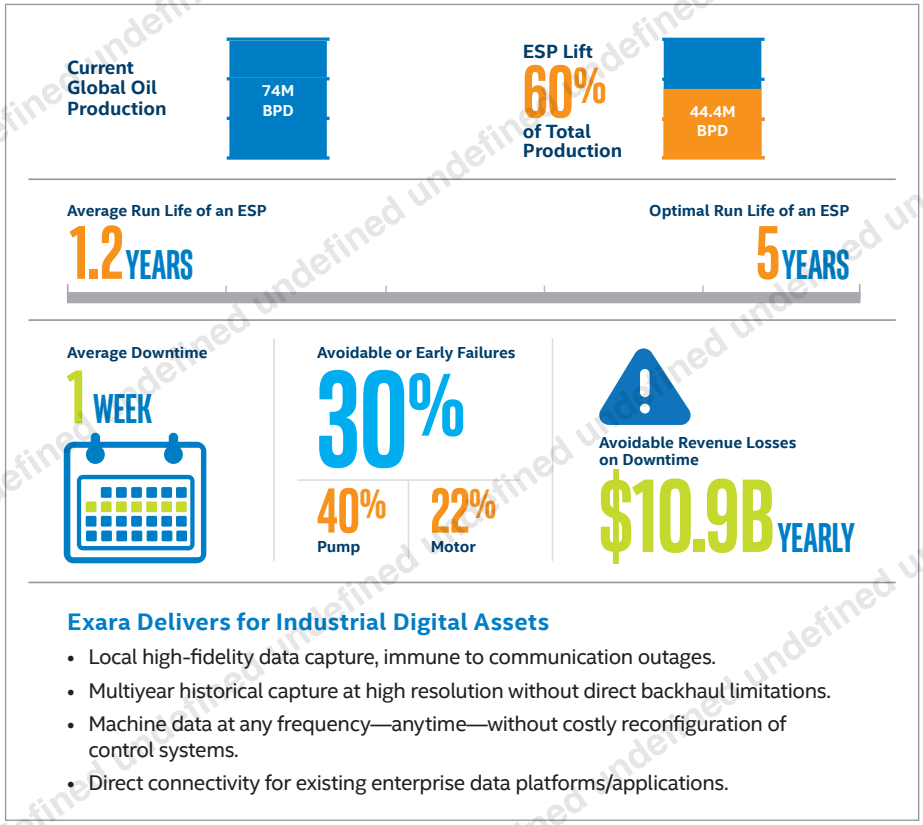
Exara Chronicle software runs on top of the Wind River Intelligent Device Platform*, a preintegrated, prevalidated platform for Intel IoT Gateways that provides security, connectivity, and remote device management capabilities. Together, these fundamental elements provide organizations high confidence that a gateway deployed in the field will provide uncompromised functionality well into the future.

Exara Chronicle in Action

Exara works closely with partners, including Intel, to mitigate net billions of dollars in lost production revenue in the oil and gas industry due to unplanned downtime for well sites utilizing electric submersible pumps (ESP).

For the scenario shown in Figure 5, Exara Remote Terminal Servers, based on Intel IoT Gateways, deliver application-ready data streams that enable a range of partner-delivered application services. These software applications (Digital Asset Solutions) directly address loss of productivity and improve field maintenance costs. Current applications deliver near-real-time telemetry, predictive asset modeling with intervention, and a digital asset profiling service that places asset specification and field event information (e.g., maintenance activity) directly in line with machine sensor data.

Figure 5. Upstream Oil and Gas Productivity Loss & Opportunity[1]



Exara Delivers for Industrial Digital Assets

- Local high-fidelity data capture, immune to communication outages.
- Multiyear historical capture at high resolution without direct backhaul limitations.
- Machine data at any frequency—anytime—without costly reconfiguration of control systems.
- Direct connectivity for existing enterprise data platforms/applications.

For more information on Exara visit **exara.net** or email **exarabiz@exara.net**.
For more information on Intel® IoT Gateways visit **intel.com/iotgateways**.

1. Source: Society of Petroleum Engineers, *Maximizing Oil Production and Increasing ESP Run Life in a Brownfield Using Real-Time ESP Monitoring and Optimization Software: Rockies Field Case Study* at www.onepetro.org/conference-paper/SPE-166386-MS.

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