Real-Time Streaming Data Management
A Platform for Large-Scale Mission Critical Sensor Network Applications

Operational Intelligence in the Oil and Natural Gas Industry

Background

Oil and natural gas operators must process, analyze, and react in real time to massive volumes of sensor data every day, increasing volumes and rates of streaming data in order to improve safety, compliance, and profit. For example, real-time analysis of streaming data from drilling rig sensors, intelligent wells, and digital oilfield installations enables early detection of drilling hazards and pending equipment failures, thereby reducing rig time, intervention, and shut-ins.

Data problems include the need for real-time integration of operational systems and an inability to maintain accurate and current information across all systems and data warehouses in real time. Poor integration leads to duplication of data and systems, and a lack of visibility across all monitored assets, resulting in the delayed identification of the root cause of problems.

The SQLstream solution proposes a streaming data architecture that is capable of processing and analyzing rig data and smart oilfield data in real time. Further, the architecture supports the integration of any and all of an organization's sensor data, operational platforms, and data warehouses in real time. The approach aggregates and analyzes live, streaming data on the fly, without the need to store the data first. Large volumes of high velocity, streaming data, in any format and from all sources, can be processed continuously and delivered to existing operational systems and data warehouses.

Big Data is a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools.

Wikipedia, 2013

Big Data Metrics

General

Oil & Gas

Volume

2009: 800 exabytes, forecast to grow by 40% per year (McKinsey, 2011).

A large offshore field produces 0.75 terabytes of data weekly, a large refinery generates 1 terabyte of raw data per day, and super majors store up to 2 terabytes per day (Abou-Sayed, 2012).

Velocity

A small scale V2I (Vehicle to Infrastructure) telematics application is in the order of 20 million events per second. Large scale GPS applications are now exceeding 1 million events per second; however, telecommunications and IP-based services (Internet Protocol) monitoring applications require the capacity to process many tens of millions of events per second.

Data rates for a typical offshore production platform are of the order of 4,000 to 10,000 events per second (Abou-Sayed, 2012).

Variety

Circa 80% of all data in an organization is unstructured, including emails and documents (Cisco, 2012).

Unstructured and semi-structured data is increasing and poses a significantly greater challenge for data processing and integration than conventional structured and sensor data.

Improving Operational Efficiency

The oil and natural gas industry is striving to improve operational efficiency but is being hindered by a number of significant number of IT and operational factors. Operational business units managed as vertical IT siloes, each with its own data acquisition, monitoring and business automation platforms. This makes it difficult and expensive to integrate information across an organization, and to deliver automated end-to-end business processes.

Data volume and velocity is increasing as a result of new sensor technology such as RFID (radio frequency identification) and wireless sensors, and technologies such as distributed fiber optic sensors that increase both the volume and velocity of data acquisition. This means that maintaining real-time operations as data volume and velocity is moving beyond the capability of existing operational infrastructure.

SQLstream's real-time, streaming Big Data technology provides the infrastructure required to manage both increasing data volume and the continuous integration of acquired data with existing systems. The platform is also a complement to, rather than replacement for, existing operational systems, offloading the real-time performance and integration bottleneck.
Why SQLstream?

The SQLstream Proposition

We recognize that businesses have existing operational systems in place. Our approach is to complement and augment these systems, while delivering the real-time operational process optimization that our customers are seeking. The SQLstream advantage comes from our ability to:

- Manage increasing high volume, high velocity log file and sensor data at a massive scale.
- Improve operational efficiency through improved real-time integration.
- Improve safety, reliability and compliance through low latency operations monitoring.
- Automate business processes to address the skills gap, for example, a lack of skills in new technologies or bridging the gap where experienced personnel have retired.

Optimizing Real-Time Operational Processes

SQLstream is best in class for advanced operational intelligence, combining all types of log file, sensor and machine-generated data at massive scale, and integrating real-time streaming intelligence continuously with Big Data storage platforms and other external systems. Our products are invariably seen as a more viable and scalable alternative to other log monitoring, streaming and operational intelligence products -- able to do a great deal more -- including advanced analytics, streaming visualization and interfaces to a wide variety of devices, databases, middleware and systems. Our core streaming data technology represents the five V's of streaming Big Data:

**Volume** | SQLstream's streaming Big Data engine supports Hadoop HBase as a massive-scale Big Data storage platform for persisting data feeds.

**Velocity** | The core value of our streaming platform is to accelerate Big Data and scale to the multi-million events per second applications now common across industries such as oil and gas, telematics, smart energy and telecommunications.

**Variety** | Unstructured data is our strength, including plugins and adapters for processing unstructured data as part of a streaming intelligence pipeline, for example, extracting sentiment for text messages and twitter feeds.

**Value** | SQLstream offers scalable operational intelligence and predictive analytics at a price point that drives down TCO yet offers powerful, complete solutions.

**Visualization** | SQLstream enables business managers to visualize complex streams of alerts and derived intelligence using real-time dashboards and map-based displays, as well as integration with other dashboard tools.

What next?

The SQLstream offers the leading streaming data management platform as well as a range of Big Data and real-time consultancy services. Whatever your Big Data need, we're here to help, and would be happy to discuss your requirements- call us, or email inquiries@sqlstream.com.

Contact us today to find out more about our products.
Or, better yet, go to www.sqlstream.com/downloads/ to **download and try a free version**.

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About SQLstream | SQLstream is the leading standards-based streaming Big Data platform, forging real-time competitive advantage from streaming service, system and sensor data. SQLstream's standards-based, distributed and scalable architecture uses industry standard SQL for the rapid analysis of high volume, real-time data streams. Standards mean lower costs, proven performance and seamless integration. With SQLstream, our customers are turbo-charging their Big Data environments for real-time, and responding with confidence to business exceptions based on accurate, up to the second information. SQLstream is headquartered in San Francisco, California and is on the web at www.sqlstream.com.