



Corvil



Advanced Streaming Analytics for Real-Time Financial Trading Systems

Summary

The network that connects your trading systems together and to the outside world is an amazing source of data about what's happening in your business - right now. But leveraging this data was once a daunting task. There is a lot of it, it moves quickly, and it comes in a variety of different protocols and formats. By combining Corvil's streaming analytics platform with Think Big's advanced data engineering and analytics capabilities, these challenges can now be overcome. The Partnership delivers an advanced IT Operations Analytics solution, with powerful benefits for Financial Markets participants:

- **Advanced machine learning and predictive analytics** for use cases ranging from anomaly detection and scenario modeling, to strategy and system optimization
- **A non-intrusive solution** that decodes and analyzes network data with zero impact on production trading systems. Support for hundreds of data formats, including all major exchange and middleware protocols
- **Eliminate data blind-spots** with access to a full picture of all activity crossing your trading network as it happens
- **Support for real-time processing** and immediate reaction, as well as **batch-oriented analysis** of detailed long-term data sets

Objectives

Electronic trading is an extremely demanding, data-driven industry, generating vast amounts of information about prices, orders, quotes and trades every second of every day. Corvil and Think Big have partnered to make sense of data from networks and other sources, helping our customers glean a deeper understanding

of what it's telling them about their business, in real-time. Every financial trading firm uses data to make trading decisions. But have you realized just how much more business insight your data contains? It's time to fully leverage it to drive advanced analytics that deliver strategic business value:

COMPLEX ANOMALY DETECTION.

Use modern analytics techniques to determine what constitutes 'normal' trading activity within your environment, based on patterns of message-flow, trading volumes and dispersion across different markets and securities. Monitor changing trends in activity patterns over time and equip real-time systems to instantly detect significant deviations from normal behavior.

CYBER-SECURITY AND FRAUD.

Whether occurring as isolated anomalies or as subtle patterns of weakly correlated behavior, modern analytical techniques combined with massive datasets can provide early warnings of potentially threatening behavior to sharply curtail risk and losses.

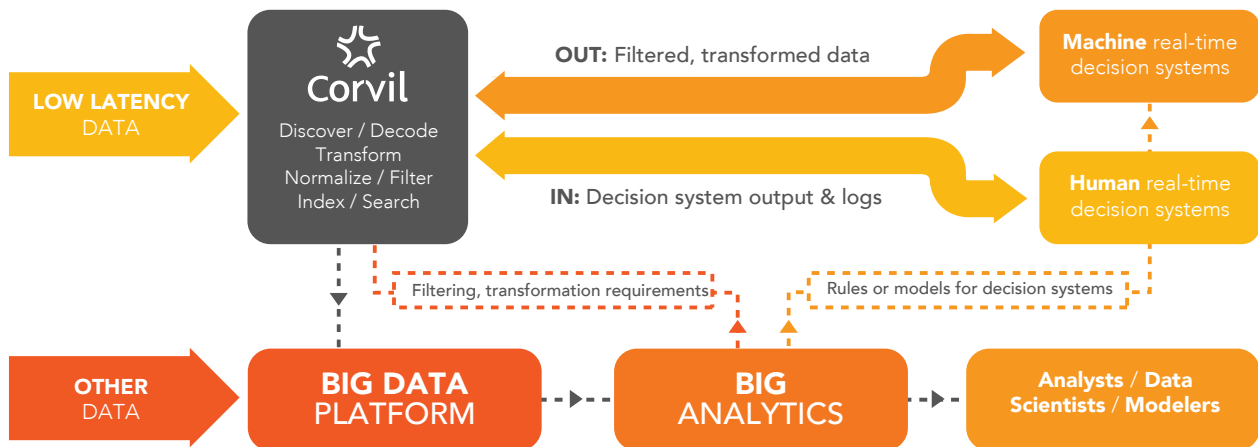
TRADE EXECUTION OPTIMIZATION.

Trading occurs in a continuously changing environment and uses myriad different execution and processing pathways both within and between firms. Analyze trading outcomes across different paths and different conditions, to identify common factors that underpin successful trades - or lead to abnormally poor results.

COMPLIANCE AND RECONCILIATION.

Capture key data and metrics to demonstrate compliance with exchange rules and regulations and reconcile trading activities in real-time. Use Big Data technologies to turn passive compliance data into an active, query-able information set delivering strategic value to your business.

Big Analytics + Decision Systems



Solution

Corvil and Think Big together provide a best-of-breed solution to capture the financial data flowing in your network, decode it, and analyze it in a powerful and flexible Big Analytics platform delivering highly valuable and actionable business intelligence.

Corvil's streaming analytics platform unlocks valuable real-time operational, customer and business data directly from the network and makes it easily accessible to external tools and applications via its open analytics streams. Real-time streaming feeds and bulk transfer APIs provide decoded data and derived analytics for messages, transactions and sessions in a normalized, open format. Using Corvil you can select precisely the information you want to use. And Corvil provides tools to integrate data directly into Big Data storage and analysis systems such as Hadoop/HDFS, and real-time processing platforms such as Storm.

Corvil patented software and algorithms instantly transform the often-chaotic data present in the network into valuable, consumable information:

1. Sources raw data from network taps, switches and aggregation devices, ensuring it is **accurately time-stamped** and sequenced. Monitors network-layer quality to detect any performance issues and missing or untimely data.
2. Reconstructs network flows and automatically discovers the data protocols and formats in use.

Corvil understands the hundreds of financial data formats **out-of-the-box**, and provides a SDK for extension to custom or in-house protocols. This step reveals all of the data in orders, quotes, transactions and market data updates.

3. **Analyzes** trading-layer behavior, **tracking** order life-cycles and metrics such as trading volumes and fill-rates.
4. **Filters and indexes** data based on programmable network or application-layer data fields, storing it for access via rapid global search no matter where in the network it was sourced.
5. **Publishes live data** and analytics in an open, normalized and structured format to downstream systems for **further processing and/or storage**.

Think Big Analytics specializes in the use of Big Data architectures and technologies to support advanced analytics. Bringing extensive experience in systems architecture, data engineering and advanced data science together with domain expertise, Think Big empowers customers with the tools and techniques needed to turn systems and trading data into valuable business insights. Whatever the state of your analytics platform, from non-existent to over-burdened, we can help design, implement and tune, as well as make the most of it through advanced analytics. We emphasize tight integration between data science and engineering in projects using our proven methodologies to deliver business value as quickly as possible.

Unique Benefits

- Turn the data flowing in your network into a high-quality source of information for **advanced analysis**. Filter, summarize and enhance your data as required to support the needs of **different use cases**.
- **Zero impact** on production system performance, and zero integration requirements.
- Proven ability to keep up with the **massive data volumes** common in financial trading environments.
- Supports **real-time use cases** with live data feeds, as well as large-scale batch-oriented processing of historical data sets.

Together, Corvil and Think Big Analytics provide the most complete end-to-end IT Operations Analytics solution that safeguards the health and performance of trading infrastructures. The partnership and solution also provides 100% visibility of your data at a granular level to help you to quickly identify issues and resolve them in minutes vs. hours or days, and realtime advanced and predictive analytics to identify and correct potential issues and threats before they negatively affect the business.



Together, **Corvil** and **Think Big Analytics** provide the most complete end-to-end IT Operations Analytics solution that safeguards the health and performance of trading infrastructures.



Corvil

Streaming Analytics to
Run Business in the **NOW**