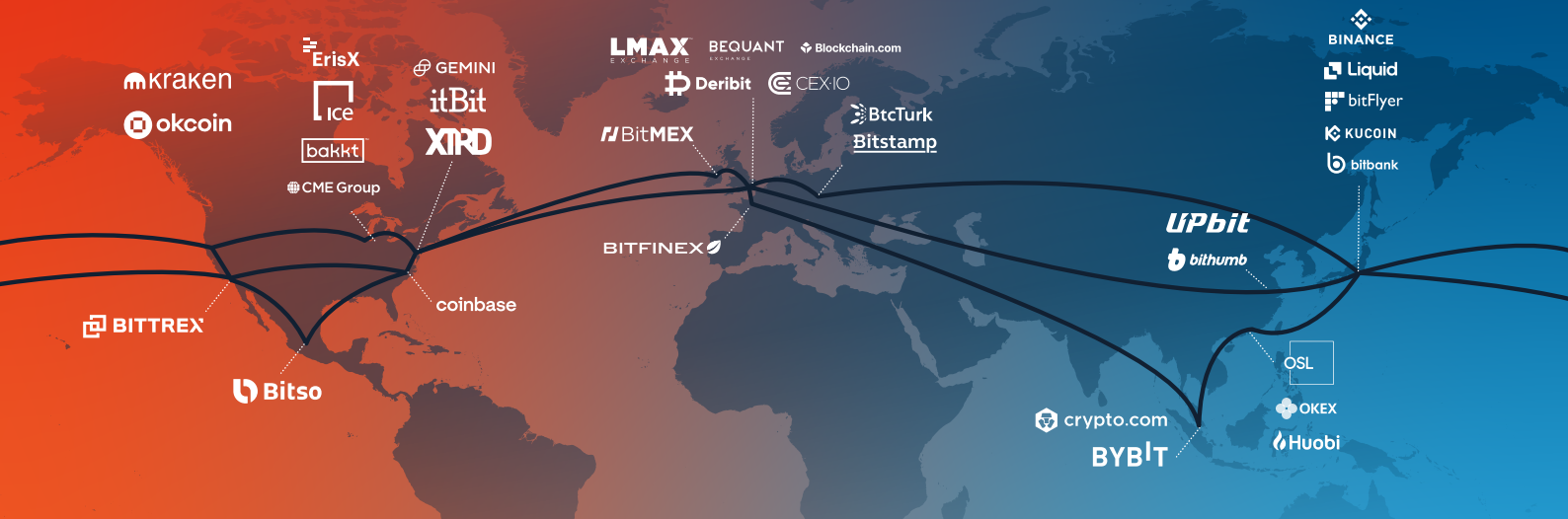


Corvil Analytics and Pico Services for Crypto Markets



KEY CAPABILITIES

Maximum Visibility

Measures every order, every market data tick and every packet to fill the missing gap of visibility need to manage real-time performance in the crypto trading environment.

Granular Instrumentation

Leverages the public cloud port mirrors to provide per-packet and per-application message analytics alongside Corvil's AppAgent to instrument internal application performance.

Corvil Analytics

Provides all of Corvil Analytics including network congestion analytics for public cloud infrastructure, and per-hop trading and market data analytics for specific crypto trading use cases and venues.

Pico Crypto Connect

Enables crypto market makers to bypass the AWS backbone and benefit from the global Pico services operation for a low latency connection between all major crypto venues.

Corvil Analytics Services

Corvil Analytics is used by the world's top banks, market makers and exchanges to safeguard the orderly operations of their trading business. And Pico Services are trusted by 430+ financial services firms globally to manage infrastructure, cloud, data and connectivity solutions for their mission critical trading solutions.

In this solution brief we outline how the Corvil Analytics product and Pico Services can be leveraged by Crypto market makers and exchanges to maximize performance and provide service assurance in the crypto trading markets.

Challenges

Crypto exchanges are largely deployed in the public cloud. So market makers and other firms are also deploying trading solutions in the public cloud to trade with these exchanges. All parties are encountering challenges with this deployment:

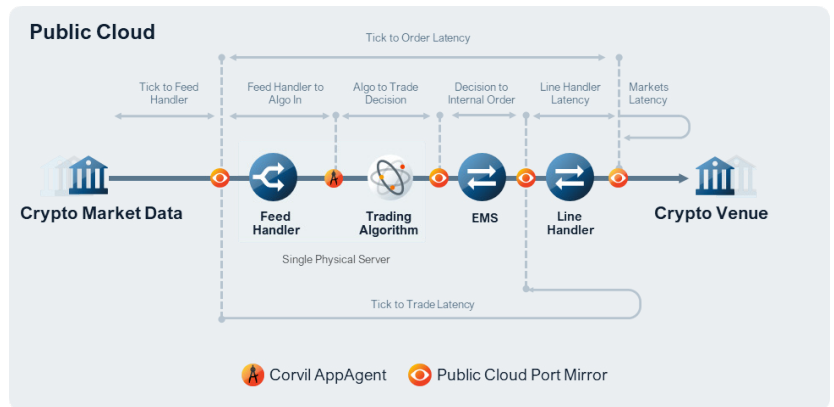
- Random connection drops between the client and the exchange
- Disputes over order flow and lack of visibility to credibly identify what happened to an order
- Variable latency in the processing of an order
- Difficulty optimizing every step in the order flow chain with no insight on which step is the causing the majority of problems
- Variable latency and congestion across the public cloud backbone between different cloud hosted crypto venues

These are also issues for on-prem traditional trading markets where Corvil Analytics and Pico Services are recognized market leaders for solving these challenges.

Why Corvil Analytics?

The current tools available to crypto venues and trading clients in the public cloud are completely inadequate for solving these known trading challenges. The most common performance visibility available in cloud typically involves software agents to measure compute, OS, database, storage and serverless compute performance. But this approach has a large blind spot that provides no visibility into congestion across the public cloud shared infrastructure. And also no visibility into the order flow and market data this is flowing between clients and the venues.

The Corvil Analytics approach leverages the ability in public cloud environments to mirror packets from the production workload interface in real-time. These packets are an accurate and passive copy of every market data message, every order and every packet sent and received by any workload in the cloud. Corvil Analytics leverages these packets in the public cloud to restore the granular visibility required to meet the challenges in this environment.



A critical aspect of the Corvil Analytics solution to provide the granular visibility for crypto markets is the ability to decrypt the market data and order flow data in real-time. This is particularly challenging because all of the venues use perfect forward secrecy for encryption. Corvil Analytics provides a solution for decryption in this environment to enable full visibility of every order and every market data message.

Corvil Solutions

1. Users can identify the cause of all connection drops using the complete packet record from the connection alongside all handshake and protocol messages.
2. With full visibility into the orders, there is a clear record of every order sent and received by both parties and every response to the order - this stops the finger pointing and quickly resolves any disputes about individual orders.
3. Corvil automatically correlates orders with responses to measure latency and track the full lifecycle of the order.
4. The performance of any workload can be measured, for example, the trading algo decision latency can be measured from the market data tick to when the order is sent.
5. Corvil also provides a product, the Corvil AppAgent, to instrument the internal stages within a workload. For example, a single workload involves handling the market data feed, making the algorithm trading decision and then the order execution process. The AppAgent enables measuring the latency for each of these stages within the workload.
6. By leveraging every packet, Corvil Analytics provides real-time visibility into microbursts that cause congestion in public cloud infrastructure and also on the private leased lines between crypto venue locations. Having visibility into the microbursts enables users to accurately size these expensive private lines.

Pico Services—Crypto Connect

The crypto market is highly fragmented and widely distributed across AWS regions and locations. Market making firms use real-time signals from multiple crypto venues to inform trading decisions. These can be distributed over the AWS backbone but this has proven to be highly variable in performance and latency.

The Crypto Connect service from Pico addresses this challenge by providing secure, private and low latency connections between all the leading digital asset exchanges.