

Canadian Securities Exchange enhances Trading Network by adding a FIX Protocol Router Appliance

The **Canadian Securities Exchange (CSE)** began operations in 2003 to provide a modern and efficient alternative for companies looking to access the Canadian public capital markets.

The operating company, **CNSX Markets Inc.**, was recognized by the Ontario Securities Commission as a stock exchange in 2004.

Designed to meet the needs of emerging companies and their investors, CSE has grown continuously and now lists more than 200 equities, government bonds and structured products.

In September 2007, the exchange launched the first continuous auction market to trade securities listed on other Canadian stock exchanges. The facility introduced a high capacity, low latency trading environment, combined with an attractive fee structure that enabled the Canadian trading community to use advanced trading technologies to their full advantage, while delivering cost-savings, enhancing the competitiveness of the Canadian markets.



FPR1202 FIX Protocol Router
housed in a 2U rack-mount enclosure.

In June 2013, due to a growing demand for increased trading capacity, CSE opened a second point-of-presence in Toronto, employing a new FIX Protocol message routing solution from **INCEPTRUM Technologies Inc.**



The Exchange For Entrepreneurs

“Our aim is to offer our customers a low cost, high performance access to our services.”

*The FIX Protocol Router from **InceptumTechnologies** is easily incorporated into our network infrastructure and allows us to provide consistent low latency FIX sessions to our customers, that are highly configurable and adaptive to our present and future network requirements.”*

Richard Carleton

CEO, Canadian Securities Exchange (CSE)

High Level Requirements:

- ❖ Centralize FIX session management.
- ❖ Content driven (Layer-7) message routing.
- ❖ Enhanced FIX gateway load balancing.
- ❖ Enhanced redundancy methods for greater fault tolerance within the trading network.
- ❖ Ability to retrofit these enhancements to other CSE trading networks.



FIX Protocol Router Deployment

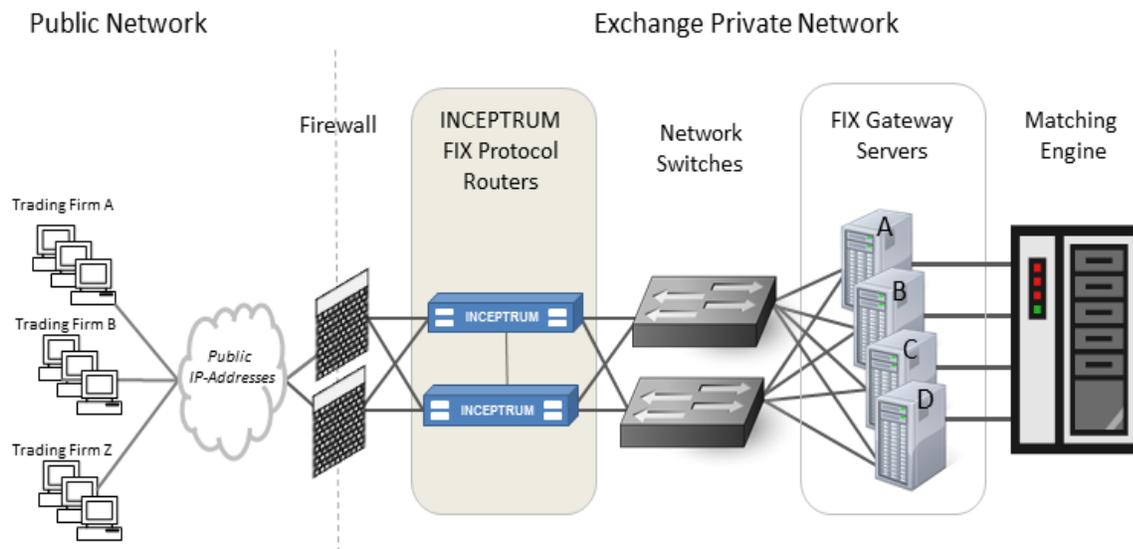


Figure -1: CSE Trading Network with FIX Protocol Router appliances

The new point-of-presence provided CSE with the opportunity to enhance their existing low latency FIX network design in the key areas of **flexibility, performance, reliability** and **scalability**.

After reviewing a number of different hardware and software solutions, CSE selected the **FIX Protocol Router ("FPR1202")** appliance from **Inceptrum Technologies**, due to its rich feature set, competitive price-point and non-disruptive (easy) deployment to both new and existing network infrastructures.

CSE's network design employs a minimum data-path strategy (see figure-1) providing a consistent low latency profile for all FIX sessions connected to the network. The FPR1202 appliance is deployed after the Firewall and before the network switches, in a **"2-Arm"** configuration. The appliance acts as a full proxy and termination point for incoming and outgoing FIX messages.

*"Non-disruptive
deployment into an
existing network
infrastructure"*



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FLEXIBILITY

The FPR1202 appliance allows for independent FIX session to be defined and managed at a single point in the network. This provides for faster “on-boarding” of new customers and easier management of existing sessions.

“Centralized session management”

Because the appliance acts as a management point for all incoming and outgoing FIX messages, it hides the internal FIX gateway structure and provides a single, virtual IP-Address for customer connections to the network.

Message routing is content-driven (*Layer-7*), by inspecting message header tag values (i.e. “**SenderCompID**”, “**TargetCompID**”). This allows for independent routing of a message to any gateway server, rather than as part of a group, associated with the end-point **IP-Address** (*Layer-4*) of the TCP-IP socket connection.

“Content based (*Layer-7*) FIX messages routing”

Inspection of message content (“in-line”) provides support for the application of **custom business rules**, to modify the message content before it is routed to a gateway server and provides safeguards, such as, the early rejection of a malformed message.

PERFORMANCE

The FPR1202 appliance provides enhanced **Server Load Balancing (SLB)**. Both individual FIX messages and FIX sessions can now be load balanced across a pool of gateway servers. This new load balancing feature helps prevent message traffic bottlenecks from forming, enhance performance and utilization of gateway servers – protecting against variable message latency. Customers are not required to modify their FIX session (IP-Address) settings, when the network Administrator makes SLB adjustments.

“Enhanced load balancing providing increased network performance”

Another feature called “**Session Consolidation**” is employed to optimize the utilization of gateway servers. Multiple incoming FIX sessions (from a Trading Firm) are consolidated into a smaller number of gateway FIX sessions. Reducing the number of connected gateway FIX sessions improves overall performance and increases the throughput capacity of the gateway server.



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RELIABILITY

The FPR1202 is deployed as a pair of appliances, in an “Active/Stand-By” configuration, to ensure the **High Availability** (HA) of routing services. The built-in health monitoring allows for the automatic fail-over between routing appliances, when a fault is detected. The state information for all active FIX sessions is continuously synchronized between appliances.

FIX messages are automatically routed to an alternative gateway server, when the primary gateway becomes unavailable, without the need to disconnect incoming FIX sessions. Secondary IP-Address routes are no longer required, since backup gateway routes are now managed internally and transparently by the appliance.

The design of the appliance also provides for the hot-swap replacement of hardware modules, without powering-down the entire appliance. This allows for emergency maintenance to be performed during a trading day session - if required.

*“Enhanced
redundancy for
network fault
tolerance”*

SCALABILITY

The FPR1202 appliance employs a modular hardware platform, housed in an industry standard (**2U form factor, 19” rack mount**) enclosure, which supports a wide range of software and hardware configurations, that are field upgradable.

In Conclusion

The deployment of the FPR1202 appliance allows faster onboarding of new customers through centralized FIX session management, which drives down operational costs and improves customer service. Enhanced load balancing ensures low latency message transport and increased network performance - unlocking extra trading capacity, without the need for additional capital expenditure on new gateway servers. Advanced HA operating modes ensures minimal network downtime, resulting in increased customer satisfaction and customer loyalty.



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About INCEPTRUM Technologies

INCEPTRUM Technologies is headquartered in Ottawa, Ontario, Canada's capital, serving domestic and global customers. Providing software and hardware solutions to a wide range of business sectors, with a specific focus on creative and leading-edge solutions for the financial industry, targeted at low latency applications, where traditional software solutions, are no longer able to meet the challenging latency requirements demanded by today's fast paced market trading environments.

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Document No: **CS-140828-1 (A)**



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