

Polaris

DISASTER RECOVERY INFORMATION –
CONNECTIVITY CLIENTS

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Introduction

This document provides an overview of the disaster recovery capabilities of the Polaris electronic trading system, detailing the architecture, connectivity and failover procedures. It is intended to help Connectivity Clients understand how orders are processed in both Production and DR environments and what to expect during normal operations as well as during DR events.

All Connectivity Clients are recommended to establish connectivity to the DR environment. If you are connecting via a connectivity provider (IGN, TNS, PicoNet, Pico, BT Radianz) then you should confirm that the provider has connectivity in place to our DR site. If you connect via cross connect, then you will need to ensure you also have cross connect connectivity in place to our DR site. You should validate your DR connectivity ahead of any DR event.

Recovery Architecture

- The Polaris trading system and its associated data centers are completely independent of the NYSE systems.
- The Polaris Production environment is hosted at Equinix NY5 in Secaucus, New Jersey.
- The Polaris DR environment is a separate, standalone environment from Production hosted at Equinix CH4 in Chicago, Illinois.

PRIMARY AND BACKUP SESSIONS

- For every FIX order entry session into Polaris, a Primary IP address and a Backup IP address is provided for both Production and DR, for a total of four (4) possible IP addresses per session. The ports for each order entry session will be the same across all four (4) IP addresses. Connectivity clients must have connectivity to the DR session for the DR IP addresses to be assigned.
- Under normal circumstances, the availability of each IP address is as follows:

	PRODUCTION (NY5)	DR (CH4)
Primary	Clients can connect via FIX and submit orders.	Clients can connect and Heartbeat via FIX. Orders will be rejected.
Backup	Not accessible Orders not accepted	Not accessible Orders not accepted

- In each environment, clients are only able to connect to the Primary IP address by default. The Backup IP address is only available for connection in the case of an outage to the Primary IP address.
- In the event of a localized outage impacting a FIX Gateway in the Polaris Production environment (e.g. hardware failure), any affected Primary FIX sessions will be failed-over to the Backup IP address. The Backup IP address will become available at this time, and the Primary IP address will be disabled.
- The sequence number on the Backup FIX session will resume from the last sequence number sent on the Primary FIX session.

- If Cancel on Disconnect has been configured for a FIX session, any live orders on the session will be canceled by Polaris when disconnecting from the Primary IP address. The client will receive the order cancel messages when connected to the corresponding Backup IP address. The exception to this is when an order is routed externally (e.g. to NYSE), and Polaris is unable to recall the order. Example: an order has been routed to a Closing Auction, and it is after the cutoff time for canceling orders in the Auction. In this exceptional case, the client order will remain live.

PRODUCTION AND DR ENVIRONMENTS

- A DR event on Polaris may occur independently of a NYSE DR event - or it may occur concurrently, depending on the circumstances. Polaris is designed to support either scenario.
- There is no logical order state replication between the Polaris Production environment and the Polaris DR environment. Orders submitted to Production will **NOT** be available in DR.
- Trade data will be replicated from Production to DR for the purposes of generating end-of-day CAT and regulatory reports.
- Floor brokers have access to both the Production and the DR environments. In a DR scenario, they remain the primary contact for any order queries.
- The DR environment is started daily to ensure that FIX connectivity is operational; however, orders are automatically rejected until the DR environment has been activated by the Polaris Support team.
- As in the Production environment, only the DR Primary IP address will be accepting connections by default. The DR Backup IP address will only be used in case of an outage to the Primary IP address in DR.
- In the event of a widespread outage of the Polaris Production environment (e.g. datacenter outage), the Polaris Support team will make a decision to switch from the Production environment to DR. This decision will be clearly communicated to all connectivity clients.
- At this time, the Production environment will stop accepting orders and the DR environment will start accepting orders. If there are still order entry sessions connected to the Production environment, and the Production environment is able to process order cancel requests, clients may still send order cancel requests into Production, but no new order requests.
- If Cancel on Disconnect has been configured for a FIX session, the Production environment may cancel all live orders when disconnecting from the Production FIX session should a disconnect occur. However, if the Production environment has suffered a catastrophic failure, it may not be able to automatically cancel orders.
- As order data from Production is not replicated to DR, the DR environment will not send back any order cancel messages from the Production environment.
- Polaris' own NYSE Pillar order entry sessions also have Cancel on Disconnect enabled, so a DR event which results in Polaris disconnecting from NYSE Pillar will cause all orders with NYSE to be canceled.
- As detailed above under **Primary and Backup Sessions**, Polaris may be unable to recall routed orders. In a DR event, this means that the order may remain live at the routed destination. In that event, the client should coordinate with their Floor Broker to confirm the execution status of such orders.

Support

- For Connectivity and FIX Session information please contact polarisfixsupport@pragmatrading.com.
- For specific order queries with NYSE in a DR event, contact your Floor Broker who can work with the NYSE to provide this information.