



TQD102 · TECHNICAL SPECIFICATION

Turquoise Derivatives Connectivity Guide

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1 Introduction

The purpose of this publication is to provide participants with the knowledge and technical details necessary for accessing the Turquoise derivatives trading system.

The Turquoise derivatives platform utilises a standard FIX 4.2 (Financial Information eXchange) interface for order entry & execution.

Participants who intend to be Market Makers must use the native SOLA Access Information Language (SAIL) protocol for quoting and order entry & execution.

Market data is disseminated via HSVF (High-Speed Vendor Feed) protocol using TCP.

1.1 Purpose

The purpose of this document is to provide participants with information on how to connect to the Turquoise derivatives platform for both the test Customer Development Service and the production service.

1.2 Readership

This document is a supporting document to the interface technical specifications. When read in conjunction with the other technical specifications, these documents provide all of the details Turquoise participants require to obtain access to the derivatives trading system.

This document is particularly relevant to project and technical staff within member firms and companies that provide Turquoise related services to member and non-member firms.

1.3 Document Series

This document is part of series of documents providing a holistic view of full trading and information services available from Turquoise for derivatives trading.

For reference the full range of documents is outlined below:

- **TQD102 - Connectivity Guide (this document)**
- TQD200 - FIX 4.2 Business Design Guide
- TQD201 - FIX 4.2 Specification
- TQD300 - SAIL Business Design Guide
- TQD301 - SAIL Specification
- TQD401 - HSVF Market Data Specification
- TQD601 - Guide to Certification

1.4 Document History

This document has been through the follow iterations:

Issue	Date	Description
1.0	19 Jan 2011	First issue of this document published.
1.1	31 Jan 2011	Publication of SAIL Drop Copy IP address for CDS test platform.
1.2	10 Feb 2011	Publication of SAIL Drop Copy IP address for production platform.
1.3	11 Oct 2011	Inclusion of Olso Bors IP addresses and ports.
1.4	14 Oct 2011	Availability of VPN connectivity.

1.5 Enquiries

Contact Technical Account Management at Turquoise for any functional queries regarding the services outlined in this document. Technical Account Management can be contacted Monday to Friday between 07:15UK and 17:45UK:

- Telephone: +44 (0)20 7382 7699

2 Connectivity Overview

2.1 Connectivity Protocol

Turquoise uses TCP/IP (Transmission Control Protocol/Internet Protocol) for network connectivity. All FIX and native SAIL interface messages are transported using TCP. All data sent by the HSVF interface is broadcast via TCP unicast. Turquoise only supports IPv4.

2.2 Services

Turquoise provides a gateway to enter orders and receive market data.

2.2.1 SAIL Trading Gateway

The SAIL trading gateway provides a native low-latency trading interface which allows participants to send and manage orders on the trading system. The SAIL protocol in addition provides market-marking functionality via quoting messaging. The interface enables clients to perform the following activities:

- (i) Submit an order
- (ii) Cancel an order
- (iii) Mass Cancel orders
- (iv) Cancel/Replace an order
- (v) Market-Making

The SAIL trading gateway uses a proprietary interface referred to as the native interface.

2.2.2 FIX Trading Gateway

The FIX 4.2 trading gateway allows participants to send and manage orders on the trading system. The interface enables clients to perform the activities outlined below.

- (i) Submit an order
- (ii) Cancel an order
- (iii) Mass Cancel orders
- (iv) Cancel/Replace an order

The entry of quotes for market-making is not supported by the FIX trading gateway. The FIX trading gateway uses the FIX 4.2 protocol.

2.2.3 Market Data Gateway

The HSVF market data feed is comprised of trades, quotes, market depth, strategies, bulletins, summaries and statistics.

The HSVF market data feed uses a TCP/IP broadcast interface. Each message type is fixed in format and messages are non-blocked (i.e. Turquoise does not wait for an acknowledgement before sending the following message) re-transmission of any data is available.

HSVF messages consist of a standard message header followed by the message body which varies in format according to the message type.

Messages transmitted by HSVF include:

- Trades
- Request for Quotes
- Quotes
- Market Depth
- Trade Cancellation
- Instrument Keys
- Instrument Summaries
- Administration messages including connection and “heartbeat” etc

2.2.4 BTS and BCS Applications

The Borsa Italiana Systems (BlTS) Trading Station (BTS) Service allows access to Turquoise derivatives trading services. In addition, it is also used to access all other London Stock Exchange Group cash, fixed income and derivatives markets.

The BltS Clearing Station (BCS) allows access to Turquoise derivatives clearing services provided on CC&G technology.

The applications enable access through a client-server trading software application and through a FIX 4.2 gateway. The server layer is located at the Turquoise derivatives data centre that is connected directly to the markets. The client application runs on the member’s own computers. The client application is an advanced multi-market trading application, compatible with a majority of Windows and Linux based operating systems.

2.3 Connection Options

Participants are able to connect to the Turquoise derivatives platform via London Stock Exchange Extranet, co-location hosting or VPN connectivity. Turquoise also supports third-party leased-line connectivity.

2.4 Architecture

The Turquoise derivatives platform consists of the following gateways:

- A single endpoint (IP address and port) interface for FIX trading.
- A single endpoint interface for SAIL trading & market-making.
- A single endpoint interface for HSVF market data services.
- Two endpoint interfaces each are provided for BTS trading and BCS post-trade services respectively.

Each FIX, SAIL, HSVF and BTS & BCS endpoint is supplemented with a secondary standby which is invoked during a failover in the event of an issue occurring with the primary. The endpoints (IP addresses and ports) of the secondary standby interfaces are equivalent to those of primaries.

An equivalent configuration of primary and secondary standby interfaces are present at a secondary datacenter which is invoked in the event of a disaster recovery situation. The endpoints (IP addresses and ports) of the secondary disaster recovery datacenter site are equivalent to those of the interfaces located at the primary datacenter site.

2.5 Disaster Recovery

Turquoise operates in cold standby mode. In the event of total loss of the primary site datacenter, Turquoise activates the disaster recovery site. This procedure is expected to elapse in the order of 2 hours.

Once the disaster recovery site is active, all intraday orders are cleared and the trading system re-started. Prior Good Till Date orders submitted from previous days are re-instated.

The endpoints (IP addresses and ports) of the disaster recovery datacenter site are equivalent to those of the interfaces located at the primary datacenter site.

3 Extranex Connectivity

3.1 Customer Development Service (CDS) Test Platform

3.1.1 CDS Trading Services

TURQUOISE		
Service	IP Address	TCP Port
FIX Trading	194.169.14.164	51350
SAIL Trading	194.169.14.162	51300
SAIL Drop Copy	194.169.14.162	51305
BTS Trading	194.169.14.168	34900 (UDP 13)
BCS Clearing	194.169.14.170	34900 (443)

OSLO BORS		
Service	IP Address	TCP Port
FIX Trading	194.169.13.164	51351
SAIL Trading	194.169.13.162	51301
BTS Trading	194.169.13.168	34900 (UDP 13)
BCS Clearing	194.169.13.170	34900 (443)

3.1.2 CDS Information Services

TURQUOISE		
Service	IP Address	TCP Port
HSVF Market Data	194.169.14.166	52300

OSLO BORS		
Service	IP Address	TCP Port
HSVF Market Data	194.169.13.166	52301

3.2 Production Platform

3.2.1 Production Trading Services

TURQUOISE		
Service	IP Address	TCP Port
FIX Trading	194.169.14.132	61350
SAIL Trading	194.169.14.130	61300
SAIL Drop Copy	194.169.14.130	61305
BTS Trading 01	194.169.14.134	34900 (UDP 13)
BTS Trading 02	194.169.14.135	34900 (UDP 13)
BCS Clearing 01	194.169.14.136	34900 (443)
BCS Clearing 02	194.169.14.137	34900 (443)

OSLO BORS		
Service	IP Address	TCP Port
FIX Trading	194.169.13.132	61351
SAIL Trading	194.169.13.130	61301
BTS Trading 01	194.169.13.134	34900 (UDP 13)
BTS Trading 02	194.169.13.135	34900 (UDP 13)
BCS Clearing 01	194.169.13.136	34900 (443)
BCS Clearing 02	194.169.13.137	34900 (443)

3.2.2 Production Information Services

TURQUOISE		
Service	IP Address	TCP Port
HSVF Market Data	194.169.14.146	62300

OSLO BORS		
Service	IP Address	TCP Port
HSVF Market Data	194.169.13.146	62301

3.3 Enablement Process

Requests to be connected to the Turquoise derivatives platform are required to be directed to:

- Connect@TradeTurquoise.com

Participants are required to specify the following information:

3.3.1 CDS (Customer Development Service) Test Platform

- Company
- London Stock Exchange Extranex SAP
- Primary and secondary contact (name, email, telephone)
- Services required (FIX, SAIL, HSVF, BTS, BCS)
- **IP address range (100MB SAP): x.x.x.88 to x.x.x.95**
- **IP address range (1GB SAP): participant specified from range VLAN951**
- **IP address range (1GB/10GB Hosting): participant specified range.**

3.3.2 Production Platform

- Company
- London Stock Exchange Extranex SAP
- Primary and secondary contact (name, email, telephone)
- Services required (FIX, SAIL, HSVF, BTS, BCS)
- **IP address range (100MB SAP): x.x.x.64 to x.x.x.79**
- **IP address range (1GB SAP): participant specified from range VLAN950**
- **IP address range (1GB/10GB Hosting): participant specified range.**

4 VPN Connectivity

4.1 Test CDS (Customer Development Service)

VPN connectivity is available for access to the TQ-CDS test platform via the VPN Extranet Developer service:

- <http://www.londonstockexchange.com/products-and-services/connectivity/extranet/extranet-vpn-developer.pdf>

4.2 Production

VPN connectivity access to production services is available upon request; for further information, please contact:

- Connect@TradeTurquoise.com

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