Volume 200 - Guide to Testing Services

Johannesburg Stock Exchange

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1   DOCUMENT CONTROL

1.1   Table of Contents

1.2   Document Information

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1.3   Revision History

Date	Ver	Sections	Description
20 Sept 2011	1.00		Initial Draft

1.4   References

- JSE Specifications

    Volume 01 – Native Trading Gateway

    Volume 02 – FIX Trading Gateway (FIX 5.0 SP2)

    Volume 03 – Post Trade Gateway (FIX 5.0 SP2)

    Volume 04 – Drop Copy Gateway (FIX 5.0 SP2)

    Volume 05 – Market Data Feed (ITCH UDP)

    Volume 06 – Market Data Feed (FAST UDP)

    Volume 07 – Indices Feed (FAST UDP)

    Volume 08 – Regulatory News Feed (FAST UDP)

    Volume 09 – JSE Reference Data Management

    Volume 10 – JSE Reject Codes Specification

2   OVERVIEW

The New JSE Equity Market Customer Testing Services is available to support clients in their development and testing of the new Equity Market Trading and Information systems for the JSE and NSX Markets.

2.1   Purpose

The purpose of this document is to provide an overview of the Customer Testing Service for the new Equity Market Trading and Information systems and the related JSE and NSX market models to assist clients in their development and testing.

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3. Testing Requirements

A review of the current mandatory testing requirements is in progress to ensure the revised requirements meet the new solution requirements. The revised test requirements will facilitate client migrations to the new solution.

Mandatory test requirements will still be required for all applications that wish to connect to the production environment. However, clients may need to 'self conform/certify' core functionality prior to completing the remaining mandatory test cycles with the JSE.

Details of the 'self conformance/certification' process and the mandatory test cycles will be issued as soon as these are finalized.

3.1 Testing

The new JSE Equity Market Trading Solution has four trading interfaces for each of the JSE and NSX markets as listed below. Clients are required to test each of the interfaces that they choose to develop and interface to:

- Native Trading Interface
- FIX Trading Interface (FIX 5.0 SP2)
- Post Trade Interface (FIX 5.0 SP2) (mandatory for Trading - OTBD)
- Drop Copy Interface (FIX 5.0 SP2) (Optional OOBD)

Clients will need to be certified for each of the interfaces that they intend to use in production. It will be mandatory for all applications to use the Post Trade Gateway for the Own Trade Book Download (OTBD) in order to manage failures at both the Client and JSE. The Drop Copy Gateway for the Own Order Book Download (OOBD) will be an optional service.

3.1.1 Trading Gateway Failover & Recovery Testing

In order to support Clients with their disaster recovery testing, every Friday, between 15:00 and 15:45, the following components will be failed in turn, in sequence:

- Primary FIX Trading Gateways
- Primary FIX Post Trade Gateways
- Primary FIX Drop Copy Gateways
- Selected Native Trading Gateways

Clients connected to a Primary Gateway that has failed must detect the disconnection and re-connect to their designated Secondary Gateway. Technical information regarding failover and recovery will be provided in Volume 11 – JSE Client Failure and Recovery Specification.

Clients will remain connected to the Secondary Gateway for the remainder of the day.

3.1.2 Market Data Failover & Recovery Testing

Clients will not be required to demonstrate that their applications can receive multicast data from new Equity Market Trading and Information systems. However; there are two Information interfaces which all Clients planning to re-request will be required to test against. These are as follows:

- Replay Service
- Recovery Service.

Note: Re-request limits will be applied to both the Replay and Recovery service, limiting the number of recovery actions a client can action in a day.

In order to help ensure Clients can develop to the Replay and Recovery service, the
JSE will deliberately create:
- a gap in the sequence numbers of the market data messages and
- a failure of the A feed gateway

Sequence Number Gaps – <<availability TBC>>

Channels affected for both JSE and NSX Markets:
    Native Level 2 Full ITCH channel A
    FIX/FAST Channel Level 1
    FIX/FAST News and
    FIX/FAST Indices

Event	Correct Customer Behavior
Primary (A) feed sequence number gap simulated	Pick up the multicast messages from the Secondary (B) feed, and do not request from Replay or Recovery services
Restore Primary (A) feed	Pick up the multicast messages from the primary (A) feed, and do not request from Replay or Recovery services
Primary and Secondary sequence number gap simulated	No action until sequence number gap is detected
Restore Primary and Secondary feeds	Detect the sequence number gap (on the next message received) and connect to the primary Replay service and request the missed messages.

A flat-file based Reference Data download service has been introduced as part of new solution. All Clients will also be required to test against this service prior to go-live. Further information is available is available in Volume 9 JSE Reference Data Management.

3.2   Optional Testing

In addition to the JSE's mandatory testing procedures, a number of optional tests will be introduced. These optional tests aim to further facilitate Clients' migrations to the new solution.

An optional High Volume test will be available to all information Clients wishing to stress test their feed handlers. Details to follow.

3.3 Application Conformance

As detailed previously there will be a requirement for mandatory testing of customer applications prior to granting access to the production environment.

A Guideline will be produced that will outline the testing activities that will need to be performed by client applications in order to achieve the required conformance.

4. Service Times

4.1 CDS Service Times

The service hours for the New JSE Equity Market Trading and Information CDS will match those of the production service. The JSE will look to provide extended periods for additional testing after hours. Further details of the after-hours sessions will be confirmed shortly.

Time (SAST)	Description
05:00 - 08:30	Start of Trading
08:30 - 09:00	Open Auction Call
09:00- 16.50	Continuous Trading
16:50- 17:00	Closing Auction Call
17:00	Post Close Session

4.2 Maintenance Days

On occasion the JSE will need to close the new CTS to perform upgrades or maintenance activities. Clients will be informed of maintenance days and early CDS closures via Service Hotlines. Furthermore, Clients should also note that on occasions where CTS has to be shut down and restarted, message sequence numbers will be reset. The Logon Reply message will contain the message sequence number of '1'.

4.3 Broadcast Data

The market data services for the JSE and NSX markets on the new solution will use a combination of protocols dependant on the service, specifically FIX/FAST and ITCH.

The majority of services will be published using FIX 5.0 SP2 and compressed using FAST 1.1. This will include the following:

- Level 1
- Level 2 Snapshot by price (TBC)
- News Service
- Indices

The following service(s) will be published in Level 2 Full ITCH:

- Level 2 Full Depth

Full details of each of these interfaces can be found in following publications:

- Volume 05 - Market Data Feed (ITCH – UDP)
- Volume 06 - Market Data Feed (FIX 5.0 SP2)
- Volume 07 - Indices Feed (FAST – UDP)
- Volume 08 - Regulatory News Feed (FAST – UDP)

4.4 Reference Data

Each market data service will publish instrument data available on that channel. The following information will be published each morning:

- Instrument ID (unique numeric identifier)
- Symbol (unique alphanumeric identifier)
- Instrument status
- ISIN
- TIDM
- Segment
- Previous Closing Price
- Ex Markers and Annotations assigned to the instrument

The full reference data set will be published separately on a daily basis as a FTP flat-file via the JSE IDP service . This will allow future enhancements and enrichments to be implemented with limited impact and provide clients with greater flexibility in how they assimilate reference data. Full details of the Reference Data service can be found in the following publication:

- Volume 9 JSE Reference Data Management

5. Trading Services

5.1 Overview

With the introduction of the new solution, the JSE will standardise on FIX 5.0 SP2 for the client interfaces with the exception of the Reference data Interface and a new, optional fixed width native interface for trading. Clients will connect to each interface via a FIX or Native Gateway, depending on the functionality they require (see figure 1 on below page).

- FIX Trading Gateway
    - o Trading Interface (FIX)
        - ❖ Order entry and immediate confirmation of Automatic Trades

- Native Trading Gateway
    - o Trading Interface (Native)
        - ❖ Order entry and immediate confirmation of Automatic Trades

- Post Trade Gateway (FIX)
    - o 'Enriched' near real-time trade confirmation of Automatic Trades (including cancellations)
    - o Off Book Trade Reporting
    - o Own Trade Book Download (OTBD)

- Drop Copy Gateway (FIX)
    - o 'Copy To' functionality
    - o Own Order Book Download (OOBD)

- Reference Data Service (IDP Service)
    - o Reference data downloads

Full details of each of these interfaces are available in the JSE User Specification document.

6. Participant Enablement

Clients will be provided with new solution CDS Trading and Information enablement's.

The new enablements created will be allocated new Comp Ids by the JSE. The JSE will look to transfer existing Member ID and Trader Groups to the new CDS environment wherever possible.

Existing Clients will be required to use the new Comp IDs allocated. Any additional enablement requests should be made to the JSE Customer Support Team.

7. Connectivity

Physical access to the new solution CDS service via the FIX and Native interfaces will be offered through the existing JSE Network and via a JSE Point of Presence (PoP) in London.

Clients can establish a connection to CDS in the following ways:

- Direct connectivity
- Network Service Provider (NSP)
- JSE PoP

7.1 Trading connectivity

Each Gateway interface will have two IP addresses acting as Primary and Secondary and Clients will be allocated which gateway they can connect to during the enablement process. Clients should configure to connect to both IP addresses and ports.

The list of Trading IP addresses for each service will be provided as part of the enablement process.

7.2 IDP FTP and SFTP services

The IDP Service details will be provided at a later date. Sample files are available to clients on the JSE website.

7.3 Market Data Connectivity

The Market Data services consists of a Level 1, Level 2 snapshot (TBC) and ITCH level 2 Feed (ITCH).

The JSE Market Data services will be configured to disseminate single message per TCP packet.

8. High Volume Service (HVS)

Details of the HVS service will be provided at a later stage. The purpose of this service will be to help Clients tweak their infrastructure in order to process the data in the most efficient way.

9. Liquidity Provision

The JSE is busy investigating options available to provide the HVS service to clients. The HVS service is required to assist with client testing.