



London
STOCK EXCHANGE

Trading Services

ALTERNATE SITE RECOVERY SERVICE DEFINITION

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Purpose of this document

The purpose of this document is to describe the processes involved when the Exchange invokes its alternative site recovery for Trading and Infolect services. It is relevant to all Exchange customers, both direct and those accessing the London Market through third-party providers.

This document describes:

- the functional process by which recovery is effected
- the sequence of events during the recovery process
- communications between the Exchange and participants during recovery
- the procedures for the restoration of the market.

Introduction

To enable the Exchange's trading and information services to be reinstated after a disaster or major central system failure at the Exchange's Primary Data Centre, comprehensive back-up arrangements at an alternative site have been planned. These back-up arrangements may be invoked to operate the Trading and Infolect services in the case of a failure at the Exchange's primary Data Centre. The impact on the Exchange's customer interfaces of a cutover to the alternative site and the technical mechanisms used for the recovery of broadcast, secure interactive and interactive request services, are documented in the Exchange publication:

Trading and Information Services - Interface Specification, TIS102, Section 4

www.londonstockexchange.com/techlib/sets/intspec_index.asp

If there is a major failure at the Exchange primary Data Centre, database consistency at the alternative site is not guaranteed, as data 'in transit' at the time of failure may not be transferred successfully. Consequently, the alternative site database may not have been updated with orders and associated trade data, which were in the process of being completed at the Primary Data Centre prior to the failure or disaster event.

There is also the possibility that there will be inconsistency between the central database held by the Exchange and the databases held within market participants' systems.

Although the likelihood of these scenarios occurring is very small, the Exchange has introduced these documented procedures to mitigate the risks.



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Functional overview

This section describes the functions of the Alternative Site Recovery procedure for our following Trading Services:

- SETS, SETSmm, ETF's Covered Warrants, IOB, IBB, DTS (Order Books)
- SEAQ, SEATS PLUS, AIM, IRS

Order book cleardown

A major activity within the Alternative Site Recovery's procedures is the cleardown of all orders for each instrument from the order book. This will be completed prior to the re-instatement of the trading service to customers from the Exchange's alternative site. This will ensure that customers who experience problems connecting to the alternative site service, and who may not be able to update the order book, are not exposed to automatic execution at invalid prices.

Trades report (disaster recovery report)

During the Alternative Site Recovery process, the Exchange will produce a report for each order book participant detailing their trades up to the point where trading ceased. The report will show for each participant a record of all their trades (automated and manual) leading up to the time of failure and which have been recovered at the Exchange's alternative site. The report will contain details of all trades in the 5 minutes before the point of failure.

The purpose of the report is to enable participants to identify any discrepancies between their own record of executed business and that of the Exchange's alternative site database and/or that of their market counterparts.

The report will be deemed to be the definitive record of transactions at the time of the Primary Data Centre failure. The content of the report is specified on page 6 of this document.

The 'Disaster Recovery Trades' report will be produced at the alternative site and distributed to market participants by the Exchange's Client Sales & Management department.

Similar to the Order Books procedure, the Exchange will produce a report for each, SEAQ, SEATS PLUS, AIM and IRS participant detailing their trades up to the point where trading ceased. The report will show each participant a record of all their trades (automated and manual) leading up to the time of failure and which have been recovered at the Exchange's alternative site. The report will contain details of all trades in the 5 minutes before the point of failure.



Sequence of events

Under the Exchange's Alternative Site Recovery arrangements it is anticipated that the time period between the failure at the Primary Data Centre and the restoration of services at the alternative site will be no longer than 4 hours.

For this reason, if failure were to occur relatively late in the trading day, the Exchange may make the decision to restore services from the start of the next trading day rather than the current trading day.

The planned sequence of events following a failure are as follows:

1. **Disaster** or **Failure** at the Exchange primary Data Centre. Exchange begins procedures for a move to the alternative site
2. Initiate invocation:
 - clear down order book
 - clear down periods
 - initiate trading period for DSRV for every segment
3. Run start of day (systems active)
4. Exchange systems are recovered at the alternative site enabling customers to re-establish network connections
5. On completion of start of day, the Exchange's Market Supervision department commences restoration of market segments. Test segments ODTT and TEST are initiated to enable customers to test connections to the alternative site
6. Customers are requested to resynchronise their database using the public order book download before beginning trading activity. Order deletion messages will be received at this point. A reference data download will also be received.
7. Disaster recovery trades report is produced at the alternative site and issued to participants (see report format on page 6)
8. Trading will be re-instated in each individual market segment when the Exchange's Market Supervision department is satisfied as to its participants' ability to provide a viable market
9. Market participants will receive notification via Service Announcements on the market restoration progress



Events following failure - broadcast interface

When the system at the alternative site is brought into operation, subscribers will need to reconnect. This will be achieved through connecting to the alternative site. The system at the alternative site will then broadcast messages as follows:

- the first message sent for each broadcast data group/ service channel reaches this state, the Disaster Recovery message (5RD)* is broadcast
- broadcast of messages continues, those in process during the disaster are transmitted along with new messages
- the services are recovered.

When the disaster occurs, some messages will have been in process and may have been received by subscribers. However, they may not have been backed-up on the alternative site system. When the recovery process is invoked by the Exchange, this will result in subscribers receiving an unpredictable mixture of two types of messages:

- new messages with an unused sequence number
- new messages with a sequence number previously used by another message.

The following processing for messages received following disaster recovery is suggested:

- all messages following the Disaster Recovery messages should be processed, since their sequence numbers will not be sufficient to determine whether they have been received before. Subscribers should be aware that this approach may involve some messages being processed twice.

* The 5RD message is generated to enable subscribers to resynchronise their messages following a disaster recovery. Subscribers should use the Message Sequence Number contained in the broadcast message header in order to identify and discard any messages that have previously been transmitted with a sequence number that is greater than, or equal to the sequence number contained in this message.



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Events following failure - interactive request interface

Once the Exchange has completed disaster recovery at the alternative site, the interactive request interface will be made available again. Logging on to the system will be as normal except that the **Logon Acknowledgement** message will have the Session Code set to Advisory Code 'E080I' to indicate that recovery has occurred.

This does not mean that the Logon has failed, but the subscriber can re-submit any requests that were outstanding at the time of the disaster, if the requests are still appropriate.

Where the acknowledgement to a **Re-request** message from a subscriber contains sequence numbers for messages issued prior to the **Disaster Recovery** message, subscribers may not receive a reliable acknowledgement.

Events following failure - secure interactive interface

Once the Exchange has completed disaster recovery at the alternative site, subscribers should re-establish their session to the Broadcast Interface.

The Public Order Book Download will be initiated thereby enabling subscribers to reconcile the state of the centrally maintained order book to their own.

On completion of the Public Order Book Download, the Secure Interactive Interface will be made available.

Logging on to the system will be as normal except that the **Logon Acknowledgement** message will have the Session Code set to Advisory Code 'E080I' to indicate recovery has occurred.

Following logon it is recommended that participants re-submit any requests made through the Secure Interactive Interface which had not been acknowledged at the time of the disaster.



Exchange communications to customers

In an Alternative Site Recovery scenario the Exchange will deliver the following communications:

- The Exchange will advise participants of the initiation of Alternative Site Recovery procedures by a fax or e-mail delivered Service Announcement. Other users of Exchange services would be notified by their service vendors
- The **Disaster Recovery Trades** report will be produced at the alternative site and disseminated to participants by the Exchange's Client Sales & Management department. Participants would receive the report by e-mail or fax, if available
- The clear-down of the all order books and the subsequent restoration of the Broadcast, Interactive Request and Secure Interactive Interfaces will generate unsolicited and delete order messages.

Customers should refer to the Exchange publication:

Trading and Information Services - Interface Specification, TIS102, Section 4 for instructions on the processing of these messages

www.londonstockexchange.com/techlib/sets/intspec_index.asp

- The Exchange's Market Supervision department will advise participants, via Service Announcements, of the restoration of trading in the individual market segments.

Report format

The Disaster Recovery Report will be in text format, and will contain the following fields:

- trade code
- segment
- sector
- ISIN code
- issuer name
- trade date
- trade time
- currency
- trade price
- trade size
- trade type
- buy party
- sell party
- trade reported by
- reporting party dealing capacity.



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Restoration of trading

When a participant's network connections have been re-established with the Trading and Infolect systems at the alternative site, the Exchange's Market Supervision unit will begin to restore the market segments so that trading can restart. Market segments will be restored individually.

Two live test segments (ODTT and TEST) will be restored so that customers can test their ability to access and interact with the Exchange trading system.

The planned order of restoration will then be as follows:

- all UK order driven segments (including CP segments)
- all UK quoted segments (including SEATS Plus)
- fixed Interest segments
- all International segments
- Trade reporting only segments

Trading in any segment will only be restored when the Exchange is satisfied that there are enough market participants to provide a viable market and ensure orderly trading.

The calculation of any index security will recommence as soon as an uncrossing takes place, unless the index is manually held by FTSE.

Return to the Primary Data Centre

The timing of the return to the Exchange Primary Data Centre will depend on the nature of the failure or disaster at the site. However, it is very unlikely that a move back to the Primary Data Centre would be contemplated on the same trading day.



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Testing & contacts

The Exchange has developed a continuous programme for the testing of its Alternative Site Recovery procedures. If your company would like to be involved in these testing procedures, please contact your account manager in the Exchange's Client Sales & Management department.

If you have any technical questions about the information contained in this document, please contact the Client Technology Group on 020 7797 3939 (STX 33939).



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Thank you

www.londonstockexchange.com

Telephone +44 (0)20 7797 1000