DSB Production
Root Cause Analysis

For Production Outage on 15th February 2021

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Revision History

Version	Date	Reason
0.1	15th February 2021	RCA
0.2	9th March 2021	Updated after legal feedback
1.0	10th March 2021	Final version

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IMPACT ASSESSMENT & CATEGORIZATION

Major Impact (Severity Two - S2)

Production FIX API Disconnection

Start: 11:30 AM UTC - 15th February 2021
Resolved: 01:27 PM UTC - 15th February 2021
Total: 1 hour, 57 minutes
Impact: 44 unique Productions FIX sessions were disconnected belonging to 36 institutions

Production "Something went wrong" error

Start: 11:30 AM UTC - 15th February 2021
Resolved: 08:47 PM UTC - 15th February 2021
Total: 9 hours, 17 minutes
Impact: 3% of transactions were affected
(3,971 of 151,856 transactions across 61 (52%) of 117 legal entities actively using the system at this time)

For details of classification of Incidents please see **Appendix 1** on page 6.

INTRODUCTION

The purpose of this Root Cause Analysis (RCA) is to determine the cause of the two distinct errors encountered by DSB Users on 15th February 2021:

1. FIX API Disconnection
2. "Something went wrong" errors encountered by ReST users

These errors were encountered by DSB users in the DSB Production environment on between the hours of 11:30 AM UTC and 08:56 PM UTC.

This RCA determines what happened during the event, how it happened, and why it happened. An investigation was undertaken by the DSB's Management Services Provider (Etrading Software) in conjunction with the DSB's Service Provision Partner.

EXECUTIVE SUMMARY - FINDINGS AND ROOT CAUSE

The root cause has been determined to have been human activity by DSB's Service Provision Partner. This was enacted through an automation system whereby a large proportion of DSB primary and secondary Production servers were patched and rebooted intraday.   The affected systems included the FIX API and Core ISIN Engine servers, immediately causing FIX API users to be disconnected and some DSB users intermittently encountering the error messages "Something went wrong" via ReST.

- The DSB Production FIX service was recovered by the DSB's Management Services Provider (Etrading Software) and completely stabilized at 11:44 AM UTC on 15th February 2021. All but one of the users who were disconnected were able to reconnect at that time.

- The "Something went wrong" error was resolved by the DSB's Management Services Provider (Etrading Software) at 20:47 UTC on 15th February 2021 when the affected servers were restarted as part of a controlled rolling restart of the core ISIN engine service on all Production instances.

During this time the DSB's Management Services Provider (Etrading Software) was unaware that the DSB's Service Provision Partner was the root cause of this incident.

The DSB has identified the action performed by the DSB's Service Provision Partner:

- Was attributed to a single engineer as part of the DSB's Service Provision Partner's planned engineering works
- Updated and restarted a large number of DSB servers
- Occurred during migration activities on the DSB's Service Provision Partner's automation platform (a multi-tenant platform)
- Occurred outside of any agreed maintenance window arranged by the DSB
- Was unrelated to any authorised work scheduled by the DSB's Management Service Provider (Etrading Software)
- Circumvented the in-place change governance procedures and necessary approvals

The DSB's Service Provision Partner has confirmed that this incident affected multiple customers.

CORRECTIVE ACTIONS TAKEN & PLANNED

The DSB has already:

- Deactivated the automation system

As part of the remediation plan, the DSB's Management Service Provider will:

- Undertake an independent review of the DSB's Service Provision Partner's performance
- Ensure the DSB's Service Provision Partner's automation system is removed in its entirety
- Improve application monitoring for out of order start-up outside of the maintenance window
- Work with the DSB's Service Provision Partner to ensure they:
    - o Provide ongoing and additional investigation regarding DSB organisational controls
    - o Improve and reinforce internal governance on service affecting changes
    - o Provide additional resources for remediation of introduced changes

DETAILED EVENT DESCRIPTION

On 15th February 2021 at 11:30 AM UTC both the production FIX servers and core ISIN engine servers were rebooted causing established FIX connections to drop. In addition, some DSB users encountered the error "Something went wrong" when performing logon, search and create ISIN tasks.
The FIX connection issue took place between 11:30 AM UTC and 01:26 PM UTC. Clients utilizing the Production FIX service reported disconnections at 11:55 AM UTC.
The "Something went wrong" error was experienced by DSB users between 02:24 PM UTC and 08:46 PM UTC. Clients started to report the "Something went wrong" error from at 08:01 PM UTC.

The majority of the DSB Production FIX client's connectivity recovered and reconnected successfully to the FIX service by 01:27 PM UTC. The "Something went wrong" error was resolved at 08:47 PM UTC following a controlled rolling restart of the core ISIN engine service on all Production instances.

TIMELINE OF EVENTS

Monday 15th February 2021

Time (UTC)	Description
11:47 AM	DSB FIX alerts were triggered on Production FIX services. DSB Technical Support started their investigation.
11:55 AM	The DSB started to receive reports from FIX clients about session disconnections to the Production FIX Service. The DSB advised impacted FIX clients of the ongoing incident.
12:05 PM	The Production FIX service started to recover as confirmed via monitoring alerts and the majority of the FIX sessions affected were automatically reconnected to the service.
12:17 PM	Out of the 44 DSB FIX Client sessions affected, 43 reconnected successfully as verified via FIX event and messages logs. 1 remaining FIX client had not reconnected automatically.
12:45 PM	FIX validation checks are passed
01:27 PM	The DSB Production FIX related alerts had stopped and the service had stabilized. FIX users who have reported disconnection confirmed they were able to connect successfully to the service. This included the 1 remaining FIX session that did not automatically reconnect – this required the DSB and Client to intervene.
02:55 PM	Service disruption notification email sent to all DSB Production FIX clients
04:59 PM	DSB Technical Support started to investigate a new issue observed in the logs where some DSB clients were getting a "Something went wrong" error during logon, search and creation of ISINs across all Production endpoints.
06:30 PM	DSB Technical Support obtained approval to action a controlled rolling restart of the Production core ISIN engine services to address the issue
08:01 PM	DSB Technical Support received the first report from client regarding "Something went wrong" error.
08:20 PM	DSB Technical Support identified that the core ISIN engine Production servers were also updated and rebooted as part of the Service Provision Partner activity.

Time (UTC)	Description
08:30 PM	DSB Technical Support began the process of restarting the DSB core ISIN engine services on all affected Production instances to resolve the issue.
08:47 PM	Services had stabilized, the error is no longer being seen in the logs.

Thursday 18th February 2021

Time (UTC)	Description
2:54 PM	Follow up service disruption notification email sent to all DSB Production users

APPENDIX 1

Classification of Incidents

Severity	Definition
Critical (S1)	Critical production issue that severely impacts the DSB Service for all Users. The situation halts business operations and no procedural workaround exists. DSB Service is down or unavailable. Major data elements are corrupted or lost and must be restored from backup. A critical documented feature / function is not available.
Major (S2)	Major functionality is impacted or significant performance degradation is experienced and is not a Critical Incident. The situation is causing a high impact to some Users' business operations and no reasonable workaround exists. DSB Service is operational but highly degraded performance to the point of major impact on usage. Important features of the system offering are unavailable with no acceptable workaround; however, operations can continue in a restricted fashion.
Minor (S3)	There is a partial, loss of use of the DSB Service with a medium-to-low impact on your business, but your business continues to function that is not a Critical Incident or a Major Incident. Short-term workaround is available, but not scalable.
Cosmetic (S4)	Inquiry regarding a routine technical issue; information requested on application capabilities, navigation, installation or configuration; bug affecting a small number of users. Acceptable workaround available.

Reference: DSB Service Level Policy 2020