

DSB Production Root Cause Analysis

For Production File Download Data Issue on 2nd and 3rd of December 2023

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Revision History

Version	Date	Reason
1.0	6th December 2023	RCA

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IMPACT ASSESSMENT & CATEGORIZATION

Major Impact Severity Three S3

Production ISIN+ File Download Data Issue

Start: 00:17 UTC 3rd December 2023

Resolved: 11:38 UTC 4th December 2023

Total: 1 Day 11 hours, 21 minutes

Impact: ISIN+ for the 2nd of December is delayed.

It was detected that the File Download for the 2nd of December was not generated. Due to large volume of data and duplicate data which needs to be deduplicated, our job cannot process the record for Credit and Equity hence the job could not finish and publish the FDL files.

For details of classification of Incidents please see [Appendix 1](#) on page 6.

INTRODUCTION

This document presents the Root Cause Analysis (RCA) for the incident that occurred on December 3, 2023. The incident is regarding the delay in publishing the 2nd of December File Download records. This was due to the Out of Memory error the server encountered when trying to publish the File Download records. This document provides an overview of the incident, the findings, root cause analysis, corrective actions taken, and planned actions to prevent similar incidents in the future.

EXECUTIVE SUMMARY – FINDINGS AND ROOT CAUSE

The incident was caused by a large data generated by the ISIN Pre-population activity. This in turn generated an Equity file of around 1.1GB and generated several duplicate ISINs amounting ~21k for Credit and ~5k for Other which then was causing an issue when we're trying to publish the File Download records due to the server encountering Out-of-Memory errors. Support did try to perform the reprocess locally to finish the job and republish the File Download for the 2nd of December 2023. In line with this, we are going to control the rate of the ISINs that will be prepopulated to avoid this issue and as a second line of defense on preventing the issue, we will be increasing the instance size of the server making it have more RAM to prevent OOM (Out-of-Memory) errors. Due to the failure of the 2nd of December FDL, we did encounter an issue

publishing the 3rd of December 2023 due to a lock file present. To fix the issue, we removed the lock file and republished the File Download records for the 3rd of December 2023 at around 5:55AM UTC 4th of December 2023. We also added a file checker to check for lock files that were not removed due to a process that failed to complete. This would help us identify if a lock file is present to prevent the job from failing. The root cause of the incident was identified, and an enhancement of determining if a lock file is present was raised to prevent this from happening again along with an instance size increase to add more memory to our servers for the OOM (Out-of-Memory) issues.

CORRECTIVE ACTIONS TAKEN & PLANNED

The DSB has already:

- Republished the ISIN+ for the 2nd and 3rd of December.
- Escalated the incident to our developers to add a file checker for lock files on the server to prevent the script from failing if ever the previous File Download job failed.
- Increased the instance size of the server to prevent OOM (Out-of-Memory) issues.

As part of the remediation plan, the DSB will:

- Implement enhanced monitoring and alerting mechanisms to detect and address similar incidents promptly.
- Provide additional training to the development team to raise awareness of potential system bugs and their impact.
- Regularly review incident response procedures to identify areas for improvement and ensure effective incident management.
- Communicate and coordinate with stakeholders, including affected teams and customers, to provide updates and address any concerns.

DETAILED EVENT DESCRIPTION

On December 03, 2023, the ISIN+ File Download was not published as scheduled upon checking by DSB Technical Support as part of the daily checkout at around 00:20 AM UTC. DSB Technical Support has investigated and has observed that the File-Download publication process did not complete as expected. DSB Support has investigated the issue and has successfully published the End of Day files at 07:26 AM UTC.

At around 5:00 PM UTC on December 03, a client reported to the DSB Technical Support that they are facing issues processing the Equity and Credit End of Day files for December 02. DSB Technical Support has acknowledged the issue and informed the client that they are working on the said issue.

DSB Technical Support then tried to reprocess the files, however, have observed that the Equity file is incomplete due to a backend component overrunning while the said file was being published. After investigating the issue, DSB Technical Support tried to reprocess the File-Download, however encountered a failure due to Out of Memory issues. DSB Technical Support then has escalated the issue to the developers for further investigation.

Consequently, due to the failure of the 2nd of December File-Download publication, the publication of for December was affected due to a lock file present. To fix the issue, DSB Technical Support removed the lock file and republished the File Download records for the 3rd of December 2023 at around 5:55AM UTC 4th of December 2023.

After further investigations with the developers in line with the December 02 File-Download issue, DSB Technical Support has republished the End of Day files for at around 11:37 UTC 4th of December 2023. DSB Technical Support then informed the client to try to redownload and reprocess the impacted files. Client has confirmed that they were able to process the impacted files after performing the successful republication.

TIMELINE OF EVENTS

Sunday 3rd December 2023

Time (UTC)	Description
12:20 AM	DSB observed that the ISIN+ File-Download was not published for December 02
7:26 AM	DSB republished the ISIN+ File Download for December 02
5:00 PM	Client reported an issue wherein they are unable to process the Equity and Credit Files for December 02
8:00 PM	DSB investigated the issue and tried to reprocess the End of Day Files
8:58 PM	DSB encountered the Out of Memory issue after reprocessing the End of Day Files
10:00 PM	DSB Support performed further investigation and escalated the issue to the developers

Monday 4th December 2023

Time (UTC)	Description
12:20 AM	DSB observed that the ISIN+ File-Download was not published for December 03 due to a lock file issue
5:55 AM	DSB republished the ISIN+ File Download for December 03
11:36 AM	DSB republished the ISIN+ File Download for December 02
11:53 AM	DSB has informed the client to redownload and reprocess the End of Day Files

APPENDIX 1

Classification of Incidents

Severity	Definition
Critical (S1)	<p>Critical production issue that severely impacts the DSB Service for all Users. The situation halts business operations and no procedural workaround exists.</p> <p>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.</p>
Major (S2)	<p>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.</p> <p>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.</p>
Minor (S3)	<p>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.</p>
Cosmetic (S4)	<p>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.</p>

Reference: [DSB Service Level Policy 2023](#)