**Background**

Hour Log runs on an application server, Glassfish. Glassfish 4.1 has an [unresolved bug](https://github.com/IQSS/dataverse/issues/1516) that causes it to intermittently confuse user-sessions, and as a result, fail to render web pages. In Hour Log v1.0.0, this has caused a log entry made by one user to appear as made by a different user. This bug is serious enough that a script was put in place to periodically monitor for it, and alert Controls Staff.

**Event Description**

On Saturday, 5th September 2015, Controls Staff was alerted by the monitoring script. It was noticed that Hour Log was not working at all, if accessed through Apache web-server (<https://controlsapp1.nscl.msu.edu/hourlog/> or <https://controls.frib.msu.edu/hourlog/>). However it was working fine if accessed directly through Glassfish (<https://controlsapp1.nscl.msu.edu:8181/hourlog/>).

**Chronology of Events**

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| **Time** | **Event** |
| 17:20, Sat, 9/5/15 | Monitoring script sends alerts about errors caused by Glassfish bug |
| 17:21, Sat, 9/5/15 | Monitoring script automatically restarts Glassfish (if the error occurs more than 100 times) |
| 18:37, Sat, 9/5/15 | Email sent to users (CCFOperations) indicating that the problem is being investigated. |
| 18:38, Sat, 9/5/15 | Email sent to helpme, checking if anything was updated on the server |
| 19:33, Sat, 9/5/15 | Users asked to access Hour Log directly (https://controlsapp1.nscl.msu.edu:8181/hourlog/), from inside the lab |
| 13:24, Sun, 9/6/15 | IT Team responds that nothing has been upgraded on the server |
| 15:01, Sun, 9/6/15 | IT Team is asked to cold-start Glassfish (only IT team can do it). However, this did not fix the problem |
| 00:19, Mon, 9/7/15 | IT Team is asked to point reverse-proxies to the working URL |
| 00:30, Mon, 9/7/15 | IT Team updates the proxies |
| 07:47, Mon, 9/7/15 | Users informed that they can use the normal Hour Log URLs. Hour Log is now accessible from outside the lab. DataU and Hallway Displays are not getting updated. |
| 10:00, Tue, 9/8/15 | Noticed that two reports (Operations and Experiment) are not working. |
| 21:00, Tue, 9/8/15 | Status update sent to users and IT team |
| 09:42, Wed, 9/9/15 | IT team is asked to create a new VM to isolate the problem |
| 09:57, Wed, 9/9/15 | Status update sent to users and IT team |
| 10:00, Wed, 9/9/15 | Started testing on QA server with a copy of current Hour Log data. Found the trigger for the problem. Tested the fix on QA server. Implemented the fix on production server. |
| 11:44, Wed, 9/9/15 | Informed IT team that the problem has been fixed |
| 11:48, Wed, 9/9/15 | Informed users that the problem has been fixed |
| 12:53, Wed, 9/9/15 | Shared initial findings with Andreas |

**Findings**

The logs on controlsapp1 were full of errors generated as a result of the Glassfish bug. Because this happened only when Hour Log was accessed through Apache, the problem appeared to be in Apache or its module mod\_jk that connects it to Glassfish. So a lot of time/effort was spent looking for problems with OS updates, Glassfish configuration changes, apache and mod\_jk updates, and Glassfish module updates. But everything looked fine.

The logs also had intermittent exceptions thrown by Hour Log while calculating EXN (‘Experiment Not Running’) hours for a facility. Looking at the database, it was found that EXN summary was made inactive. This explained why the two reports were not working, and DataU and Hallway Displays were not updating but did not explain why the rest of the application was trigerring the Glassfish bug. However, once the EXN-problem was fixed, the rest of the application also started working fine. So it appears that the repeated occurrence of the exception, caused by Hour Log, somehow trrigered the bug in Glassfish.

**Trigger**

A user (with admin privileges) had set EXN to ‘inactive’ at about 15:20 on 9/5/15. This caused Hour Log to throw NP exceptions when computing certain reports. This should affect only two reports and the summary-report API. However, its repeated occurrence appears to have triggered the bug in Glassfish. Due to these errors, none of the Hour Log pages could be rendered, when accessed through Apache. Note that this did not happen if the sessions were not coming through Apache.

**Root Cause**

Based on the findings, the root causes are:

1. A Glassfish bug that was triggered by
2. an Hour Log bug that was triggered by
3. setting EXN to inactive

**Corrective Action**

EXN was set to ‘active’ in the database.

**Preventive Action**

1. Modify Hour Log so as to compute hours for all summaries not just active ones
2. Test Case #DEF-02 has been added to Hour Log Test Suite to test for this defect
3. Upgrade Glassfish and/or its modules to a version that fixes the bug, when they become available