

Degraded Service Event

Event Period: 5/26/2010 11:00 EST – 5/27/2010 11:00 EST
System Affected: Operations
Products Affected: WIST/ECHO

Executive Summary:

The ECHO 10.23 release promoted the new ACL and Group Management capabilities into an active state whereby access to provider objects and catalog items are affected by the new provider configured ACLs. After the deployment of 10.23 into the Operational system it was immediately noticed that query performance was degraded for some providers, specifically LPDAAC_ECS, NSIDC_ECS, and LARC. During this initial period of poor performance, the average query time for a granule query jumped from 12s to 212s.

The ECHO development and database team correlated the poor query performance to long running database searches. After investigating the root cause, the ECHO development, database, and operations team worked to introduce 3 minor patches to the Operational system returning the average query time to its original performance level. During this work, there was no Operational downtime required due to the recent high availability efforts.

Detailed Summary:

After the release of ECHO 10.23, the ECHO team discovered a query performance issue resulting from poorly formed SQL queries searching through the ECHO database. The source of these SQL statements was traced to the “restriction flag == null” granule ACL filters utilized by the ECS data providers. The configuration was not incorrect, but was resulting in up to 3 SQL queries which performed a full table scan during execution. It is likely that any of the granule ACL filters would have resulted in the same performance problem.

The ECHO development team implemented an initial fix, which was tested on the ECHO workload system and then promoted to the Operational system at 18:30 EST on the day of the incident. This reduced the average query time to approximately 70s. The development team then implemented another fix, which was tested and deployed to the Operational system at 22:00 EST. This second fix reduced the average query time to approximately 30s. A final fix was implemented, tested, and deployed to the Operational system at 10:30 EST on the following morning. The final fix reduced the average query time back to its original 12s average query time.

The ECHO 10.23 release had been tested numerous times in the ECHO workload environment; however the specific ACL configuration which caused the performance problem was not utilized. The workload test utilized a simplified ACL structure, which did not highlight the specific issue which was encountered. During performance testing of the fixes referenced previously it was also noted that the workload test was not able to reproduce the same performance issues seen in the Operational system after the initial fix. This is due to the nature of the queries being run in the workload environment and will be addressed.

Timeline:

- 5/26 11:30 EST – ECHO 10.23 deployed Operations. Performance issues were immediately noticed by the ECHO Operations team and reported by NSIDC.
- 5/26 11:52 EST – Status message sent to echo-status-internal mailing list and WIST warning banner posted re: degraded performance.
- 5/26 18:30 EST – Pushed 10.23.5 to address ACL performance issues.
- 5/26 22:00 EST – Pushed 10.23.6 to address additional ACL performance issues.
- 5/27 10:30 EST – Pushed 10.23.7 to resolve ACL performance issues.

Associated Tickets/NCRs:

- ECHO_NCRs – 11005106 – Query Performance negatively impacted by restriction flag ACL

Future Mitigation:

The ECHO workload environment will be updated to utilize the same ACL configuration as is configured in the Operational mode for all future workload tests. This will be implemented by 6/8/2010. The queries which were run against the Operational system on 5/26 will also be captured and recorded for inclusion in a separate performance test. As a general lesson learned, the ECHO team will work to pull long running queries from the Operational system for regular inclusion into the workload performance tests.