FTS Best Practices

Michael Diesburg

FIFE Workshop

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What is FTS?

FTS is a transfer service that moves files from one static location to another static location.

It works in conjunction with a SAM DB so any files transferred by FTS must be cataloged in SAM.

It runs as a dropbox type operation. I.e. a user puts files to be transferred into a designated dropbox along with the associated SAM metadata.

FTS will periodically scan the dropbox for new files, initiate transfers, and verify that the data is on tape.

What FTS is NOT

It is not an on-demand transfer service.

- i.e. the user cannot trigger the transfer to occur at a specific time.
- FTS will initiate transfers on its next scheduled scan of the dropbox

It is not a general file delivery tool.

- i.e. files cannot be moved between arbitrary locations.
- Destinations must be locations known to SAM.
- Locations of dropboxes are statically specified in the FTS configuration file.

FTS Capacities

A single FTS server should be able to do:

- ~100k files/day
- ~50 MB/sec (~5 TB/day)

The above assumes:

- Adequate bandwidth between source and destination nodes.
- No backlog at destination
- No access delay at source (staging from tape).
- No significant delay in response from SAM.

What you will need

- A place to run the server
  - This is normally a VM set up specifically to run FTS
  - Some run FTS on their online or nearline nodes.
    - If your dropbox is in /pnfs this can occasionally require remounts or even reboots to clear a wedged mount. This could be an issue on a critical node.
    - Firewall issues can also be an issue on an online system.
  - If your dropbox is not in /pnfs and you require high throughput (~50MB/s) then you will probably want to use dedicated hardware for the FTS server.

What you will need

- A dropbox
  - The dropbox may be any directory that is directly readable on the FTS server node.
    - We recommend using /pnfs scratch or persistent areas.
  - You may make any directory structure under the dropbox top level that you like. FTS will recursively scan down.
    - But try to keep it simple. Try to structure your dropbox so a directory holds not more than a few thousand files at a time.

Operational Considerations

- FTS maintains metadata information in memory for each file it processes until that file is verified to be on tape. This can lead to heavy memory consumption on the server node.
- The server has some ability to control memory consumption via its configuration but this must be tuned on a case-by-case basis.
- To minimize memory issues your server should have at least 6GB memory. If you are trying to store large numbers of files (> 100k/day) you should have at least 12GB.
- Balancing the load will also help with memory issues. It is better to put 100k files/day into the dropbox than to put 1M files in every 10 days.

Operational Considerations

- FTS (and /pnfs) work best with files in the size range of ~10MB to a few GB. Try to tailor your files sizes to this range.
- If your file sizes exceed 8GB you may encounter problems with your /pnfs configuration.
- Each file written to /pnfs requires a database entry. This is true even if you have Small File Aggregation turned on. Large numbers (~1M) of small files can cause serious delays in moving files to tape even if the aggregate size is small.
- If you need to store many very small files, consider tarring them up yourself before putting them in the dropbox
- Or you might also consider using a conditions DB if the files are small enough.

Operational Considerations

- FTS can remove files from the dropbox after it has verified that the files have a tape label in Enstore. This can be done two ways:
  - FTS can query Enstore via the “enstore” commands.
    - This has minimal delay. FTS will be able to get the info as soon as the Enstore DB is updated.
      - But it does require that /pnfs be mounted on server
  - FTS can query the SAM DB for tape locations.
    - This has longer delay. The SAM DB is updated from the Enstore RECENT_FILES_ON_TAPE listings. These listings are only updated once per day.

Operational Considerations

- Files written to a Small File Aggregation cache may also remain on disk until the buffer is flushed to tape.
  - The delay is configuration dependent, but it typically 24 hours.
- Backlogs can also extend the dwell time by a few days

- To accommodate these possible delays you should have a dropbox that can hold at least 1 weeks worth of data.
- You should expect that it may take 2-3 days to determine that a file has been successfully written to tape.

FTS status for uboone-fts-uboonesamgpvm01

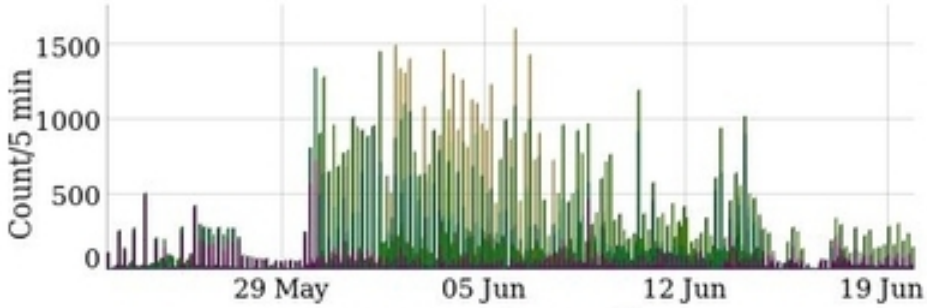
Generated at 2016-06-19 22:55:54 CDT (update)

Summary

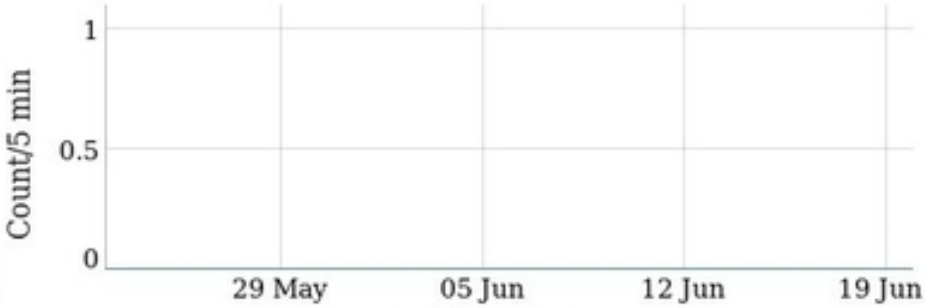
FTS: OK	SAM: OK

Completed files:	412424
Failed transfers:	2
All error files:	2
Waiting on tape:	141
Other pending files:	0
New files:	0

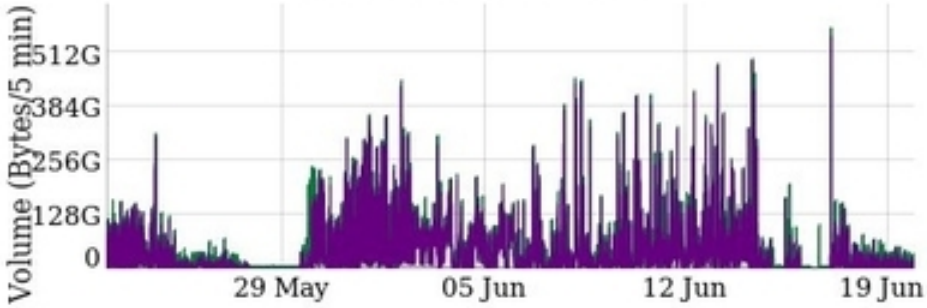
Files completed



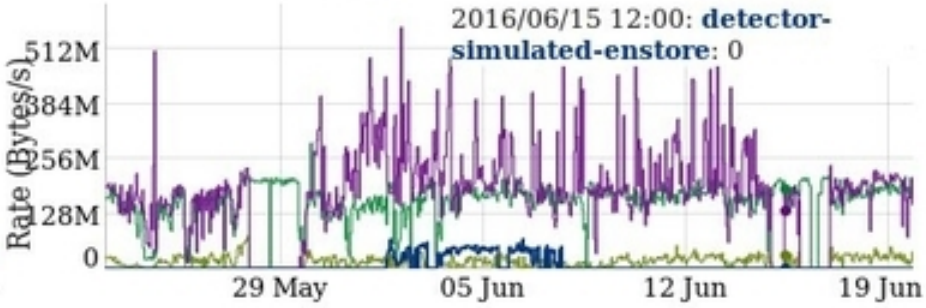
Files declared

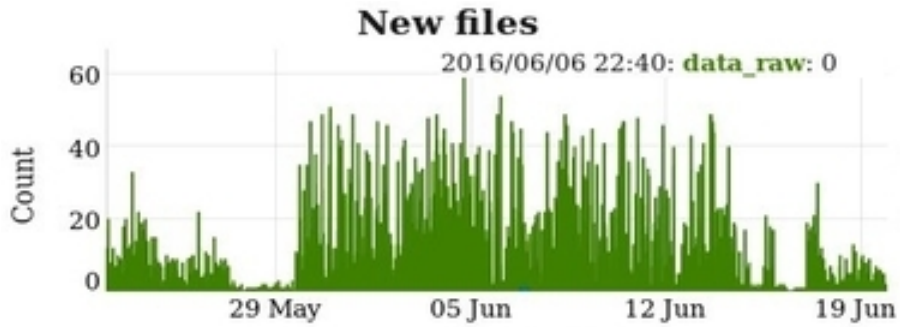


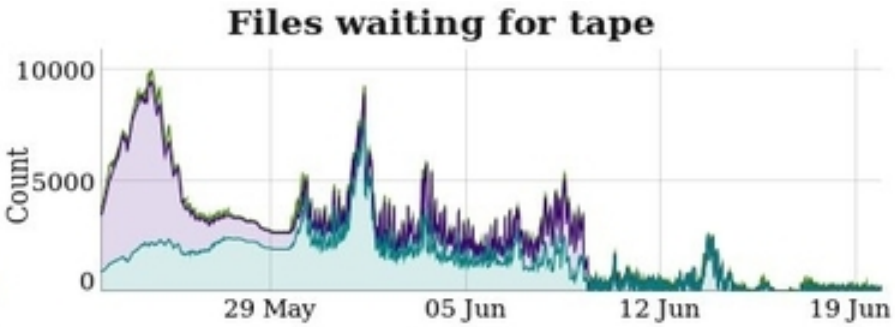
Data transferred

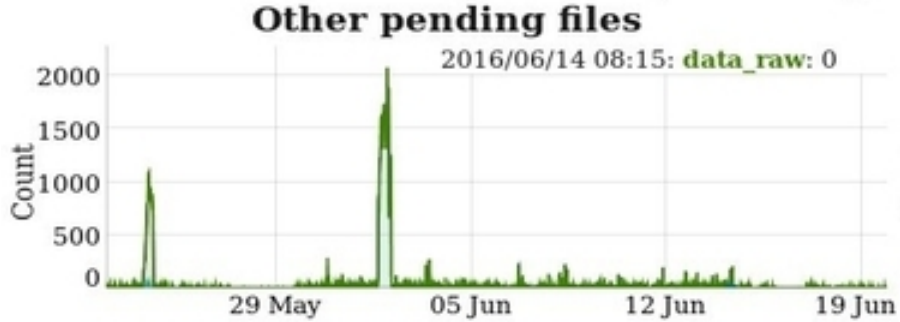


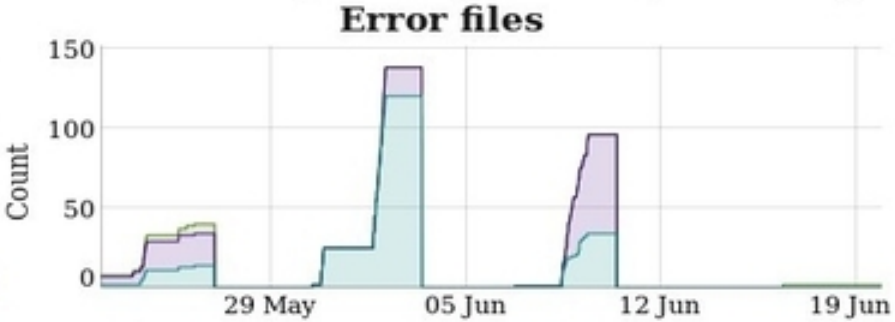
Transfer rate











+Recent completed transfers (30 hidden)

+Failed transfers (2 hidden)

+All errors (2 hidden)

+Pending (141 hidden)

+New (0 hidden)

+Configuration