



BNL FTS

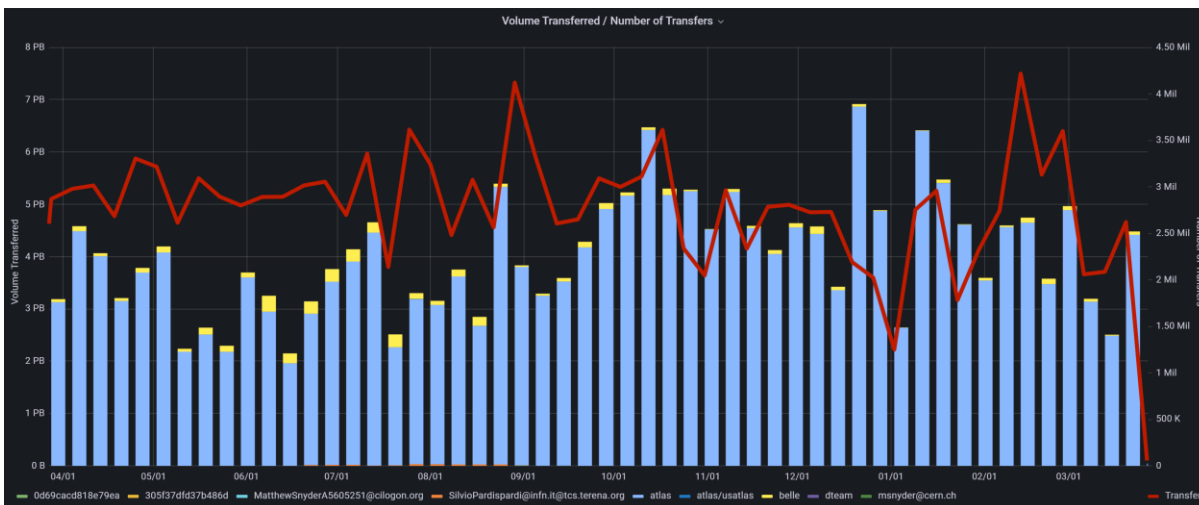
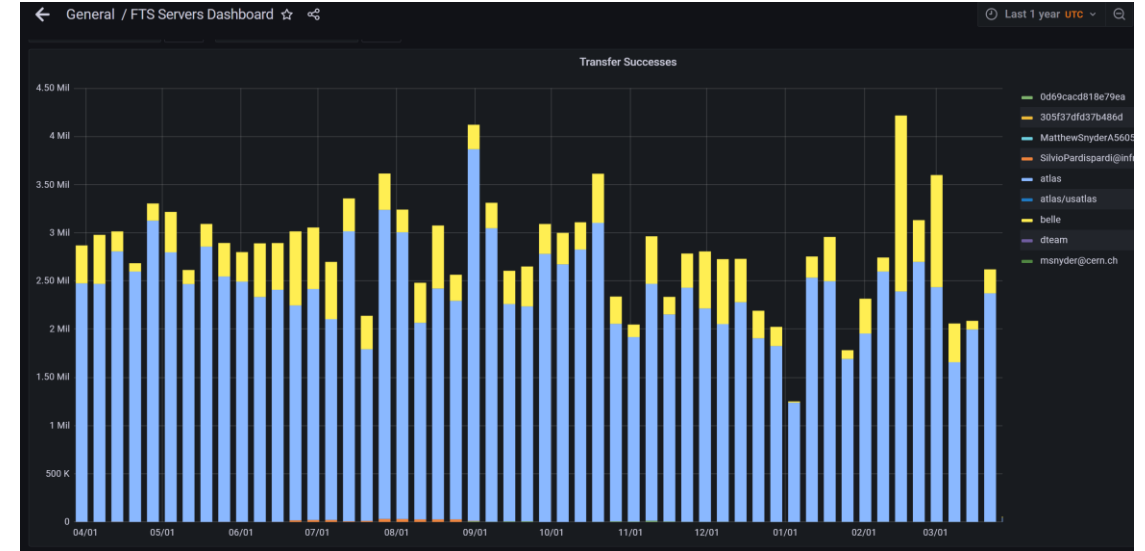
Hironori Ito
Brookhaven National Laboratory
XRootD and FTS Workshop 2023, Jozef Stefan Institute, Ljubljana, Slovenia



@BrookhavenLab

BNL FTS for ATLAS and Belle II

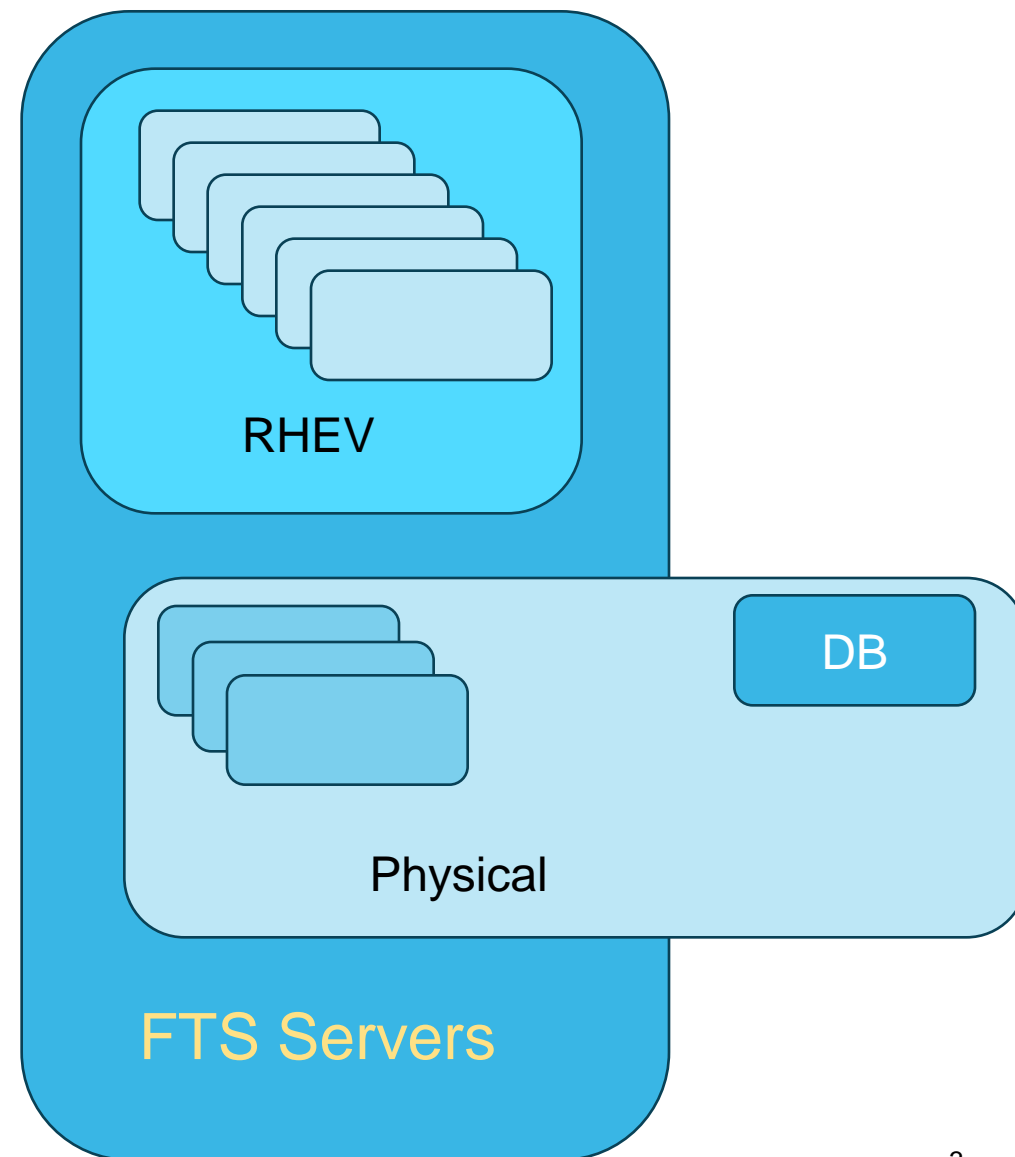
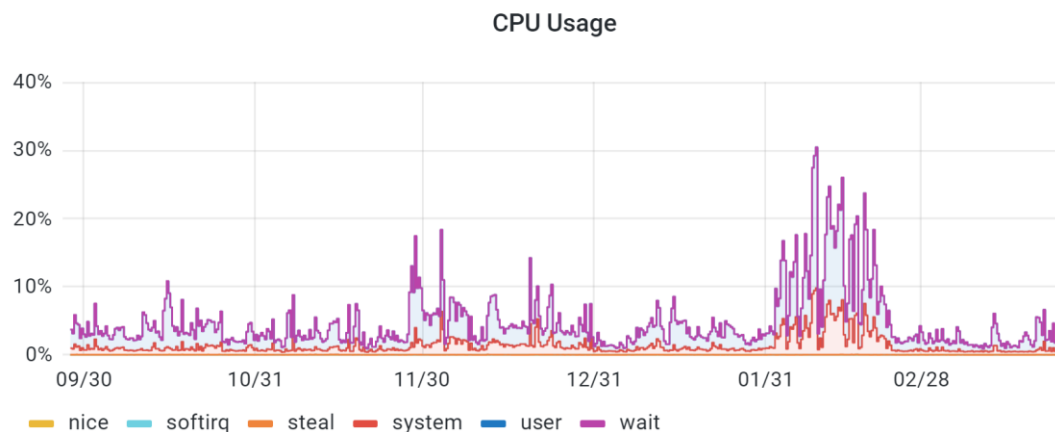
- BNL FTS is used primarily by ATLAS and Belle II experiments.
 - ATLAS; North American sites
 - Belle II; All RUCIO transfers except T0 exports
- BNL FTS has been used as a backup for CERN ATLAS FTS



- 4PB per week
 - ATLAS dominates the throughput
- 2.5M files per week
 - Belle II sends a lot of smaller size files.

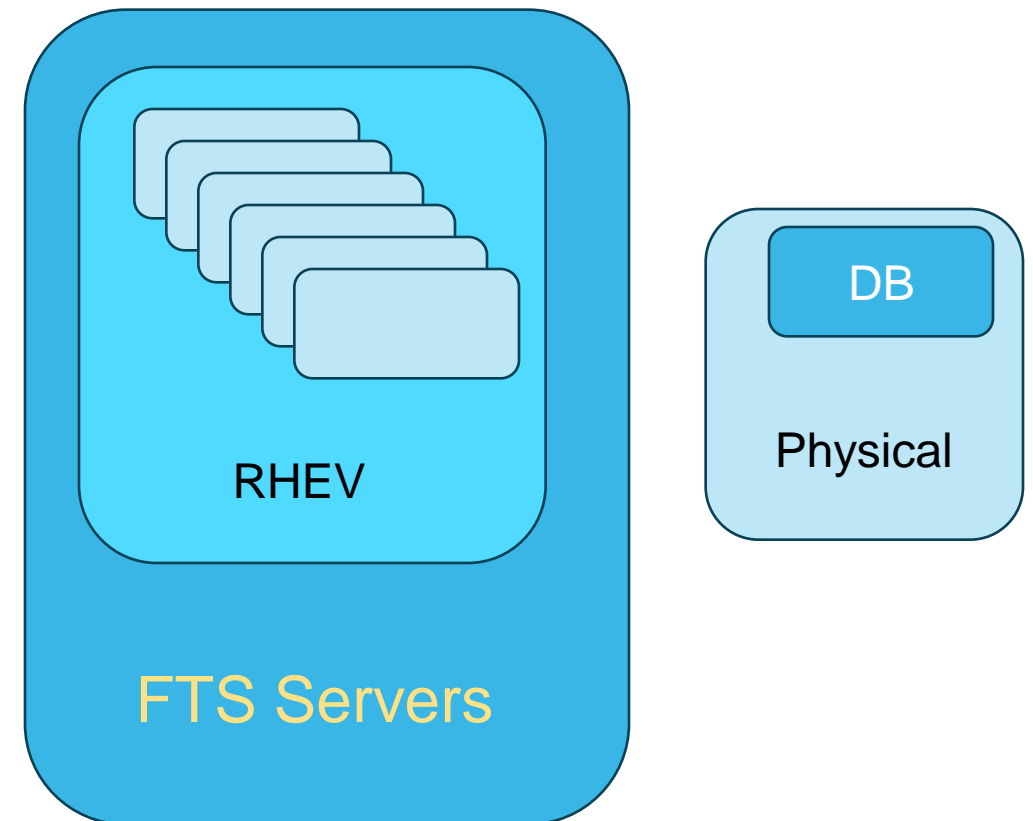
BNL Current FTS Setup

- 3 physical hosts with 1 running DB
 - Fast NVME for DB
 - DB still MariaDB 5.5
- 6 virtual hosts on RHEV
 - Allows easy scaling
 - Horizontally; more hosts
 - Vertically; more CPUs, more RAM, etc...
 - Resiliency



FTS Future Setup

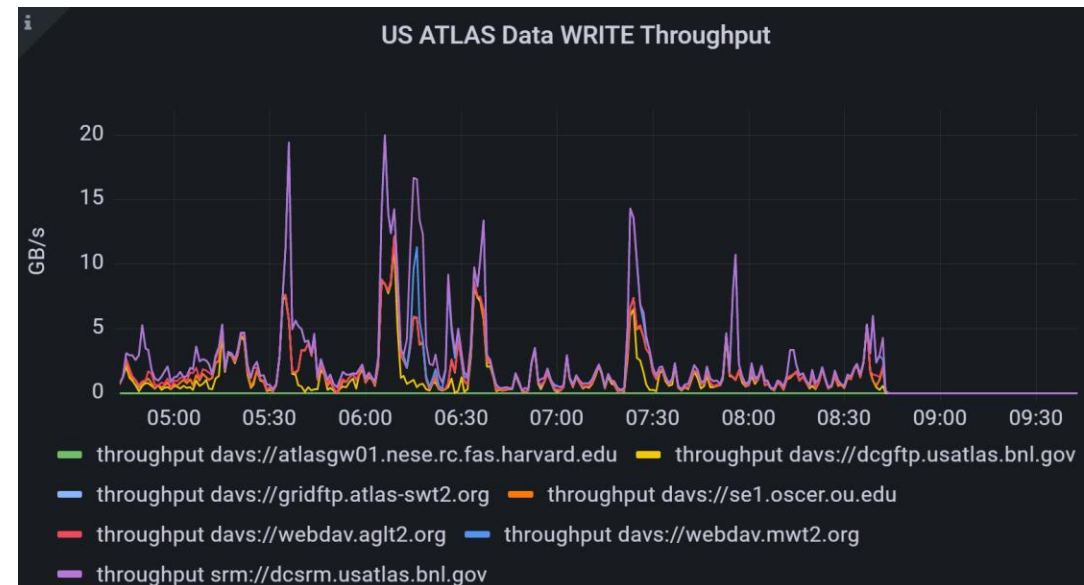
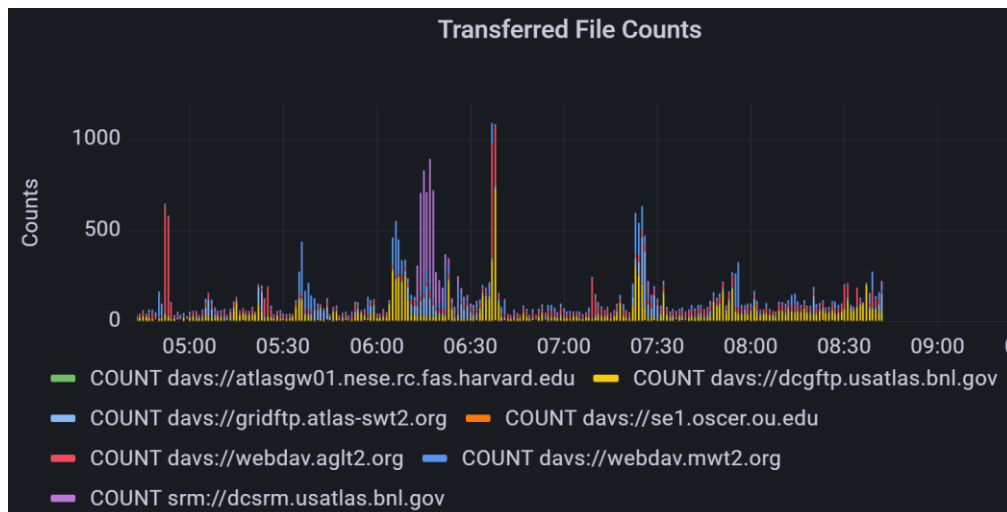
- All frontend servers will be on RHEV.
 - In anticipation of HL-LHC, 12 or more VMs are likely
- DB will remain on physical host.
 - Deployment of new DB server coming later in this year.



FTS Monitor

Grafana, MySQL and Time Series Data

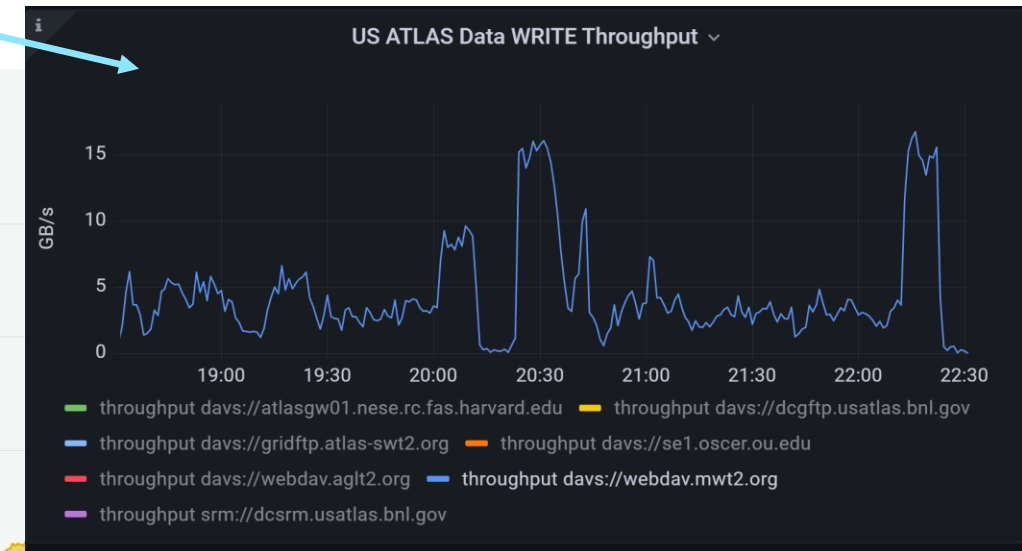
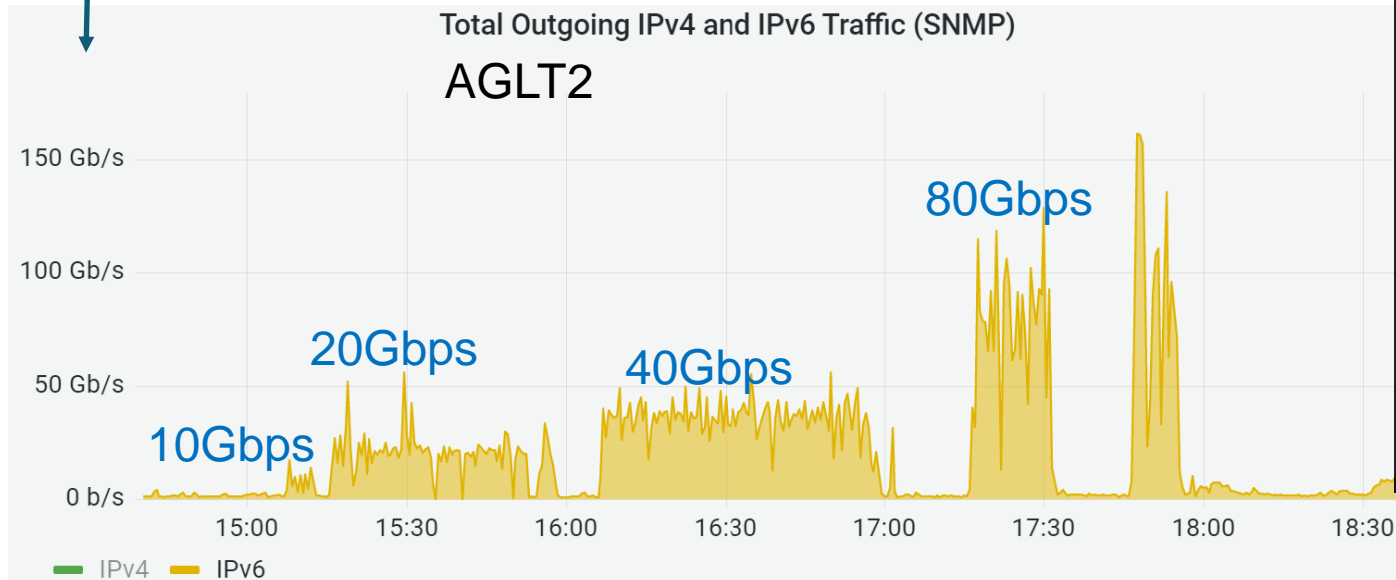
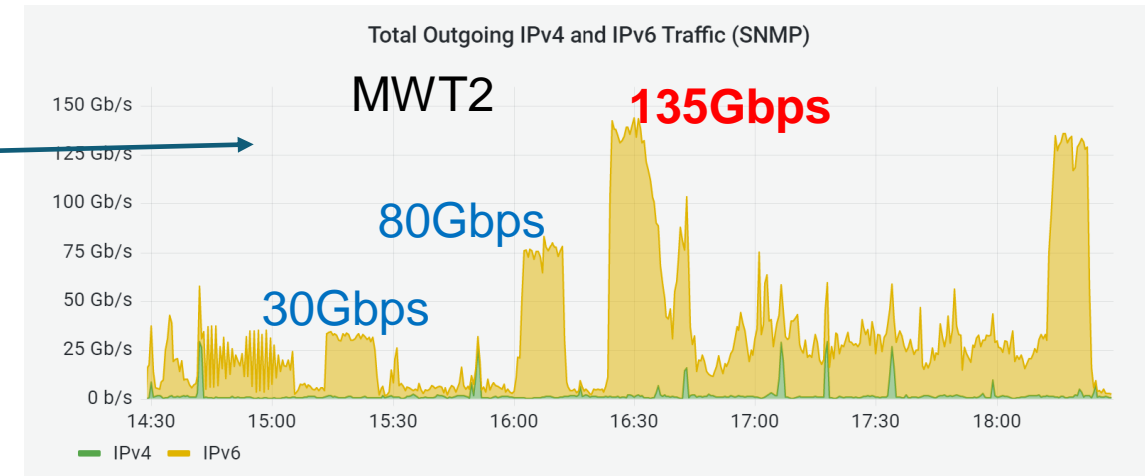
- Grafana allows direct query to MySQL (or many other popular DB)
- MySQL and Grafana supports many query for Time series data.
- \$__timeGroupAlias in Grafana is used for plots shown below.
- [BNL USATLAS FTS Throughput Monitor](#)



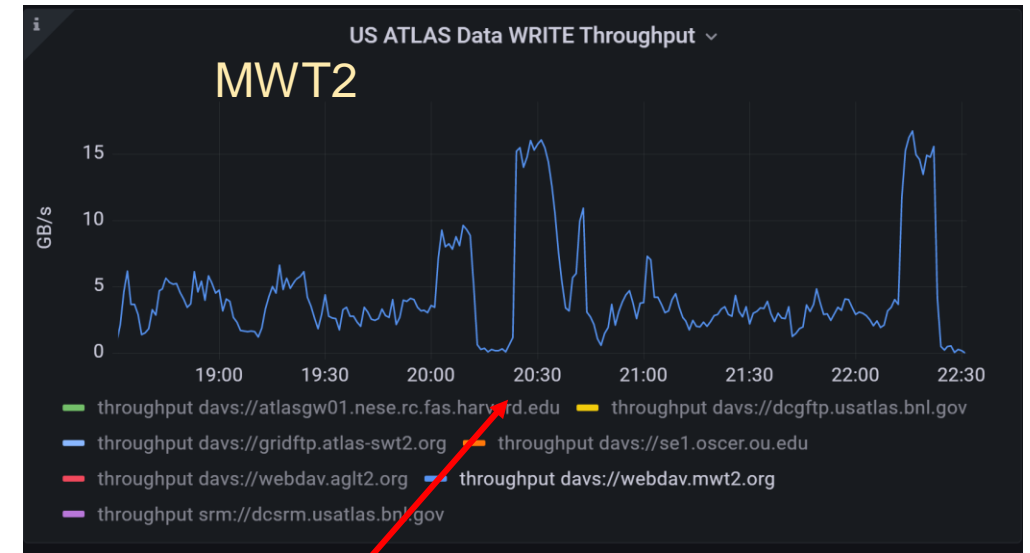
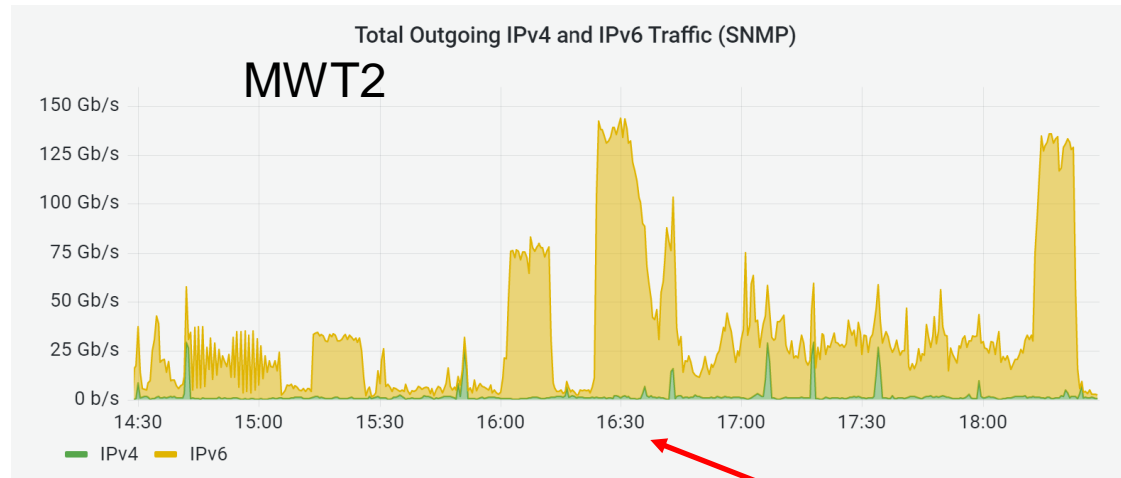
US ATLAS Network Throughput Tests

- US ATLAS has started mini Data throughput test.
- Use BNL FTS to initiate the transfers at the desired rate.
- Observe the data transfer rate using

- ESN Net Monitor
 - <https://public.stardust.es.net/d/lkFCB5Hnk/lhc-data-challenge-overview?orgId=1>
- BNL FTS monitor
 - <https://monitoring.sdcc.bnl.gov/pub/grafana/d/A4JjYk24k/usatlas-lhc-wan-write-throughput?from=now%2B2h&to=now%2B5h>



Throughput Network Throughput Tests



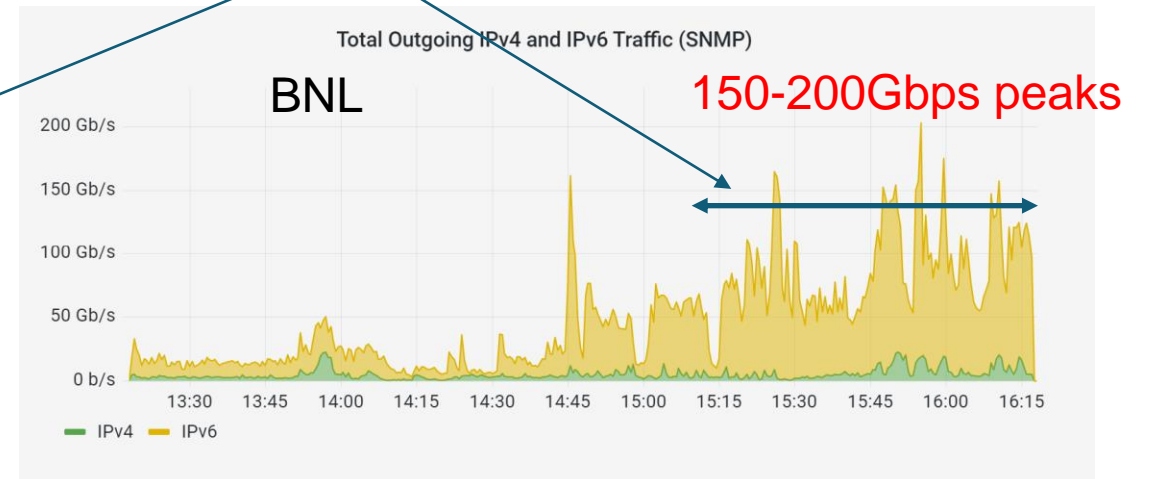
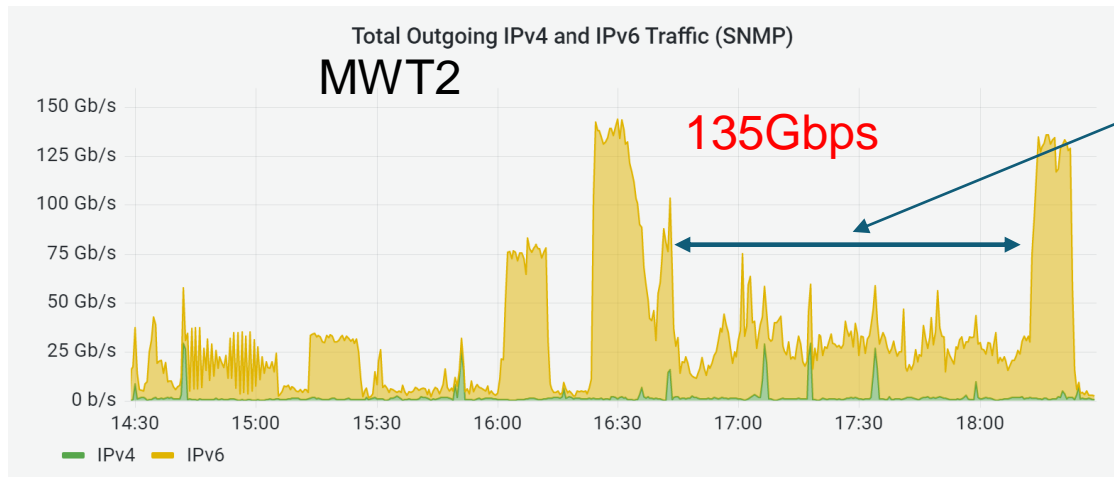
Time difference

- ESNet Monitor captures all network traffic on LHCONE
 - No distinction on VO or Client (FTS/DDM or something else)
- FTS monitors only DDM transfers
 - But, it might include transfers within the sites (etc... tape to disk) if not careful

Some observation during the test

- FTS can easily push the data between sites to a desired rate
- Watch out for concurrency limit for source, destination and links
- There are a lot of slow transfers in production.

- Trying to push to 200Gb/s
- Slow transfers from other sites prevent fast transfers

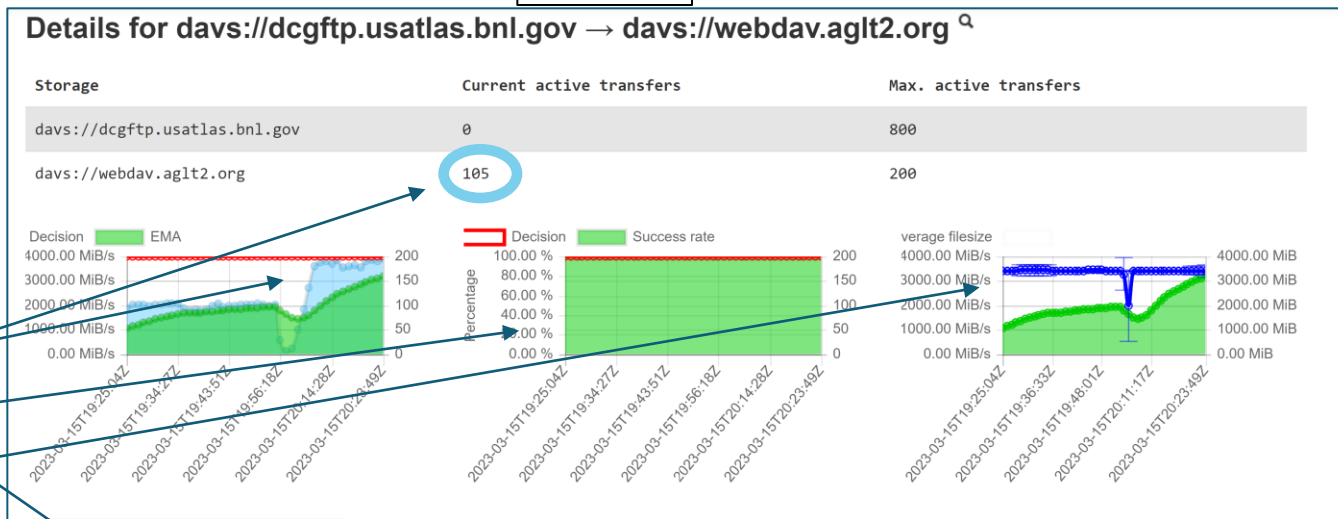


More on FTS Monitors

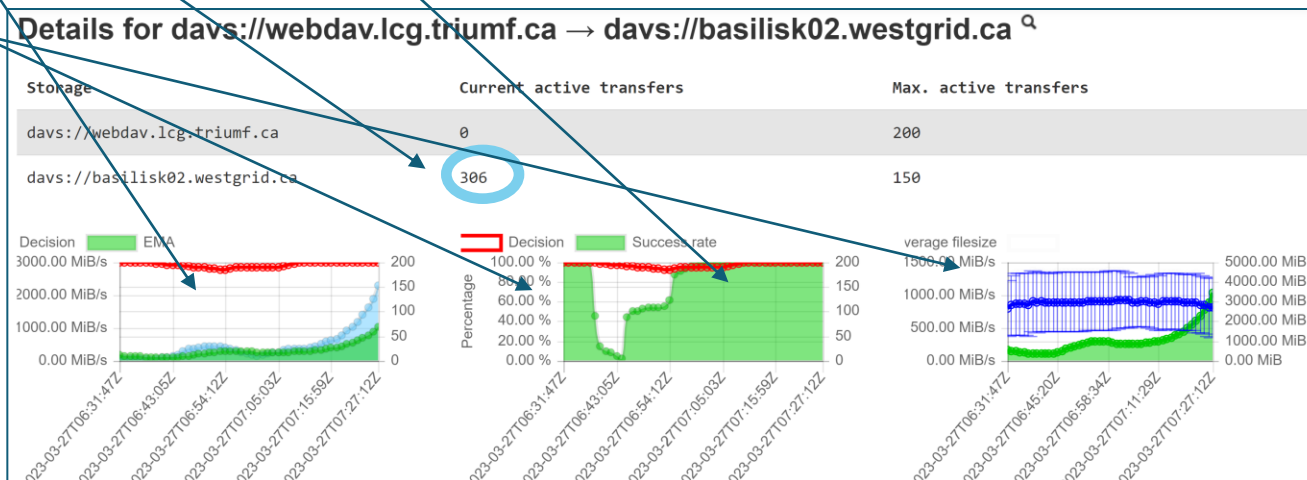
Good

- FTS Optimizer monitor is useful for finding reason for slow transfers.

- Current concurrency
- Failure rate
- File size



Recovered



Conclusion

- FTS has been stable and easy-to-support service at BNL
- FTS has been serving both ATLAS and Belle II well.
 - FTS can efficiently transfer data to/from sites.
- BNL is getting ready for HL-LHC by new deployment.
- Impact by the transition from X509 to Token remains to be seen.
- Throughput required by HL-LHC seems reasonably attainable, provided that slow transfers (or slow storage SE) do not interfere faster data transfers.