



# ESCAPE

European Science Cluster of Astronomy &  
Particle physics ESFRI research Infrastructures

## Xcache studies @CC-IN2P3

Bastien, Fabio, Paul, Ghita

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# Setup

- Xcache: deployed on Openstack VM
  - 100GB Volume for storage
  - No limit type peak/average/burst on the IO, 10Gbps hypervisor
  - 32GB RAM ( tests with 2 other configurations)
  - Dockerized:
    - 1 image for xcache containing all necessary libraries
    - 1 image to get and renew the proxy certificate
    - Config and secrets mounted as volume
  - Puppetized:
    - Easier deployment to launch/Test/Production environment
- Grid Job run on HTCondor:
- 1 dedicated worker
- Iperf tests between the worker and Xcache:
  - ~1 Gb/sec. ( 9 Gb/sec for dCache)
  - Internal dd copy: ~220MB/s



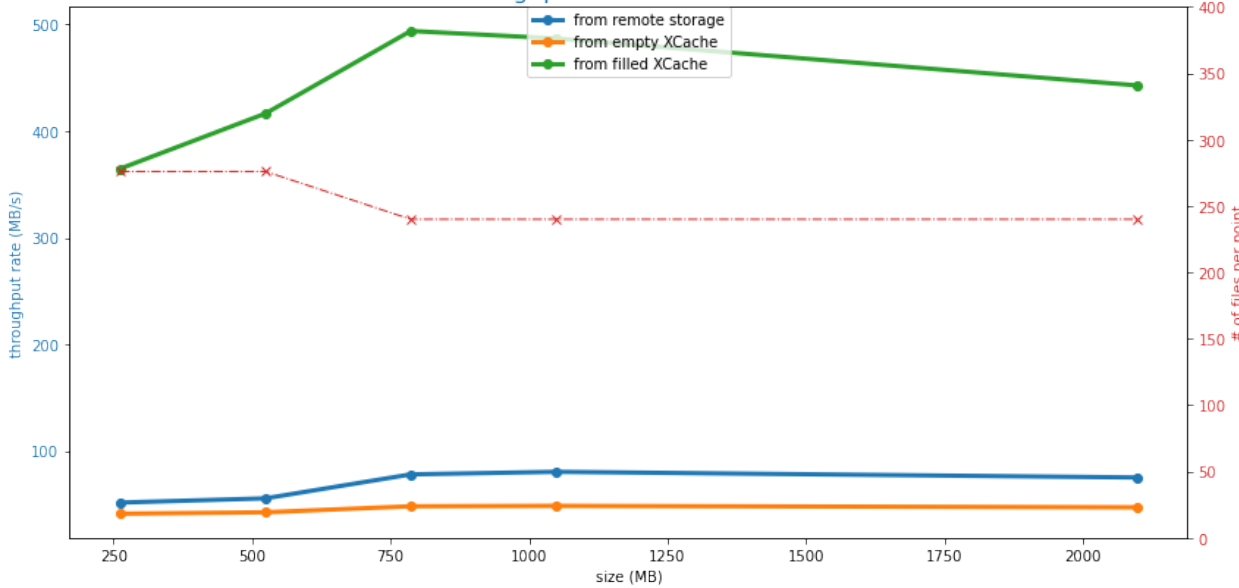
# Test procedure

- Mock data registered in ESCAPE RUCIO and pushed to
  - CC-IN2P3 dCache, DESY dCache, (LAPP DPM)
- Same dataset of 106 files:
  - Sets of ~20 Files with 256, 512, 1024, 2048 MB: 94GB in total
- 1 condor job runs on the full dataset (on each RSE)
  - Script copies (xrdcp) each file of the dataset 3 times:
    - 1 directly from the RSE
    - 1 through empty Xcache (after flushing the XCache)
    - 1 through filled Xcache
  - Compute 3 times and throughputs for each file .
- Iterate job for different RSEs and different times and days.

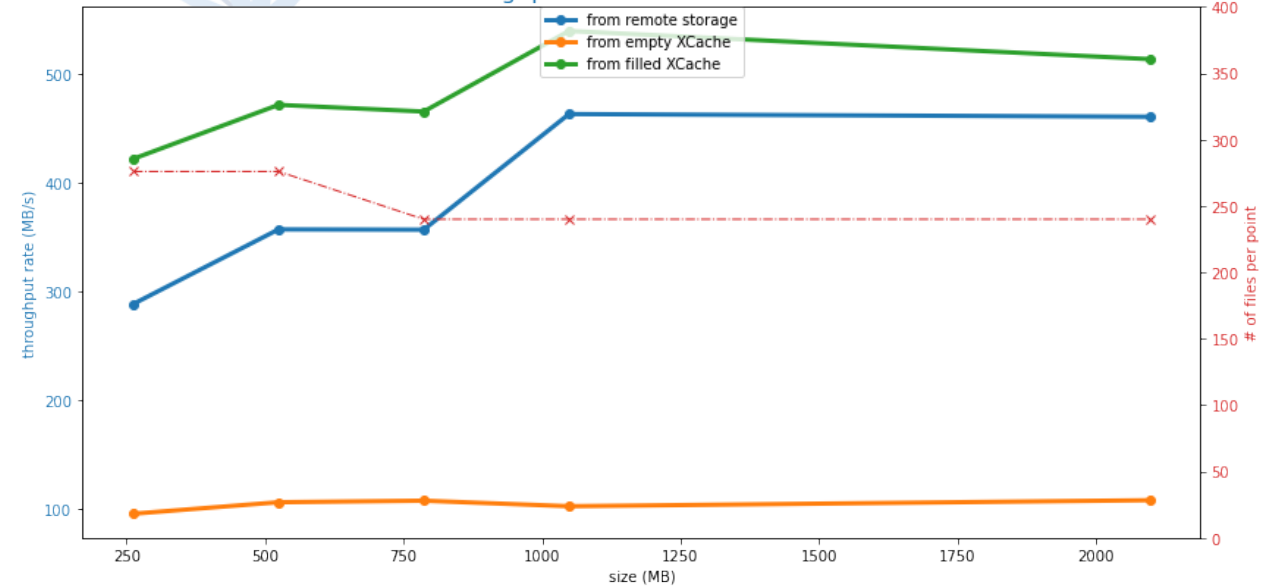


# Throughput IN2P3, DESY

Throughput from DESY-DCACHE



Throughput from IN2P3-CC-DCACHE

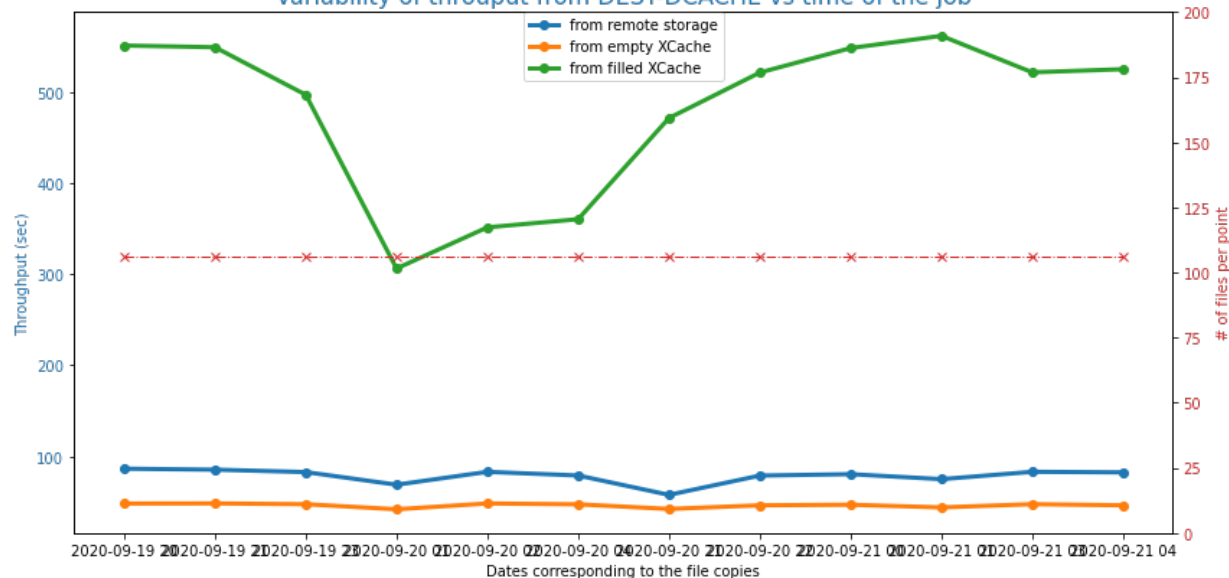


Site	RSE (MB/sec)	XC0 - empty Xcache (MB/sec)	XC1 - Filled Xcache (MB/sec)
CC-IN2P3	385	104	482
DESY	68	45	441

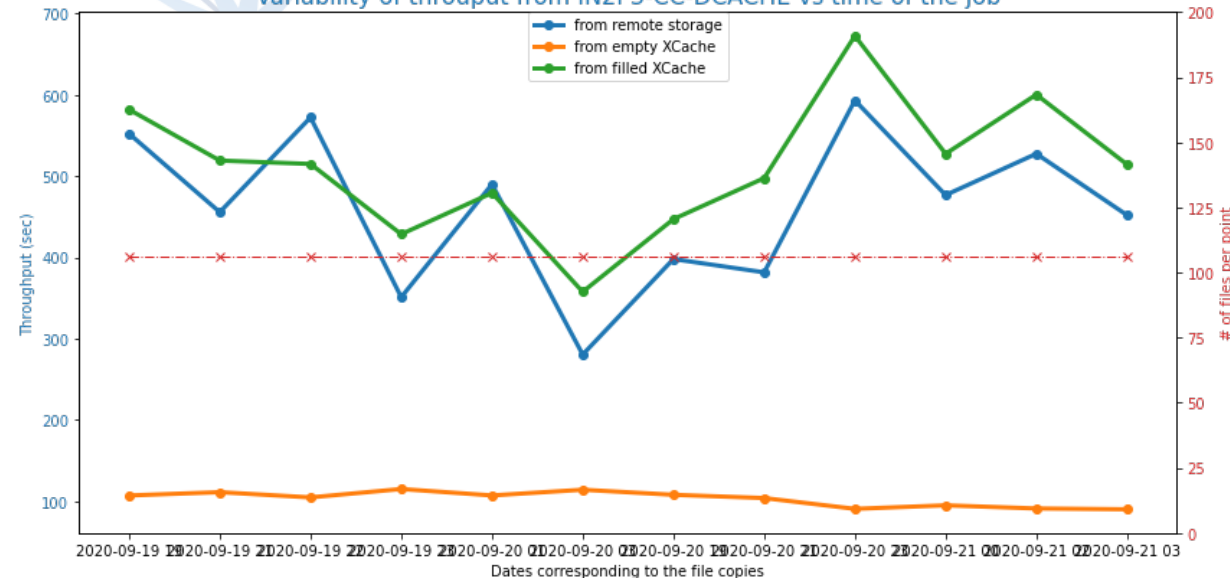


# Variability of the throughput

Variability of throuput from DESY-DCACHE vs time of the job

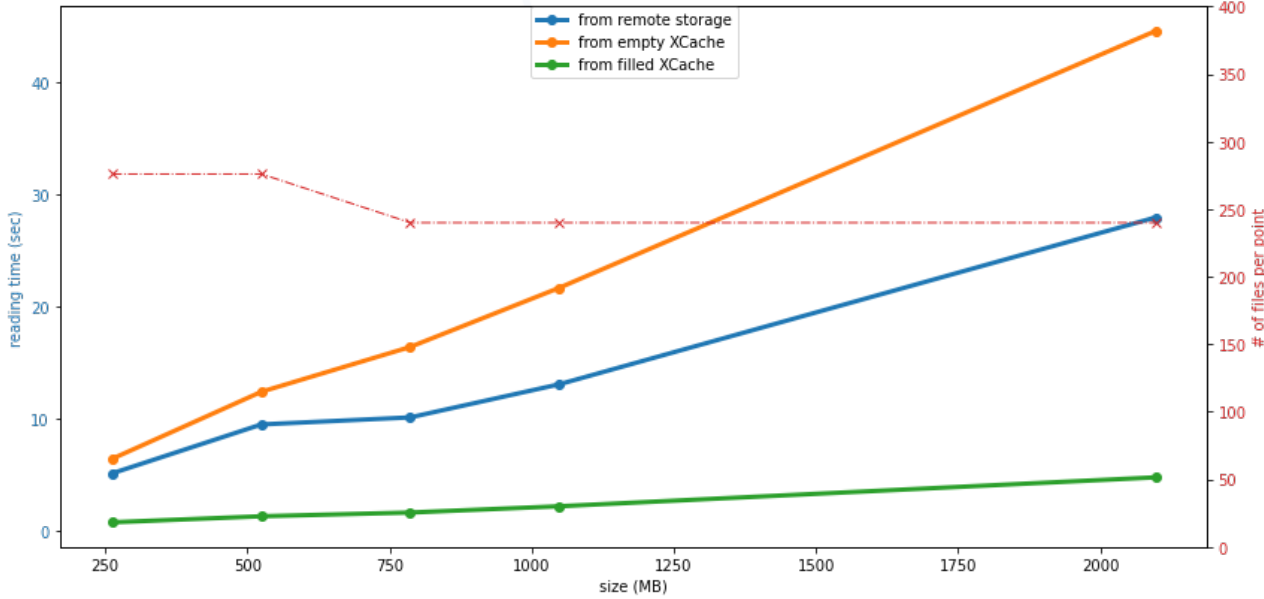


Variability of throuput from IN2P3-CC-DCACHE vs time of the job

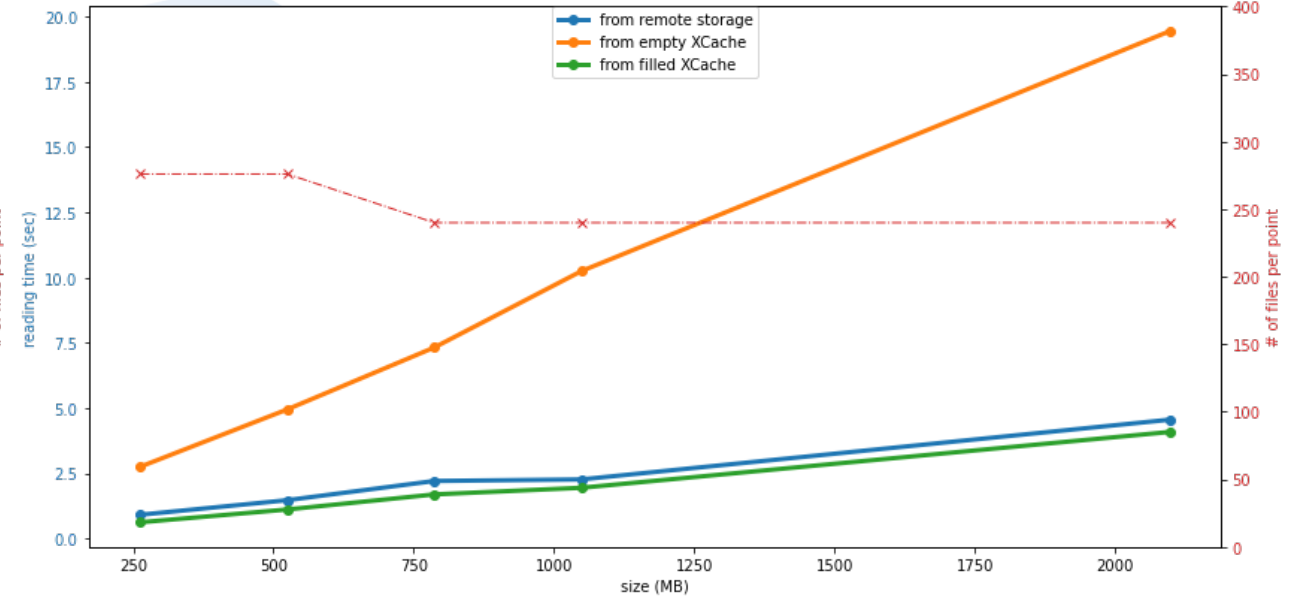


# Reading time

Transfers from DESY-DCACHE



Transfers from IN2P3-CC-DCACHE



# VM configuration effect

RAM: 8G

QoS: Average=40MB/s, Peak=100MB/s, burst=3GB

Throughput unpredictable!

RAM: 8GB

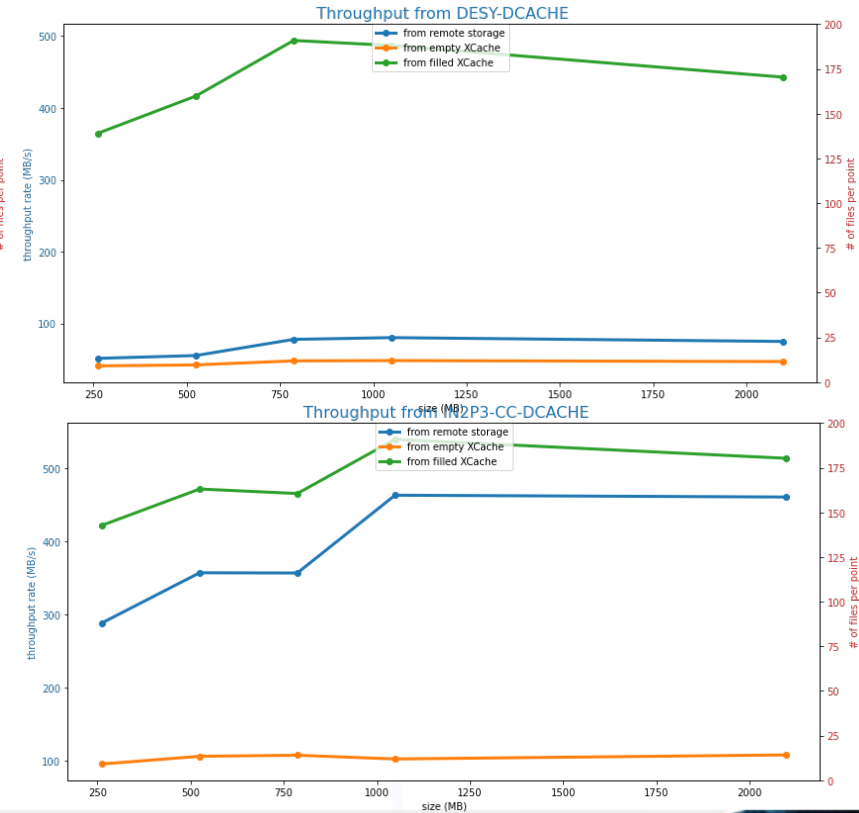
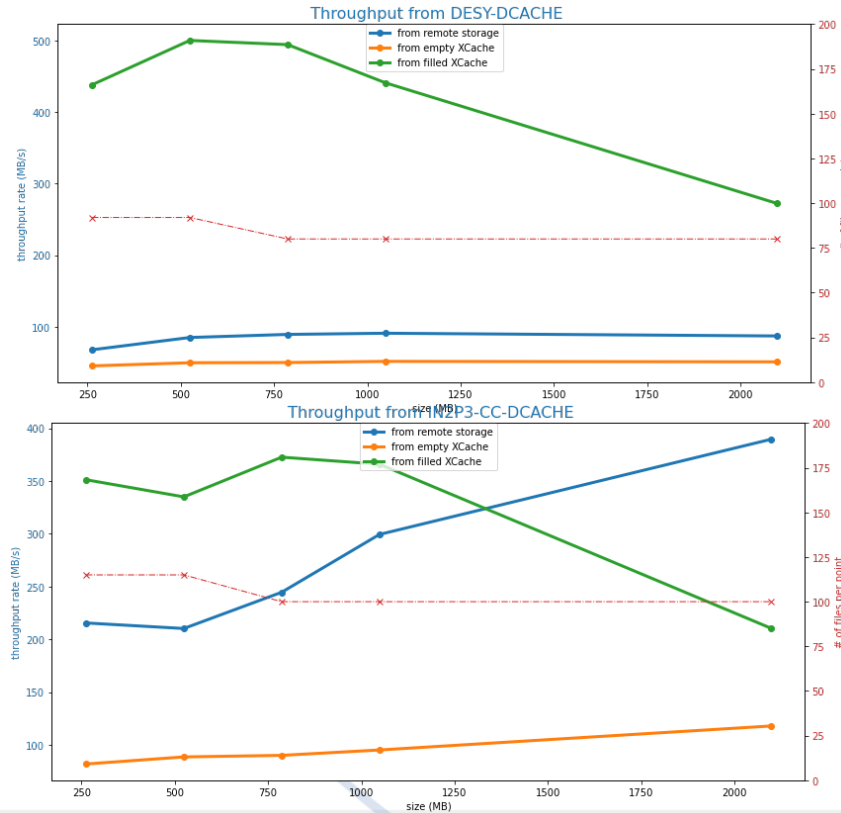
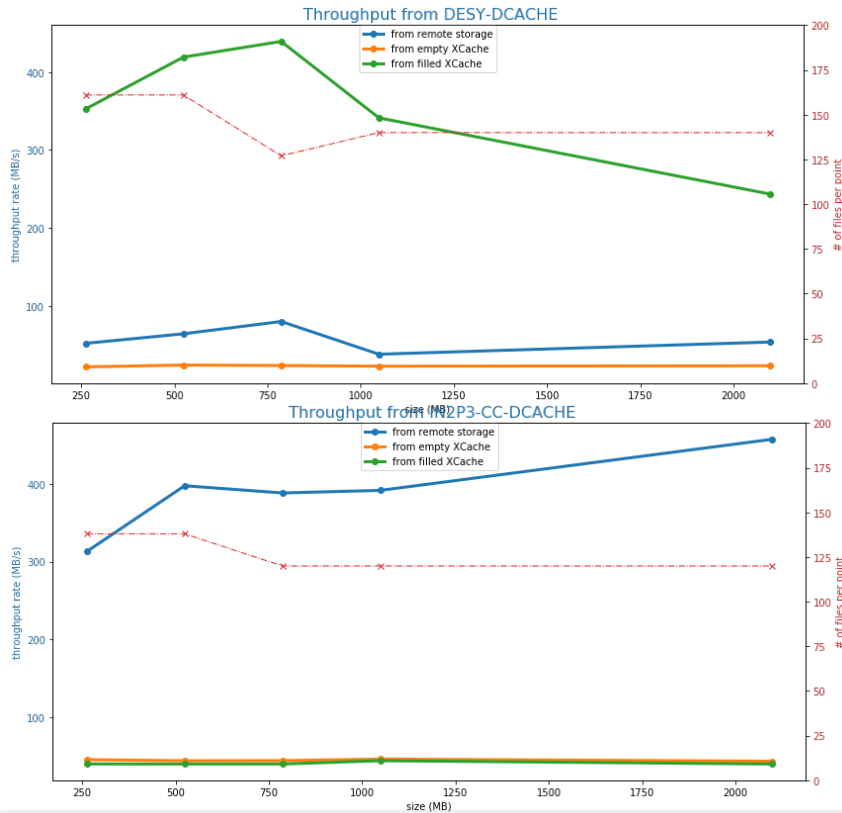
QoS: no limitation /hypervisor

Effect on large files (2GB)

RAM: 32GB

QoS: No limitation

OK



# Observations and Next

- Xcache:
  - Files are seen as local file when they are on the Xcache, as expected.
  - Xcache deployment: VM configuration is important (QoS, RAM, occupancy of the hypervisor)
  - Planned:
    - deployment on physical storage (already available soon-to-be configured)
    - Separate metadata from data
- Side observation: difficulty to use RUCIO (add rules, logs, debug, messaging...)
- Next:
  - Extend tests with webdav, tokens....
  - Add more RSEs (?): for the moment 1 Xcache for all.
  - Perform same type of tests with experiments applications: LSST, CTA, ATLAS..

