Ligo/Virgo Data Transfer

Bulk data replication tools and plans for S6 data replication

Antonella Bozzi, Stefano Cortese, Livio Salconi

European Gravitational Observatory

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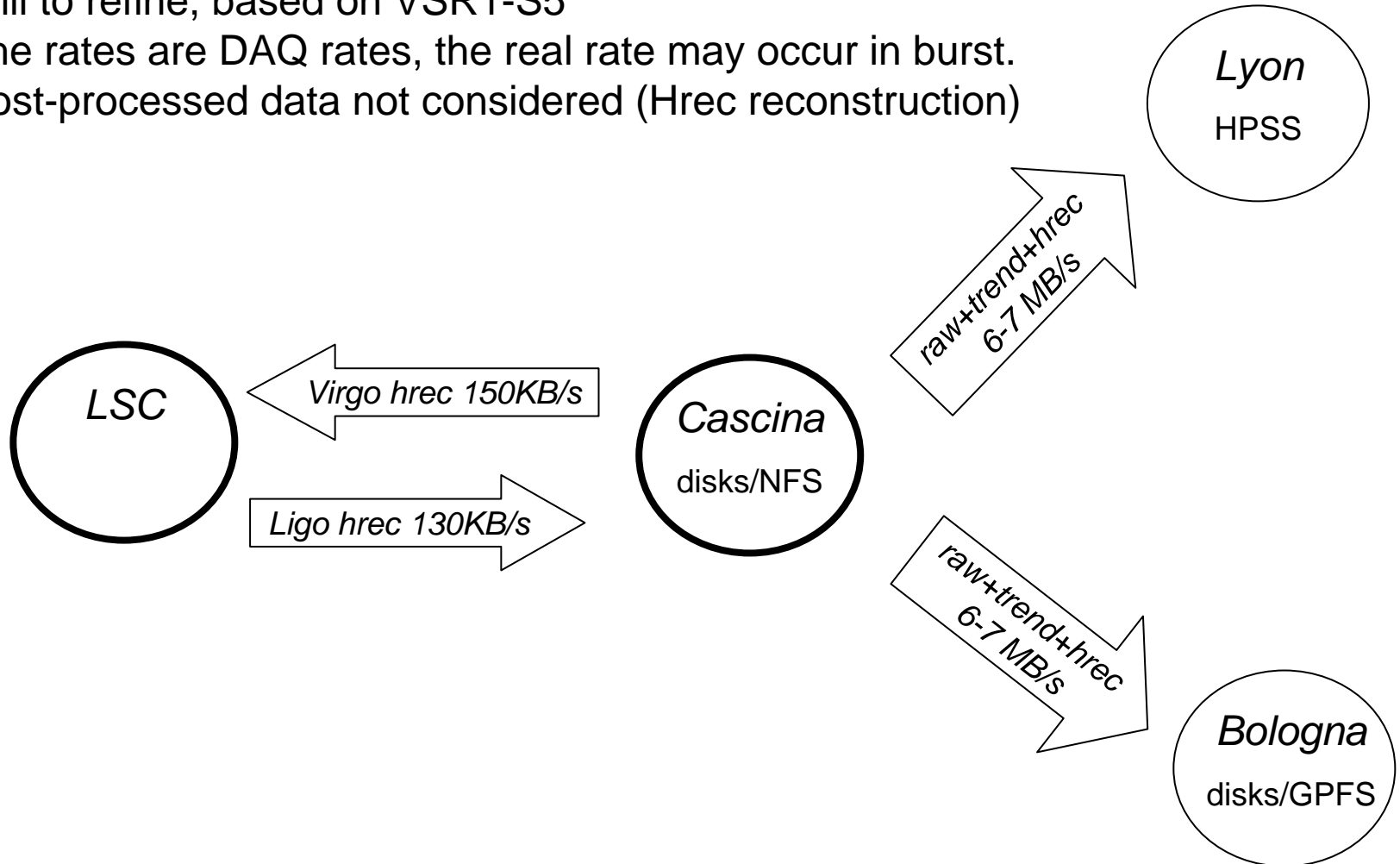
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Bulk in-time replication

1. Useful for data produced continuously that must be replicated permanently at fixed locations
2. More complex than batch transfers of fixed datasets
3. Not suited for user driven transfers of distributed data listed in catalogs

Whatever the transfer tool (bbftp, srb, etc.) the real engine is the process that manages the whole automatic procedure:
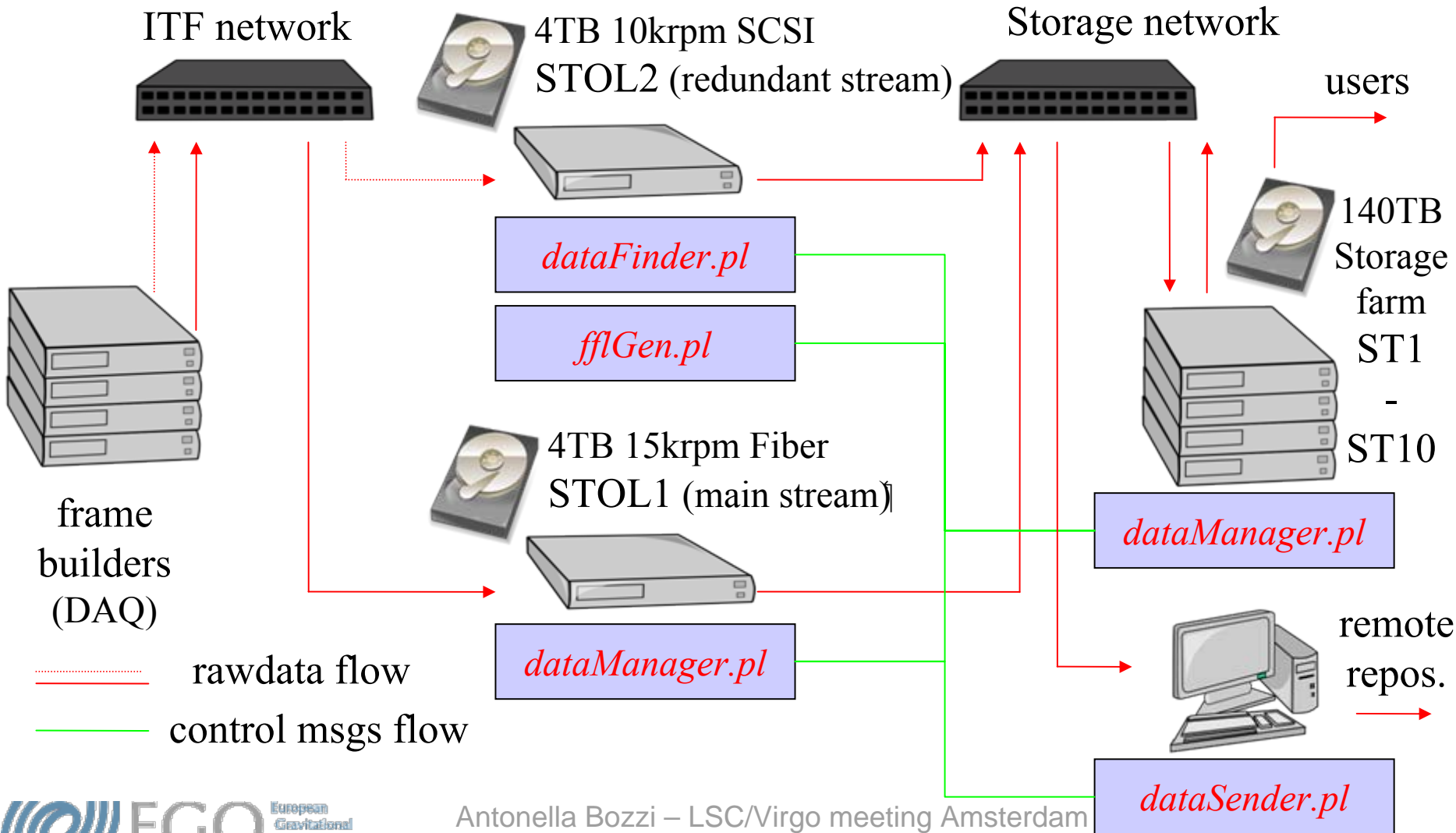
- Discovers newly produced files and builds the queues

- Builds and schedules the transfer jobs (preserving time ordering)

- Manages the errors (storage at the endpoints and link errors) and resends the files in error

- Places the files at the target location (creating a directory structure or registering in a database)

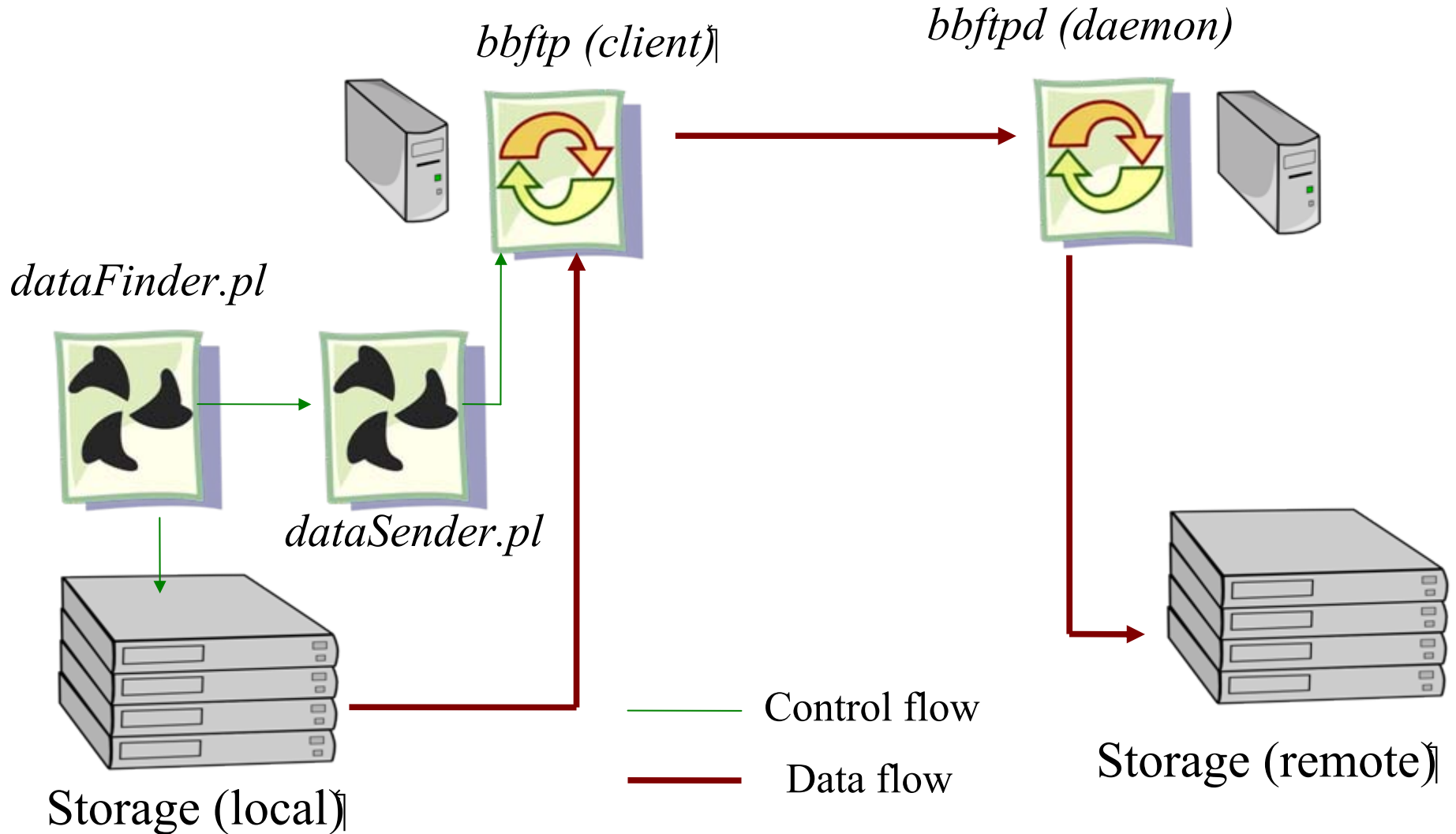EGO European Gravitational Observatory

In-time data fluxes

- Still to refine, based on VSR1-S5
- The rates are DAQ rates, the real rate may occur in burst.
- Post-processed data not considered (Hrec reconstruction)

Lyon
HPSS

LSC

Virgo hrec 150KB/s

Ligo hrec 130KB/s

Cascina
disks/NFS

raw+trend+hrec
6-7 MB/s

raw+trend+hrec
6-7 MB/s

Bologna
disks/GPFS

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Layout at Cascina

ITF network

4TB 10krpm SCSI
STOL2 (redundant stream)

Storage network

users

dataFinder.pl

fflGen.pl

140TB
Storage
farm
ST1
-
ST10

4TB 15krpm Fiber
STOL1 (main stream)

dataManager.pl

frame
builders
(DAQ)

dataManager.pl

remote
repos.

········· rawdata flow

———— control msgs flow

dataSender.pl

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Current architecture: single flux

bbftp (client)

bbftpd (daemon)

dataFinder.pl

dataSender.pl

———— Control flow

———— Data flow

Storage (remote)

Storage (local)

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Transfer tools

Various transfer workhorses:

- bbftp: the simplest, optimized for the transfer only

- SRB : adapted to work with Fr library, Xrootd+HPSS
  Is more than a transfer tool, file must be placed in the SRB/Xrootd environment

- LDR: is more than a transfer tool, handles file metadata and replicas

- GRID-FTS: is much more than a transfer tool, actually part of the whole GRID architecture, handles natively the file catalog

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Improvements under study

- Upgrade of Internet link at Cascina: 1Gbps (now 100Mbps)
  Available throughput from 100Mbps to 500Mbps
  More simultaneous transfers possible

- Pass from looping scripts to event driven processes

- Handle more robustly the exceptions

Current study focuses on:

- Passing from *perl* to *phython*

- Handle queues with *MySQL*

- Making the process modular respect to the transfer tool and the placement at the CCs.

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Other related issues

- On-line data
  They go on the same links but should be given priority

- Post processed data (i.e. different hrec versions)
  eligible for batch transfers, but maybe suitable to be accessible on-demand in a GRID-like structure

- Placement at the CCs
  very tightened with the access method chosen and the file catalog
  Better decouple it ?