



Full FTS Deployment CMS Perspective

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VO Experience with FTS

In March of 2006 CMS modified PhEDEx to support FTS transfers

- ➔ Tested with CERN to Tier-1 and some dedicated Tier-1 to Tier-2 at CNAF

By the summer all the Tier-1 sites had a functional FTS server and channels were setup for “associated” Tier-2s

- ➔ Tier-2 - STAR and STAR-Tier-2 from the associated Tier-1

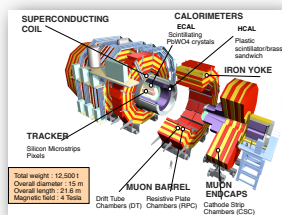
During CSA06 transfers from all EGEE Tier-1s to Tier-2s were driven through FTS

Tier-1 to Tier-2 links are more diverse in terms of performance

- ➔ Time-outs needed to be adjusted for some sites to avoid timing out when the file size exceeded 3GB



VO Experience CERN Export



Tier-0

Tier-0 to Tier-I Flow
Predictable
High Priority

Tier-I to Tier-I
Burst with Rereco
Load Balancing

Tier-I

Tier-I

Tier-I

Tier-I

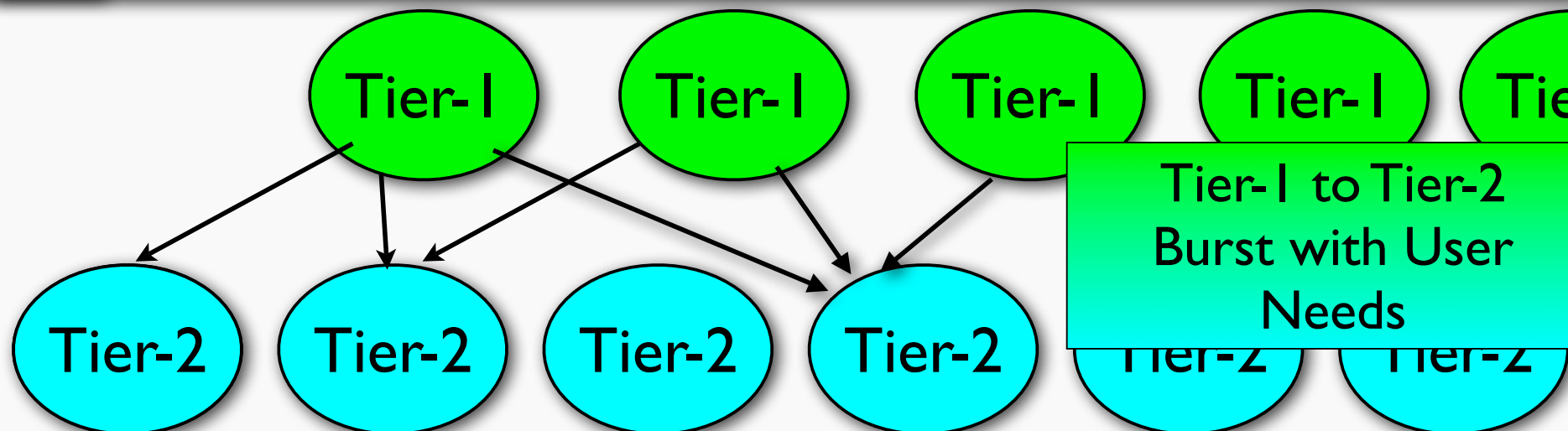
Tier-I

After early development/operations experience in the service challenges
FTS at CERN has performed stably

- ➔ All Tier-0 to Tier-I transfers in CSA06 were FTS driven
- Support and response was good



VO Experience Tier-1 to Tier-2

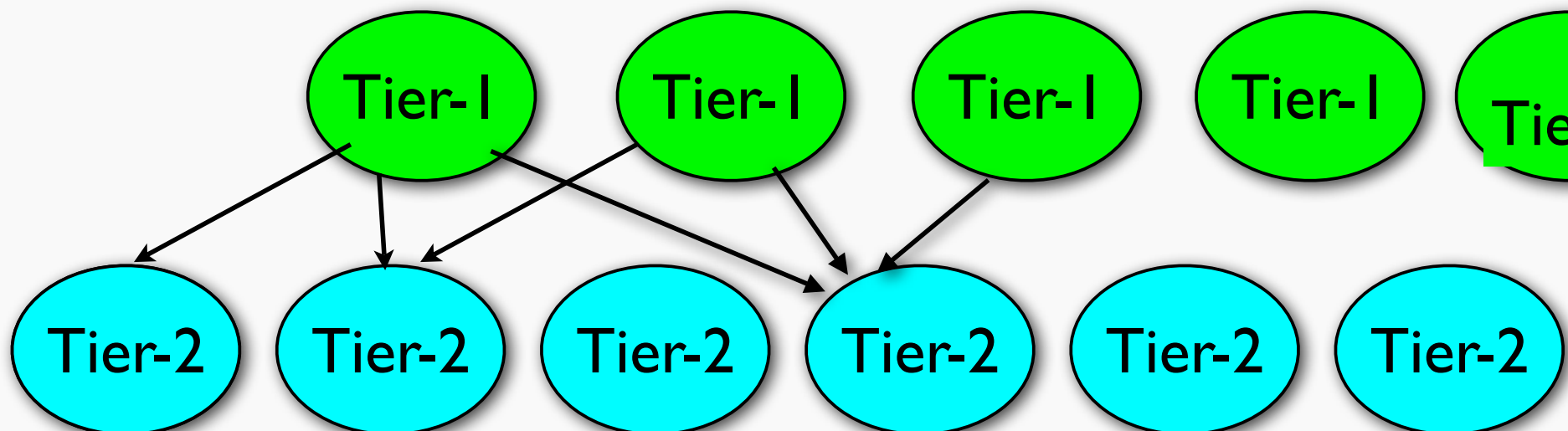


In the CMS model data may need to be served from any Tier-1 to support the analysis needs at a Tier-2 center

- Each FTS server supports more channels than the server at CERN
- Tier-2 centers can be behind firewalls
- Requires push mode for transfers
 - If using push mode to a CASTOR SRM implementation this also requires URL copy
 - The performance and source load are better with srmcopy mode, so non-CASTOR sites wanted srmcopy in push mode
 - Number of channels and permutations increased

FTS acts as a throttle

- ➔ Allows a site to tune a group of channels to restrict the total bandwidth or files in flight to avoid overloading a site



In the CMS model there are two items which we would like to avoid overloading

- ➔ The data export from the Tier-1s and the data import into the Tier-2s
- ➔ In the current implementation we can optimize only one
 - An FTS located for a group of channels for a Tier-2 can throttle ingest
 - An FTS with channels for a Tier-1 source can throttle export



VO Experience

The VO experience from CMS using FTS has been good, especially for CERN to Tier-1s

- ➔ But we see more development is needed for a production system for the experiment
- ➔ The number of Tier-1 to Tier-2 channels is large and the diversity of configurations and end-points make the potential number of channels very large
- ➔ To protect the Tier-1 export along with the Tier-2 import we need communications between the FTS servers or an alternative solution
 - Or to decide we do not need to protect both elements