FTS3 and networks

BigPanDa workshop

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Outline

- Background
  - FTS2 vs FTS3
- Features
  - Network awareness
  - Supported + expected
- More information
  - CHEP 2013 presentation
  - https://indico.cern.ch/contributionDisplay.py?sessionId=5&contribId=40&confId=214784

FTS highlights

FTS2	FTS3
Mature service, ~10 years in prod	> 1 year as a Pilot – 6 months ATLAS prod + LHCb
Channel model – site pair	Endpoint-centric Adaptive optimization – zero config
SRM, gsiftp	SRM, gsiftp, HTTP, xroot
Oracle	Oracle, MySql (SQLite or PostgreSQL easily)
No horizontal scalability	Scales well horizontally
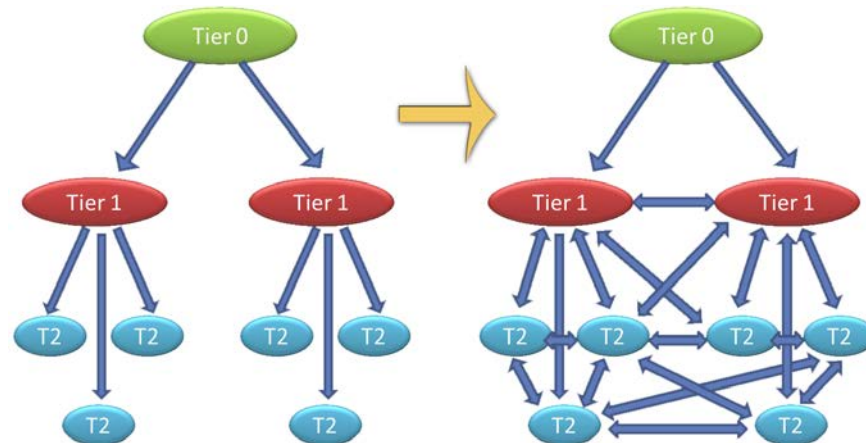
What effects transfers?

- For every transfer three entities and their state play a role
    - Source storage system
    - Network
    - Destination storage system
- All three are effected by multiple activities

Activities...
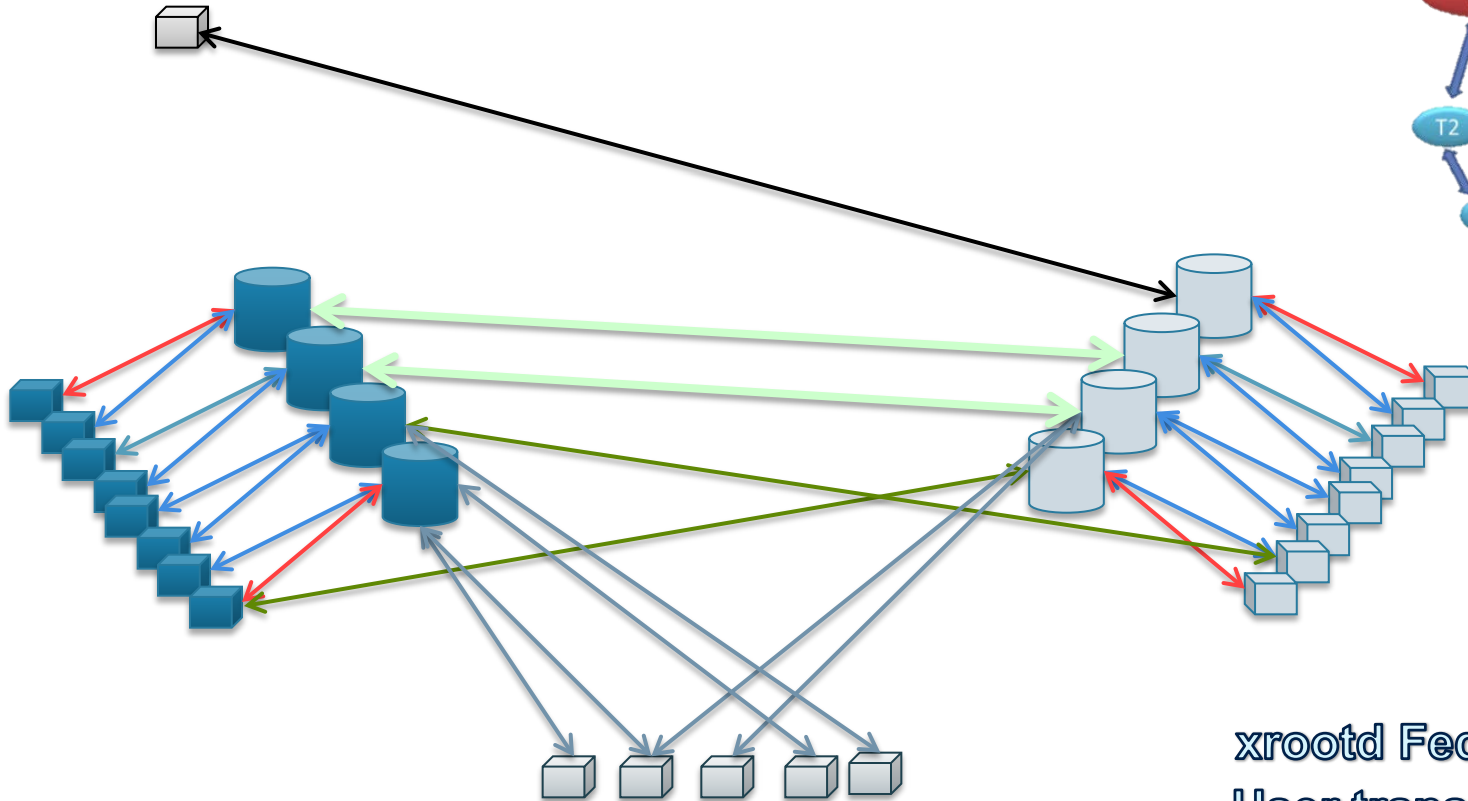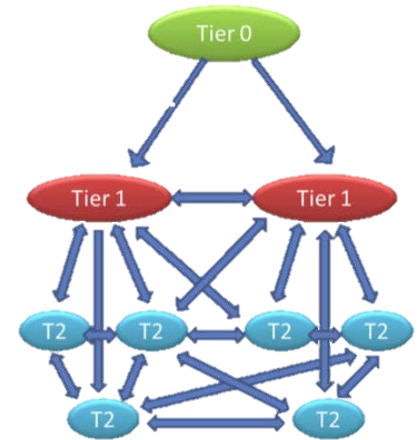
xrootd Fed.
User transfers
Scheduled

Alternatives

- Manage all resources
  - extremely complex, unlikely to succeed
  - optimal resource utilization
- Don't manage, but observe and react.
  - with reasonable algorithms
    - low priority for private access
    - medium for federation access
    - high for local and scheduled (FTS)
  - plus overprovisioning of network bandwidth
- Combination?

Role of "network as a resource"

- Use for every transfer
  - will result in an enormous complexity
  - only beneficial if combined with managing all forms of access (local,....) and storage systems load

- Use to reserve and limit bandwidth
  - changing only slowly (like batch quotas)
  - low granularity
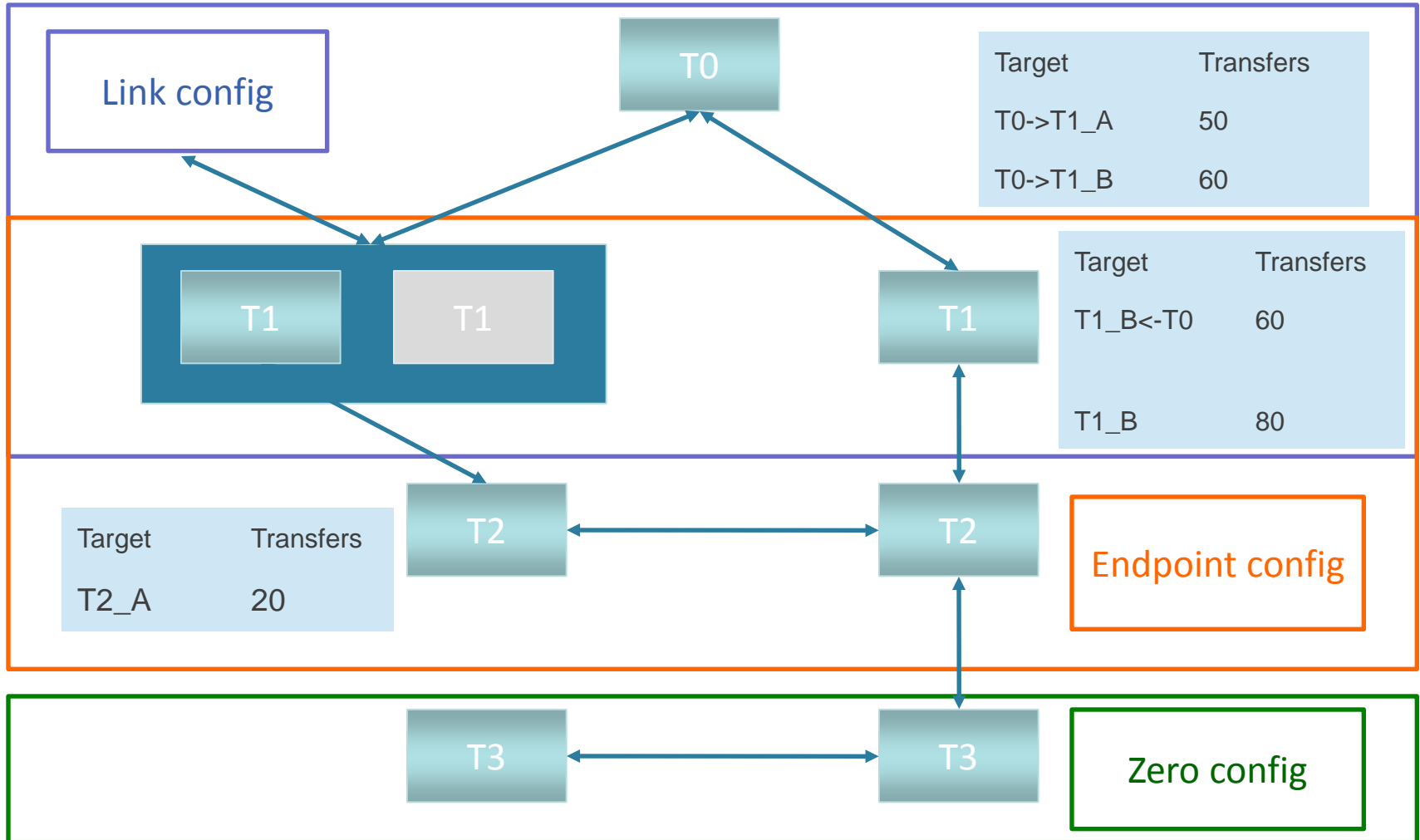
FTS3 network as a resource (2)

- Adaptive optimization
  - achieved throughput and success rate of links influencing the algorithm
  - information for transfers success rate and throughput are retrieved from FTS3 database
- PerfSonar
  - preliminary experimentation of bandwidth and ping tests shown that we can profit
  - integration will start very soon and Pilot service will be used for testing
- Software-defined networks

FTS 3 deployment Model

- Centralized (1 or 2 instances)
  - service can scale horizontally
  - less effort needed to exchange status between instances
  - (much) faster evolution
    - DevOps model for operation and support

FTS3 configuration model

Link config

Target	Transfers
T0->T1_A	50
T0->T1_B	60

Target	Transfers
T1_B<-T0	60
T1_B	80

Target	Transfers
T2_A	20

Endpoint config

Zero config

FTS3 features

- Multiple replicas support
- Transfer multi-hop
- Stage-in files from archive (SRM)
- VO shares per activity (primary, production, secondary, tier0, tier1, etc)
- Integration of perfSonar information (bandwidth & ping tests)
- Blacklisting DN/SEs, retries, etc

FTS3 work in progress

- deeper integration with archival storage and include high performance file management capabilities (deletes, renames...)
- web interface for simple file selection and transfer management
  - proxy management and delegation within the browser
- transfer of files off local machines, e.g.
  - local to remote storage
  - remote storage to local
  - laptop to laptop ?

Sample volume