

EMI is partially funded by the European Commission under Grant Agreement RI-261611



New Generation WLCG File Transfer Service

FTS 3

CHEP 2012 New York

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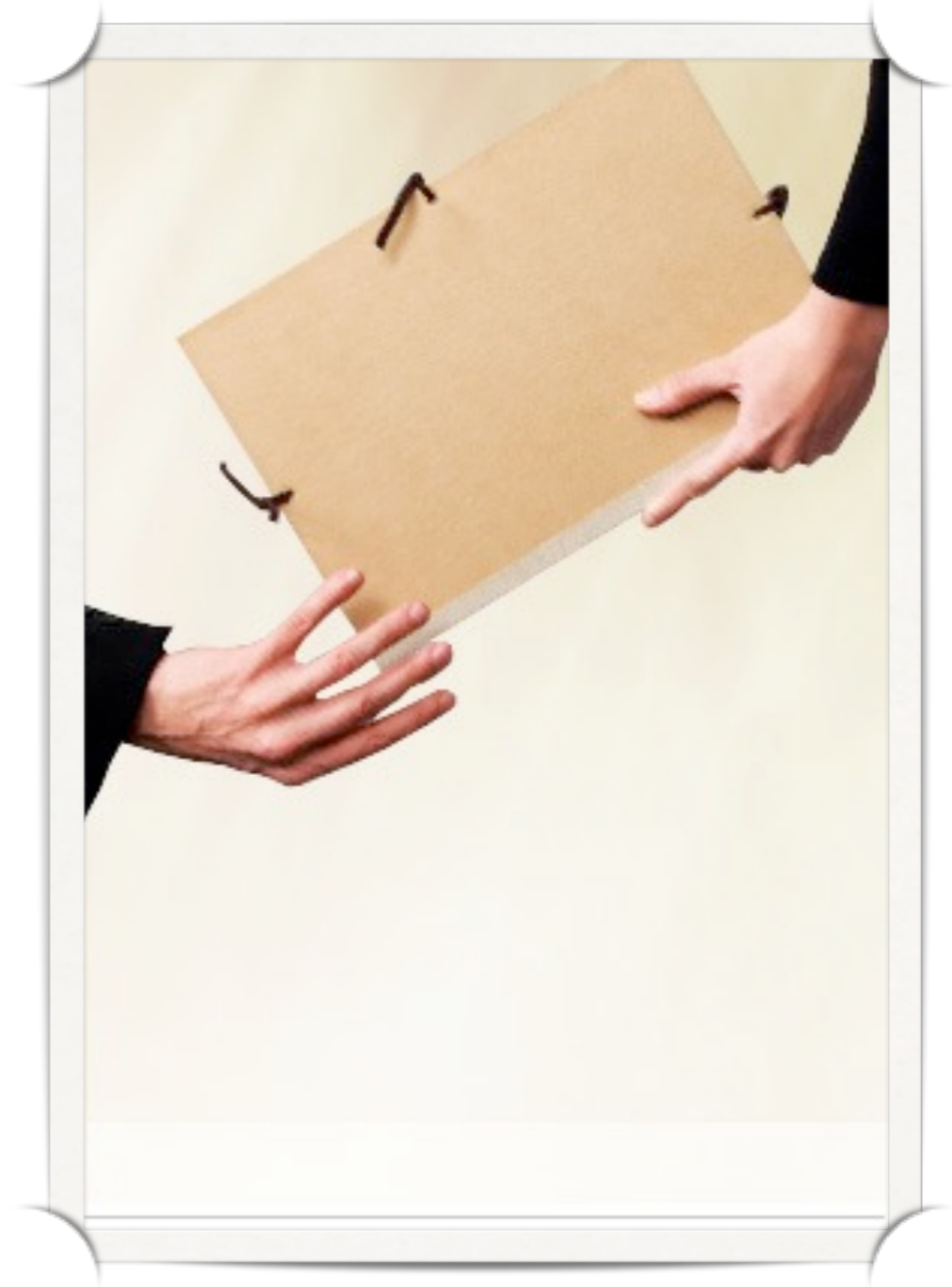
FTS = File Transfer Service

The Big Picture

FTS now: FTS 2

New paradigm: FTS 3

FTS 3 features



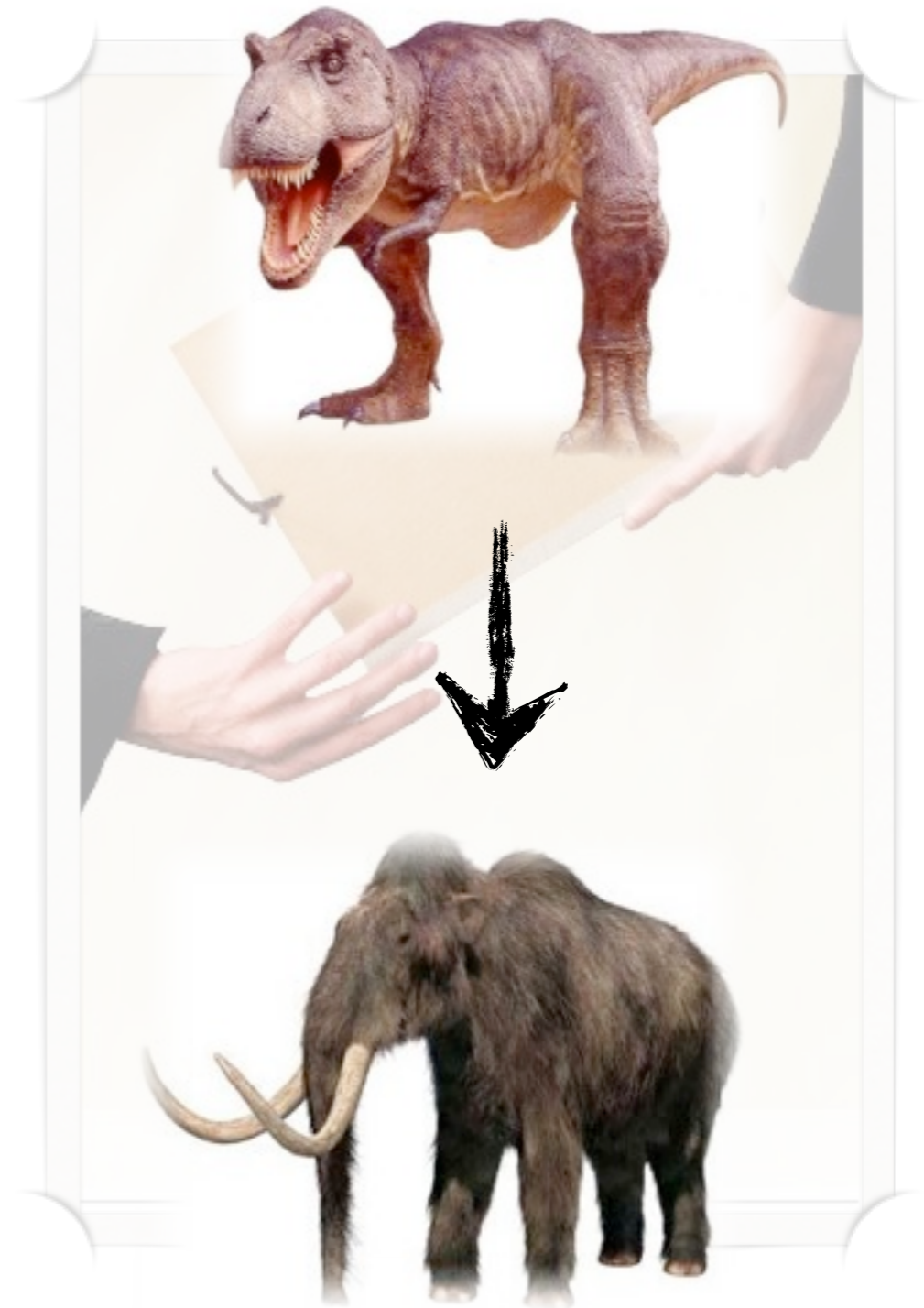
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The Big Picture

FTS now: FTS 2

New paradigm: FTS 3

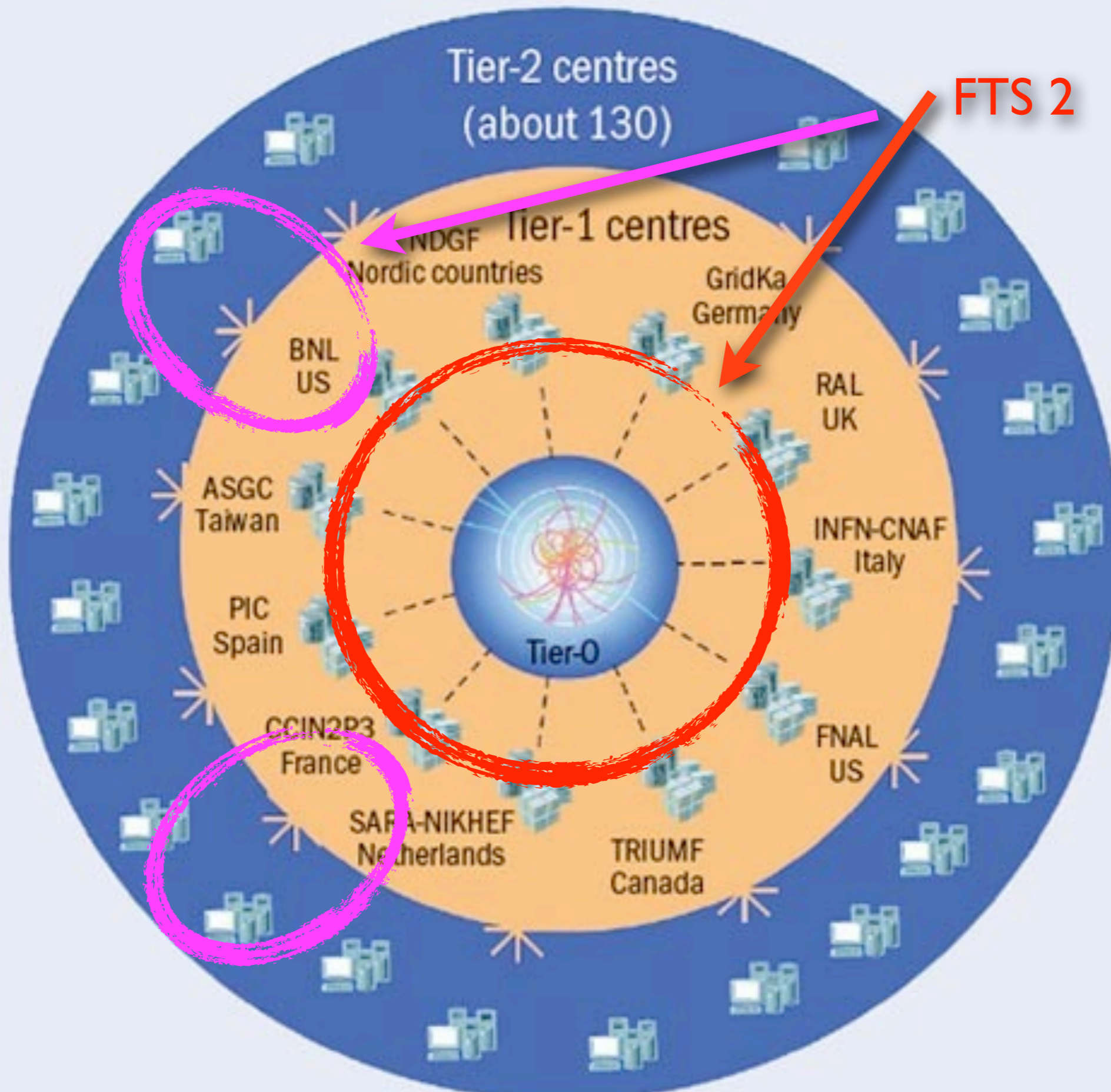
FTS 3 features



FTS does: reliable data distribution for WLCG



with resource management



FTS 2 and LHCOPN

were motivated

by the **Monarch** model

~25 Petabytes per year



Dedicated optical fiber,
10 Gbit/s



FTS does: reliable data distribution for WLCG



with resource management

FTS does: reliable data distribution for WLCG

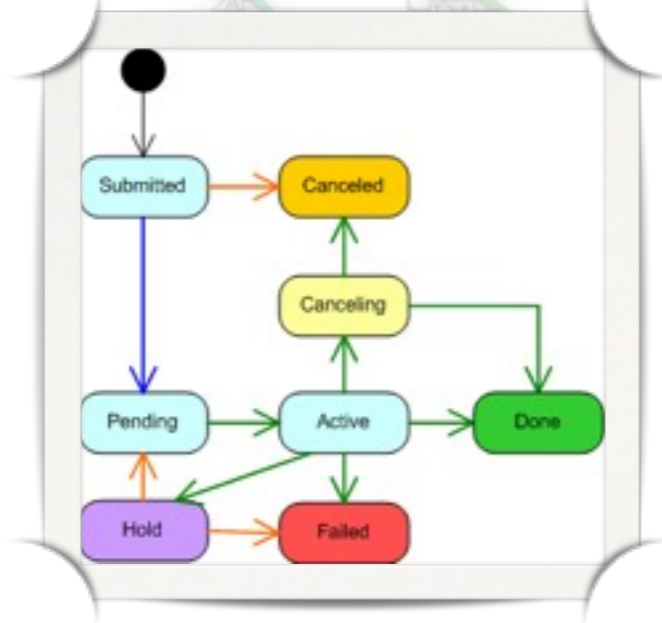
supervising



Transfer job



batch processing



monitoring

FTS does: reliable data distribution for WLCG

supervising

Fair
share

Maximize
throughput

Transfer job

batch processing

monitoring

FTS does: reliable data distribution for WLCG



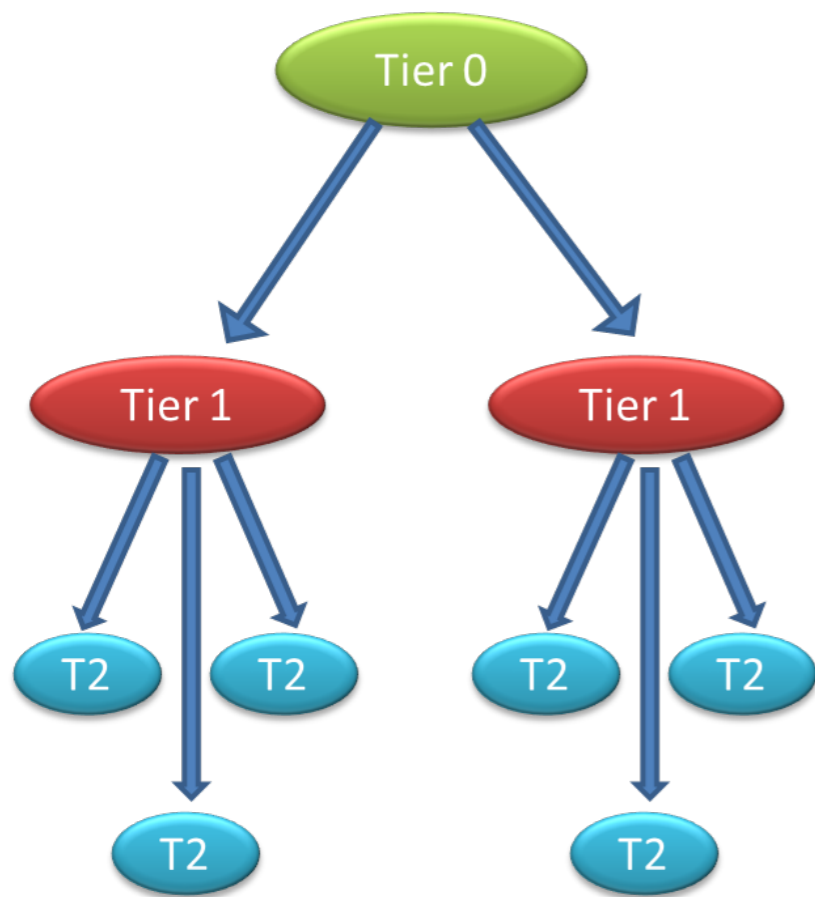
FTS 2 has been built for the Monarch Model and works very well

The networks used by WLCG are very reliable and bandwidth has increased to enable other transfers

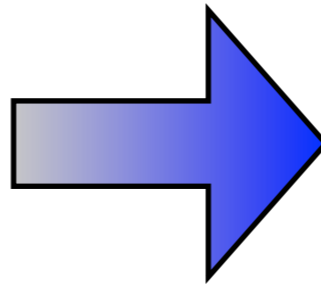
The assumptions of the model are no longer true

FTS 3

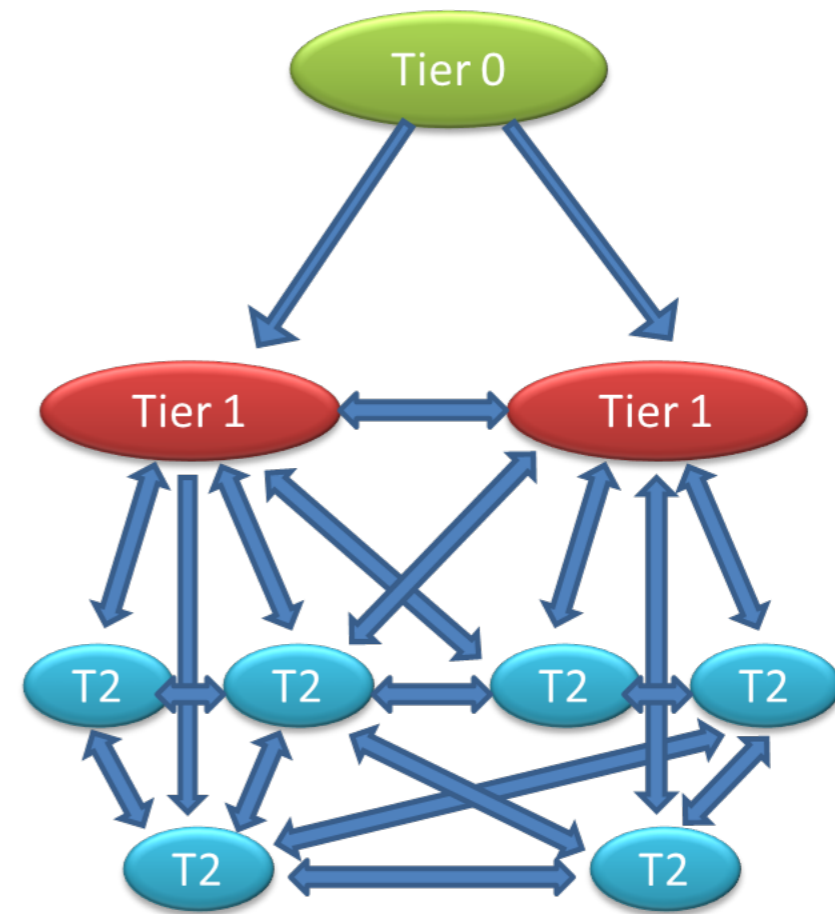
Structured data migration



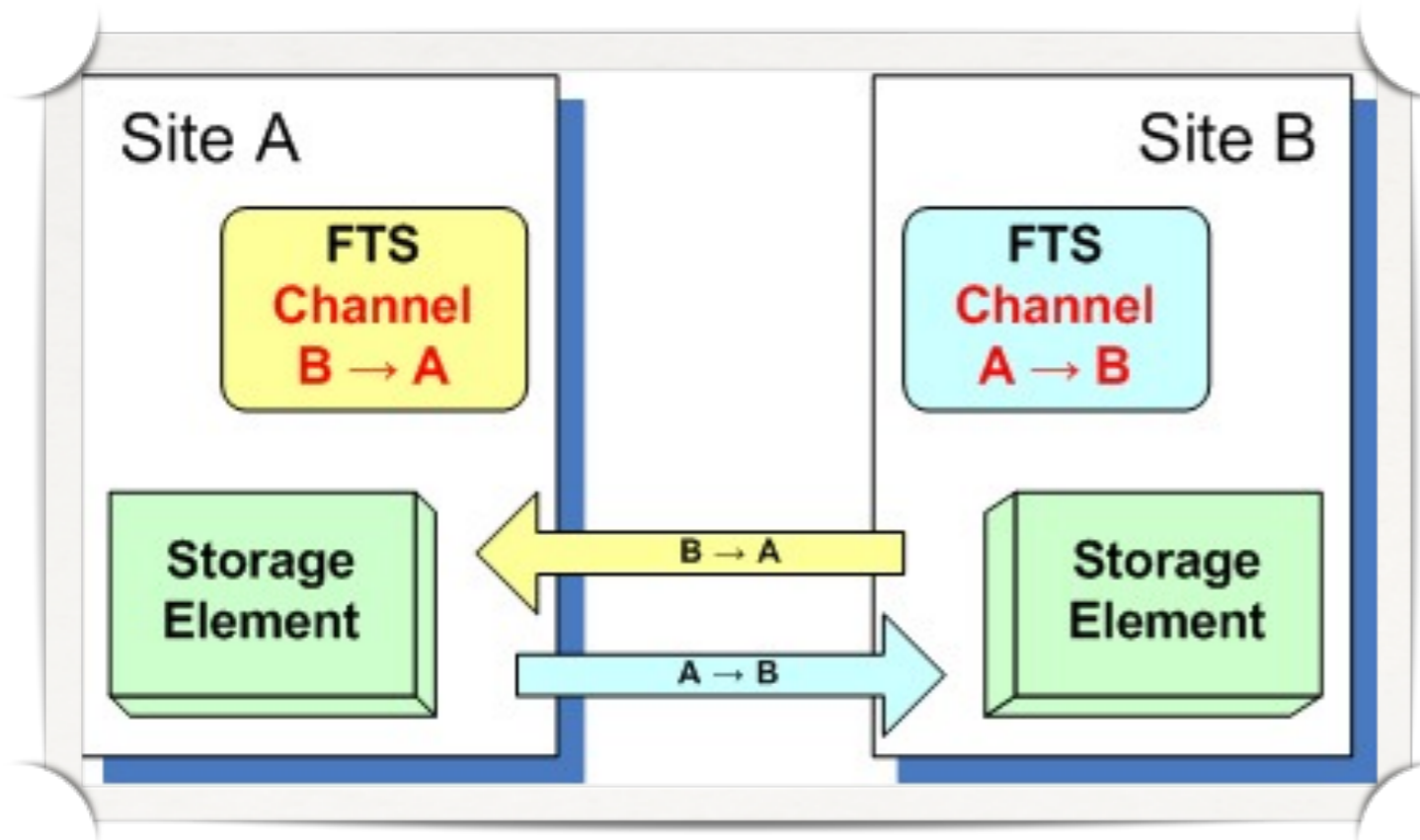
Hierarchy



Dynamic data placement



Mesh



Unidirectional

Abstract

P2P transfers

Transfer slots: shares

Convenient



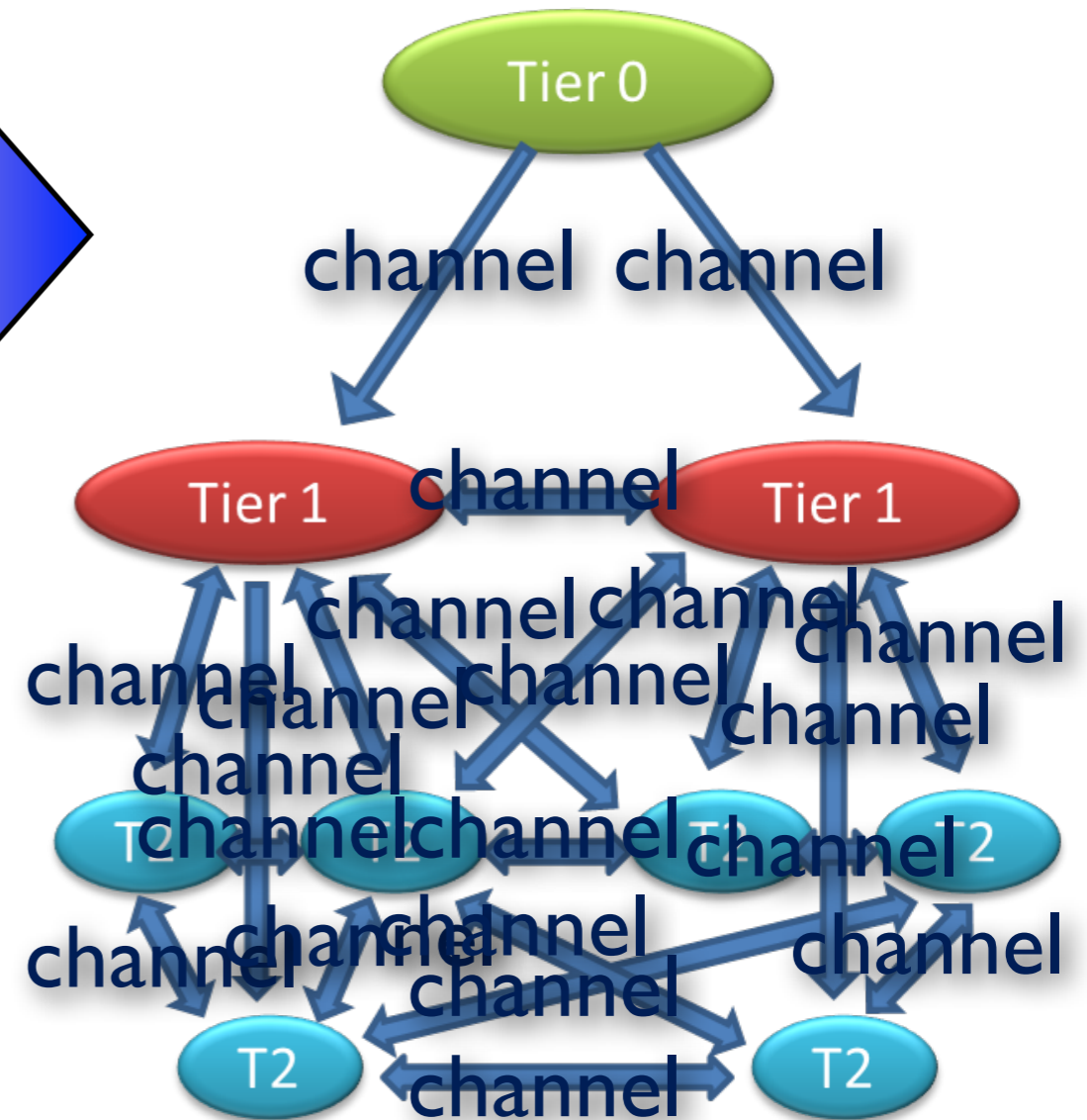
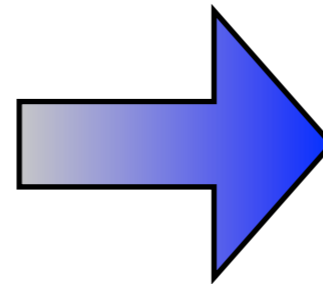
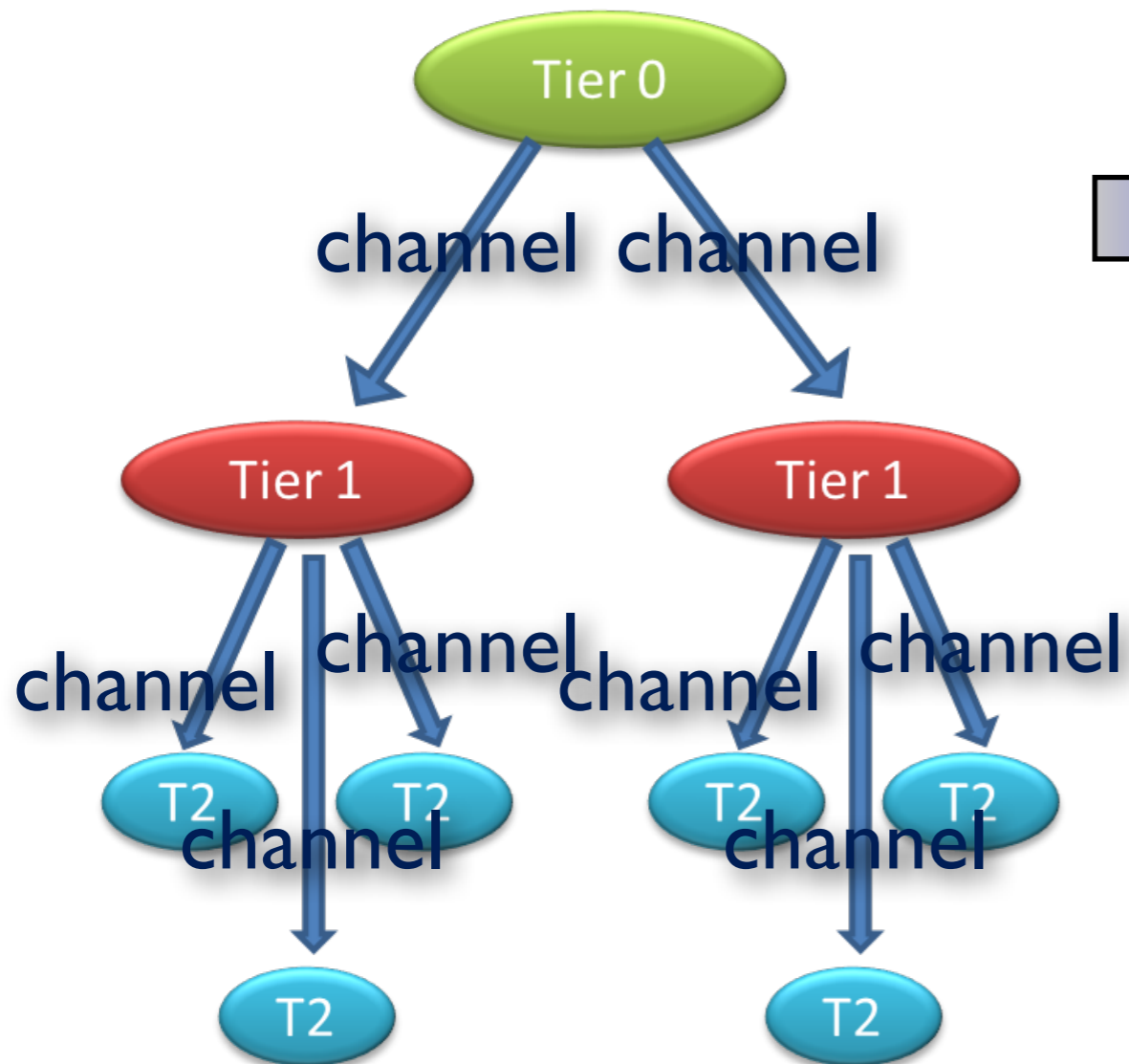
High management granularity

Channel configuration is mandatory

FTS 2 manages “Channels”

FTS 2 manages $O(10)$

Mesh: $O(N^2)$



Not practical

Nothing is managed exclusively



TI



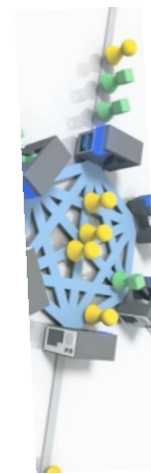
dark

gridftp

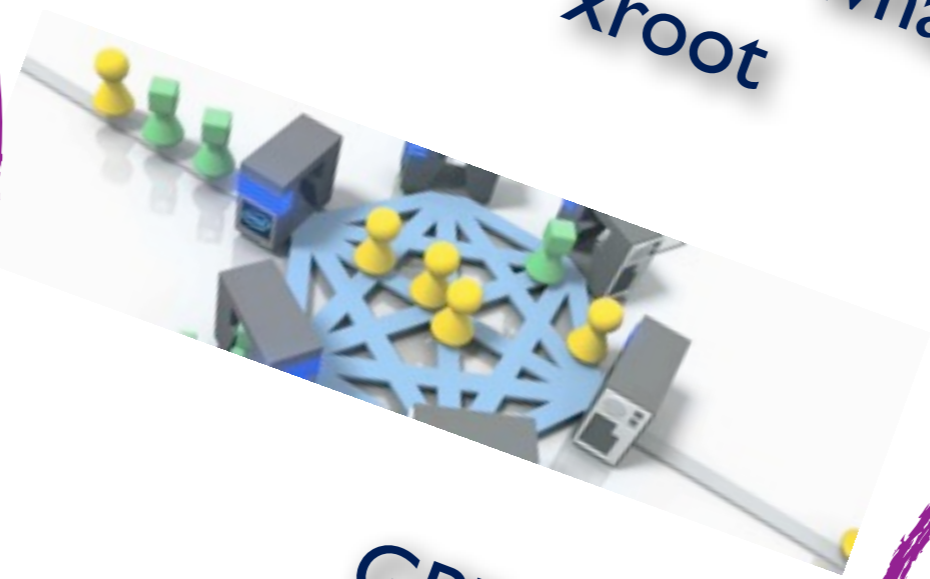
http

xroot

whatever



~~SRM~~



GPM/Internet

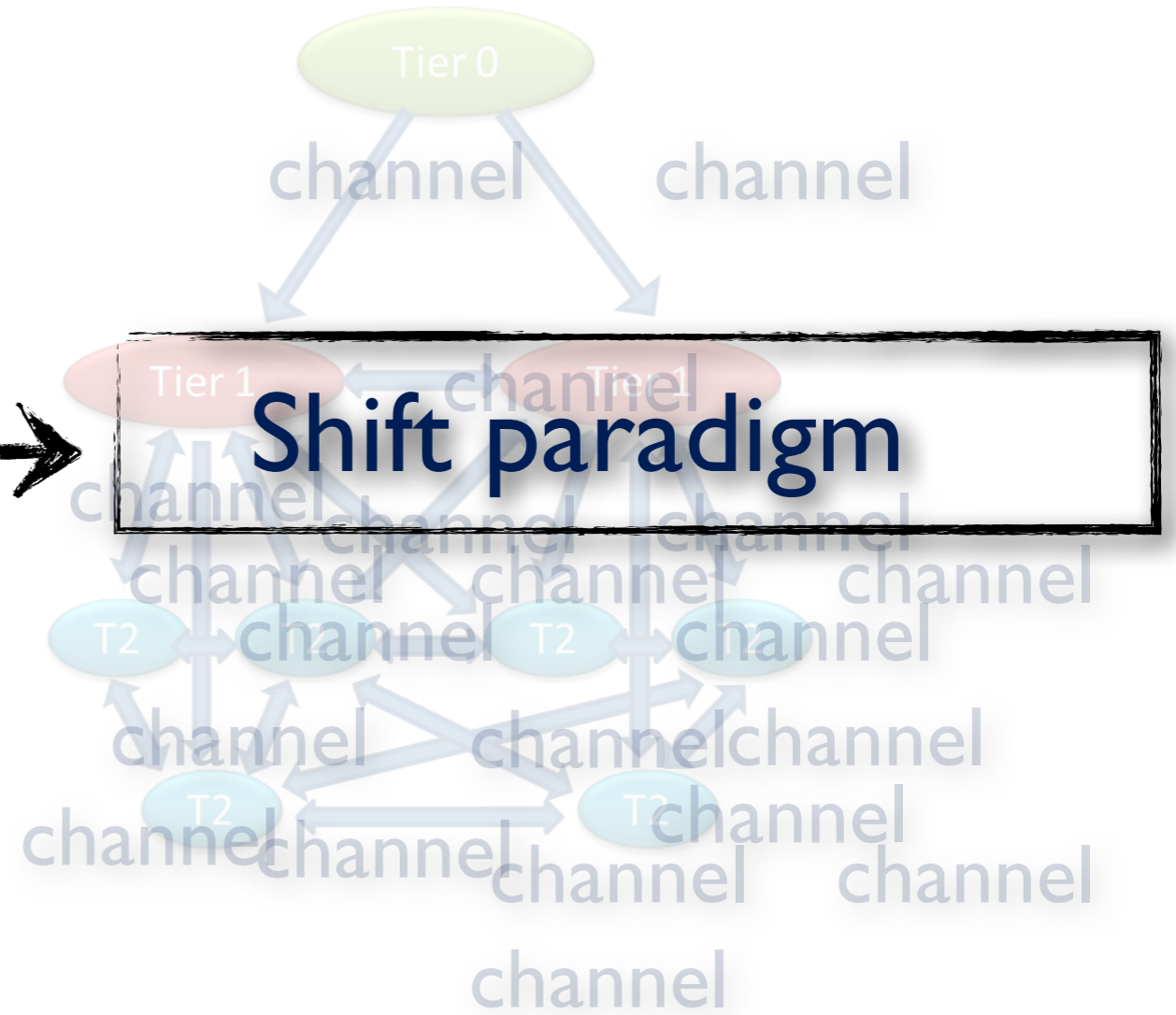
how to share???



T2 NorthGrid



dark



Scalable FTS 3 for the Mesh



Site, SE, network - individually managed
resources: a lot!

Multiple transfer protocols

Static + dynamic and default configuration:
minimize burden

And...

FTS 3 does: reliable data distribution for WLCG



with resource management

FTS 3 = FTS 2 functionality + new domain + more

Pair config



Point config

Channel share



SE, site share

Channel parameter



SE, site, network
parameter

Pair config



Point config

Channel share

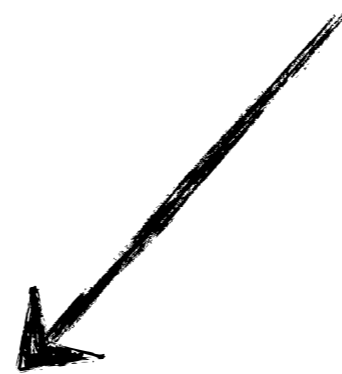


SE, site share

Channel parameter



SE, site parameter



Max. incoming slots

SE name

VO

Max. outbound slots

SE:dpm.cern.ch:VOShare (ATLAS) = (100, 200)

SE:dpm.cern.ch:VOShare (CMS) = (50, 50)

SE:dpm.cern.ch:VOShare (LHCb) = (0, 0)

SE:dpm.cern.ch:PublicShare = (100, 150)

SE:dpm.cern.ch:ControlProtocols = (SRM)

SE:dpm.cern.ch:TransferProtocols = (gsiftp, http)

Max. incoming slots

SE name

VO

Max. outbound slots

SE:dpm.cern.ch:VOShare (ATLAS) = (100, 200)

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SE:dpm.cern.ch:PublicShare = (100, 150)

SE:dpm.cern.ch:ControlProtocols = (SRM)

SE:dpm.cern.ch:TransferProtocols = (gsiftp, http)

Less config work

Default config

```
SE:not.configured.se:PublicShare = (50, 50)
```

SE config

```
SE:dpm.cern.ch:PublicShare = (50, 50)
```

For T2

Less config work

Default config

```
SE:not.configured.se:PublicShare = (50, 50)
```

SE config

```
SE:dpm.cern.ch:PublicShare = (50, 50)
```

Site (SE group) config

```
SITE:RAL:VOShare (CMS) = (50, 50)
```

For T2

For T1

Less config work

Default config

```
SE:not.configured.se:PublicShare = (50, 50)
```

SE config

```
SE:dpm.cern.ch:PublicShare = (50, 50)
```

Site (SE group) config

```
SITE:RAL:VOShare (CMS) = (50, 50)
```

Directional config

Config at CERN!

```
DIRECTION:CERN-RAL:VOShare (CMS) = (500, 500)
```

Config at RAL!

```
DIRECTION:RAL-CERN:VOShare29 (CMS) = (100, 200)
```

For T2

For T1

For T0

Less config work

Default config

SE:not.configured:PublicShare = (50, 50)

SE config

SE:dpm.cern.ch:PublicShare = (50, 50)

Site (SE group) config

SITE:RAL:VOShare (CMS) = (50, 50)

Directional config

Config at CERN!

DIRECTION:CERN-RAL:VOShare (CMS) = (500, 500)

Config at RAL!

DIRECTION:RAL-CERN:VOShare₃₀ (CMS) = (100, 200)

Precedence

For T2

For T1

For T0

Less config work

FTS 3 scales in Tx-Ty and mesh/cloud

Default config

SE:not.configured.se:PublicShare = (50, 50)

Site (SE group) config

SITE:RAL:VOShare (CMS) = (50, 50)

Directional config

Config at CERN!

DIRECTION:CERN-RAL:VOShare (CMS) = (100, 200)

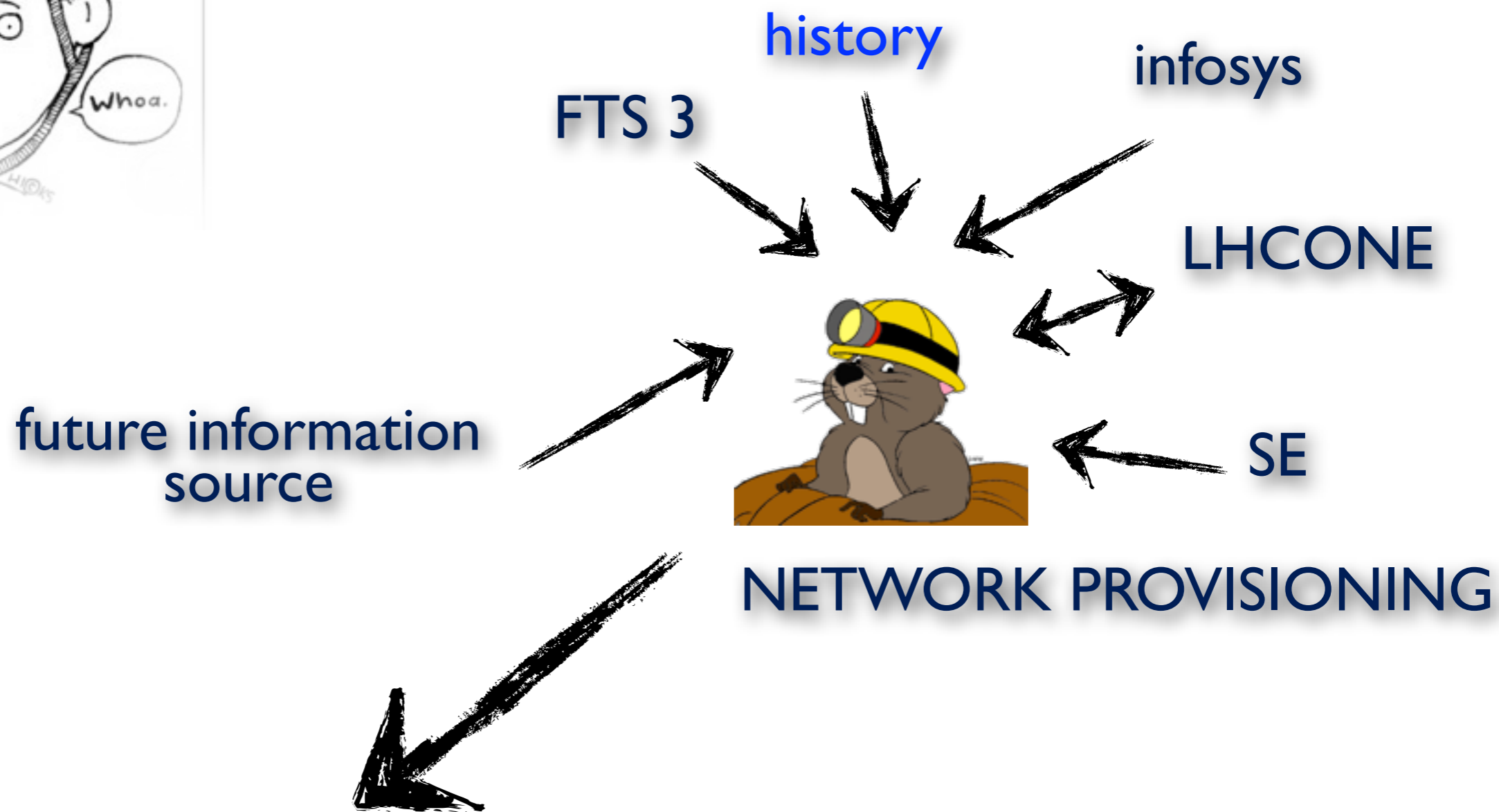
FTS 2-like control in T0-T1

Config at RAL!

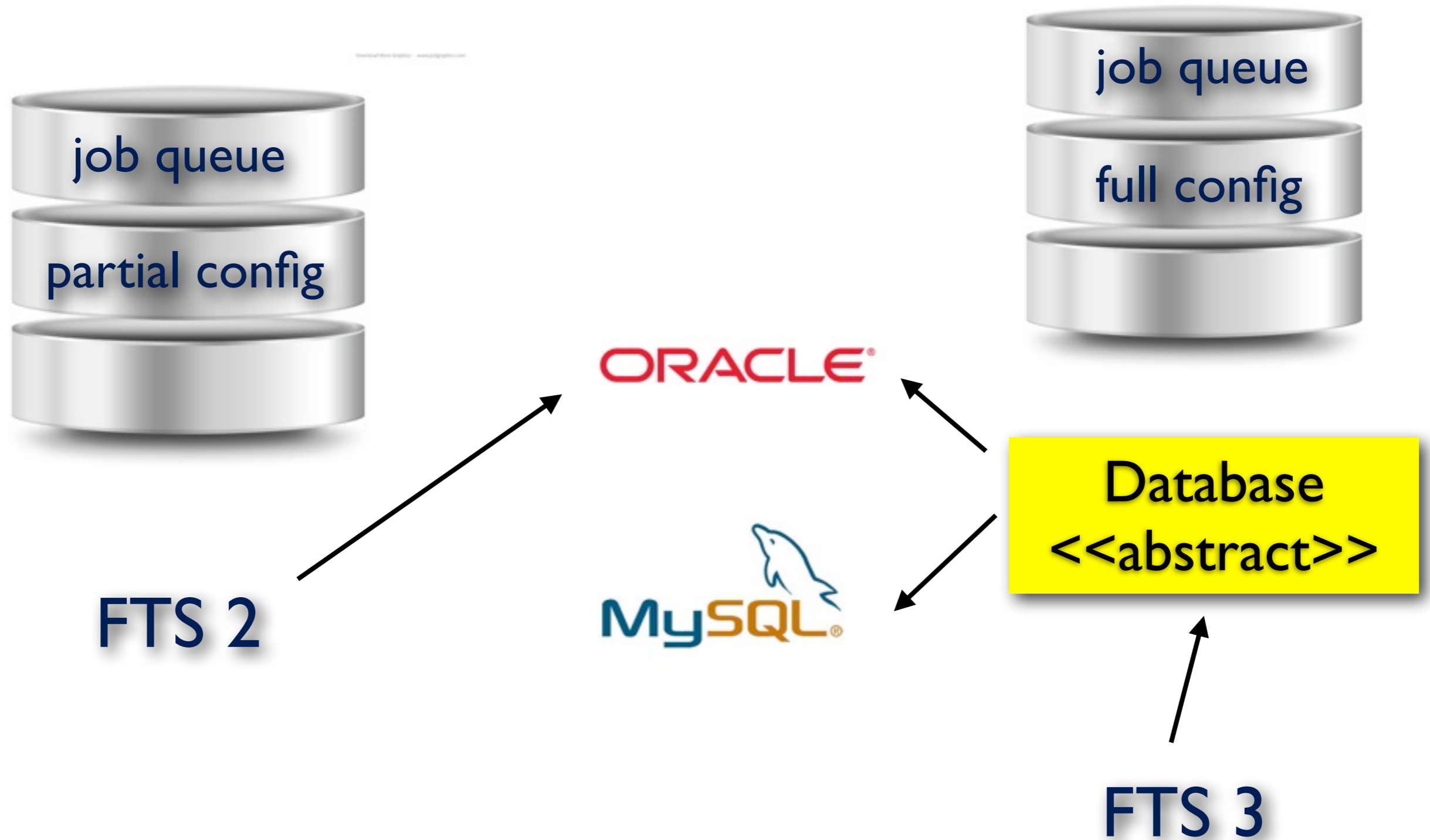
DIRECTION:RAL-CERN:VOShare (CMS) = (100, 200)



And the network? SE state?



The database backend



The software

FTS 2	FTS 3
Java, C, C++, Python	C++
XML config files, config scripts, config in database,	config in database
Standalone, overlaps	Integrates with GFAI 2
gridftp	gridftp, http, xroot, rfio, dcap, ...

From GFAL 2!



Protocol plugin, first
release will include http

The deployment: alternatives

*One FTS
to rule them all...*

easy to optimize
new architecture
horizontally scalable

FTS 3 realms

independent
overlaps possible

**redundant
load balanced**

**FTS 3 scales in Tx-Ty and
mesh/cloud**

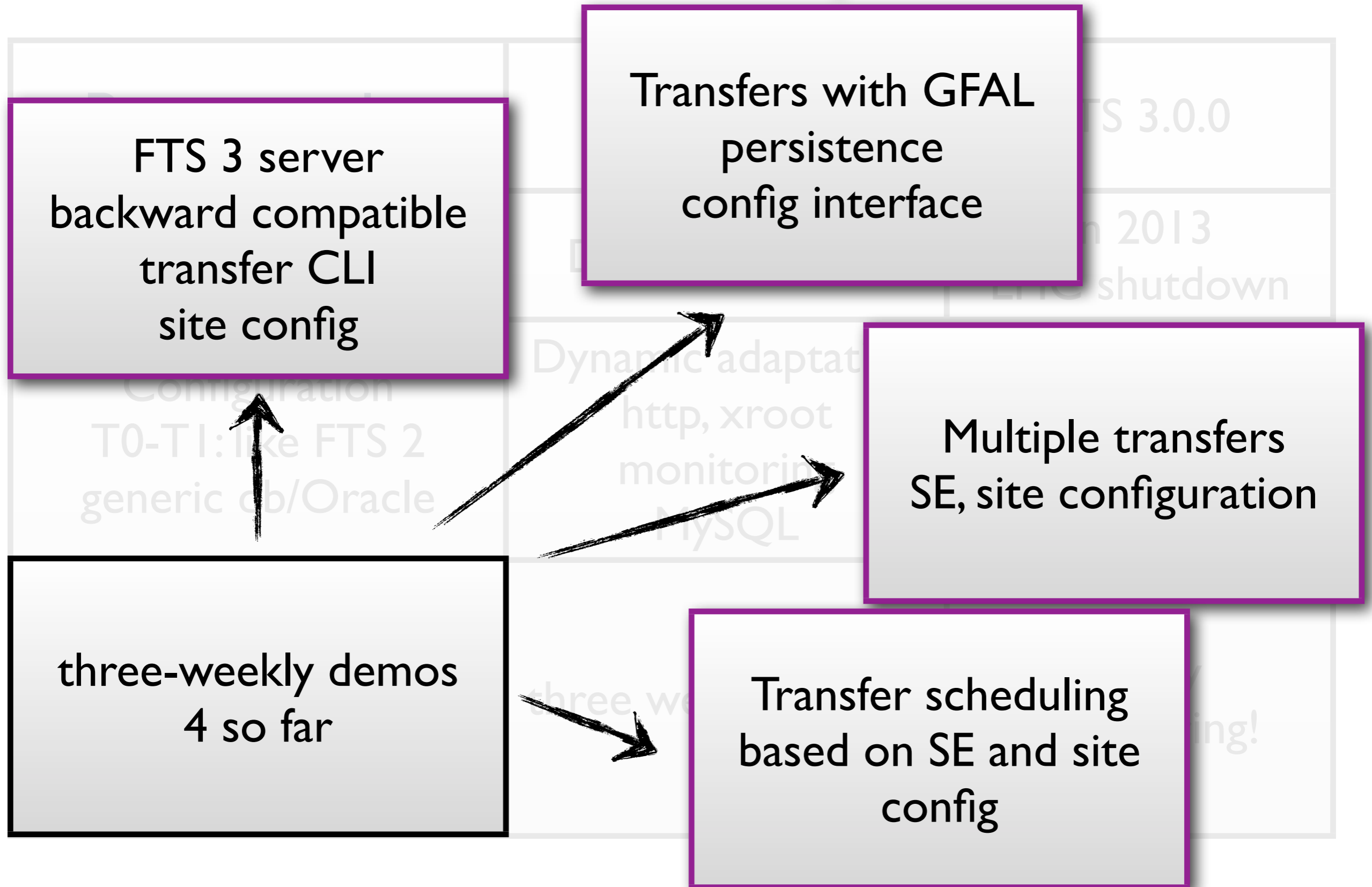
**FTS 2-like control
in T0-T1**

**FTS 3 supports
HTTP, MySQL**

The roadmap

Prototype I	Prototype II	FTS 3.0.0
June 2012	December 2012	In 2013 LHC shutdown
Configuration T0-T1: like FTS 2 generic db/Oracle	Dynamic adaptation http, xroot monitoring MySQL	Tested
three-weekly demos 4 so far	three weekly demos	Happy transferring!

The roadmap



The future: TEG requirements

Load balancing

Staging from archive

Back pressure

Our aim: FTS
stays the only
tool for managed
transfers

Alternatives of
SRM

Replicas

Transfer protocol negotiation

Let's meet in every third week!

fts3-steering@cern.ch

svnweb.cern.ch/trac/fts3