HTTP Third-Party Copy: Getting rid of GridFTP

Diego Davila, Brian Bockelman

Benedikt Maier, Fernando Garzon, Felipe Gomez-Cortes, Lisa Paspalaki
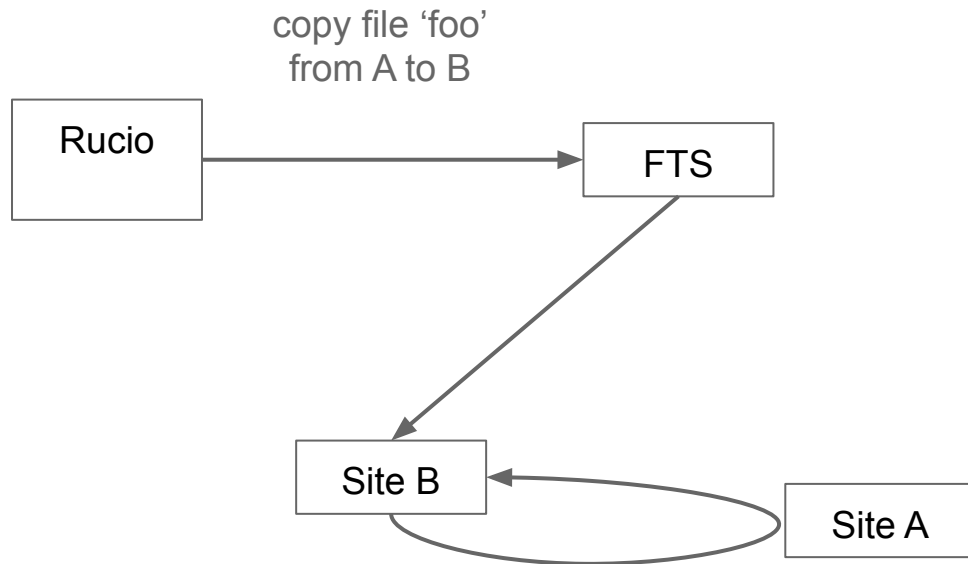
Stephan Lammel, Eric Vaandering, Nick Smith

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Let's start by breaking down the title into 3 different concepts:

1. Third Party Copy (TPC)
2. GridFTP
3. HTTP-TPC

Third Party Copy (TPC)

copy file 'foo'
from A to B

Rucio → FTS

Site B

Site A

FTS*
orchestrates the
copy **without
streaming** the
file

(*)FTS - File Transfer Service
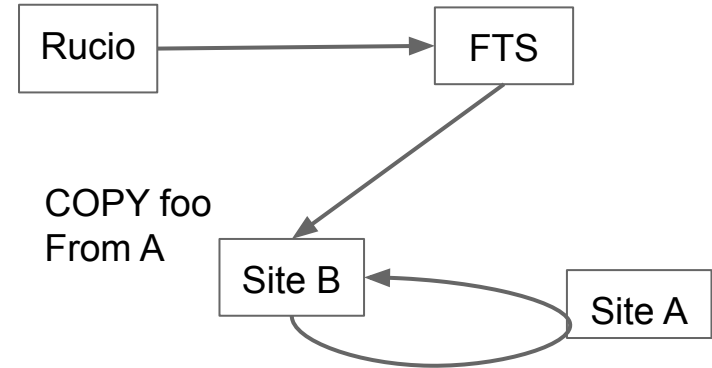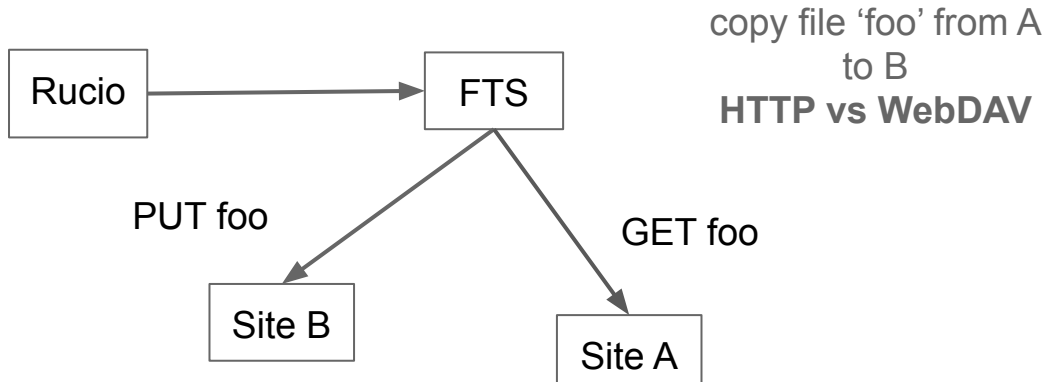
GridFTP

In simple terms:

- An implementation of gsiFTP protocol which is an extension of FTP(*) to be used in the grid, i.e. FTP + GSI(**) authentication
- The most popular implementation used by the LHC experiments CMS and ATLAS to do TPCs i.e. move files around sites.

The issue: it heavily relies on the Globus Toolkit which announced its end-of-support on January, 2018

(*)FTP - File Transfer Protocol
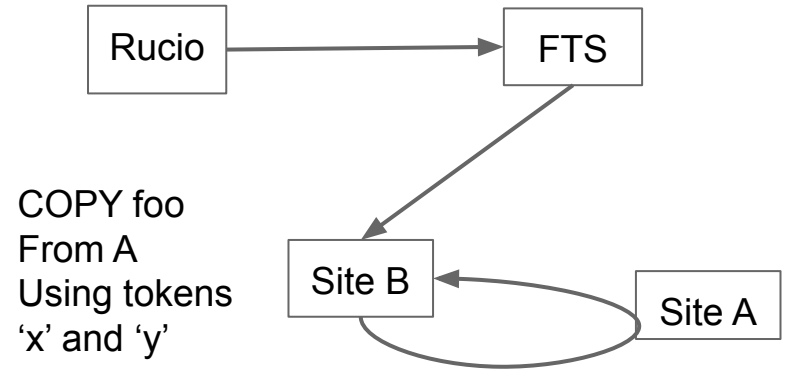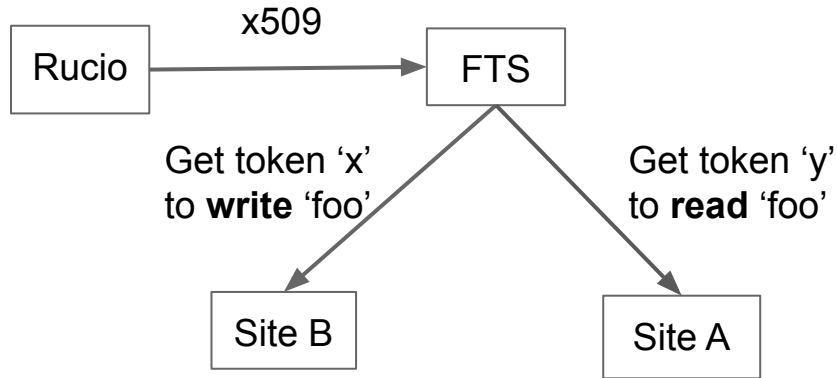(**)GSI - Grid Security Infrastructure

HTTP-TPC

- The idea of doing TPC using the HTTP protocol
- HTTP by itself does not support TPC as we know it (without streaming)
- **WebDAV(*):** an extension of the HTTP protocol that adds COPY to the verbs supported by HTTP.

copy file 'foo' from A
to B
HTTP vs WebDAV

```
Rucio  ───────►  FTS
```
PUT foo   GET foo
```
       Site B        Site A
```

```
Rucio  ───────►  FTS
```
COPY foo
From A
```
       Site B  ◄───  Site A
```

(*)WebDAV: Web Distributed Authoring and Versioning

WebDAV

- **Bonus:** WebDAV supports tokens!
- A step further on getting rid of GSI
- Currently a mix of x509 and tokens are used for TPC

Rucio →(x509)→ FTS

FTS → Get token 'x' to **write** 'foo' → Site B

FTS → Get token 'y' to **read** 'foo' → Site A

Rucio → FTS

FTS → Site B

COPY foo
From A
Using tokens
'x' and 'y'

Site A → Site B

The adoption of WebDAV from the CMS perspective

This was done in 2 phases:

1. Testing
- Picked sites a guinea pigs
- Focused on debugging issues
- Integration with PhEDEx is managed by sites
- Rules in old TFC(*) (xml)

2. Getting the bulk of the sites
- Publicly announced to sites
- More CMS teams on board
- Focused on a systematic approach
- Integration with Rucio is centrally managed (can be automated)
- Rules in new TFC (json)

(*)TFC: Trivial File Catalog

The process from the CMS site's perspective

1. **Minimal testing**
   a. Open ticket to the site asking for a WebDAV endpoint
   b. Manual testing and debugging of the endpoint
   c. Make sure the new TFC (storage.json) is up to date
2. **LoadTests and validation of the TFC**
   a. The new TFC is used to create a _Test instance of the site
   b. LoadTests are enabled on that _Test instance
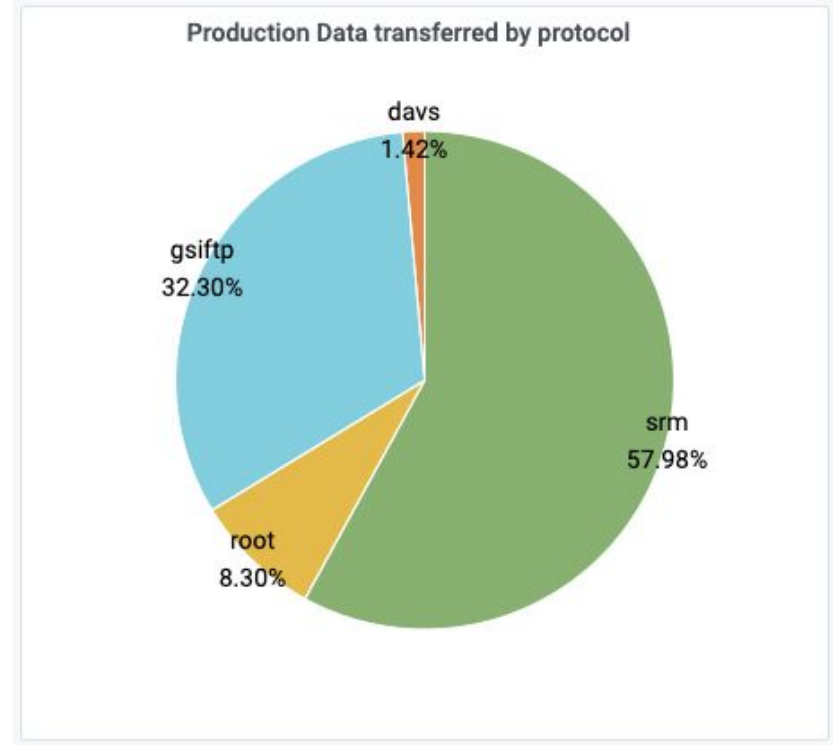   c. Monitoring of the LoadTests
3. **Production mode**
   a. Once the LoadTests seem fine the production instance is configured.

Current Status: CMS

- 35 sites reported to have a WebDAV endpoint
- 30 have passed manual tests
- 12 have production reads enabled in Rucio
- 3 have production reads and writes enabled in Rucio

Status per site can be seen here:

https://twiki.cern.ch/twiki/bin/view/CMS/WebDAVStatus4Sites

Production Data transferred by protocol
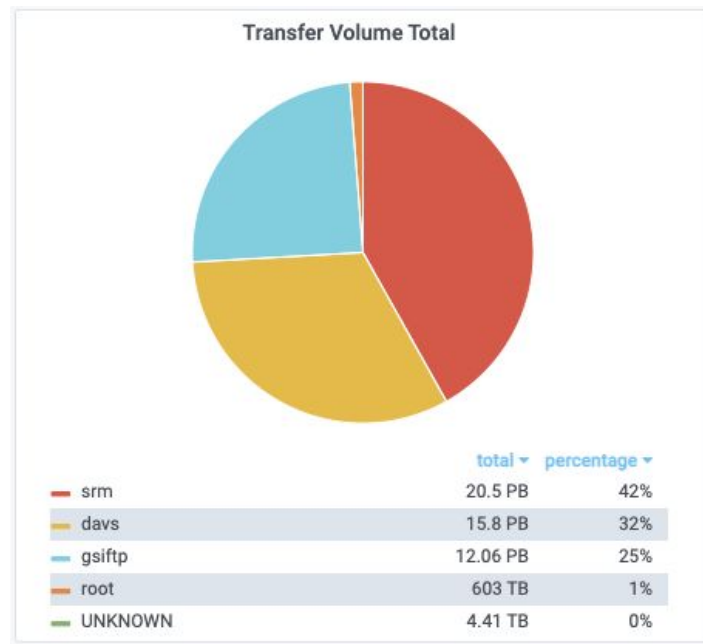
Production transfers by protocol in the last 30 days

Current Status: ATLAS

Sites using WebDAV in production:

- T1 - 11/12
- T2 - 29/60
- T3 - 8/24

Status per site can be seen here:

https://atlasdistributedcomputing-live.web.cern.ch/tpc/

Transfer Volume Total		
	total ▼	percentage ▼
— srm	20.5 PB	42%
— davs	15.8 PB	32%
— gsiftp	12.06 PB	25%
— root	603 TB	1%
— UNKNOWN	4.41 TB	0%

Production transfers by protocol in the last 30 days

Time for Questions