

ROOT/HTTP Third Party Copy

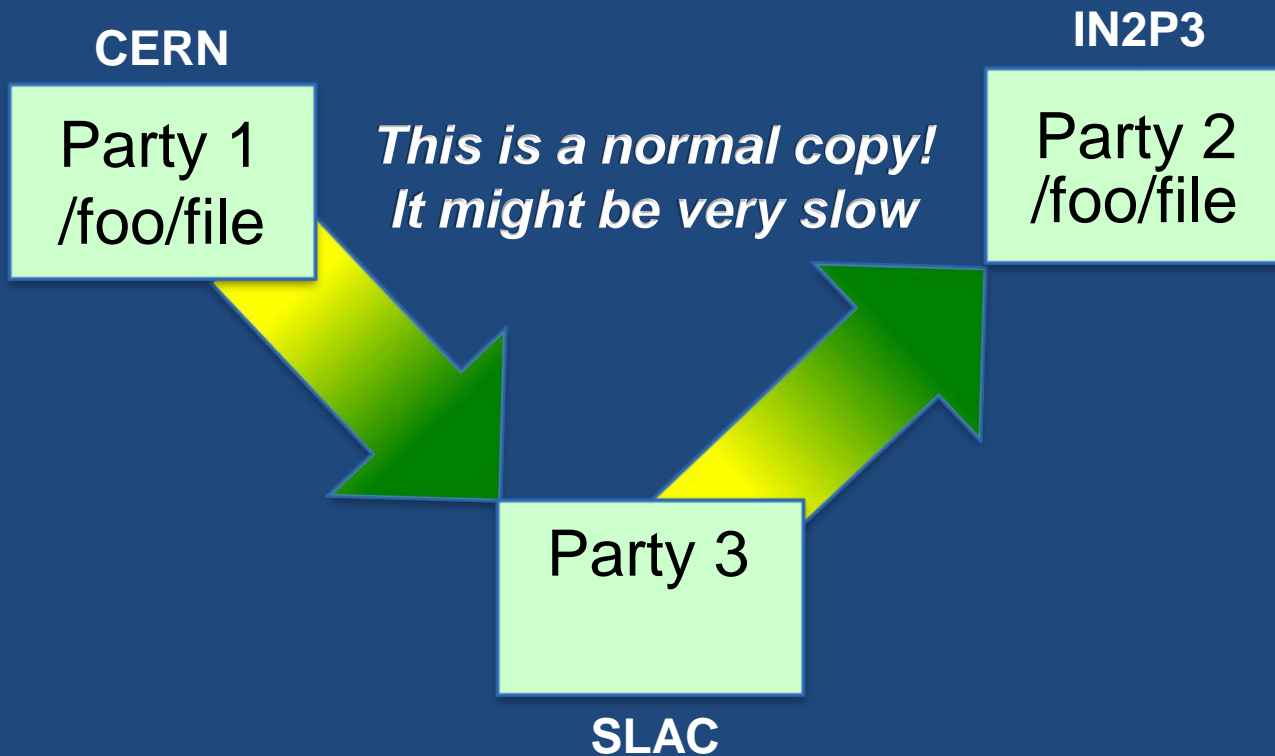
ATLAS S&C Week

CERN

March 6, 2018

Andrew Hanushevsky, Alastair Dewhurst, Wei Yang

The Bane of Copying Files

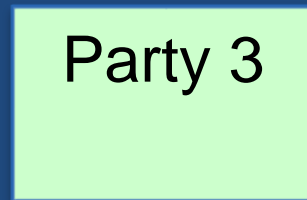


xrdcp root://Party1//foo/file root://party2//foo/file

3rd Party Copy to the Rescue



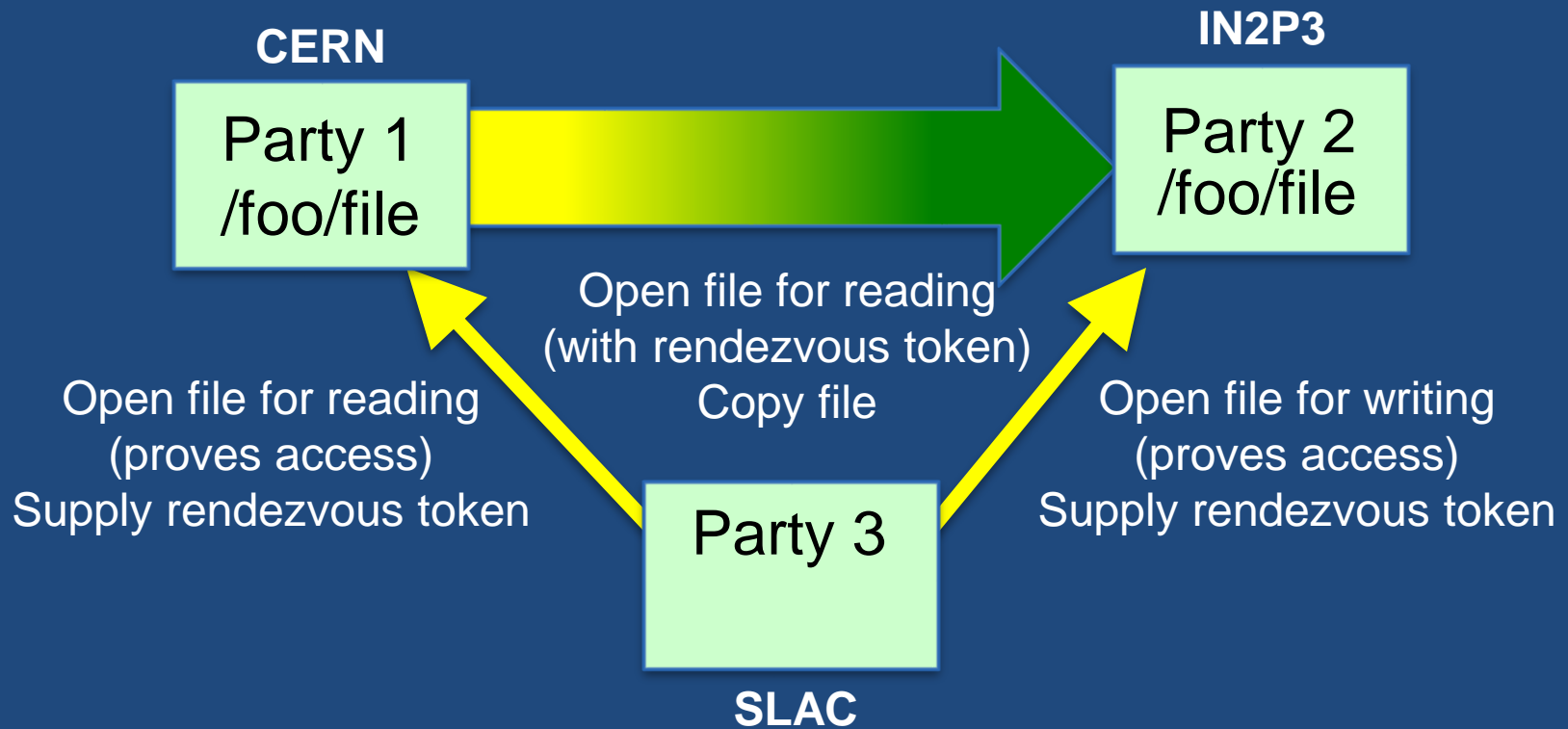
*This is a 3rd party copy!
It is as fast as it can be*



SLAC

```
xrdcp -tpc only root://Party1//foo/file root://party2//foo/file
```

XRootD 3rd Party Copy “Magic”



3rd Party Copy Security

- There is no standard for 3rd party copy
 - GridFTP & Davix use x509 forwarding
 - Dependent on x509 + identity authorization
 - Davix plans to also support sciToken authentication
 - XRootD uses transitive closure protocol
 - Works with any kind of authentication/authorization
 - This also covers sciToken authorization
 - sciToken is newly proposed HEP authorization
 - Similar to signed URL used in S3


Authentication & Authorization

- HTTP/WebDAV
 - x509+VOMS (standard does not define authentication per se), limited fine-grained authorization (but fully available with XRootD/HTTP)
- XRootD
 - x509+VOMS, grid-mapfile, or GUMS, Kerberos plus others, fine-grained capability based authorization
 - Supports VOMS roles in authorization
 - It may be possible to use voms-lcmap as well

Who Supports 3rd Party Copying?

- GridFTP via globus-url-copy
 - Since ~2005
 - Globus defined protocol
- HTTP via davix-cp
 - Since 2016
 - dCache/DPM non-standard HTTP extensions
- XRootD via xrdcp
 - Since 2010
 - XRootD Collaboration defined protocol

If GridFTP Works, Why This Talk?

- Globus has ended support for Open Source Globus Toolkit, including GridFTP
 - Replaced by a \$\$\$ subscription model
 - Globus Connect
- But...
 - WLCG and Grid Community Forum promises support until ~2021.
 - Support cost  whenever OpenSSL ABI changes
 - Inevitable that a free replacement must be found
 - Currently only HTTP/WebDAV & XRootD support 3PC
 - Must evaluate these as practical replacements

ATLAS Storage Ecosystem

XRootD

EOS*

DPM*

dCache

Castor*

*Third Party Copy
must work between all combinations
via FTS and Rucio
in order for a protocol to be a
viable replacement*

XRootD Proxy



Required for XRootD 3rd Party Copy

**Uses XRootD core (i.e. XRootD Inside!)*

XRootD 3rd Party Copy Evaluation

D – Direct invocation

F – Using FTS

R – Using

Rucio

X – Fully functional

X – Issues found

X – Broken

	Castor	dCache	DPM	EOS	XRootD
Castor				FR	
dCache					
DPM					
EOS	FR				DFR
XRootD					DFR

Issues

FTS was unable to verify checksum for Castor & EOS transfers

HTTP 3rd Party Copy Evaluation

D – Direct invocation

F – Using FTS

R – Using

Rucio

X – Fully functional

X – Issues found

X – Broken

	Castor	dCache	DPM	EOS	XRootD
Castor	DF	DF	DF	DF	DF
dCache	DF	DF	DF	DF	DF
DPM	DF	DF	DF	DF	DF
EOS	DF	DF	DF	DF	DF
XRootD	DF	DF	DF	DF	DF

Issues

Castor and EOS do not support WevDAV.

No XRootD endpoints known that have enabled https.

Rucio replication not tested.

XRootD Deployment Scenario

- Castor, DPM, EOS, Vanilla XRootD ready
 - Need to add `ofs.tpc` directive to config file
 - Should this be made the default?
- dCache requires an XRootD proxy front
- All need x509 proxy cert with prod attribute
 - Maybe add x509 forwarding, if we must
- AGIS/RUCIO configuration site settings
 - `read_wan`, `write_wan`, `delete_wan`

Conclusion

- We do know that GridFTP can be replaced
 - For us, HTTP & XRootD are widely deployed
 - All ATLAS sites usually have both
- More evaluation is needed
 - To make sure all SE combinations work
- Free data management looks quite doable
 - We are starting to plan now
 - Expect a transition period as things fall into place