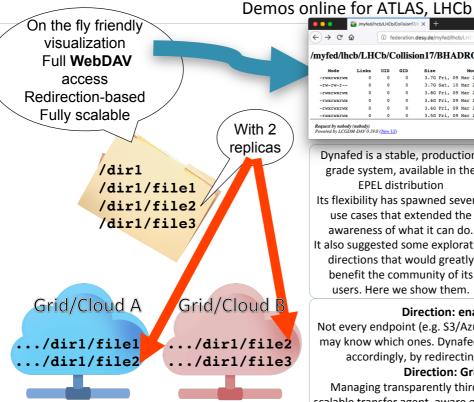# Dynafed: Common directions for HTTP and Cloud storage federations

F.Furano O.Keeble
CERN IT-ST

Dynafed allows the creation of flexible and seamless storage federations out of sites that expose **WebDAV, HTTP, S3 or Azure interfaces. Works great with CEPH.**
Read/write support, FTS-friendly, matches Cloud and Grid on the fly
Flexible, open, high performance authorization subsystem
Part of the XDC project (see talk 537), in production for LHC@home (see talk 88), preproduction for ATLAS@Uvic (see poster 161, talk 105), Belle-II (see talk 479), deployed at RAL (see talk 421)
Demos online for ATLAS, LHCb

On the fly friendly visualization
Full **WebDAV** access
Redirection-based
Fully scalable


```
/dir1
/dir1/file1
/dir1/file2
/dir1/file3
```

With 2 replicas

Grid/Cloud A
```
.../dir1/file1
.../dir1/file2
```

Grid/Cloud B
```
.../dir1/file2
.../dir1/file3
```

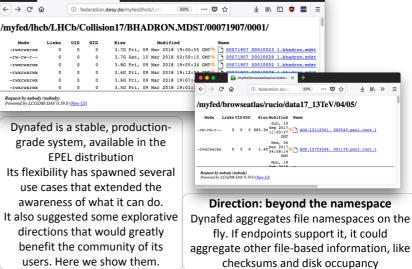Dynafed can aggregate a high number of endpoints, cloud and Grid.
The flexibility of its extendable authorization system made it useful also in the case of just one external Cloud storage, as Dynafed can match virtually any HTTP-based authentication/authorization scheme to Clouds

Dynafed is a stable, production-grade system, available in the EPEL distribution
Its flexibility has spawned several use cases that extended the awareness of what it can do. It also suggested some explorative directions that would greatly benefit the community of its users. Here we show them.

Direction: beyond the namespace
Dynafed aggregates file namespaces on the fly. If endpoints support it, it could aggregate other file-based information, like checksums and disk occupancy

Direction: enable third-party copy requests
Not every endpoint (e.g. S3/Azure) can perform third party copies, and Dynafed may know which ones. Dynafed can then recognize a COPY request and treat it accordingly, by redirecting it or by tunneling the data, transparently.

Direction: Grid-aware cloud transfer agent
Managing transparently third-party copy will make Dynafed an indefinitely scalable transfer agent, aware of location and status of the endpoints, and would work out of the box with FTS

Direction: information source
Dynafed internally juggles a plethora of useful real-time data on what it's doing, like site status, latencies, list of accesses, geographical distributions and others. This information may be used to feed external monitoring and orchestration systems in a simple and robust way, just through HTTP and JSON

The current known deployments are quite diverse, able to serve HEP applications and beyond.
We believe that this kind of flexibility and low operational cost will continue improving the way data is made available to be accessed and processed

More info at:
http://lcgdm.web.cern.ch/dynafed-dynamic-federation-project

Main site, links to docs, support, news, releases

Federation multi-VO testbed (courtesy of DESY), Information, links and demos

Our contribution fills the gaps to support advanced aspects of Grid/HEP on Cloud Storage.
Converge with the requirements that other communities may have.
Privilege standards-based lightweight systems
Ensure long term sustainability.

IT-ST : Storage group