



Davix : **A toolkit for HTTP based data access**

Devresse Adrien
Fabrizio Furano
IT/SDC/ID



Motivation for HTTP data access

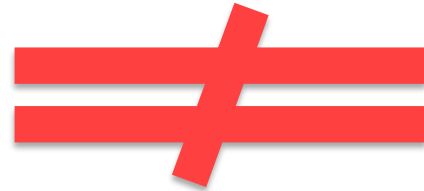
We know that ...

- **HTTP is obviously widespread**
- **Many client Tools**
- **Good quality client Tools**
- **(curl, browsers)**
- **HTTP opens the advantages of the Web World to the grid Storage World**



Motivation for Davix

Classical Web Data access



**High Performance
Computing Data access**

Requirements for HPC

- **We need Scalability**
 - Clusters of servers with redirectors
- **We need Performance**
 - Session Reuse
 - Low Latency
- **We need partial and vectored ops**
 - We work on large files, reading chunks
 - We want performant Remote IO
- **We need File and Metadata Management**
 - WebDAV support



Requirements for HPC (2)

- **We need Security**
 - Grid uses X509 on client side
 - Grid uses Proxy certificate
- **We need Reliability**
 - Multiple replicas access
 - Fail-over
- **We need an I/O framework**
 - Physicists want to access data and not to make HTTP Queries.



Design choice

- **We do not want to reinvent the wheel**
 - Re-use as much as possible
- **Easy to use / Deploy**
 - Multi-platform
 - Packaged officially
 - Available through mainstream channels
- **We want standard and generic solutions**



Existing Client Status (1)

Platform \ Tools	Curl	Libneon	Cadaver	GVFS-dav	httplib	davlib
	Windows / Linux / Mac OS X	Windows / Linux / Mac OS X	Linux / Mac OS X	Gnome (Linux)	Python compatible platform	Linux / Mac OS X
GET	YES	YES	YES	YES	YES	YES
GET Partial	MANUAL	MANUAL	NO	YES	MANUAL	YES
PUT	YES (1)	YES	YES	YES	YES	YES
Transparent Redirect	PARTIAL (2)	MANUAL	PARTIAL (2)	YES	MANUAL	PARTIAL
Auto Retry	YES	NO	NO	NO	NO	NO
X509 cert	YES	YES (3)	YES (3)	NO	YES	NO
VOMS	YES	NO	NO	NO	NO	NO
Vector (Bulk) Read	NO	NO	NO	NO	NO	NO
Grid CA	YES	NO	NO	NO	NO	NO
S3 Auth Support	NO	NO	NO	NO	NO	NO
Shared Library	YES	YES	NO	YES	YES (python lib)	NO
GUI	NO	NO	NO	YES	NO	YES
CLI	YES	NO	YES	YES	YES (script)	YES
File I/O API	NO	NO	NO	YES	NO	NO
File Management API	NO	NO	YES	YES	NO	NO

Existing Client Status (2)

Platform \ Tools	davFS2	KIO	TrailMix	Aria2c	CYBERDUCK	Davix
	Linux / Mac OS X	KDE (Linux)	Firefox supported Platform	Linux	DOTNET (Win/Mac)	Win/Linux/Mac
GET	YES	YES	YES	YES	YES	YES
GET Partial	NO	YES	NO	NO	YES	YES
PUT	YES	YES	YES	NO	YES	YES
Transparent Redirect	PARTIAL (2)	NO	YES	YES	N/A	YES
Auto Retry	NO	NO	NO	YES	PARTIAL	YES
X509 cert	YES	NO	YES	YES	NO	YES
VOMS	NO	NO	NO	NO	NO	YES
Vector (Bulk) Read	NO	NO	NO	NO	NO	YES
Grid CA	NO	NO	NO	YES	NO	YES
S3 Auth Support	NO	NO	NO	NO	YES	YES
Shared Library	NO	YES	NO	NO	NO	YES
GUI	NO	YES	YES	NO	YES	NO
CLI	YES	YES	NO	YES	NO	YES
File I/O API	NO	YES	NO	NO	NO	YES
File Management API	NO	YES	NO	NO	YES	YES
Session Pool	NO	YES	YES	NO	N/A	YES
WEBDAV	YES	YES	YES	NO	YES	YES
Incremental parsing (For BIG collections)	NO	NO	NO	NO	NO	YES
Metalink Support	NO	NO	NO	YES	NO	Under Development
HTTP PATCH Method	NO	NO	NO	NO	NO	Under Development
	« (1) »	Bug on redirection with old curl version				

Goals of Davix

**Tool for High performance I/O
and file management with
HTTP based on existing tools
(libneon).**



Davix is

- **An API + a C++ shared Library with High level IO API**
 - Davix::File
 - Davix::Posix
- **A set of command line tools for data management**
 - davix-put, davix-get, davix-ls



Features of Davix (1)

- **Optimizations**
 - Vectored / Bulk Operations
 - Readv / Write
 - Redirection caching
 - Partial read / partial write
 - Multi-stream (Metalink) *
 - Asynchronous I/O *



* Not yet Implemented

Features of Davix (2)

■ Security

- Support of X509 client side
- Support of Grid Proxy certificates (VOMS ext)
- S3 auth tokens
- Credential delegation for HTTP 3rd party copy
- SSL session reuse



Features of Davix (3)

- **Reliability**

- Failover
 - Auto-retry
- Multiple replicas management
 - Through Metalinks*



* Not yet Implemented

Features of Davix (4)

- **Data management extensions**
 - WebDav / S3 parsing
 - Third Party Copy
 - Checksum
 - ACLs, Staging, Quotas *



* Not yet Implemented

Integration with ROOT

- **Bring Davix HTTP support to ROOT I/O (TDavixFile)**
 - Objective: A versatile, high quality and high performance HTTP plugin for ROOT
 - Support HTTP, WebDav, S3
 - Tested against Grid Storage Systems
 - No change in the usual TFile::Open() interface. When it's there it will just work.
 - TDavixSystem uses WebDAV to perform metadata operations like listings, move, delete, etc.
 - Will Benefit of our effort in improving HTTP support.

Integration with ROOT : Support

- Davix Options can be configured via `system.rootrc` (Documented) and at runtime using `gEnv` ... e.g.
 - `Davix.S3.SecretKey: secret`
 - `Davix.S3.AccessKey: token`
- Support for grid environment (`grid-security`, `VOMS`, etc...)
 - `Davix.GSI.GridMode: y`

Integration with ROOT :

Status

- We submitted it as a patch for ROOT 5.34 and ROOT 6
- Already packaged and available in EPEL 6 under the package root-net-davix
- Switched off by default
 - Can be enabled with a simple switch in `system.rootrc` : `Davix.UseOldClient no`
- **Ready to test !**



Davix Status



- **Released, API Stable (0.2.8)**
 - Released on EPEL / Debian
 - API/ABI Stable
- **Already used by**
 - The Dynamic Federations (UGR HTTP plugins)
 - GFAL 2.0, FTS 3.0
 - ROOT : TDavixFile, TDavixSystem
- **Collaborative development**
 - available on GIT
 - contributions are welcome
 - Nice Website under construction 😊

Davix Roadmap

- **Davix 0.3.0 On rails**
 - HTTP Patch
 - SOCKS 5 support
 - Metalink transparent failover
- **Davix 0.4.0**
 - Asynchronous IO
 - Metalink multi stream
 - Support for Zero Copy architecture
 - splice() support



Davix Contribution



Any **comments**, **feature requests**, or even better, **contribution** is **Welcome**

Link:

<https://svnweb.cern.ch/trac/lcgutil/wiki/davix>

Contact:

Davix-devel@cern.ch

The End !



Questions ?

