

The EUDAT logo features a stylized graphic of three interlocking cubes in orange and yellow, with the word "EUDAT" in bold blue capital letters below them.

EUDAT



B2STAGE: get data to computation!

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eudat.eu/b2stage
www.eudat.eu

Outline



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- What is B2STAGE?
- Who can use B2STAGE & why?
- B2STAGE tools (with examples)
- Ongoing activities

Whats is B2STAGE?



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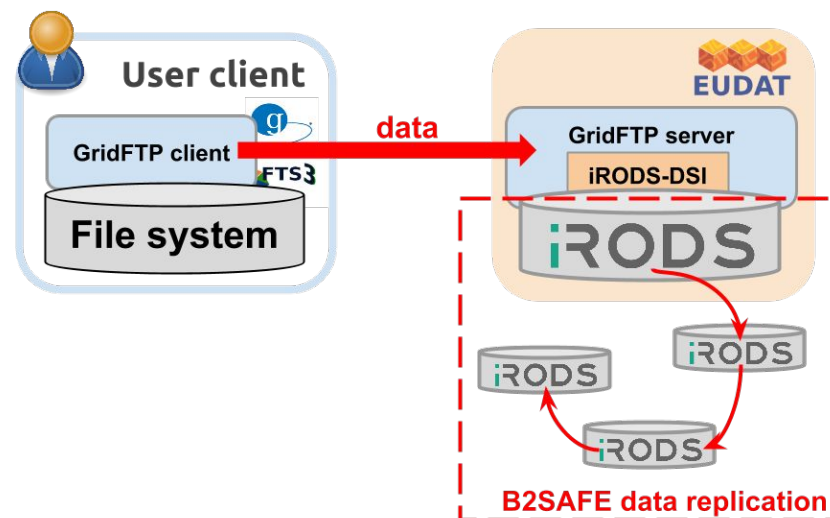
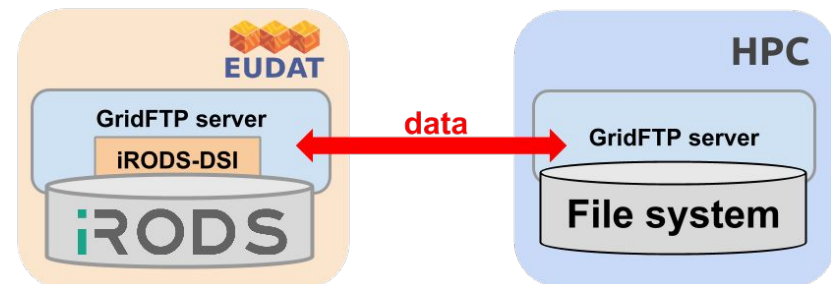
- **B2STAGE** is a reliable, efficient and easy-to-use **service to transfer research data sets between EUDAT storage resources and high-performance computing (HPC) workspaces.**
- The service allows users to:
 - **transfer large data collections** from EUDAT storage facilities to external HPC facilities for processing
 - **ingest computation results** onto the EUDAT infrastructure
 - **access** stored data sets **through associated PIDs**
 - in conjunction with **B2SAFE**, **replicate community data sets**, ingesting them onto EUDAT storage resources for long-term preservation

Who can use B2STAGE & Why?



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- **Researchers:** can transfer large data collections from EUDAT storage resources to HPC facilities **for processing**.
- **Community Data Managers:** can ingest data sets onto EUDAT storage resources **for long term preservation** (in combination with the B2SAFE).



B2STAGE tools



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- The B2STAGE service comprises two different packages:
 - The **GridFTP iRODS-DSI** to enable fast data transfer through the GridFTP protocol;
 - The **Data Staging Script** to instrument data transfers via a command-line tool (**dismissing**);
- B2STAGE is involved in the development of cross services components:
 - The **EUDAT python library** to provide users with programmatic access to EUDAT services (**ongoing**).
 - **HTTP API interface** to furnish a RESTful interface towards EUDAT services (**ongoing**).



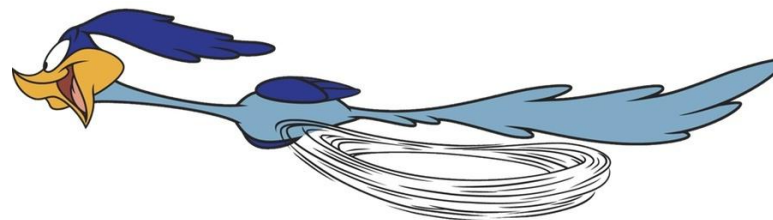
- The iRODS-DSI allows users to **manage data on EUDAT nodes (iRODS) through any standard GridFTP client**



- **DSI (Data Storage Interface): GridFTP can be extended** to support different underlying storage system
- Implemented making use of the **iRODS C API**
- Supports the main iRODS operations (**get, put, delete, list, checksum calculation**)

B2STAGE: why GridFTP?

- **high-performance:** optimized use of bandwidth (parallel streams), automatic TCP optimisation
- **secure:** uses GSI (requires X.509 certificates)
- **reliable:** fault tolerant mechanism, to handle network unavailability and server problems (restart)
- **de facto standard for moving large files across the Internet**

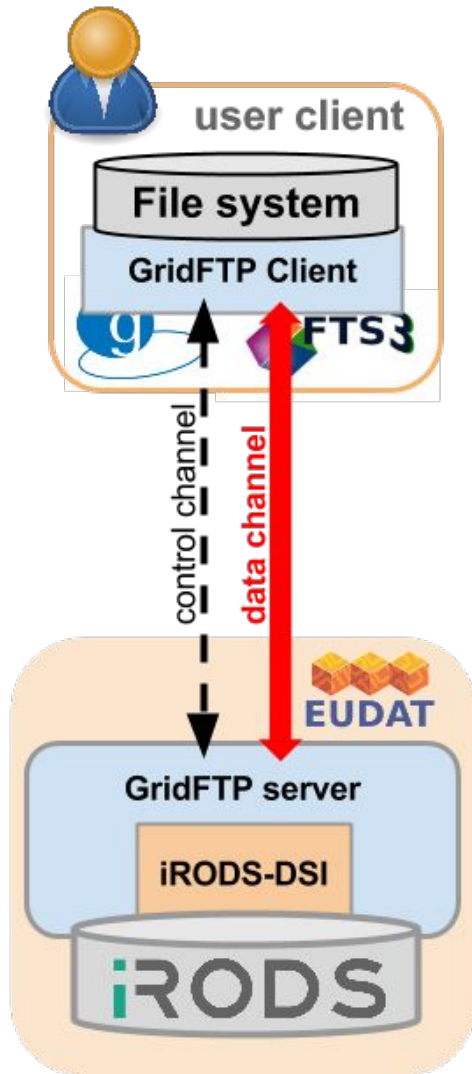


Why not:

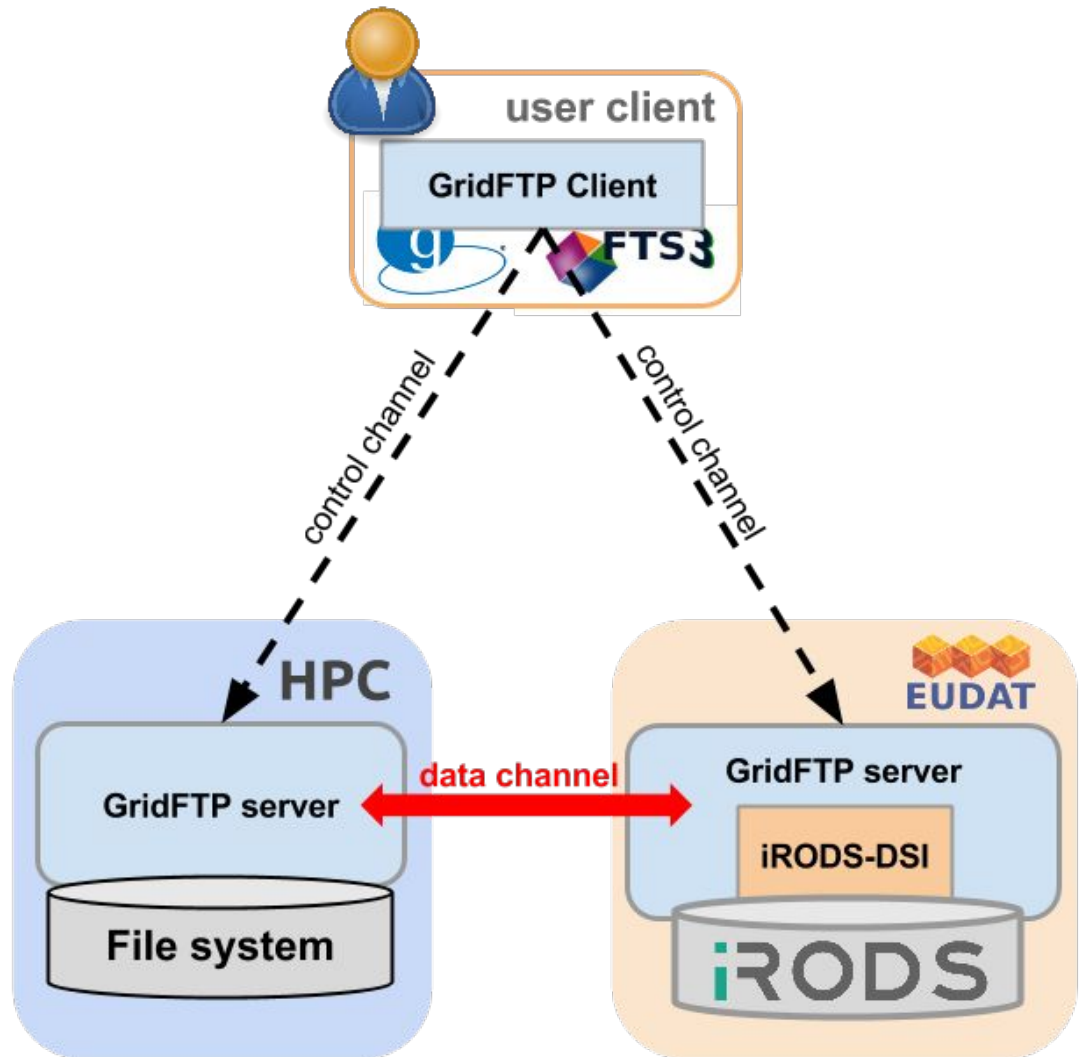
- scp? Encryption slows transfers
- FTP? Insecure. Not supported at many secure sites (such as HPC centres)
- BitTorrent? Only works well with “popular” files

GridFTP transfer types

DIRECT



THIRD PARTY



GridFTP web clients (3rd party)

WebFTS (Beta version) *Simplifying power*

Home My jobs Submit a transfer

Grid SE Grid Storage Element

gsiftp://data.pico.cineca.it:2811

Create Folder Delete

Select All Files None Refresh

| Name | Mode | Da |
|----------|------------|----|
| . | -rwxr-xr-x | 28 |
| CINECA01 | drwxr-xr-x | 20 |

0 File(s) Selected

Transfer Files Activity Endpoints Bookmarks Console

RECENT ACTIVITY 0 0 0

Endpoint cineca#DataRepository

Path /CINECA01/home/DRES_cinstaff/rmucci00/ Go

select none up one folder refresh list

| Name | Mode | Size |
|---------------|--------|------|
| DSI_Test | Folder | |
| home | Folder | |
| motorBike-VTK | Folder | |
| testHook | Folder | |
| good | 125 B | |
| te.txt | 5 B | |
| test.job | 697 B | |
| testirodmap.c | 714 B | |

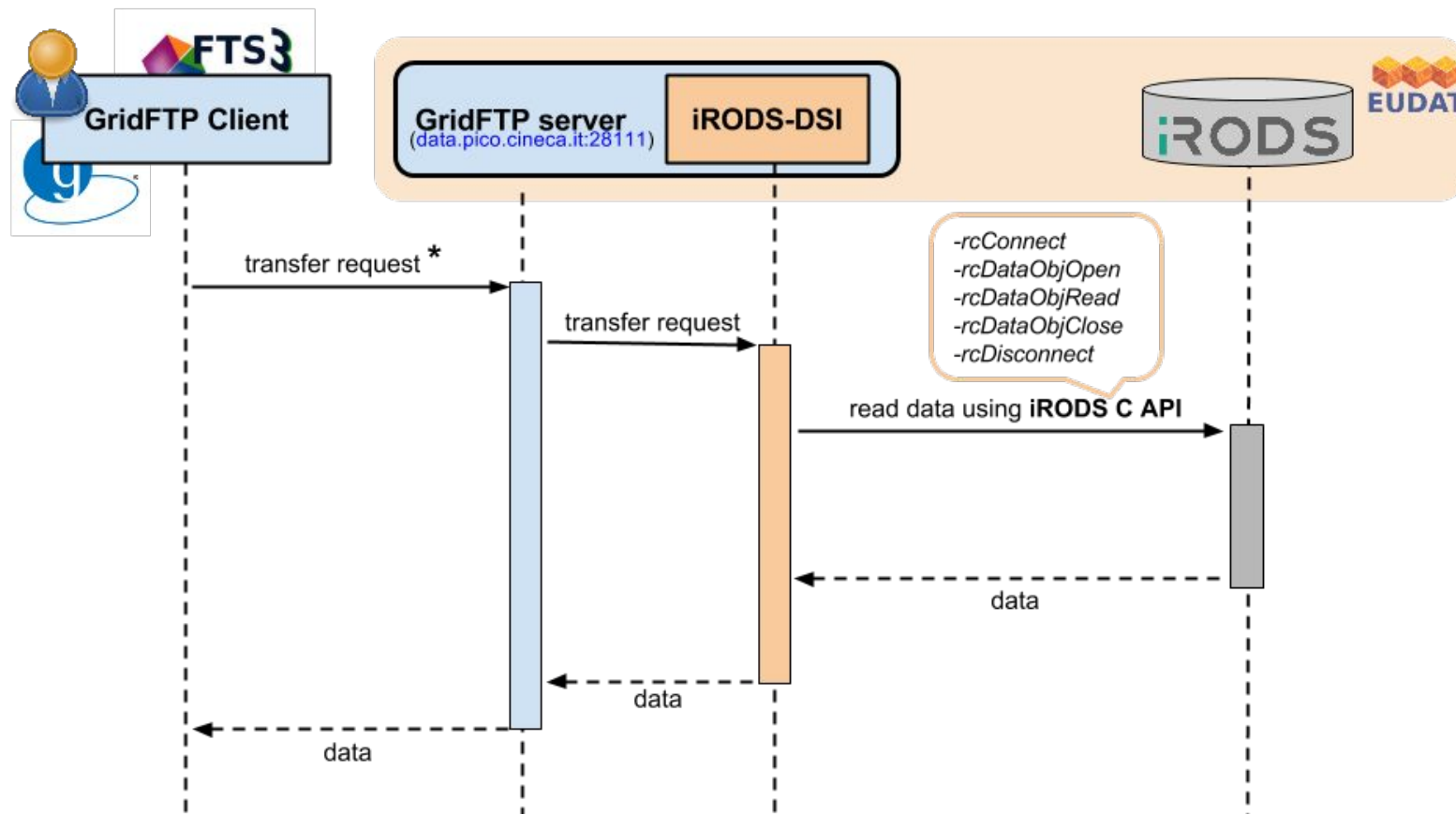
Endpoint cineca#PICO

Path /-/ Go

select all up one folder refresh list

| Name | Mode | Size |
|----------------|----------|------|
| BA_helper | Folder | |
| DSI_Test | Folder | |
| Desktop | Folder | |
| Documents | Folder | |
| Downloads | Folder | |
| Music | Folder | |
| Pictures | Folder | |
| Public | Folder | |
| R | Folder | |
| Templates | Folder | |
| Videos | Folder | |
| hell | Folder | |
| motorBike-VTK | Folder | |
| Untitled.ipynb | 874 B | |
| test.job | 697 B | |
| testirodmap.c | 714 B | |
| xauth | 43.27 KB | |

GridFTP IRODS-DSI: an example



```
*$ globus-url-copy gsiftp://data.pico.cineca.it:2811/CINECA01/home/cin_staff/rmucci00/data.txt mydata.txt
```

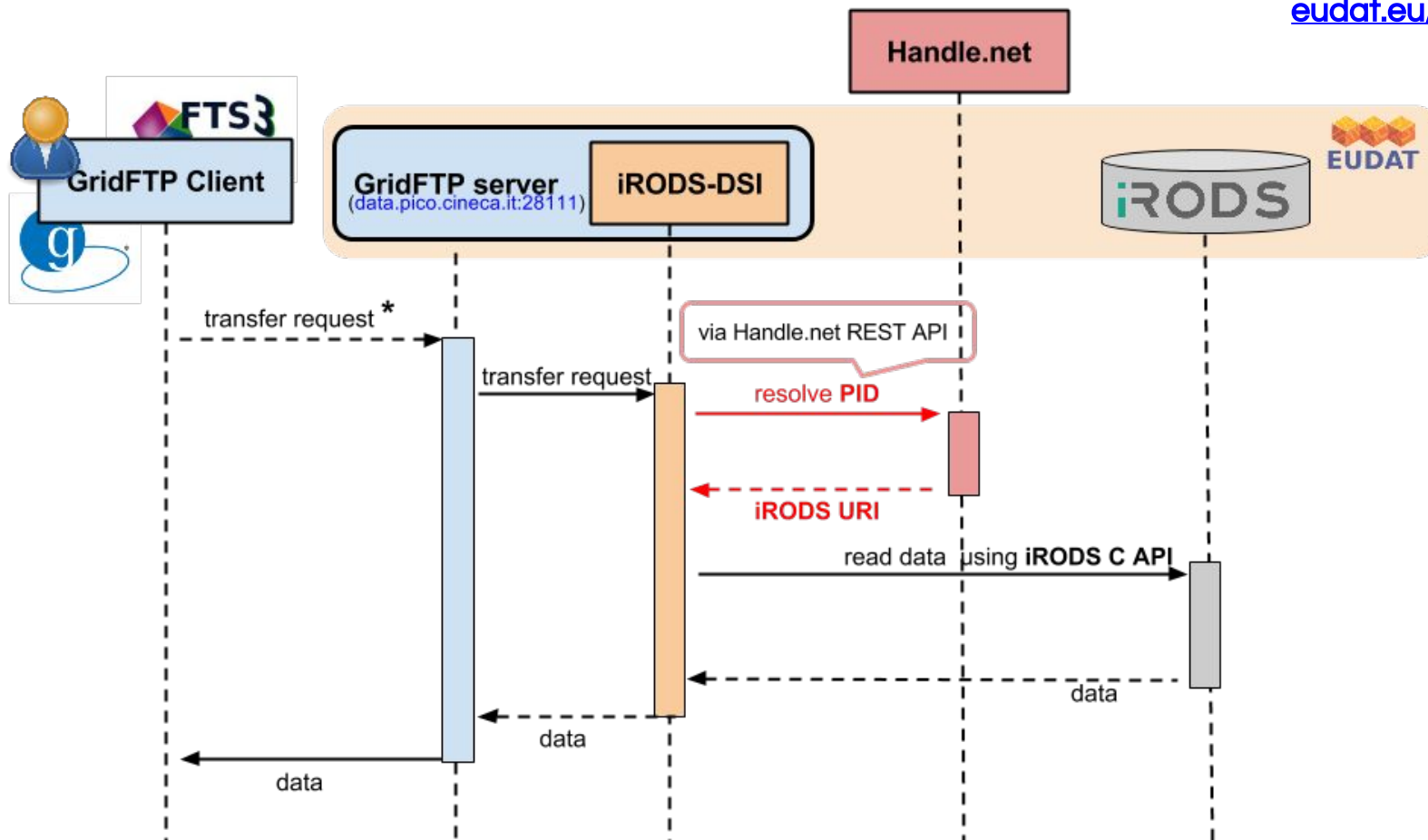
GridFTP endpoint

iRODS path

iRODS-DSI: PID management (new)

- The iRODS-DSI module has been extended to use **PIDs** for listing and retrieving resources
- Users can list and download data passing to the GridFTP client either a **PID** or an **iRODS path** as input.
- For the PID resolution the iRODS-DSI uses the **Handle.net** registry REST API

iRODS-DSI: PID management (1)



*\$ globus-url-copy gsiftp://data.pico.cineca.it:2811/11100/xa3dae0a-6371-11e5-ba64-a41f13eb32b1 data.txt

GridFTP endpoint

PID

- A **programmable** and **flexible** python **API library** to **create and execute workflows** composing different EUDAT services
- **Let's make EUDAT scritable!**
- Enable collaborations with other projects (PRACE, EGI..)
- First draft of the library:
 - find datasets by community names or tags using **B2FIND**
 - **Manage transfers** using Globus Online API (and FTS3 later on);



Data search:

```
from eudat import b2find

# Get "aleph" dataset
datasets = b2find.get_dataset_source(community='aleph')
print 'First dataset URI = ' + datasets[0]
```

PID resolution:

```
from eudat import b2handle

# Get physical URL of the object resolving PID
URL = b2handle.get_url_by_pid("/11100/33ac01fc-6850-11e5-b66e-e41f13eb32b2")
print "Returned URL: " + URL
```

Data transfer:

```
from eudat import b2stage

# Initialize the Globus client
globus = b2stage.ClientGlobus(resource_file_path=RESOURCES_FILE, debug=True)
# Perform a data transfer between 2 endpoints (third party transfer)
task_id = globus.transfer(src_endpoint, dst_endpoint, src, dst, recursive=args['-r'])
```

All the code is available open source on **GitHub!**



<https://github.com/EUDAT-B2STAGE>

Questions?



- For more info: <http://eudat.eu/services/b2stage>
- User documentation: <http://eudat.eu/services/userdoc/b2stage>