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iRODS speaks SFTP: More ways to securely transfer your data

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Problem statement

Science domains working with <u>confidential data</u> require:

- Encrypted data transfer
- Secure user authentication
- Well known & validated client software
- Easy to integrate into existing research workflows

SFTP is a solution

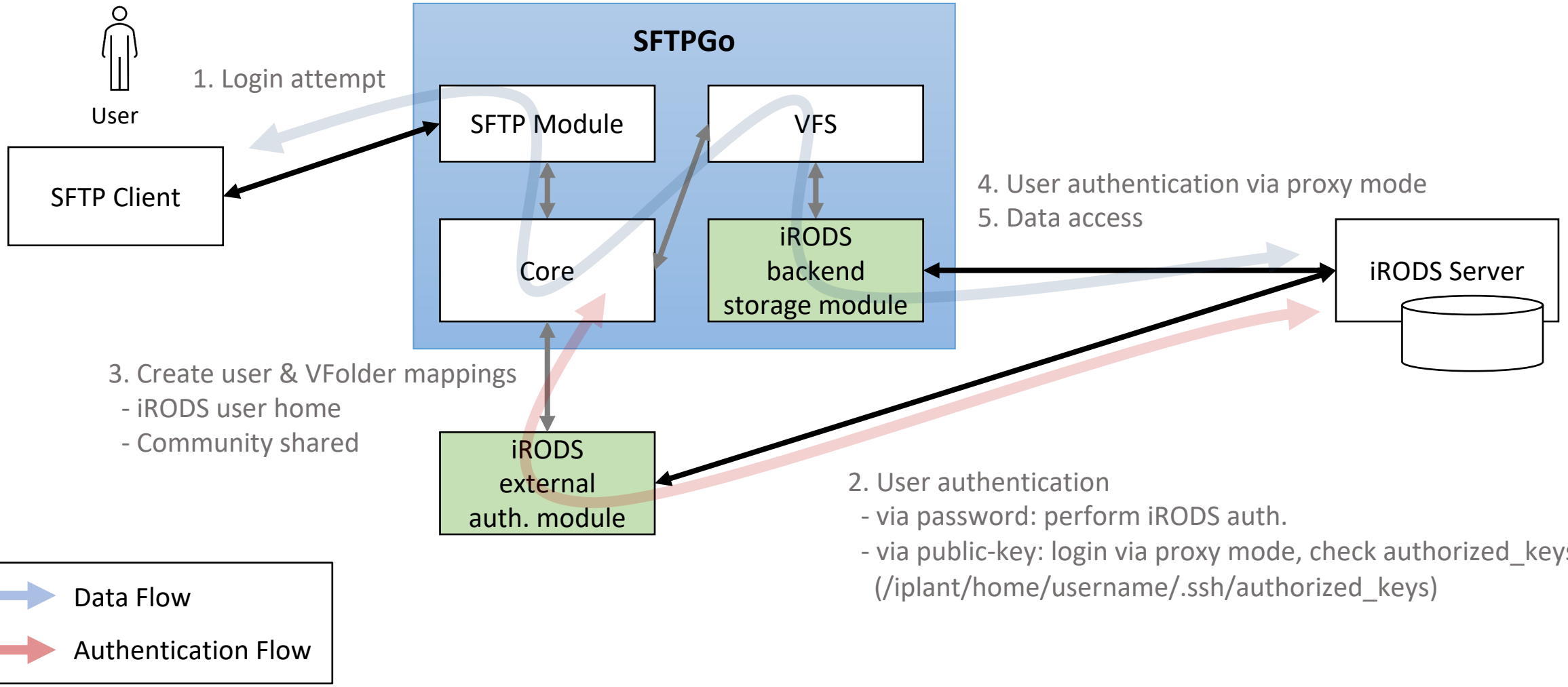
Meet the requirements:

- Based on SSH Protocol, supporting various encryption algorithms
  - AES (128/256/192, GCM/CTR/CBC), 3DES CBC, ARCFOUR (128/256) …
- Public-key authentication
- Well known, validated SFTP clients
  - OS built-in SFTP client, Curl, FileZilla, Cyberduck, ETC…
- Users & administrators are already familiar with SFTP

SFTPGo

- An open-source SFTP server written in pure Go
- Various backend storage
  - Local disk, S3, Azure Blob Storage, GCS, other SFTP, ETC…
- Built-in defender
  - IP filter, blocking brute-force login trial
- Additional data transfer protocols
  - FTP, SCP, WebDAV
- Easy integration to other services
  - Admin REST API
  - External authentication module

SFTPGo for iRODS

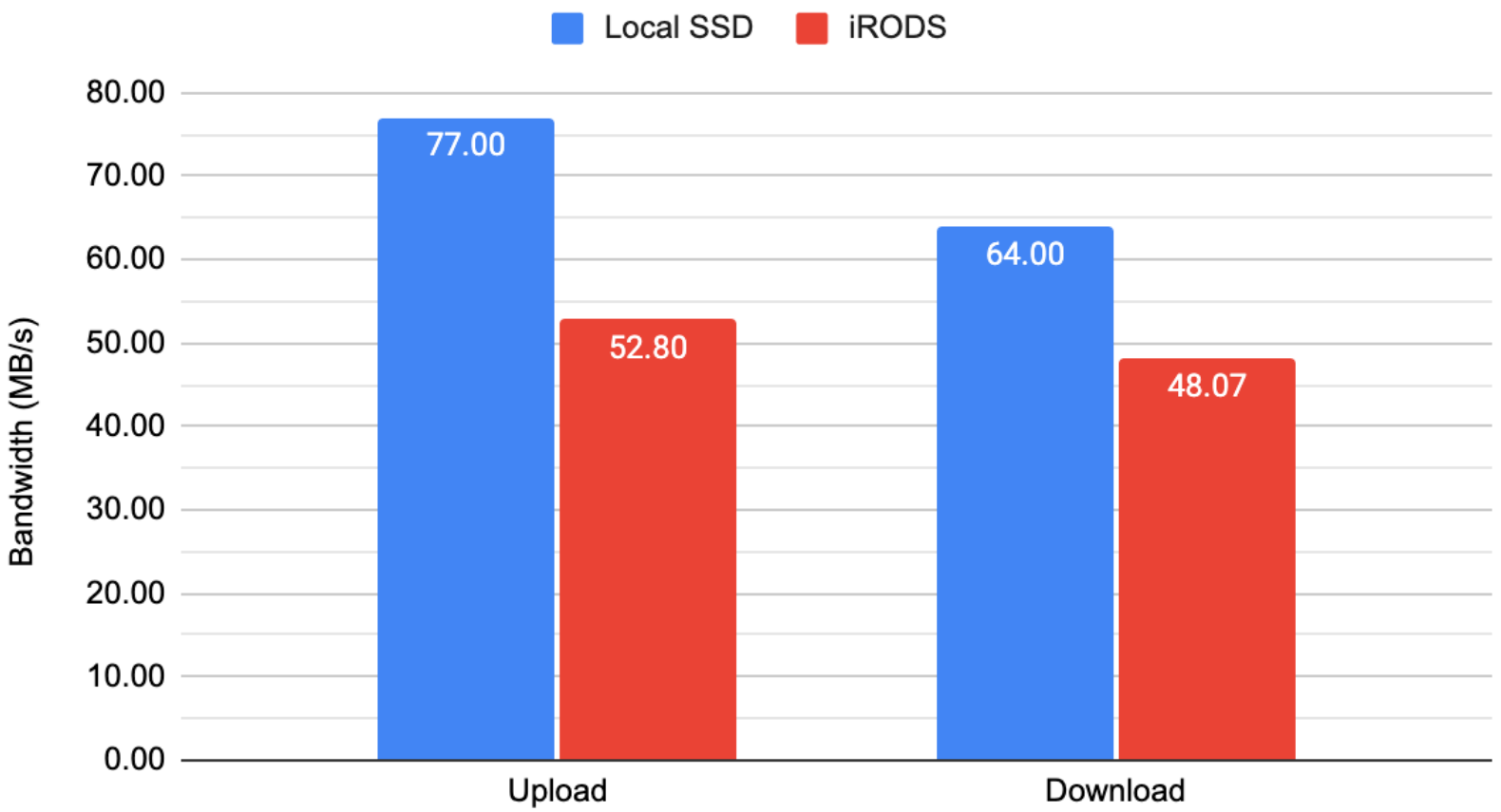


“/zone/home/username/.ssh/authorized_keys”

- A text file containing a list of public keys, located in “.ssh” dir. under user home
- Options in a comma-separated string
  - “expiry-time=YYMMDD[HHMM]”: *Set an expiration time*
  - “from=98.165.125.0/24,!98.165.125.240”: *Set an IP filter*
  - “home=/zone/home/username/subdir”: *Set a home directory (collection)*

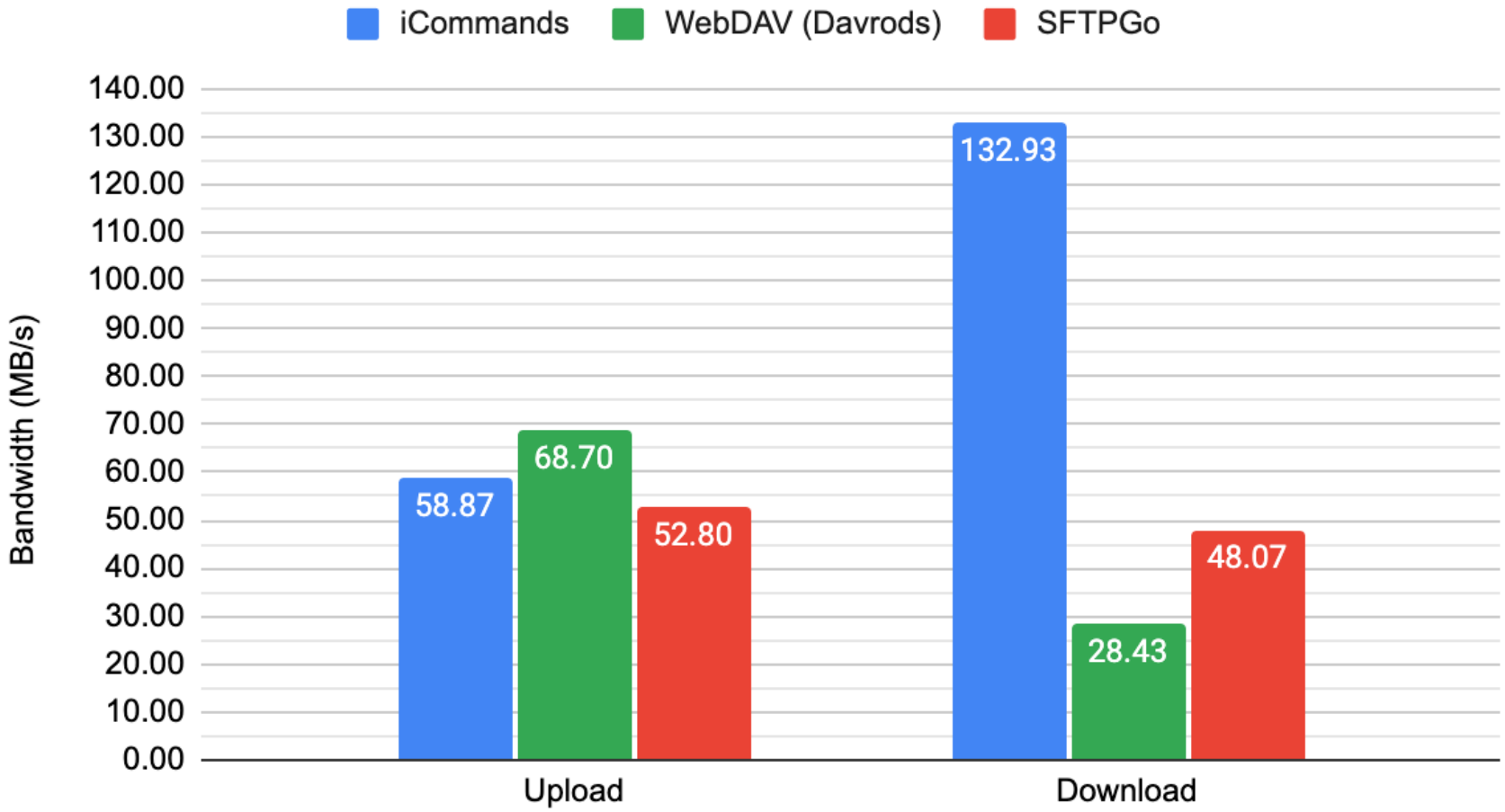
```
expiry-time=“20221231”,home=“/iplant/home/iychoi/device1”,from=“98.165.125.0/24” ssh-rsa AAAAB3N…
from=“98.165.125.0/24” ssh-rsa AAAE2Vj…
```

I/O Performance of backend storage modules



iRODS backend storage module requires data transfer over LAN, while local fs module doesn't

I/O Performance of iRODS clients



Quick Demo: Password-based authentication

Quick Demo: Public-key authentication

Applications

Health Science Projects (CyVerse Health)

- Encrypted data transfer between sites and services
- Integration to existing workflows

Agriculture Project

- Assign different public-key auth. to each Raspberry Pi, generating sensor data
- Set a home directory for each device (cannot access other directory when bleached)
- SFTP is already supported in Python or via SFTP CLI

Deployment plan

Alpha release (May 18th)

- Only accessible from **UA network** or via **VPN**
- May undergo maintenance any time

(Open) Beta release (August 2nd, Subject to change)

- Domain name change to "**data.cyverse.org**"
- No access restriction
- May undergo maintenance any time when issues occur

Release (To be determined)

- Scheduled maintenance (same day as Data Store maintenance day)

Open-source

Backend storage module for iRODS

- https://github.com/cyverse/sftpgo
- Forked from https://github.com/drakkan/sftpgo
- Added iRODS backend storage module

External authentication module for iRODS

- https://github.com/cyverse/sftpgo-auth-irods
- A simple command-line program, working with JSON data via STDIN/STDOUT

Deployment scripts & configuration

- https://github.com/cyverse/sftpgo-deploy
- Deploy using docker-compose

Conclusion

Provide SFTP access to iRODS

- The service runs separately from iRODS (no configuration change on iRODS)
- Secure authentication and data access

Implemented public-key authentication

- Implemented on top of iRODS proxy authentication
- Provide “options” for access control

To be used in science projects

- Health science projects
- Agriculture project
- …

Questions?