Introduction to Globus for ALCF Users
Research Data Transfer

2022 ALCF Computational Performance Workshop
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THE UNIVERSITY OF CHICAGO

Argonne NATIONAL LABORATORY

globus

Globus is …

a non-profit service developed and operated by

THE UNIVERSITY OF CHICAGO

Our Mission

Increase the efficiency and effectiveness of researchers engaged in data-driven science and scholarship through **sustainable** software

Development is funded by...

U.S. DEPARTMENT OF
ENERGY

THE UNIVERSITY OF
CHICAGO

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

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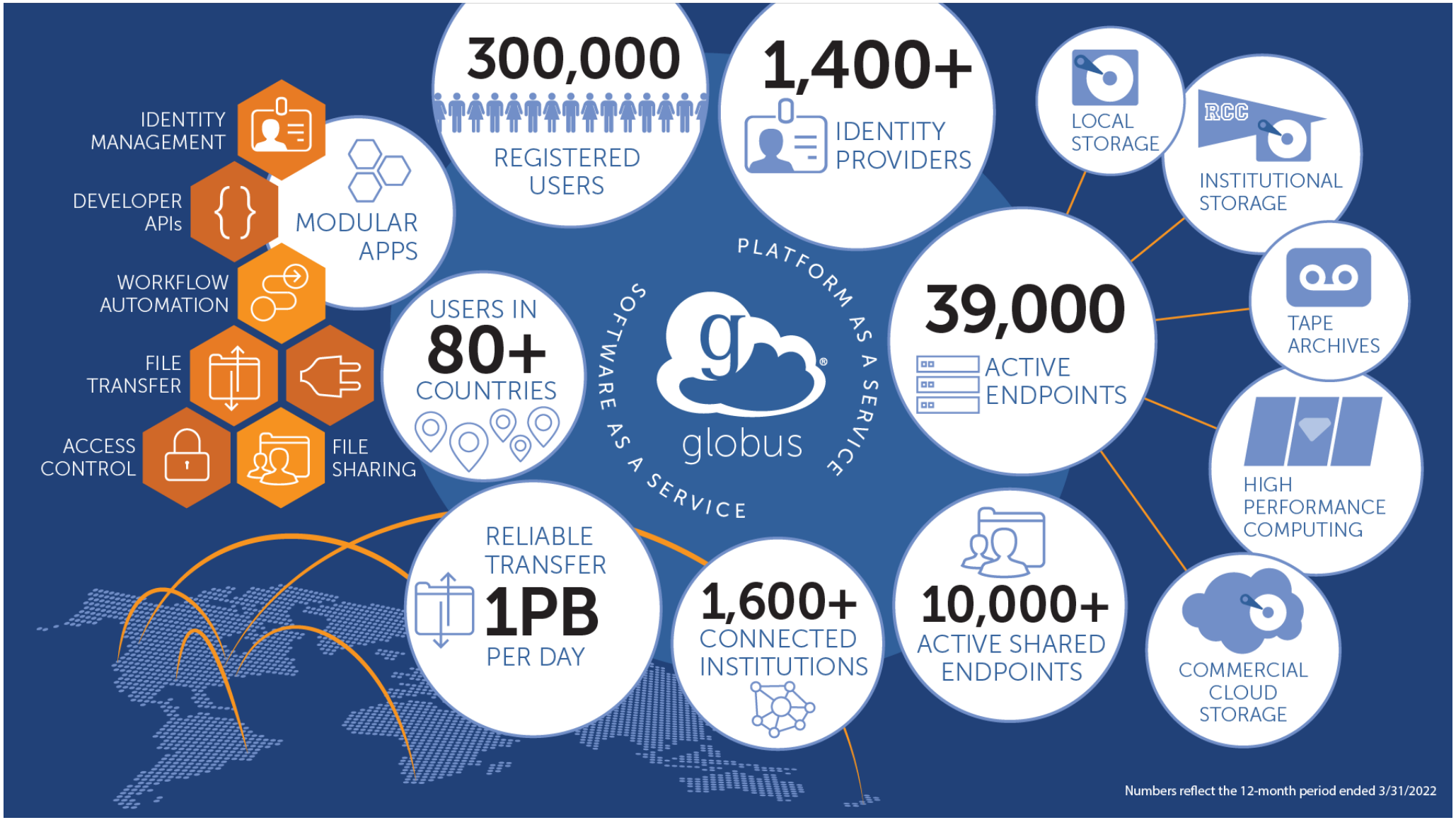
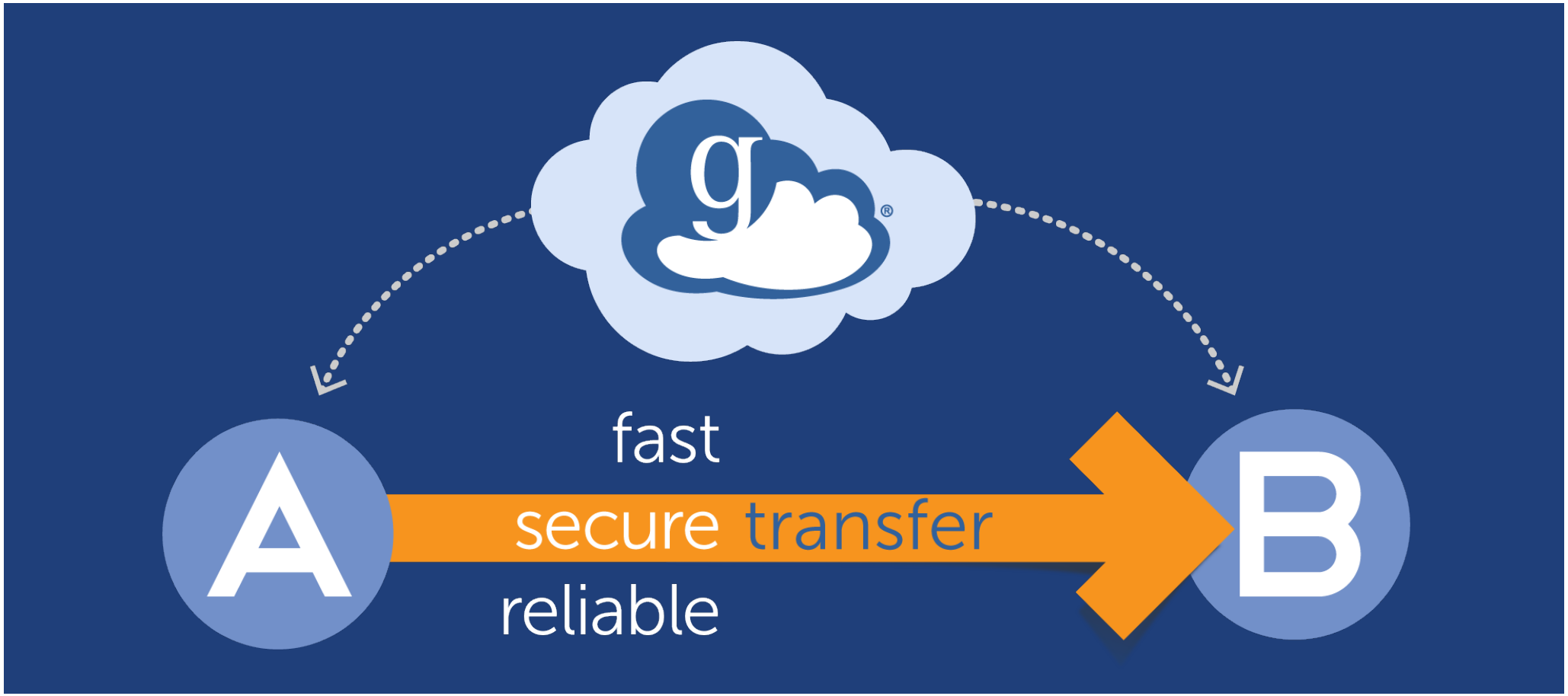
Operations are funded by subscribers


300,000
REGISTERED USERS
1,400+
IDENTITY PROVIDERS
LOCAL STORAGE
RCC
INSTITUTIONAL STORAGE
IDENTITY MANAGEMENT
DEVELOPER APIs
WORKFLOW AUTOMATION
FILE TRANSFER
ACCESS CONTROL
FILE SHARING
MODULAR APPS
USERS IN 80+ COUNTRIES
PLATFORM AS A SERVICE
SOFTWARE AS A SERVICE
globus
39,000
ACTIVE ENDPOINTS
TAPE ARCHIVES
HIGH PERFORMANCE COMPUTING
RELIABLE TRANSFER
1PB
PER DAY
1,600+
CONNECTED INSTITUTIONS
10,000+
ACTIVE SHARED ENDPOINTS
COMMERCIAL CLOUD STORAGE
Numbers reflect the 12-month period ended 3/31/2022

1,587,616,487,880 MB
TRANSFERRED



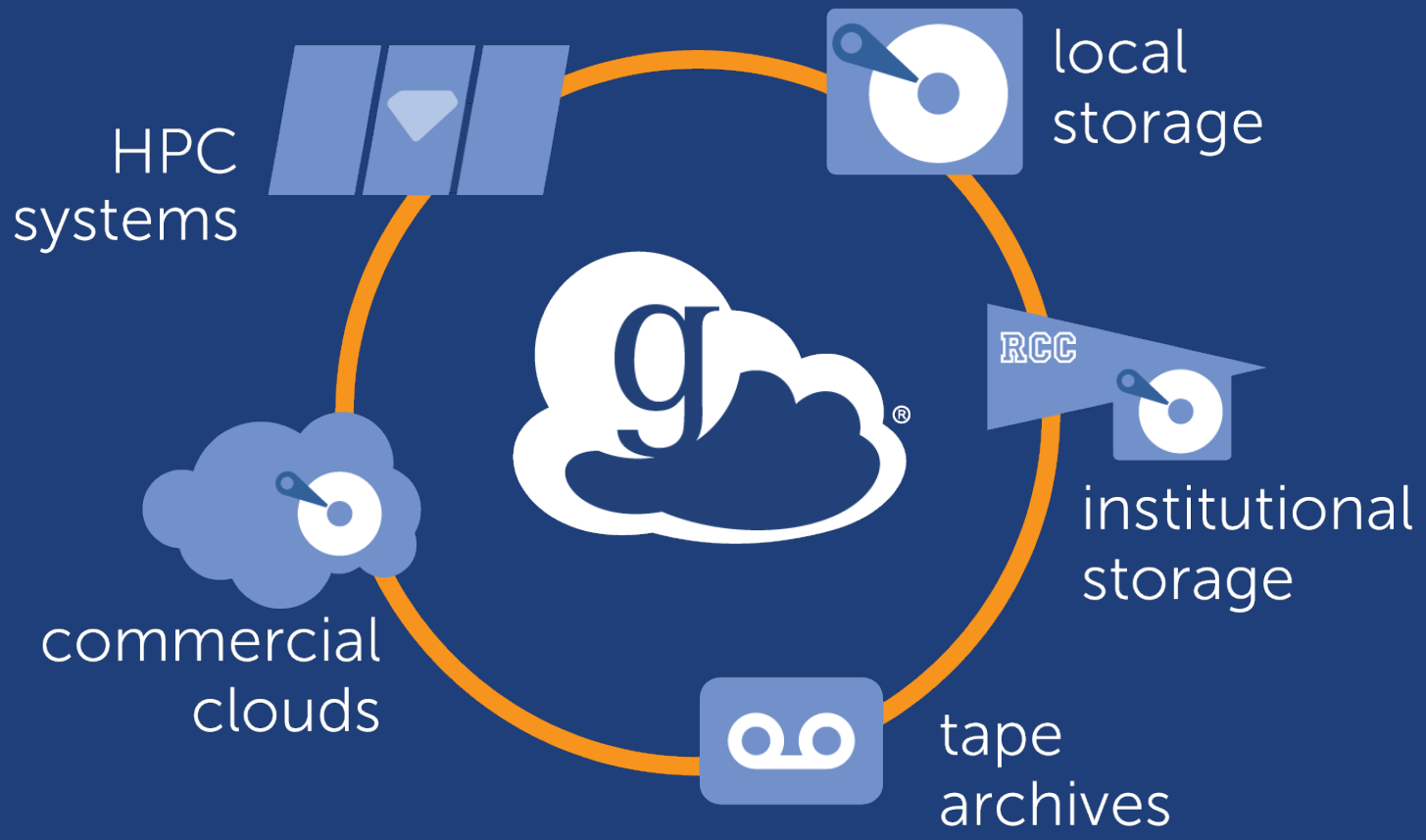
Globus delivers…

Fast and reliable ~~big~~ data transfer, sharing, and platform services…

…directly from your own storage systems…

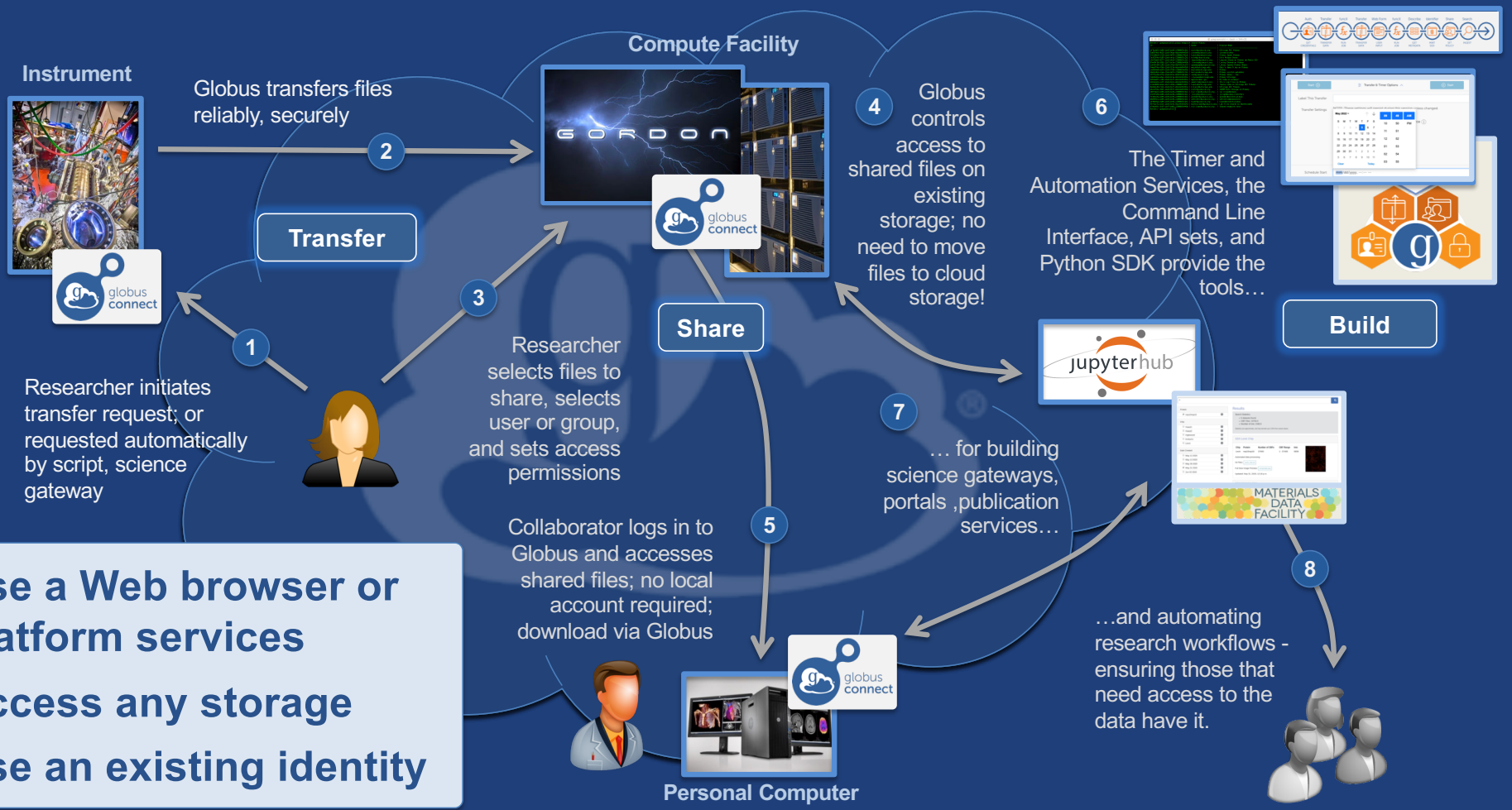
...via software-as-a-service using existing identities with the overarching goal of...

…unifying access to data across tiers



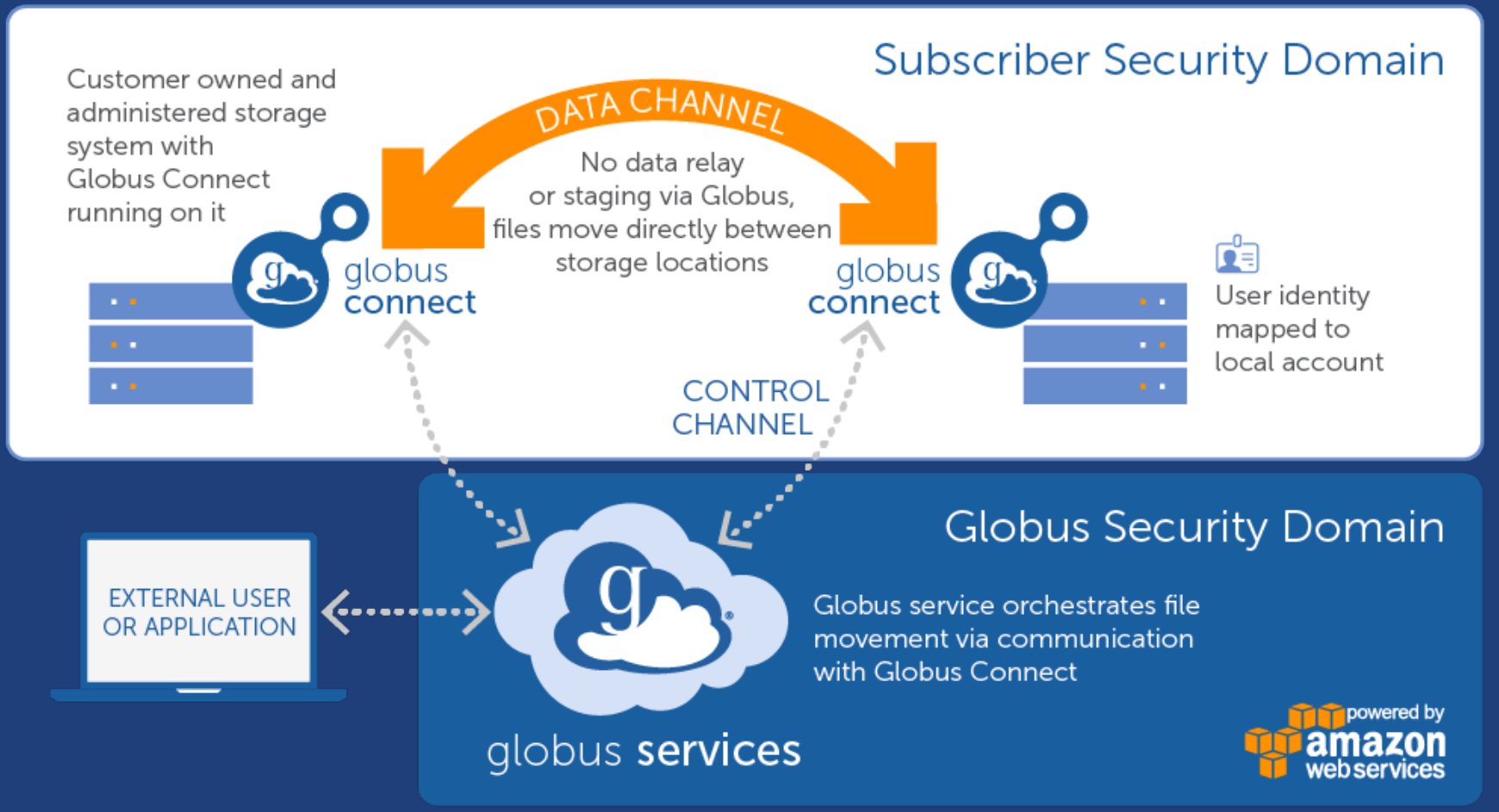
PREMIUM globus connectors
aws | S3
Google Cloud
Microsoft Azure
Blob Storage
10
01
DATACORE | Swarm
SCALITY
IBM Cloud
Microsoft OneDrive
Google Drive
SPECTRA
IBM Spectrum Scale
box
iRODS
Quantum
ACTIVE SCALE
hadoop
ceph
HPSS
wasabi
hot cloud storage
lustre

Globus SaaS / PaaS: Research data lifecycle

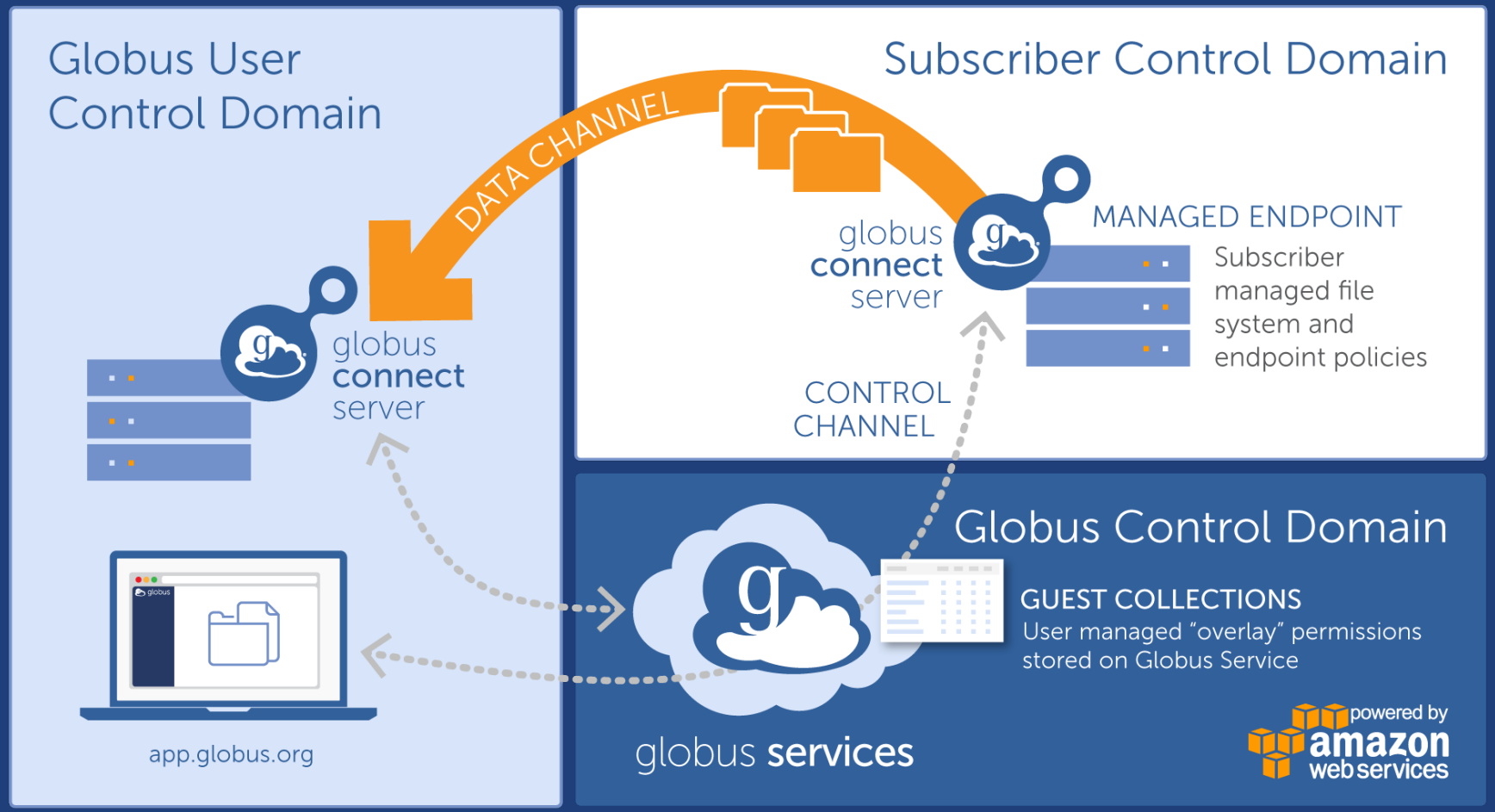


- **Use a Web browser or platform services**
- **Access any storage**
- **Use an existing identity**

Hybrid SaaS – Transfer – Mapped Collections



Hybrid SaaS – Sharing – Guest Collections



Globus core security features

- **Access Control**
  - Identities provided and managed by institution
  - Institution controls all access policies
  - Globus is identity broker; no access to/storage of user credentials
  - Fine grained access control on the collections
- **Data remain at institutions, not stored by Globus**
- **Data does not flow through the Globus Service but directly between Endpoints and their Collections**
- **Integrity checks of transferred data**
- **High availability and redundancy**
- **Encryption of user files and Globus control data**

Collections and Globus Connect

- **Globus Connect Server**
  - Multi user Linux Systems
  - https://docs.globus.org/globus-connect-server/
- **Globus Connect Personal**
  - Personal Workstations and Laptops
  - https://www.globus.org/globus-connect-personal
  - OS specific instructions
    - https://docs.globus.org/how-to/

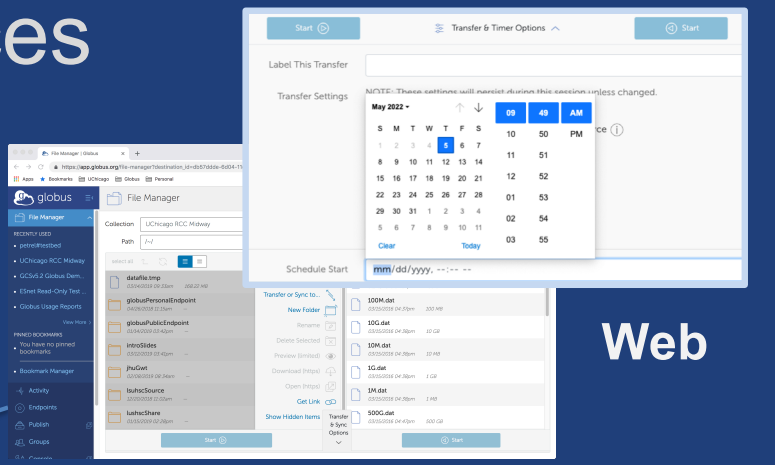
Globus Transfer Demo

- Authenticating to Globus
  - Linking in other identities
- The hamburger menu – file / folder management
- Transfer to and from ALCF resources
  - theta, cooley, thetagpu, grand
  - University of Chicago RCC Midway
- Globus Connect Personal
  - Installation
  - Transfer

One service, many interfaces

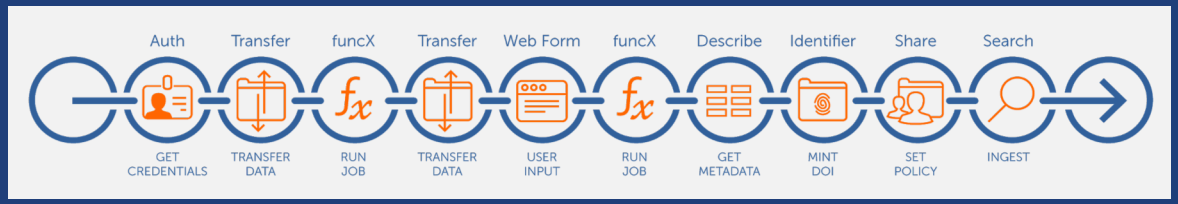
```
(globus-cli) jupiter:~ vas$ globus
Usage: globus [OPTIONS] COMMAND [ARGS]...

Options:
  -v, --verbose                 Control level of output
  -h, --help                    Show this message and exit.
  -F, --format [json|text]      Output format for stdout. Defaults to text
  --map-http-status TEXT        Map HTTP statuses to any of these exit codes:
                                0,1,50-99. e.g. "404=50,403=51"

Commands:
  bookmark          Manage Endpoint Bookmarks
  config            Modify, view, and manage your Globus CLI config.
```

CLI



Web

Globus service



Flows

```
GET /endpoint/go%23ep1
PUT /endpoint/vas#my_endpt
200 OK
X-Transfer-API-Version: 0.10
Content-Type: application/json
…
```

Rest API

Globus Automation Capabilities

Timer Service

Scheduled and recurring transfers
(*a.k.a. Globus cron*)

Command Line Interface

Ad hoc scripting and integration

Globus Flows service

Comprehensive task (data and compute) orchestration with human in the loop interactions

Globus APIs

- Auth
- Groups
- **Transfer**
- Search
- Timer
- Flows
- GCS Manager

- Globus Web App consumes public Transfer API
- Resource named by URL (standard REST approach)
- Globus APIs use JSON for documents

docs.globus.org/api/transfer

Globus Python SDK

- **Python client library for the Globus REST APIs**
- **Largely direct mapping to REST API**
- `globus_sdk.TransferClient` **class handles connection management, security, framing, marshaling**

globus-sdk-python.readthedocs.io/en/stable/

globus.github.io/globus-sdk-python

Support Resources

- **Globus Documentation: docs.globus.org**
- **Globus Timer: globus.org/blog/scheduled-and-recurring-transfers-now-available-globus-web-app**
- **Globus CLI: docs.globus.org/cli/**
- **Globus Automation Services and Flows: docs.globus.org/globus-automation-services/**
- **YouTube Channel: youtube.com/user/GlobusOnline**

Developer References

- Globus API / SDK Documentation
  - Transfer API : docs.globus.org/api/transfer/
  - SDK: globus-sdk-python.readthedocs.io/en/stable/
- Globus GitHub: github.com/globus/
  - Jupyter Notebooks
    - Stand alone notebooks and hub integrations that walk through much of the functionality of our SDK
    - https://github.com/globus/globus-jupyter-notebooks
  - Automation Examples
    - Shell scripted CLI and Python module examples of common research data management use cases
    - https://github.com/globus/automation-examples

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