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# Leveraging Globus Identity for the Grid

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Chicago



THE UNIVERSITY OF  
**CHICAGO**



**Open Science Grid**

**ci c:connect**

# Open Science Grid

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**Helps researchers speed up their research using high throughput computing methods**

Helps campus HPC administrators share resources for multi-campus and national collaborative research

Last 30 days: 100M core-hours

Last 12 months: 200 Million jobs consumed 1 Billion hours of computing involving 1.5 Billion data transfers to move 223 Petabytes

Accomplished by federating 114 clusters providing 1h-100M hours each

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# OSG: 114 resource endpoints

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... with campus users far and wide

... with X.509 Auth for **virtual organizations**

Replace the need for users to have X.509 proxies

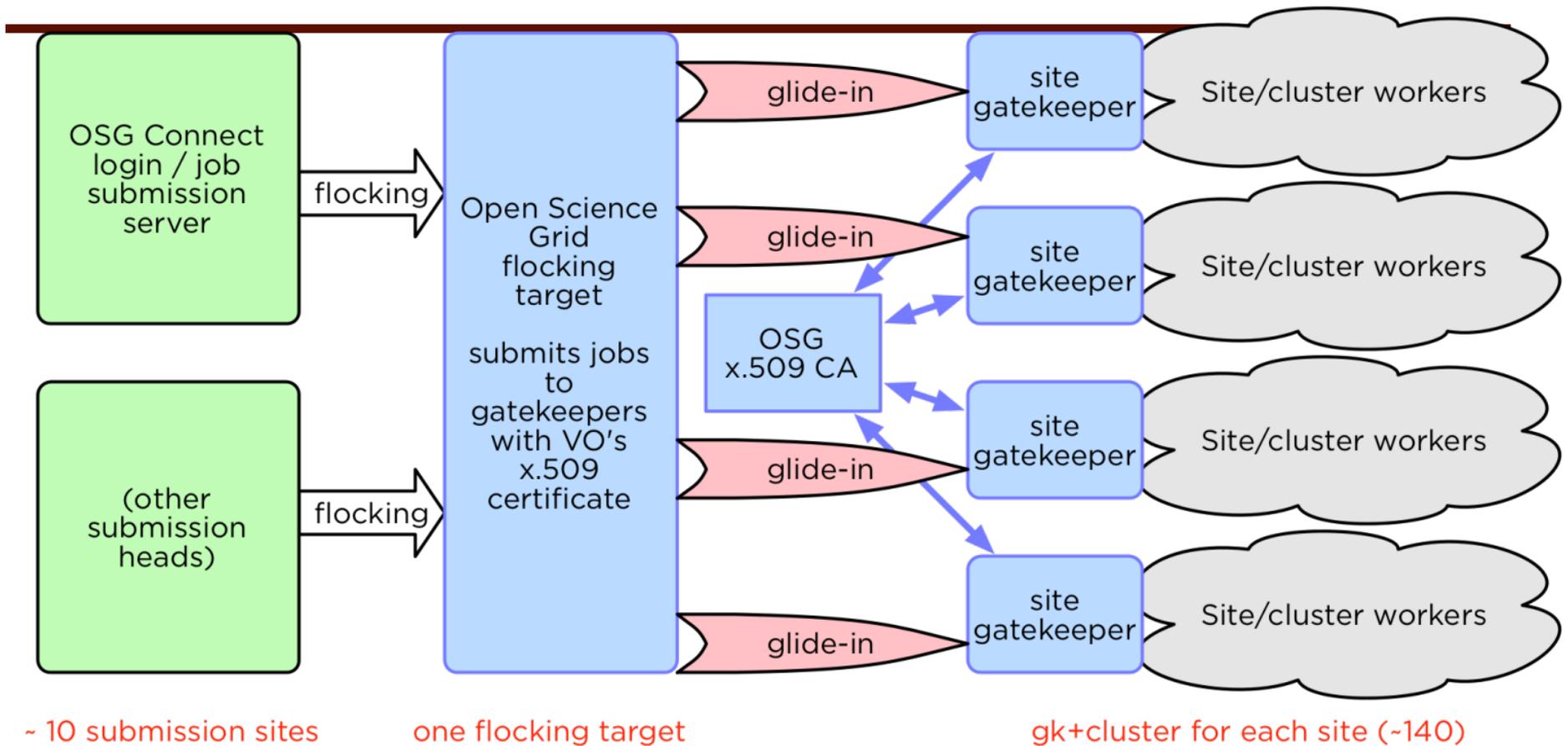
Reduce time between sign-up and job submission

(hours not days)

→ **OSG Connect**

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# OSG VO high-level architecture



x.509 virtual organization validation occurs during wide area job distribution.

**trust relationship** between the resource provider and the OSG VO.

**users not required to use x.509 certificates directly.**

# OSG and CI Connect

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CI Connect provides a framework to create entry points to use OSG and campus resources

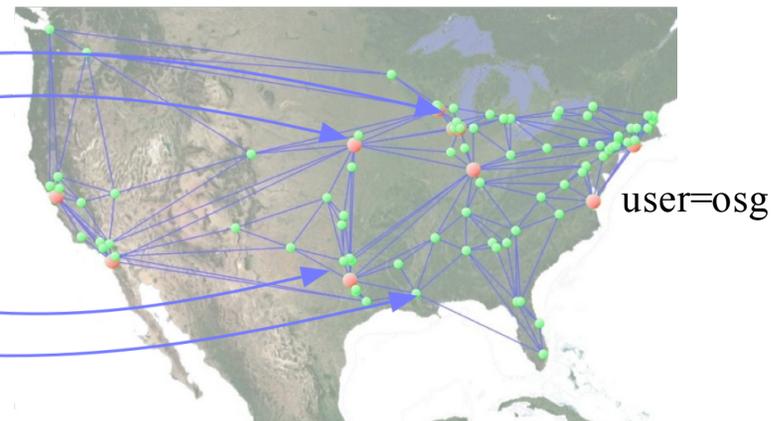
OSG Connect functions central entry point for campus-based users and individual PI's

Access to resources using the OSG VO and glidein service

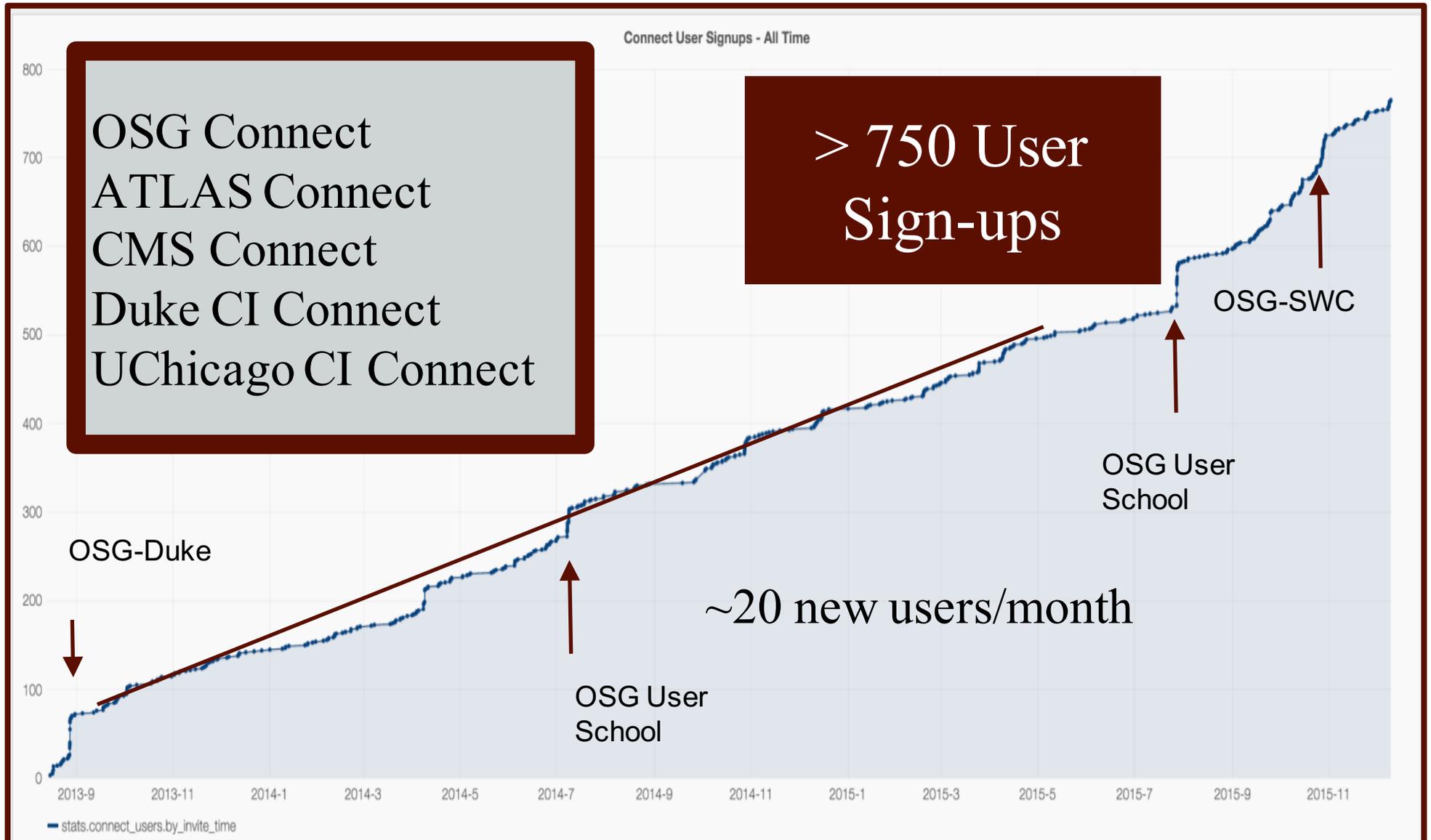
Potential integration with campus specific resources

An *identity bridge*: OSG Connect identity (Globus) ▶ virtual organization roles (OSG)

`user=angus`  
`user=bobby`  
`user=carol`  
`user=donna`  
`user=eddie`



# CI Connect Growth

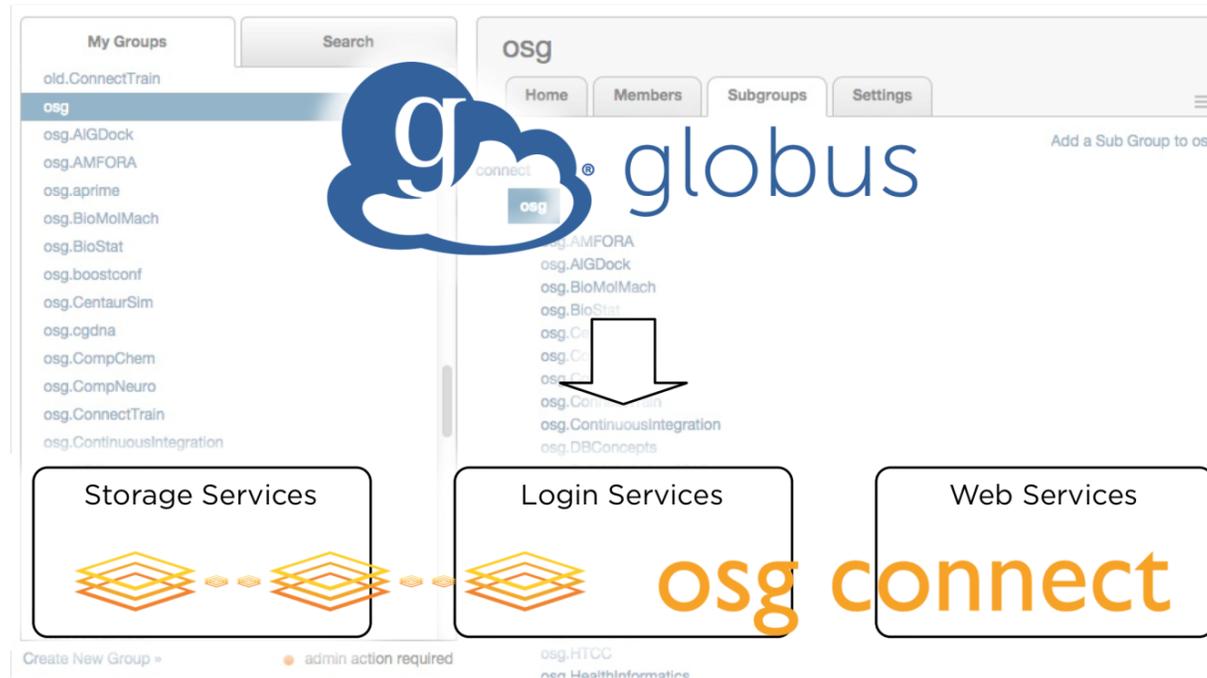


# Establishing identity

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How do we get from <campus researcher> to user=angus on OSG Connect?

Globus Auth provides an answer.



# IdM with Globus Auth

The screenshot shows the Globus ID interface for the group 'osg.AIGDock'. On the left is a sidebar with 'My Groups (249)' and a search bar. The main area shows group details: 'osg.AIGDock' with tabs for 'About', 'Members (7)', 'Subgroups', and 'Settings'. Below the tabs, it indicates '7 active' and '1 rejected' members. A table lists 'Active Members' with columns for name, username, and member since. The 'CI Connect' member is circled in red. A red callout box points to this member with the text 'Customer-directed team management'. Below the active members is a 'Rejected' section. At the bottom of the screenshot, the Globus ID logo is visible, and a user profile for 'CI Connect (connect@globusid.org)' is shown with 'Home' and 'Log Out' links.

name	username	member since
CI Connect	connect@globusid.org	2 years ago
David Mink	dvmink@globusid.org	2 years ago
Chen Li	jesseleechen@globusid.org	2 years ago
Trung Hai Nguyen	nguyentrung@globusid.org	a year ago
OSG Connect Operations	osgconnect@globusid.org	2 years ago
Laurentiu Spiridon	spirilaurentiu@globusid.org	2 years ago

Customer-directed team management

SSH key upload (for login shell)

## Manage SSH and X.509 Keys

[Add a New Key](#)

You have the following key attached to your Globus ID account:

The interface shows a list of SSH keys. The first key, 'SSH Public Key', is circled in red. To its right are three buttons: 'expand', 'delete', and 'rename'.

# Python Client

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- Globus Auth exposes a REST API
  - Globus provides Python module
    - <https://github.com/globus/globus-sdk-python>
  - Using the module, we:
    - search our group hierarchy for relevant changes
    - store these changes locally to track current state
    - provision user accounts into directory (nss\_nis)
    - provision user files and directories in storage systems
    - populate local groups as a direct mirror of Globus Groups
    - define access rights to GridFTP and job submission
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# Python Client (example)

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```
from nexus import GlobusOnlineRestClient

config = {
    'server': 'nexus.api.globusonline.org',
    'client': 'osgconnect',          # service account
    'client_secret': 'password', # secret!
}

gc = GlobusOnlineRestClient(config=config)
headers, response = gc.get_group_members(groupuuid)
members = response['members']
members = [member for member in members if member and member['username']]
members.sort(lambda a, b: cmp(a['status'], b['status']) or cmp(a['username'], b['username']))
for member in members:
    print '%s (%s) %s' % (group, member['status'], member['username'])
    headers, profile = gc.get_user_profile(member['username'])
    if profile.has_key('credentials'):
        keys = sorted([cred['ssh_key'] for cred in prof['credentials'] if
cred['credential_type'] == 'ssh2'])
        # store ssh keys into ~/.authorized_keys
```

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# Integrating with Login Hosts

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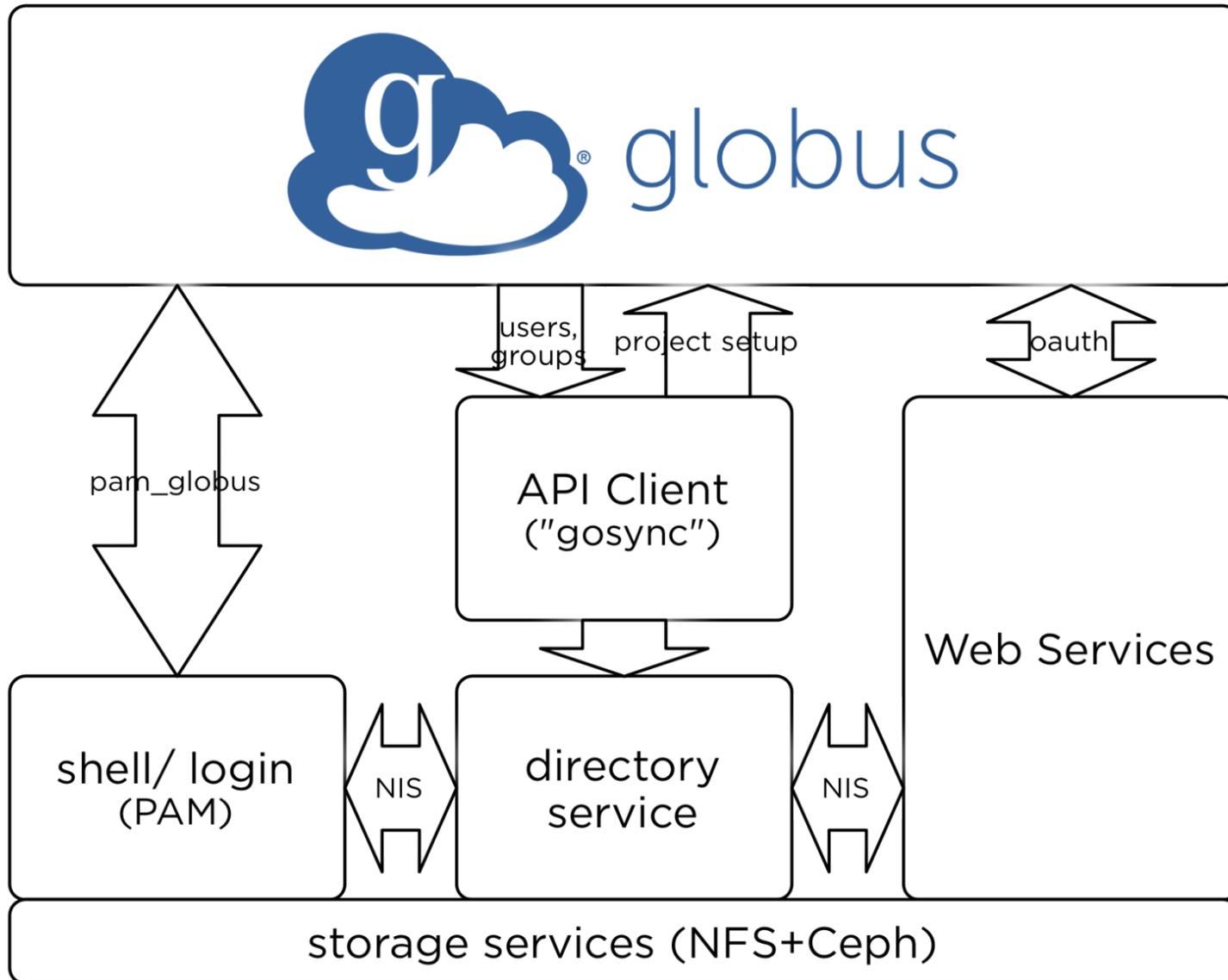
Want to reduce the credentials users need to remember and use

Used curl C library and REST interface to authenticate logins

- Service integrated with Linux using PAM modules

```
/* If authtok exists, try to authenticate with the old
authtok. */
if (pass) {
    rc = globus_authenticate(NEXUSBASE, user, pass);
    if (rc == PAM_SUCCESS)
        return PAM_SUCCESS;
}
}
```

# Summary: Data flow architecture



- OSG Connect
- ~614 users
  - ~104 projects
  - ~120 campuses

Architecture extended to other campus integrations via **CI Connect:**

ATLAS  
CMS  
Duke University  
UChicago

# Future directions

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Update infrastructure to use new Globus Auth API and interface

'Genercize' infrastructure and extend to support users and clusters in Virtual Clusters for Community Computation (VC3)

Further integration with Globus transfer

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# Thank you!

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And our thanks to the Globus, CILogon and OSG teams. In particular:

Rachana Ananthakrishnan (Globus)

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Stephen Rosen (Globus)

Kyle Chard (Globus)

Mats Rynge (OSG)

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# Further information

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Open Science Grid

<http://opensciencegrid.org/>

OSG Connect

<http://osgconnect.net/>

Globus Python SDK

<https://github.com/globus/globus-sdk-python>

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