

Distributed Web Security for Science Gateways

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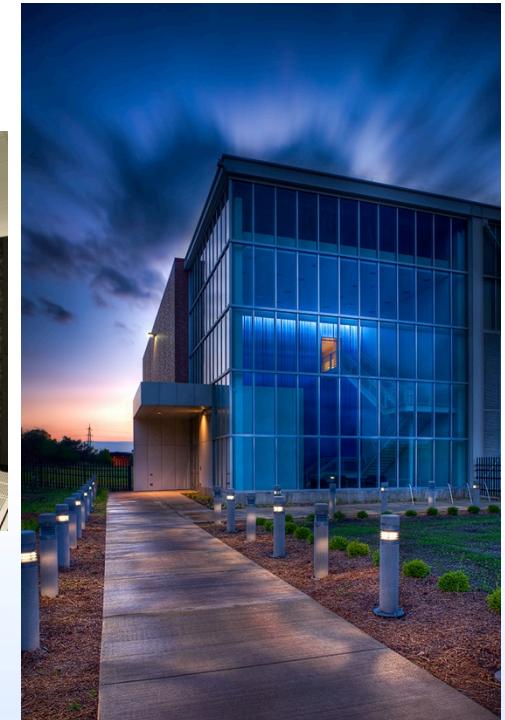
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This material is based upon work supported by the National Science Foundation under grant number 1127210.

National Center for Supercomputing Applications (NCSA)

- Located at University of Illinois at Urbana-Champaign
- Established in 1986 by NSF Supercomputer Centers Program



www.ncsa.illinois.edu

Distributed Web Security for Science Gateways



- Software Development for Cyberinfrastructure grant from the NSF Office of CyberInfrastructure (www.nsf.gov/oci)
 - 3 year project: August 2011 – July 2014
- Co-PIs: Marlon Pierce (IU), Rion Dooley (TACC)
- *What is cyberinfrastructure?*
 - Supercomputers, mass-storage systems, data repositories, networks, software and more
 - Supporting science and engineering research and education

Motivating Example: Photo Printing



2
Your
flickr
Password

3
Photos

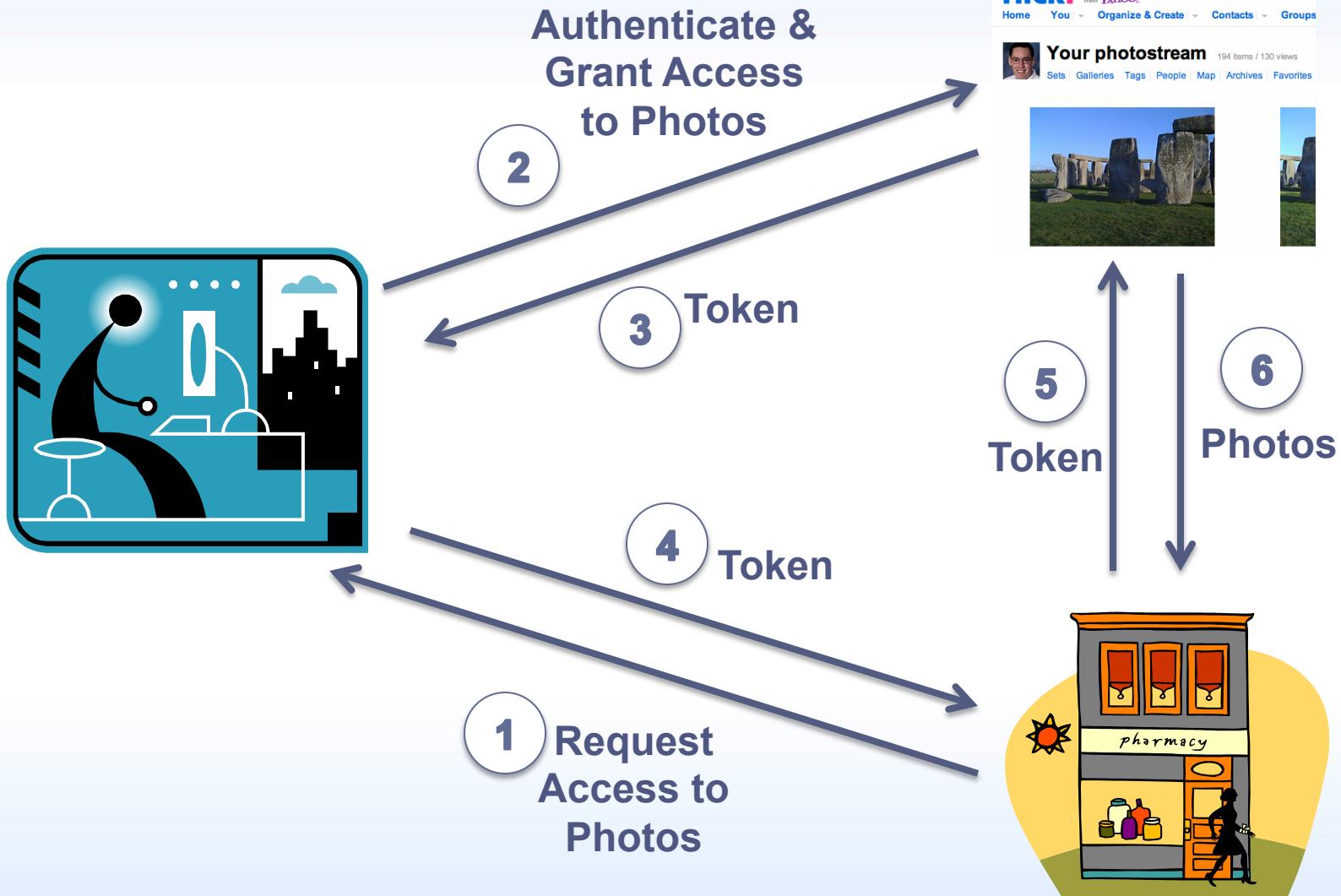
1
Your
flickr
Password



Defining Terms

- **Authentication:** *Who are you?*
 - customer #83461234987
 - name: Jim Basney
 - email: jbasney@illinois.edu
- **Authorization:** *What are you allowed to do?*
 - Access private information
 - Charge purchases to your credit card
- **Delegated Authorization:** *Authorizations you grant to others*
 - Park your car (valet key)
 - View your photos on Flickr
 - Collaboratively edit an online Google doc
- **Credential:** *How security information is conveyed*
 - Also known as **Assertion** or **Token**

Delegated Authorization



OAuth

- An open protocol for delegated authorization (oauth.net)
- Development
 - OAuth 1.0 released (October 2007)
 - OpenID+OAuth hybrid developed (2009)
 - OAuth 1.0a revision (June 2009)
 - RFC 5849 (Informational), April 2010
 - OAuth WRAP (2009-2010)
 - Basis for OAuth 2.0
 - OAuth 2.0 Standards Track RFC coming soon
 - OpenID Connect based on OAuth 2.0
- Used by Flickr, Twitter, Facebook, Google, Netflix, ...





FeedFliks wants to access your Netflix Account.

To confirm, please login to Netflix:

Login

Password

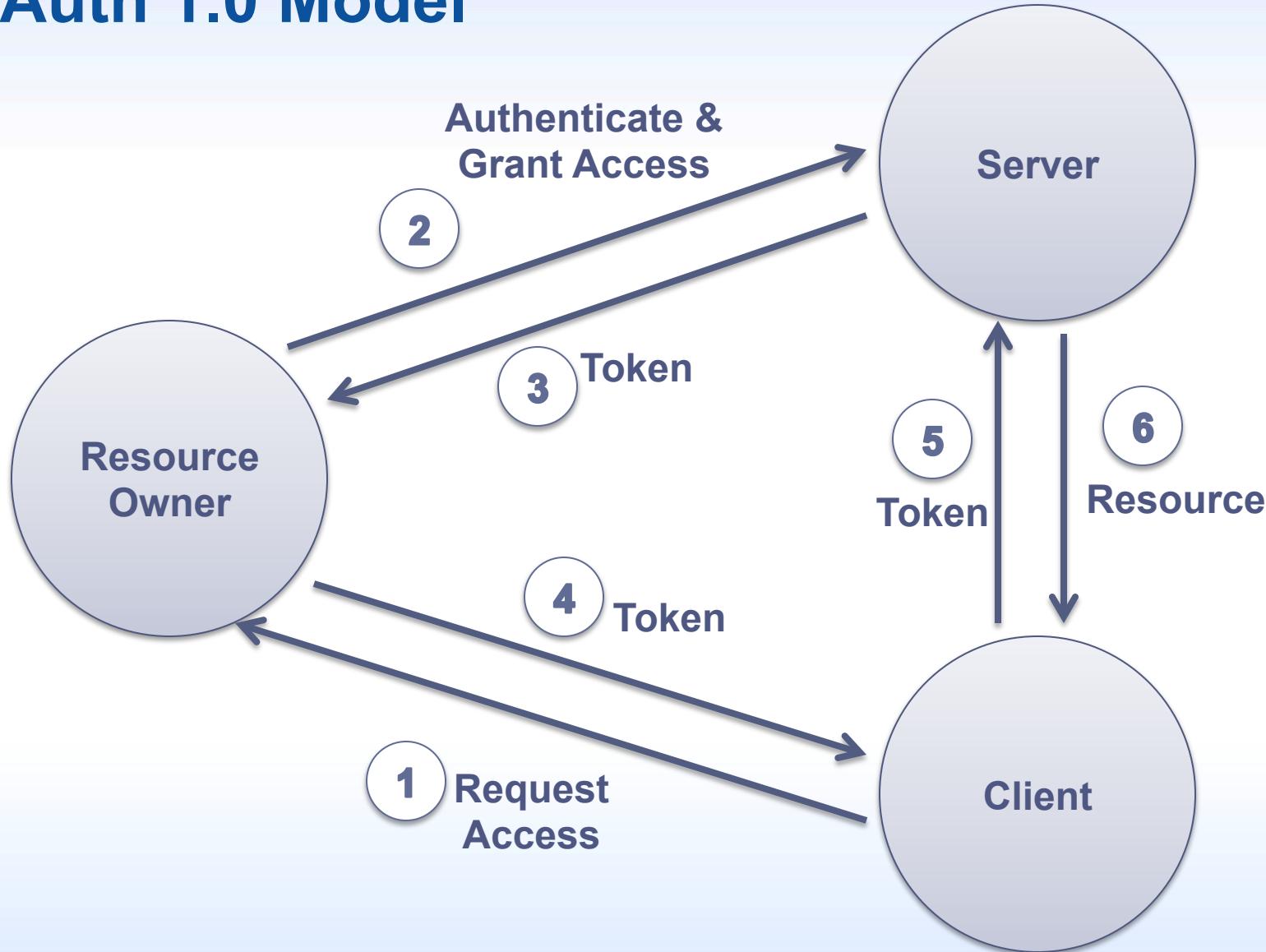
Yes, Link This Account

You should not authorize **FeedFliks** unless you trust them with access to your account. By confirming, you allow **FeedFliks** to access, share and update your Netflix data, including your queue, rental history, and ratings.

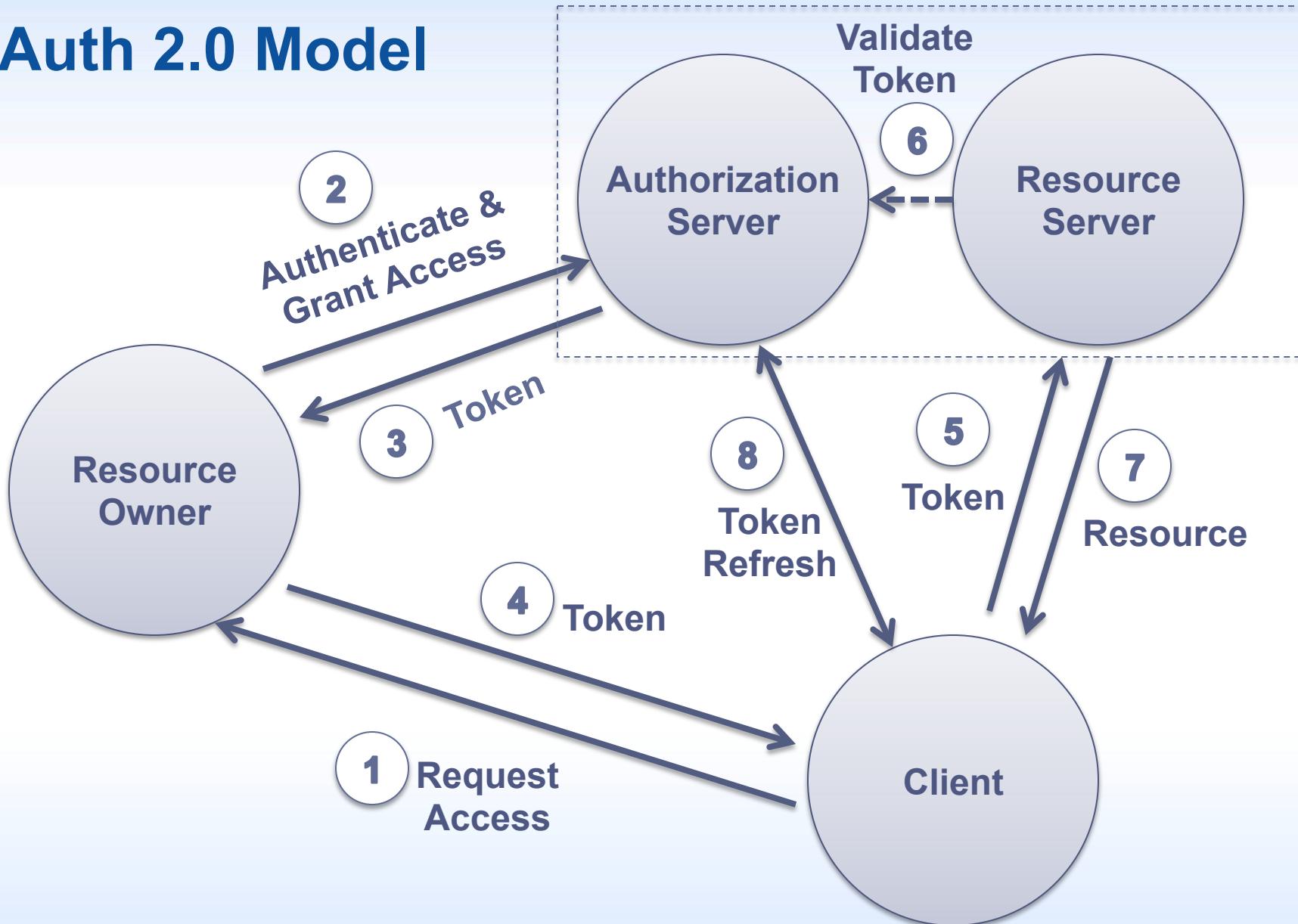
This page is provided by Netflix to authorize third-party applications, but has not been configured to send requests securely. If you grant access but you did not initiate this request at **FeedFliks**, it may be possible for other users of **FeedFliks** to access your data. We recommend you deny access unless you are certain that you initiated this request directly within **FeedFliks**.

Your password will always remain private, but **FeedFliks** will have ongoing access to your account. You can remove access at any time in [Your Account](#). Your usage of any third party application that interacts with Netflix is governed by the Netflix [Terms of Use](#).

OAuth 1.0 Model



OAuth 2.0 Model



Home / Log in

Log in with a SourceForge account

Enter your account info:

Username: Password: Remember Me [?](#)**Log in**[Forgot your username/password?](#)

Need an account on SourceForge.net?

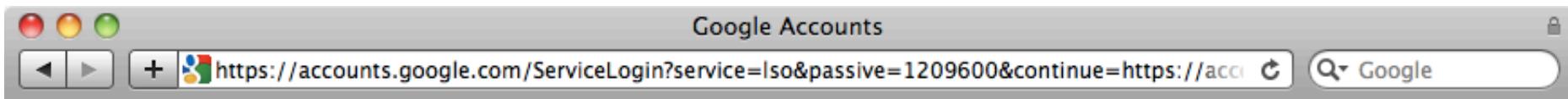
[Create Account](#)**Log in with OpenID**

Please click your account provider:

 Remember Me [?](#)**Log in**[Forgot your OpenID?](#)

OpenID eliminates the need for multiple usernames across different websites.

[Learn more - Get an OpenID](#)



Accounts

Sign in to **Sourceforge.net** with your Google Account. [Learn more](#)

Sign in Google

Email

Password

Stay signed in

[Can't access your account?](#)





Google accounts

[Sign in as a different user](#)

You are signing in to **Sourceforge.net** with your Google Account
jbasney@sciencegatewaysecurity.org

 **Sign in**

Remember me

You can always change your Google Account approval settings. Sourceforge.net
is not owned, operated, or controlled by Google or its owners. [Learn more](#)

SourceForge – Download, Develop and Publish Free Open Source Software

https://sourceforge.net/

RSS Google

SOURCEFORGE Browse Blog Support Jobs Resources Jim Basney Account Log Out

Find, Create, and Publish Open Source software for free

Search from thousands of software titles Search

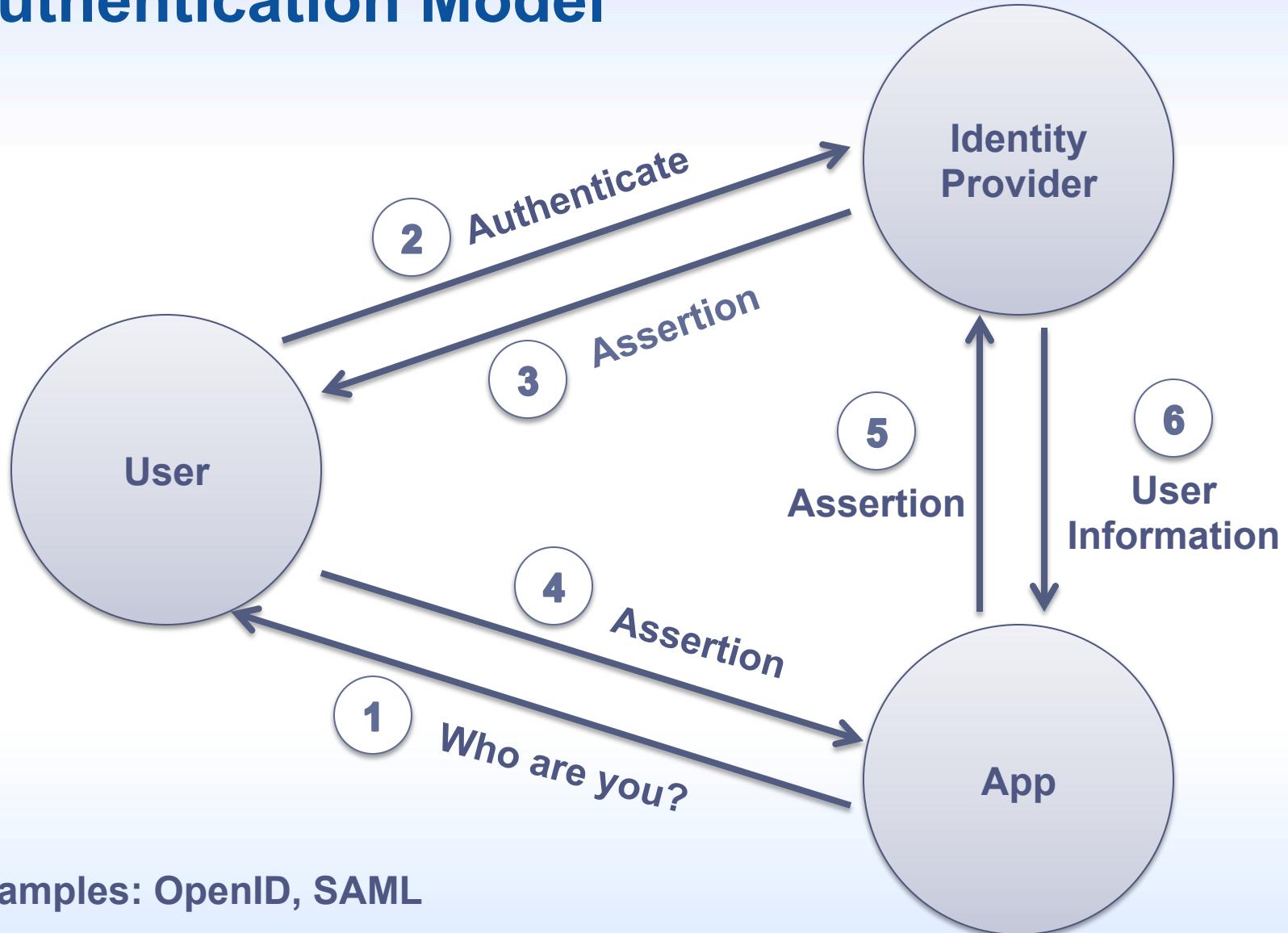
TODAY: 4,123,532 DOWNLOADS 5,438 CODE COMMITS 4,905 FORUM POSTS 743 BUGS TRACKED MORE DETAILS

Find, Create, and Publish Open Source software for free

Search from thousands of software titles Search

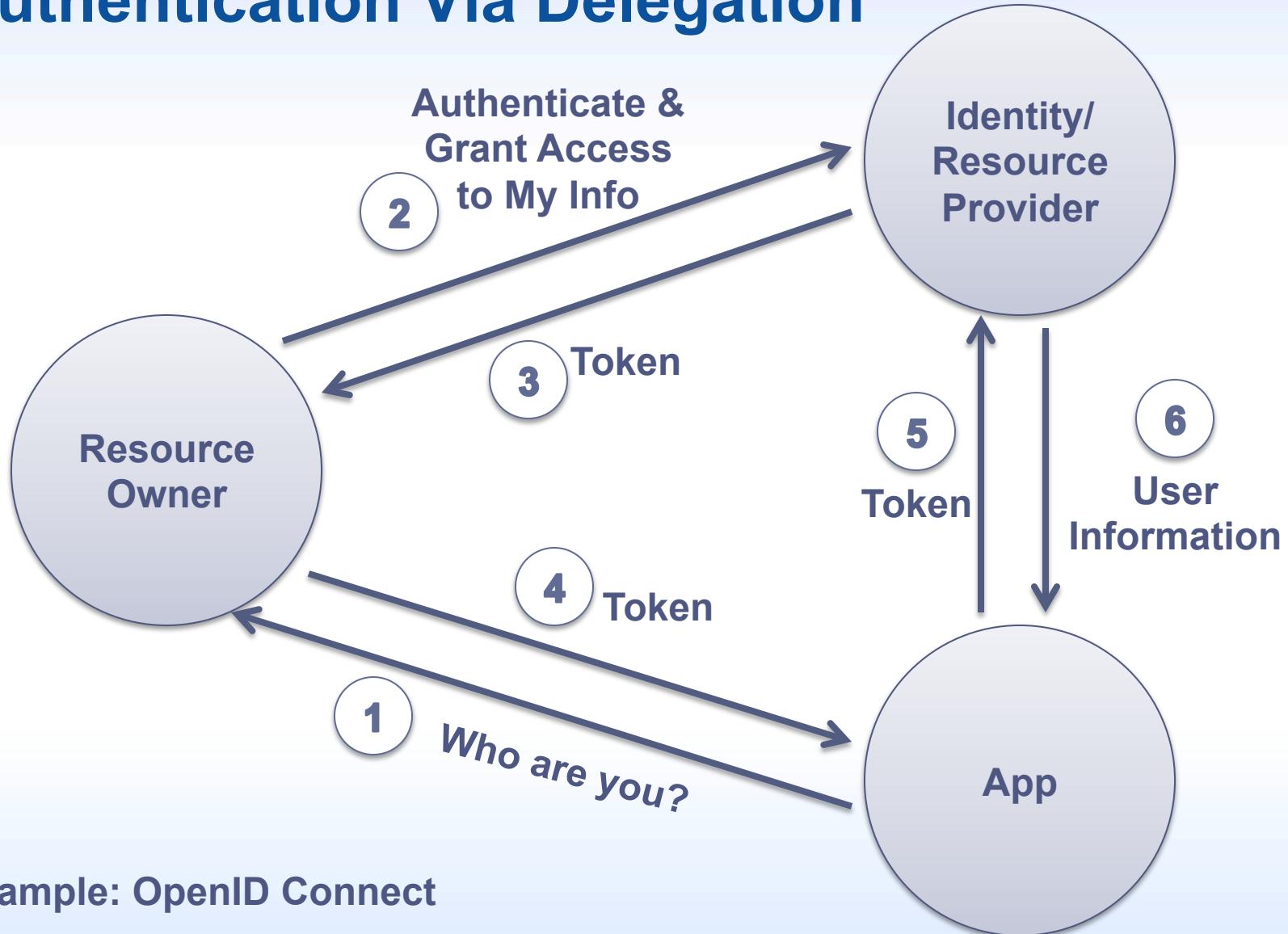
TODAY: 4,123,532 DOWNLOADS 5,438 CODE COMMITS 4,905 FORUM POSTS 743 BUGS TRACKED MORE DETAILS

Authentication Model



Examples: OpenID, SAML

Authentication Via Delegation



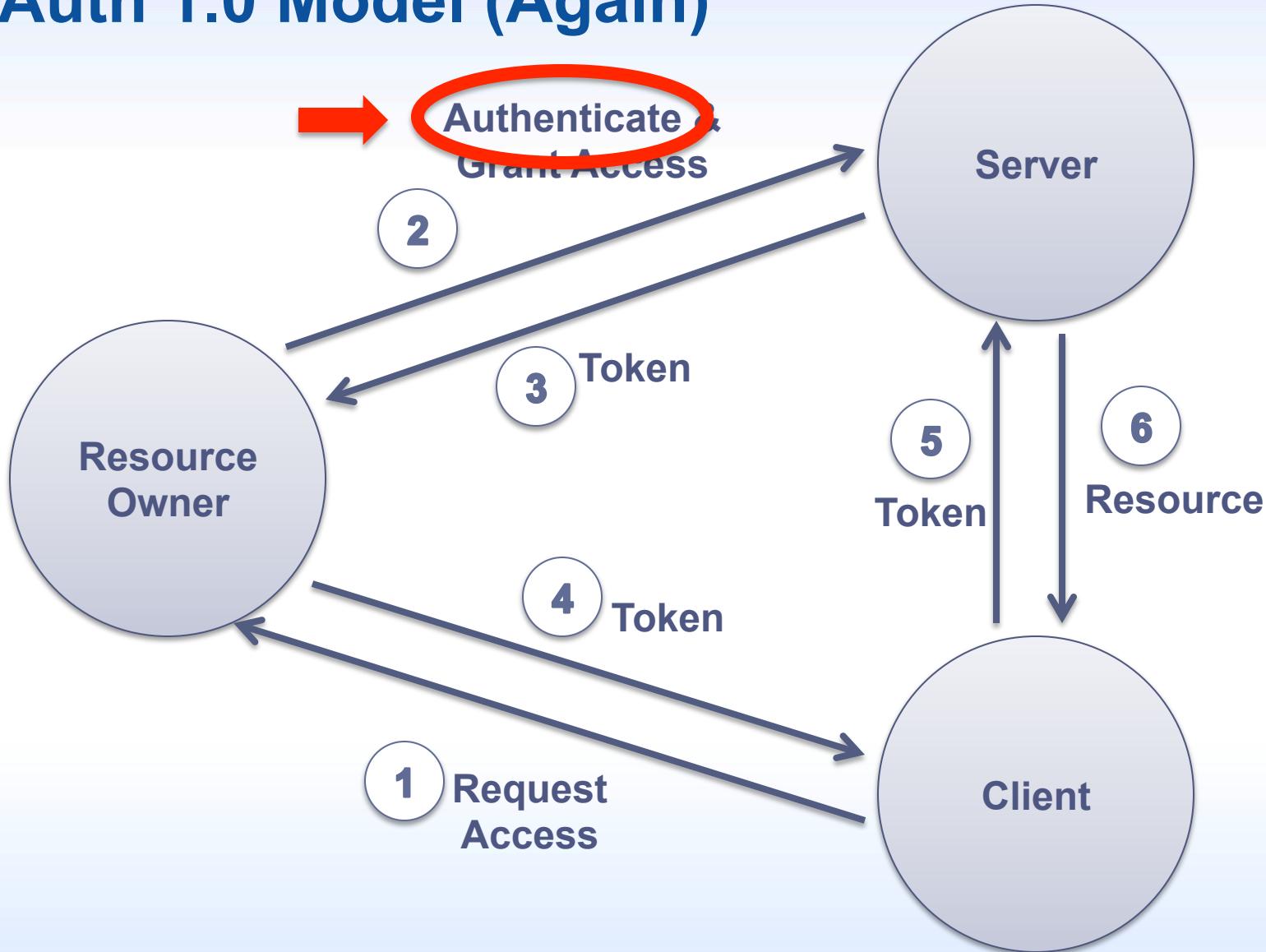
Example: OpenID Connect

Authentication Via Delegation

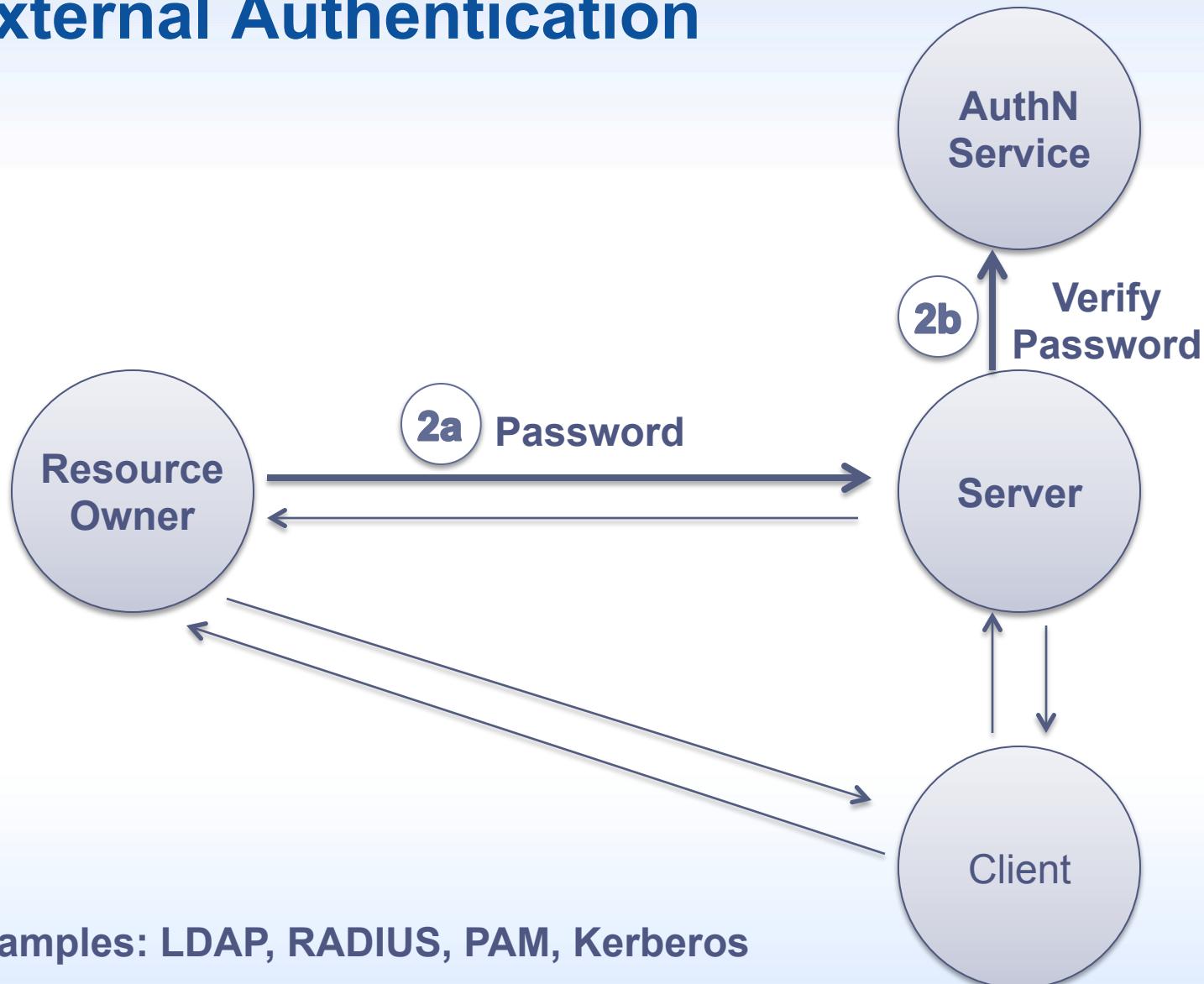
- Bad Idea
 - App: Who are you?
 - User: Here's full access to my Twitter account.
- Better Idea
 - App: Who are you?
 - User: Here's read access to my Twitter account profile.
- Delegated access to user's profile information
 - <http://nat.sakimura.org/2011/05/15/dummys-guide-for-the-difference-between-oauth-authentication-and-openid/>
- Example: **OpenID Connect** built on OAuth



OAuth 1.0 Model (Again)

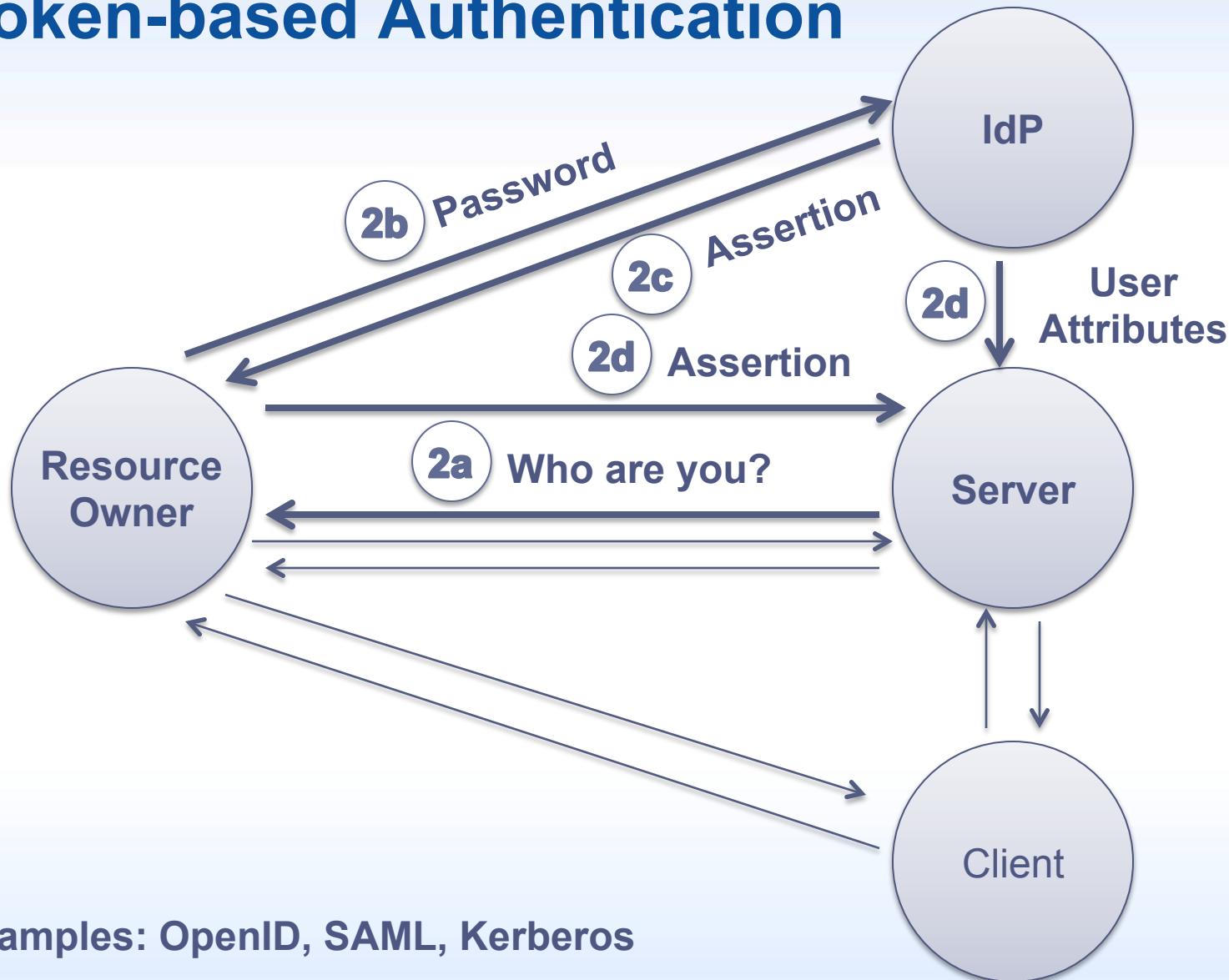


External Authentication



Examples: LDAP, RADIUS, PAM, Kerberos

Token-based Authentication



Examples: OpenID, SAML, Kerberos

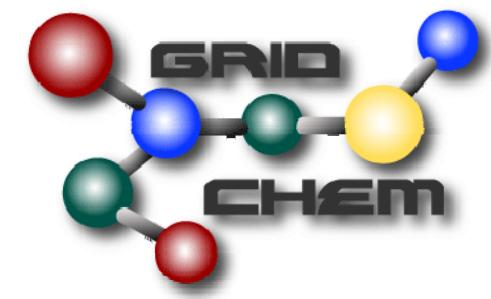
Science Gateways

The image is a collage of screenshots from several science gateway websites, illustrating the variety of tools and resources available to researchers.

- CyberGIS Gateway:** Shows the homepage with a search bar and links for Home, Resources, Community, Support, and About.
- Globus Online:** Features a large "Move files fast. No IT required." banner with a video player and a sign-up/sign-in button.
- GridChem.org:** Displays the Computational Chemistry Grid interface with a molecular model logo and navigation links.
- iPlant Collaborative:** Shows a green-themed homepage with sections for Challenge, Calendar of Events, and Discover.
- UltraScan LIMS Portal:** A white-themed portal for the TeraGrid Science Gateway, featuring news, upcoming events, and social networking features like My-Plant.org.

Logos for various partner institutions are visible at the bottom left, including CCS, CCT, NCSA, TACC, OSC, and Nsf.

Text from the pages includes:
CyberGIS: high-performance, distributed, and collaborative GIS
Globus Online | Reliable File Transfer: No IT Required.
Reliable, high-performance, secure file transfer.
Move files fast. No IT required.
UltraScan Analysis Software
Welcome
The "Computational Chemistry Grid" (CCG) is a virtual organization that provides access to high performance computing resources for computational chemistry with distributed supercomputing services and access to measurement data from the CCG client. GridChem is a Java desktop application that provides an interface to integrate the hardware, software and middleware resources necessary to solve quantum chemistry problems using grid technologies.
NOTICES
G90 and Molpro available from Blacklight
We have new connections b/w team Blacklight & us available from Blacklight at PDC. Please take advantage of these and let us know if you need any assistance using consulting portal. We may also provide DMUs on Blacklight soon. GridChem Team
start/2011-09-16/1
Start/2011-09-16/1
Power Outage Tomorrow 17 Sep 2011
There is an expected power disruption at NCSA building that hosts GridChem Middleware servers and this will affect the services. The expected down time is about 1 hour. All services will be restored by 18 Sep 2011. Services will be started tomorrow Saturday evening. This notice will be updated when the service is back on line. Thanks for your patience and support GridChem Team.
GMS move and New Client
We expect to release new services and client tomorrow after the servers have been moved. Please look for new client in www.gridchem.org download section. The server will be moved to a new location and a new client would be needed to work with new services. Please use consulting portal to report issues as usual. Thanks for your patience GridChem Team.
February 24-27, 2011 GridChem external Collab Workflow workshop at Indiana University
February 02, 2011 GridChem Workflow Implementation meeting at Indiana University
Number of 5-21, 2011 September 24-27, 2011 Pragmatis Workshop: Grid Computing, Cyberinfrastructure, Data Deployment and Production
OSC Ohio Supercomputer Center
National Science Foundation
POWERED BY TeraGrid
Supported by a grant from the National Science Foundation.
webmaster@www.gridchem.org



Computational Chemistry Grid:

Production Cyberinfrastructure for Computational Chemistry

For more information, please visit
www.gridchem.org or contact
help@gridchem.org.

CLIENT



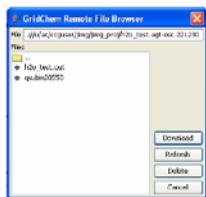
Graphical user interface (GUI) helps scientists:

- generate input
- submit and monitor quantum chemistry jobs
- remotely visualize output data

Client available for multiple platforms (Linux & Windows)

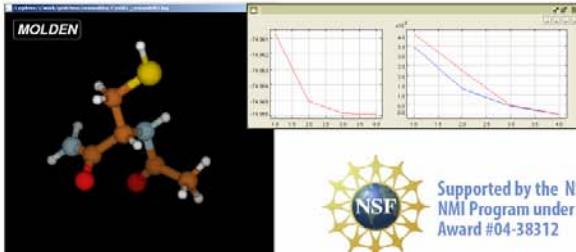
No Grid services needed on client system

DOWNLOAD RESULTS



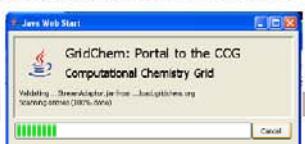
DOWNLOAD RESULTS

POST PROCESS REVIEW



Supported by the NSF
NMI Program under
Award #04-38312

JAVA WEB START

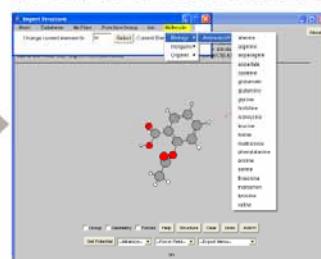


Client Application runs on Local Machine

INTRO



BUILD MOLECULE



BUILD INPUT FILE

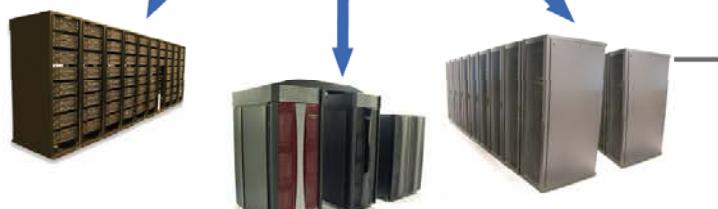


Middleware Server

Middleware interface to the computational grid

- authentication
- data management
- resource specification
- routes jobs
- provides client with job status information
- provides access to job data for analysis
 - input, output, job details stored in mass storage archive
- resource discovery
- accounting management
- system and job monitoring

Grid Services Leveraging NMI Software



3,525,000 CPU hours
available annually

CCG Resources



NCSA
www.ncsa.uiuc.edu



CCS
Center for Computational Sciences
www.ccs.uky.edu



CCT
www.cct.lsu.edu



OSC
www.osc.edu



TACC
www.tacc.utexas.edu

Science Gateways: Accessing Resources



A screenshot of the Computational Chemistry Grid (CCG) science gateway portal. The header features the CCG logo and navigation links for about us, news, downloads, training & documentation, on-line help, and contact us. The main content area includes sections for Welcome, Overview, Notices, G99 and Molpro available from Blacklight, Power Outage Tomorrow 17 Sep 2011, and a Calendar of Events.



user accesses
science gateway

science gateway uses
external resources
(supercomputers,
compute clusters,
data stores)



Science Gateways: Tiered Access Models



A screenshot of the Computational Chemistry Grid (CCG) science gateway interface. The page title is "COMPUTATIONAL CHEMISTRY GRID". It features a navigation bar with links like "about us", "news", "downloads", "training & documentation", "on-line help", and "contact us". The main content area includes sections for "Welcome", "Overview", "Notices", "G99 and Molpro available from Blacklight", "Power Outage Tomorrow 17 Sep 2011", "GMS move and New Client", and a "Calendar of Events". The "Calendar of Events" lists various dates and events related to the GridChem project.



user
authenticates to
science gateway

science gateway
authenticates to
service providers

Science Gateways: Tiered Access Models

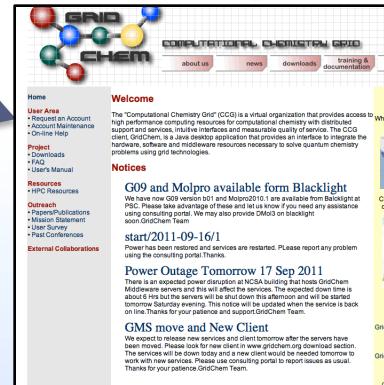
- Option A: Transitive Trust
 - Bilateral agreement between science gateway & service provider
 - Bulk allocation of service to the science gateway
 - Service provider may not know who the end users are
 - Users may not know who the underlying service providers are
- Option B: Delegation of Rights
 - End user has account at underlying service provider
 - Goal: Use underlying services via science gateway interfaces
 - Science Gateway explicitly acts on the user's behalf when interacting with the underlying service providers
- Both options are useful
 - Today let's focus on *Option B: Delegation of Rights*

Motivating Example: Science Gateway



1 Your Password

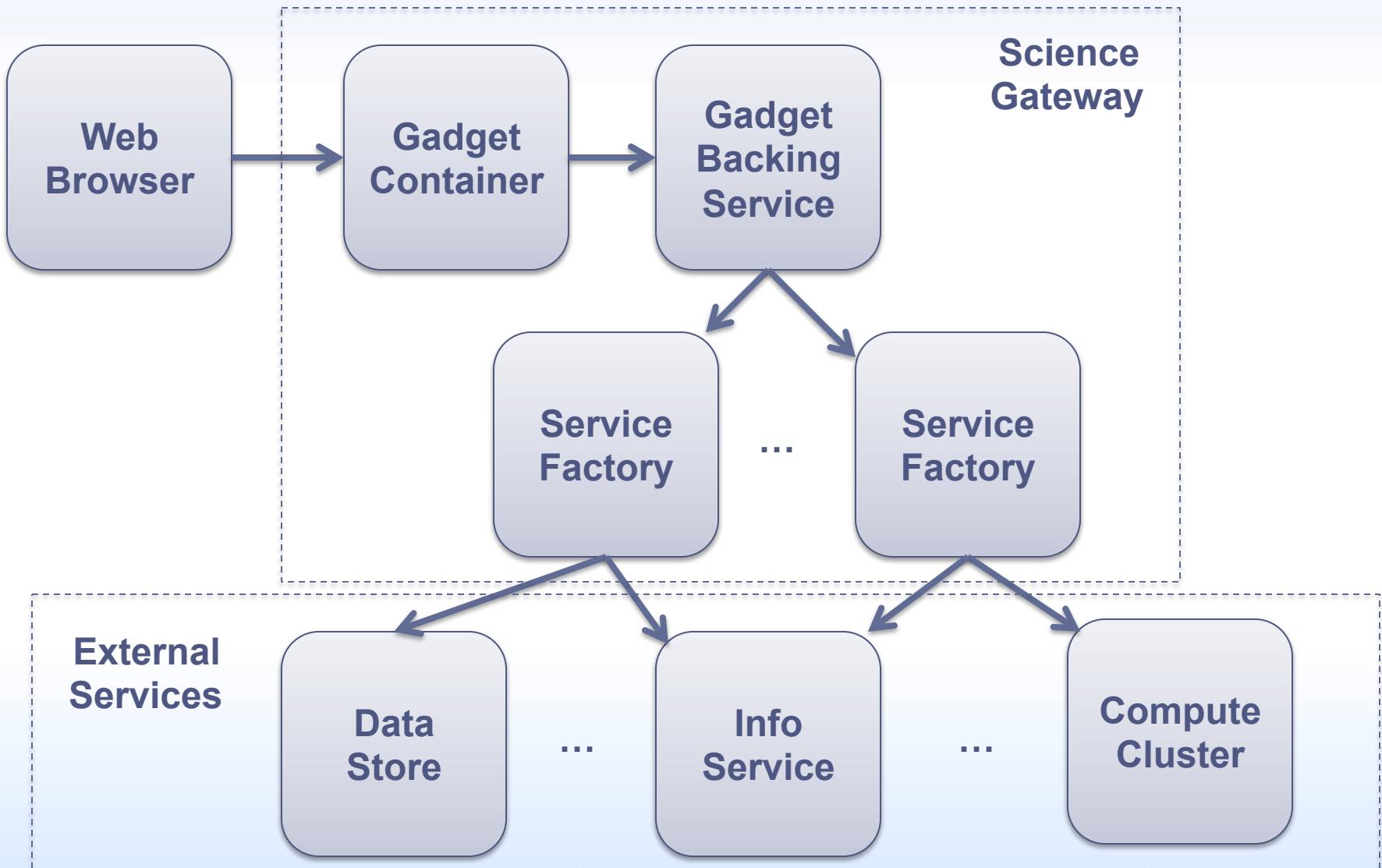
2 Your Password
3 Access



Delegated Authorization via OAuth



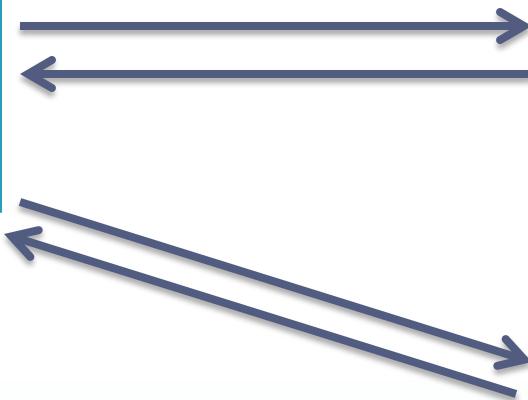
Challenge: Multi-Tier Science Gateways



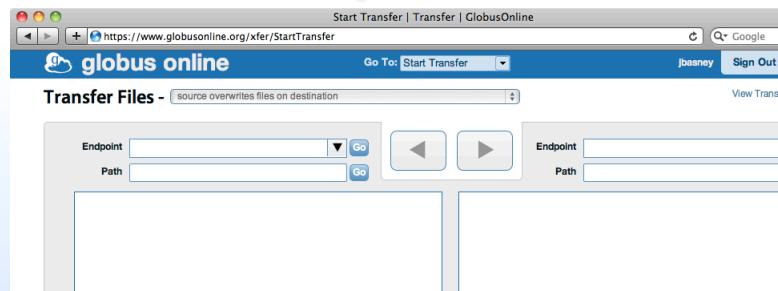
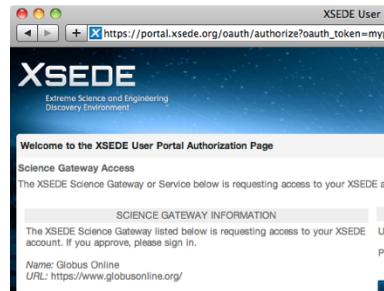
Long-Running Science Gateway Workflows

- Common Science Gateway Use Case:
 - Scientist launches workflow (computational simulation, data analysis, data movement/replication, visualization)
 - Workflow runs for hours/days/weeks
 - Scientist monitors workflow / receives notifications of completion
- Challenge: Duration of Delegation
 - “How long can the science gateway act on my behalf?”
 - Ideally: only as needed for the workflow to complete
 - Limit duration of delegation to minimize window of exposure
 - Difficult / inconvenient to predict workflow duration
 - Approaches: refresh / renewal / revocation
- **OAuth 2.0 refresh is needed!**

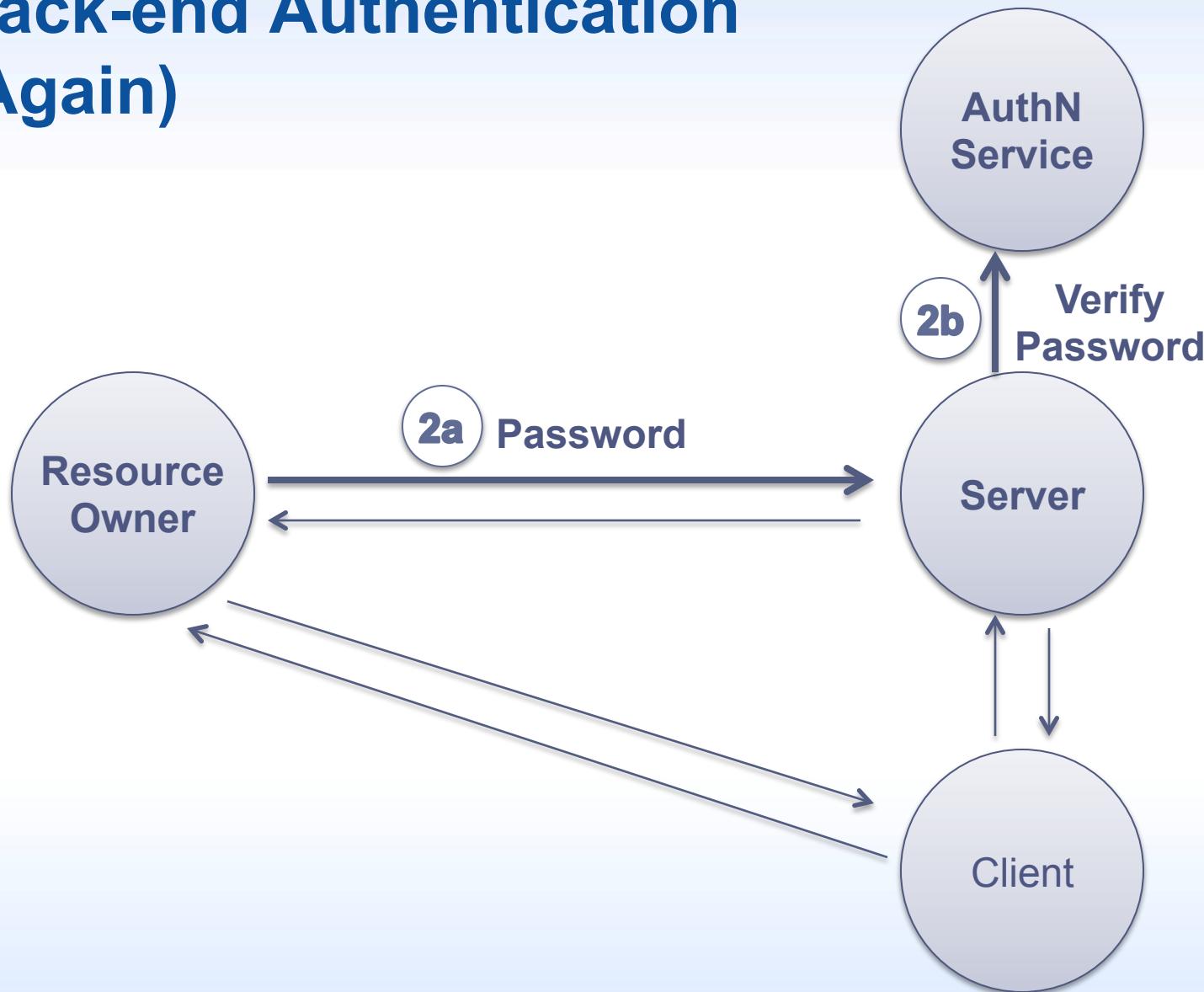
Globus Online Example



Kerberos
Authentication
Server



Back-end Authentication (Again)



Start Transfer | Transfer | GlobusOnline

https://www.globusonline.org/xfer/StartTransfer

globus online

Go To: Start Transfer

jbasney Sign Out

Transfer Files - source overwrites files on destination

View Transfer Activity

Endpoint Go

Path Go

Endpoint Go

Path Go

Please select an endpoint above.

Please select an endpoint above.

Label This Transfer

This will be displayed in your transfer activity.

Get Globus Connect

Turn your computer into an endpoint. The easiest and most convenient way to send and receive files on your machine.

Start Transfer | Transfer | GlobusOnline

https://www.globusonline.org/xfer/StartTransfer

globus online

Go To: Start Transfer

jbasney Sign Out

Transfer Files - source overwrites files on destination

View Transfer Activity

Endpoint xsede#forge Path

Endpoint Path

Please select an endpoint above.

Activate Endpoint: xsede#forge

The administrator of this endpoint, **x sede#forge**, requires that you authenticate using their MyProxy OAuth server to activate the endpoint. When you click 'Continue' you will be redirected to their website.

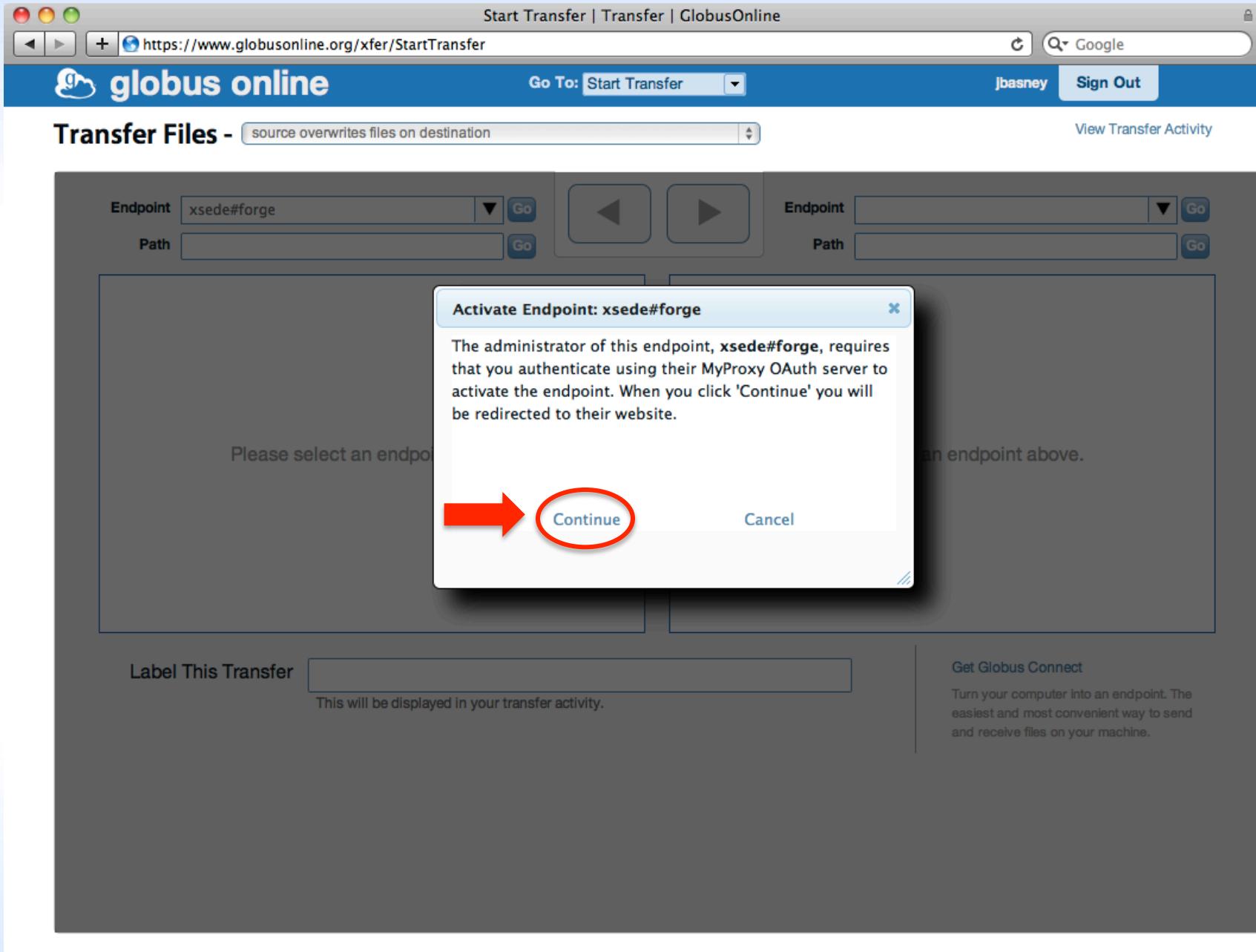
Continue Cancel

Label This Transfer

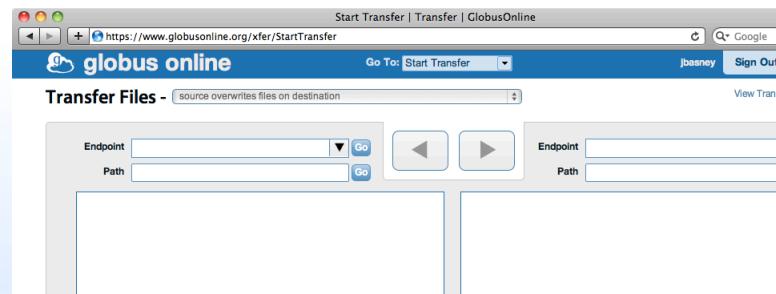
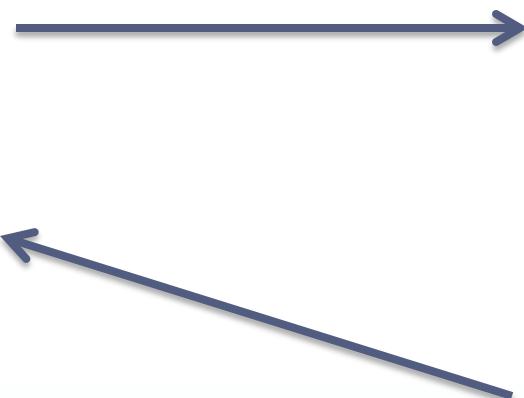
This will be displayed in your transfer activity.

Get Globus Connect

Turn your computer into an endpoint. The easiest and most convenient way to send and receive files on your machine.



Globus Online Example



XSEDE User Portal Delegation Authorization

https://portal.xsede.org/oauth/authorize?oauth_token=myproxy:delegation,2011:/tempCred/65580feb7d2edb554cb4225

XSEDE
Extreme Science and Engineering
Discovery Environment

Welcome to the XSEDE User Portal Authorization Page

Science Gateway Access

The XSEDE Science Gateway or Service below is requesting access to your XSEDE account. If you approve, please sign in with your XSEDE username and password.

SCIENCE GATEWAY INFORMATION

The XSEDE Science Gateway listed below is requesting access to your XSEDE account. If you approve, please sign in.

Name: Globus Online
URL: <https://www.globusonline.org/>

SIGN IN

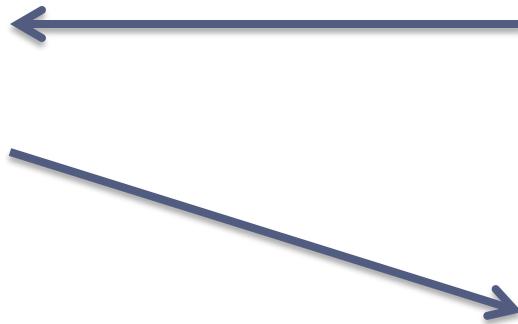
Username:
Password:

SIGN IN (Red arrow points to this button)
CANCEL

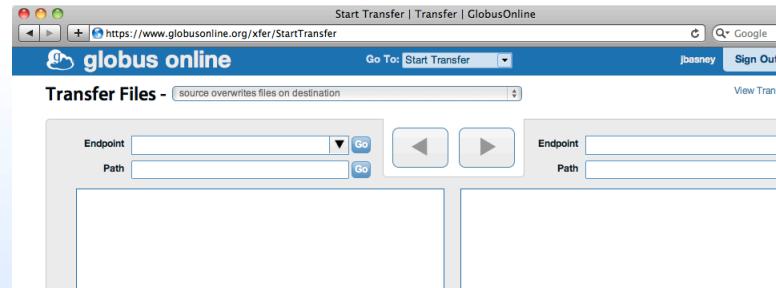
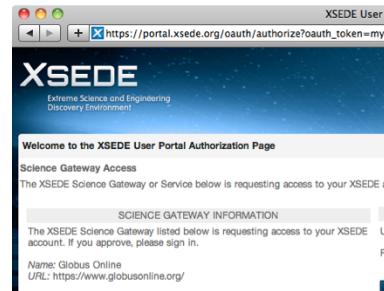
Please send any questions or comments about this site to help@xsede.org.



Globus Online Example



Kerberos
Authentication
Server



Start Transfer | Transfer | GlobusOnline

https://www.globusonline.org/xfer/StartTransfer?origin=xsede%2523forge

globus online

Go To: Start Transfer

jbasney Sign Out

Transfer Files - source overwrites files on destination

View Transfer Activity

Endpoint xsede#forge Path ~/

Endpoint xsede#ncsa-mss Path ~/

select all | none up one folder refresh list settings

bit.ncsa.uiuc.edu Folder

cog-jglobus-1.8.0 Folder

cog-jglobus-1.8.0-bin.tar.gz 3.76MB

select all | none up one folder refresh list settings

copperhome Folder

modi4.tar.gz 1.7MB

myproxy-bundles.tar.gz 344.1MB

prithvi.backup.tar.gz 789.33MB

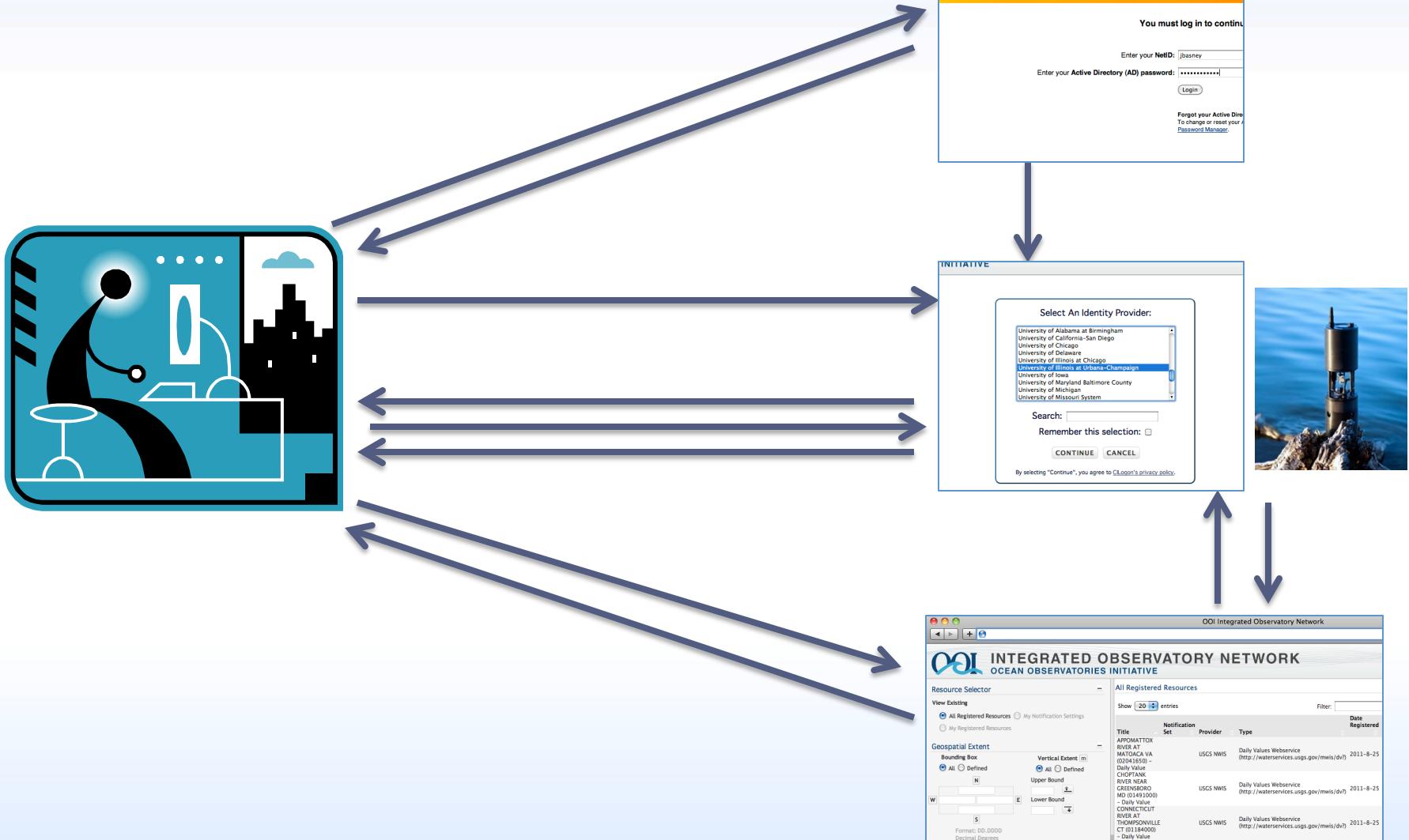
Label This Transfer

This will be displayed in your transfer activity.

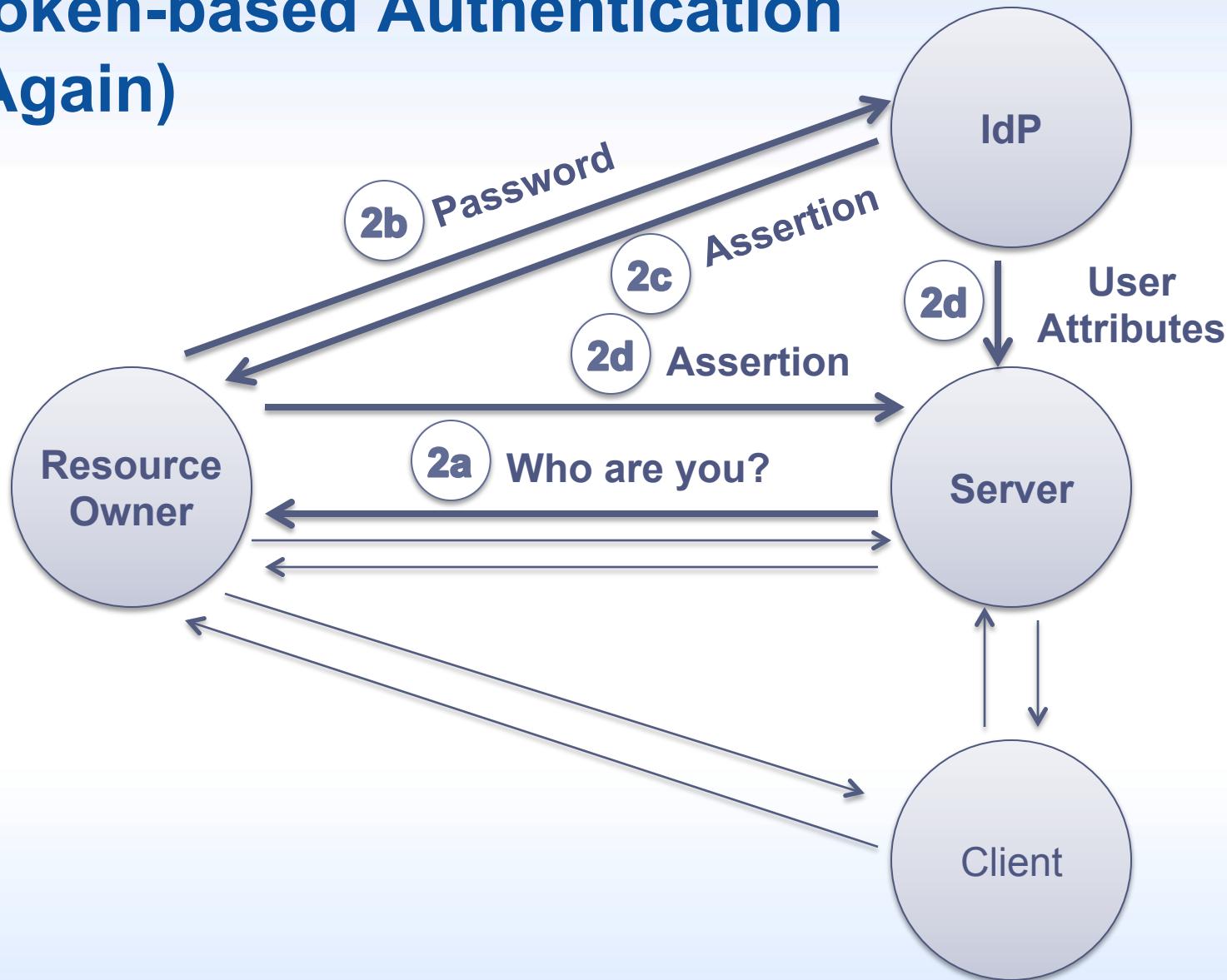
Get Globus Connect

Turn your computer into an endpoint. The easiest and most convenient way to send and receive files on your machine.

OOI Example



Token-based Authentication (Again)



OOI Integrated Observatory Network

INTEGRATED OBSERVATORY NETWORK
OCEAN OBSERVATORIES INITIATIVE

Sign in Create account Help

Resource Selector

View Existing

All Registered Resources My Notification Settings
My Registered Resources

Geospatial Extent

Bounding Box All Defined
Vertical Extent [m] All Defined
Upper Bound Lower Bound

Format: DD.DDDD
Decimal Degrees

Temporal Extent

Time Range All Defined
From: To:

ISO Formatted Time in UTC
yyyy-mm-ddThh:mm:ssZ

All Registered Resources

Show 20 entries Filter:

Title	Notification Set	Provider	Type	Date Registered	Details
APPOMATTOX RIVER AT MATOACA VA (02041650) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
CHOPTANK RIVER NEAR GREENSBORO MD (01491000) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
CONNECTICUT RIVER AT THOMPSONVILLE CT (01184000) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
Delaware River at Trenton NJ (01463500) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
ESOPUS CREEK AT COLD BROOK NY (01362500) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
HUDSON RIVER AT FORT EDWARD NY (01327750) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
JAMES RIVER AT CARTERSVILLE VA (02035000) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
Kalihhi Str nr Honolulu Oahu HI (16229000) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwis/dv?)	2011-8-25		
Kinapua Str...					

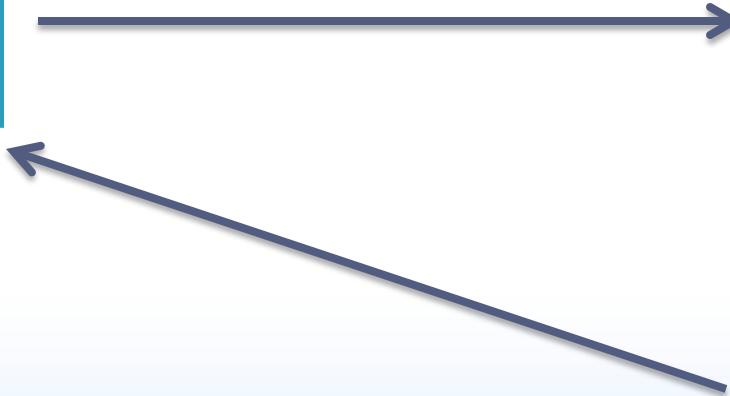
Resource Registration Description

Resource Registration Contact Information
Original Source Description
Original Source Contact Information
Geospatial Coverage
Temporal Coverage
Variables
References

Dataset Access Set Up Notifications



OOI Example



INITIATIVE

Select An Identity Provider:

- University of Alabama at Birmingham
- University of California - San Diego
- University of Colorado Boulder
- University of Delaware
- University of Illinois at Chicago
- University of Illinois at Urbana-Champaign
- University of Iowa
- University of Maryland Baltimore County
- University of Michigan
- University of Missouri System

Search: _____ Remember this selection:

CONTINUE CANCEL

By selecting "Continue", you agree to [CIOon's privacy policy](#).



OOI Integrated Observatory Network

INTEGRATED OBSERVATORY NETWORK
OCEAN OBSERVATORIES INITIATIVE

Resource Selector

View Existing All Registered Resources My Notification Settings My Registered Resources

All Registered Resources

Filter: _____ Date Registered

Geospatial Extent

Bounding Box All Defined

Vertical Extent All Defined

Upper Bound Lower Bound

W E N S

Format: DD,DDDD Decimal Degrees

Title	Provider	Type	Date Registered
APPOMATTOX RIVER AT MATOACA VA (02041650) – Daily Values Webservice (http://waterservices.usgs.gov/mwvsi/dv7) 2011-8-25	USGS NWIS	Daily Values Webservice	(http://waterservices.usgs.gov/mwvsi/dv7) 2011-8-25
CHOPTANK RIVER AT GREENSBORO MD (01491000) – Daily Values Webservice (http://waterservices.usgs.gov/mwvsi/dv7) 2011-8-25	USGS NWIS	Daily Values Webservice	(http://waterservices.usgs.gov/mwvsi/dv7) 2011-8-25
CONNECTICUT RIVER AT THOMASVILLE CT (01118400) – Daily Value Datasource	USGS NWIS	Daily Values Webservice	(http://waterservices.usgs.gov/mwvsi/dv7) 2011-8-25

Welcome To The CILogon Delegation Service

https://cilogon.org/delegate/?oauth_token=http://cilogon.org/serverA/tempCred/5bb668056d439369850bb1e3f7a474a8/1316530539597&c

Powered By
CILogon 

Show Help

OOI INTEGRATED OBSERVATORY NETWORK OCEAN OBSERVATORIES INITIATIVE

Select An Identity Provider:

University of Alabama at Birmingham
University of California-San Diego
University of Chicago
University of Delaware
University of Illinois at Chicago
University of Illinois at Urbana-Champaign
University of Iowa
University of Maryland Baltimore County
University of Michigan
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Search:

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CONTINUE **CANCEL**

By selecting "Continue", you agree to [CILogon's privacy policy](#).

For questions about this site, please see the [FAQs](#) or send email to [help @ cilogon.org](mailto:help@cilogon.org).
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OOI Example



Login – University of Illinois at Urbana
/://shibboleth.illinois.edu/idp/Authn/UserPassword

ILLINOIS LOGIN

You must log in to continue.

Enter your NetID:

Enter your Active Directory (AD) password:

[Forgot your Active Directo...](#)

[To change or reset your AD Password Manager...](#)

INITIATIVE

Select An Identity Provider:

- University of Alabama at Birmingham
- University of California - San Diego
- University of Colorado Boulder
- University of Delaware
- University of Illinois at Chicago
- University of Illinois at Urbana-Champaign
- University of Iowa
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OOI Integrated Observatory Network

INTEGRATED OBSERVATORY NETWORK
OCEAN OBSERVATORIES INITIATIVE

Resource Selector

Show 20 entries

Filter:

Title	Provider	Type	Date Registered
APPOMATTOX RIVER AT MATOACA VA (02041650) - Daily Values	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/nwis/dv7)	2011-8-25
CHOPTANK RIVER AT GREENSBORO MD (01491000) - Daily Values	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/nwis/dv7)	2011-8-25
CONNECTICUT RIVER AT THOMASVILLE CT (01118400) - Daily Value	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/nwis/dv7)	2011-8-25

Geospatial Extent

Bounding Box

All Defined

Vertical Extent (m)

All Defined

Upper Bound

Lower Bound

W E N S

Format: DD.DDDDD
Decimal Degrees

Login – University of Illinois at Urbana-Champaign

https://shibboleth.illinois.edu/idp/Authn/UserPassword

ILLINOIS LOGIN

You must log in to continue.

Enter your NetID:

Enter your Active Directory (AD) password:

Login

Forgot your Active Directory password?
To change or reset your Active Directory password, go to the [CITES Password Manager](#).

More Information

Where to Get Help
Contact the [CITES Help Desk](#) at consult@illinois.edu.

What Is a NetID?
Your NetID serves as your login to many University computing and networking services and also determines your University email address, which is netid@illinois.edu.
For more information, see the [Your Network ID \(NetID\)](#) page.

Technical Information

Service that has requested authentication:

Service Provider EntityID:
<https://clilogon.org/shibboleth>

This login service uses the following server:

shibboleth.illinois.edu

This page's URL should start with https:// followed by the server listed above.

For most web browsers, the security padlock icon for this page should be closed/locked.



OOI Example



Login – University of Illinois at Urbana
/://shibboleth.illinois.edu/idp/Authn/UserPassword

ILLINOIS LOGIN

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Enter your Active Directory (AD) password:

[Forgot your Active Directory password?](#)

[To change or reset your password, use the Password Manager.](#)



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OOI Integrated Observatory Network

INTEGRATED OBSERVATORY NETWORK
OCEAN OBSERVATORIES INITIATIVE

Resource Selector

View Existing
 All Registered Resources My Notification Settings
 My Registered Resources

All Registered Resources
Show 20 entries

Title	Provider	Type	Date Registered
APPROMATTOX RIVER AT MATOACA VA (02041650) - Daily Values	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwvsi/dv7)	2011-8-25
CHOPTANK RIVER AT GREENSBORO MD (01491000) - Daily Values	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwvsi/dv7)	2011-8-25
CONNECTICUT RIVER AT THOMASVILLE CT (01118400) - Daily Values	USGS NWIS	Daily Values Webservice (http://waterservices.usgs.gov/mwvsi/dv7)	2011-8-25

OOI Integrated Observatory Network

Resource Selector

View Existing

All Registered Resources My Notification Settings
 My Registered Resources

Geospatial Extent

Bounding Box

All Defined
 All Defined

N
W E S

Format: DD.DDDD
Decimal Degrees

Vertical Extent [m]

All Defined
 All Defined

Upper Bound
Lower Bound

Temporal Extent

Time Range All Defined

From: _____
To: _____

ISO Formatted Time in UTC
yyyy-mm-ddThh:mm:ssZ

My Registered Resources

Show 20 entries Filter: _____

Availability My Registration Title Original Source Title Publication Date Details

No data available in table

Showing 0 to 0 of 0 entries First Previous Next Last

Resource Registration Description
Resource Registration Contact Information
Resource Availability Settings
Resource Activation Settings
Original Source Description
Original Source Contact Information
Geospatial Coverage
Temporal Coverage
Variables
References

Search Select All Deselect All Delete Selected Save Changes

Sign out Account settings Help

Wrap Up

Thanks
for your
interest!

- More info
 - www.sciencegatewaysecurity.org
 - jbasney@illinois.edu
- References

Jim Basney, Rion Dooley, Jeff Gaynor, Suresh Marru, and Marlon Pierce, "Distributed Web Security for Science Gateways," Gateway Computing Environments Workshop (GCE11), November 17, 2011, Seattle, WA.

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