

NASA CDDIS: Important Changes to User Access

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Abstract

The Crustal Dynamics Data Information System (CDDIS) supports data archiving and distribution activities for the space geodesy and geodynamics community. The main objectives of the system are to make space geodesy and geodynamics related data and derived products available in a central archive, to maintain information about the archival of these data, to disseminate these data and information in a timely manner to a global scientific research community, and to provide user based tools for the exploration and use of the archive. Since its inception, the user community has utilized anonymous ftp for accessing and downloading files from the CDDIS archive. Although this protocol allows users to easily automate file downloads, many organizations, data systems, and users have already migrated from ftp or are actively pursuing a move away from the protocol due to problems from a system and security standpoint. Furthermore, U.S. Government agencies have become increasingly concerned about this legacy protocol and ensuring data integrity for the user community and have recently begun to disallow the use of the ftp protocol. The CDDIS, operated by NASA GSFC, must therefore address these concerns and provide alternative methods for access to its archive for continued easy and automated download of its contents. The poster discussed the upcoming changes at CDDIS and provided examples on transitioning from anonymous ftp.

1. Background

The CDDIS has a large international user community; over 245K unique hosts accessed the system in 2018. Today, users access the CDDIS archive through anonymous ftp and https. The ftp protocol allows users to easily automate file downloads but has problems from a system/security standpoint. As per U.S. Government and NASA directives, the CDDIS must begin to move users away from reliance on anonymous ftp. Regardless, the CDDIS staff is committed to ensuring continued, easy, open access to its archive. The staff is developing outreach materials, such as the poster presented at the 21st International Workshop on Laser Ranging, that aim to educate and assist users in transition to new access protocols.

The major reason for changing the archive access methods at CDDIS is system security and data integrity; ftp with its clear text username and password and lack of encryption, is just not acceptable in the current internet environment. In fact, some organizations have deprecated ftp or totally banned its usage. The ftp protocol also has the disadvantage of being a two-port protocol along with operating in both an active and passive mode. This mode means that EVERY firewall/switch in the network path between CDDIS and the user must be configured correctly to function reliably. Unfortunately, proper network configuration is too often not the case and, in most instances, outside the control of CDDIS or the data provider to fix.

The https protocol is as efficient as ftp transfer without the firewall/router issues of ftp. As stated previously, the two-port ftp protocol can result in connectivity problems (e.g., with firewall, router/switches, etc.); https is a one-port protocol with fewer issues with downloads. The archive

access through https continues to present the same structure as that provided through ftp. In addition, ftp:ssl access, an extension of ftp using TLS (transport layer security), can be used for scripting downloads from the CDDIS archive. Therefore, the CDDIS has implemented access to its full archive through https to alleviate these problems and comply with U.S. Government guidelines.

2. Overview of New Access Methods

As an alternative to anonymous ftp, the CDDIS has configured servers to utilize protocols that allow two new methods for system access: https (browser and command line) and ftp-ssl (command line). The CDDIS has implemented access to its full archive through these alternate means as systems and users continue to move away from using ftp. The current directory structure of the CDDIS archive does not change. The new access protocols will require users to update existing scripts implemented to access the CDDIS archive. Furthermore, the system uses Earthdata Login for access through https. For the near-term, access to data in the CDDIS archive will continue through ftp but users are strongly encouraged to explore the https and ftp:ssl capabilities as soon as possible.

2.1 Getting Started with https

Archive access through the https protocol utilizes a NASA single sign-on system, the EOSDIS Earthdata Login utility (Figures 1a-c) for user authentication. Thus, users must first register with the EOSDIS Earthdata Login to obtain a user ID for access to the archive. Earthdata Login (<https://urs.earthdata.nasa.gov/>) is the single mechanism for user registration and profile management for all Earth Observing System Data and Information System (EOSDIS) components. CDDIS, as one of the twelve EOSDIS Distributed Active Archive Centers (DAACs, <https://earthdata.nasa.gov/about/daacs>), is moving to be more integrated with its larger parent organization. In addition, Earthdata Login allows users to easily search and access the full breadth of all twelve EOSDIS DAAC archives. Earthdata Login also allows CDDIS staff to know our users better, which will then allow us to improve CDDIS capabilities.

Before users can utilize the https protocol to access the CDDIS archive, they must access the webpage, <https://cddis.nasa.gov/archive>, to establish an account and authorize access; this page will then redirect the user to the Earthdata Login page. The following procedure details the easy steps for user to begin and set up their system to use the https protocol to access the CDDIS archive:

1. User enters URL in browser: <https://cddis.nasa.gov/archive/>
2. System redirects user to the Earthdata Login page to input a username and password (Figure 1a)
3. If the user has an Earthdata Login account, the user enters the username and password credentials
4. If the user does not have an Earthdata Login account, they will be prompted to establish an account (Figure 1b)
5. System prompts the user to follow the instructions to create this account

6. System then asks the user to authorize the Earthdata Login access to the user's Earthdata profile; this step is only necessary the first time the system is used to access the CDDIS archive and will not be required for future download sessions.
7. Once the user has an Earthdata Login account, system redirects user to the CDDIS archive (Figure 1c).

The user now has all permissions required to access the CDDIS archive via a browser (Figure 3) or via a command line interface (Figures 4a-c).

EARTHDATA LOGIN

CDDIS
Crustal Dynamics Data Information System

Username

Password

Stay signed in (this is a private workstation)

I don't remember my username
 I don't remember my password
 Help

Why must I register?

The Earthdata Login provides a single mechanism for user registration and profile management for all EOSDIS system components (DAACs, Tools, Services). Your Earthdata login also helps the EOSDIS program better understand the usage of EOSDIS services to improve user experience through customization of tools and improvement of services. EOSDIS data are openly available to all and free of charge except where governed by international agreements.

Get single sign-on access to all your favorite EOSDIS sites

EARTHDATA LOGIN My Profile

You are already logged in, and we are redirecting you back to the previous site.

If you are not redirected, click the button below.

EARTHDATA LOGIN

Register for an Earthdata Login Profile

Profile Information

Username:

Password:

Password Confirmation:

Required field

Username must:

- Be a Minimum of 4 characters
- Be a Maximum of 30 characters
- Use letters, numbers, periods and underscores
- Not contain any blank spaces
- Not begin, end or contain two consecutive special characters(. _)

Password must contain:

- Minimum of 8 characters
- One Uppercase letter
- One Lowercase letter
- One Number

User Information

First Name: **Middle Initial:**

Last Name: **E-mail:**

Country Information

Country:

Affiliations

Affiliation: **User Type:**

If 'other' selected above:

Organization:

Study Area:

Agreements

Please notify me via email with important information about EOSDIS science data products (e.g. updates, new data releases, quality issues), EOSDIS applications/tools (e.g. updates, service outages), and other relevant information for users.

Yes, I'm interested in Meris and ESA Sentinel-3 Data.

I acknowledge that all Earthdata Login applications running in DAACs will have access to my profile information. Information in user profiles complies with NASA's Web Privacy Policy

By accessing and using this information system, you acknowledge and consent to the following:

You are accessing a U.S. Government information system, which includes: (1) this computer; (2) this computer network; (3) all computers connected to this network including end user systems; (4) all devices and storage media attached to this network or to any computer on this network; and (5) cloud and remote information services. This information system is provided for U.S. Government-authorized use only. You have no reasonable expectation of privacy regarding any communication transmitted through or data stored on this information system. At any time, and for any lawful purpose, the U.S. Government may monitor, intercept, search, and seize any communication or data transiting, stored on, or traveling to or from this information system. You are NOT authorized to process classified information on this information system. Unauthorized or improper use of this system may result in suspension or loss of access privileges, disciplinary action, and civil and/or criminal penalties.

I'm not a robot

Figure 1a. Earthdata Login access page; enter existing username and password or creates a new username.

Figure 1c. Following a successful log in to Earthdata Login, user is redirected to CDDIS archive.

Figure 1b. If user does not have an Earthdata Login account, a registration page is displayed.

2.2 Browser Interface

After successful registration and Earthdata Login, the user has access to the CDDIS archive using the https protocol. The user can enter the address in a browser to access the archive through the web (Figure 2) or can use the command line interface (e.g., through cURL or Wget) to script and automate file retrieval from the CDDIS archive. The web-based interface allows for simple, interactive download of files by clicking folders and files (Figure 2).



Figure 2. Web browser interface to the CDDIS archive.

2.3 Command Line Examples

In addition to a web browser interface, users can create scripts for a command line interface to download files from the archive; cURL is one of the supported programs that can be used for the bulk download of files, particularly through making modifications to the user's existing scripts.

The following examples assume the user has a valid Earthdata Login account (see section 2.1 above). Command line access requires two files are present in the user's local account:

- `.netrc` file: contains login and initialization information required by the auto-login process

- cookie file: a text file that stores the cookie required by the Earthdata Login application

The following credentials are used in the command line examples shown in Figures 3a-c below:

- Earthdata Login username: ***edluser***
- Earthdata Login password: ***edlpword***
- Earthdata Login cookie file: ***edl_cookie_file***

The user must follow several initial steps in order to use cURL for interfacing to the archive through the command line:

1. Ensure cURL is installed on the local system
2. Create a text file named `.netrc` and add a line for Earthdata Login validation
3. Set permissions to user read-only on the `.netrc` file to ensure no one can read user's credentials
4. Create a cookie file

Figure 3 shows an example of these commands and their results. It should be noted that this figure and the examples in Figures 4a-c illustrate commands for a Linux/UNIX-based system.

```
> curl
curl: try 'curl --help' or 'curl --manual' for more information
>
> touch .netrc
> echo "machine urs.earthdata.nasa.gov login edluser password edlpword" > .netrc
>
> chmod 0600 .netrc
> ls -l .netrc
-rw----- 1 user usergroup 66 Jun 19 14:36 .netrc
>
> touch .edl_cookie_file
>
```

Figure 3. Commands to ensure user's local computer environment is properly configured to use cURL for command line interface to CDDIS archive through https.

Figures 4a-c provide examples of using cURL commands to list and download files from the CDDIS archive:

- Get a list of files in a directory matching a pattern
- Download a single file
- Download a group of files within a range

The user should refer to documentation for cURL to learn more about the command line flags (e.g., `-n`, `-c`, `-L`, etc.) specified in the examples below.

```

>
> curl -c .edl_cookie_file -n -L
"https://cddis.nasa.gov/archive/slr/slrlog/*_2018*.log?list"
borl_20180615.log      32773
godl_20180723.log     33466
ha4t_20180504.log     30380
.:
.:
monl_20180723.log     24334
thtl_20180723.log    23578
# Total number of files = 17
# Total file size = 534587
>

```

Figure 4a. Command to list files matching a pattern (SLR site log files updated in 2018).

```

>
> curl -c .edl_cookie_file -b .edl_cookie_file -n -L
"https://cddis.nasa.gov/archive/slr/cpf_predicts/current/jason3_cpf_181001_7741.cne" -O
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
  0  465    0    0    0    0    0    0  --:--:-- --:--:-- --:--:--    0
100  289    0  289    0    0    53    0  --:--:-- 0:00:05 --:--:--   71
  0  266    0    0    0    0    0    0  --:--:-- 0:00:10 --:--:--    0
  0    0    0    0    0    0    0    0  --:--:-- 0:00:10 --:--:--    0
100 22141    0 22141    0    0  2034    0  --:--:-- 0:00:10 --:--:--  2034
>
> ls -l jason3*
-rw-r--r--  1 user      usergroup  22141 Oct 25 14:37 jason3_cpf_181001_7741.cne
>

```

Figure 4b. Command to download a single file (current SLR CPF prediction file for Jason-3) and verify it is stored on the user's local computer.

```

>
> curl -c .edl_cookie_file -b .edl_cookie_file -n -L
"https://cddis.nasa.gov/archive/slr/data/npt_crd/allsat/2018/allsat_2018100[1-9].npt" -O
--_curl_--https://cddis.nasa.gov/archive/slr/data/npt_crd/allsat/2018/allsat_20181001.npt
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
100 1539k  100 1539k    0    0  5527k    0  --:--:-- --:--:-- --:--:--  5537k

[2/9]: https://cddis.nasa.gov/archive/slr/data/npt_crd/allsat/2018/allsat_20181002.npt -->
allsat_20181002.npt
--_curl_--https://cddis.nasa.gov/archive/slr/data/npt_crd/allsat/2018/allsat_20181002.npt
100 1624k  100 1624k    0    0  6561k    0  --:--:-- --:--:-- --:--:--  6561k
.:
.:
[9/9]: https://cddis.nasa.gov/archive/slr/data/npt_crd/allsat/2018/allsat_20181009.npt -->
allsat_20181009.npt
--_curl_--https://cddis.nasa.gov/archive/slr/data/npt_crd/allsat/2018/allsat_20181009.npt
100 1950k  100 1950k    0    0  6930k    0  --:--:~ --:~:~ --:~:~  9.8M
>
> ls -l allsat*
-rw-r--r--  1 user      usergroup  1576424 Oct 25 14:17 allsat_20181001.npt
-rw-r--r--  1 user      usergroup  1663636 Oct 25 14:17 allsat_20181002.npt
.:
.:
-rw-r--r--  1 user      usergroup  1996817 Oct 25 14:17 allsat_20181009.npt
>

```

Figure 4c. Command to download a group of files (all SLR "allsat" normal point data files for October 01-09, 2018) and verify the files are stored on the user's local computer.

3. Future Plans

The https protocol access method is now available for use by the global community. In addition to examples using the cURL utility, users can use the Wget command to script access to CDDIS. The CDDIS staff is currently working on documentation for the CDDIS website in using Wget and examples of commands. Additional examples on using cURL and Wget will soon be available on the CDDIS website; users are encouraged to consult the available documentation at:

https://cddis.nasa.gov/About/CDDIS_File_Download_Documentation.html

as well as various presentations on these updates to the CDDIS archive access:

<https://cddis.nasa.gov/Publications/Presentations.html>

The staff is in the process of implementing ftp:ssl access to the archive; ftp:ssl is another option for users to access CDDIS and is the option most similar to standard anonymous ftp. As with https, ftp:ssl will satisfy U.S. Government/NASA requirements for encryption.

The staff is also testing implementation of a WebDAV (Web Distributed Authoring and Versioning) interface to provide another method for accessing CDDIS archive. If feasible for CDDIS, this interface method would allow users to securely connect to the CDDIS archive as if it were a local drive on their computer.

4. Conclusions

In the near future, the CDDIS cannot and will no longer support non-encrypted anonymous ftp access to its archive. Users are STRONGLY encouraged to update their access methods and scripts as soon as possible to use the available protocols, https and ftp:ssl. Documentation is available on the CDDIS website; for additional help, users can contact the user support staff at:

support-cddis@earthdata.nasa.gov

The staff welcomes feedback on the CDDIS and in particular the ideas expressed in the poster and paper; users are encouraged to contact the authors to provide feedback or obtain additional information about the CDDIS. The data and products available through the CDDIS archive are acquired as part of NASA's Earth Science Data Systems and archived and distributed by the Crustal Dynamics Data Information System (CDDIS). Users of the CDDIS are asked to cite the system in their publications:

C. Noll, The Crustal Dynamics Data Information System: A resource to support scientific analysis using space geodesy, *Advances in Space Research*, Volume 45, Issue 12, 15 June 2010, Pages 1421-1440, ISSN 0273-1177, DOI: 10.1016/j.asr.2010.01.018.