

# Handling large data within SNIC, using SweStore

JONAS LINDEMANN



# SweStore

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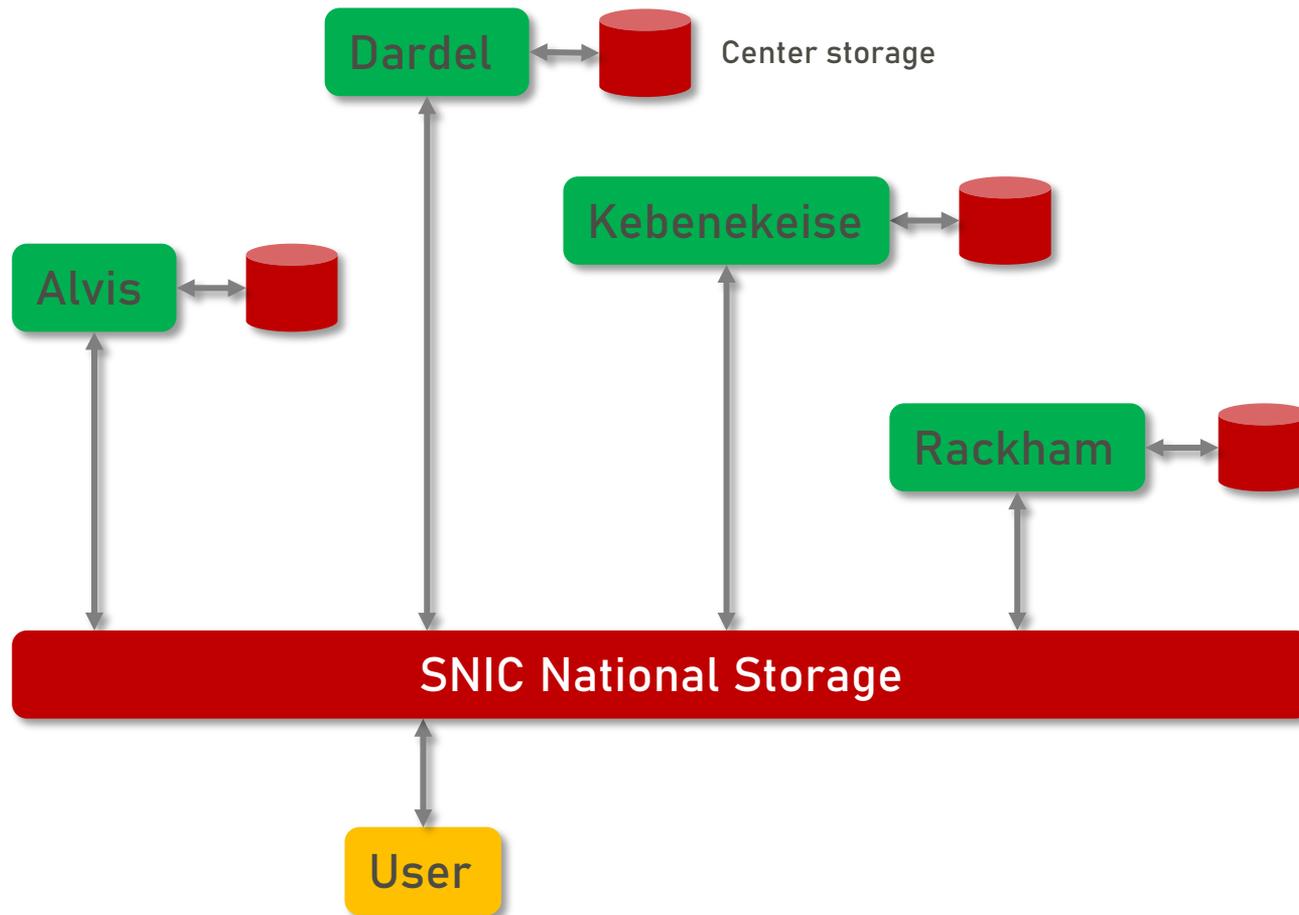


- Mission
  - offload the Centre storage resources
  - “Intermediate” storage resource
- Uses the dCache storage service
- Distributed storage system
  - Storage pools spread geographically
- Supports most common access protocols



# Storage at SNIC

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# SweStore - Policy

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- SweStore is for active research data
- SweStore is an intermediate term storage service
- Swestore is NOT supposed to be used for backups and such requests for allocation will be rejected.
- Swestore is not supposed to be used as archiving service, long-term storage or repository for “static” data.
  - Once data is no longer in the process of change, and decision on which data should be retained shared and/or preserved has been taken, data should be moved toward appropriate data services.
  - The higher education institutions are responsible for archiving and long-term preservation of research data produced by researchers employed by them;



# Applying for storage

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# Applying for SNIC National Storage

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- Apply for resources via SNIC
- For more information goto
  - <https://www.snic.se/allocations/storage/>
- Applications are handled through SUPR
  - Small up to 10 TiB (continuous application rounds)
  - Medium up to 50 TiB (continuous application rounds)
  - <https://supr.snic.se/round/storage>



# Applying for SNIC National Storage

Start / Rounds

## Rounds

Resources are made available through rounds, in which projects proposals are made. First, you need to select the type of round to use:

<b>Compute Rounds</b> Access to resources for high performance computing. <a href="#">Go to Compute Rounds</a>	<b>Storage Rounds</b> Access to storage resources at centres and nation-wide. <a href="#">Go to Storage Rounds</a>	<b>SNIC SENS</b> Access to HPC resources specifically for analyzing sensitive data. <a href="#">Go to SNIC SENS</a>
<b>SNIC Science Cloud</b> Access to SNIC cloud resources. <a href="#">Go to SNIC Science Cloud</a>	<b>SNIC AI/ML</b> Access to SNIC AI and Machine Learning resources. <a href="#">Go to SNIC AI/ML</a>	<b>SNIC Dedicated User Support</b> Dedicated user support for users of ongoing SNIC compute, cloud, and storage projects. <a href="#">Go to SNIC Dedicated User Support</a>

You can also view all rounds (including closed and decided).

Select Storage Rounds



# Applying for SNIC National Storage

The screenshot shows the 'Storage Rounds' page on the SNIC SUPR website. The page title is 'Storage Rounds' and the URL is 'https://supr.snic.se/round/storage/'. The page content is organized into a grid of six storage options, each with a description and a 'Go to' button. The options are:

- SNIC Small Storage:** Storage at SNIC centres. Continuous evaluation of proposals during the year. To apply, you must be a scientist in Swedish academia, at least at the level of PhD student. Button: [Go to SNIC Small Storage](#)
- SNIC Medium Storage:** Storage at SNIC centres. Monthly evaluation of proposals during the year. To apply, you must be a scientist in Swedish academia, at least at the level of assistant professor. Button: [Go to SNIC Medium Storage](#)
- SNIC Large Storage:** Storage at SNIC centres and national dCache and iRODS storage. Evaluation of proposals twice a year with a peer-review procedure. To apply, you must be a scientist in Swedish academia, at least at the level of assistant professor. Button: [Go to SNIC Large Storage](#)
- Swestore Small:** National dCache and iRODS storage. Monthly evaluation of proposals during the year. To apply, you must be a scientist in Swedish academia, at least at the level of PhD student. Button: [Go to Swestore Small](#)
- Swestore Medium:** National dCache and iRODS storage. Monthly evaluation of proposals during the year. To apply, you must be a scientist in Swedish academia, at least at the level of assistant professor. Button: [Go to Swestore Medium](#)
- Centre Local Storage:** Local resources that are not allocated via SNIC. Conditions are described per round. Button: [Go to Centre Local Storage](#)

Two yellow arrows point to the 'Swestore Small' and 'Swestore Medium' options, indicating they are the recommended project types.

Select Swestore  
project type



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# Applying for SNIC National Storage

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## SNIC Medium Swestore 2020

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### This Round is Open for Proposals

More information about this round is available at <https://www.snic.se/allocations/storage/swestore/>.

This round is open for proposals until 2021-01-01 00:00.

Create New Proposal for SNIC Medium Swestore 2020



Create storage proposal

### Resources

Resource	Centre	Upper Limit	Available	Unit	Note
 dCache	Swestore	100	1 000	TiB	



# Applying for SNIC National Storage

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## Create New Proposal for SNIC Medium Swestore 2020

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### Checklist

Before creating a new proposal, please consider the points below. Proposals not meeting these requirements cannot be approved.

- You (**Jonas Lindemann**) must be the principal investigator (PI) for the proposal.
- The proposal must contain all mandatory information.
- The proposal must be submitted before the deadline (**2021-01-01 00:00**).

You may choose to create a proposal from scratch or by cloning information from an earlier proposal.

### Alternative 1: Create Proposal from Scratch

To create a proposal from scratch for SNIC Medium Swestore 2020, please start by providing a title for the proposal.

Principal Investigator	Jonas Lindemann
Round	SNIC Medium Swestore 2020
Project Title *	<input type="text"/>
	<input type="button" value="Create New Proposal"/>

### Alternative 2: Create Proposal Based on Earlier Proposal

To create a proposal for SNIC Medium Swestore 2020 by cloning information from an earlier proposal, please choose an earlier proposals to use as a template.

Principal Investigator	Jonas Lindemann
Round	SNIC Medium Swestore 2020
Proposal to Clone *	<input type="text" value="-"/>
	<input type="button" value="Clone Proposal"/>



# Applying for SNIC National Storage

**SNIC SUPR**

Admin User

Start  
Reviews  
  Reviewer Competence  
Proposals  
  SNIC 2018/13-14  
  SNIC 2018/12-27  
  SNIC 2018/12-28  
Rounds  
Projects  
  LVIS 2017/5-1  
Groups  
  application-experts  
  lunarc-staff  
  SNIC-application-mgmt  
  snic-partnercommittee  
  SNIC-training-subscribe  
  SONC  
  swestore-operations  
  wicg-tier2  
Accounts  
Personal Information  
Support  
Logout

Logged in as:  
Jonas Lindemann  
(jonas.lindemann@lunarc.lu.se)  
Turn on warning colour.

Start / Proposals / SNAC Small Swestore 2018 / **SNIC 2018/12-28** / Admin

## Testproject (SNIC 2018/12-28)

Your proposal has been created. Please continue to fill it out.

**Instructions:** Get started by editing the basic information for your proposal below. Add any co-investigators you have for your proposal. Finally, submit the proposal (it will not be handled unless you do that).

Information about this round is available at <https://www.snic.se/allocations/swestore/>.

**Dnr:** SNIC 2018/12-28  
**State:** Editing (not yet submitted)  
**Round:** SNAC Small Swestore 2018  
**Principal Investigator:** Jonas Lindemann

[Check Principal Investigator Information](#)

### Basic Information

**Project Title:** Testproject  
**Directory Name:**  
**Abstract:**  
**Resource Usage:**  
**Affiliation:** Lunds universitet  
**Primary Classification Code:**  
**Requested Duration:** 12 months

[Edit Basic Information](#)

### Co-Investigators

There are no co-investigators for this proposal.

[Add Co-Investigator](#)

### Resources

Click on the linked resource name below to show more information about the resource in this proposal.

Resource	Requested Unit
<a href="#">dCache @ Swestore</a>	10 TiB

Small = 10 TiB



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# Accessing dCache storage

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# SNIC Supported access protocols

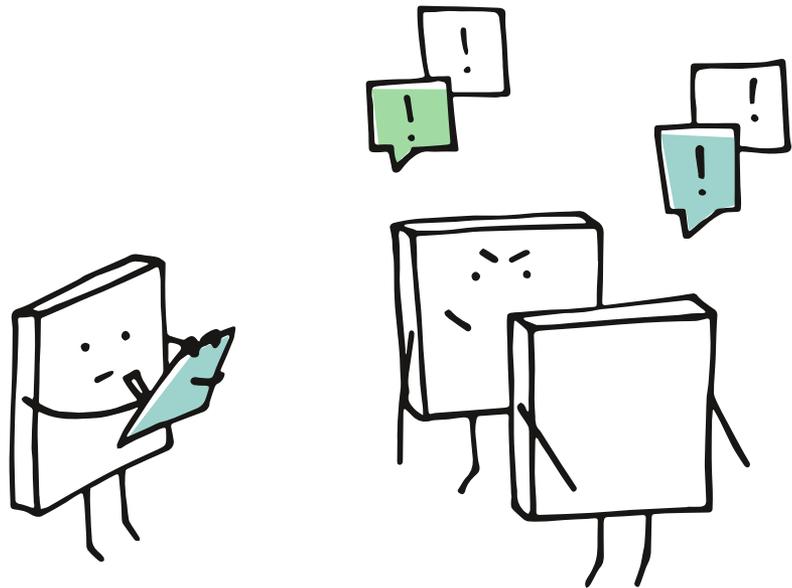
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## GridFTP

- Also called gsiftp. Well supported in dCache.
- Mostly used in high energy physics

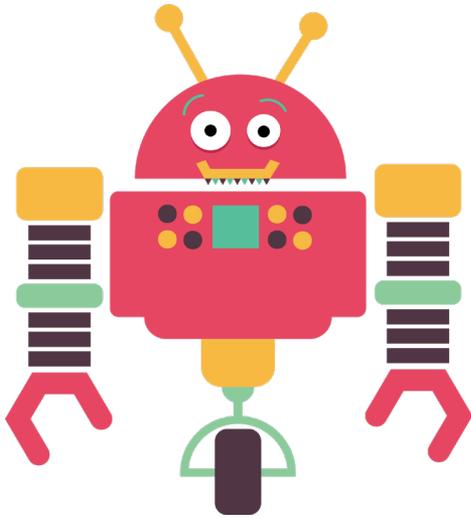
## HTTP/WebDav

- Recommended protocol for SweStore.
- Can be mounted as a network drive
- Many clients available
- Data also available directly on the web



# Supported clients

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- Graphical Clients
  - **WinSCP** (Windows)
  - **CyberDuck** (Windows and macOS X)
  - **WebDav** network mount (Linux, Windows and macOS X)
- Command line clients
  - **NorduGrid ARC** command line clients
  - **Rclone** – command line tool
- ... and more
  - See documentation



# Client usage matrix

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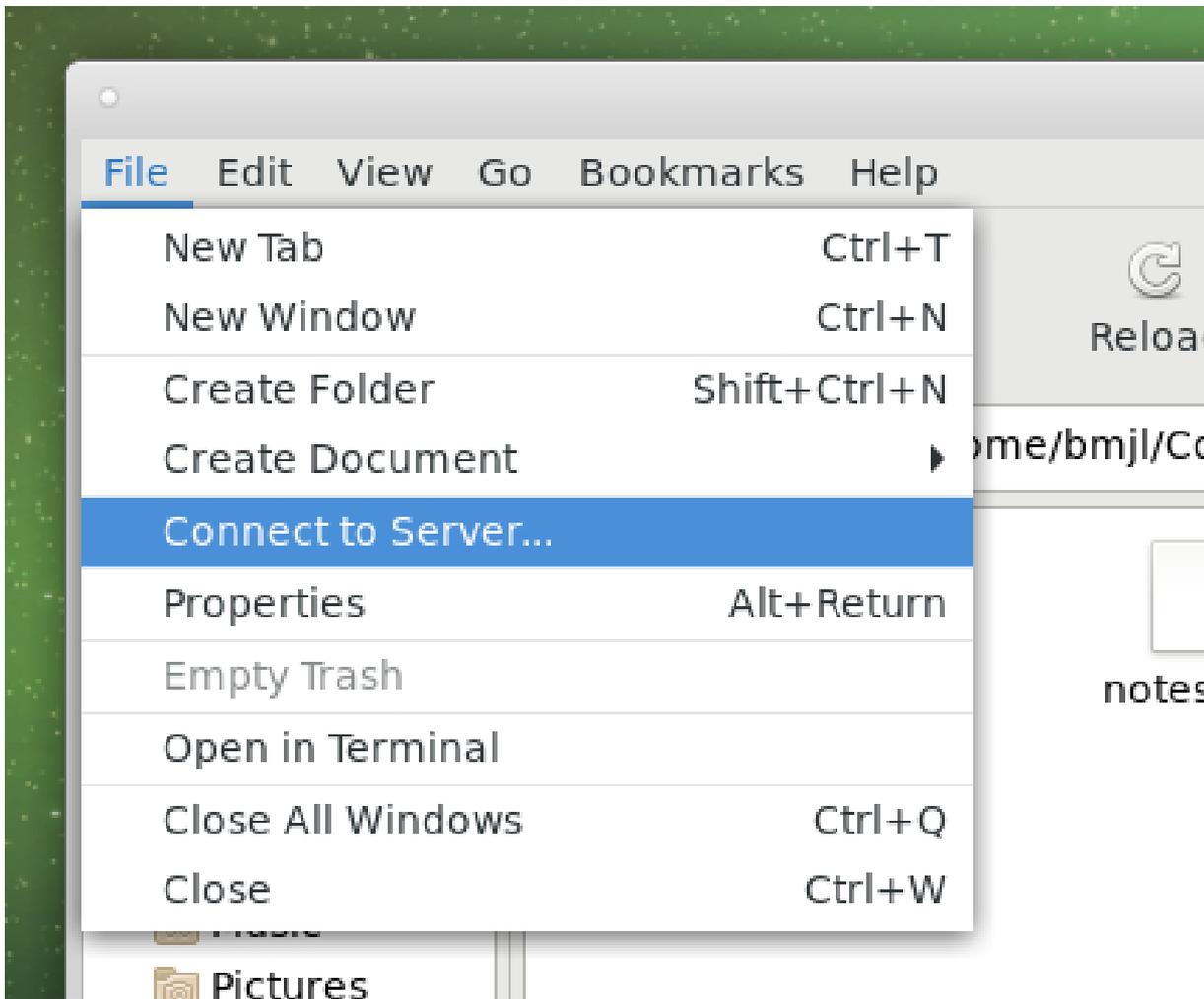
Client	UI	Mount	Command line	Automation	Platform
WinSCP	•				Windows
CyberDuck	•				macOS, Win
WebDav	•	•	(•)		All
NorduGrid ARC			•	•	Linux
Rclone			•	•	All



# Mounting as drive (Linux)

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This example shows how dCache is mounted using the Caja file browser in the MATE Desktop environment.

Similar procedure is applicable in other Linux desktop environments.



**Connect to Server**

**Server Details**

Server:  Port:

Type:

Folder:

**User Details**

User Name:

Password:

Remember this password

Add bookmark

Bookmark Name:

Don't check the "Remember this password". Use a password manager such as KeePassX or similar.



storage-training



File Edit View Go Bookmarks Help

Back Forward Up Stop Reload Home Computer 100% Icon View Search

Places Location: davs://s\_jonli@webdav.swestore.se/snic/storage-training

- Computer**
  - bmjl
  - Desktop
  - File System
  - Documents
  - Downloads
  - Music
  - Pictures
  - Videos
  - Trash
- Network**
  - s\_jonli ...
  - Browse Net...

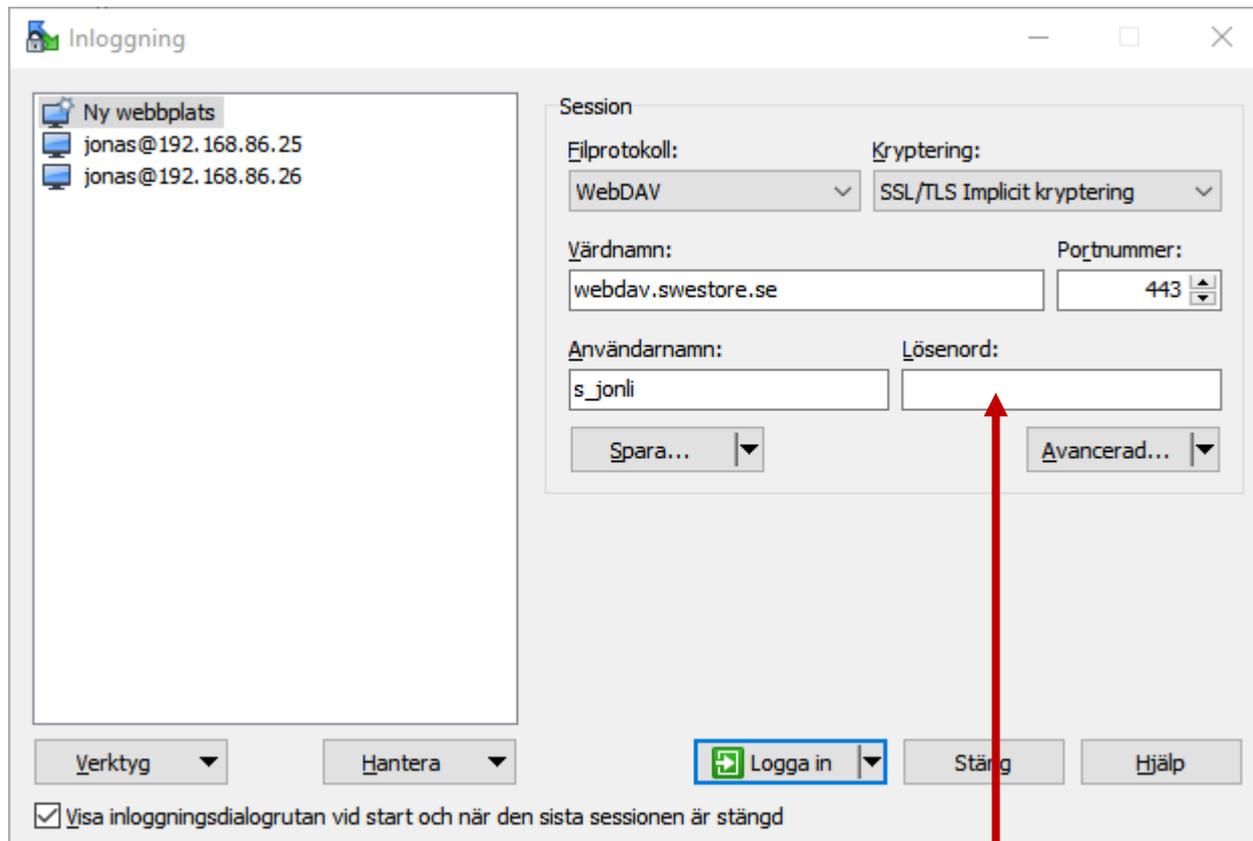
Course

1 item

# WinSCP

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Don't save the password with the session. Use a password manager such as KeePassX or similar.



storage-training - s\_jonli@webdav.swestore.se - WinSCP

File Kommandon Markera Session Visa Hjälp

Adress /snic/storage-training

Sök filer.. Ladda ner Redigera Ny Egenskaper Synchronisera

Överföringsinställningar Standard

s\_jonli@webdav.swestore.se x Ny session

- mouse\_brain
- ngs-data
- ops
- parathyroidfusion
- patent\_data
- pdcc-perftest
- plog\_amazon
- pnapirnaseq
- polgen
- prace4lofar
- predixcan\_asap\_davaaca
- reference\_4
- releasefactors14
- repair
- safer
- salix\_genome
- scanoats\_oat\_genome
- shiftcomp
- slumeg
- snd
- snic2019-8-237
- snic2020-4-19
- snic2020-21-14
- snic2020-21-16
- snic2020-21-17
- snic2020-22-10
- snylin\_16\_01
- ssc2017
- storage\_abdv
- storage-training
  - Course
- subatom-swestore

Course

69% Överför

File: C:\Users\Jonas Lindemann\Desktop\skivarp.png  
Mål: /snic/storage-training/

Tid kvar: 0:00:03 Förluten tid: 0:00:07  
Bytes överförda: 138 MB Hastighet: 19,5 MB/s

Obegränsad

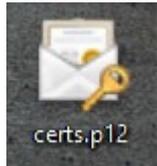
0 B av 0 B i 0 av 1

WebDAV 0:00:40

# Mounting as drive (Windows)

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←  Guiden Importera certifikat ×

## Välkommen till guiden Importera certifikat

Den här guiden hjälper dig att kopiera certifikat, listor över betrodda certifikat och listor över återkallade certifikat från din hårddisk till ett certifikatarkiv.

Ett certifikat, som utfärdas av en certifikatutfärdare, bekräftar din identitet och innehåller information som används för att skydda data eller för att etablera säkra nätverksanslutningar. Ett certifikatarkiv är ett systemområde där certifikat förvaras.

Plats

Aktuell användare

Lokal dator

Klicka på Nästa om du vill fortsätta.



←  Guiden Importera certifikat ×

**Fil som ska importeras**  
Ange vilken fil du vill importera.

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Filnamn:

Obs! Mer än ett certifikat kan lagras i samma fil i följande format:

- Personal Information Exchange- PKCS #12 (.PFX,.P12)
- Standard för kryptografisk meddelandesyntax- PKCS #7-certifikat (.P7B)
- Microsoft serialiserat certifikatarkiv (.SST)



←  Guiden Importera certifikat

**Skydd av privat nyckel**  
För att upprätthålla säkerheten skyddades den privata nyckeln med ett lösenord.

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Ange lösenordet för den privata nyckeln.

Lösenord:

Visa lösenord

Importalternativ:

- Aktivera starkt skydd av den privata nyckeln. Varje gång ett program använder nyckeln, kommer du att meddelas om detta alternativ aktiveras.
- Ange att den här nyckeln kan exporteras. Detta gör att du kan säkerhetskopiera eller flytta dina nycklar vid ett senare tillfälle.
- Skydda privat nyckel med virtualiseringsbaserad säkerhet (kan ej exporteras)
- Ta med alla utökade egenskaper.



←  Guiden Importera certifikat

### Certifikatarkiv

Ett certifikatarkiv är ett systemområde där certifikat förvaras.

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Ett certifikatarkiv kan väljas automatiskt, eller så kan du ange en plats för certifikatet.

- Välj certifikatarkiv automatiskt utifrån certifikattyp
- Placera alla certifikat i nedanstående arkiv

Certifikatarkiv:

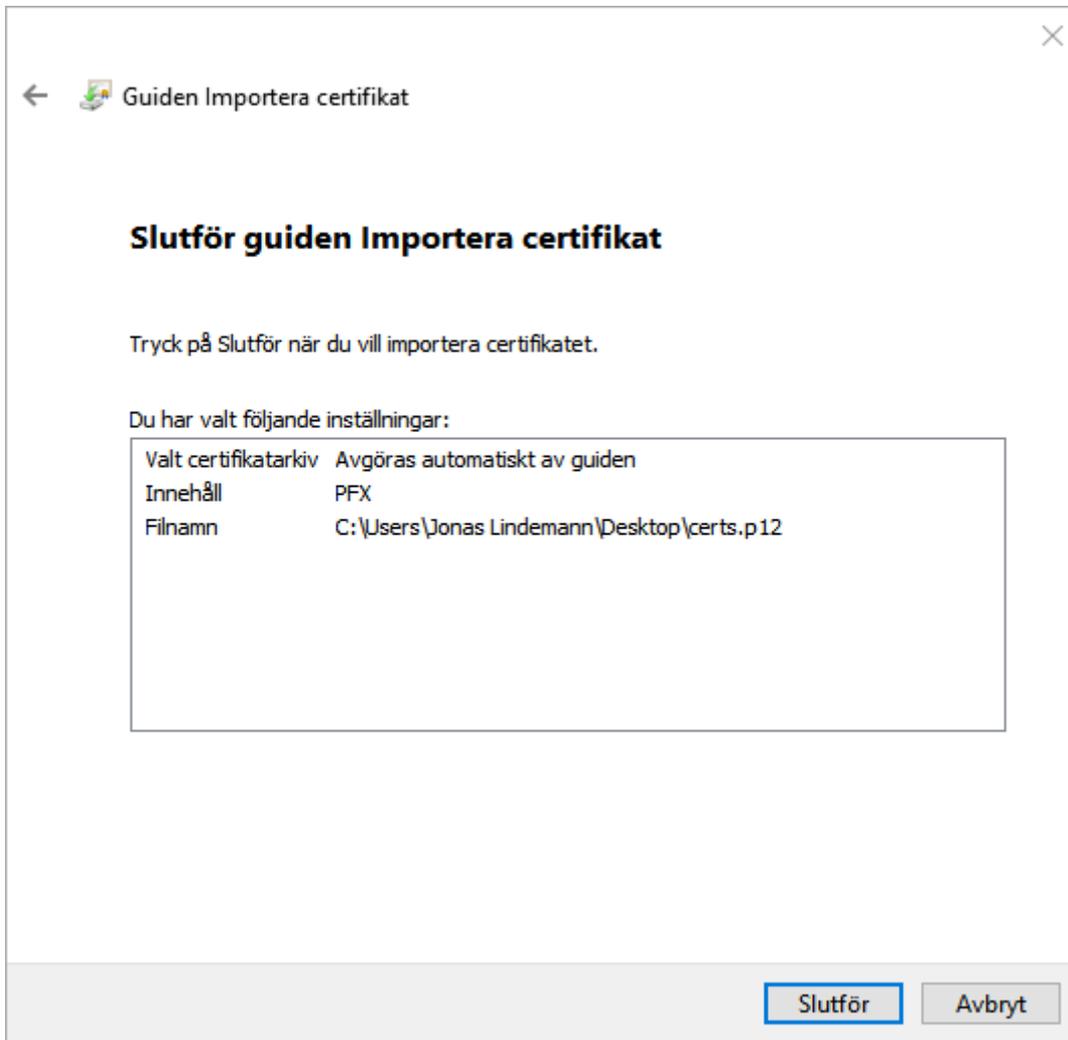
Bläddra...

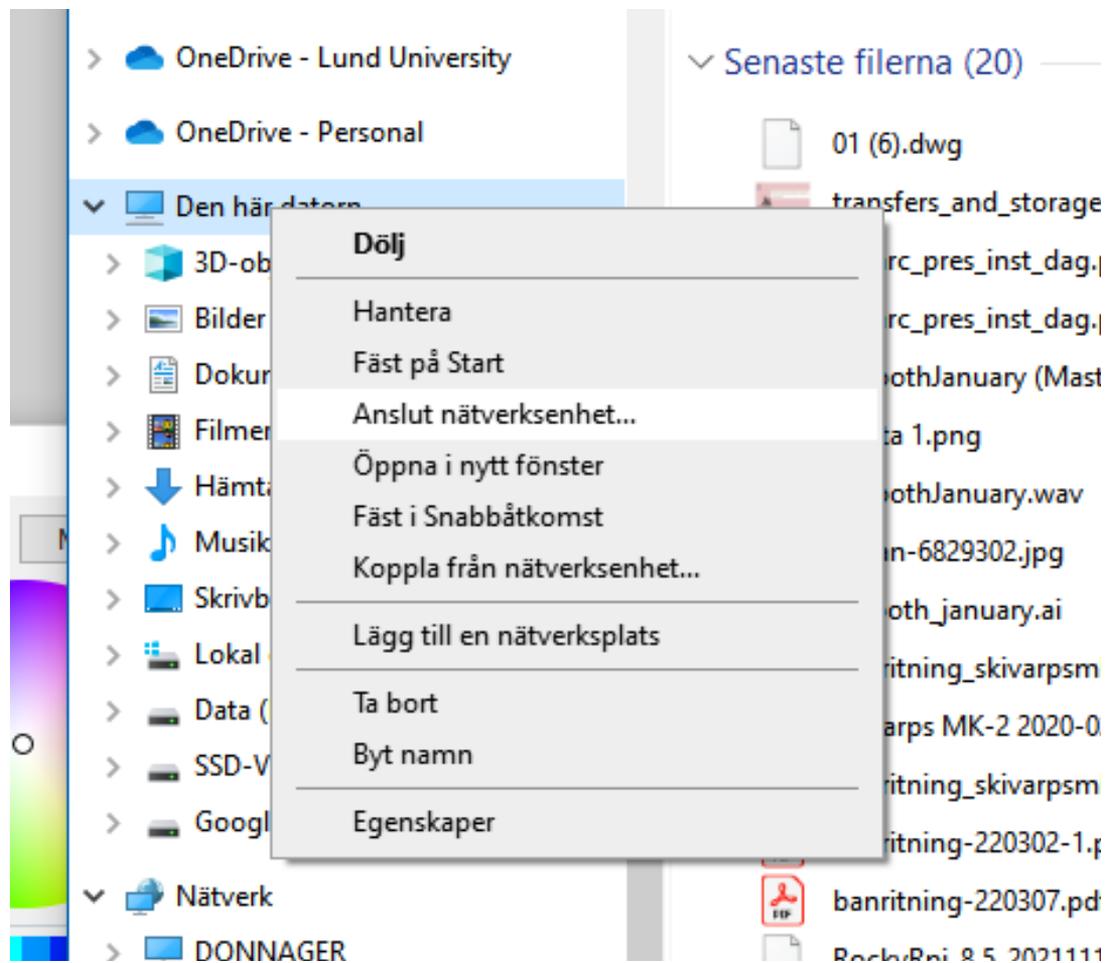
Nästa

Avbryt



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Anslut nätverksenhet

### Vilken nätverksmapp vill du ansluta?

Ange enhetsbeteckningen för anslutningen och mappen som du vill ansluta till:

Enh<sup>e</sup>t: Z: ▾

Mapp:  ▾

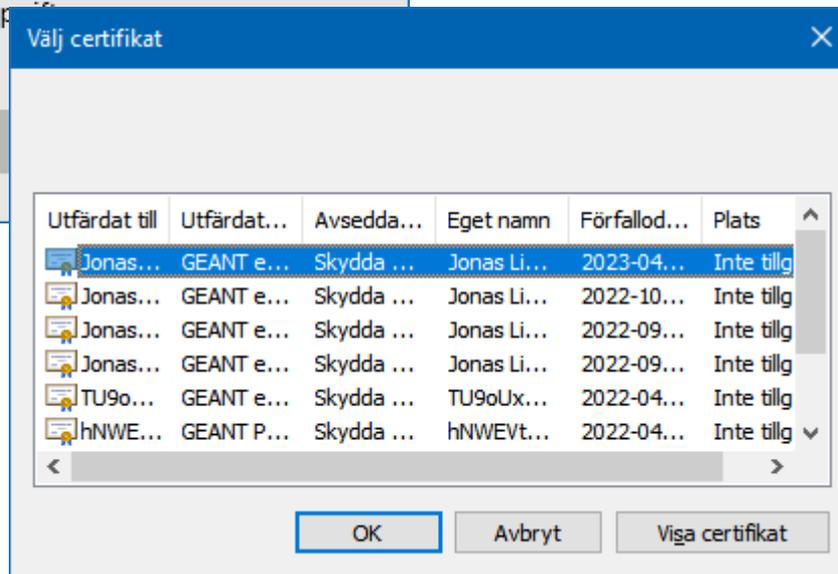
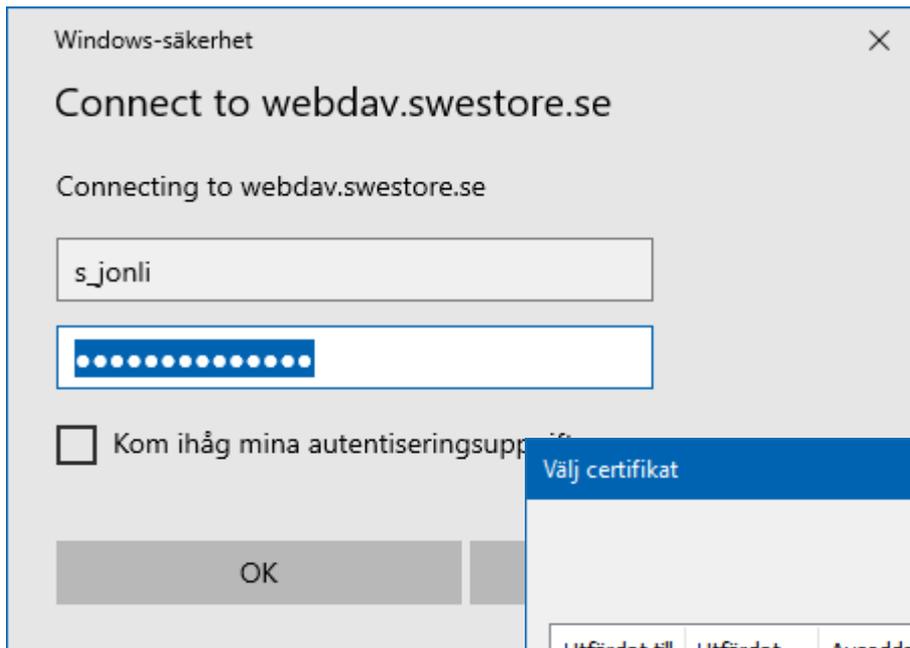
Exempel: \\server\resurs

Återanslut vid inloggning

Anslut med andra autentiseringsuppgifter

[Anslut till en webbplats som du kan använda för att lagra dokument och bilder.](#)





Arkiv Start Dela Visa Enhetsverktyg

Fäst i Snabbåtkomst Kopiera Klippa in Klipp ut Kopiera sökväg Klippa in genväg Urklipp

Flytta till Kopiera till Ta bort Byt namn Ny mapp Ordna

Nytt objekt Enkel åtkomst Nytt Egenskaper Öppna Redigera Historik Öppna Markera alla Avmarkera alla Invertera markering Markera

Den här datorn > storage-training (\\webdav.swestore.se@SSL\DavWWWRoot\snic) (Z:) > Sök i storage-training (\\webdav.swestore.se@SSL\Da...

Namn	Senast ändrad	Typ	Storlek
Course	2022-02-14 16:44	Filmapp	

Dropbox

- Byggmek
- Development
- Privat
- Public
- Shared
- Zoom Media
- sketch2847.zip

Lund University

OneDrive - Lund University

OneDrive - Personal

Den här datorn

- 3D-objekt
- Bilder
- Dokument
- Filmer
- Hämtade filer
- Musik
- Skrivbord

Lokal disk (C:)

- Data (D:)
- SSD-Video (E:)
- Google Drive (G:)
- storage-training (\\webdav.swesto

Nätverk

- DONNAGER

Microsoft Windows [Version 10.0.19044.1586]  
(c) Microsoft Corporation. Med ensamrätt.

C:\Users\Jonas Lindemann>net use z: https://webdav.swestore.se/snic/storage-training /user:s\_jonli|

Välj certifikat

Utfärdat till	Utfärdat...	Avsedda...	Eget namn	Förfallod...	Plats
 Jonas...	GEANT e...	Skydda ...	Jonas Li...	2023-04...	Inte tillg
 Jonas...	GEANT e...	Skydda ...	Jonas Li...	2022-10...	Inte tillg
 Jonas...	GEANT e...	Skydda ...	Jonas Li...	2022-09...	Inte tillg
 Jonas...	GEANT e...	Skydda ...	Jonas Li...	2022-09...	Inte tillg
 TU9o...	GEANT e...	Skydda ...	TU9oUx...	2022-04...	Inte tillg
 hNWE...	GEANT P...	Skydda ...	hNWEvt...	2022-04...	Inte tillg

OK    Avbryt    Visa certifikat

# NorduGrid ARC

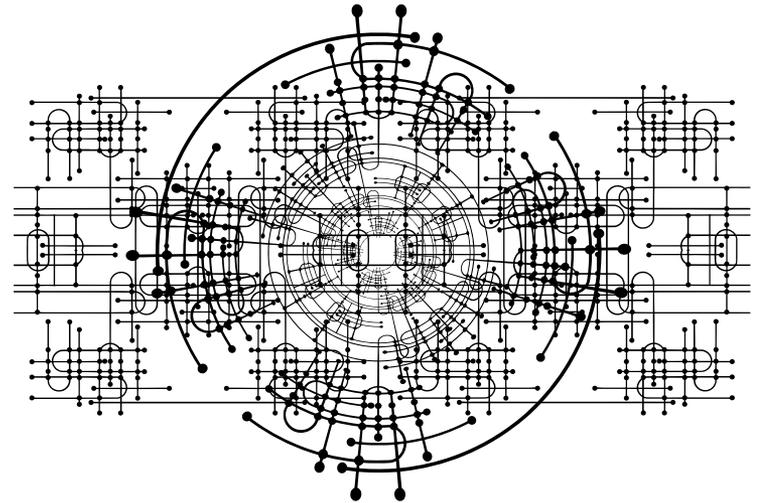
---



# NorduGrid ARC Middleware

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- Command line client for accessing storage resources
- Developed for accessing storage resources within the Worldwide LHC Computing Grid (WLCG) project
- dCache was also developed in the WLCG project
- Uses certificate based authentication



# Storage commands in ARC

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- **arccp**
  - Copy files to and from storage resources
  - Handles most grid protocols such as: http, https, httpg, ftp, gsiftp, lfc, rls, srm
- **arcls**
  - List files and directories on storage resources
- **arcrm**
  - Removing files on resources
- **arcmkdir**
  - Create directories
- Most commands are similar to corresponding Linux/Unix commands with “less functionality”



# Obtaining a certificate - Requirements

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- Your organization must be set up to allow this
- A tool for testing this is the Sectigo SSO check page on <https://cert-manager.com/customer/sunet/ssocheck>
- Your identity must fulfill the requirements for requesting personal certificates, within Sweden the requirement is SWAMID Assurance Level 2 Profile (SWAMID AL2), or higher.
- Enabling this only needs to be done once. Routines for this vary among organizations, it typically involves visiting a helpdesk to show an identity document to verify your identity.



# Requesting a certificate

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- Got to the following page:
  - <https://cert-manager.com/customer/sunet/idp/clientgeant>





Access to

Sectigo Certificate Manager

## Choose Your Institution

Recent institutions

---

 **Lund University** ➤  
lu.se

---

[+ Add another institution](#)

[Edit](#)



[IN ENGLISH](#)

## LUNDS UNIVERSITET

Du är i färd med att logga in i **Sectigo Certificate Manager**

Användarnamn

Lösenord

LOGGA IN

Detta är Lunds universitets identitetsutgivare (eng. Identity Provider, IdP) och används av de flesta webb-baserade IT-tjänster vid universitetet. Identitetsutgivaren stödjer Single Sign On och du som användare matar endast in användarnamn och lösenord en gång och blir därefter per automatik inloggad i efterföljande IT-tjänster. För att kunna logga in med ett annat konto var vänlig använd webbläsarens funktion för att starta en ny privat webbläsarsession. När du avslutar din inloggning var vänlig att stäng webbläsaren, särskilt om du gjort inloggningen ifrån en publik dator.

Vid problem med inloggning kontakta LU Servicedesk, +46 46 222 90 00

För regelverk om användande av identitetsutgivaren se nedanstående länkar

[Användarvillkor](#)

[Hantering av personuppgifter](#)

## Digital Certificate Enrollment

This is your certificate enrollment form. Once you submit, your certificate will be generated and downloaded to your computer.

Name **Jonas Lindemann**  
 Organization **Lunds universitet**  
 Email **jonas.lindemann@lunarc.lu.se**

Select your Certificate Profile to enable your enrollment options.

Certificate Profile\*  
 GÉANT IGTF-MICS Personal

**i** IGTF MICS Personal Certificate - provides secure email services and client authentication, enables you to encrypt and digitally sign email communications, and to authenticate you to e-Infrastructure services.

Term\*  
 395 days

Enrollment Method

- Key Generation
- CSR

Key Type\*  
 RSA - 4096

Password is required to unlock the certificate file download to protect private key.

Password\*  
 ..... 

Password Confirmation\*  
 ..... 

[I have read and agree to the terms of the EULA](#)

**Submit**





## Generating Certificate

This may take a few moments.

Once your Certificate is generated you will be redirected to a page where it will be automatically downloaded.

Do not close this tab or your browser.





**certs.p12**

Personal Information Exchange

7,99 kB



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# Install certificate (certs.p12) in browser

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- Many services require your certificate to be installed in your browser.
- Please visit the following link for instructions on how to do this:
  - [http://docs.snic.se/wiki/Requesting\\_a\\_grid\\_certificate\\_from\\_the\\_Nordugrid\\_CA#Installing\\_the\\_certificate\\_in\\_your\\_browser](http://docs.snic.se/wiki/Requesting_a_grid_certificate_from_the_Nordugrid_CA#Installing_the_certificate_in_your_browser)



# Register certificate with SUPR

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- To be able to use clients that require certificates. Your certificate must be registered in SUPR
- Visit the following page in SUPR to register it:
  - [https://supr.snic.se/person/prepare\\_register\\_certificate/](https://supr.snic.se/person/prepare_register_certificate/)



# Preparing to use our certificate with ARC

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- The generated certs.p12 file can't be used directly by the grid tools and has to be converted to a different format.
- Two files have to be created
  - usercert.pem – User public key
  - userkey.pem – User private key



# Converting certs.p12 to .pem format

---

Extracting the private key:

```
$ cd
$ mkdir ~/.arc
$ chmod 0700 ~/.arc
$ openssl pkcs12 -nocerts -in ~/certs.p12 -out ~/.arc/userkey.pem
Enter Import Password:
MAC verified OK
Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
```

Enter the passphrase  
that was used to  
encrypt the .p12 file

Select a passphrase  
to protect the private  
key



# Converting certs.p12 to .pem format

---

Extracting the public key

```
$ openssl pkcs12 -clcerts -nokeys -in ~/certs.p12 -out ~/.arc/usercert.pem  
Enter Import Password:  
MAC verified OK
```

Protecting the private key

```
$ chmod 0400 ~/.arc/userkey.pem
```



# Creating a proxy certificate

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- To access dCache resources using the ARC client a short lived authentication token, proxy certificate, must be generated (also applies to rclone with certs)
- This is done using the **arcproxy** command line tool
- When the proxy has been created the storage resources can be accessed without the need for further authentication.



# Creating a proxy certificate

---

Creating proxy certificate

```
$ arcproxy
Enter pass phrase for private key:
Your identity: /DC=org/DC=terena/DC=tcs/C=SE/O=Lunds universitet/CN=Jonas
Lindemann bygg-jli@lu.se
Proxy generation succeeded
Your proxy is valid until: 2022-03-15 09:16:12
```



# Displaying proxy information

---

```
$ arcproxy -I
Subject: /DC=org/DC=terena/DC=tcs/C=SE/O=Lunds universitet/CN=Jonas Lindemann
bygg-jli@lu.se/CN=1985496675
Issuer: /DC=org/DC=terena/DC=tcs/C=SE/O=Lunds universitet/CN=Jonas Lindemann
bygg-jli@lu.se
Identity: /DC=org/DC=terena/DC=tcs/C=SE/O=Lunds universitet/CN=Jonas Lindemann
bygg-jli@lu.se
Time left for proxy: 11 hours 56 minutes 19 seconds
Proxy path: /tmp/x509up_u424
Proxy type: X.509 Proxy Certificate Profile RFC compliant impersonation proxy -
RFC inheritAll proxy
Proxy key length: 2048
Proxy signature: sha384
```





# Uploading single files

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```
$ arccp DJI_0001.JPG gsiftp://gsiftp.swestore.se/snic/storage-training/  
$ arcls gsiftp://gsiftp.swestore.se/snic/storage-training/  
Course  
DJI_0001.JPG
```





# Uploading single files

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- Copying **all** files in the **many\_files** folder into the **storage-training** directory. **many\_files** is not copied.

```
$ arccp --recursive=999 many_files/  
gsiftp://gsiftp.swestore.se/snic/storage-training/
```

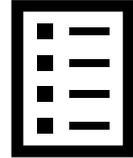
- Copying the folder **many\_files** to the folder **many\_files** in the **storage-training**.

Shows progress during transfers

```
arccp --recursive=999 --indicate many_files/  
gsiftp://gsiftp.swestore.se/snic/storage-training/many_files/  
  
|=====|  
...  
|=====|
```

IMPORTANT: Please note the trailing slashes. They indicate a folder





# Listing files

---

Short directory listing

```
$ arcls gsiftp://gsiftp.swestore.se/snic/storage-training/Course
apply_storage1.png
apply_storage2.png
apply_storage3.png
apply_storage4.png
apply_storage5.png
```

Long directory listing

```
arcls --long gsiftp://gsiftp.swestore.se/snic/storage-training/Course
<Name>          <Type>  <Size>   <Modified>   <Checksum>      <Latency>
apply_storage1.png  file  116876 2022-02-14 15:44:21  adler32:e58f06bb  (n/a)
apply_storage2.png  file  131456 2022-02-14 15:44:21  adler32:06a7362d  (n/a)
apply_storage3.png  file  139240 2022-02-14 15:44:21  adler32:3f3b33ee  (n/a)
apply_storage4.png  file  152858 2022-02-14 15:44:22  adler32:fb001dd   (n/a)
apply_storage5.png  file   89300 2022-02-14 15:44:22  adler32:474e75d8  (n/a)
```





# File metadata

---

```
$ arcls --metadata gsiftp://gsiftp.swestore.se/snic/storage-training/Course
apply_storage1.png
checksum:adler32:e58f06bb
latency:
mtime:2022-02-14 15:44:21
name:apply_storage1.png
size:116876
type:file
validity:1970-01-01 00:59:59
apply_storage2.png
checksum:adler32:06a7362d
...
```



# Downloading single files

---



```
arccp gsiftp://gsiftp.swestore.se/snic/storage-training/DJI_0001.JPG myjpeg.jpg
```



# Downloading multiple files

---



```
$ arccp --recursive=999 --indicate gsiftp://gsiftp.swestore.se/snic/storage-  
training/many_files/ downloaded_files/  
10610 kB  
33127 kB  
4 kB  
664 kB  
15410 kB  
8 kB  
17216 kB  
...
```





# Creating directories

---

```
$ arcmkdir gsiftp://gsiftp.swestore.se/snic/storage-training/newdir  
$ arcls gsiftp://gsiftp.swestore.se/snic/storage-training  
Course  
newdir
```





# Removing files and directories

---

Removing a remote file:

```
$ arcrm gsiftp://gsiftp.swestore.se/snic/storage-training/newdir/dummyfile
```

Removing a remote directory:

```
$ arcrm gsiftp://gsiftp.swestore.se/snic/storage-training/newdir/
```





# Long running operations

---

- Note that copying large directory trees can take quite some time, and might fail if you're not aware of the following:
  - Your login session created with the **arcproxy** command has a limited lifetime. Use **arcproxy -l** to show the remaining time. Use **arcproxy -c validityPeriod=xxH** to initiate a session with longer lifetime.
  - The command will abort if you lose your network connection with the computer where you are running arccp. A utility such as **screen** or **tmux** can be used to create a terminal session you can reattach to.
  - Transfer rates are largely dependent on the average file size, if you have a lot of **small files** the transfer will be **slower** than if you have **large files**.
  - We recommend to limit your transfer sessions (ie. the directory tree copied with each arccp command) to 1TB if you have mostly large (100+MB) files and to 100GB if you have smaller files.



# Rclone

---



# Rclone

---



- Rclone is a general tool for transferring files to and from a multitude of storage sources and protocols
- Command line tool
- **"Swiss army knife of cloud storage"**
- Rclone can help you with (from the web page):
  - Backup (and encrypt) files to cloud storage
  - Restore (and decrypt) files from cloud storage
  - Mirror cloud data to other cloud services or locally

# Configuring Rclone

---

- Rclone needs to be configured for SweStore
- **rclone config** can be used to create the required configuration file

```
$ rclone config
1. n for New remote
2. swestore for name
3. webdav for Storage (or the corresponding number in the list)
4. https://webdav.swestore.se for url
5. other for vendor (or the corresponding number in the list)
6. Just press <Enter> for user (ie. leave blank)
7. n for No leave this optional password blank
8. Just press <Enter> for bearer_token
9. n for Edit advanced config?
10. y if you think the resulting config is correct, otherwise e to edit again.
11. q to Quit config
```



# Configuring Rclone

---

- The recommended authentication for rclone is to use certificates. Create a proxy cert using **arcproxy**.
- Path to the proxy-certificate is provided through command line options

```
$ rclone --client-cert=/tmp/x509up_uXXX --client-key=/tmp/x509up_uXXX
```

- A bit cumbersome. To make it easier we create an alias and add it to the bashrc:

```
echo 'alias rclone-cert="rclone --client-cert=/tmp/x509up_u${UID} --client-key=/tmp/x509up_u${UID}"' >> ~/.bashrc
```

- Now we can use rclone-cert instead

# Listing directories and files

---

Listing directories:

```
$ rclone-cert ls swestore:/snic/storage-training
-1 2022-02-14 16:44:22 -1 Course
-1 2022-03-14 22:08:12 -1 newdir
```

Listing files:

```
$ rclone-cert ls swestore:/snic/storage-training
116876 Course/apply_storage1.png
131456 Course/apply_storage2.png
139240 Course/apply_storage3.png
152858 Course/apply_storage4.png
89300 Course/apply_storage5.png
```



# Copying files

---

Copying a single file:

```
$ rclone-cert copyto IMG_E0868.JPG swestore:/snic/storage-training/IMG_E0868.JPG
```

Recursive copy:

```
$ rclone-cert copy /home/bmjl/Courses/storage-training/examples  
swestore:/snic/storage-training/examples
```

Recursive copy with process (-P):

```
rclone-cert copy -P /home/bmjl/Courses/storage-training/examples  
swestore:/snic/storage-training/examples  
Transferred:      338.249 MiB / 1.894 GiB, 17%, 52.625 MiB/s, ETA 30s  
Transferred:      75 / 407, 18%  
Elapsed time:     6.5s  
Transferring:  
*                runsten/DJI_0051.JPG: 33% /4.505Mi, 0/s, -  
*                runsten/DJI_0052.JPG: 6% /4.658Mi, 0/s, -  
*                runsten/DJI_0053.JPG: 17% /4.747Mi, 0/s, -  
*                runsten/DJI_0054.JPG: 7% /4.808Mi, 0/s, -
```



# File operations

---

Creating a directory

```
$ rclone-cert mkdir swestore:/snic/storage-training/examples/new_dir
```

Removing a file

```
$ rclone-cert deletefile swestore:/snic/storage-training/examples/test.txt
```

Removing a directory

```
$ rclone-cert rmdir swestore:/snic/storage-training/examples/new_dir/
```

Removing all files in a directory

```
$ rclone-cert delete swestore:/snic/storage-training/examples/
```

Removing all empty directories

```
$ rclone-cert delete swestore:/snic/storage-training/examples/
```



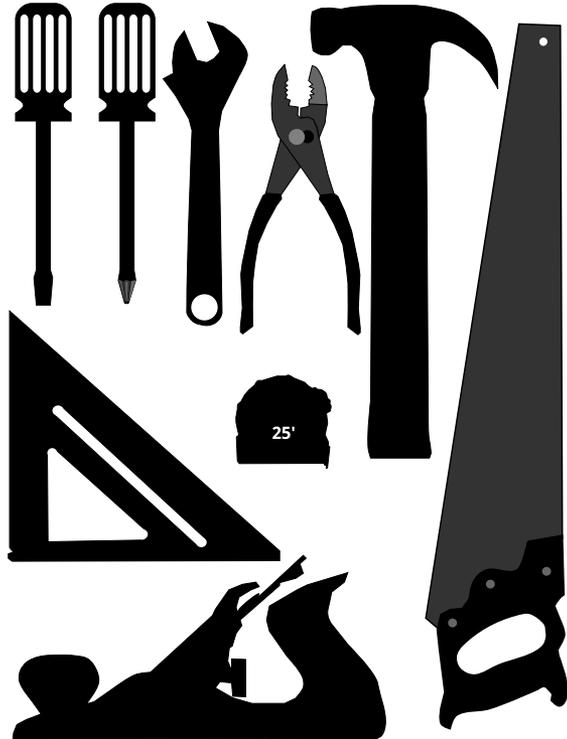
# Miscellaneous

---



# Client tools on SNIC resources

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- dCache command line clients (ARC/Rclone) are installed on the SNIC resources.
- WebDav mount of dCache should be available on most resources with remote desktop services



# Links to documentation

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- Applying for storage projects
  - <https://snic.se/allocations/storage/>
  - <http://docs.snic.se/wiki/Swestore>
- Using dCache
  - <http://docs.snic.se/wiki/Swestore-dCache>
- Using rclone with dCache
  - [http://docs.snic.se/wiki/Accessing\\_Swestore\\_with\\_rclone](http://docs.snic.se/wiki/Accessing_Swestore_with_rclone)
- Using ARC with dCache
  - [http://docs.snic.se/wiki/Accessing\\_Swestore\\_with\\_the\\_ARC\\_client](http://docs.snic.se/wiki/Accessing_Swestore_with_the_ARC_client)
- Certificate setup with SweStore
  - [http://docs.snic.se/wiki/Certificate\\_Setup\\_for\\_Swestore](http://docs.snic.se/wiki/Certificate_Setup_for_Swestore)

