



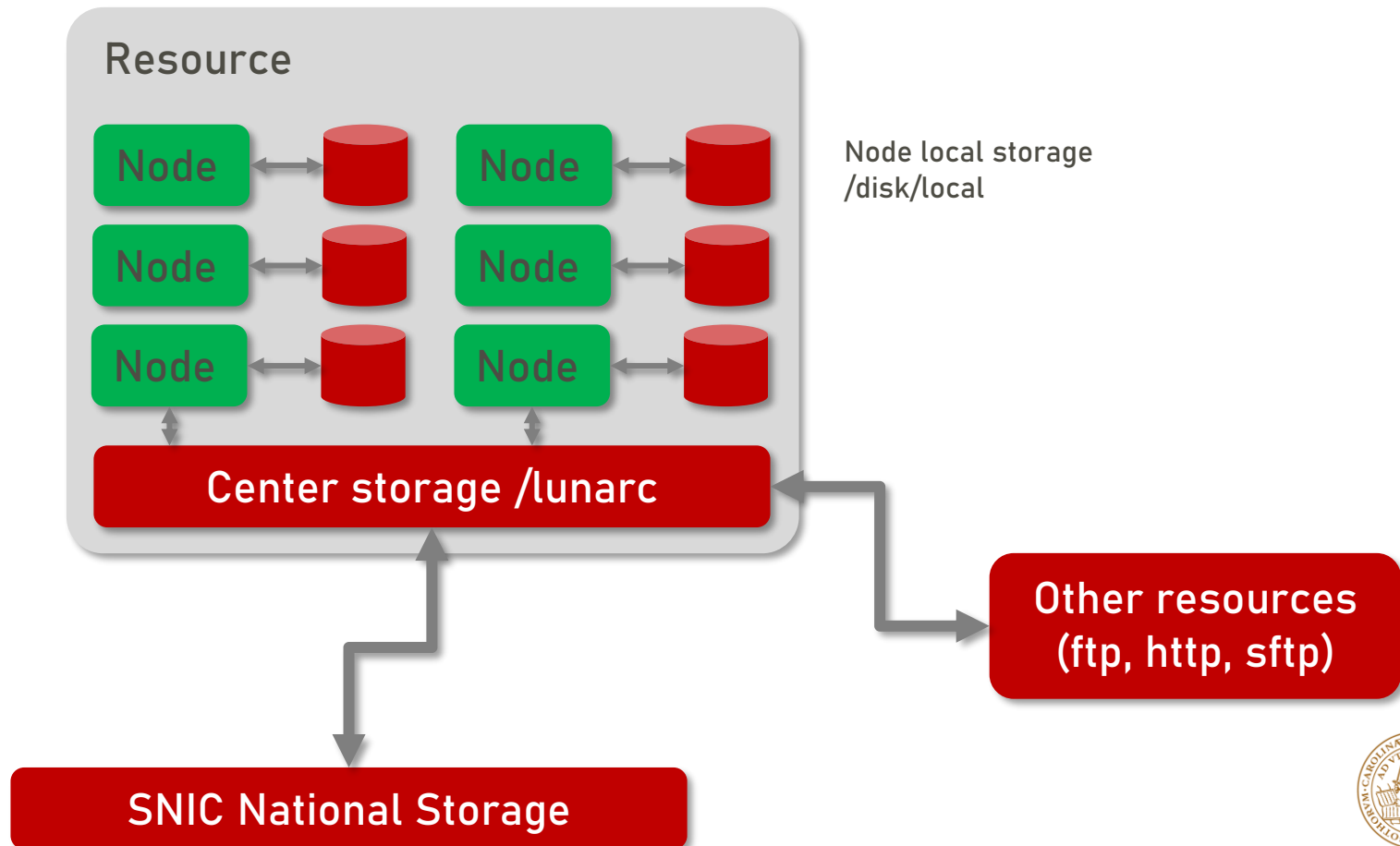
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Data storage and data transfers

JONAS LINDEMANN



Storage at SNIC



Local storage

- Each node has a local disk
- Used for data not shared between nodes
- Scratch-files
- Environment variables
 - \$SNIC_TMP
- Consider using this when application uses "scratch"-like IO-operations.

Center storage

- Storage available on all SNIC resources
 - Parallel filesystem **/lunarc/nobackup/projects/xxx, /home/xxx**
 - Check documentation on relevant SNIC center
- High performance / High bandwidth
- Shared between nodes
- Supports parallel transfers in MPI jobs
- Project storage
 - Apply through SUPR
 - Shared with PI and collaborators



SNIC environment variables

SNIC Variable	Value at Lunarc	Description
SNIC_BACKUP	/home/[username]	Location of backed up space on resource
SNIC_RESOURCE	[aurora ...]	Name of the current resource
SNIC_SITE	Lunarc	Name of SNIC site
SNIC_TMP	[temporary directory]	Temporary storage on nodes



National storage

- Storage available to all centers in Sweden
- Not mounted as a filesystem
- ARC client or iRODS clients
- Intended to store large amounts of data
- Fewer large files
- Large volumes / High latency
- Redundant storage
- Check documentaion at <http://docs.snic.se/wiki/Swestore>



Transferring files



SSH Storage clients

- Linux
 - SFTP built-in
- Mac OS X
 - SFTP built-in
 - Cyberduck
- Windows
 - WinSCP
 - PSFTP (part of PuTTY installation)
 - Windows Subsystem for Linux (Linux on Windows)



Transferring files

- SFTP is the primary way of transferring files to and from SNIC resources
 - sftp/psftp command line tool
 - WinSCP graphical client (Windows)
 - Cyberduck graphical client (Mac OS X)
- Most SNIC resources have access to internet
 - scp/sftp to other resources
 - wget/curl can be used to transfer from HTTP(S) resources
 - arccp/icp/irsync can be used to transfer to national storage resources (more information on docs.snic.se)



Logging in with sftp

```
Jonass-MacBook-Air:~ lindemann$ sftp bmjl@aurora.lunarc.lu.se
Password:
Please enter your onetime password :207151
Connected to aurora.lunarc.lu.se.
sftp>
```



Listing remote files (sftp)

```
sftp> ls
imb                               imb_test
mpibench-1.1.tar.gz             mpibench-1.2
skampi                          skampi-5.0.4-r0355
skampi-5.0.4-r0355.tar.gz
```



Listing local files (sftp)

```
sftp> ll  
Desktop  
Development  
Documents  
Downloads  
Dropbox  
Library  
Movies  
Music  
Pictures  
Public  
PyQt-mac-gpl-4.8.5  
PyQt-mac-gpl-4.8.5.tar.gz  
QtSDK  
sw_local_sbin.tar.gz  
usercert.p12
```



Changing remote directory (sftp)

```
sftp> cd imb
sftp> ls
ReadMe_first      WINDOWS          doc              license
src               versions_news
```



Changing local directory (sftp)

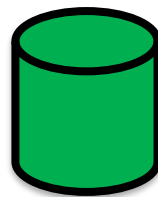
```
sftp> lcd Documentation  
sftp> ls  
qmake.qch      qt.qch          qtcreeator.qch  sdk.qch
```



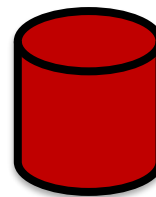
Transferring local file (sftp)

```
sftp> put PyQt-mac-gpl-4.8.5.tar.gz
Uploading PyQt-mac-gpl-4.8.5.tar.gz to
/home/bmj1/openmpi/PyQt-mac-gpl-4.8.5.tar.gz
PyQt-mac-gpl-4.8.5.tar.gz    27% 2592KB 918.4KB/s    00:07 ET

sftp> ls
PyQt-mac-gpl-4.8.5.tar.gz      imb
imb_test                      mpibench-1.1.tar.gz
mpibench-1.2                  skampi
skampi-5.0.4-r0355           skampi-5.0.4-r0355.tar.gz
```



Local



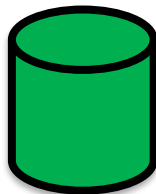
SNIC Resource



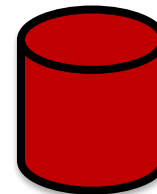
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Transferring remote file (sftp)

```
sftp> get mpibench-1.1.tar.gz
Fetching /home/bmj1/openmpi/mpibench-1.1.tar.gz to
mpibench-1.1.tar.gz
/home/bmj1/openmpi/mpibench-1.1 100% 235KB 235.0KB/s
00:01
sftp> ll
Desktop                               Pictures
...
Dropbox                               QtSDK
Library                               mpibench-1.1.tar.gz
Movies                               sw_local_sbin.tar.gz
Music                                usercert.p1
```



Local



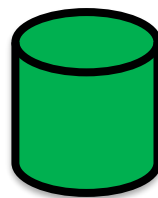
SNIC Resource



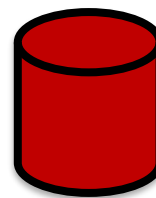
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Transferring multiple local files (sftp)

```
sftp> mput *.txt
Uploading Changelog.txt to
/home/bmjl/openmpi/Changelog.txt
Changelog.txt          100%   15KB   15.4KB/s   00:00
Uploading InstallationLog.txt to
/home/bmjl/openmpi/InstallationLog.txt
InstallationLog.txt    100%  452KB  90.5KB/s   00:05
```



Local



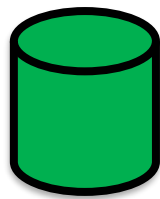
SNIC Resource



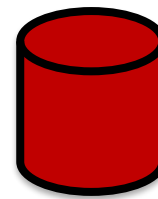
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Transferring multiple remote files (sftp)

```
sftp> mget *.tar.gz
Fetching /home/bmj1/openmpi/mpibench-1.1.tar.gz to mpibench-
1.1.tar.gz
/home/bmj1/openmpi/mpibench-1.1 100% 235KB 235.0KB/s 00:01
Fetching /home/bmj1/openmpi/skampi-5.0.4-r0355.tar.gz to skampi-
5.0.4-r0355.tar.gz
/home/bmj1/openmpi/skampi-5.0.4 100% 377KB 377.1KB/s 00:00
```



Local



SNIC Resource



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More commands

```
sftp> help
```

```
Available commands:
```

```
bye
```

```
cd path
```

```
chgrp grp path
```

```
chmod mode path
```

```
chown own path
```

```
df [-hi] [path]
```

```
exit
```

```
Quit sftp
```

```
Change remote directory to 'path'
```

```
Change group of file 'path' to 'grp'
```

```
Change permissions of file 'path' to 'mode'
```

```
Change owner of file 'path' to 'own'
```

```
Display statistics for current directory or  
filesystem containing 'path'
```

```
Quit sftp
```



Copying from the web to SNIC resources

Index of /CentOS/7/isos/x86_64/ - Mozilla Fire

Index of /CentOS/7/... x +

mirror.nsc.liu.se/CentOS/7/isos/x86_64/

Most Visited Centos Wiki Documentation Forums

Index of /CentOS/7/isos/x86_64/

Name:	Last Modified:	Size:	Type:
../		-	Directory
0_README.txt	2017-Sep-13 17:00:49	2.4K	text/plain
CentOS-7-x86_64-DVD-1708.iso	2017-Sep-06 12:59:05	4.2G	application/octet-stream
CentOS-7-x86_64-DVD-1708.torrent	2017-Sep-13 16:38:48	169.0K	application/x-bittorrent
CentOS-7-x86_64-Everything-1708.iso	2017-Sep-06 12:59:26	8.1G	application/octet-stream
CentOS-7-x86_64-Everything-1708.torrent	2017-Sep-13 16:39:04	324.5K	application/x-bittorrent
CentOS-7-x86_64-LiveGNOME-1708.iso	2017-Sep-05 17:22:31	1.2G	application/octet-stream
CentOS-7-x86_64-LiveGNOME-1708.torrent	2017-Sep-13 16:39:06	48.5K	application/x-bittorrent
CentOS-7-x86_64-LiveKDE-1708.iso	2017-Sep-05 17:32:08	1.6G	application/octet-stream
CentOS-7-x86_64-LiveKDE-1708.torrent	2017-Sep-13 16:39:09	67.3K	application/x-bittorrent
CentOS-7-x86_64-Minimal-1708.iso	2017-Sep-05 16:15:13	792.0M	application/octet-stream
CentOS-7-x86_64-Minimal-1708.torrent	2017-Sep-13 16:39:10	31.5K	application/x-bittorrent
CentOS-7-x86_64-NetInstall-1708.iso	2017-Sep-05 15:36:49	422.0M	application/octet-stream
CentOS-7-x86_64-NetInstall-1708.torrent			application/x-bittorrent
shasum.txt			plain
shasum.txt.asc			plain
sha256sum.txt			plain
sha256sum.txt.asc			plain

lighttpd/1.4.45

- Open Link in New Tab
- Open Link in New Window
- Open Link in New Private Window
- Bookmark This Link
- Save Link As...
- Save Link to Pocket
- Copy Link Location
- Search Google for "CentOS-7-x86_64..."
- Inspect Element (Q)



Copying from the web to SNIC resources

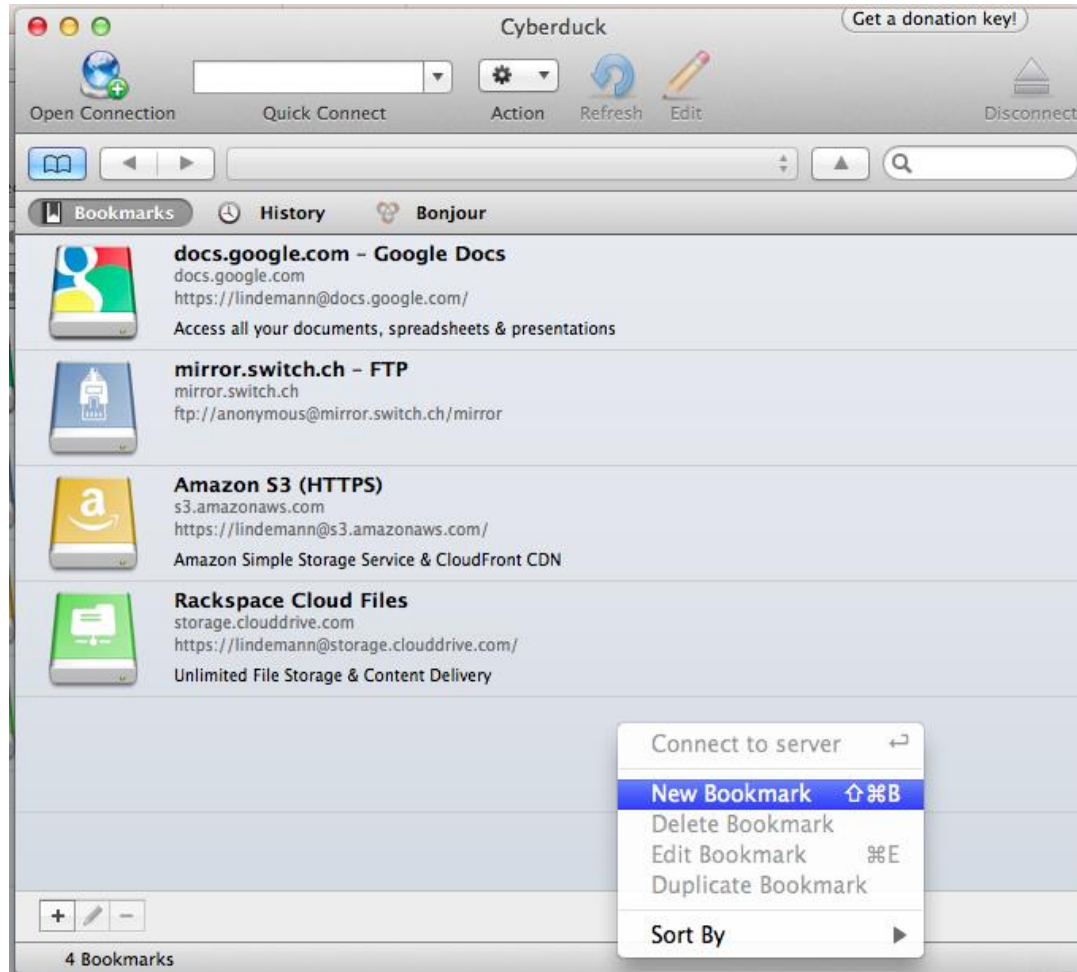
```
$ wget http://mirror.nsc.liu.se/CentOS/7/isos/x86_64/CentOS-7-x86_64-NetInstall-1708.iso
--2017-11-28 10:49:05--
http://mirror.nsc.liu.se/CentOS/7/isos/x86_64/CentOS-7-x86_64-NetInstall-1708.iso
Resolving mirror.nsc.liu.se (mirror.nsc.liu.se)... 130.236.101.92,
2001:6b0:17:2::1:92
Connecting to mirror.nsc.liu.se (mirror.nsc.liu.se)|130.236.101.92|:80...
connected.
HTTP request sent, awaiting response... 200 OK
Length: 442499072 (422M) [application/octet-stream]
Saving to: \u2018CentOS-7-x86_64-NetInstall-1708.iso\u2019

100%[=====>] 442,499,072 36.4MB/s   in
8.3s

2017-11-28 10:49:13 (50.8 MB/s) - \u2018CentOS-7-x86_64-NetInstall-1708.iso\u2019 saved [442499072/442499072]
```



Transferring files with Cyberduck



Rightclick
or
⌘B



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Transferring files with Cyberduck

aurora.lunarc.lu.se – SFTP

SFTP (SSH File Transfer Protocol)

Nickname: aurora.lunarc.lu.se – SFTP

URL: <sftp://bmjl@aurora.lunarc.lu.se>

Server: aurora.lunarc.lu.se Port: 22

Username: bmjl

☐ Anonymous Login

SSH Private Key: None Choose...

Client Certificate: None

More Options

Path:

Connect Mode: Default

Encoding: UTF-8

Download Folder: [C:\Users\Jonas Lindemann\Downloads](#) Choose...

Transfer Files: Use browser connection

Web URL: <http://aurora.lunarc.lu.se>

Notes:

Timezone: UTC

1. Change to SFTP

2. Give it a nickname

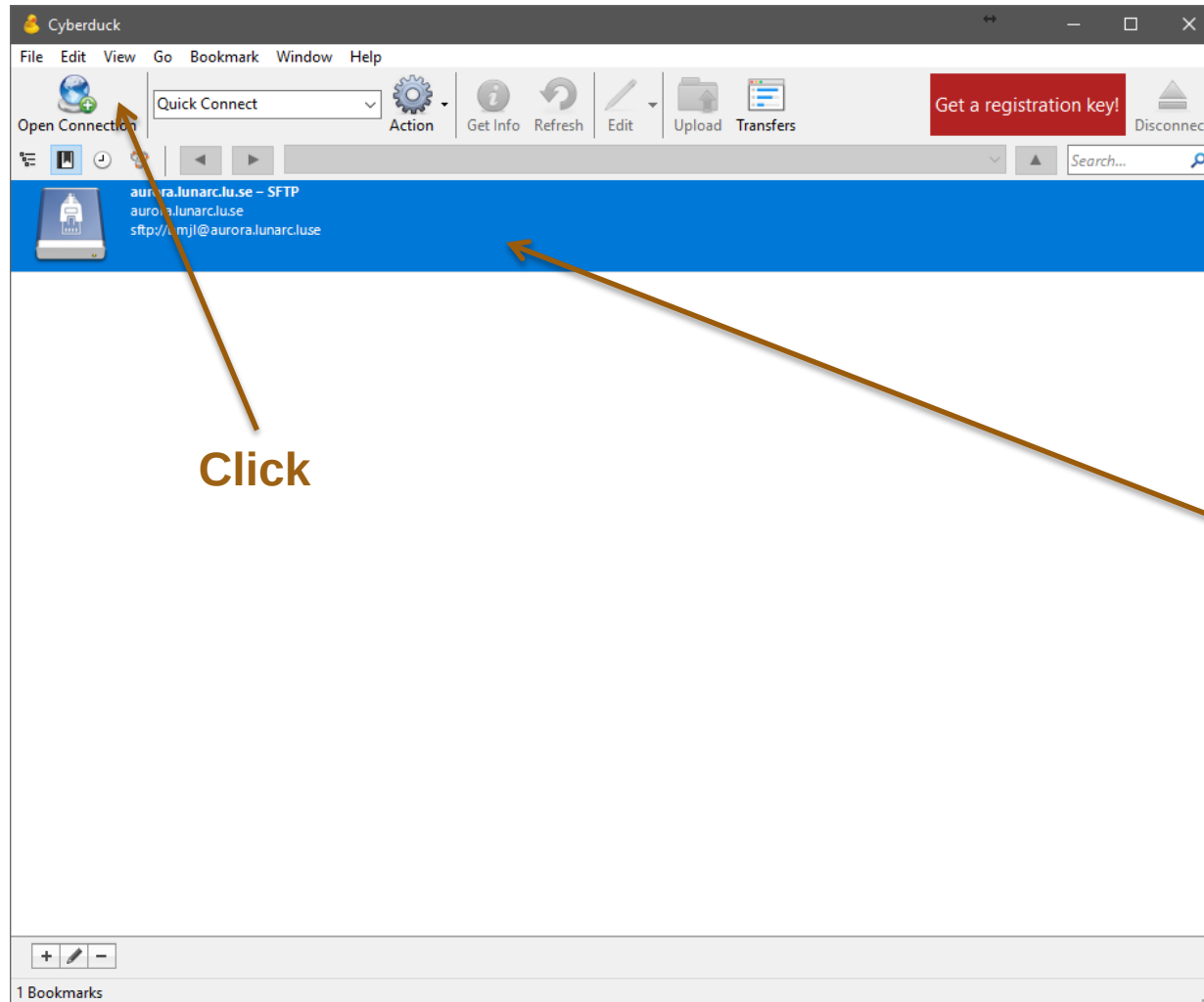
3. Enter hostname

4. Set user name (optional)

Important



Transferring files with Cyberduck



Click

Doubleclick



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Transferring files with Cyberduck

 Provide additional login credentials.

 Enter your Pocket Pass OTP.

bmjl:

Password:

☐ Anonymous Login

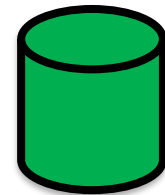
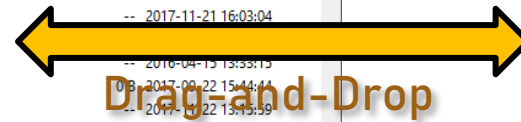
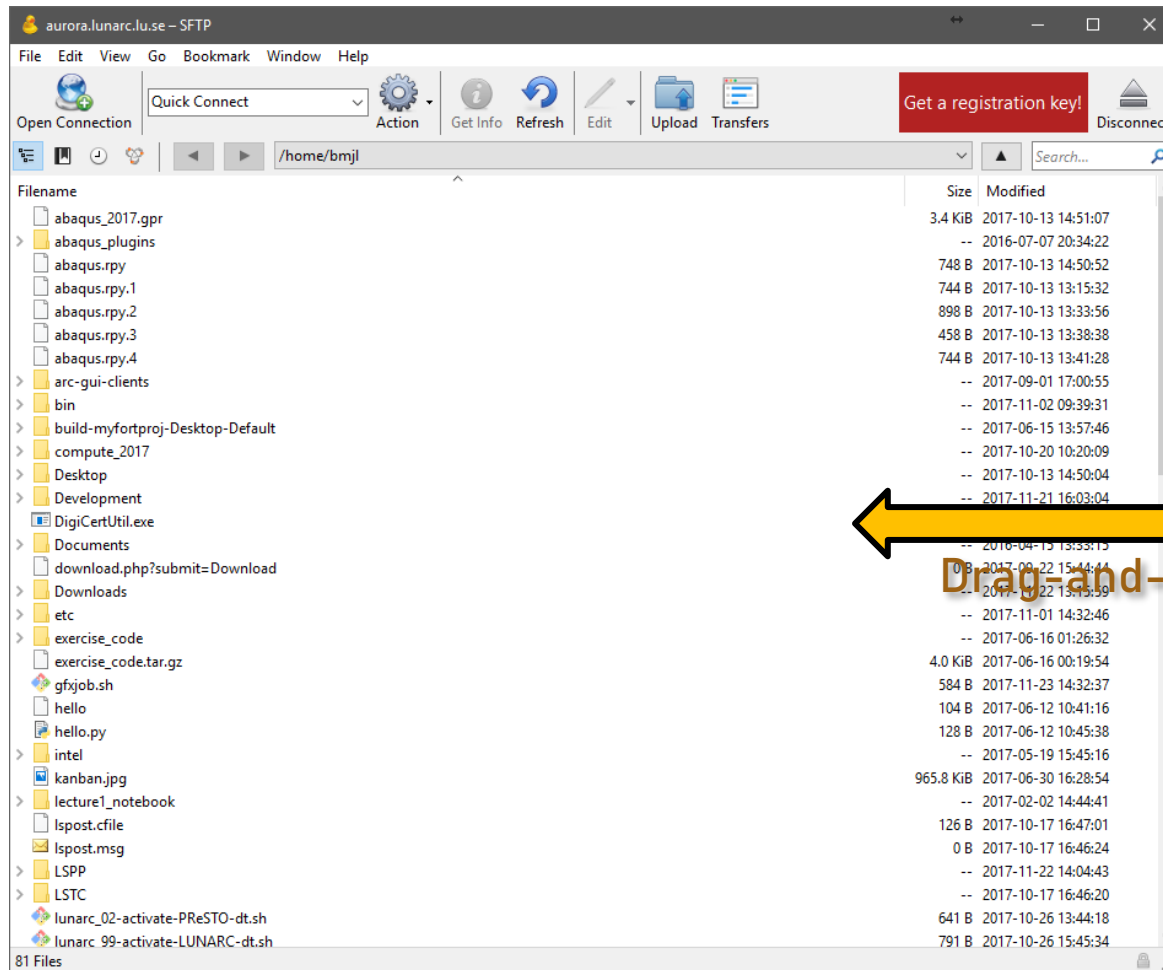
SSH Private Key: None Choose...

☐ Save password

Login Cancel

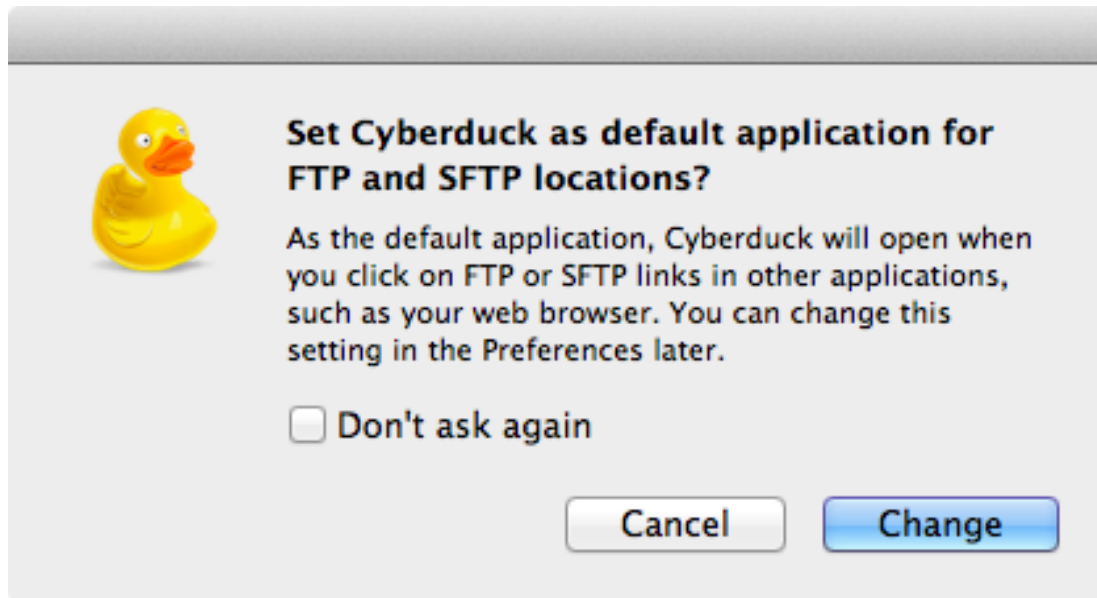


Transferring files with Cyberduck

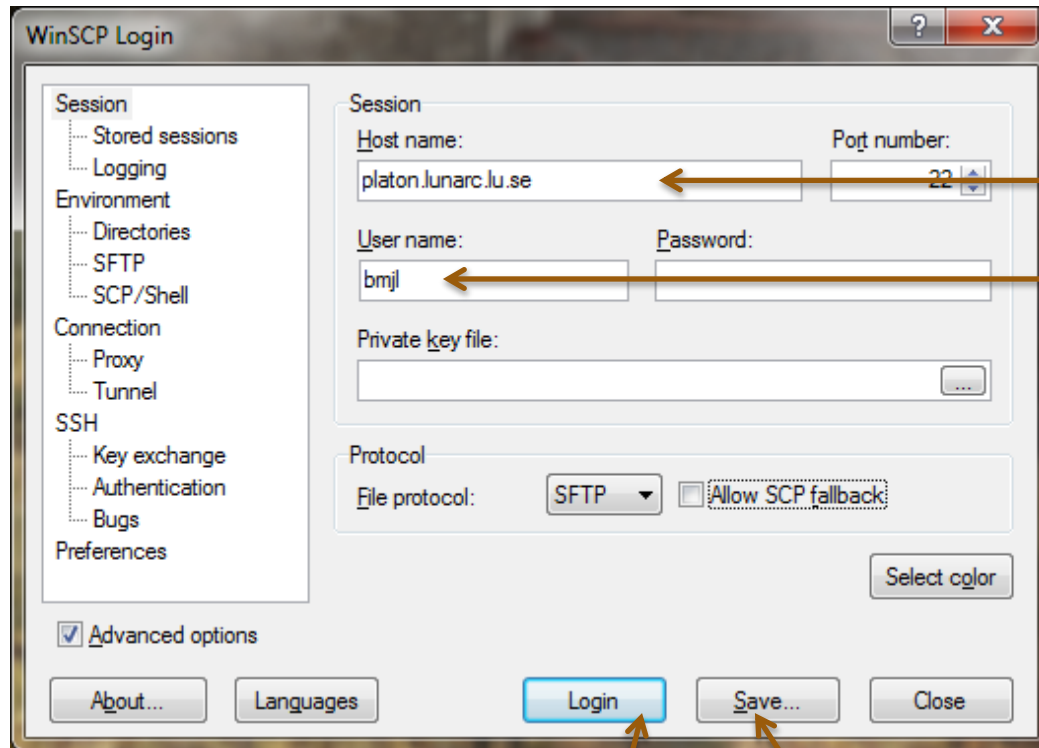


Local

Transferring files with Cyberduck



Transferring files with WinSCP



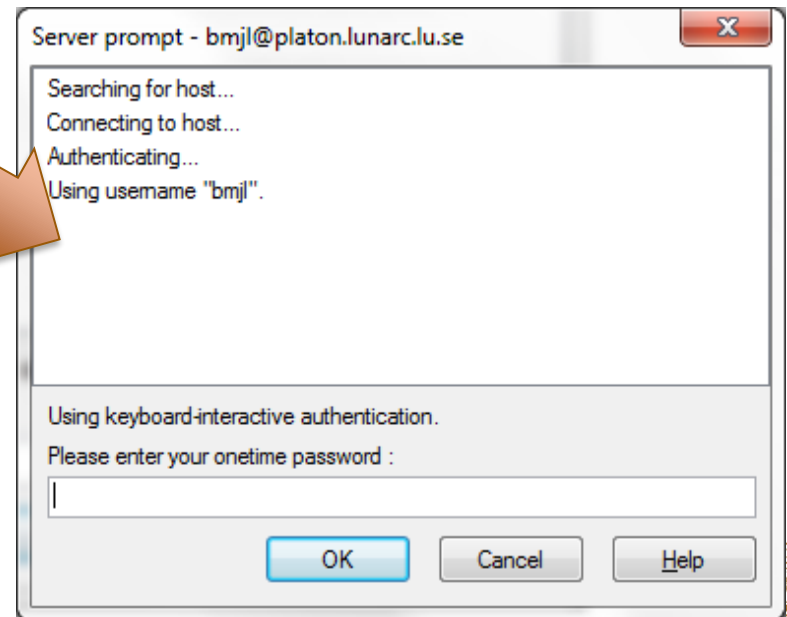
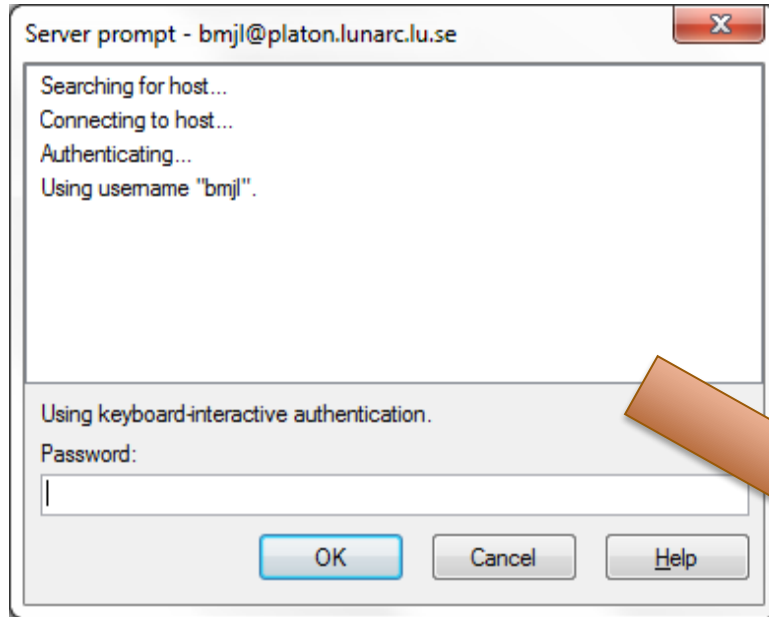
1. Enter hostname

2. Set user name
(optional)

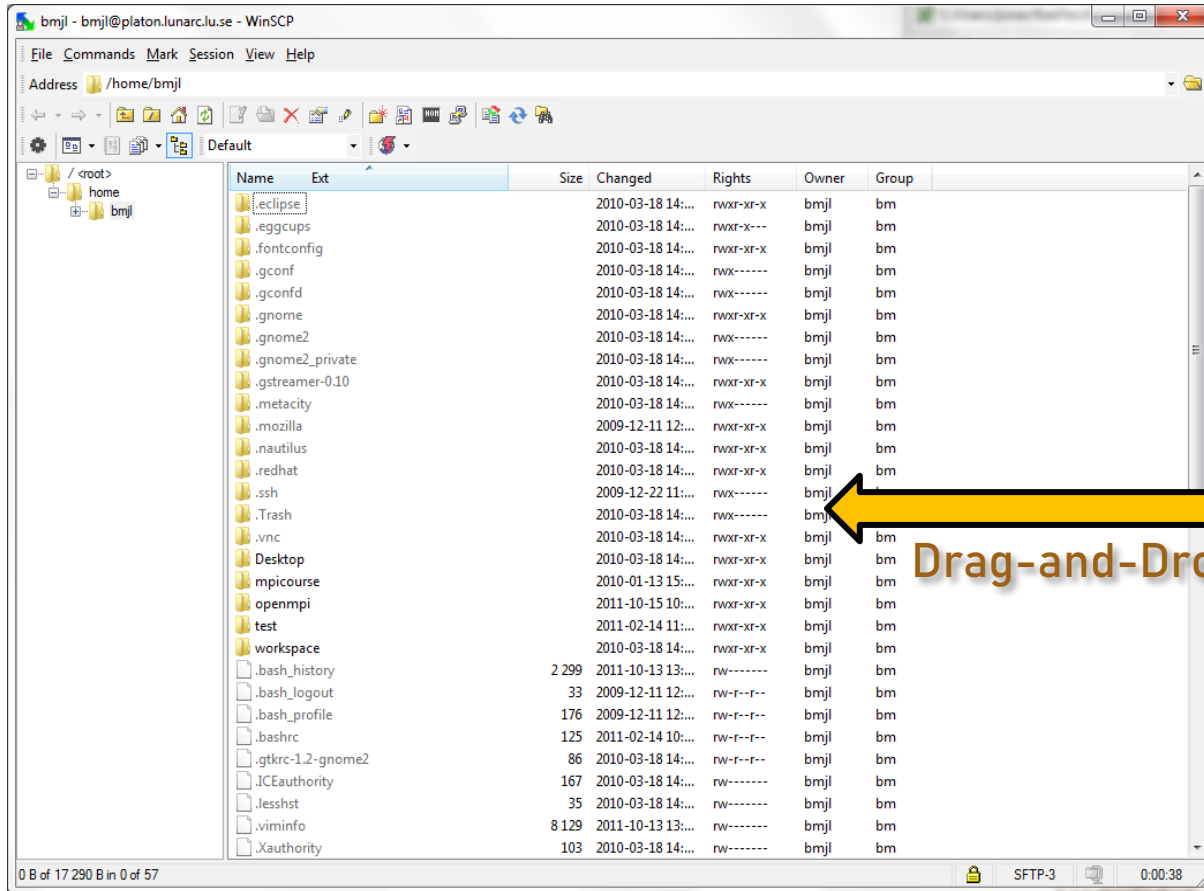
4. Click Login (optional)

3. Save session (optional)

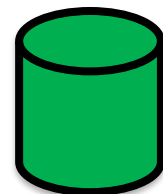
Transferring files with WinSCP



Transferring files with WinSCP



Drag-and-Drop



Local



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SNIC National Storage



Using storage resources

- SNIC National Storage provides > 25 Petabyte of storage in the national storage infrastructure
- Available through dCache / iRODS
- dCache / iRODS is a distributed storage system
 - Central metadata repository
 - srm.swegrid.se
 - Protocol is srm:// and gsiftp://
- Distributed pools located on each SNIC centre



Applying for SNIC National Storage

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

SNIC National Storage - Policy

- SweStore is for “live” or “working” research data
- Swestore is NOT supposed to be used for 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;

This could change in the near future.



Applying for SNIC National Storage

The screenshot shows the SNIC SUPR Rounds application page. The browser address bar displays <https://supr.snic.se/round/>. The page title is 'Rounds'. The main content area is titled 'Rounds' and contains the following text: 'Resources are made available through rounds, in which projects proposals are made. First, you need to select the type of round to use:'. Below this text are six cards, each with a title, description, and a 'Go to' button. An orange arrow points to the 'Storage Rounds' card.

Card Title	Description	Action Button
Compute Rounds	Access to resources for high performance computing.	Go to Compute Rounds
Storage Rounds	Access to storage resources at centres and nation-wide.	Go to Storage Rounds
SNIC SENS	Access to HPC resources specifically for analyzing sensitive data.	Go to SNIC SENS
SNIC Science Cloud	Access to SNIC cloud resources.	Go to SNIC Science Cloud
SNIC AI/ML	Access to SNIC AI and Machine Learning resources.	Go to SNIC AI/ML
SNIC Dedicated User Support	Dedicated user support for users of ongoing SNIC compute, cloud, and storage projects.	Go to SNIC Dedicated User Support

Select Storage Rounds



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Applying for SNIC National Storage

Storage Rounds

Start / Rounds / Storage Rounds

Storage resources are made available through storage rounds. There are different sizes of SNIC allocated rounds for centre storage and Swestore national storage, as well as local rounds at centres. Select the size of round to use:

SNIC Small Storage	SNIC Medium Storage	SNIC Large 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.	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.	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.
Go to SNIC Small Storage	Go to SNIC Medium Storage	Go to SNIC Large Storage

Swestore Small	Swestore Medium	Centre Local Storage
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.	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.	Local resources that are not allocated via SNIC. Conditions are described per round.
Go to Swestore Small	Go to Swestore Medium	Go to Centre Local Storage

Select Swestore
project type



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Applying for SNIC National Storage

SNIC Medium Swestore 2020

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	
 iRODS	Swestore	100	1 000	TiB	

Click  above to show more information about the resource.

Applying for SNIC National Storage

Create New Proposal for SNIC Medium Swestore 2020

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 *	
	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 *	-
	Clone Proposal



Applying for SNIC National Storage



AdminUser

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
wlcg-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
dCache @ Swestore	10	TiB
iRODS @ Swestore	10	TiB

Small = 10 TiB



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Accessing dCache storage



SNIC dCache update

- Currently only supports read-write access using ARC client using certificate authentication
- During spring new protocols and authentication will be made available
 - Username / Password authentication
 - Filesystem will be directly mounted on LUNARC resources
 - Webdav-access from Windows/Mac/Linux



Access protocols

- GridFTP
 - Also called gsiftp. Well supported within Swestore.
 - Features: Transfer checksums. Writes goes directly to storage pools for high speed transfers.
 - Access URL: `gsiftp://gsiftp.swestore.se/`
- HTTP/WebDAV
 - Contender for being the recommended protocol for Swestore.
 - Features: Direct support in web browsers. Redirected reads and writes if special url is used and client supports it



Storage commands in ARC

- **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
- Most commands are similar to corresponding Linux/Unix commands with “less functionality”



Copying single files

--debug=INFO is useful
for debugging file
transfers

```
$ arccp python_lecture_5_qt.tar.gz gsiftp://gsiftp.swestore.se/ops/jonas/  
$ arccp -i 5.11.zip gsiftp://gsiftp.swestore.se/ops/jonas/  
|=====|
```

```
$ arccp --debug=INFO srm://srm.swegrid.se/ops/jonas/GridFTP-1.0.20-linux.gtk.x86.zip  
./myzipfile.zip  
INFO: Loading configuration (/opt/local/nordugrid/etc/arc/client.conf)  
INFO: Configuration (/opt/local/nordugrid/etc/arc/client.conf) loaded  
INFO: Loading configuration (/Users/jonas/.arc/client.conf)  
INFO: Configuration (/Users/jonas/.arc/client.conf) loaded  
INFO: Använder proxyfil: /Users/jonas/x509_up501  
INFO: Använder certifikatfil: /Users/jonas/.globus/usercert.pem  
INFO: Använder nyckelfil: /Users/jonas/.globus/userkey.pem  
INFO: Använder CA-certifikatkatalog: /opt/local/nordugrid/etc/grid-  
security/certificates  
INFO: Överföring från srm://srm.swegrid.se/ops/jonas/GridFTP-1.0.20-linux.gtk.x86.zip  
till file:/Users/jonas/.myzipfile.zip  
INFO: Reell överföring från srm://srm.swegrid.se/ops/jonas/GridFTP-1.0.20-  
linux.gtk.x86.zip till file:/Users/jonas/.myzipfile.zip  
INFO: Redirecting to new URL: gsiftp://philo.hpc2n.umu.se:2811/jonas/GridFTP-1.0.20-  
linux.gtk.x86.zip  
INFO: ftp_read_thread: erhåll och registrerar buffrar
```

Destination file must
be specified. Using "."
does not work.

Recursive copying

Depth of recursion

```
arccp --recursive=3 jonas2/  
srm://srm.swegrid.se/ops/jonas/jonas2/
```

Recursive copying can be a costly operation. dCache not suitable for copying a lot of files. Use larger files. Preferable archives.

Listing files

```
$ arcls srm://srm.swegrid.se/ops/  
motd.1  
bla  
generated  
ops  
motd.f343  
GridFTP-1.0.20-linux.gtk.x86.zip  
test23  
test24  
ronstestfile  
ronstestfile3  
testfile-put-1296854868-6468a2d5df07.txt
```

Listing files

```
$ arcls --long gsiftp://gsiftp.swestore.se/ops/jonas/
```

<Name>	<Type>	<Size>	<Modified>	<Checksum>	<Latency>
5.11.zip	file	91843890	2018-10-02 09:21:48	adler32:dd8d3a52	(n/a)
89d3ba15-a0f7-4807-ac4d-e4b0e573c23b.dat	file	20971520	2018-06-27 14:11:04	adler32:e4e5ae4f	(n/a)
arc-gui-clients-0.2.1.1.tar.gz	file	11325530	2012-06-27 11:07:44	adler32:9488ce25	(n/a)
astyle_2.02.1_linux.tar.gz	file	153253	2013-02-11 21:10:25	adler32:a15a9038	(n/a)
autoconf-latest.tar.gz	file	1927468	2012-06-27 11:07:43	adler32:4d316ef9	(n/a)
b05459c8-6618-47b1-a2d7-99f1cf249b69.dat	file	1073741824	2018-06-27 14:13:17	adler32:c02d0001	(n/a)
cal fem	dir	512	2012-09-10 19:12:43	(n/a)	(n/a)
cc16ccbb-6800-4a74-b94d-8e34d78e5b27.dat	file	1073741824	2018-06-28 12:13:47	adler32:c02d0001	(n/a)
cd da00ff-e4b2-4696-a201-0c36c15e7a43.dat	file	1073741824	2018-06-28 12:13:47	adler32:c02d0001	(n/a)
CentOS-7-x86_64-NetInstall-1708.iso	file	442499072	2018-06-27 14:09:24	adler32:ecf505c9	(n/a)
eigen_test	dir	512	2013-12-22 23:46:46	(n/a)	(n/a)



Creating directories

```
$ arcmkdir gsiftp://gsiftp.swestore.se/ops/jonas/testdir
$ arcls --long gsiftp://gsiftp.swestore.se/ops/Jonas
<Name>                <Type> <Size>          <Modified>      <Checksum>      <Latency>
...
testdir                dir    512 2018-10-02 09:26:15  (n/a)            (n/a)
...
```



Querying metadata

```
$ arcls --metadata gsiftp://gsiftp.swestore.se/ops/jonas/5.11.zip  
/ops/jonas/5.11.zip  
checksum:adler32:dd8d3a52  
mtime:2018-10-02 09:21:48  
name:/ops/jonas/5.11.zip  
size:91843890  
type:file
```





Computer



bmjl's Home



Trash

Lunarc
Documentation

ARC Storage Explorer - [Main Window]

File Edit View Go Transfer Bookmarks Help

srn://srm.swegrid.se/ops/jonas

srn.swegrid.se ops jonas

Folder	File	Size	Type	Last modified
test3	testfiles3	---	folder	Thu Mar 28 16:11:23 2013
testfiles	testfiles	---	folder	Thu Apr 25 14:21:54 2013
job_templates	test3	---	folder	Tue Apr 16 15:14:08 2013
examples	swestoredrop	---	folder	Tue Sep 10 16:20:08 2013
calfem	povray	---	folder	Mon Apr 15 19:52:39 2013
mesh	mydir	---	folder	Wed Feb 13 11:27:29 2013
Imaging	mesh	---	folder	Mon Sep 10 21:50:39 2012
povray	job_templates	---	folder	Mon Sep 10 21:48:43 2012
mydir	iso-test	---	folder	Wed Apr 24 13:33:00 2013
testfiles3	installations	---	folder	Fri May 31 16:49:41 2013
iso-test	Imaging	---	folder	Fri Apr 12 10:17:57 2013
eigen_test	examples	---	folder	Mon Sep 10 21:49:48 2012
installations	eigen_test	---	folder	Mon Dec 23 00:46:46 2013
swestoredrop	calfem	---	folder	Mon Sep 10 21:12:43 2012
	tl-4.3.0-server.zip	90.799 MB	file	Thu Jan 29 15:53:34 2015
	test42.tar.gz	1.2109 MB	file	Wed Apr 17 10:36:50 2013
	test.tar.gz	10.801 MB	file	Thu Feb 28 10:18:51 2013
	geomdraw2.m	6.8984 KB	file	Tue Feb 12 12:48:51 2013
	autoconf-latest.tar.gz	1.8382 MB	file	Wed Jun 27 13:07:43 2012
	astyle_2.02.1_linux.tar.gz	149.66 KB	file	Mon Feb 11 22:10:25 2013
	arc-gui-clients-0.2.1.1.tar.gz	10.801 MB	file	Wed Jun 27 13:07:44 2012

More information on SNIC National Storage

- dCache and iRODS clients are installed on the LUNARC resources.
 - Graphical client for dCache is available through the LUNARC HPC Desktop
 - Applications/Lunarc tools/Storage tools
- More information on how to use the clients can be found at
 - <http://docs.snic.se/wiki/Swestore>

