

Access to ECMWF resources

Computer user training course 2015

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Wide Area Network - Internet

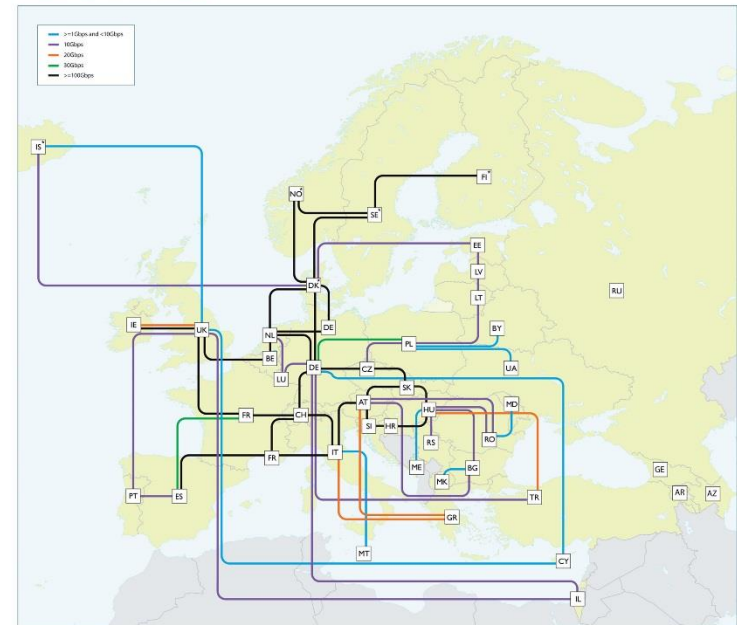
- **Between ECMWF and Internet 2 x 10Gb/s (redundant)**
- **European Research Network**
- **At your end ...?**
 - Often several Mb/s to Gb/s
- **Much higher bandwidth than RMDCN**
- **Suitable for users for (large) data transfers**
- **Increasingly used for research data dissemination**
- **Could be used as backup for RMDCN**



www.geant.net

The Pan-European Research and Education Network

GÉANT interconnects Europe's National Research and Education Networks (NRENs). Together we connect over 50 million users at 10,000 institutions across Europe.



GÉANT connectivity as at January 2014.



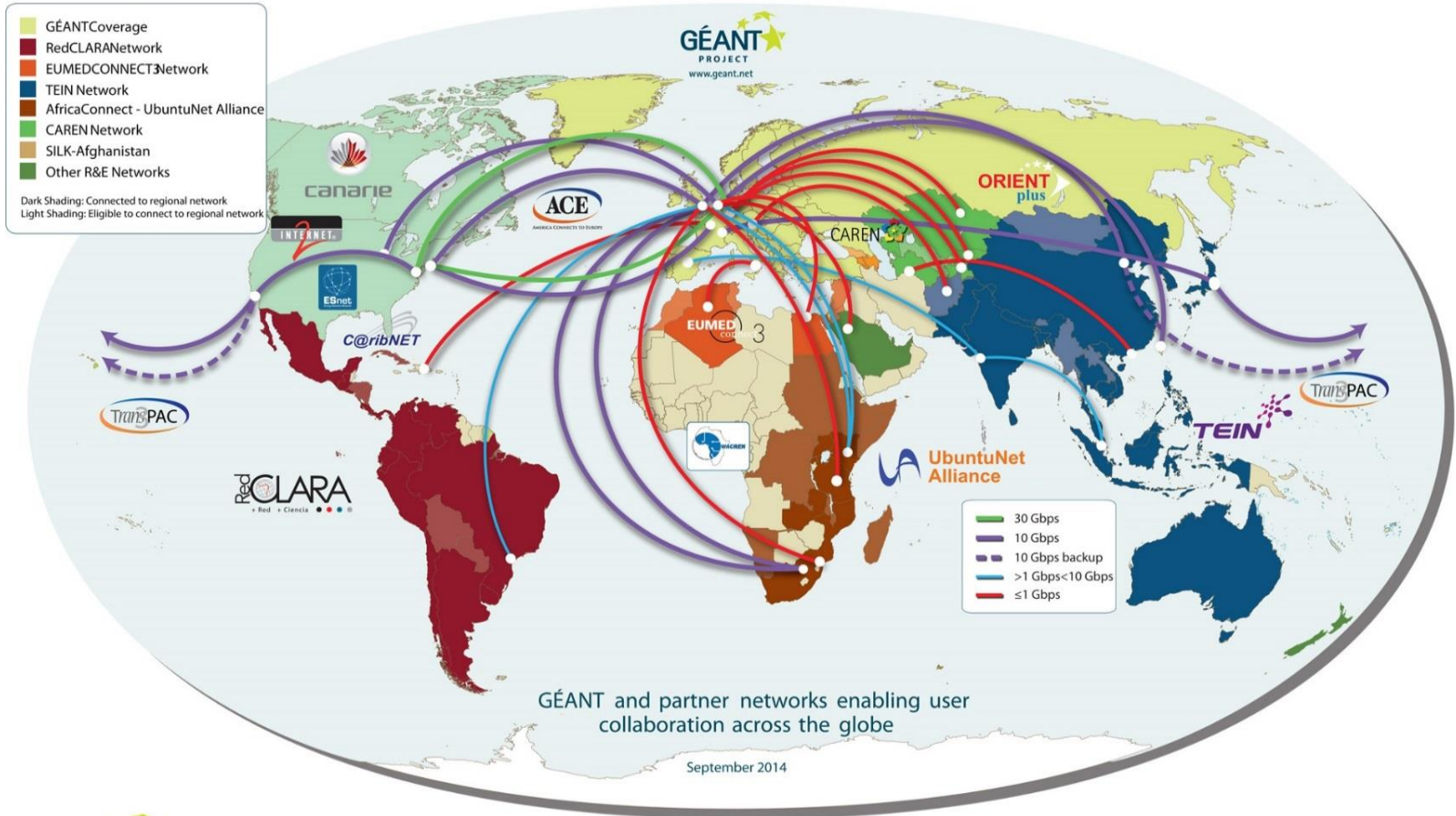
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Wide Area Network - Internet



At the Heart of Global Research and Education Networking



connect • communicate • collaborate
GÉANT is co-funded by the European Union within its 7th R&D Framework Programme.



Wide Area Network - RMDCN

- **Regional Meteorological Data Communication Network**
 - Includes ECMWF members, WMO region VI and GISC sites
 - In 1999 29 sites; today 53 sites connected to RMDCN as of February 2015
 - 500 Mb/sec ECMWF uplink
 - Access speed ranges between 1 Mbps up to 50 Mbps
 - Member states basic package: 4 Mbps (redundant connections)
 - Different service levels with well defined compensations when failures
- **Additional 100 Mbps leased line between ECMWF and the UK Met Office in Exeter**
- **RMDCN available for world wide meteorological community (WMO RA VI and WMO GISC)**
- **RMDCN mainly reserved for operational data dissemination and GTS. If in doubt, check with your Computing Representative**

Access to ECMWF - Security Token

- **All external access to ECMWF requires a Security token validation**
 - Interactive logins
 - ECaccess website
 - File transfers
 - Access to restricted areas on website e.g. forecasts, ecCharts
 - Webmail
 - Creation of X509 certificates
- **Some access possible with certificates, either for the web or ECaccess services**
- **Read the security rules**



Interactive Access

- **Ssh sessions via Internet:**

\$ ssh [-X] <uid>@ecaccess.ecmwf.int or

\$ ssh [-X] <uid>@ecaccess.meteo.ms

meteo.ms - domain name of your Meteorological Service

- **X11 forwarding supported (option -X)**

- **Ssh session via RMDCN:**

\$ ssh [-X] <uid>@msaccess.ecmwf.int or

\$ ssh [-X] <uid>@msaccess.meteo.ms

- **Available to Meteorological Services only**

- **RMDCN may be reserved for operational activities, check with your Computing Representative**

ECaccess – Web Access – <http://ecaccess.ecmwf.int/> *

ECMWF ECaccess login

Web session

Automatic logout will occur after an idle time of : 30 minutes

Please enter your userid :

Your passcode (obtained from your security token) :

Log on

NX interactive session

ECMWF server : ecgate

Or workstation :

Network link speed : adsl

Initial application : xterm

Window option (NX3) : floating window

Virtual desktop resolution (NX3) : available area

Log on (NX3) Log on (NX4)

Tips for using ECaccess

When using ECaccess, please use the menu navigation keys, not your browser back button. To make the service more secure, ECaccess instructs your browser not to cache personal information.

NX sessions

Please note that NX3 is no longer supported by NoMachine. You are encouraged to use NX4 instead.

* Also available on msaccess or on local gateways

ECaccess – Web Session

- **Manage files located in**
 - HOME
 - SCRATCH
 - ECFS (ec: and ectmp:)
- **Submit jobs**
- **View batch queues**
- **View your own submitted and/or running jobs**
- **Manage ECtrans associations and file transfers**
- **Download ECaccess certificate**
 - Can be used in conjunction with ECtools

ECaccess – Web - NX

- **Secure remote access (ssh) and desktop virtualization (VNC like)**

- **Based on the NX software from NoMachine:**

<http://www.nomachine.com/>

Version 4 is recommended

- **Improved technology, much faster than X11 or VNC**
- **Local client available, that can be customised via session configuration files**
- **NX available on local gateways starting from ECaccess release 3.3.0 onwards**

ECaccess – Web - NX

- **Graphical sessions available on ecgate and cca**
 - **WindowMaker window manager**
 - **Xterm in floating window**
- **You can start several graphical applications from a virtual desktop or an xterm**

ECaccess – Web - NX

The screenshot shows a terminal window titled "xterm" with a list of running jobs. The jobs are listed in a table format with columns for job ID, name, user, status, and time. An "Application Menu" is open over the terminal, showing options like "Info", "Allow X11 access from ...", "Update Application Menu", "Run command ...", "open xterm on ...", "local xterm", "ecgate (AIX)", "ecgate (RedHat Linux)", "c2a", and "c2b". Below the menu, there are sections for "lxab linux cluster (ECMWF only)", "Editors", and "Appearance".

Job ID	Name	User	Status	Time	Host
1291700	wind_ml	esk0	normal	9:27 1-00:00:00	ecgb05
1291647	datasyncro	swec	normal	17:15 1-00:00:00	ecgb09
1291646	us_job_all	gdq	normal	17:26 1-00:00:00	ecgb08
1291615	us_job_all	gdq	normal	19:39 1-00:00:00	ecgb04
1291546	previ_bal_	ar9	normal	31:40 2:00:00	ecgb10
1291539	us_job_all	gdq	normal	34:10 1-00:00:00	ecgb10
1291505	us_job_all	gdq	normal	41:23 1-00:00:00	ecgb09
1290758	soc38h1b3	fim	normal	2:11:35 1-00:00:00	ecgb07
1290754	get_macc_N	hc0	normal	2:11:40 1-00:00:00	ecgb05
1288986	controlrun	nli	normal	5:41:24 1-00:00:00	ecgb08
1287969	c_10_38h1b	sp0r	normal	8:11:42 1-00:00:00	ecgb08
1287239	mars.job	rgk	normal	10:43:20 1-00:00:00	ecgb10
1287143	MyM_DA_con	nkn	normal	10:55:05 1-00:00:00	ecgb04
1286320	retr	aure	normal	12:29:52 1-00:00:00	ecgb07
1285885	MyM_DA_con	nkn	normal	13:16:31 1-00:00:00	ecgb04
1285359	deneme18.b	tmy			ecgb10
1276179	MARSEXTR2	nkc			ecgb07
1276176	MARSEXTR2	nkc			ecgb04
1276173	MARSEXTR2	nkc			ecgb04
1276172	MARSEXTR2	nkc			ecgb04
1291155	ecgb_retri	hui			ecgb07
1289288	get_convec	gbpw			ecgb05
1289289	get_convec	gbpw			ecgb08
1289287	get_convec	gbpw			ecgb07
1288955	get_convec	gbpw			ecgb09
1287512	anneds_201	sbw			ecgb05
1287283	MONICOSHOR	sbt			ecgb08
1285860	iberia_38h	smx			ecgb07
1285855	seepra	f12f			ecgb08
1285488	dka_h38_11	mib			ecgb09
1279334	dka_h38_11	mib			ecgb08
1276721	38h1_1_30_	mdx			ecgb05
6	ecgb11:/home/us/usc/ -->				

The Emacs editor window is titled "emacs@ecgb11.ecmwf.int" and shows a file named "Buffers Tools Sh-Script Help". The content of the file is a shell script with comments and commands. The script includes a "pwd" command to print the current directory, an "echo" command to list the content of the current directory, and an "ls -l" command to list files. The script also includes comments about the PATH variable and a "Firstjob" section.

```
dir=/scratch/ms/...

the working directory of the batch script before it is
uted.

-type=FAIL

ifies that an email should be sent in case the job fails.
r options include BEGIN, END, REQUEUE and ALL (any state
ge).

=00:05:00

ifies that your job my run up to HH:MM:SS of wall clock
. The job will be killed if it exceeds this limit. If
is not defined, the default limit for the queue (qos)
be used.

-----
urrent directory and its content
-----

at your job will be executed in the specified workdir:"

pwd # prints the path name of the current directory

echo "
List of the content of the current directory:
"
ls -l

#-----
# show your PATH
#-----

echo "
----- Firstjob 36% L80 (Shell-script[pdksh])-----
```

File Transfers to ECMWF – FTP or SFTP

- Through Internet, using ecaccess.ecmwf.int
- To login, use
 - \$ `ftp ecaccess.ecmwf.int` OR `sftp <uid>@ecaccess.ecmwf.int`
- Enter your UID and passcode from security token
- Direct access to limited number of file systems
 - ECHOME (\$HOME)
 - ECSCRATCH (\$SCRATCH)
 - ECFS (ec:)
 - ECTMP (ectmp:)
 - ECHOST (e.g. ecgate, cca)
- ECaccess Web Toolkit offers similar access via command line tools
 - ETools may already be installed on your organisation's desktop or can be installed by yourself

File Transfers to ECMWF – FTP

```
--> ftp uid@ecaccess.ecmwf.int
```

```
ftp> ls
```

```
227 Entering Passive Mode. (136,156,66,24,219,252)
```

```
150 Opening ASCII mode data connection
```

```
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECHOME
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECHOST
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECMARS
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECFS
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECSCRATCH
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECJOBS
drwxr-x--- 1 uid ecaccess 2048 Dec 18 2014 ECTMP
```

```
226 Transfer complete
```

```
ftp> cd ECHOST
```

```
250 CWD command successful
```

```
ftp> ls
```

```
227 Entering Passive Mode. (136,156,66,24,204,2)
```

```
150 Opening ASCII mode data connection
```

```
drwxr-x--- 1 uid ecaccess 2048 Feb 11 17:06 frutiger
drwxr-x--- 1 uid ecaccess 2048 Feb 11 17:06 ecgate
drwxr-x--- 1 uid ecaccess 2048 Feb 11 17:06 cca
drwxr-x--- 1 uid ecaccess 2048 Feb 11 17:06 c2a
```

```
226 Transfer complete
```

```
ftp> cd ECHOST/cca$PERM
```

```
250 CWD command successful
```

```
ftp> ls
```

```
227 Entering Passive Mode. (136,156,66,24,226,191)
```

```
150 Opening ASCII mode data connection
```

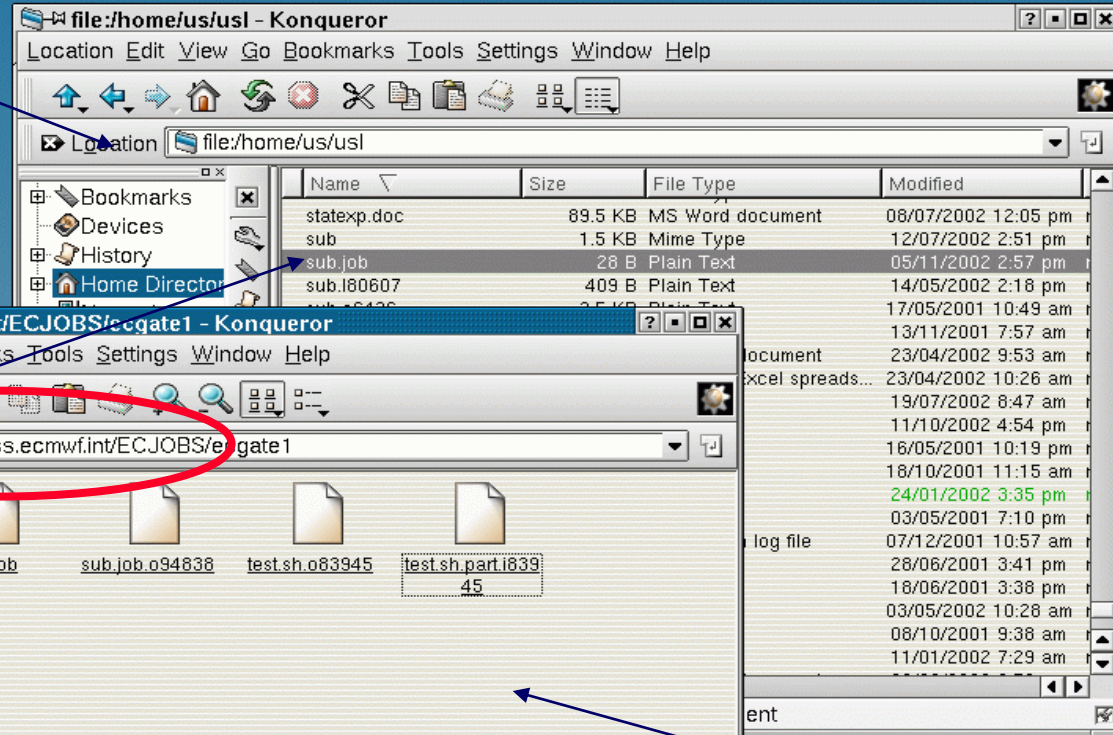
```
drwxr-xr-x 1 uid gid 24576 Sep 12 14:31 FLEXPART82
drwxr-xr-x 1 uid gid 24576 Sep 30 08:06 FLEXPART90
-rw-r--r-- 1 uid gid 5150720 Sep 05 12:30 flexpart82.tar
drwxr-xr-x 1 uid gid 4096 May 01 2014 hdfsos
drwxr-x--- 1 uid gid 4096 May 01 2014 hdfsos2
-rw----- 1 uid gid 112524 Mar 25 2014 hello_world.err
-rw----- 1 uid gid 371 Mar 25 2014 hello_world.out
drwxr-x--- 1 uid gid 4096 Sep 05 16:38 idl
drwxr-x--- 1 uid gid 4096 Aug 10 2013 vim74
```

```
226 Transfer complete
```

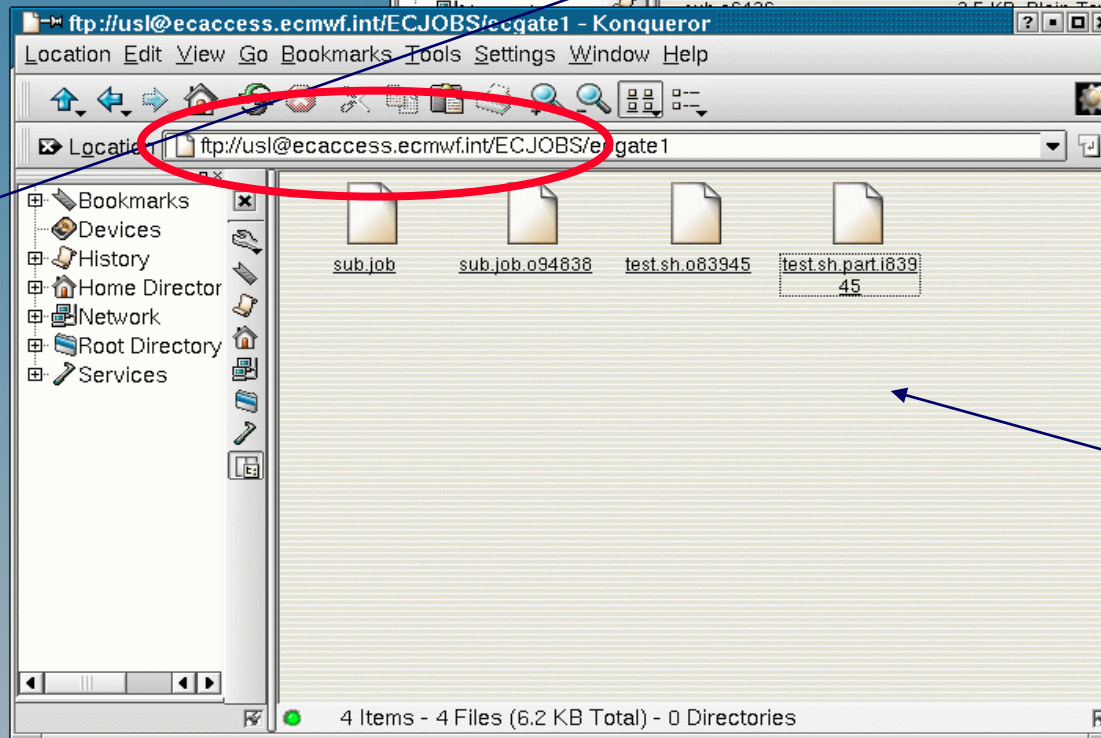
```
ftp>
```

File Transfers to ECMWF - Browser– ftp/sftp

Local environment



Local file can be dragged and dropped into ecaccess area.



FTP entry for batch access

File Transfers from ECMWF to MS

- A straight FTP to Meteorological Services **via RMDCN** lines from ecgate is theoretically possible
 - **This may only be available for operational purposes!**
- For transfers **via Internet** connections one has to use ectrans, FTP via the ECMWF FTP-gateway or sftp/scp.
 - ectrans is recommended; it will be covered later, during the session on ECaccess

File Transfers from ECMWF – FTP interactive

--> **ftp proxy**

Connected to proxy.ecmwf.int.

220- 136.156.64.10 PROXY-FTP server (DeleGate/9.9.5) ready.

...

220-

220-extended FTP [MODE XDC][XDC/BASE64]

220

Name (proxy:uid): **username@ms-host**

331 Password required for username.

Password: **XXXXXX**

230-- PASS for username@ms-host.

220-Welcome to Pure-FTPd.

220-You are user number 2 of 50 allowed.

220-IPv6 connections are also welcome on this server.

220 You will be disconnected after 15 minutes of inactivity.

331 User username OK. Password required

230-User username has group access to: 500

230-OK. Current directory is /

230 \(-)/ -- { connected to 'ms-host' }

ftp>

ftp> **get filename**

...

ftp> **quit**

File Transfers from ECMWF – Batch FTP (1/2)

~~FTP script with plain text password possible~~

```
#!/bin/ksh  
HOST=proxy.ecmwf.int  
USER=username@myserver.org  
PASS=anonymous@myserver.org  
  
ftp -inv $HOST << EOF  
user $USER $PASS  
dir  
put myfile  
bye  
EOF
```

Not recommended!
Use .netrc file or
ssh instead.

File Transfers from ECMWF – Batch FTP (2/2)

- **.netrc file can be used for automated login**

```
machine proxy login anonymous@kernel.org password test@test.org
```

- **FTP in shell scripts**

```
ftp proxy <<EOF  
dir  
put myfile  
quit  
EOF
```

- **Limitation of .netrc**

- **Only one entry for one host !**
- **Should be readable only to the owner**

File Transfers from ECMWF - sftp/scp

- **sftp/scp commands are part of the ssh package**
- **sftp is a more secure replacement for the ftp command**
- **scp is a more secure replacement for the rcp command**
- **They allow different authentication mechanisms**
- **sftp/scp transfers can be slightly slower than ftp/rcp transfers due to the encryption of the connection**
- **sftp with password:**
 - `$ sftp user@host.meteo.ms`
 - user@host.meteo.ms' s password: `xxxxxx`
 - sftp>
- **scp example:**
 - `$ scp localfile user@host.meteo.ms:/home/user/destinationfilename`

File Transfers from ECMWF - sftp/scp

- Transfers can be automated with the use of private/public keys
- Use ssh-keygen command to generate private/public keys
- **Add** contents of ~/.ssh/id_rsa.pub to ~/.ssh/authorized_keys on all remote machines where you wish to transfer files to, using public key authentication
- If successful sftp, scp and ssh commands to these remote machines will not prompt for a password anymore
- This allows the use of these commands in batch mode

Data transfer of large volumes

- To export/import “large amounts” of data (e.g. ERA, EPS or Seasonal FC) use your Internet connection whenever possible
- “large volume” depending on
 - Internet connection
 - Available time?
 - 10s of TBs
- If network transfer is not feasible check with User Support for alternatives, e.g. transfer via media

Further Information

- **Access to computing facilities:**

www.ecmwf.int/en/computing/access-computing-facilities

- **User documentation**

software.ecmwf.int/wiki/display/UDOC/User+Documentation

- **ECaccess documentation and releases:**

software.ecmwf.int/wiki/display/ECAC/ECaccess+Home

- **Networks**

www.ecmwf.int/en/computing/our-facilities/networks

www.ecmwf.int/en/computing/our-facilities/rmdcn