

ECaccess Service

Introduction to ECMWF computing services

Paul Dando

Computing and Software Support Team



ECaccess concepts

- ECaccess provides a portal to access ECMWF computing and archiving facilities
 - File and job management in batch or interactive mode through an extended (S)FTP server
 - File, job and data transfer management through a web browser or via command-line tools
 - All services available on your local system as well as the Atos HPC at ECMWF
- Strict authentication using soft tokens (TOTP) and X509 certificates
- Data integrity and confidentiality guaranteed by SSL/TLS

ECaccess architecture – multiple tiers

- ECaccess client
 - on your local system or at ECMWF
 - ftp / sftp client
 - Web browser
 - ECaccess Web Toolkit
- ECaccess Gateway
 - Entry point for all ECaccess users
 - Verifies user's authentication
 - May be installed at your local site
 - Default ECaccess gateway is `boaccess.ecmwf.int`

ECaccess architecture – multiple tiers

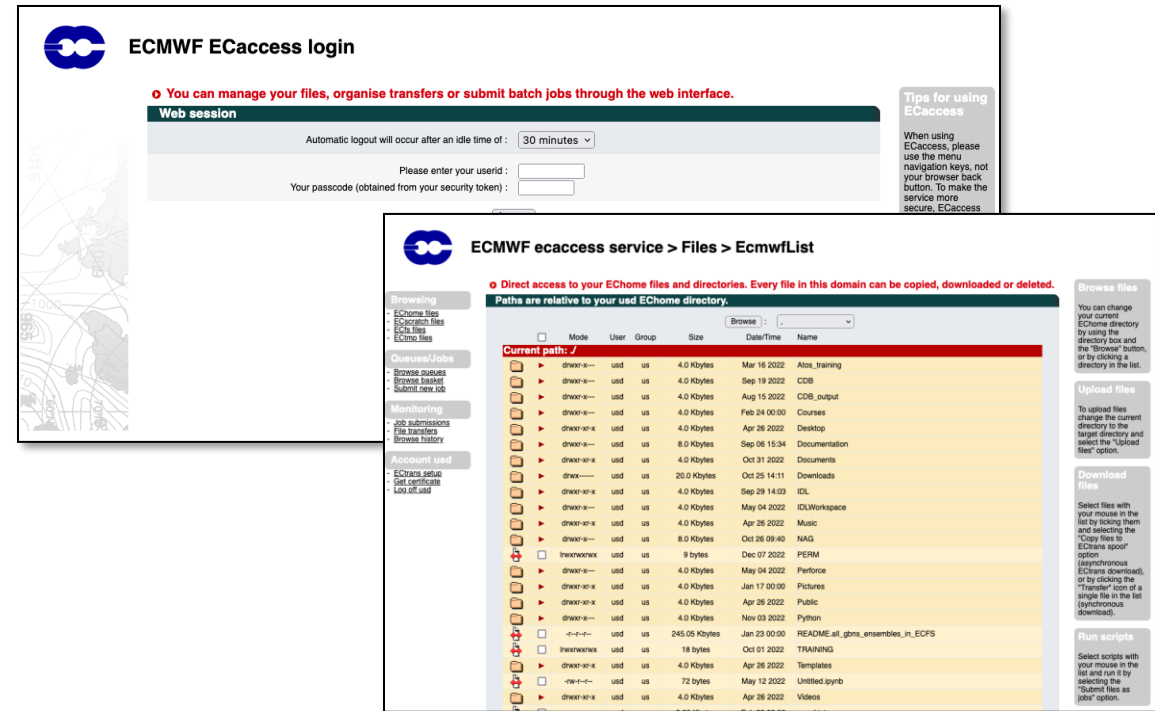
- ECaccess server
 - Located at ECMWF on boaccess.ecmwf.int
 - Entry point for all remote ECaccess gateways
 - Keeps track of ECaccess user activity
- ECaccess Atos
 - Provide job management through SLURM – both ecs and hpc hosts
 - Provides access to all ECMWF file systems, including ECFS
 - Manages spool for batch jobs and unattended file transfers

ECaccess local gateways

- Use local ECaccess gateway if installed
- Internet ECaccess gateways available at over 30 NMSs and other sites
- If no local gateway, use ECMWF's gateway – boaccess.ecmwf.int
- See Web Toolkit command **ecaccess-gateway-list**

ECaccess interactive sessions

- Web interface: <http://boaccess.ecmwf.int>
- (s)ftp access



- TOTP authentication required
 - See <https://confluence.ecmwf.int/display/UDOC/Using+Time-based+One-Time+Passwords>

! Only the code from the default TOTP device is accepted !


- For interactive SSH or X11 access use Teleport SSH or the Linux VDI
 - <https://confluence.ecmwf.int/display/UDOC/Teleport+SSH+Access>
 - <https://confluence.ecmwf.int/display/UDOC/How+to+connect+-+Linux+Virtual+Desktop+VDI>

ECaccess Web Toolkit

- Available from
 - <https://confluence.ecmwf.int/display/ECAC/Releases+-+Web+Toolkit>
- Must be installed on each platform for which access to ECMWF services is required
- Also available on the ECMWF HPCF

```
$ module load ecaccess  
$
```

- Provides commands for
 - File management
 - Job management
 - Transfer management
- The **ecaccess** command provides general information
- A certificate is needed to use from remote systems

 *You should enable
passwordless ssh access on
the Atos HPC*

ECaccess Web Toolkit – getting a certificate

```
$ ecaccess-certificate-create
Please enter your user-id: uid1234
Your passcode:#####

$ ecaccess-certificate-list
chmod                168h      Oct 21 08:24      change file mode
deleteFile           168h      Oct 21 08:24      delete file
deleteJob            168h      Oct 21 08:24      delete a job
getFileList          168h      Oct 21 08:24      get file list
getFileSize          168h      Oct 21 08:24      get file size
...
```

- Certificates are:
 - valid for 7 days
 - Can be extended for special or operational requirements
 - needed only for file and job management
 - not needed when using the ECaccess Web Toolkit on the ECMWF HPCF

ECaccess Web Toolkit – file management

Command	Purpose
ecaccess-file-chmod	Change ECaccess File Mode Bits
ecaccess-file-copy	Copy an ECaccess File
ecaccess-file-delete	Remove an ECaccess File
ecaccess-file-dir	List ECaccess Directory Contents
ecaccess-file-get	Download an ECaccess File
ecaccess-file-mget	Download Multiple ECaccess Files at once
ecaccess-file-mkdir	Make a Directory on the ECaccess File System
ecaccess-file-modtime	Show the Last Modification Time of an ECaccess File
ecaccess-file-move	Move or Rename ECaccess Files
ecaccess-file-mput	Upload a File on the ECaccess File System
ecaccess-file-rmdir	Remove a Directory on the ECaccess File System
ecaccess-file-size	Show the Size of an ECaccess File

- Different storage areas – or ‘domains’ or ‘file systems’ - can be accessed
 - E.g. ‘home:’ for \$HOME or ‘ec:’ for ECFS

ECaccess Web Toolkit – job management

Command	Purpose
ecaccess-job-delete	Delete an ECaccess job
ecaccess-job-get	Download a job output / error / input file
ecaccess-job-list	List all ECaccess jobs
ecaccess-job-restart	Restart an ECaccess job
ecaccess-job-submit	Submit a new ECaccess job
ecaccess-queue-list	List available queues

Unattended file transfers with ectrans

- Unattended file transfers
- Automatic retry on failure
- Synchronous or asynchronous transfers
- Downloads or uploads
- Secured transfers using sftp, ftps (or ftp)
- Email notifications
- ectrans associations can be set up for various destinations
- ectrans association name is unique on each ECaccess gateway
- ectrans association has to be created on the specific ECaccess gateway to be used
- Transfers with ectrans are always initiated from ECMWF

ECaccess Web Toolkit – ectrans association and transfer management

Command	Purpose
ecaccess-association-delete	Delete an ectrans association
ecaccess-association-get	Get an ectrans association description file
ecaccess-association-list	List all you ectrans associations for a specified ECaccess gateway
ecaccess-association-protocol	List the supported ectrans protocol
ecaccess-association-put	Create or update an ectrans association
ecaccess-ectrans-delete	Delete an ectrans transfer
ecaccess-ectrans-list	List all ectrans transfers
ecaccess-ectrans-request	Request a new ectrans transfer
ecaccess-ectrans-restart	Restart and exiting ectrans transfer

- An ectrans association must be created before ectrans can be used
- Passwords for destination host are provided with the “-password” option of **ecaccess-association-put**
 - ssh keys can also be used
- See <https://confluence.ecmwf.int/display/ECAC/Unattended+file+transfer+-+ectrans>

The ectrans command – available at ECMWF only

```
$ ectrans -help
usage: ectrans [-gateway name] -remote msuser@[destination] \
               [-get|-put] -source [ec:|ectmp:]filename [args ...] (*)
       ectrans -check requestID (*)

-gateway {arg} - access gateway name (default (**): boaccess.ecmwf.int)
-remote {arg} - access method (default (**): *none*)
-source {arg} - source file name
-target {arg} - target file name (default: same as -source)
-retryCnt {arg} - define the number of retries (default: async=144, sync=0)
-retryFrq {arg} - define the frequency of retries (default: async=10m, sync=1m) (***)
-put      - interactive/synchronous transfer (no spool)
-get      - interactive/synchronous pull (rather than push) file
-overwrite - if existing target file
...
```

The ectrans command – an example

```
$ ectrans -remote ectrans_eacc -source z_an.grib -verbose
verbose: gateway=boaccess.ecmwf.int
verbose: echost=boleccmd.ecmwf.int
verbose: ecport=644
verbose: action=spool
verbose: ecuser=uid1234
verbose: source=z_an.grib
verbose: target=z_an.grib
...
verbose: 4585153 bytes to upload
184775993

$ ecaccess-ectrans-list
184775993  COPY          ectrans_eacc                boaccess.ecmwf.int  Oct 09 14:01
$
```

ECaccess-based Time Critical Service – Option 1

- Simple job submissions following ECMWF operational activity
- Jobs are monitored by ECMWF
- ECaccess events (a.k.a. notifications)
 - One user at ECMWF defines the ECaccess events

```
$ ecaccess-event-list
167 an00h000 At this stage, the analysis at 00UTC is complete.
168 an12h000 At this stage, the analysis at 12UTC is complete.
178 fc00h240 At this stage, the deterministic forecast at 00UTC for step 240 (10
days) is complete.
...
```

- About 100 ECaccess events defined by ECMWF
- See the ECMWF product's dissemination schedule:
 - <https://confluence.ecmwf.int/display/DAC/Dissemination+schedule>

ECaccess-based Time Critical Service – Option 1

- Users can submit jobs to an event using `ecaccess-job-submit`

```
$ ecaccess-job-submit -help

    ecaccess-job-submit [-eventIds list] [-manPage content]
                        [-retryCount number] [-retryFrequency frequency] source

$ ecaccess-job-submit -eventIds fc00h240 -retryCnt 2 myjob.ksh
23587624

$ ecaccess-job-list
23587624    ecs          STDBY          0/3      Oct 09 14:09    [fc00h240 (178)] myjob.ksh
```

- The ECaccess job is in STANDBY mode until the owner of the event sends a notification to it
- The event owner can send environment variables with the notification. These can be used by the job
- ECaccess submits the job to the batch system (SLURM) on Atos (ECS or HPC)
- ECaccess duplicates the job and puts it in STANDBY mode ready for the next event notification

ECaccess-based Time Critical Service – Option 1

The screenshot displays the ECaccess-based Time Critical Service interface, showing a file transfer log, a job status table, and a script editor.

File Transfer Log:

```
File: /ec/ws3/tc/emos/logs/0001/o/main/00/eve/036/ms_ec.1 Size: 88 KB
Source: served by ad-log@36801 at 2025-10-09 11:12:11
The whole file transferred (in 0.0 s)

05:56:16 slurm_script[602] [[ fc00h036 == ms1104 ]]
05:56:16 slurm_script[603] [[ fc00h036 == ms1104ref ]]
05:56:16 slurm_script[604] [[ fc00h036 == ms360ref ]]
05:56:16 slurm_script[607] [[ 1 -gt 11 ]]
05:56:16 slurm_script[619] seq=2025100900
05:56:16 slurm_script[620] local=/usr/local/apps/ecaccess/current/bin/ecevent
05:56:16 slurm_script[621] vars=MSJ_EXPVER='0001; MSJ_BASETIME=00; MSJ_STEP=0036; MSJ_YEAR=2025; MSJ_MONTH=10; MSJ_DAY=09; MSJ_EVENT=fc00h036; MSJ_MEMBERS=1; MSJ_IFS_CYCLE=49r1;
05:56:16 slurm_script[622] /usr/local/apps/ecaccess/current/bin/ecevent -ecport 644 -env MSJ_EXPVER='0001; MSJ_BASETIME=00; MSJ_STEP=0036; MSJ_YEAR=2025; MSJ_MONTH=10;
MSJ_DAY=09; MSJ_EVENT=fc00h036; MSJ_MEMBERS=1; MSJ_IFS_CYCLE=49r1; ' -send fc00h036 -seq 2025100900 -delay 15h
Notification received for fc00h036 (74 subscription(s) updated)
05:56:16 slurm_script[624] [[ fc00h036 == mo/c_thu ]]
05:56:16 slurm_script[630] sleep 90
05:57:46 slurm_script[631] rm
rmdir: failed to remove '/etc
05:57:46 slurm_script[632] tr
05:57:46 slurm_script[632] xc
05:57:46 slurm_script[634] xc
05:57:46 slurm_script[638] xr
05:57:46 slurm_script[638] EC
05:57:46 slurm_script[638] ex
```

Job Status Table:

Date&Time	Name	Jobs	Status
09 05:40:24	ms_an18	18	FAILED
09 05:40:23	ms000	33	DONE
09 05:56:16	ms036	74	DONE
09 06:06:25	ms072	119	DONE
09 06:27:20	ms144	219	FAILED
09 06:41:22	ms192	19	DONE
09 06:55:14	mswave	12	FAILED
09 06:55:12	msmetgram	1	DONE
09 06:55:12	ms240	103	FAILED

Script Editor:

```
# Define the date used by the MARS request
if [[ $MSJ_YEAR != "" && $MSJ_MONTH != "" && $MSJ_DAY != "" ]]
then
    DATE=$MSJ_YEAR$MSJ_MONTH$MSJ_DAY
    TIME=$MSJ_BASETIME00
else
    echo "SMS date not defined!"
    DATE= date +%Y%m%d
    TIME="0000"
if [[ date +%k%M -gt 1630 ]] ; then
    TIME="1200"
fi
fi
#-----
TMP_PREFIX=NWP_MORIA
export MARS_MULTITARGET_STRICT_FORMAT=1
AREA=85/-80/20/80 # EURO
cd $SCRATCH
echo "Creating $TARGET"
# call to MARS
/usr/local/bin/mars <<EOF
ret,
type=an,
class=od,
expver=1,
stream=oper,
repres=00,
date=$DATE,
time=$TIME,
area=$AREA,
param=LSM/Z,
levtype=sfc,
levelist=OFF,
nrid=0.125/0.125.
```

Job Status Table (Right):

Name	Jobs	Status
ms012	9	DONE
ms072	8	DONE
ms_bc	1	DONE
ms012	5	INIT
ms072	10	INIT
ms_bc	9	INIT
ms012	9	INIT
ms072	10	INIT
ms_bc	0	INIT
ms012	3	DONE
ms072	9	DONE
ms_bc	8	DONE

ECaccess-based Time Critical Service – Option 1

- 100+ users submitting 1500+ jobs per day to 80+ ECaccess events
- TC-1 service open to all users with Atos login access (ecs and / or hpc) ...
- ... with access to real-time data in MARS
- ECaccess events system can be – and is – used for other activities
 - Copernicus activities – CAMS, GFAS, ERA5
 - TC-2 activities
- TC-1 sample SLURM job available at:
 - https://confluence.ecmwf.int/display/UDOC/HPC2020%3A+realtime_metgram.sh

ECaccess references

- ECaccess User Guide
 - <https://confluence.ecmwf.int/display/ECAC/User+Guide>
- ECaccess Web Toolkit
 - <https://confluence.ecmwf.int/display/ECAC/Web+Toolkit+-+The+full+featured+client>
- ECaccess – unattended file transfers with ectrans
 - <https://confluence.ecmwf.int/display/ECAC/Unattended+file+transfer+-+ectrans>
- ECaccess Time Critical Option 1 service
 - <https://confluence.ecmwf.int/display/UDOC/Simple+time-critical+jobs>
- ECaccess tutorial
 - <https://confluence.ecmwf.int/display/UDOC/ECaccess+and+ECaccess+Web+Toolkit+tutorial>

Questions ?



Your turn !

ECaccess and ECaccess Web Toolkit tutorial:

- <https://confluence.ecmwf.int/x/wAGwFQ>