

Time-critical applications

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User Support

Member State time-critical applications

- Following Council support in 2005, a framework for Member State time-critical applications has been implemented.
- It consists of 3 options:
 - 1) **Simple job submission** monitored by ECMWF
 - 2) Member State **'ecFlow' suites monitored** by ECMWF
 - 3) Member State **'ecFlow' suites managed** by ECMWF
- Technical guidelines to advise on the development of such suites are available from the web:

<https://software.ecmwf.int/wiki/display/UDOC/Time+Critical+applications>

MS time-critical applications: Introduction

- Daily data access from real-time archive in Feb 2015 (March 2013):
 - ECMWF data distribution – dissemination to ‘Member States’:
 - RMDCN: 90GB (110GB)
 - Internet: 1100GB (500GB)
 - Local dissemination: 1500GB (*2) (750GB)
 - Real-time MARS access by MS users on ecgate:
 - 1000GB (600GB)

MS time-critical applications: Option 1

- Enhanced ECaccess batch system
 - Scheduled run of jobs and retry mechanism (in ectrans) were already available in ECaccess.
- New concept of events, also known as notifications, added to ECaccess
 - Events are defined by one user; they can be made publicly available.
 - Event name: “fc12h240”
 - Event description: “at this stage, the 10 day forecast data from the high resolution 12UTC run is available”
 - Users can subscribe their own jobs to “public events”; these jobs will remain in standby mode until ...

MS time-critical applications: Option 1

- events - notifications
 - ... until the event owner sends a notification to an event; ECaccess will then submit the jobs subscribing to that event.
 - Environmental variables can be passed to the jobs when the notification is given to the event, e.g. a date, time, ...
 - Last but not least, soon after the notification of an event, ECaccess will schedule a new version of the jobs subscribing to the event, ready to be submitted at the next notification.
- More than 1300 jobs for about 170 users in ~60 events.

MS time-critical applications: Option 1

ECMWF eaccess service > Jobs > Submit - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

ECMWF eaccess service > Jobs > Submit

Submit a script.

Source script

Please write your script :

```
#  
# Batch request script:  
#
```

Or upload it from:

Subscribe to notification(s).

Subscription(s)

<input type="checkbox"/>	Id	Name	Comment
Notification(s) list			
<input type="checkbox"/>	326	ef00hplumes	At this stage, the EPS plume charts at 00UTC have been updated.
<input type="checkbox"/>	341	ef00h240	At this stage, the ensemble forecast model at 00UTC (step 240) is complete
<input type="checkbox"/>	323	ef12h504	At this stage, the ensemble forecast model at 12UTC - for step 504 (21 days) is complete
<input type="checkbox"/>	342	ef12h240	At this stage, the ensemble forecast model at 12UTC - step 240 - is complete
<input type="checkbox"/>	324	ef00h504	At this stage, the ensemble forecast model at 00UTC - for step 504 (21 days) is complete
<input type="checkbox"/>	343	bc00h072	At this stage, the boundary condition forecast at 00UTC - step 72 - is complete.
<input type="checkbox"/>	167	an00h000	At this stage, the analysis at 00UTC is complete.
<input type="checkbox"/>	168	an12h000	At this stage, the analysis at 12UTC is complete.

Script content editor

With the "script content editor" you can either enter your text line by line, and paste the in your er.

Script upload

As an alternative to the "script content editor", you can press the "Browse" button to navigate on your hard disk and select a script file from your computer.

Current PATH

The script you are going to submit will be executed in your ECSCRATCH domain. All non absolute PATH used in your script will be relative to this domain.

ECaccess target queue

Done

buaccess.ecmwf.int

MS time-critical applications: Option 1

ECMWF eaccess service > Jobs > Submit - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

<input type="checkbox"/>	285	motcrefc	At this stage, the Monthly Forecast hindcast products have been updated.
<input type="checkbox"/>	286	wm00h120	At this stage, the the European Shelf model at 00UTC is complete (step 120).

Total: 34

automatically renew subscription
 one script to one notification

Settings of your job request.

Job settings

Do not run before (yyyy-MM-dd HH:mm) : 2006-05-10 20:
Job expires after (in days) : 7
Select the ECaccess target queue : ecgate [LoadLeveler] v
 script contains no directives
 redirect stderr to stdout

Man page for your job :

man page for ECMWF operators

Retry frequency (in seconds) : 600
Retry count (<0:disabled) : 144

Send mail to : usl
 at the beginning
 at the end (on success)
 at the end (on failure)
 when restarted (on retry)

Submit job

Done buaccess.ecmwf.int

start ECMWF eaccess ser... documents time_crit_opt_1_ug - ... untitled - Paint EN 97% 21:40

automatically
renew subscription

one script to one
notification

man page for
ECMWF operators

retry count and
frequency

MS time-critical applications: Option 1

ECMWF ecaccess service > Jobs > Track

Use this interface to track jobs you have submitted to ECMWF.

Jobs submitted by us2

<input type="checkbox"/>	JobId	EAccess queue	Notification(s)	Schedule	Try number	Status
	35825	hpcd (LoadLeveler)	bc06h072 (344)	Jun 02 05:03	0/1	INIT
	35828	hpcd (LoadLeveler)	bc06h072 (344)	Jun 02 05:03	0/1	INIT
	35964	hpcd (LoadLeveler)	tr12h000 (185)	Jun 01 19:43	0/1	STDBY
	35963	ecgate (LoadLeveler)	tr12h000 (185)	Jun 01 19:43	0/1	STDBY
	35962	hpcd (LoadLeveler)	fc12h240 (182)	Jun 01 19:43	0/1	STDBY
	35961	hpcd (LoadLeveler)	wg12h240 (188)	Jun 01 19:43	0/1	STDBY
	35960	hpcd (LoadLeveler)	fc12h144 (181)	Jun 01 19:43	0/1	STDBY
	35959	ecgate (LoadLeveler)	fc12h240 (182)	Jun 01 19:42	0/1	STDBY
	35958	ecgate (LoadLeveler)	fc12hmetgram (184)	Jun 01 19:42	0/1	STDBY
	35957	hpcd (LoadLeveler)	fc12hmetgram (184)	Jun 01 19:42	0/1	STDBY
	35956	ecgate (LoadLeveler)	wg12h240 (188)	Jun 01 19:42	0/1	STDBY
	35955	ecgate (LoadLeveler)	fc12h144 (181)	Jun 01 19:42	0/1	STDBY
	35954	ecgate (LoadLeveler)	bc12h072 (345)	Jun 01 19:42	0/2	STDBY
	35952	ecgate (LoadLeveler)	bc12h072 (345)	Jun 01 19:42	0/1	STDBY

Jobs list

All jobs are kept track of by their job identity number. The job status can be either "STDBY", "INIT", "WAIT", "RETR", "EXEC", "DONE" or "STOP".

Job result

To get more details about a job, select it with your mouse in the list by clicking the "Track job" icon.

Delete

You can delete one or more than one job by ticking the job(s) in the list and clicking the "Delete selected".

MS time-critical applications: Option 1

- list events available to user:

```
> ecaccess-event-list
326 ef00hplumes At this stage, the EPS plume charts at 00UTC have been updated.
341 ef00h240 At this stage, the ensemble forecast model at 00UTC (step 240) is complete
342 ef12h240 At this stage, the ensemble forecast model at 12UTC - step 240 - is complete
343 bc00h072 At this stage, the boundary condition forecast at 00UTC - step 72 - is complete.
167 an00h000 At this stage, the analysis at 00UTC is complete.
168 an12h000 At this stage, the analysis at 12UTC is complete.
172 ef00hmetgram At this stage, the EPS metgram database at 00UTC has been updated.
...
> ecaccess-event-list 342
Notification id: 342
Name: ef12h240
Public: true
Owner: emos
Comment: At this stage, the ensemble forecast model at 12UTC - step 240 - is complete.
```

MS time-critical applications: Option 1

- Submitting job and checking job status

```
> ecaccess-job-submit -help
```

Usage:

```
ecaccess-job-submit -version|-help|-manual
```

```
ecaccess-job-submit [-debug] [-local] [-encrypt] [-bufsize length]
[-scheduledDate date] [-noDirectives] [-gateway name] [-remote location]
[-transferOutput] [-transferError] [-transferInput] [-keep] [-eventIds
list] [-sterr2Stdout] [-noRenew] [-mailTo email] [-onStart] [-onSuccess]
[-onFailure] [-onRetry] [-jobName name] [-manPage content] [-lifeTime
days] [-retryCount number] [-retryFrequency frequency] [-queueName name] source
```

```
> ecaccess-job-submit --noDirectives --eventIds 342 --retryCount 2 --queueName ecgate sms.cmd
35853
```

```
> ecaccess-job-list 35853
```

Jobid: 35853

Location: ecgate@ecgate.ecmwf.int

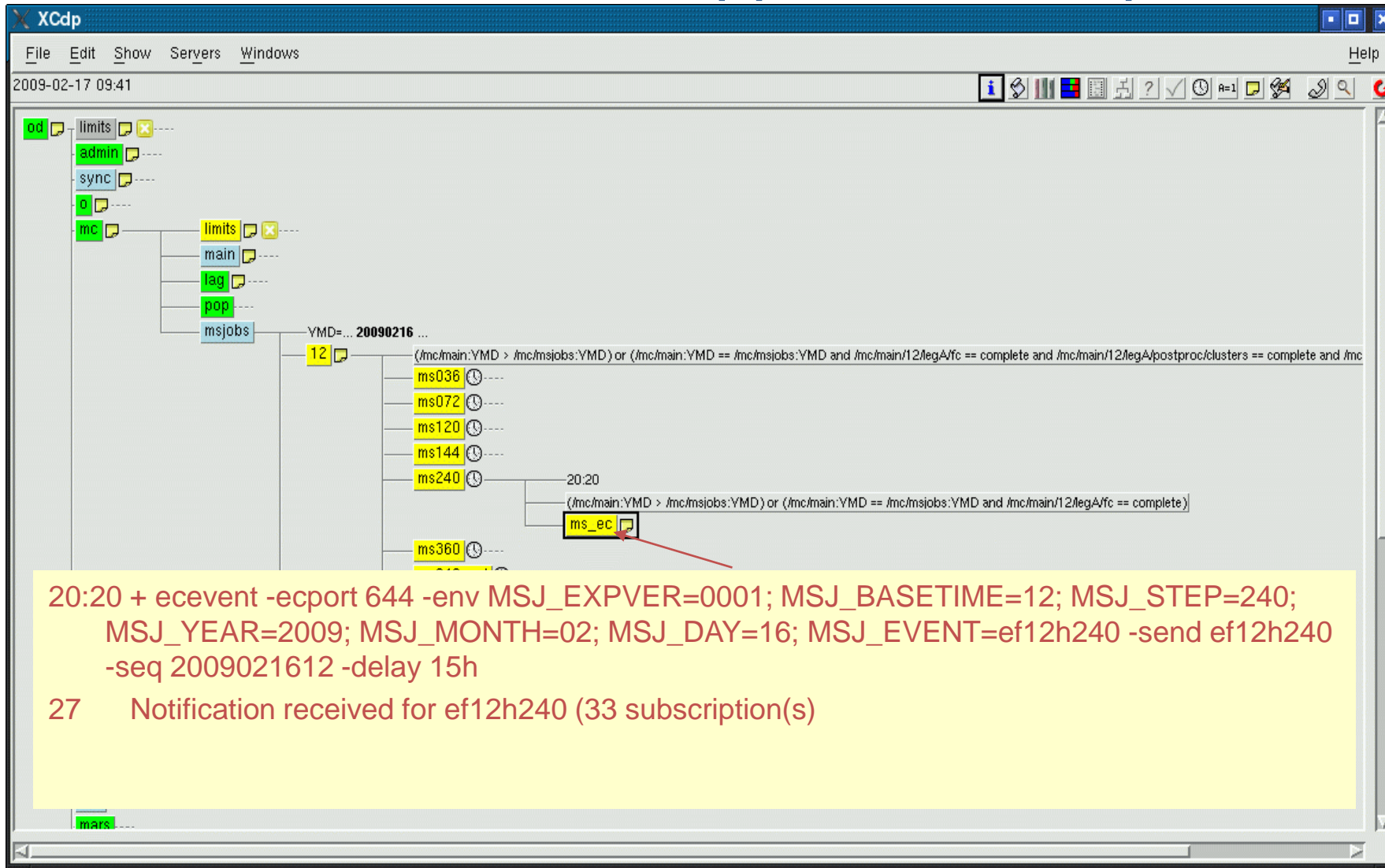
Notification(s): ef12h240 (342)

Schedule: May 31 20:06

Try number: 0/2

Status: STDBY

MS time-critical applications: Option 1



The screenshot shows the XCDP (X-Cluster Data Processing) interface. The main window displays a hierarchical tree of tasks. The tree is organized as follows:

- od
 - limits
 - admin
 - sync
 - o
 - mc
 - limits
 - main
 - lag
 - pop
 - msjobs
 - YMD=... 20090216 ...
 - 12
 - ms036
 - ms072
 - ms120
 - ms144
 - ms240
 - 20:20
 - ms_ec
 - ms360

The terminal window at the bottom of the interface shows the following command and output:

```
20:20 + ecevent -ecport 644 -env MSJ_EXPVER=0001; MSJ_BASETIME=12; MSJ_STEP=240;  
MSJ_YEAR=2009; MSJ_MONTH=02; MSJ_DAY=16; MSJ_EVENT=ef12h240 -send ef12h240  
-seq 2009021612 -delay 15h  
27 Notification received for ef12h240 (33 subscription(s))
```

Operators' interface – monitoring

Time Critical Applications v0.0.5_20122301001

Filter: Runs Status

Last update : Mon Mar 05 12:37:14 GMT+000 2012

00Z_runs			
Date&Time	Name	Jobs	Status
: /od/o/msjobs/00 (9 Items)			
05 05:40:59	ms_an18	13	DONE
05 05:40:59	ms000	36	DONE
05 05:56:17	ms036	80	DONE
05 06:06:25	ms072	108	DONE
05 06:27:48	ms144	75	DONE
05 06:41:59	ms192	1	DONE
05 06:55:34	mswave	2	DONE
05 07:25:59	msmetgram	14	DONE
05 06:55:13	ms240	130	DONE
: /od/mc/msjobs/00 (11 Items)			
05 07:41:06	ms000	1	DONE
05 07:47:03	ms036	1	DONE
05 07:52:08	ms072	4	DONE
05 08:00:17	ms120	4	DONE
05 08:04:41	ms144	5	DONE
05 08:21:59	mspost240	17	DONE
05 08:20:59	ms240	36	DONE

12Z_runs			
Date&Time	Name	Jobs	Status
: /od/o/msjobs/12 (9 Items)			
04 17:40:37	ms_an06	9	INIT
04 17:40:39	ms000	30	INIT
04 17:56:51	ms036	76	INIT
04 18:07:11	ms072	96	INIT
04 18:27:22	ms144	76	INIT
04 18:41:38	ms192	1	INIT
04 18:55:53	mswave	4	INIT
04 19:26:22	msmetgram	15	INIT
04 18:55:54	ms240	142	INIT
: /od/mc/msjobs/12 (11 Items)			
04 19:40:34	ms000	1	INIT
04 19:46:39	ms036	1	INIT
04 19:52:48	ms072	3	INIT
04 20:00:54	ms120	4	INIT
04 20:04:57	ms144	7	INIT
04 20:21:14	mspost240	16	INIT
04 20:20:13	ms240	35	INIT

bc_runs			
Date&Time	Name	Jobs	Status
: /od/o/msjobs/00bc (2 Items)			
05 05:49:10	ms012	1	DONE
05 06:06:25	ms072	8	DONE
: /od/o/msjobs/06bc (2 Items)			
05 11:49:41	ms012	1	DONE
05 12:06:19	ms072	8	DONE
: /od/o/msjobs/12bc (2 Items)			
04 17:49:44	ms012	2	INIT
04 18:07:02	ms072	5	INIT
: /od/o/msjobs/18bc (2 Items)			
04 23:49:43	ms012	1	DONE
05 00:06:30	ms072	7	DONE

other_runs			
Date&Time	Name	Jobs	Status
: /od/mofc/mon/00/msjobs (1 Item)			
27 22:00:53	msmofc	8	INIT
: /od/mofc/thu/00/msjobs (2 Items)			
01 10:00:51	msmofc_bacl	0	INIT
01 22:01:08	msmofc	0	INIT
: /od/seas3/fcdate/main/prod/msjobs (1 Item)			
15 13:01:17	seasonal_fc	10	INIT
: /od/seas4/fcdate/main/prod/msjobs (1 Item)			
08 12:01:42	seasonal4_fc	7	INIT

Event: /od/o/msjobs/06bc ID: 101155 Name: ms072 Updated: Mon Mar 05 12:36:12 GMT+000 2012

User: Dominique Lucas, x2386 Refresh Select All Select None Resubmit selected Set/UnSet Complete Maximize Single mode Logout

JobId	Initial Job ID	UserID	Creation Date	Start	QueueName	Retry	Status	Job Complete	Selected
2640507	1832666	ka8	1/1/2012	2012-03-04 12:07:38	ecgate	1/1	FAIL	✗	<input type="checkbox"/>
2640500	992973	nls	1/1/2012	2012-03-04 12:07:37	ecgate	1/1	DONE	✗	<input type="checkbox"/>
2640501	2620126	sui	1/1/2012	2012-03-04 12:07:37	ecgate	1/1	DONE	✓	<input type="checkbox"/>
2640504	2144798	cnz	1/1/2012	2012-03-04 12:07:38	ecgate	1/1	DONE	✓	<input type="checkbox"/>
2640502	657593	zit	1/1/2012	2012-03-04 12:07:37	ecgate	1/1	DONE	✓	<input type="checkbox"/>
2640505	1856640	cnx	1/1/2012	2012-03-04 12:07:38	ecgate	1/1	DONE	✓	<input type="checkbox"/>
2640506	2455950	nk7	1/1/2012	2012-03-04 12:07:38	ecgate	1/1	DONE	✓	<input type="checkbox"/>
2640503	2348621	ka8	1/1/2012	2012-03-04 12:07:38	ecgate	1/1	DONE	✓	<input type="checkbox"/>

Date and time when last Notification was received for this event

Management of your own notifications

- Defining events and sending notifications to them:

> `ecevent -help`

```
Usage: ecevent [-create|-send|-clear|-delete|-grant|-update] <MyNotification> \  
[-comment "comment_for_my_notification"] \  
[-public] [-private] [-env "variables_to_pass"] [-seq <number>] \  
[-notify|-subscribe] [-users "list_of_users"]
```

> `ecaccess-event-send -help`

Usage:

```
ecaccess-event-send -version|-help|-manual
```

```
ecaccess-event-send [-debug] [-environment variables] [-delay duration] \  
[-at date] event-id sequence
```

MS time-critical applications: Option 2

Member State **ecFlow (or SMS) suites** *monitored* by ECMWF

- Suitable for more **complex** applications with several tasks with interdependencies between them.
- ecFlow suites developed according to technical guidelines provided by ECMWF
- ECMWF operators will provide monitoring and restart services
- Use of this service needs to be **requested by the TAC representative** of the relevant Member State.

MS time-critical applications: Option 2

Enhanced access to ECMWF resources:

- Inspired from the environment used for ECMWF's Operational work.
- Special UIDs are used, e.g. zit, zde, zno ...
- Access to high priority queues on ecgate and the HPCs.
- Access to duplicated storage systems on the HPCs.
- Possibility to get input data using ECMWF's operational data dissemination system (ECPDS).
- Possibility to use ECPDS to send output data.

MS time-critical applications: glameps

The image displays two overlapping windows from a workflow management system. The left window, titled 'XCdp <2>', shows a hierarchical tree of tasks. The right window, titled 'ecFlowUI (4.1.0) - Preview version', shows a similar tree with more detailed task information.

XCdp <2> (Left Window):

- 2015-02-19 15:35
- biceps-mumo_tc
 - biceps
 - biceps2ecfs
 - leps2dwd
- cosmoleps_tc
 - cleps_timecrit (YMD=... 20150219 ...)
 - emergency
 - cleps_00
 - cleps_12
 - check
- glameps_tc
 - GLAMEPStc
 - Info
 - main
 - lag
 - admin
- laef_tc
 - LAEF_11km
 - main
 - lag
 - newbreed
 - admin
- moths_tc
 - ecmwf_op
 - ens
 - det
 - housekeeping
 - archive
 - emergency_tasks
 - m15_op
 - main
 - lag
 - fastrun
 - emergency_tasks
 - admin
- aladin_portugal_tc
 - aladin
 - 00
 - 12
 - change_day (23:59)

ecFlowUI (4.1.0) - Preview version (Right Window):

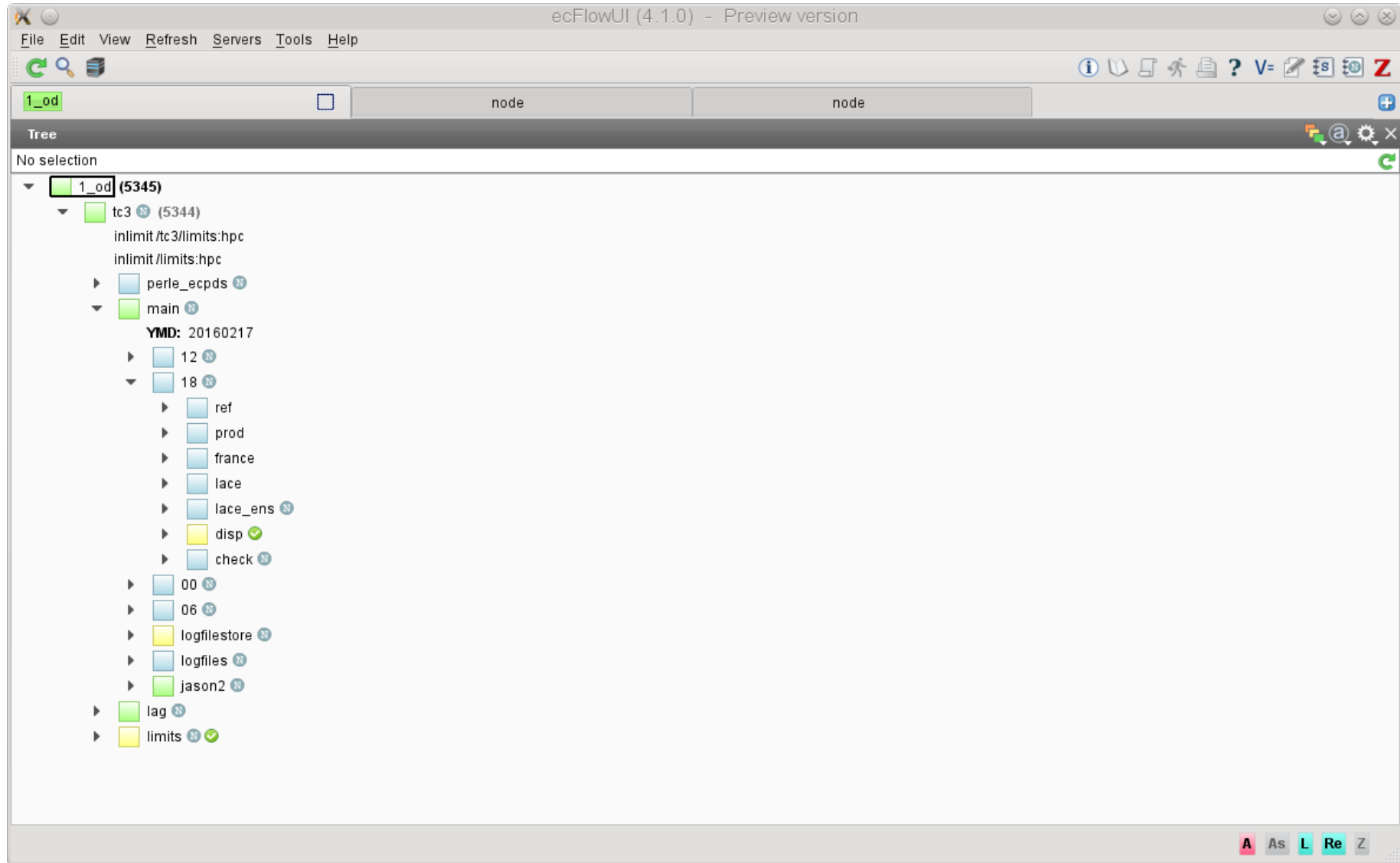
- 2_harmonie_tc 2_biceps_mumo_tc
- node node
- Tree
 - 2_harmonie_tc (261)
 - AEMET_TC2_suite (28)
 - AIC (113)
 - InitRun
 - Build
 - CollectLogs
 - MakeCycleInput
 - Date
 - Postprocessing
 - YMD: 20160217
 - YMD: 20160217
 - Hour
 - Wrapup
 - AIB (117)
 - 2_biceps_mumo_tc (302)
 - disBckDWD (20)
 - biceps (242)
 - YMD: 20160217
 - ifs_fct
 - clepsStart
 - 00
 - 06
 - 12
 - 18
 - biceps2ecfs (37)

MS time-critical applications: Option 3

Member State **ecFlow (SMS) suites managed** by ECMWF

- Further **enhancement** of the previous option
- Application developed, tested and maintained by the MS
- It must be possible to test the application using ECMWF e-suite data
- MS suite handed over to ECMWF
- MS responsible for the migration of the application
- ECMWF will monitor this suite
- ECMWF could provide first-level on-call support while second-level support would be provided by the MS
- To be **requested by the TAC representative** of the relevant Member State
- Option suitable when one or a small number of MS want to run a specific time-critical project

MS time-critical applications – option 3



MS time-critical applications: Option 3

- LBC for LAMs:
 - ‘Up to 60h’, four times a day at 00/06/12/18 UTC for Meteo-France, several domains, hourly data.
 - Up to 108h, once a day at 12 UTC for Meteo-France (MOCAGE), 2 domains, hourly data.
 - Up to 78h, four times a day at 00/06/12/18 UTC for LACE countries (Hungary, Czech Rep, Slovenia, Croatia, Austria) as part of the BC Optional Programme, hourly data used.
 - Up to 60h, 4 times a day, ENS BC data being built for the LACE_ENS project run by the Hungarian Met. Service.
- PERLE for Meteo-France
 - “on demand” data extraction of IFS boundary conditions to be used to drive a dispersion model running in Toulouse.

Reference

- Time critical applications:

<https://software.ecmwf.int/wiki/display/UDOC/Time+Critical+applications>

- ecFlow:

<https://software.ecmwf.int/wiki/display/ECFLOW/>