

European Centre
for Medium Range Weather Forecasts

COMPUTER NEWSLETTER

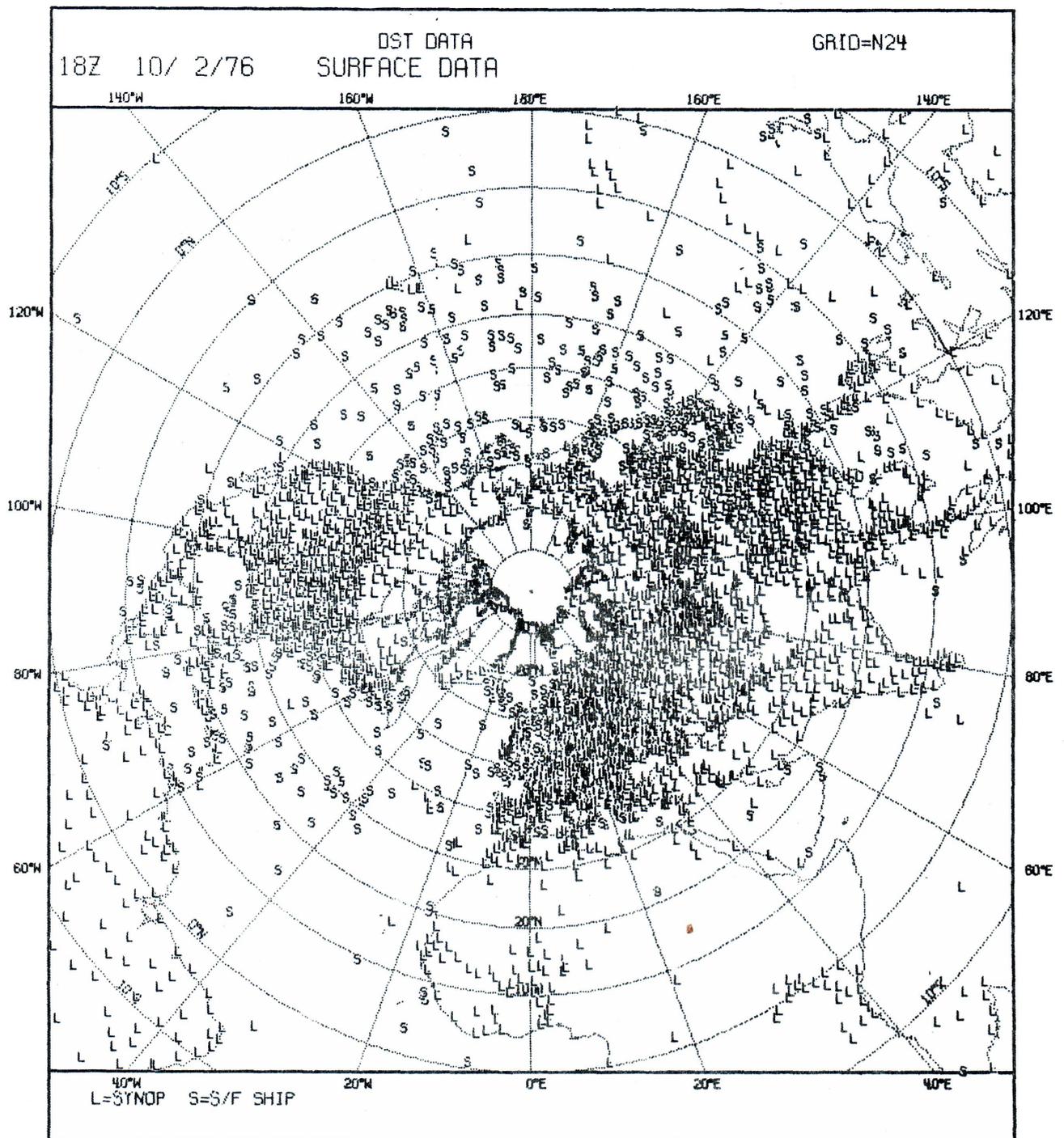
Fitzwilliam House Skimped Hill Bracknell Berkshire England

Bracknell (0344) 24777 Telex 847908

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April 1978

Weather Observations to Medium Range Forecasts

At standard times throughout the day, all over the world, meteorologists observe the weather, and record temperature, pressure, wind, type of cloud, etc. at the meteorological stations. These stations may be on the ground (more than 5000), special weather ships (7) or other ships and aircraft willing to send meteorological information on a volunteer basis. The front cover this month, illustrates the observational coverage for the Northern Hemisphere on 10 February 1976, at 1800 GMT.

Some observing stations (about 900) launch balloons carrying radiosonde equipment which transmit coded information to the ground and provide temperature, wind and humidity measurements throughout the depth of the atmosphere. Some fully automated ground stations and ocean buoys report weather parameters without human aid. Satellites transmit pictures and coded information. From the movement of clouds, wind directions and speeds can be deduced.

Continuously, 24 hours a day, all around the globe, the atmosphere is scrutinised and recorded in figures and coded messages. This information is transmitted on telecommunication lines to Regional Telecommunications Hubs (RTH) and hence, onwards around the world-wide network. ECMWF will receive all available data, as indeed does any national meteorological centre. Via the RTH at Bracknell (U.K. Met. Office) and through the network front-end processor (NFEP), the Cyber 175 will be fed continuously throughout the day with a series of meteorological bulletins from all over the world.

These bulletins must first be cleaned and decoded. Even with the most sophisticated decoding programs, some mistakes due to manual coding or typing errors cannot be automatically corrected (less than 5% anyway). Bulletins rejected by the programs will therefore be visualised on a screen, and a forecaster on duty will examine them and if he can, correct them. The corrected bulletins will be re-inserted in the cleaning, decoding chain of programs. The next step is the control of the meteorological quality of the information. Some subroutines will check each type of meteorological report for internal consistency, and in some cases apply temporal checks, comparing with a previous observation. The principle is that observations should follow basic meteorological assumptions, e.g. no rain if the sky is clear - vertical structure should not deviate too far from hydrostatic equilibrium. At this stage, the decoded, cleaned and checked report, with, if necessary, some flags to indicate that a parameter is suspicious, or has added automatic corrections, will be stored in the REPORTS DATA BASE (RDB). The RDB will contain on-line, the observations received for 3 days. Older observations will be archived on tapes. The forecaster will be given the ability to interrogate the RDB, and may ask for display on screen of observations, plotting of charts, statistics on the coverage or quality of received observations, visualisation of reports and even the introduction of corrections within a report.

Any user program running as a batch job will have the ability to interrogate this data base. Eventually, the ECMWF Member States will also have this ability, by means of remote job entry terminals.

Daily, at about 8pm, the operational suite of programs will start to extract from the RDB, which is thus used as a reservoir, continuously filled, and pumped at the appropriate time. The set of available observations relative to the period of time which is to be processed by the analysis programs, will be extracted and then used to initialise the forecast model in order to simulate the evolution of the atmosphere for the next 10 days.

- Joel Martellet

Thanks, Richard

On 1 April, unfortunately no joke, Richard Friedman went back to Berkeley.

During the last discussions with him, and reading his 'Memoirs of a Consultant', I realised how different the situation was at the time he came, and how much he has done for us.

The plan was for him to concentrate on Cray Fortran development, but apart from that he was involved in many other things, like establishing user advisory, user support tasks, publishing Newsletters and News Sheets and others.

We have been fortunate to have Richard with his wide range of experience and capabilities, with us, and it is a pity that he had to leave earlier than intended.

- Rob Brinkhuysen

Job Scheduling - Cyber 175

1. Checkpointing and Program Termination

To facilitate a smooth changeover from STBIG sessions to normal sessions, it is important that in all cases, the operators should have information for the required method of job termination.

1.1 Some jobs, notably those put in for overnight runs, have a mechanism whereby the operators may terminate them cleanly by setting sense switch 1. The programs are iterative in nature and as such, by inspecting sense switch 1 each time (or every 'n' times) round the main loop, they can determine whether or not the operator requires the job to terminate and so tidy up before stopping. A call to sub-routine SSWTCH(N,J) will set J to 1, if sense switch N is set, or 2 if it is not. Would those users making use of this facility and those who would like to make use of it, please ensure that the operators know that your program uses this feature by:

- a) putting the comment:
`*ONSWI TO TERMINATE*`
 after the '.' of the 'LGO.' card,
- and b) putting the control statement:
`COMMENT.*ONSWI TO TERMINATE*`
 immediately after the 'LGO.' card.

Otherwise the operators may have to DROP your job, causing it to abort, and possibly losing output and leaving files in an unusable condition, due to buffers not being flushed.

1.2 A similar facility is available for jobs not using tape or private disk pack whereby these jobs can be locked out at the end of a STBIG session and re-activated for the next suitable session. The convention to use is:

- a) put the comment:
`*LOCKOUT*`
 after the '.' of the 'LGO.' card,
- and b) put the control statement:
`COMMENT. *LOCKOUT*`
 immediately after the 'LGO.' card.

In the absence of either of the above, the operators will DROP the jobs concerned.

N.B. LOCKOUT will only be allowed if a job is not using tape or private disc pack.

2. CP Time

A meaningful 'T' parameter value must be put on future job cards.

Jobs for lunchtime STBIG sessions should have a 'T' parameter within the following limits:

$$0 < T \leq 1000_s$$

Weekend or overnight jobs which have a CP time in excess of 77776_s (9.1 hours) should have $T = \emptyset$

Normal daytime jobs should bear a reasonable estimate of CP time. The following list may help in preparing 'T' parameters:

<u>HOURS</u>	<u>MINS</u>	<u>SECS</u>	<u>OCTAL SECS</u>	<u>HOURS</u>	<u>MINS</u>	<u>SECS</u>	<u>OCTAL SECS</u>
	5	300	454	7	420	25200	61160
	10	600	1130	7.5	450	27000	64570
	20	1200	2260	8	480	28800	70200
	30	1800	3410	8.5	510	30600	73610
1	60	3600	7020	9	540	32400	77220
1.5	90	5400	12430	9.1	546.1	32766	77776
2	120	7200	16040				
2.5	150	9000	21450				
3	180	10800	25060				
3.5	210	12600	30470				
4	240	14400	34100				
4.5	270	16200	37510				
5	300	18000	43120				
5.5	330	19800	46530				
6	360	21600	52140				
6.5	390	23400	55550				

3. Use of Private Packs

The following operational modifications and recommendations have been introduced during the last month.

3.1 Identification of jobs requiring a private pack

In order to allow private pack jobs to be identified by our operators, jobs requiring a private pack should, if no other ST parameter is present, specify the parameter STPAK on the jobcard. This will allow the operations staff to schedule these jobs manually should it become necessary.

This parameter should be put onto your jobcard immediately. Any jobs which use private packs and which have not specified STPAK will be dropped by the operator.

Note that if your job fits in the STBIG category, the STBIG parameter must still be specified and STPAK will not be required.

During normal running, it is not intended to restrict private pack jobs to a particular time of day. Rather, this parameter allows private pack jobs to be held back in the input queue if a pack scheduling difficulty arises.

Example

a) A job requiring a private pack

```
EWPG1,T100,STPAK.
MOUNT(SN=ssss,VSN=vvvv)
:
```

b) A large core job requiring a private pack

```
EWPG1,T1000,STBIG.
MOUNT(SN=ssss,VSN=vvvv)
:
```

NOTE that STBIG always takes precedence over STPAK.

3.2 Make private pack requests before magnetic tape requests

Jobs which use a private pack as well as magnetic tapes should always MOUNT the pack required before issuing a REQUEST or LABEL for the magnetic tapes.

Example

```
EWPG1,T100,NT1,STPAK.
MOUNT(SN=ssss,VSN=vvvv)
REQUEST,TAPE1,NT,PE,NORING.
```

3.3 Release a private pack as early as possible within a job

Jobs should DSMOUNT their private packs as soon as processing on that pack is completed.

Example

```
EWPG1,T100,STPAK.
MOUNT(SN=ssss,VSN=vvvv)
:
process files from private packs
:
DSMOUNT(SN=ssss,VSN=vvvv)
:
continue job processing
:
```

3.4 Make local copies of small files on a private pack

If a long job uses a short file from a private pack, it will be more efficient to make a copy of the file onto the system packs, and then process the copy. If necessary, the updated copy can be rewritten to the private pack at the end of the job. This procedure will only be worthwhile for jobs exceeding around 400, seconds and for private packs totalling less than around 5 million characters.

Example

```
EWPG1,T600,STPAK.
MOUNT(SN=ssss,VSN=vvvv)
ATTACH(XX,PERMFILE1,SN=ssss)
COPY(XX,YY)
DSMOUNT(SN=ssss,VSN=vvvv)
REWIND(YY)
:
process the copy of PERMFILE1 in file YY.
```

4. Priority

Use jobcard priority on short jobs not requiring tapes or private packs

Normally, jobcard priorities should not be used. However, we ask that jobs which do not use magnetic tapes, private packs, STBIG, or resources other than system default specify P10 on their jobcard. Since the system default CPU time is 40, seconds, P10 may be used on those jobs requiring less than 40, seconds.

Example

EWPG,T20,P10.

It is also intended that the number of jobs in concurrent execution will be increased, thus alleviating the contention problem in the execution queue.

In the longer term, systems programming staff are re-implementing the job class scheduling code, which allows jobs to be classified and automatically scheduled according to their CPU time requirements.

5. Multi-read access for Cyber files

Users are encouraged to use MR=1 when ATTACHing 'read only' files as its absence can generate scheduling problems. There is, however, an easier way to provide multi-read access. If a file is initially catalogued with an XR password multi-read permission is granted for subsequent use if the file is attached without this password. Hence:

CATALOG, lfn, MYFILE, ID=EWMY3, XR=YZ.
ATTACH, lfn, MYFILE, ID=EWMY3.

allows multi-read access.

- Operations / Systems

Direction of Printed Output

Use of the TID parameter on a Cyber ROUTE or DISPOSE card or on a Cray job card allows the user to direct printed output to a remote printer or terminal. (TID=AB or TID=AC). If the TID parameter is not used, or if output is deliberately disposed to the central site printer (from remotely submitted jobs), it is necessary to use the FID parameter to inform the operators where the output should be sent to, e.g.

FID=FHuuu
or FID=JHuuu
or FID=BHuuu
or FID=RLuuu

In the absence of an FID parameter, jobs printed at Rutherford will be identified on the banner page as EWuuu.

The operators procedure for handling output generated at the central site printer is as follows:

IBH and BH	to Brandon House
IFH and FH	to Fitzwilliam House
IJH and JH	to John Scott House
IRL and RL	remain at Rutherford

ALL other printed output is sent to the Fitzwilliam House terminal room.

Note that output routed to RJE terminals may be diverted by operator control to the central site for one of 2 reasons:

- (a) excessive file size (1000, sectors)
- (b) terminal equipment breakdown

Under these circumstances, unless the user has coded a FID parameter, the banner heading will be EW... with consequent delivery by courier to Fitzwilliam House. All users are therefore encouraged to code the FID parameter ALWAYS, thus minimising possible delays in receiving output via courier.

- David Dent

Hints for Intercom Users

Intercom allows the user a ration of 500 CP seconds for any one session. When this ration is exhausted, a warning message is displayed, allowing a short time for the user to save files. The user is then automatically logged out, with the consequent loss of any local files. There have been some instances reported when the EDITOR was in use, and insufficient time was allowed by the system for the necessary SAVE and CATALOG commands. The loss of several hours editing work is distressing! The problem is being investigated, but in the mean time, users who indulge in long editing sessions are advised to make use of the ASSETS command, which reports the CP time used. SAVE and CATALOG should be used will before the time limit is reached. Remember to PURGE earlier versions of your edit file.

Don't use RETURN to evict files which have an associated desposition code (e.g. OUTPUT). These files are not returned to the system but remain in the OUTPUT queue with the Intercom generated name : LQLQILQ (where LQ is the remote user's ID). To evict such a file use DISPOSE or ROUTE.

- J-L. Pepin, F. Hollmann

Enhancements to Cray AUDIT

A modified version of Cray AUDIT is now operational. It allows for the selection of permanent files by means of parameters.

AUDIT has the following parameters:

ID	=	user identification	(default : all)
PDN	=	permanent dataset name	(default : all)
ED	=	edition number	(default : all)
US	=	user number	(default : all)
L	=	dataset name	(default : \$OUT)

ID, PDN and ED are as specified on the SAVE control card. ED is not meaningful unless PDN is specified. PDS (as used on PDS DUMP/PDS LOAD) can be used instead of PDN. US is specified on the JOB card. A Computer Bulletin describing this utility will be distributed shortly.

- Gary Harding

Transfer of Character/Blocked Files from CRAY to CYBER

The DSOUT utility has been produced to run on the CRAY to transfer CB files from the CRAY to the CYBER via standard DUMP format magnetic tapes.

The DSOUT utility creates a CB file comprising the CYBER JCL to catalog a file as the first section followed by the file body to transfer. This file is then DISPOSED to the ECLIPSE with the dataset name CYxxxxx where xxxxx is a unique sequence number.

An indirect ECLIPSE operator file exists to DUMP the CYBIN files from the ECLIPSE to magnetic tape in standard DUMP TAPE format. The Cyber QCRAOUT utility has been modified to recognise and ROUTE CYBIN files to the CYBER input queue.

In order to enable the operator to be able to control the ECLIPSE disk space, the CYBIN files will be disposed to an ECLIPSE station identifier as defined below:

File size less than 1 Mb	ST=DG
File size between 1 and 3 Mb	ST=C3
File size between 3 and 5 Mb	ST=C5

Files of less than 1 Mbyte will be quickly transferred from the CRAY to the CYBER. Files greater than 1 Mbyte will normally be transferred from the CRAY to the CYBER overnight.

It should be noted that files greater than 5 Mbytes will not be transferred.

The CRAY DSOUT utility can be called with the following parameters:

DN	=	name of local file to transfer (mandatory)
PFN	=	PFN of file on CYBER (default = DN)
ID	=	ID of file on CYBER (default = 1st 5 chars. of job name)
CY	=	cycle of file on CYBER (default = 1 if initial cycle else highest cycle + 1)
PW	=	modify password if existing cycle (no default)

Note the following:

1. The DSOUT control card is restricted to 80 characters with no extensions, so it may not be possible to specify all the above parameters.
2. The PFN is restricted to 15 characters maximum, and must be alphanumeric.

A typical CRAY job to transfer a Character Blocked File to the CYBER is shown below:

```
JOB,JN=EWTS1.      FID=BHTS
ACCESS,DN=F,ID=DUMPOO,PDN=SOURCE.
DSOUT,PFN=SOURCE,ID=EWTS1,DN=F.
end of job.
```

- User Support

CRAY-1 Software Bugs

In order to help users identify problem areas in their code, a list of known bugs in the CRAY-1 Software has been generated. This list is maintained in a Cyber file and can be interrogated via Intercom:

```
ATTACH,C,CRAYBUGS,ID=EWDD1
PAGE,C
=/CFT/
+
:
:
E
```

This example searches for the first CFT bug listed. There will also be subsections for LDR, \$FTLIB, etc. The complete file may be printed by:

```
BATCH,C,PRINT,id
```

If anyone is aware of bugs not mentioned in this list, please let us know.

- User Support

Computer Bulletins

New issues this month

B7.2/1: CRAY-1 Job Submission and File Transfer via the CYBER-175.

In preparation

B2.2/1: Introduction to Control Statements on the CRAY-1.

B8.1/1: CRAY-1 Audit of Permanent Datasets

- User Support

COMING SOON!

FFT's - how to compute them at 47 Megaflops/sec

CRAY I/O - how fast is it?

ECMWF Graphics - plans for development.

Your suggestions, comments, criticisms, items of interest etc., are welcome. Please send contributions to User Support, Brandon House.

