TECHNICAL MEMORANDUM

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Report on the twelfth meeting of Member State Computing Representatives, 18-19 May 2000

U. Modigliani and P. Prior (Compilers)

Operations Department

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European Centre for Medium-Range Weather Forecasts
Europäisches Zentrum für mittelfristige Wettervorhersage
Centre européen pour les prévisions météorologiques à moyen

Contents

Preface

The twelfth meeting of Member State Computing Representatives took place on 18-19 May 2000 at ECMWF. Seventeen representatives from Member States, and, for the first time, from Co-operating States, took part. The list of attendees is given in Annex 1

The Head of Computer Division (Walter Zwieflhofer) opened the meeting by giving an overview of the Computer Division's status and plans. Then each Computing Representative gave a short presentation about the use their service makes of ECMWF's computer facilities and ECMWF staff gave technical presentations about some specific aspects of the Centre's services

This report briefly summarises each session, concentrating in particular on the discussions. Part 1 covers ECMWF's contribution, Part 2 the Member State and Co-operating State contributions. All the reports in Part 2 have been provided by the Representatives themselves

Part I

ECMWF Staff contributions

ECMWF'S Computer Service: Status and plans

W. Zwieflhofer

Status of the Fujitsu service

The VPP5000 with 38 PEs was installed in October 1999. The system passed its 90-day Reliability Acceptance on 16 February. A trial service was offered to Member States users from 17 January and an official Member States' service began on 13 March. The operational suite was transferred on 9 May. The new machine is much faster than the VPP700, each individual processor having a peak performance of 9.6 Gflops (compared to 2.2 Gflops for the VPP700, 2.4 for the VPP700E). It provides significantly improved scalar performance and better performance on shorter vectors. All the Centre's codes are now consistent and use only the 64 bit addressing mode.

Following comments made at the last meeting, ECMWF investigated the turnaround times for Member States' jobs. Noting that the majority of their jobs were single PE jobs, ECMWF increased the number of PEs set aside for single PE jobs to 17 on the VPP700. Throughput is now much improved and there remain plenty of capacity for single PE jobs.

Plans for the HPCF

The VPP5000 will be upgraded to 100 processors, as planned, in summer 2000. There will be a reduced user service in the second half of July, when the machine will be made available to the engineers so that the disks can be reorganised, etc. The service on the VPP700 will not be affected. The Fujitsu service contract terminates on 31 December 2002, so to allow a 6-month parallel run, the first phase of a replacement system must be installed in summer 2002. This, in turn, means that an ITT for a replacement must be issued in early 2001.

Data Handling System

Additional tape units and processing power were added to the system at the end of 1999. Phase 5, including upgrading the IBM 3950 Magstar tape drive to double density units, was approved by Council in December 1999 and should result in a system with enough capacity to support the expected load until mid-2002. An ITT will be required to cover data handling demands beyond mid-2002 (including the parallel running of the HPCF systems).

Progress in making backup copies of tapes for the Disaster Recovery System is good but the hardware is yet to be moved to its permanent, purpose-built accommodation in the grounds of ECMWF.

Desktop systems and servers

Currently, ECMWF uses workstations and servers supplied by SGI. The call-off contract under which they were supplied expired in July 1999, so an ITT for a new "preferred supplier" was issued in December 1999.

The Centre's evaluation of the tenders received was completed shortly before this meeting and will be presented to the Technical Advisory Committee Subgroup on Workstation Strategy next week, before being submitted to Council for approval at its next meeting (June 2000). In summary, the Centre proposes a high specification IBM Intellistation PC running LINUX for scientific users and the same equipment with a lower specification for technical users. The Centre considered that LINUX was currently not a viable solution for large servers, so IBM RS/6000 servers running AIX are proposed.

Member State server (Ecgate)

One year ago, at the time of the last Computing Representatives' meeting, the Member State server resources were provided by two SGI Challenge servers, each having 18 Gbytes of /scratch disk space. Having two machines created various problems related to load balancing and access to local file systems. In June 1999 the system was upgraded to the current configuration of one SGI Origin 2000 with about 75 Gbytes of /scratch disk space. This system is now four to five times as powerful as the previous system and avoids the complications of having two machines. There are currently no plans to move the Ecgate service to AIX based servers: the proposed new contract will be for a gradual replacement programme over the next three to four years.

Local Area Network

Following an ITT issued in early 1999, the Centre's general purpose network infrastructure, which had been based on FDDI, was replaced by Gigabit Ethernet. A solution based on Cabletron switches was selected and installed during the second half of 1999. An upgrade, already foreseen in the initial contract, is planned for later this year.

Wide Area Network

The last year has been dominated by the implementation of the RMDCN, which proved much more difficult and time-consuming than expected. Reliability Acceptance started somewhat later than scheduled, at the end of November 1999, and, following successful Final Acceptance tests, the contractual Service Commencement Date was 15 March 2000. So far, the bandwidth delivered has been very good and the service to individual User Sites has been good, with the exception of Switzerland, which has had a series of problems. Equant had a great deal of difficulty in trying to trace the root of the problems but they seem to have been related to a bug in Cisco's IOS router software. The latest release of Cisco's IOS software is now running in Switzerland and appears not to cause the same problems. Nevertheless, the situation needs further analysis before we can be sure that the problem is permanently resolved.

Almost all the leased lines have been cancelled with a termination date of 15 June 2000. The possibility of upgrading links asymmetrically was stressed. For those countries who have much more traffic in one direction than in the other, this is a very cost effective solution (e.g. Denmark has upgraded its circuit from ECMWF to 256 kbps but retained a bandwidth of 96 kbps to ECMWF).

The bandwidth of the ECMWF Internet link remains at 8 Mbps. The number of services available from ECMWF via the Internet is constantly increasing. The aim is to make access to the Centre's resources, whether via the Internet or the RMDCN, as similar as possible, with similar interfaces, authorisation schemes, etc.

Web services

ECMWF's web pages are in the process of being updated. There are three distinct areas. ECMWF internal pages are restricted to Centre users only and contain any information useful for individuals, groups or sections at the Centre. Member State pages contain much documentation on ECMWF's system and forecast information. These pages are protected by certificates, which can be set up by an individual user using their SecurID card, and are valid for one year. The certificate system had some teething problems but now seems to be operating satisfactorily. Some general information is available on the public website.

New dissemination system

The old NTS telecommunications software ran on the VAX cluster. Since the design of the VAX system put limitations on its performance, it was decided not to invest effort into making the cluster Y2K compliant but to transfer the dissemination software to the Centre's High Availability HP configuration. The new system is written entirely in Java. Initially there were some problems, which were eventually discovered to be related to HP's Java Virtual Machine. An upgrade corrected the problem in November 1999. The system is now stable and has sufficient capacity to ensure that the limiting factor for product dissemination is the network bandwidth.

User Support Services
Status of the actions agreed during last year's workshop

U. Modigliani

At the workshop on use of ECMWF computing systems by Member States (April 1999) ten proposals were compiled for action by ECMWF. A report on progress on each of these is given below.

1. ***Find a better way of relaying the available information on the various file systems and their functions to users***

   The Centre has implemented better ways of pointing to the already available information and developed new documentation. Since the last meeting, the Centre has made available:

   - A set of short "Guidelines for ECMWF users". They can be found on the Member State web site
   - A "What's new" page, to consistently advertise the most recent changes to the Help pages
   - A search tool and corresponding indexes to find relevant documentation
   - Revised and updated Fujitsu and workstation job examples
   - VPP5000 manuals and other documentation on the main differences between VPP700 and VPP5000
   - "Getting started with MARS", a revised introduction to MARS, distributed as part of the New User's pack. This document refers to the on-line MARS User's Guide, also made available since the last meeting
   - An "Introduction to ECMWF's computing facilities", being finalised and to be put on-line shortly

2. ***Develop more application interfaces on the lines of PrepIFS, Unified Model interface and the HIRLAM set-up***

   Since the last meeting the Java-based prepIFS has become the default for ECMWF use. A test version has been made available on the new Member State web site. This version is being tested by several Member State users.

   The experience of having a person working at the Centre to port the Unified Model onto the Fujitsu systems has proved very successful for UKMO. It allowed the UKMO to use last year a considerable amount of their supercomputing resources at ECMWF.

   The Centre has tried to advise the HIRLAM Technical Manager on how to optimise and enhance the HIRLAM Reference Model's use of the Fujitsu system. In the last couple of months some changes have been made: it is now slightly easier and more efficient to use and work with the HIRLAM set-up.

3. ***Provide a more direct access to the archive system to satisfy various requirements (e.g. enable data transfer from the Centre's archive system directly to a Member State system)***

   Due to lack of resources (RMDCN implementation, Y2K preparation) it had not been possible to make progress on this issue. Users are reminded that it is possible to achieve the ecget functionality by using a combination of ecqsub, ecp, and eccopy to transfer the data. The data will need to be temporarily stored somewhere, for example on $SCRATCH.

4. ***Minimise the need for two stage jobs as much as possible***

   The VPP5000 has better scalar performance than the VPP700 and therefore the compilation is faster. Moreover, the I/O is much improved because of the new FPFS file system and Noble disks. In any case, it is clearly more efficient to divide the jobs into tasks using different amounts of resources and better suited for systems with different characteristics.

   The Centre has re-organised the various file systems on the VPP700 and VPP5000. More space has been made available to the Member States. In particular, more "permanent" space has been provided, in order to avoid the I/O associated with the recompilation of codes. This space is available to users to store libraries, utilities, etc.

   However, the VPPs are not the best systems for source-code management; it is clearly advisable to use a workstation server such as ecgate1.

5. ***Simplify the use of compile/link/run cycles for development on ecgate1 by keeping the levels of Fujitsu compiler and cross-compiler as equivalent as possible***

   To simplify job development on ecgate1 the levels of the native compiler and cross compiler are now the same both for the VPP700 and VPP5000. This situation is not easy to maintain because native compilers and cross compilers are usually released at different times.

Although the native compiler on the VPP5000 is about three times faster than the native compiler on the VPP700, it is still advisable to use the cross compiler on the workstation server ecgate1.

6. *Improve the line speed and remove some of the difficulties associated with use of the Internet*

The "double login" problem is well known and the Centre will address it, as soon as resources become available.

7. *Improve job turnaround and provide users with more information on their jobs' status*

More PEs are available in the single PE partition. Moreover, some Member State activity (Mercator) has been moved to the VPP700E, releasing some resources on the VPP700 for other Member State work.

In general, Member State jobs have higher priority than ECMWF research jobs.

Job turnaround is being monitored and new, more meaningful statistics have been developed. These plots will be put on the Member State web pages (http://wms.ecmwf.nt/services/stat/cos/). They are available for various queues, on a daily and monthly basis and as a trend.

Moreover, the eoj (end of job) output has been enhanced to show additional information on the characteristics of a job.

8. *Member States could identify one or more user groups which use ECMWF supercomputing resources in preference to other resources (as in the case of UK Met. Office and DWD, Germany)*

DWD (Potsdam group) and UKMO have clearly proved the effectiveness of having a particular "user group" using ECMWF supercomputing resources in preference to other resources. The Centre has provided as much support and co-operation as possible to such initiatives. Moreover, the Centre believes that the DEMETER project will demonstrate similar effective use.

9. *Review and speed up the Special Project registration process in order to give easier access to the Centre's supercomputing resources to interested researchers*

The procedure to register a Special Project is illustrated in Figure 1 (normal registration) and Figure 2 (late registration).

The Centre suggests increasing the percentage of resources available in the "reserve" to about 20%. These resources can be allocated fairly quickly and this means would provide interested researchers with easier access to the Centre's resources.

Fig. 1 Handling of applications for Special Projects

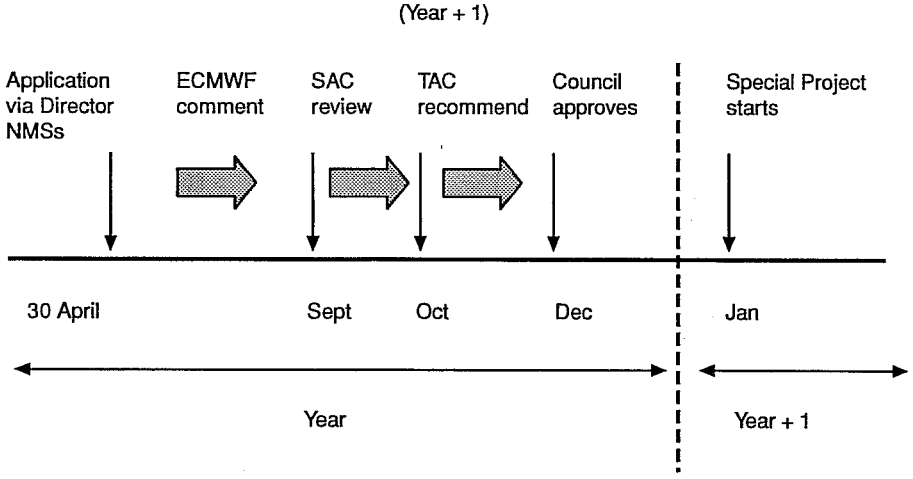
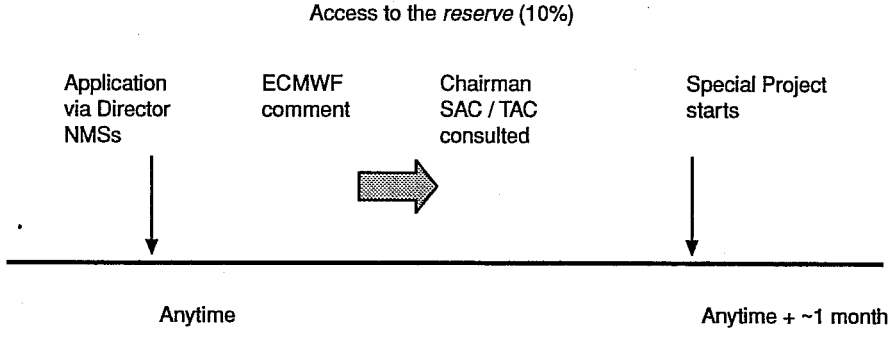


Fig. 2 Handling of applications for Special Projects



10. ***Ensure that the Member State requirements are considered during the high speed computing facility procurement process and assist Member States during the migration process***

The Centre has considered Member State requirements during the previous procurement process for the high speed computing facility and Member State users have been supported by ECMWF in their migration to the Fujitsu system. Users were assured that these considerations would continue to be taken into account in future procurements.

Finally, some statistics:

- There are about 800 registered Member State users
- Since last year about 200 new users have been registered
- About 65% of the registered users have logged in this year
- A daily average of 150 different Member States users execute some program on ecgate1
- The supercomputer use by Member States has increased considerably, in particular in certain Member States. Some previously inactive Member States have started using the Fujitsu systems

Questions and Comments

A. Dickinson (UK)

The use of our own User Interface depends on X-access from Bracknell to the Centre. This requires a lot of effort: we have to specify which IP hosts can access ECMWF. If we want to make this more generally available the effort will increase tenfold. Does this depend on the Centre's security policy or the UKMO's?

Matteo Dell'Acqua

The X-access situation used to be different depending whether coming from a Member State network or the Internet. We used to have a simple filter on the router for the Member State network and this was updated on request. For the Internet we had for some time a simple X-gateway, specifying the IP address to connect to, which could be brought up by a user. This service is still available via the Internet, but for RMDCN it is still too early to answer. We are using the Firewall-1 toolkit and at the moment there is nothing to relay X-applications. So, for one type of link the X-access is allowed via a feature that did not require any administrative effort. We will look into the possibility of providing something similar for the RMDCN link.

Walter Zwieflhofer

Could we know if any Member States, other than France, are interested in the ecget functionality?

E. Krenzien (Germany)

We are interested.

P. Halton (Ireland)

We may be interested for the Fastex project.

M. Pithon (France)

Some users (Mercator) have said that the space available on the VPP5000 is less than that available on the VPP700E.

U. Modigliani

On the VPP5000 $TEMP and $LTEMP are the same file system. Currently the size of this file system is about 120 Gbytes. On the VPP700E the Mercator group has 50 Gbytes exclusively. Currently, they are some of the few users of the VPP5000. If there is a future need to increase the amount of disk space available to Member States we have the resources to do so. Moreover, with the new FPFS it is possible to have very large file systems.

High Performance Facility Update

Neil Storer

The presentation began by giving a comparison of various VPP systems at ECMWF:

	VPP700/116	VPP300/4	VPP700E/48	VPP5000/38
PEs				
P-PE	1	1	1	1
IMPEs	10	1	4	4
S-PEs	105	2	43	33
PE performance	2.2 GF	2.2 GF	2.2 GF	9.6 GF
Memory	2 GB	2 GB	2 GB	4 GB
Peak performance				
	257.4 GF	8.8 GF	105.6 GF	364.8 GF
Networks				
Crossbar (speed)	2 x 560 Mb/s	2 x 560 Mb/s	2 x 560 Mb/s	2 x 1536 Mb/s
HIPPIs	4	2	4	4
FDDIs	8	2	4	2
Gigabitethernet	0	0	0	6
Diskspace				
	1752 GB	136 GB	960 GB	2100 GB

The VPP5000 is being acquired in two phases. Phase 1 began on 28 October 1999 with the installation of a 38 PE system. Provisional Acceptance was begun on 18 November and the system was made available for running Member States' jobs from 17 January 2000. 90-day Reliability Acceptance was passed on 16 February and operational work began running on the machine on 9 May. Phase 2 of the acquisition will begin on 27 June with the installation of a 62 PE VPP5000. It is planned to merge this system with the original 38 PE system on 24 July to produce the final 100 PE VPP5000. Provisional Acceptance is planned to begin on 1 August.

The details of VPP5000's conceptual architecture and of the PEs were described. The exact configuration of PEs and I/O at ECMWF was presented. A comparison between the VPP5000/38 and the VPP5000 is given in the table below.

	VPP5000/38	VPP5000/100
PEs		
P-PE	1	1
IMPEs	4	8
SIOPEs	0	4
SPEs	33	87
Networks		
HIPPIs	4	10
FDDIs	2	0
Gigabitethernet	6	16
Disk devices		
Allegro	14	34
DF350	8	16
Noble	12	32

Property	VPP700	VPP500	
	Compatible	-KA32	-KA64
Instruction length	64-bit	128	128
Address-mode	32-bit	32	64
Fortran			
INTEGER	32-bit	32	32
REAL	32-bit	32	32
DOUBLE	64-bit	64	64
REAL*16	128-bit	128	128
C			
int	32-bit	32	32
long long	64-bit	64	64
long	32-bit	32	64

C-preprocessor macros were mentioned and users were referred to

http://wms.ecmwf.int/support/docs/fujitsu/Bin_Compat.html

It was explained that, in order to increase performance proficiency and therefore job throughput, various PEs had been designated for various types of jobs. For instance, some PEs are reserved exclusively for multiple single PE jobs, others for parallel processing, etc. Some are left for flexible use, accepting various combinations of job types.

Graphics Update

Jens Daabeck

A broad overview of the status of and plans for graphics facilities at ECMWF was given. The properties of MAGICS 6.1 and METVIEW 2, which are currently available to Member States were described, in particular the new features and capabilities which had been introduced with the latest versions. Plans for the next releases were also presented. Since the Centre's existing SGI workstations will eventually be replaced by IBM desktops running Linux, the results of ECMWF's investigations of Linux-based facilities were given. The performance of various graphics cards was compared and users were referred to http://www.spec.org/gpc (graphics performance characterisation) for more information. S. Orrhagen asked whether Metview 3 would be available to Member States at the end of July. J. Daabeck confirmed this.

Dissemination Update

John Hennessy

The current range of products disseminated was summarised, with particular emphasis on new products. Approximately 300,000 products are now disseminated daily, a volume of approximately 3 Gbytes. It was explained that the transfer of the dissemination application from the VAXs to the HP systems had provided a good opportunity for making modifications to ensure that the MARS and dissemination request languages were made as near identical as possible. It was noted that documentation describing the new dissemination would be available at the website within several weeks.

MARS update

Baudouin Raoult

The new access to MARS data via the web was presented. In particular, it is intended to facilitate MARS retrievals for Member States' users. Data are available in GRIB and BUFR (not yet). There is comprehensive documentation and an "assistant" is available to help first time users by prompting to build valid requests or replying to questions. Requests can be unique or scheduled for a regular time each day. It was stressed that the interface is designed to use commands identical to the existing MARS access, though it will be user friendlier, as it refers to parameter names rather than number or abbreviations. Users were encouraged to try the access and to pass on any comments to the Meteorological Applications Section.

Web developments

Heinz Richter

H. Richter described the current operational web environment, listing the various servers, their functions and organisation. He explained that access via certificate had been introduced to avoid the need for daily submission of SecurID passcodes and to allow the encryption of transmitted data. A Public Key Infrastructure (PKI) had had to be built and the PKI server must be maintained, with lists of revoked certificates etc. Certificates will enable access to facilities such as prepIFS and webMARS. The importance of setting up the correct configuration for one's browser was stressed

M. Pithon (France) asked why system documentation and manuals needed protection. ECMWF replied that ECMWF documentation occasionally contained critical references to systems which should not be publicly accessible. Furthermore, ECMWF does not have the right to publish manuals provided by vendors.

Network developments

Wide Area Network

T. Bakker presented the current status of membership of the RMDCN, noting that it was continuing to grow since the Initial Deployment. He demonstrated the type of statistics which were being produced to monitor line usage, reliability of service and so on. He noted that "Packetshaper" had been acquired to manage traffic prioritisation and ensure that operational data acquisition and product dissemination are not delayed by other data transmissions.

Local Area Network

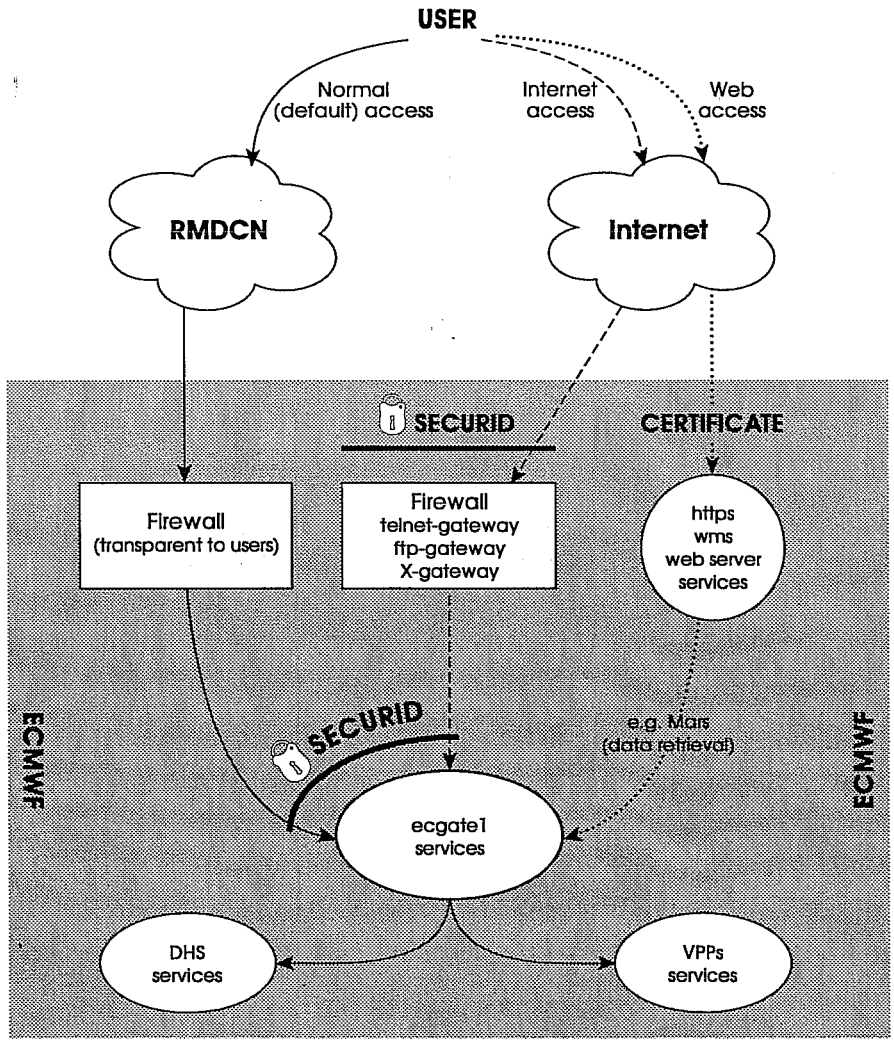
D. Niebel briefly summarised the development of the ECMWF local area network from the early 1980's, stressing the enormous increases in bandwidth which had been necessary to keep pace with the computing resources. It was also stressed that fault tolerance was an important criterion when planning the system. Physical resilience is provided by the routers being paired and there is logical redundancy supported by OSPF (Open Shortest Path First) and VRRP (Virtual Router Redundancy Protocol). The routers are due to be replaced by models which will double the port density and it is planned to introduce Jumbo frames (9 KB or 64 KB frames, instead of the current 1500 Byte frames), which will increase transfer rates and reduce CPU overheads.

DISCUSSIONS

Access to ECMWF

W. Zwieflhofer clarified the user registration procedure. Access paths to ECMWF are shown in the conceptual diagram overleaf. Basic user registration provides access via the "Normal" access. Permission to use an Internet access requires a special, additional request. Access via the Internet currently requires double logins: first, the Internet firewall requires SecurID authentication, then ecgate1 cannot differentiate between RMDCN and Internet traffic, so requires a login again. The two separate firewalls for RMDCN and Internet traffic ensure that the user has two separate addresses for the two types of access, so that return traffic follows the same route as the inward traffic. A means of avoiding double logins will be investigated as soon as resources are available.

Conceptual diagram of ECMWF services



Finally, access to the Member State web server does not require the additional Internet access authorisation specified on the User Registration form. This authorisation is only required for users wishing to telnet into ECMWF's machines via the Internet. All registered users with a certificate can access the Member State web server. Users create their own digital certificate using their SecurID authentication and this certificate remains valid for one year and is renewable.

N. Kreitz reminded users that it is possible to use ftp from ecgate1 (ftp-gateway) to return data.

H. de Vries (Netherlands) asked whether it was correct that they could connect to server happ only via the RMDCN. T. Bakker confirmed that this was intended. Happ is only on the internal ECMWF network and is accessible by a very restricted number of Member State users via https for control of their service's dissemination requirements.

In reply to W. Zwieflhofer's enquiry, G. Duska (Hungary) commented that her service would find Member State web server access via the RMDCN very useful, since their Internet access was usually fully loaded during the day.

Revised Special Project registration procedure

Member State Computer Representatives did not consider that they could usefully comment on this proposal, as they were not closely involved with Special Projects. The general opinion was that the proposal should be put to the TAC and SAC, if the changed procedure could help to promote Special Projects.

Training course re-organisation

U. Modigliani explained that a re-organisation of the computer user training courses was being considered, in order better to meet users' needs. There appears to be a "fair number of users who wish only to access ecgate1 to retrieve MARS data, so it is proposed that the introduction for new users" be followed by the MARS section of the course and take up the first week of the course. The second week would begin with 3 days on "Use of the ECMWF supercomputer resources" and be completed by 2 days on SMS/XCdp. The third week would comprise 2 days on MAGICS followed by 3 days on Metview. Both L. Frappez and S. Orrhagen considered this a good change. There were no adverse comments.

Member States' mailing lists

U. Modigliani proposed that ECMWF use mailing lists in the Member States to inform individual users of subjects of interest to them. Member State users' IDs would either be added to a mailing list maintained at ECMWF or e-mails would be sent to the group name of a mailing list held in the Member State. P. Halton considered this a good idea and would avoid any possible delay in information dissemination, for instance while Member State Computer Representatives were absent from work. M. Pithon, H. de Vries and N. Olsen all said they had mailing lists already set up which ECMWF could use.

Metview user group

S. Orrhagen explained that several Swedish users would like to have the opportunity to discuss Metview usage. Various users use Metview in different ways and it would be very valuable to be able to pool experience and possibly learn from others.

There was no interest from other Member State representatives at this time so this proposal will not be followed up for the time being.

Next meeting

The representatives from Sweden, Finland, Slovenia, Hungary, Norway, Netherlands, Ireland, Greece, France, Spain, Germany and Denmark all considered that the next meeting should be in 12 months. The Belgian representative proposed an 18 month interval, as did the Swiss representative though noting that he was not the official Member State Computing Representative. The UK representative proposed 18-24 months. The Austrian representative did not comment, as he is also Chairman of the TAC.

W. Zwieflhofer concluded that, subject to TAC endorsement, the next meeting of Member State Computing Representatives would take place in approx. 1 year's time.

The meeting was closed by W. Zwieflhofer at 13:00h.

PART II

Member States'/Co-operating States' Presentations

AUSTRIA AUSTRIA

Central Institute of Meteorology and Geodynamics, Vienna, Austria

Computer equipment:

The following equipment is doubled (same type if not specially shown by * or special remark):

a) Production/Development Server	SUN SPARCcenter-2000 (4 CPUs, 512 MB Memory) Disk 12.6 GB, CD-ROM, Tape 8mm, 5 GB
b) Database Server	SUN Enterprise 450 Server (2 CPUs, 2 GB Memory) Disk 33.6 GB, CD-ROM, Floppy 3.5"
c) ECMWF-Server:	SUN SPARCstation 10 (1 CPU, 65 MB Memory) Disk 2.5 GB, Floppy 3.5" * SUN SPARCstation 10 (1 CPU, 65 MB Memory) Disk 3.5 GB, Floppy 3.5"
d) GTS-Server:	SUN Ultra-1 (1 CPU, 256 MB Memory) Disk 6.3 GB * SUN SPARCstation 20 (1 CPU, 192 MB Memory) Disk 4.2 GB, CD-ROM, Floppy 3.5"
e) Internet- and Product Server:	SUN SPARCstation 20 (2 CPUs, 96 MB Memory) Disk 6.3 GB
f) Intranet-Server	SUN Ultra-1 (1 CPU, 65 MB Memory Disk 10.5 GB, CD-ROM, Floppy 3.5"
g) Domain name Administration and Operating Server	SUN SPARCstation IPC (1 CPU, 32 MB Memory) Disk 2.6 GB, CD-ROM, Floppy 3.5", Streamer Tape 150 MB * SUN Ultra-1 (1 CPU, 65 MB Memory) Disk 4.2 GB, CD-ROM, Floppy 3.5"
h) LACE Distribution and Archive Server:	SUN SPARCstation IPC (1 CPU, 32 MB Memory) Disk 2.6 GB, CD-ROM, Floppy 3.5", Streamer Tape 150 MB * SUN Ultra-1 (1 CPU, 65 MB Memory) Disk 4.2 GB, CD-ROM, Floppy 3.5"
i) Backup and Archive Server:	SUN Enterprise 250 Server (2 CPUs, 128 MB Memory) Disk 26.4 GB Single Equipment with double Access: DLT Cartridge Roboter (3.5 TB, 4 drives) Single Equipment: Tape 0.5", 9-track, 6250/3000/1600/800 bpi) Optical Disk Roboter (4 Drives, 144 Slots rewritable Magneto-optical Disk, 650MB Cartridge)

Single Equipment:

a) RC-LACE Model Group	Digital Personal Workstation 600 AU (1 CPU, 1 GB Memory) Disk 8.6 GB, CD-ROM, Floppy 3.5", Tape 4mm DAT

and c. 60 other Servers and Clients depending on special needs at the several Departments and Regional Services of ZAMG, and a flock of nearly 300 PCs, some of them used for routine work, e.g. for forecasters and to supply special Media (Broadcast and Television, Newspapers).

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Software:

SUN-Systems:

Operating System:	Solaris (UNIX)
Compiler:	Fortran 77, Fortran 90 C, ANSI C, C++
Script language:	Perl
Graphics:	Xelion GKS, MAGICS, PV-Wave, OpenGL
Libraries:	IMSL, Nag
Database:	SYBASE
GIS:	ARC/INFO
Backup SW:	Veritas Netbackup
E-mail:	Z-mail

Digital Workstation:

Operating System:	Digital UNIX
Compiler:	Fortran 90, C++
Graphics:	NCAR Graphics

Personal Computer:

Operating System:	Windows NT, Windows 95, (Windows 3.11), S.U.S.E LINUX, SCO UNIX, MacOS
Compiler:	Fortran, Visual Basic, C
Graphics:	Xelion GKS, MAGICS
Applications:	MS Office, ABC Flowcharte, ARC/VIEW, Corel Draw, Exceed, Exchange, Netscape, OnNet, PageMaker, PhotoShop, SYBASE ODBC, Quark Xpress

ZAMG - Netzwerk Backbone Stand: Dezember 1999
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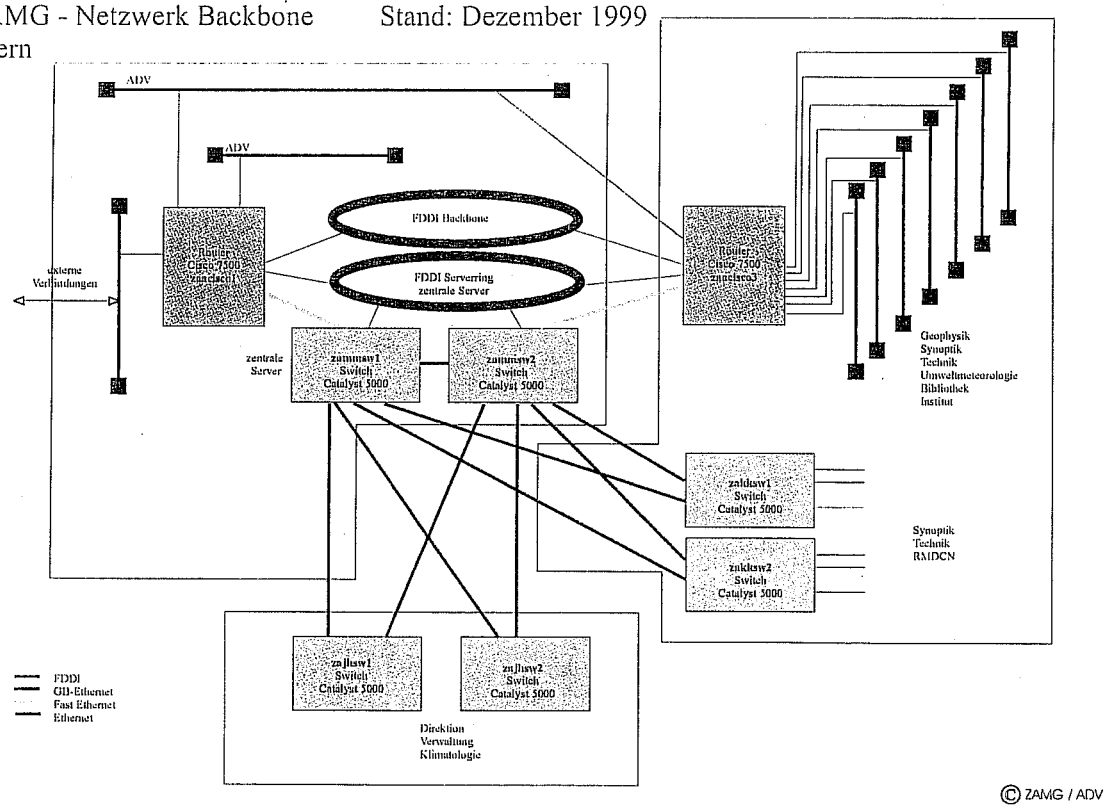

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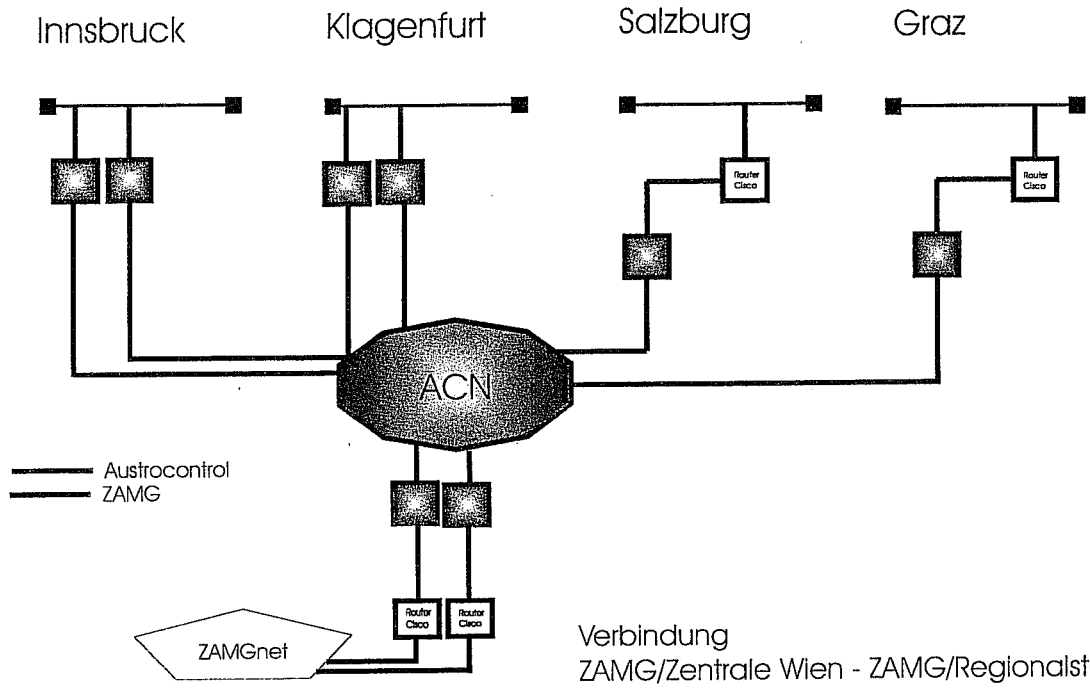

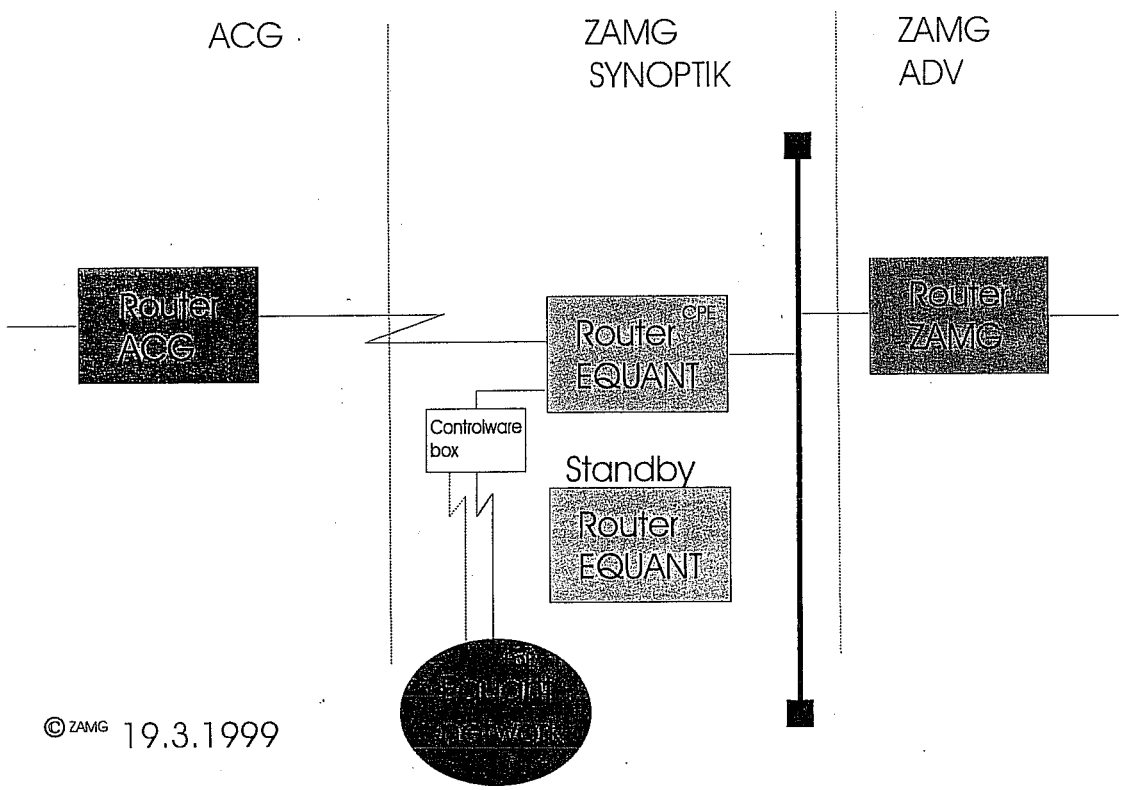

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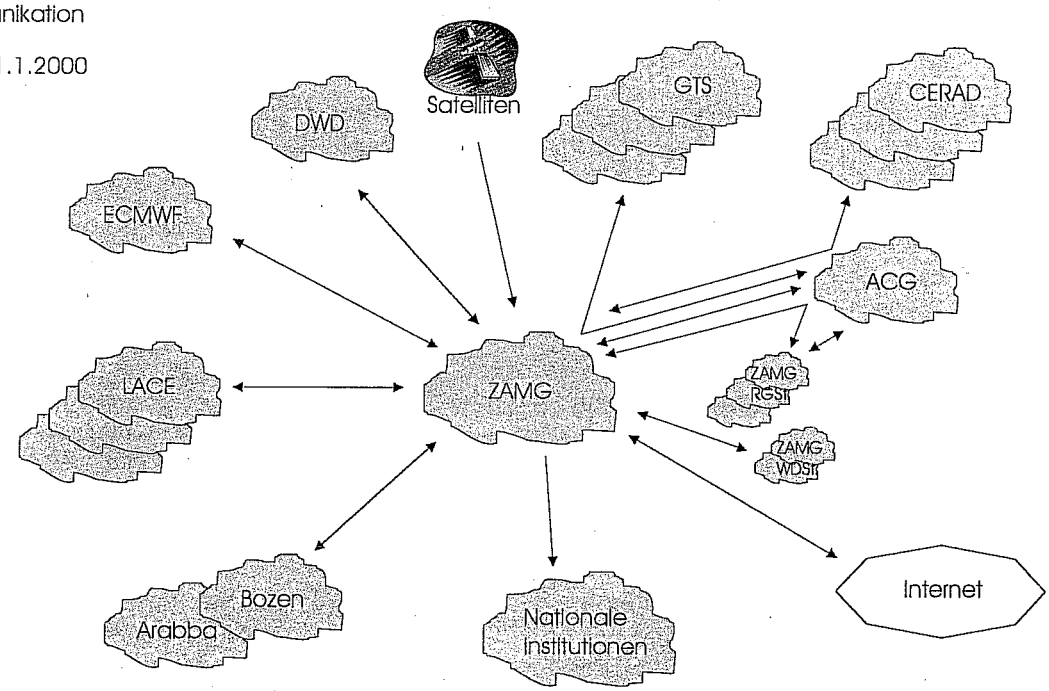
Budgetary costing for RC-LACE countries (all costs as in UK Pound Sterling)

# LACE - Lines					LACE-Information					
Connection			CIR		to separate GTS-usage from LACE-usage				Comment incl. Cordes Formula for EQUANT	
from	to Country	Port	out	in	GTS out	GTS in	LACE out	LACE in	CIR - Cost Splitting (%)	ISDN Backup
Austria		512							Austria : Country	512
	Implemente	512								384
#	Croatia		64	8	16	8	48	0	RC-Lace+GTS (11:89)	
#	Czech Rep		16	128	8	16	8	112	GTS(11.7:5.9)+RC-Lace-Ret (82.4:0)	
	Germany		24	24	24	24	0	0	GTS (50:50)	
#	Hungary		64	16	16	8	48	8	RC-Lace+GTS (10:90)	
#	Slovakia		48	16	8	8	40	8	RC-Lace+GTS (12.5:87.5)	
#	Slovenia		64	8	8	8	56	0	RC-Lace+GTS (11:89)	
	Turkey		16	16	16	16	0	0	GTS (0:100)	
	ECMWF		96	96					ECMWF (0:100)	

ZAMG
Kommunikation

Stand: 1.1.2000



BELGIUM BELGIUM

Institut Royal Météorologique

Avenue Circulaire 3, B - 1180 Bruxelles, tél 32 (0) 2 373 06 11, fax 32 (0) 2 375 12 59

XII Member State Computing representatives' Meeting 18-19 May 2000

1. Computer equipment and connection to ECMWF

The contracts of the main servers in the Belgian meteorological computer centre will end by the end of this year. So the changes occurred in this part of the computer environment since two years have consisted in reinforcing some units.

This configuration is partially shared by three scientific institutions situated in the area of the "plateau d'Uccle" in Brussels (Royal Observatory, Royal Institute of Meteorology, Institute for Space Aeronomy):

- 1 number crunching unit: CRAY SV (8 SV1 processors, 4 GB memory, 60 GB internal disks).
- 1st file server: HP9000/K410 (2 processors, 384 MB memory, 6 GB internal disks);
- 2nd file server: HP9000/K210 (2 processors, 384 MB memory, 4 GB internal disks); connected to both servers:
  - 2 AutoRAID HP 12H (2 x 200 GB) disk arrays,
  - 400 GB optical disks jukebox.

  High-availability system between the two file servers.
- batch server: HP V-2200 (8 PA8200 processors, 2 GB memory, 36 GB disks)

The other part of the installation shown in the figure concerns the meteorological service:

- a login/application server: HP 9000/K210 (3 processors, 3 84 Mb memory, 4 GB internal disks)
- a cluster of 3 HP stations dedicated to the following tasks:
  - a Weather Office server: HP D390 (2 processors, 128 MB memory, 9 GB internal disks)
  - a communication server: HP D350 (2 processors, 128 MB memory, 2 x 2 GB internal disks);
  - a data base server: HP K 100 (1 processor, 256 MB memory, 3 x 2 GB internal disks) connected to these three servers: - 1 HP AutoRAID 12H (200 GB) disk array, - 6 GB external disks.
- a library server: HP R3 80 (1 processor, 5 12 MB memory, 2 x 9 GB internal disks) connected to a DLT library of 1 TB (uncompressed).
- a graphical application server: BP 73 5-125 (1 processor, 176 MB memory, 5 GB internal disks) soon disabled.

Connected to these servers: about 60 X-terminals, some workstations, about 200 PCs through a switched network. About 80 % of the PCs were replaced for Y2K. Some PCs are now migrating to linux.

The main servers are connected together through a 100 Mbps FDDI network.

External communications lines

- Belnet/ Intemet (Belgian academic network): 512 kbps line through a CISCO router
- RMDCN through a CISCO router with the following channels
  - for the link with ECMWF: 96 kbps,
  - for the GTS link: Brussels → Toulouse: 32 kbps

    Toulouse → Brussels: 96 kbps (this channel is in test status)
  - for the link with Bracknell: 16 kbps.

  An ISDN backup is available (2 x 64 kbps).
- Belgocontrol (National Airport): 64 kbps
- Meteo Wing (Air Force): 64 kbps for data and Safir
  these two last connections should disappear when RMDCN will become operational for Belgocontrol and the Meteo Wing.
- several modems for data collection and distribution,
- to the lightning detection system Safir,
- to Météo-France: RETIM system (via satellite).

BELGIUM BELGIUM

Equipment plans

- a connection to AWZ (OMS oceanographic meteorologic station at the coast): ISDN 2 x 64 kbps through a CISCO router.
- in 2000/2001: upgrade of FDDI network to 1 Gbps Gigabit Ethernet technology.
- in 2001: renewal of the main servers: number cruncher, file server system, login/application servers

2. Projects run at ECMWF

11 projects registered at ECMWF use ecgate to extract MARS archives with some treatment on Fujitsu for some of them.

Ex: data for trajectories models, data for snow models, data for ozone calibration measures, . . .

Two projects use the Fujitsu for model experiments:

- SPBECLIMOD deals with a coupled global atmosphere ocean sea-ice model (AOGCM) used to study the influence of air-sea-ice interactions in the polar regions on global climate.

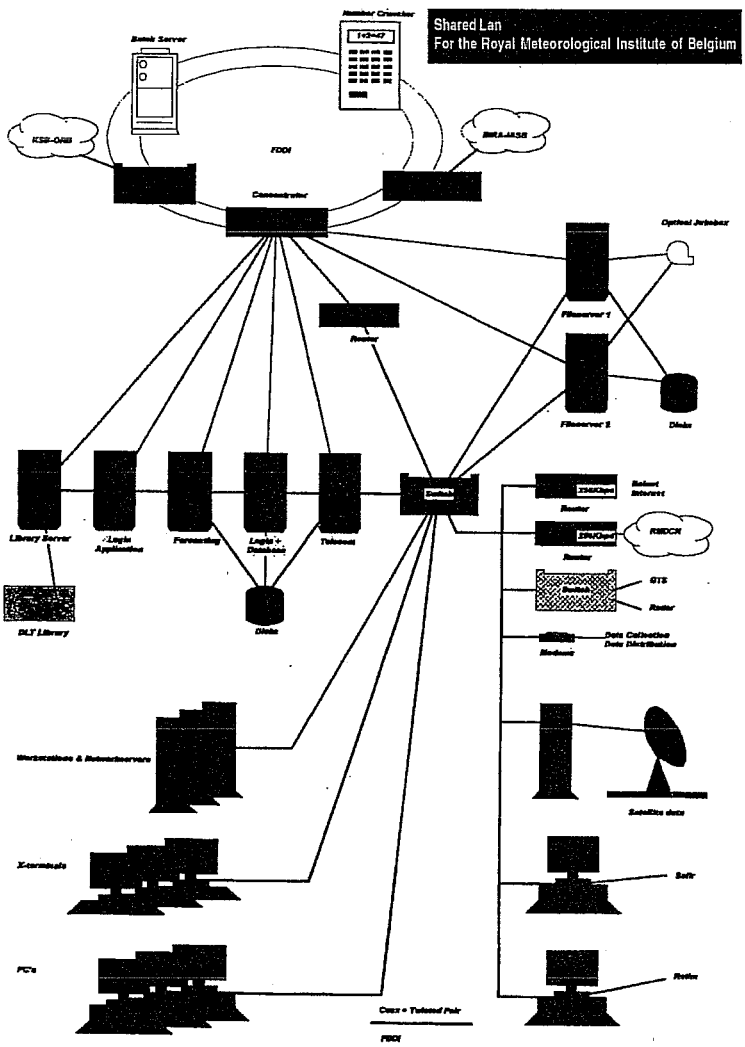
The software is made of 3 modules:

- an atmosphere model: LMDZ (Laboratoire de Météorologie Dynamique, Paris, France)
- a coupler module: OASIS (CERFACS, Toulouse, France) and
- an ocean-ice model: CLIO3 (University of Louvain-la-Neuve).

This software is now working and the production started this year. The production will probably continue over this year.

- BEDM has just started to implement the ETA nested model from NCEP for previsibility experiences. The aim is to study the influence of the domain size, the resolution and the processes of nesting on the sensitivity to initial conditions.

Users are very satisfied of service and support from ECMWF.



DENMARK DENMARK

12th Member State Computing Representatives' Meeting 18/19 May 2000

The computer system at DMI

The main computer environment at DMI is shown in figure 1.

The major change in the computer equipment has been the compute-servers and mass storage system.

Main computer

The main computing system still consists of a 16 processor NEC SX-4 with 4 Gb MMU, 8 Gb XMU, 136 Gb disc storage. The main uses of the computer are running weather prediction and climate research. The HIRLAM weather prediction model is run for an area around Greenland and an area around Denmark. The run consists of nested models, where the first model run uses ECMWF as boundary fields, while the nested models uses the HIRLAM as boundary conditions.

Mass storage

In December 1999 we installed a new mass storage system so that we increased the storage size from around 10 Tb to around 16 Tb. The software used is unitree and it runs on a HP server.

Main UNIX servers

3 SGI Origin-200

- 1 server with 4 R10000 processors, 2 Gb main memory, 3 00 Gb disk storage
- 1 server with 4 R10000 processors, 2 Gb main memory, 150 Gb disk storage
- 1 server with 2 R10000 processors, 2Gb main memory, 74 Gb disk storage

These systems handle the data pre-processing, message switching, the generation of the GRIB database, the post-processing and most of the production of graphical products.

The two computers with 4 processors were last year configured so that one of the computers was the primary while the other was the secondary. This meant that the boot sequence consisted of two parts.

- In part one of the boot sequence the disk storage used locally by each computer was mounted
- In part two of the boot sequence it was considered whether the computer was going to be primary or secondary. The primary computer mounted the shared disks while the secondary computer NFS-mounted the disks.

Due to stability problems we stopped using the above configuration. In stead we chose to split the computers so that we now have two independent computers using a standard configuration. When the systems has proven to be stable, the computer with 300 Gb disk storage will be the primary server, the system with 150 Gb disk will be the secondary server, while the main use of the server with 75 Gb disk storage will be verification of different products.

SGI Origin-200

- 1 R5000 processor, 128 Mb main memory, 20 Gb disk storage.

The former Y2K test computer is for the moment used to receive the dissemination products via RMDCN. This computer will in near future be replaced by 2 Sun Sparc-stations i. e. one primary and a hot standby.

SGI Origin-200

- 4 R10000 processors, 1 Gb main memory, 64 Gb disk storage.
- File server for the research department.

SUN Ultra 10 Servers

- 1 processor, 128 Mb main memory, 9 Gb disk storage.
- Serves as file servers for the different departments.

SUN Ultra enterprise Server

- 2 processors, 256 Mb main memory, 68 Gb disk storage of which 60 Gb is raided.
- Climatological database based on Ingress DBMS

6 SUN Ultra 10 Servers

- 1 processor, 128 Mb main memory, 9 Gb disk storage.

Serves as ftp, Internet and firewall servers

2 SUN Sparc 5

- 1 processor, 96 Mb main memory, 18 Gb disk storage.
- Handling of the new RMDCN line in connection with receiving of GTS data and receiving of SADIS data.

6 SUN

- Different models.
- Handling of data to be sent to external users.

2 SUN Sparc 5

- 1 processor, 64 Mb main memory, 20 Gb disk storage.
- Handling satellite data from Meteosat and NOAA.

Other computers

Data from the 3 Danish weather radar's are handled by micro-VAX 3 100 computers and transferred from these to DMI via ftp using ISDN lines.

Distribution of data between the different computers are handled by 3 PCs that have Solaris installed.

UNIX Workstations

There are about 50 UNIX Workstations, of which most are PCs that has installed Solaris. Most of these PCs are equipped with two screens.

Network

On the Local Area Network we link the network by use both routers, bridges and switches.

The networks at the regional centres are linked by bridges via leased lines, using ISDN as backup.

The circuit used to Greenland has been replaced by the Internet. This change has proven to be more stable than the former fixed line.

Projects run at ECMWF

The remote jobs run at ECMWF are to a large extent data retrieval from the MARS archives.

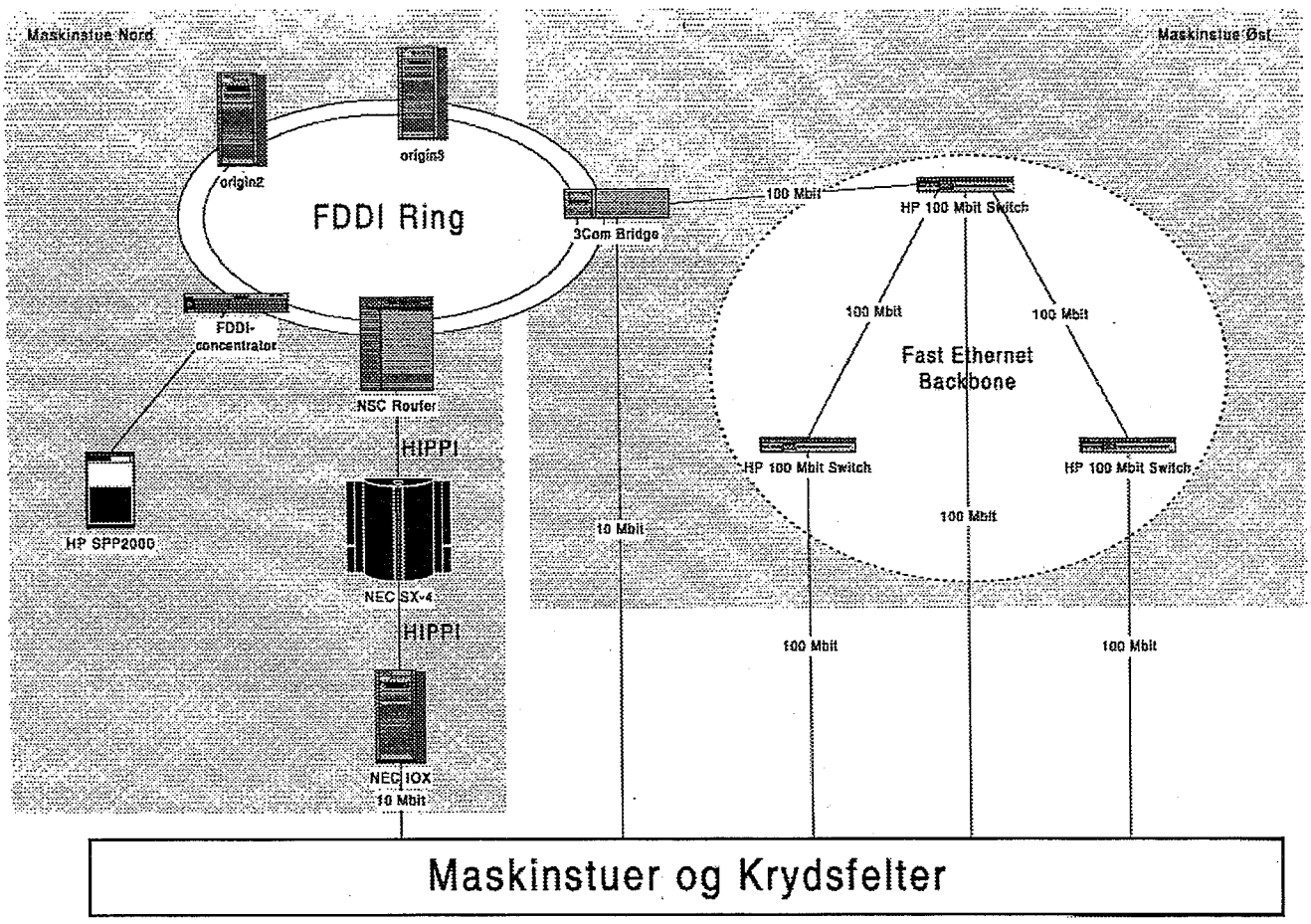
The research department are running some experiments on the HIRLAM 3D-Var code. Some jobs have been run in order to compare the new 3D-Var code with the reference HIRLAM system.

The VPP 700 has also been used in calculating trajectories for the stratosphere and there have also been run jobs connected to a research project on reduction of the ozone layer.

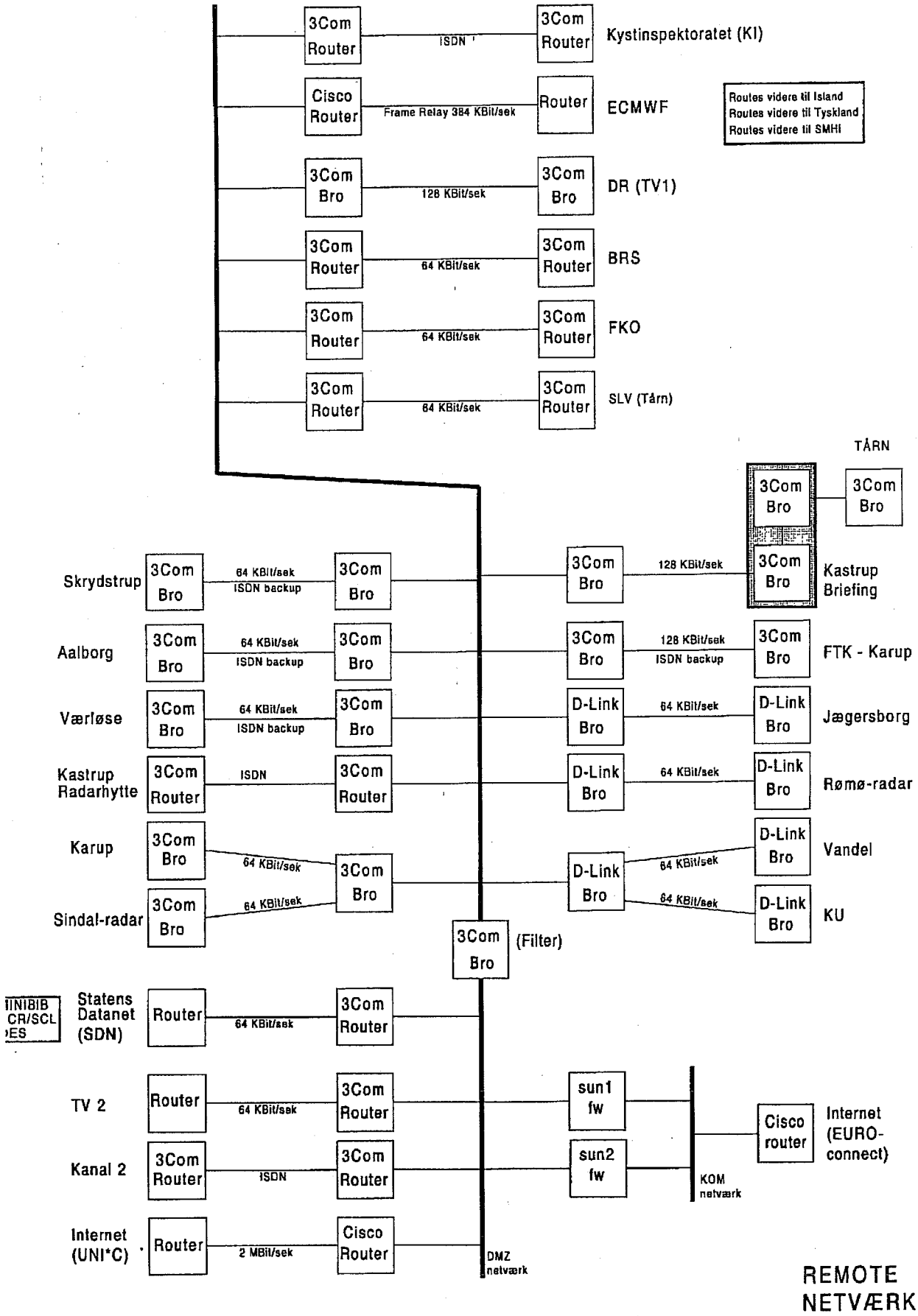
The main use of the computer system at ECMWF will in the future not differ very much from the former use.

DENMARK

DENMARK



DENMARK DENMARK



DENMARK

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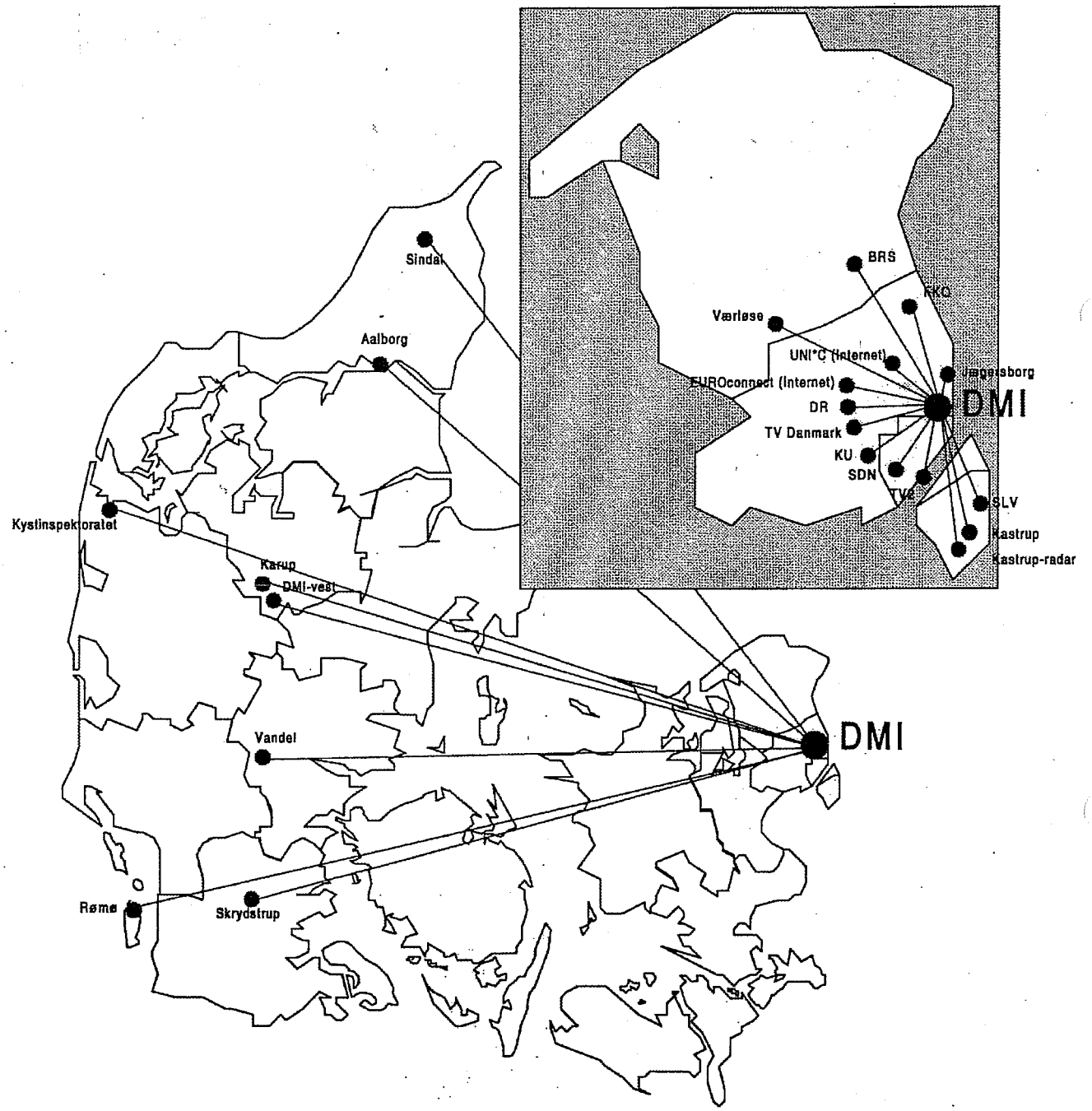
Indenlandske LAN-LAN forbindelser



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Desuden følgende udenlandske forbindelser:

ECMWF
SMHI

FINLAND FINLAND

Computing Environment at FMI

Timo Hopeakoski, Finnish Meteorological Institute

General

- the production environment is mainly based on centralized database systems
- the databases are built on Oracle 7.3.4 system and a great deal of data handling is based on C/C++ software
- the database servers are semi-clustered and the cluster consists of two Digital-Unix server
- the backup systems use Networker software, Oracle backup software and the Clone feature of the operating system
- the real-time database contains weather data which is stored immediately after its arrival and is available a couple of days (observations, HIRLAM and ECMWF products)
- the climatological database contains all weather information from Finland starting from the year 1880
- the administrative databases contain information about personnel, salaries, education etc.
- the size of the databases at present are

  real-time 30 Gbytes

  climatological 15 Gbytes

  administrative 4 Gbytes
- the speed of the connection to ECMWF is 96 kbytes/s and uses TCP/IP protocol and RMDCN network

Hardware

ECMWF

- number crunching Fujitsu
- data archives SGI

CSC (Centre for Scientific Computing) situated in Espoo, Finland

- number crunching Cray T3E 512 + 32 CPUs

  SGI O2000 128 CPUs

System security

- firewall Digital Alpha
- backup systems Digital Alpha

Monitoring systems

- SMS
- PCM (Polycenter Console Manager)
- Netview

Personal workstations

- Unix SGI 25

  Alpha 8
- VMS (Meteorologist's workstations) VAX 40
- Linux 60
- NT 15

Weather prediction servers

- Unix SGI 4

  VAX 2

FINLAND FINLAND

Research servers

- Unix SGI 4
- VMS VAX 2

Satellite operations servers

- VMS Alpha 2

Radar operations servers

- Unix (Iris) SGI 3 (2O2 + 1 Indy)
- VMS (Nordrad) VAX 3
  Alpha 2

Database servers

- Unix Alpha 2

WWW servers

- Linux 2

Computing statistics

Number of weather messages received daily	16000
Number of production processes daily	2500
Number of computers under control	170
Number of network devices	35
Number of local network (ip-networks)	30
(VLAN)	9
Number of ip-addresses	1200
Number of decnet addresses	60
Number of daily e-mail messages	3000
Number of PCs	800
Number of Macintoshes	30

Projects run at ECMWF

- The international HIRLAM project
- MARS data retrieval and processing
- Finnish sea wave model
- Research of air pollution
- Trajectory models
- Air quality models
- Stratospheric chemistry model

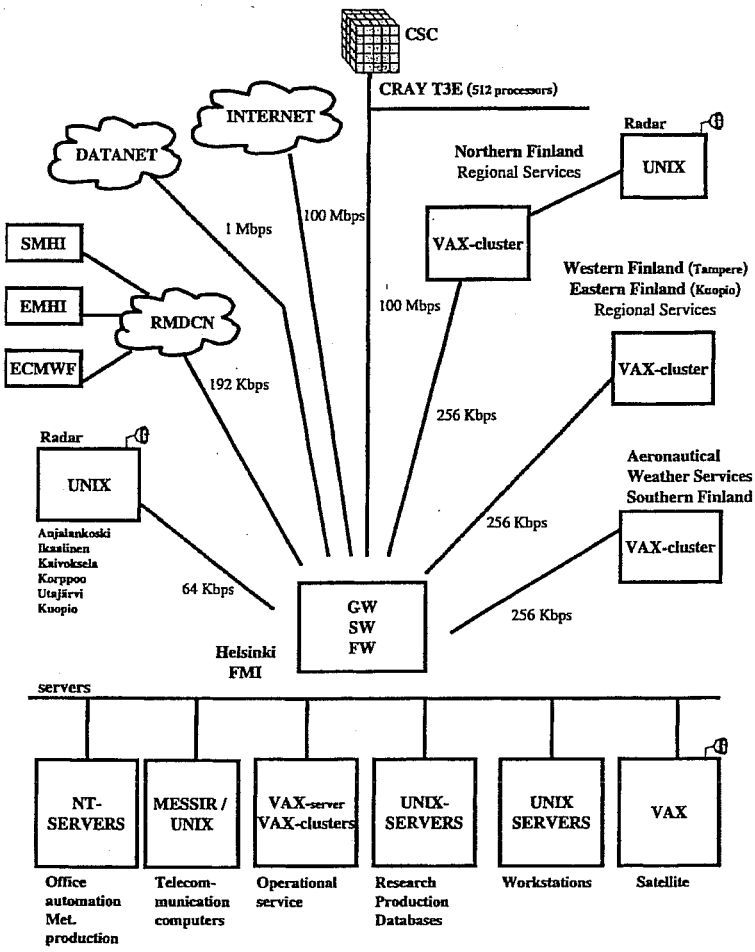
Experience using ECMWF systems

- user support we have got has been excellent
- no major difficulties in processing runs
- the certificate system has caused difficulties when trying to read ECMWF internal pages

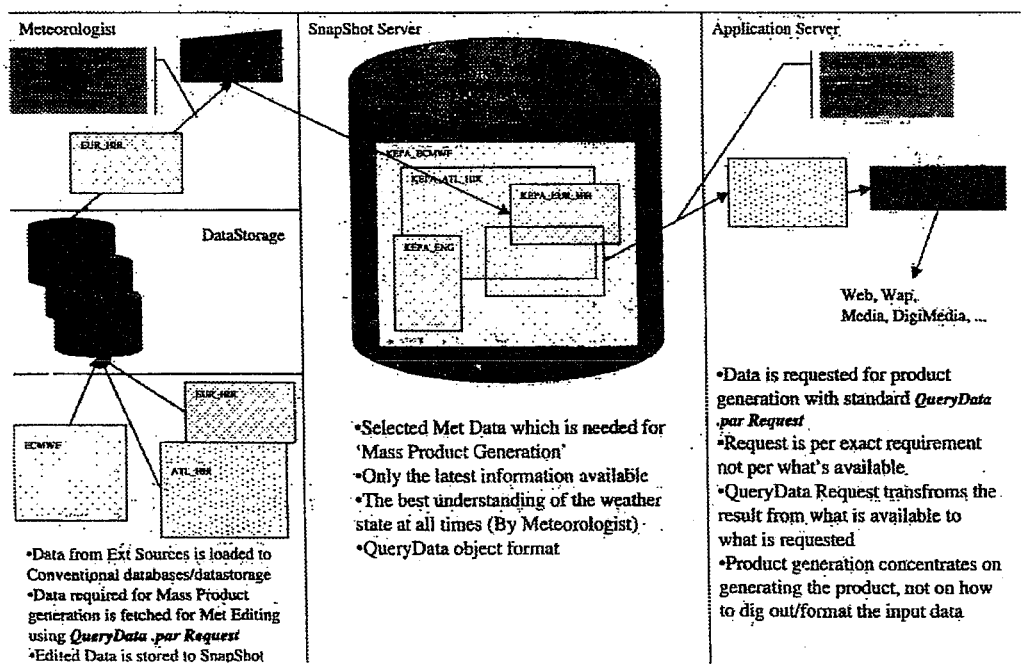
FINLAND FINLAND

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

COMPUTER NETWORK AT FMI



SnapShot DataStore Overview



•Data from Ext Sources is loaded to Conventional databases/datastorage
•Data required for Mass Product generation is fetched for Met Editing using ***QueryData .par Request***
•Edited Data is stored to SnapShot

•Selected Met Data which is needed for 'Mass Product Generation'
•Only the latest information available
•The best understanding of the weather state at all times (By Meteorologist)
•QueryData object format

•Data is requested for product generation with standard ***QueryData .par Request***
•Request is per exact requirement not per what's available.
•QueryData Request transfroms the result from what is available to what is requested
•Product generation concentrates on generating the product, not on how to dig out/format the input data

FRANCE FRANCE

Twelfth Member States Computing Representatives Meeting 18-19 May 2000

Marion Pithon, Météo France

1. Computing environment and Network Configuration at Météo France

1.1 Computer equipment

The major change in the computing environment has been, in October 1999, the upgrade of our VPP700 FUJITSU supercomputer by a VPP5000.

The current configuration is the following:

- Vector computing: VPP5000 (31 PEs)
- File server and archiving system: O2000 (8 procs), 2 STK9310 silos, a IBM 3494 library and a STK9710 silo.
- Scalar systems: HP servers
- Visualisation system: SUN servers
- Climatological data base: a SUN server
- Backup system: a SUN server and a STK9710 silo
- Telecommunication system: SUN servers

Supercomputer

The new VPP5000 has 31 PEs, 208 Gbytes of distributed memory and 2 TB of RAIDS disks.

All operational tasks (a global model, a limited area model, some post processing, wave models, trajectories models, seasonal forecasts, . . .) are run on the VPP5000 since February 2000.

The increase of computer power (by a factor of 4.5 compared to the VPP700) has enabled the increase of the number of runs (4 times a day for the global system) and will allow, next month, the change of the assimilation scheme (from 3D-Var to 4D-Var).

File server and backup system

The data management is provided by an archiving system made of a SGI O2000 (8 processors, 4 Gbytes of memory and 1. 8 Tbytes of RAID3 disk cache) which controls an IBM3494 library and two StorageTek 9310 silos (with 30 drives in total) and a STK9710 silo (with 4 DLT drives) in a remote location for double copies. The total capacity of the system is 70 Tbytes. The total volume of data stored is 37 Tbytes (with more than 2.5 Million of files) and a monthly growth of 2 Tbytes. The software used for the file service and archiving system is DMF.

The backup service is provided by the software "Time Navigator" from Quadratec on a SUN E450 and a STK9710 silo.

HP servers

A set of HP servers (3 T600, 2 D370 and 2 C180) is in charge of all the operational tasks: acquisition and pre-processing of data, storage in data base, start of the models on the supercomputers, post processing (production of graphical products) and also monitoring and supervision of all these tasks. There is also 1 HP server for tests and integration.

4 HP servers (2 with 3 procs and 2 with 2 procs) are available to users for development purpose and use of graphical tools, code management . . .

A new HP server will soon be used as front-end for the VPP (for cross compiling, use of graphical libraries for visualisation, . . .)

SUN servers

2 E3500, 1 E450, 9 Ultra 60 (2 proc), 9 Ultra 10 are used for our interactive visualisation system for forecasters.

A SUN E450 houses the backup system.

A SUN Enterprise 5000 is used for a climatological database (based on ORACLE).

A SUN E3000 (2 processors) handles the telecommunication system (locally developed software TRANSMET) which is in charge of collecting and broadcasting observed meteorological data.

FRANCE FRANCE

1.2 Network

The backbone of our local Area Network (an ATM switch) has been replaced in March by a solution based on Ethernet 100 connections with Cabletron equipment. Computers mainly dedicated to operational tasks are also linked together through a FDDI ring. A HIPPI link enables fast communications between the VPP5000 and the O2000 (file server). Météo France is in the process of procuring a replacement for the LAN to provide Gbits Ethernet connections for the end of this year.

Some connections to outside are made through leased lines (Météo France Regional services, Cerfacs), through Renater (French part of Internet) or via TRANSPAC (French X25 public network).

Connections from outside to Météo France are protected by a firewall implementation. The software used is Firewall 1 from Checkpoint on 2 SUN servers which will be replaced by a dedicated equipment (NOKIA).

1.3 Connection to ECMWF

Our connection to the GTS is now made through the RMDCN network. Connection to ECMWF is operational through RMDCN since mid January (with CIR of 512 kbps in and 256 kbps out) and to Offenbach and Bracknell since March.

Users also use Internet (with a maximum throughput of 2 Mbits/s and an expected one of 700 kbits/s) to connect to ECMWF.

An important issue is to avoid concurrent traffic during operational transfers. That's why Météo France try to promote, among users, the use of Internet for big data transfers and generalise the use of convenient tools that enable data transfers in batch mode (ecbatch utilities). For telnet connections, users from outside laboratories use mainly Internet access, but people from Météo France prefer to use RMDCN (more user friendly, because avoiding the connection to ECMWF firewall).

2. Use of ECMWF resources

Operational products

The volume of data concerned by the dissemination of ECMWF products hasn't increased very much since last year. The volume is per day: 320 Mbytes for IFS 12Z, 110 Mbytes for wave model results and about 90 Mbytes for EPS results. Since RMDCN, the volume of data transferred is not limited by telecommunication bandwidth but by disk space at our local computer; this could change soon.

The projects

36 Météo France projects and 6 special projects are registered for this year the main activity is data retrieval from MARS on ecgate1 (almost 75 % of Météo France users).

The more active projects are:

- Climate simulations.
- Mesoscale model experiments.
- Participation in DEMETER project.
- Cyclones tracks forecasts with the limited area model ALADIN.
- Trajectories and backward trajectories computation.
- Statistical works on ECMWF data.
- Control and monitoring of data.
- IASI OSSE database exploitation.
- Studies on EPS.

The following are registered as special projects in 1999:

- MERCATOR project: build a global ocean circulation simulation tool based on a high-resolution model assimilating real time data
- Universal software for data assimilation: variational method for global ocean
- Chemistry cloud and radiation interactions in a meteorological model
- Seasonal to interannual predictability of a coupled ocean atmosphere model
- Decadal climate variability over the North Atlantic European region

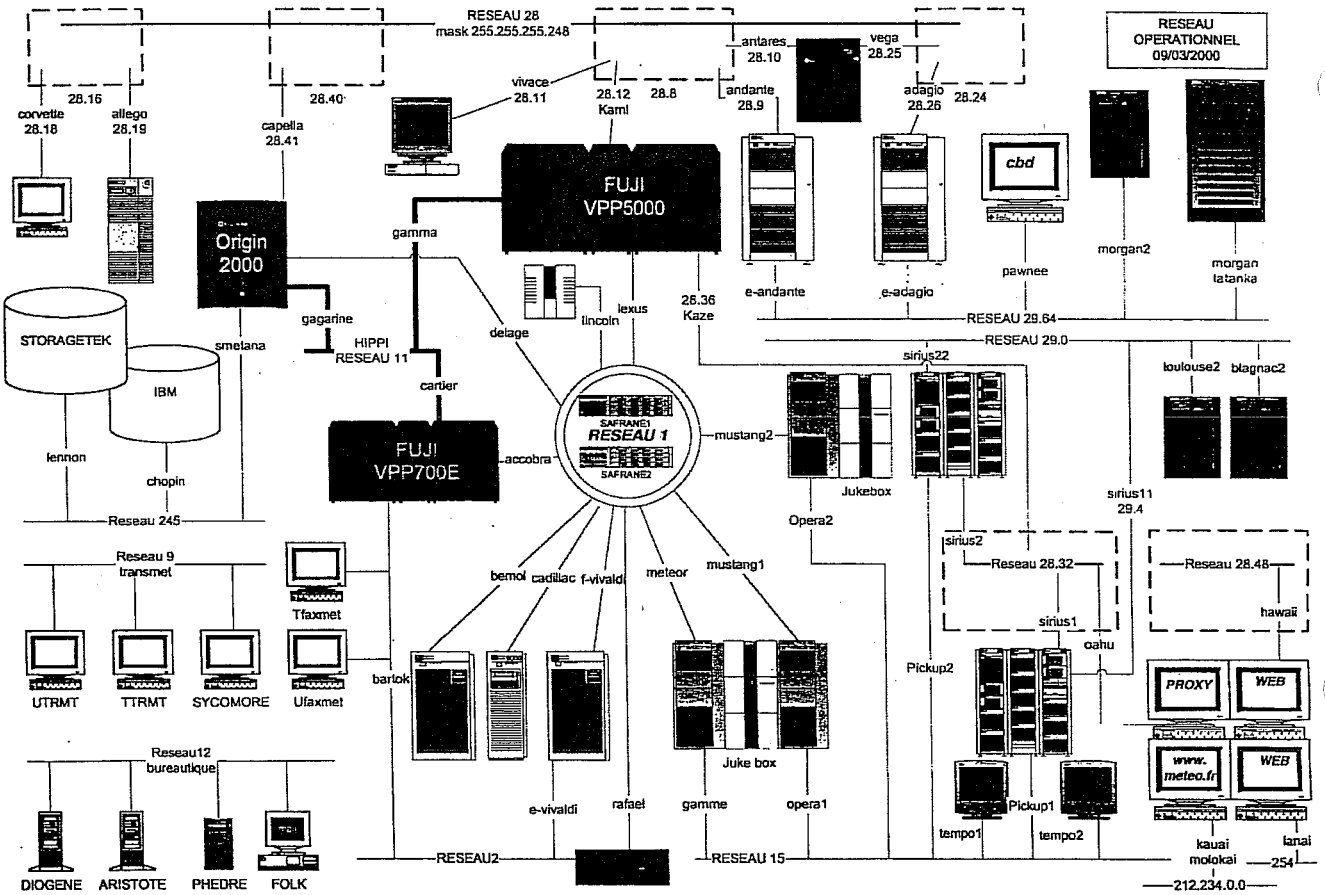
FRANCE FRANCE

In 1999, the total amount of CPU used on the VPP was only 10 % of CPU allocation for France. This poor CPU use can be explained once more by:

- the fact that most users don't need to compute at ECMWF.
- the better turnaround experienced, at the moment, on the VPP5000 at Météo France.

Current concerns

The majority of users are very pleased with the user support service which is very efficient and well organised. Users appreciated Dominique Lucas visit to France last year and the different meetings with some members of important projects. Users also notice the effort made in Web documentation and various information they can get from ECMWF (newssheets and messages from calldesk). There are, however, some complaints about the complexity of the first secure web connection (to be able to get a certificate). Finally, users are very satisfied with the good reliability of ECMWF various systems.



M. Pithon commented that users would like to have been consulted regarding the file naming system when the new dissemination system was written.

ECMWF: It was considered that the short time frame available for development did not allow for consultations. Moreover, the ultimate deadline of Y2K meant that file names should ideally remain as close to the originals as possible, to reduce potential problem areas.

M. Pithon asked whether the validity of certificates could be extended beyond 12 hours for data transfer purposes to allow weekend working. Data transfer in batch jobs via the Internet is very practical, since it avoids 2 stage logins for the user and conflict with operational traffic.

ECMWF: This is mainly a policy decision and your requirements can probably be met.

M. Pithon: The facility to use ecput directly to ECFS is very much appreciated but French users would also welcome an ecget directly from ECFS. Is it available? They eventually plan to install the ecbatch facilities on their file server, to allow direct file transfer from ECMWF to Météo-France.

ECMWF: It is planned to investigate the feasibility of a direct ecget and, if possible, it will be implemented.

M. Pithon commented that, since Météo-France had a VPP5000, there was little need or incentive for general users to use the ECMWF system. As suggested at the previous meeting, they had found the identification of certain projects with special requirements, to be arranged individually with ECMWF, to be the best way of utilising their allocation.

N. Olsen (Denmark) commented that priority schemes could ensure that batch output did not interfere with dissemination. M. Pithon agreed but pointed out that, once a large batch output had begun transferring, the priority scheme was powerless.

ECMWF noted that Packet shaper hardware was used to both France and Denmark and was proving satisfactory since a recent operating system upgrade.

GERMANY GERMANY

Member States Computing Representatives' Meeting 18 - 19th May, 2000

Elisabeth Krenzien, Deutscher Wetterdienst

1 Computer equipment at DWD and connections to ECMWF

In accordance with the five years contract signed by DWD and SGI in 1997 to continuously upgrade most of DWD's computer centre's infrastructure (Figure 1) the third phase is implemented and the final, two step, phase is already in preparation. The current configuration of the main servers is the following

	J90	T3E-1200	02000			
Processor	CMOS / Vector	DEC Alpha EV5	MIPS R 10 000 +			
CPU / Nodes	32	816	8	14	12	12
Main Memory (GB)	8	123	2.5	5	10.7	10.7
Disk Capacity (GB)	172	1024	56	72	3035	217
Tape Drives	4	-	-	-	16	-
Networks	FDDI HIPPI	FDDI HIPPI	Fast Ethernet HIPPI / ATM			
Operating System	UNICOS 10	UNICOS/mk2.0	IRIX 6.5			

Table 1: System specification Phase 3

The major changes since the last meeting are further enhancements of the CPU capacity of the Cray T3E, the disk capacity of the data server Origin2000 and the joint withdrawal of the Cray C90 and the old model chain GM/EM/DM in December 1999.

Currently the T3E and one of the routine servers are the main platforms for the operational model chain Lokal Modell (LM)/Global Modell (GME) that is fully operational since the end of 1999 while the second routine server and the Cray J90 host non-time-critical operational tasks and user activities; the J90 being the only vector system available.

The replacement of the SGI Hierarchical Storage Management system DMF on the J90 by the Adic HSM systems AMASS and DataMgr on the O2000 was completed within a month but the stability and reliability of the whole data handling system (O2000, STK ACS -SD-3) and AMASS/DataMgr) needs to be improved.

Since July 1999 DWD runs the DMRZ (Deutsches Meteorologisches Rechenzentrum), a distributed computing centre based on HPC resources of the national (Offenbach) and military (Traben Trarbach) weather service (Figure 2). After two years the synergetics and cost effectiveness of the pilot operation will be evaluated.

The most important changes related to the telecommunication link to ECMWF computer systems are the upgrade and introduction of RMDCN in spring and the shut down of the former 2 Mb/s with CIR of 512 kb/s beginning of May. The data communication to ECMWF is schematically shown in Figure 3.

2 Projects and experiences using ECMWF computers

Within the last 12 months the usage of the Fujitsu VPP systems grew considerably since the LLM project succeeded to implement a working environment allowing to quasi automatically run the serial and sensitivity runs of the very high resolution mesoscale model. Additionally specific LM and GME studies have been performed. Special Projects of the Max-Planck Institute of Meteorology perform their climate and coupled ocean / atmospheric model studies on the VPP5000 with great success.

The ecfs software is implemented in a test environment and the 3 months test phase for specific users is about to begin. It will replace the present nfs based user archive on DataMgr.

The majority of new users intends to access Mars data with growing interest in the operational forecast data to support short term international projects, an easy procedure to handle the resulting amount of administration work would be helpful.

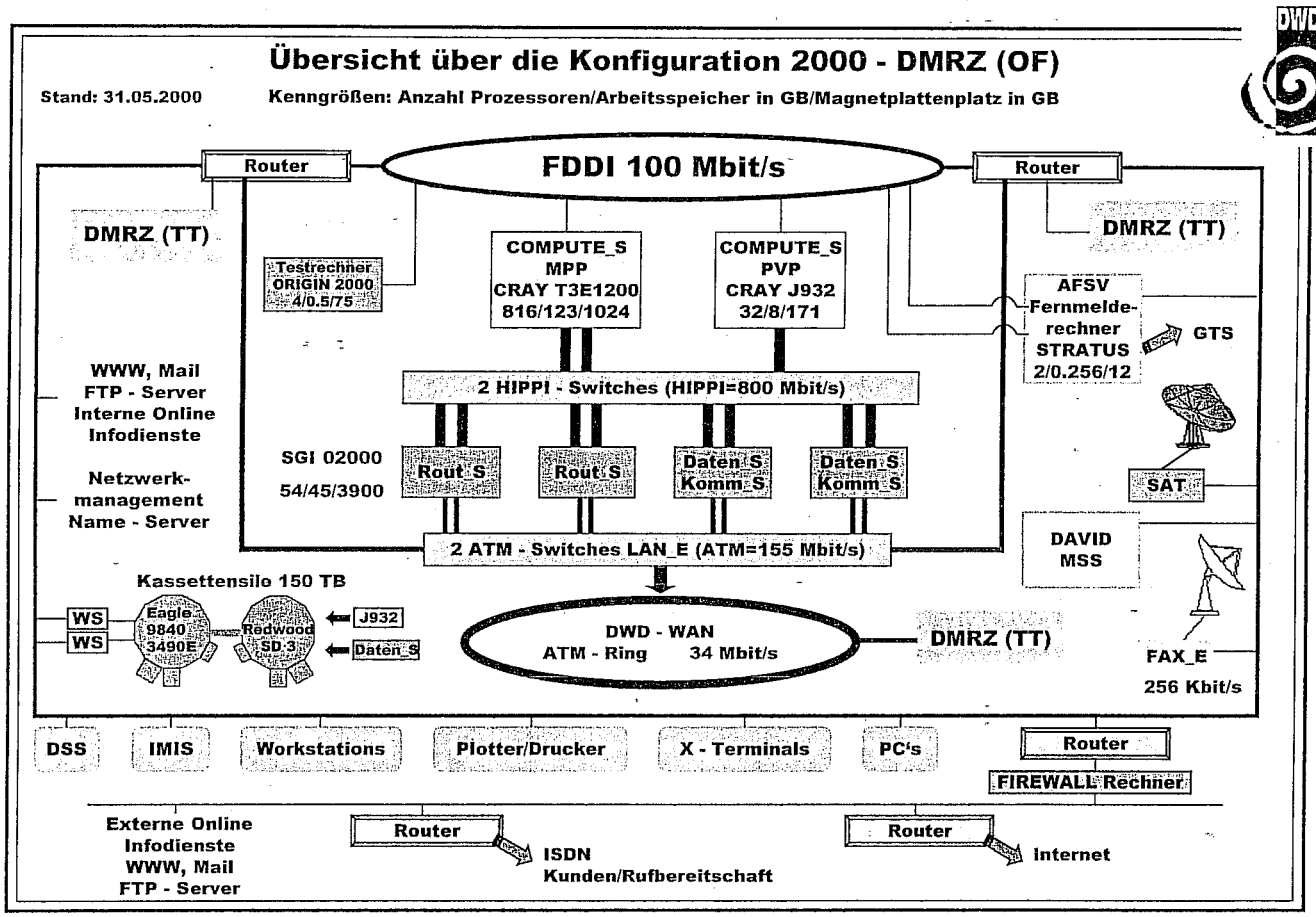
In principle there are no difficulties in using the computer equipment because of the portable code development strategy. A limiting factor at the moment is a shortage in human resources in general.

GERMANY GERMANY

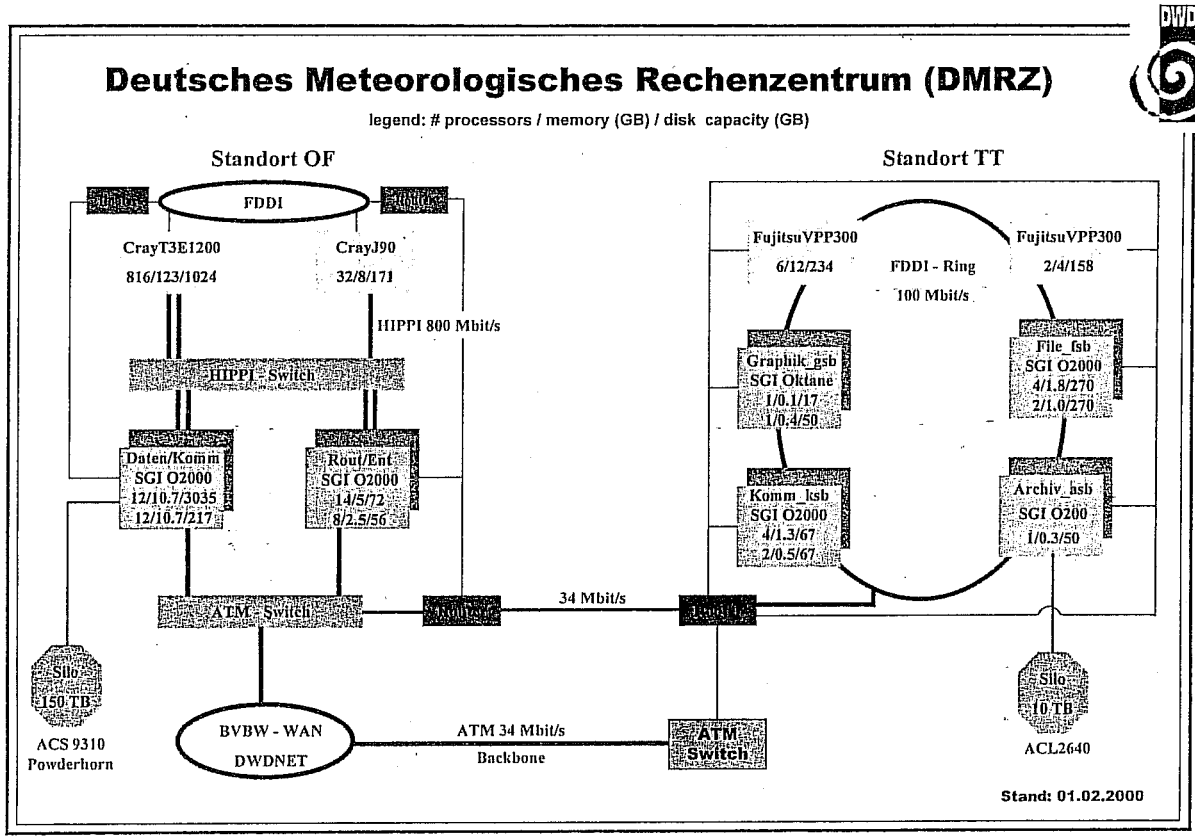
3 Plans

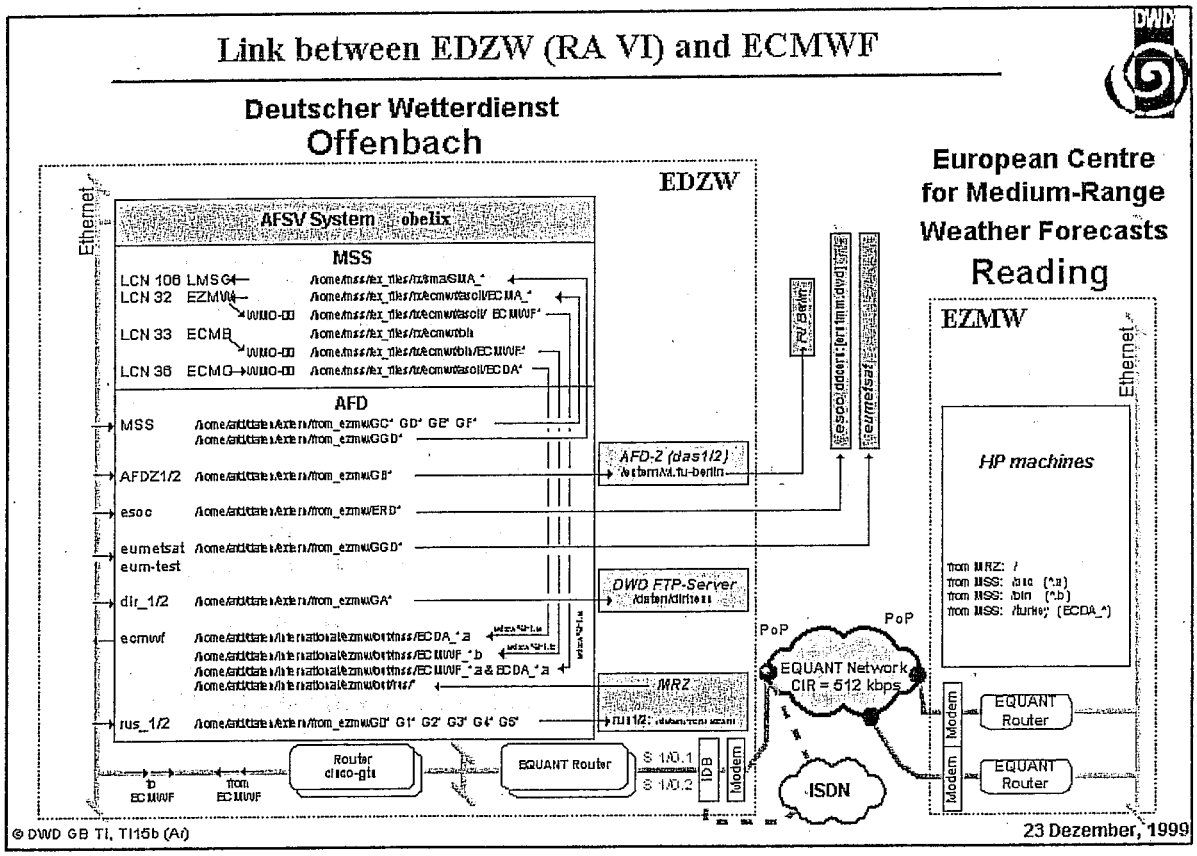
An external study is under the way to evaluate the possibility (techniques and methods) of a unified user interface to access remote computer resources at DMRZ and ECMWF environment such as libraries and interfaces to archives. The envisaged goal is to make remote tools and resources of HPC easily available and transparent for users at DWD and other member states if so wished. DWD will provide a consultant at ECMWF to integrate the Centre's services for the intended communality.

Further plans imply the continuation of the LLM model runs including more intensive usage of the storage capacities.



GERMANY GERMANY





GREECE GREECE

HNMS Computer Representative Report

Captain N. Kamberakis

In main operation systems:

1. Data Base

In this system there were not any major changes. DIAS is in the final phase of fully distributed data base system among all internal and external users that handle or use meteorological data. Also a connection with the Regional Meteorological Weather Centres will be implemented by the end of next year.

2. NWP

A new computer system VP2200 with 8 CPU (3.2 Gflops) has been installed for our operational limited area model "SKIRON" which is now operational.

As the result of our cooperation in consortium COSMO a non-hydrostatic model (LM) has been installed. Data from DWD used for analysis and boundary conditions. The non-hydrostatic COSMO model is integrated in an area covering Greece with grid length 12.5 km. The model is integrated once a day based on 0000 UTC analysis.

We plan to upgrade the VP2200 system on 6.4 Gflops (16CPU) for integrate the LM model with grid length 4 km.

3. Meteorological Support System

We upgraded the connection with 10 Weather Offices to 64 Kbps. Up to the end of the year the Meteorological Support System will be installed in 25 new users (Local Weather Offices mainly in PC Windows NT platforms), and we are going to change (upgrade) all the Indy (SG1-8 W/Ss) and Indigo to Ultra 10 (SUN) (10 W/S).

Also we upgraded the low end visualisation system under PC-Windows NT platform with new features (to support better the air navigation needs - automation of weather information for air staffs - new editor, new graphics tools for SWC).

Finally we plan to optimise the system software (mainly under UNIX platform) and introduce new libraries that will change the way that covers all conversion and metafile production software

4. Nowc

Greece move fast to evolve a NOWCASTING system. We are in the strategic point to decide to develop or to buy a NOWCASTING system.

5. Operational Support

We support all the major computer and telecommunication systems on a 24 hours basis on operator level and we expect to improve the operational support to the administration level. The RMDCN project is progressing according to the schedule. Finally we changed all the routers in our network with CISCO routers, and we have installed a PIX Firewall.

6. Y2K Problem

We encounter the problem in house. We don't have serious problems. We upgraded all the operation systems in the new version (IRIX 6.2, Solaris 2.7) and we used all the patches and the Service packs. We installed new version of compilers.

7. Usage of ECMWF Computer facilities

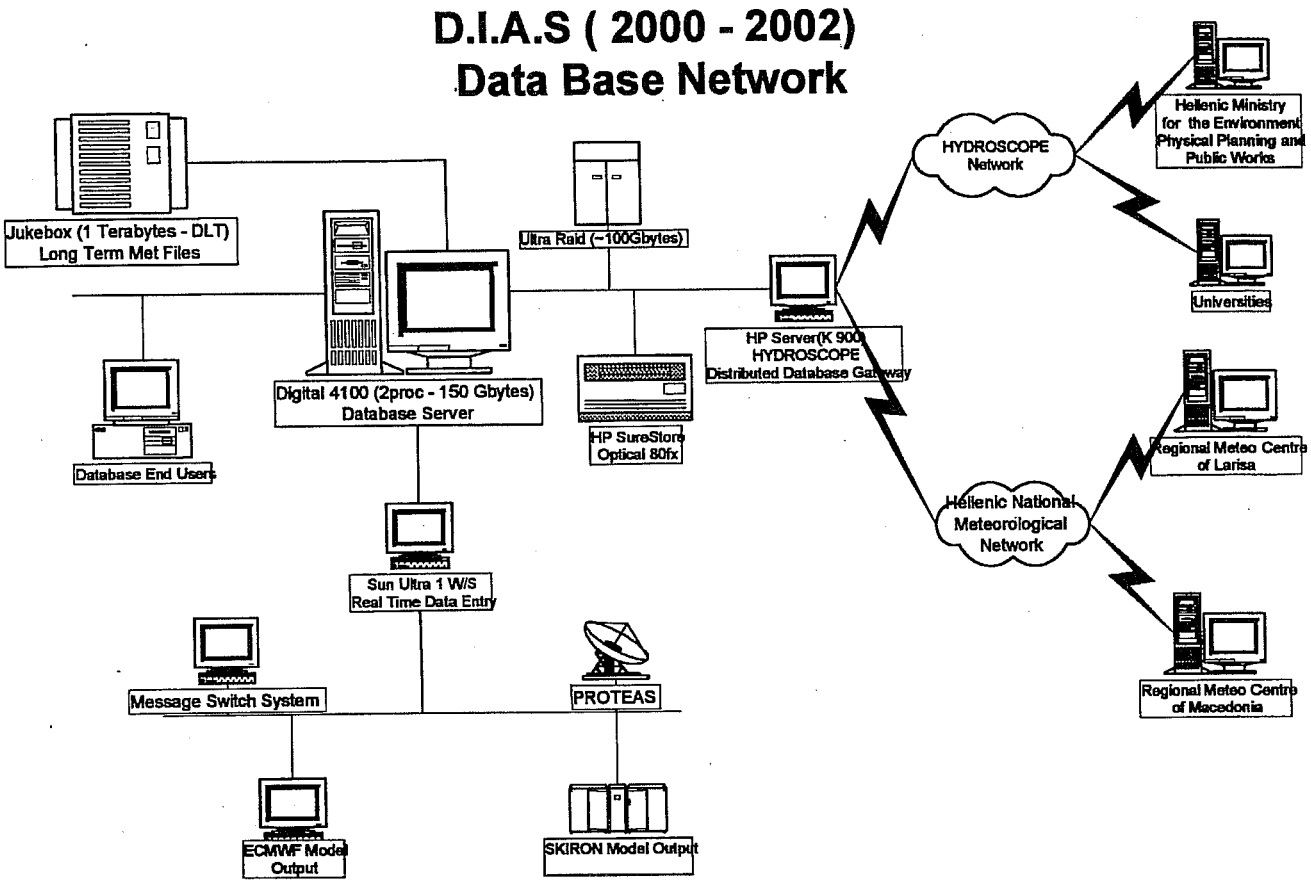
HNMS receives both 1200 and 0000 UTC based data up to 240 and 72 hours respectively. Also data from ECMWF are used for analysis and boundary conditions of SKIRON. The basic use for METVIEW is the research at HNMS and HTAF. HNMS basically uses FUJITSU system for MARS retrievals and the Trajectory Model.

Main Operational Systems

- Central Data Base (D.I.A.S.)
- Operational Meteorological W/S System
- N.W.P.

GREECE

GREECE



SKIRON MODEL	
Grid Resolution	10Km
Data Assimulation	ECMWF
Intergration time	72h

LM	
Grid Resolution	12.5Km
Data Assimulation	DWD
Intergration time	72h

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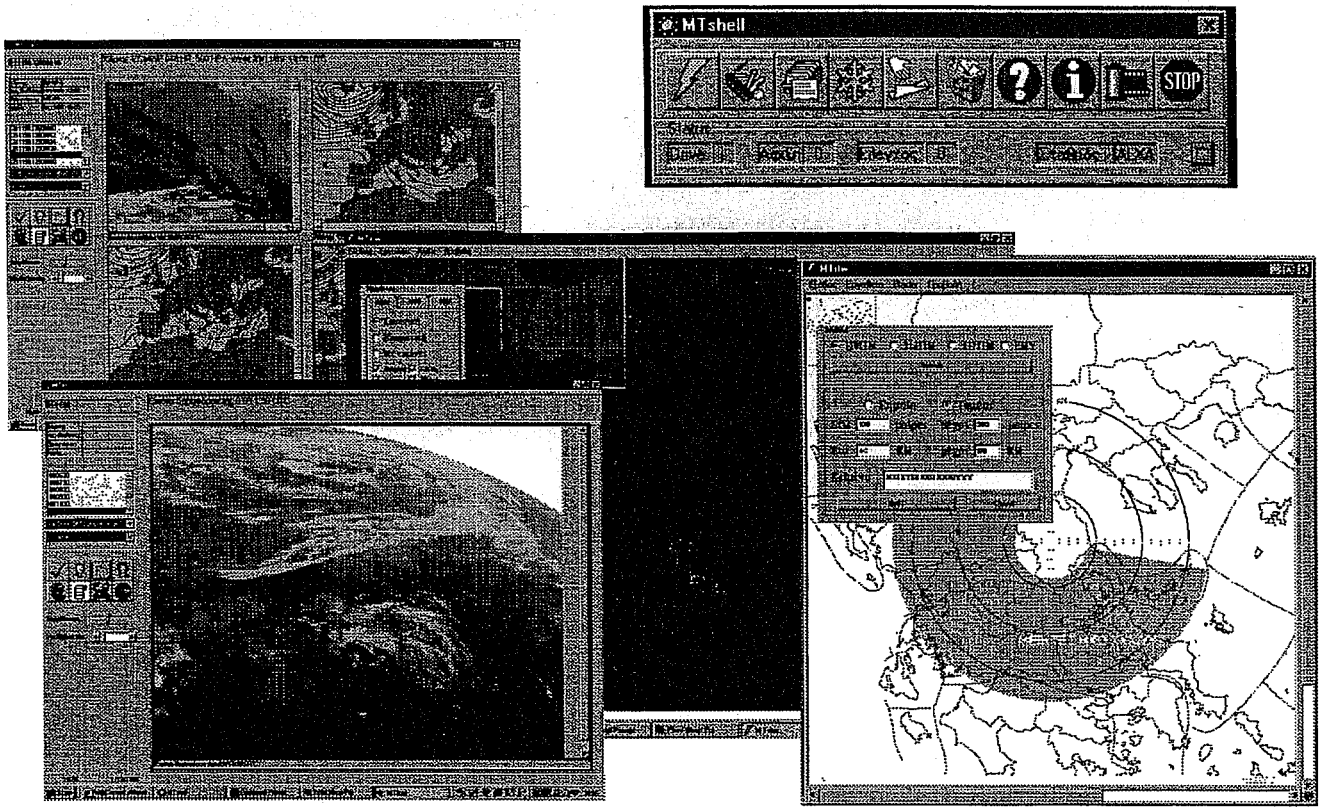
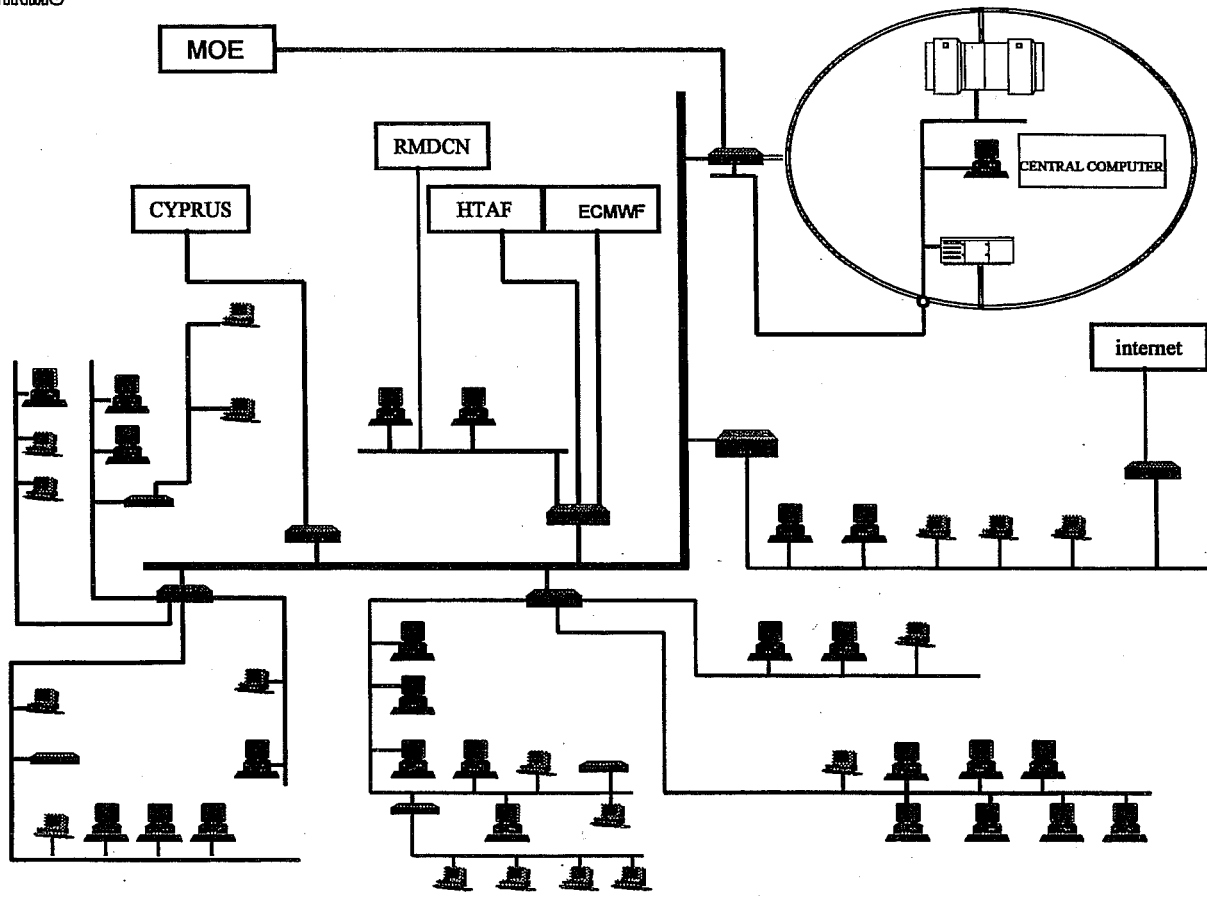


HNMS

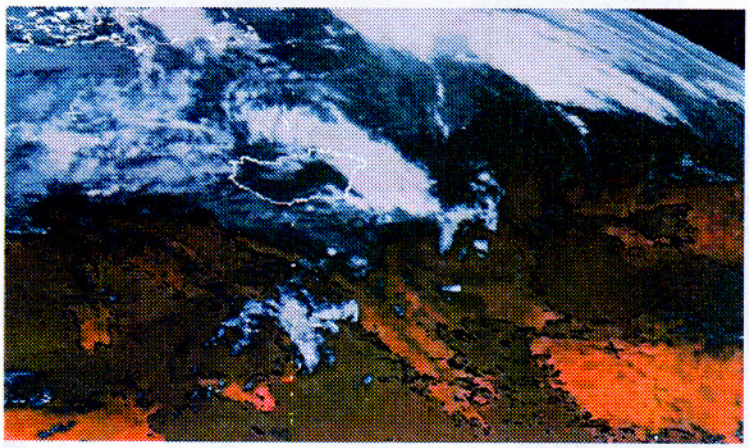


HUNGARY

HUNGARY

ECMWF member states computing representatives' meeting 18-19 May 2000

Gizella Duska, Meteorological Service of the Republic of HUNGARY



Introduction of Hungarian Meteorological Service (HMS)

- HMS was established 130 years ago.
- The Department for Weather Forecasting, Telecommunication and Information and Economical Department are in the headquarters of the city of Budapest. The Atmospheric Environmental Observation Department and the Satellite Research Laboratory are located in the suburbs of the city. The Storm Warning Observatory is in Siofok at Lake Balaton.
- HMS has 320 employees.
- HMS has been a co-operating state of ECMWF since 1994. Our forecasters could display the first GRIB data in spring of the following year.

Computer resources

- A Dual Message Switching Computer has run since 1993. It handles 64 lines (leased and switching lines, fax, X.25, ...) and stores 20,000 messages in the real time database.
- HP servers - D280, K250 (512-640 Mb memory, 10-12 Gbytes disc space) are responsible for operational tasks, pre-processing of radar, satellite, observation and forecast data reached by the workstations for display. HP K200 server is for the ORACLE 7.3.4 database with RAID5 disc array.
- HP workstations (3 B180, 2 C200, 4 J210 and 3 HP715) are used for the interactive displaying system for the forecasters and developers. Two HP B180 computers have dual display for the best view.
- DEC 600AU (512 MB Memory, 16 GB disc) and 2 SUNW SPARCstation-LX computers are available to users for development purpose.
- Silicon Graphics ORIGIN 2000 server was installed in January of 1999. It has 12 processors, 4 Gbytes memory and 63 Gbytes of disc space. This machine runs the operational ALADIN-HU Limited Area Model, post processing and research studies.
- All the machines above have UNIX system but we manage several LINUX, Netware and Windows NT based servers for special functions (e-mail, FTP, BBS, WEB,...)

Network

- The main computing and network environment at HMS is shown in figure 1.
- This January Hungary joined the new European meteorological telecommunication system (RMDCN), which replaced the earlier GTS system in Europe.
- The whole Local Area Network of HMS was renewed, the old Ethernet networks replaced by the CISCO active tools controlled 10/100 Mbps network. There is a 128 Kbps leased line to Storm Warning Observatory and a 2 Mbps line to the Main Observatory.
- HMS has INTERNET connection via a non-profit University Network.

HUNGARY

HUNGARY

- SADIS aviation meteorological messages are arriving continuously whole day.
- The Dimension_Vaisala SAFIR lightning detection network with 5 stations has been on duty over the country for 2 years.
- The modernisation of the radar network began last year. In November the Russian MLR-5 radar was replaced by an EEC DWSR-2500C type Doppler radar. A DEC computer collects data in every 15 minutes. Two other old radar are working at west and east part of Hungary.
- METEOSAT digital satellite pictures have been received since 1991. Our Service joined several EUMETNET programs and became a co-operating state of EUMETSAT last July. Now we could process METEOSAT pictures every half an hour. Images and sounding data of NOAA satellites are received from 1992.
- Lightning and radar data as well as pictures of the satellites are also sent to the central network. After processing on UNIX server's data can be displayed on any workplaces of the HMS.
- Our network is protected by a firewall implementation.

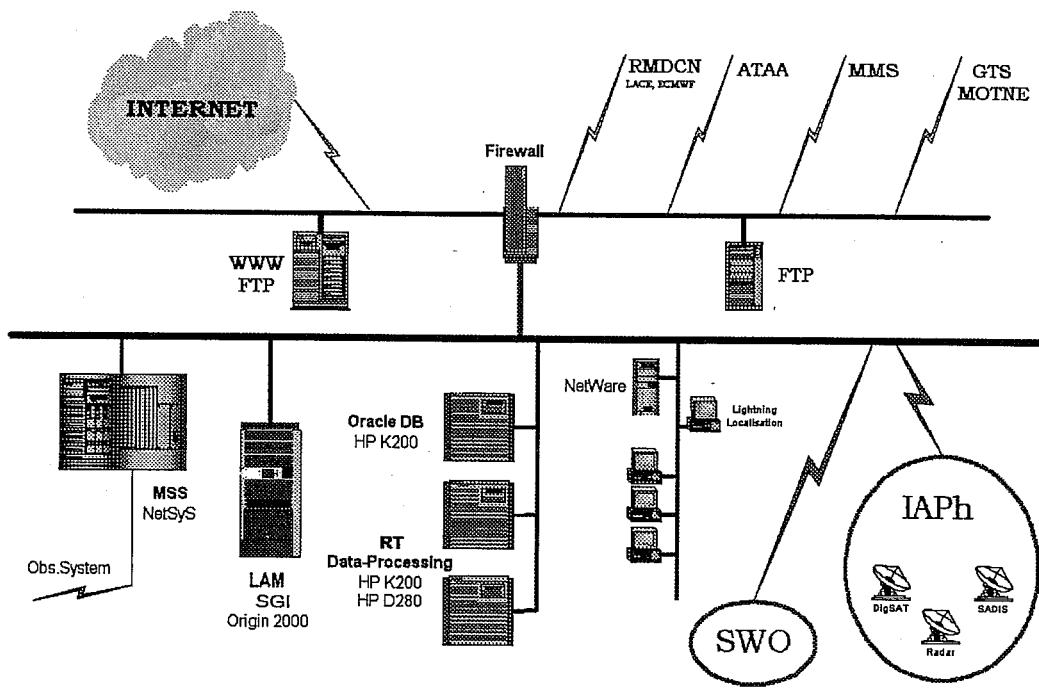
Connection to ECMWF

- ECMWF dissemination is received in GRIB code on a LINUX based ftp server.
- We are able to visit to the secured homepage of ECMWF and change our dissemination file.
- The MARS client software package was installed on the HP K250 server.
- Three users are authorised to access MARS data via this server for non-operational usage.

We have no projects run at ECMWF

Future plans

- Our future plan is to upgrade the ORACLE database system, make the cluster server with multiprocessors and AUTORAID disc capacity.
- We are going to complete our ORACLE database with international observation, ECMWF products, radar and satellite data.
- We planned to use ECMWF software (MAGICS, METVIEW) for the operational forecasting.



Hungarian Meteorological Service
Logical Network Diagram

ICELAND ICELAND

Meeting of Member State's Computing Representatives ECMWF 18-19 May 2000

Presentation by Sigurdur J. Kristinsson, Icelandic Meteorological Office

The Icelandic Meteorological Office is located in Reykjavik Iceland and is under the auspices of the Ministry of the Environment. The IMO incorporates five main departments: the geophysical department, the department of instruments and observations, the department of research and processing, the department of computers and IT, and the department of weather services. The director of the Icelandic Meteorological Office is Mr. Magnus Jonsson.

The computer and IT department is responsible for the management and maintenance of computer systems, data distribution, the central database, telecommunications and the website. Computing equipment includes PC's running Windows, Linux and Solaris. Digital Alpha's running Digital Unix, VAX's running Open VMS and SUN Sparc's running Solaris.

Our computer configuration is built on the client server model. Servers perform the tasks of data collection, processing and distribution while clients present the data to end users in a final form such as observations and forecasts or as information used in reports and graphical presentations.

Connection to the outside world is through a variety of telecommunications equipment. One of our most important connections is of course the RMDCN link. It is over this vital line that we receive from ECMWF the 00 and 12 UTC atmospheric model data, and wave model data. EPS data (only plume for Reykjavik used) is currently received via fax. In addition we receive HIRLAM data from DMI via ECMWF. This data is then used in our land and sea forecasts and aviation and maritime weather services. A valuable service is being provided by means of radio, television, newspapers, the WWW and GSM telephone to many individuals and companies.

Although we expect to increase our service offerings in the coming months we do not foresee a significant increase in data retrieval or a load increase on the RMDCN link. EPS data will most likely be added sometime next year.

Difficulties using ECMWF services are mainly related to limited access since we are a Co-operating Member State.

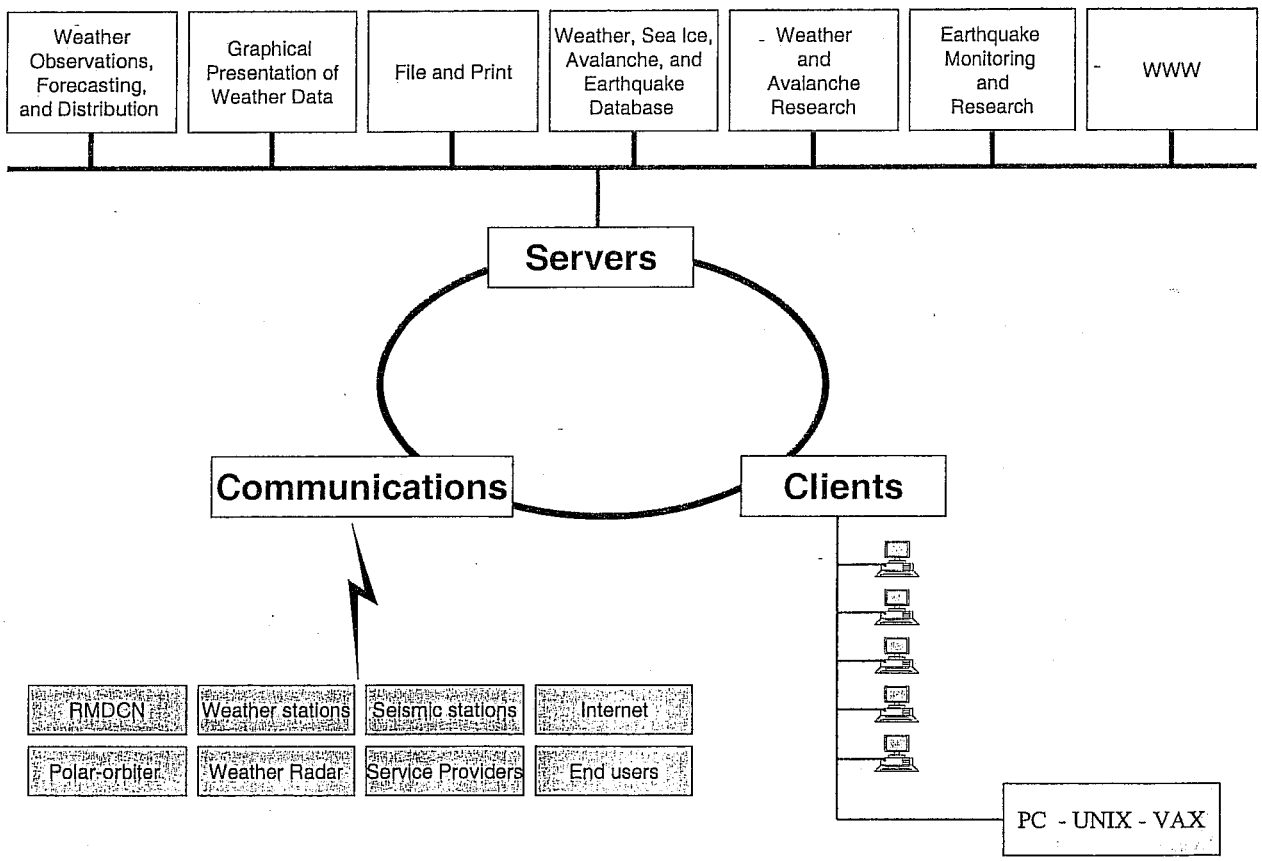


Fig.1: Computing environment at IMO

ICELAND ICELAND

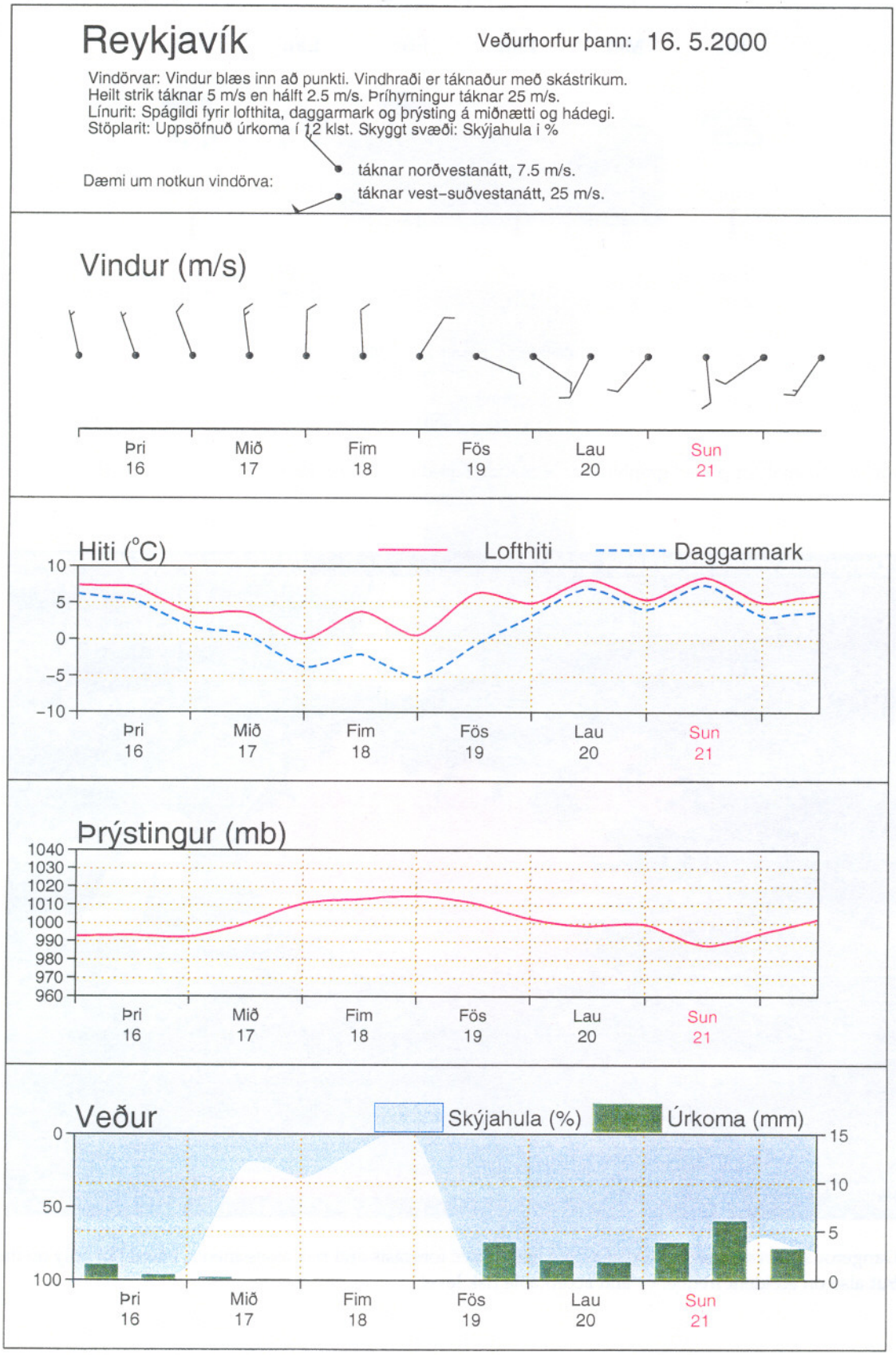


Fig.2: Kalman filtered Metview presentation based on 12 UTC data

ICELAND ICELAND

Fig.3: Kalman filtered simplified graphical presentation based on 12 UTC data

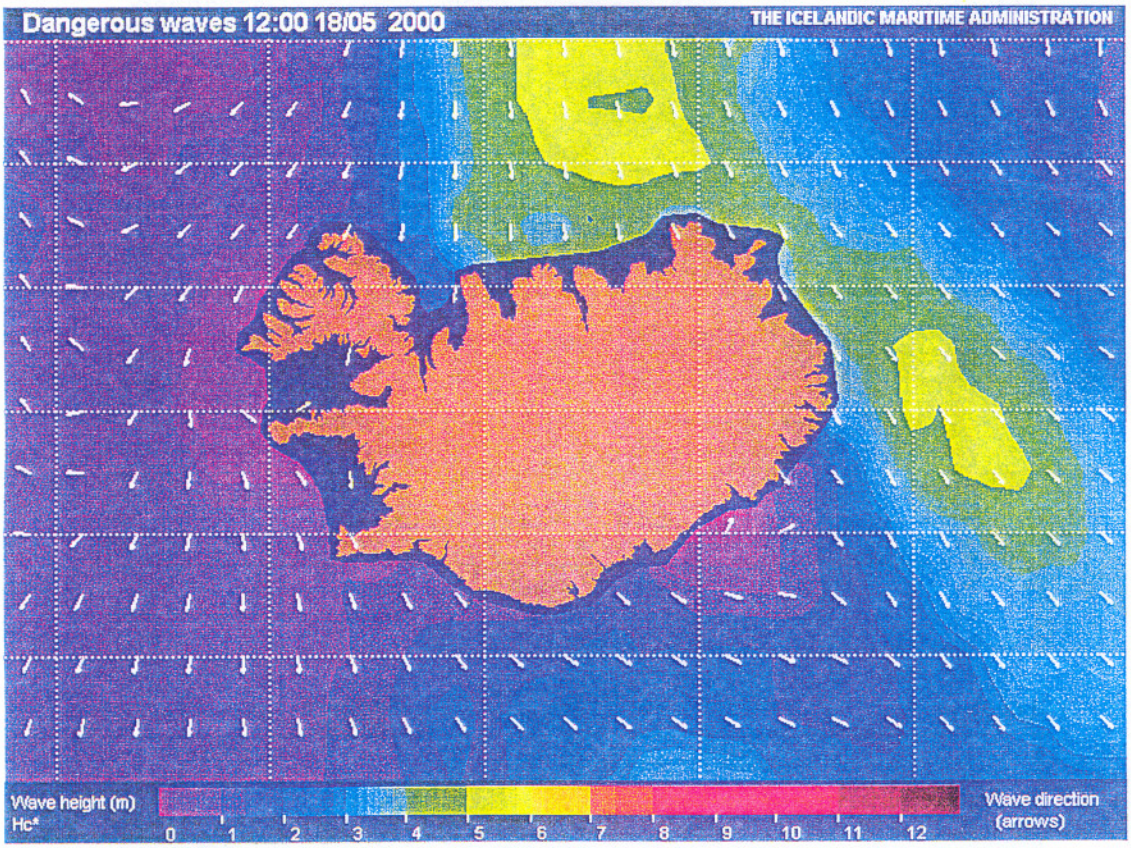


Fig 4. Dangerous waves presentation predicted from wave forecasts and risk assessments, based not only on the sea state but also on accident frequency and acceptable risk level.

Comment: Being a Co-operating State, Iceland has no access to trajectory data. These data would be very valuable to them.

IRELAND

IRELAND

Member States Computing Representatives' Meeting, May 18-19, 2000

Paul Halton, Met Éireann - the Irish Meteorological Service, Dublin

1. Computer Applications Equipment at Met Éireann

The main computing environment at Met Éireann is shown on Figure 1. The Year-2000 project resulted in the upgrading of some systems, and the replacement of others. The Linux Operating System is now used extensively, particularly for the development of new in-house applications.

NWP and Graphics Servers

- The HIRLAM and WAM applications are run 4 times daily on an SGI Challenge L server. Configuration: 6 x MIPS R10000 processors (194 MHz each), 512MB Memory, IRIX V6.5, and 21.9GB disk capacity.
- Two SGI Origin 200 servers decode and process GRIB bulletins received from the GTS and ECMWF. Configuration: 1 x MIPS R10000 processor (180 MHz each), 128MB Memory, IRIX 6.5, and 12.7GB disk capacity each.

  These servers function as graphics file servers for X-based graphical display systems. X-clients, using XCHARTS, can access and display NWP products from HIRLAM, UKMO, DWD and ECMWF. These two servers also support the following:

  - Plotting applications;
  - ADE database - Synops, Temps, Pilots, Ships and other GTS data up to 24 hours old.
  - DNS services and file and print services for UNIX systems.
- A SGI O2 is used as a FAX server to store and forward Analysis, Forecast and WAFS charts. Selections of aviation weather charts are automatically faxed to aviation weather offices. This server also supports an IT Documentation INTRANET.

CLIMATOLOGY and INTRANET SERVERS

- Sun Ultra 170 running Solaris (2.5); Ultrasparc 170 MHz processor; 18.5 Gbytes storage. Runs Openingres RDBMS from Computer Associates (CA). This is the database server. It processes Incoming climate data and automated e-mail and fax messages to customers.
- Sun Enterprise 250 Server running Solaris (2.6); Ultrasparc 300 MHz processor; 13 GB storage. Runs Openingres RDBMS from Computer Associates. This is an applications server. It handles incoming climate data processing and automated outgoing data transmissions. It also hosts user logins, mostly supporting X-windows displays on PCs. The Climate INTRANET web site is also supported by this server.
- Digital Decsystem 5000 running Ultrix (4.2); Mips R2000 25 MHz processor; 6 GB disk. Runs Openingres RDBMS from CA. Used as a backup for the INTRANET server.
- Internet browser enabled PCs and workstations, accessing the INTRANET site, can extract and view climatological, radar, satellite, and synoptic data through an easy to use Graphical User Interface.

Internet Firewall

- A permanent Internet 128kbit link to a local ISP, Eircom.net, is protected by a Gauntlet Firewall running on a Windows NT server.

Weather Radar Systems

- The EWIS (Ericsson) Radar data from Dublin Airport is received over a 2Mbps Microwave link and stored on a VaxStation-3300 linked to a MicroVax-3100 through a Local Area VAX Cluster. Runs VMS V5.5-2 and Multinet 4.1.
- The RAINBOW (Gematronik) Radar data from Shannon Airport is received and distributed on a network consisting of 5 x DEC AlphaStation 200 4/100, running Compaq Tru64 UNIX V4.0E. Two servers (Shannon & HQ) have 128MB RAM and 10GB disk capacity each. Three clients have 64MB RAM and 6GB of disk capacity each. RainBow V3.3 is installed. High Resolution 1km x 1km Irish Radar Composites are generated and sent to the TV graphics presentation systems. 5km x 5km data are sent to UKMO, via the GTS (RMDCN), in BUFR-94 format, for inclusion in the UKMO RadarNet composites.

- UKMO RadarNet Composites are received and stored on a dedicated WRADS PC running SCO Zenix. A MacRadar application, supplied by Litton WSI, distributes the data to 12 MS-DOS based microRadar clients. The WRADS system was upgraded for RMDCN by WSI.
- Radar images are downloaded to the INTRANET site. A selection of the radar data is permanently archived in, and can be retrieved from, the Climatological database.

Communications Computers

- Two Vax-4200 computers clustered with a Vax-3100 handle the real time communications including reception and pre-processing of data from the GTS, ECMWF, AFTN, IAA and Irish observing stations. Operating system is VMS V 5.5-2 with Y2K patches. Multinet V4.1, with Y2K patches, provides TCP/IP connectivity to/from other nodes on the LAN/WAN.
- The Vax-3100 remains a cluster member but has no further use after the Year-2000 project.

RMDCN Servers

- 2 x PC's running Red Hat Linux are used to handle the processing of incoming RMDCN data, originating on the GTS. On reception the files are split up, named and transferred to the existing back-end servers locally. The RMDCN servers will also handle the processing of outgoing data by compiling large files and sending them to Bracknell using ftp.
- The routine NWP data disseminated from ECMWF is routed to the VAX-4200 servers.

Data Collection Systems (DCS)

- 2 x Linux Servers support the DCS system for the collection of weather reports from Automatic Weather Stations. The DCS has been extended to collect reports from manual synoptic stations using a new OBS application. All reports collected by the DCS are sent to the Communications Computers for bulletin distribution.
- The Linux-based PC application OBS, was written in-house and is installed at each of the manual synoptic stations, replacing the TELEX systems. The OBS system applies local quality control to all Synoptic reports before they are sent by dial-up to the DCS at HQ.

Road Ice Prediction System (RIPS)

- A Linux Server supports the RIPS system which collects reports from 50 Road Side Automatic Weather Stations. 2 x Windows 98 client PCs are used to view the observation data and to input NWP forecast data which is transferred to the National Roads Authority.

Office Systems

- Two Windows NT Servers provide office services, including e-mail, file and print facilities.
- MS Exchange on the Windows NT servers supports MS-Outlook on user PC's.
- An SMTP Gateway Server on BSD UNIX supports Internet mail and DNS services.
- Dr. Solomon's Anti-Virus guard is centrally managed and regular updates are distributed to all networked PC's.

PDUS System

- Satellite data from METEOSAT and GOES are received, stored and processed on a DecAlpha Station 255, with OpenVMS v6.2H with Y2K patches. VCS, Germany, supplies the PDUS software. Special images are produced for the SATREP project, TV Graphics Systems, and INTRANET.

Graphics Output Devices

5 x HP A0 Pen plotters; 1 x HP DesignJet 750CM A1 plotter, 8 x HP A4 laser printers; 1 x Tektronix Colour A4 LaserJet printer.

TV Graphics Systems

- 5 x SGI O2 workstations, running IRIX v6.5, 512MB RAM are installed- one at TV3, two at RTÉ and two at HQ. All systems run Metacast Ultra from Metaphor AB, Norway. At HQ two O2 workstations are used for TV forecast

preparation. At the TV stations, the O2's are set up as clients. Each client gets its non-NWP data from the servers in HQ. The NWP data is pushed to each TV client that requires it, as soon as it is ready on the Graphics Servers.

- IT Operations use special status displays to monitor data availability on TV systems.

Networks

- 2 x Cisco Catalyst 2100 Ethernet Switches and AT Hubs manage the Ethernet.
- The Ethernet connects all computers, workstations, PC's and network devices. The network is Switched Ethernet with 10Mbps to each computer with UTP connections.
- Extensive use is made of NFS for moving files from one server to another on the LAN. FTP is used for automated file transfers. FTP and RCP are used for interactive file transfers.

2. Connection to ECMWF

- The connection to ECMWF is through the new RMDCN service. Data is exchanged over the link using TCP/IP protocol. The old X.25 link will be disconnected after 15 June 2000.
- The status of critical nodes on the LAN /WAN, including the EQUANT supplied router on the ECMWF link, is monitored by a special SNMPc display as shown in Figure 2.
- ISDN backup links are monitored using an ISDNwatch utility.
- The timely reception of routine products from ECMWF is monitored by IT Operations.

3. Projects Currently Running at ECMWF

The computer facilities at ECMWF are mainly used as follows:

- Data retrieval from the MARS archive
- Experimental runs of the HIRLAM model
- Trajectory model
- Running Metview in batch mode
- The FASTEX project (Specially funded Research project)

4. ECMWF Training Courses

Met Éireann regularly sends participants to the training courses run at ECMWF.

5. Future Plans

Met Éireann has linked up to the new RMDCN facility run by ECMWF. An in-house project, to receive, identify, monitor, trace and distribute GTS data to the existing in-house applications, will be completed by mid June and the old X.25 links to ECMWF and UKMO will be terminated.

The following projects will be undertaken during 2000:

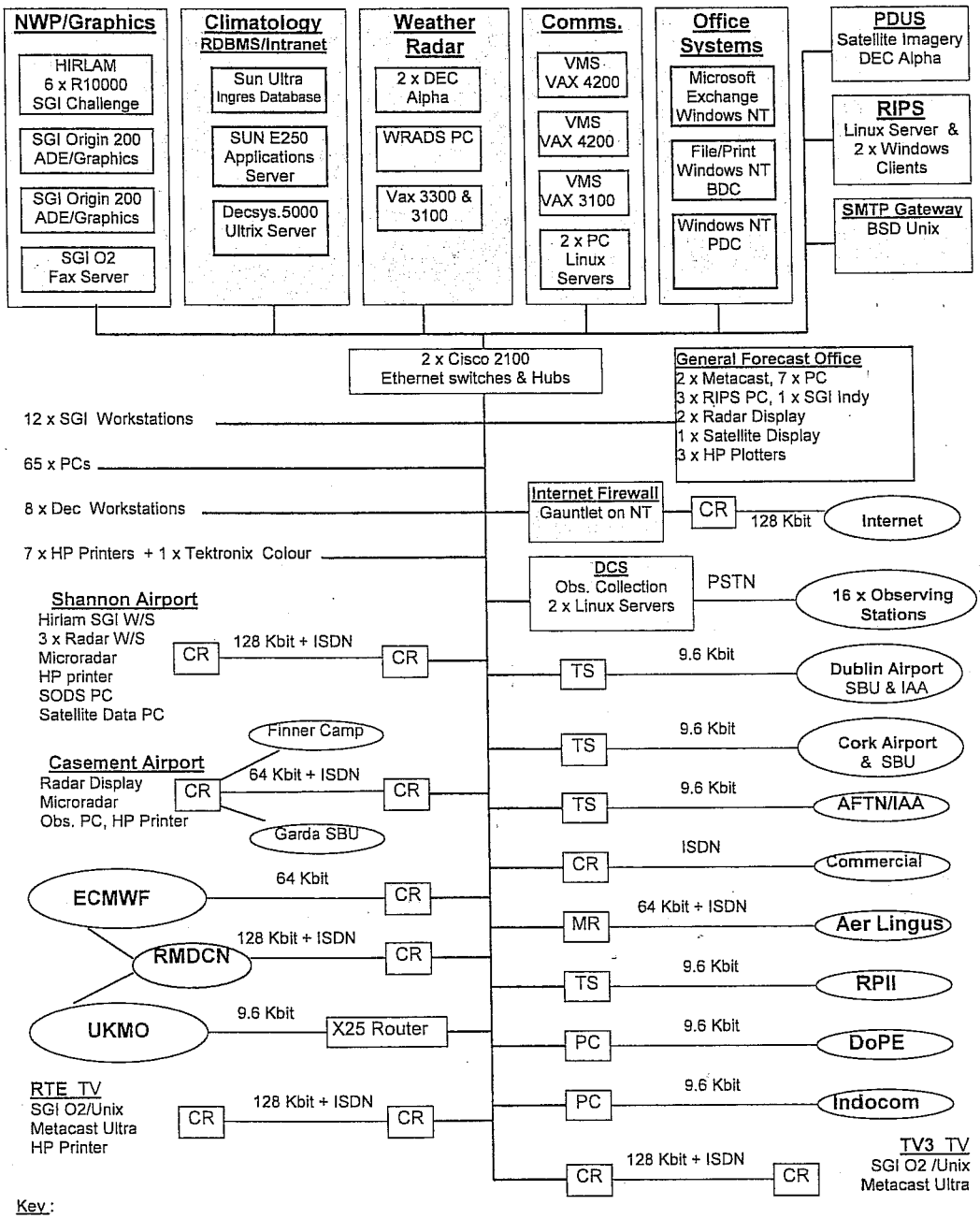
- Operational introduction of a Very-Short-Range version of HIRLAM, run on a dual-processor, high spec Linux-based PC. The VSR model will be run hourly at HH+45.
- Phase-1 of new Met Éireann WEB site, including and FTP server, in 2000.
  (Phase-2, with e-commerce will be set up in 2001).
- The HP Pen plotters will be replaced with networked InkJet plotters during summer 2000.
- Switched Ethernet improvements to provide Fast Ethernet, 100Mbps, on the LAN at HQ.
- Extension of the LAN/WAN links to include Dublin and Cork Airports.
- Installation of a new Airport Information Board facility for aviation users at Irish airports.
- Replacement of the existing HIRLAM server, the SGI Power Challenge L.

IRELAND

IRELAND

Met Éireann

I.T. Infrastructure at Glasnevin H.Q. and remote sites



Key :

——— Telecommunications Circuit

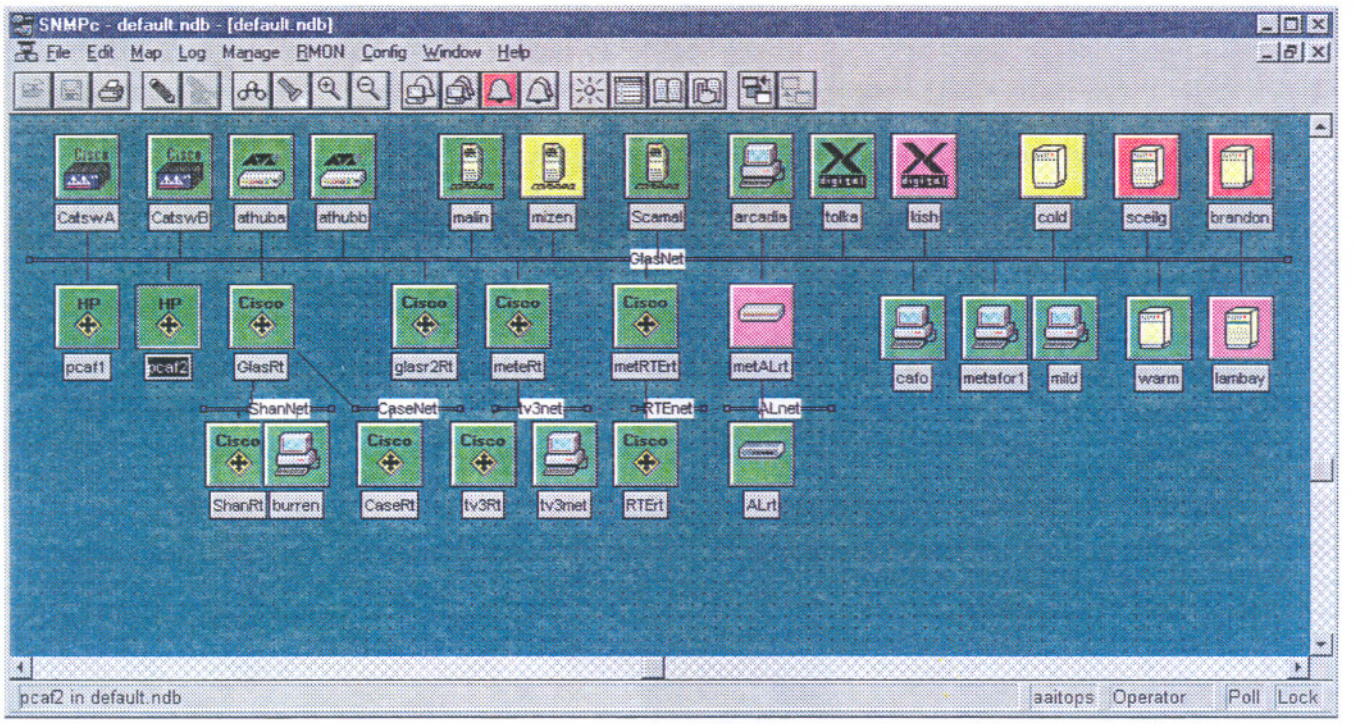
——— Ethernet LAN

AFTN : Aeronautical Fixed Telecom Net
BDC,PDC: Backup,Primary Domain Controller
CR : Cisco router
DCS : Data Collector System
DoPE : Dept. of Public Enterprise
ECMWF : European Centre for Medium Range Weather Forecasts
IAA : Irish Aviation Authority
ISDN : Digital Telephone Network
MR : Motorola Router
NWP : Numerical Weather Prediction
PDUS : Primary Data User Station
PSTN : Public Telephone Network
RIPS : Road Ice Prediction System
RMDCN : Regional Met. Data Comms Network
RPII : Radiological Protection Inst.
SBU : Pilot Self Briefing Unit
SODS : Shannon Opmet Distribution
TS : Terminal Server
UKMO : UK Met Office

lanmet.doc 22 Feb. 2000 wd

Figure 1.

IRELAND IRELAND



NETHERLANDS NETHERLANDS

May 18, 2000 The Netherlands and ECMWF

KNMI's Computer Infrastructure and ECMWF

KNMI is the Dutch national data and knowledge centre for weather, climate and seismology. It performs scientific research, maintains the extensive infrastructure for observations and information processing and provides data and services, general weather information and severe weather warnings.

In 1999 all market related ('commercial') activities have been transferred to a newly established company HWS. Since then the only products which go directly to the public are the severe weather warnings and weather reports and forecasts on the Internet.

KNMI operates from a main office in De Bilt (the new and renewed buildings were officially opened this week by HM Queen Beatrix) and branch offices at Schiphol Airport (aviation) and Hoek van Holland (maritime meteorology). Furthermore, there are meteorologists at other airports and at the Hydro-Meteo Centre in Middelburg (SW of the Netherlands).

1 Infrastructure

Figure 1 shows KNMI's current computer infrastructure.

The heart of the network are two 100 Mbit/s FDDI rings, one which connects the general servers in the computer centre and one which connects the 10 Mbit/s Ethernet LAN network segments in the different user buildings. The WAN connects to the branch offices. Connections to the Internet (2 Mbit/s) and other telecommunication services are separated from the LAN by a firewall. KNMI's external webserver (www.knmi.nl) is located outside this firewall.

Computer facilities in the LAN are:

- A 2 CPU SGI Origin 2000 (backup 2 CPU Origin 200) server for the mass storage system.
- A 16 CPU SGI Power Challenge for Climate research.
- A 16 CPU SGI Origin 2000 for operational HIRLAM and applied research.
- A cluster of 3 DEC-Alpha workstations for operational applications.
- Many (≈ 20) DEC-Alpha meteorological workstations.
- Several (~ 5) DEC-Alpha workstations for development of operational applications.
- Many (≈ 100) SGI Indy/O2 personal workstations.
- A Sun workstation server with general software for e.g. the SGIs and DEC-Alphas.
- Many (≈ 500) Windows-95 PCs.
- A few (~ 20) Linux PCs.
- 5 SGI Origin 200 Webservers.
- A WNT exchange server which handles all email.
- A WNT Windows Terminal Server to give access to WNT applications in a UNIX environment.
- A VMS cluster (2) for message switching.

Developments in 1999

- The whole infrastructure was checked and adapted for millennium compliance.
- The mass storage system was completely renewed. The StorageTek silo with a (fully exploited) capacity of 2.5TB was upgraded with state-of-the-art technology (StorageTek PowderHorn 9310) with an initial capacity of 10TB and a maximum capacity of 120TB (adding more tapes). The Convex C210 server with Fileserv software was replaced by a SGI Origin 2000 (and a backup Origin 200) which runs SGI's DMF software.
- All email handled through a Microsoft Exchange Server

Developments in 2000

- In February the leased line to ECMWF was replaced by a 96 kbit/s connection through the RMDCN (Regional Meteorological Data Communications Network).

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- Since April the GTS connection with Bracknell runs through a 24 kbit/s RMDCN connection.
- An ITT for a new generation of personal workstations.
- An ITT to upgrade the HIRLAM machine is in preparation (aiming at 20 times more capacity).

2 ECMWF use

Operations

For its weather forecasts, KNMI uses various ECMWF products. To give an impression:

- The deterministic model for medium range (up to day 5) forecasts.
- The Ensemble Prediction System for forecasts up to 9 days ahead (also available on the Internet).
- Trajectory computations.
- Boundaries from the deterministic model for HIRLAM.

Users

On April 20, 2000, there were 86 Dutch users with an account on ecgate1. Of these 43 had logged in to ecgate1 in the previous 10 days; 24 had logged in earlier in 2000; 12 had last logged in in 1999 and 6 in 1998. One new user had never logged in yet.

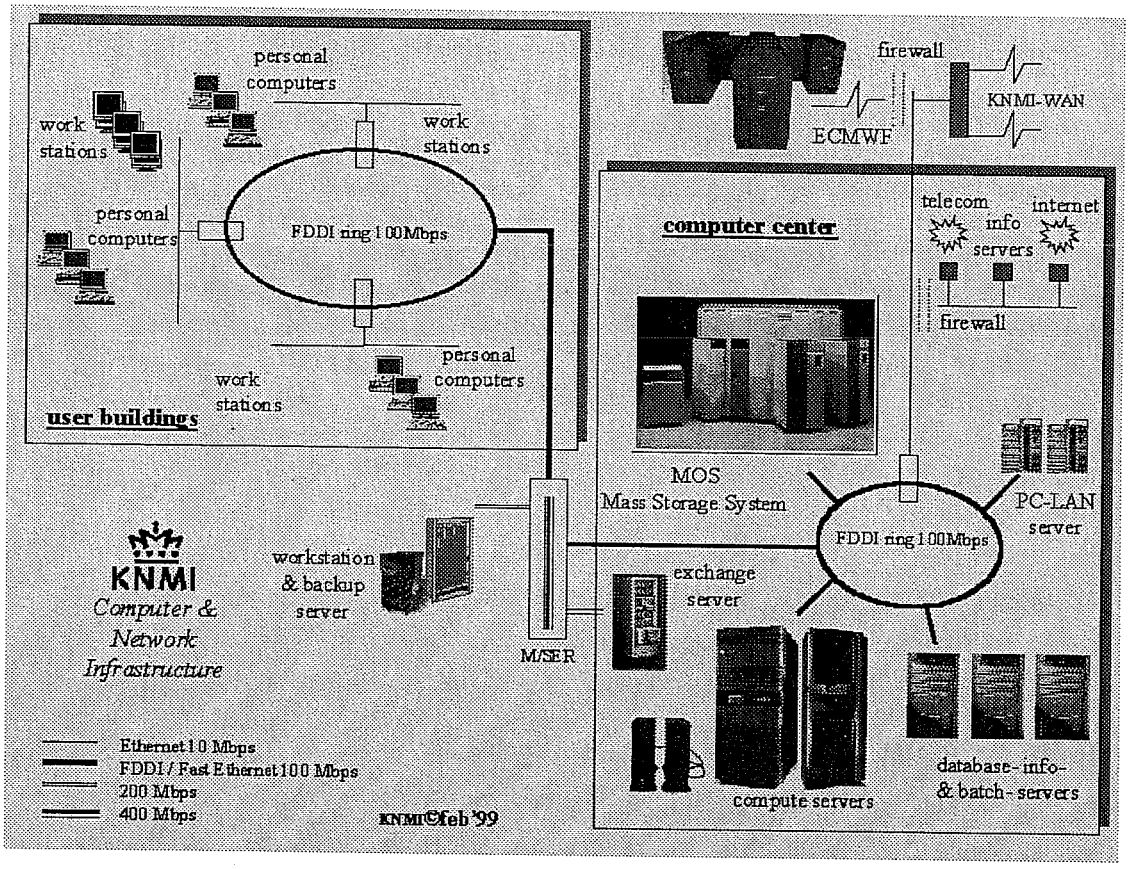

Fig 1: KNMI's computer Infrastructure

Eleven users are from outside KNMI: 7 from Utrecht University, 3 from Wageningen University and 1 from the Netherlands Energy Research Foundation ECN.

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Projects

Table 1 lists the Dutch projects for access to the Fujitsu services with their total use of resources in 1999. Of the allocated 142 kSBU, 77 kSBU (54%) have been used. Special projects used another 30 kSBU (42%) of the allocated 72 kSBU.

The Fujitsu was used by 27 users in one of the regular projects. One of them used 39 kSBU; another 14 kSBU. Furthermore, 20 users have access to at least one of the special projects.

For 2000 the total allocation for regular projects is 348 kSBU. Until April 26 15.9 kSBU had been used. If one extrapolates this, the total usage for the whole year amounts to 14%. But experience learns that usually some projects use large amounts of SBU's in relatively short periods, unevenly spaced over the year.

3 Experience and suggestions

The help of User Support, especially John Greenaway, is very much appreciated. Any questions are always answered promptly and adequately.

The use of the Fujitsu is sometimes hampered by the inconvenient ways to get the large amounts of data which are produced to KNMI for further processing, inspection and interpretation. Using eccopy over the RMDCN line is slow and interferes with interactive use of other users. Using ftp over the Internet is much faster, but requires manual logging in and supplying of two passcodes. The ideal way would be an automatic ftp over the Internet to a machine inside the KNMI LAN. Are there ways to pass the two firewalls in a secure way?

Is it really necessary to supply a passcode twice when logging in through the Internet, once to the gateway and once to ecgate1? It is especially annoying that when a wrong passcode is supplied with ftp to ecgate1, the whole procedure has to be repeated all over again, including the waiting for passcode changes on the SecurID.

Much of the information available on the shielded part of ECMWF's Web server is relevant for more KNMI employees than only those who have an account at the Centre. A few people already have accounts only for access to these Web pages, since last year only used to get a certificate. Are there possibilities to provide the Member States with something like 'generic' certificates, to be supplied by the MSCR e.g. for those who do not need access to ecgate1 (if only to prevent that these people who want to renew their certificate after one year typically can not remember where they put their SecurID, forgot their pincode and maybe even cannot find their usercode anymore)?

People found that access to ERS scatterometer data at the Centre is not allowed, even for ESA Member States. The reason would be that it is not desirable to have different classes of ECMWF Member States (i.e. Member States that are also Member States of ESA and those that are not).

There is a possibility to run a MARS client locally at a Member State computer, avoiding the need of logging in to ecgate1. Probably that would mean that the data are sent over the RMDCN line? Would users still need an account at ECMWF to use a local MARS client? Are there possibilities to transfer the data over the Internet following a request from a local MARS client?

4 Outlook

The HIRLAM group is planning semi-operational runs on ECMWF.

Plans exits to use the ECHAM climate model on the VPP700.

The new developments to run the ECMWF model from a Member State are very useful and might intensify cooperation between scientists and ECMWF.

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Operations		Used [kSBU]	Alloc [kSBU]
Nlcwdtra	Trajectory computations for local emergencies	0.2	
Climate research			
Nlglomac	Atmospheric Composition	1.4	
nlhirkli	Climate research with HIRLAM	0.2	
nloocean	Oceanography	7.1	
nldmwgac	Other climate research	39.4	
Applied research			
nldmlam	HIRLAM maintenance	14.3	
nlsatnwp	Satellite data research	14.1	
nlwmcalc	Other applied research	0.3	
Total		77.0	142.0
Special Projects*			
spnlagul	Limited area ocean model of the Agulhas Retroflection	1.7	15.0
spnlctmk	Chemistry and transport studies	1.8	3.0
spnl_ux	Validation of reanalyzed A/S _uxes	17.1	20.0
spnlles	Large Eddy simulations BL clouds	0.7	10.0
spnlmix	OGCM mixed-layer modules and assimilation	2.5	15.0
spnlozas	Assimilation of GOME and SCIAMACHY chemical species	0.02	1.7
spnlprob	Short-term regional probabilistic fc using IFS	5.4	5.0
spnlsiep	Stratosphere - troposphere exchange	1.2	2.0
Total		30.3	71.7

Table 1: Netherlands' projects in 1999 *Taken from the 4-week accounting report from Dec 6, 1999

H. de Vries commented that for the large data volumes now produced from running models at ECMWF, RMDCN was too slow and Internet, with the requirement for double login, too cumbersome. They would like an automated means of transferring data to their site.

ECMWF: eccopy utilities can be used to transfer output automatically via the Internet and should be capable of passing through the KNMI firewall.

Is it really necessary to provide the passcode twice for Internet login?

ECMWF: A change to this procedure is on the Centre's plan of work but other priorities have, so far, had to take precedence. It will, however, be done.

The Member States' web server contains a great deal of useful information for a wide range of users. Could there be some way of granting access to users other than by registering them as full computer users with SecurID cards, etc.?

ECMWF agreed that the current system was not ideal and undertook to investigate alternative solutions.

Hirlam project staff at KNMI are keen to have access to ERS scatterometer data and H. de Vries asked whether these data could be made available by ECMWF to ECMWF Member States who were also ESA members.

ECMWF replied that there were political issues to be resolved, which were already being discussed at management levels.

KNMI would like to install a local MARS client and transfer the data resulting from MARS requests over the Internet.

ECMWF replied that such facilities were planned and were in line with policy, which is to make access via RMDCN and Internet as similar as possible.

NORWAY NORWAY

The Computing Environment at DNMI May 2000

Rebecca Rudsar, DNMI, Oslo, Norway

Computer Resources

The software (NORCOM) which manages the communication for data acquisition and routing of observations has functioned successfully since it was installed in March 1999. The GTS communication with SMHI (Swedish Met. Inst.) and UK Met. Office is now via RMDCN.

Observation data is transferred to the SGI Origin 2000 for decoding. The decoding programs for SYNOP, TEMP, PILOT, AMDAR and DRIBU, originally obtained from ECMWF, have been modified to handle the decoding of National Groups. A decoding program for METAR has been written based on the same structure. The decoded observations are stored in an internal DNMI format.

VAX4000-200 is used for running the Nordic Radar system, NORDRAD, which is a communication system for the distribution and collection of radar data between Nordic countries.

VAX3300 is connected to a radar unit (Hagahogget) covering Southeast Norway and is used for communication to the previously mentioned VAX4000-200.

New radar was installed in November 1999 at Hægebostad in the very south of Norway. It has been operational since the end of April 2000. The system consists of two Sun Ultrasparc 10 computers with the software Rainbow. These are used for acquisition, product generation and monitoring and for display.

Processing of data from NOAA satellites is done by the MEOS system (Multi Mission Earth Observation System). A new version of MEOS was installed in September 1999. A new tracking system is installed on a PC and the processing is run on an SGI O2. The MAPP (MEOS Advanced Product Presentation Facility) is installed on five SGI workstations.

Alpha-200 is used for processing the data obtained from the geostationary satellite Meteosat. The data consists of satellite pictures, DCP (Data Collection Platform) data and MDD (Meteorological Data Distribution) data.

Oracle software is used for the Climate database and a Verification database. A new tape station was installed in the StorageTek tape robot winter 1999. In addition to being used for archiving observations and model results for DNMI it is also used by the project Reg. Clim. (Regional Climate Development under Global Warming). This is a Norwegian project sponsored by the Norwegian Research Council.

The SGI Origin 200 receives the disseminated data from ECMWF and transfers it to the operational suite. The telecommunication link to ECMWF has been via RMDCN since November 1999.

DNMI is connected to the University network, Uninett, via a 10 Mbps connection for Internet and a 100 Mbps connection for access to the supercomputer in Trondheim. Supernet (ATM) is a part of Uninett and at present the transmission rate between the University of Oslo and the University of Trondheim (NTNU) is 123Mbps. The Supercomputing Project at NTNU operates and supports High Performance Computing equipment for use by Norwegian universities and the Norwegian Meteorological Institute. At present there are two computers a Cray T3E and a Cray J916/8128.

Cray T3E

Processors:	96 DEC Alpha EV5 RISC processors.
Main Memory:	128 x 92 Mbytes, 4 x 256 Mbytes / 12.5 Gbytes total.
Disk:	237 Gbytes.
Architecture:	Distributed Memory MIMD.
Peak Performance:	600 Mflops per processor / 57.6 Gflops total.
Operating System:	UNICOS/mk (Cray MPP UNIX).

The Cray J90 is being phased out and tenders for a new supercomputer are being evaluated at the present time.

The Norwegian version of the HIRLAM 50km model has been the Operational Numerical Weather Prediction model since June 1995. NWP versions of the HIRLAM 50km model (version 2.6) with a nested 10 km model are run on the Cray T3E. An upgrade to a newer version of the HIRLAM reference is continuously under consideration, and is expected later this year. The Maritime Prediction models for ocean waves and storm surge are also run on the Cray T3E as part of the operational suite.

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The computers running the operational suite were upgraded to SGI Origin 2000 and Origin 200 in 1999. All pre- and post-processing is at present performed on the SGI Origin 2000. The Supervisor Monitor Scheduler (SMS) and the X Command and Display program (XCDP), developed at ECMWF, are used to control and monitor the operational suite. The RAID disk system is connected to the Origin 2000 and to the Origin 200 computers. 32 Gbytes containing the file system for the operational suite and data is mounted on Origin 2000. In the case of machine failure the High Availability Software ensures that the RAID disk system is switched over to the Origin 200 and SMS continues from checkpoint state. The telecommunication links to the forecasting centres at Bergen and Tromsø are 384 and 256 Kbps respectively. Operational products are distributed to two fileservers at each centre using the TCP/IP protocol. ISDN links (128 Kbps) are used as backup.

The satellite distribution system (Infosat), the automatic fax distribution system (Autofax), the system for processing data from automatic observing stations and the customer database for the distribution of products via a WEB interface are run on the IBM RS6000 computers.

The distribution of products via satellite, Infosat, started in spring 1997. The data is sent from the Institute to the Earth station at Nittedal (a distance of approx. 25 km). The transfer speed was increased to 38.4 Kbps in March 2000. Data is distributed via Intelsat 707 to the two forecasting centres, eleven airports and several customers (approx. 50).

The Autofax system distributes approximately 250 products per day via facsimile.

The project "Distribution of products to customers via a Web site" (Værbutikken) is now operational and there are many types of customers who access the web pages every day. The largest customers are oil-related companies. These companies have their own network called SOIL (Secure Oil Information Link) and this network is connected directly to 'Værbutikken'. Further work is being done to improve presentation and it is hoped that an English version will be available by the end of the year.

ECMWF Products

Disseminated data from the operational forecast model, the global wave model and the Ensemble Prediction System are received from ECMWF. This data amounts to approx. 62 Mbytes per day.

12Z-Based-products:	34.0 Mbytes
00Z-Based-products:	23.0 Mbytes
EF-T159:	1.5 Mbytes
WAVE-Models:	3.0 Mbytes

Dissemination data received from ECMWF is converted from GRIB format and placed in our present fields database. The data is then accessible by the graphics package which has been developed at DNMI.

The data is also used

1. for general forecasting by the forecasting department.
2. as boundary values for the Norwegian limited area models.
3. as backup for the Norwegian limited area models.
4. as input to the maritime and air pollution models.
5. as input to a ship routing program for the Pacific.
6. the Norwegian Institute for Air Research still receives ECMWF data on a regular basis. The data is utilised in the European Arctic Stratospheric Ozone Experiment.
7. by a commercial weather forecasting company.

Data retrieval from MARS is used for research projects.

Projects at ECMWF

The following are registered as Special Projects in 1999/2000:

- Parametrization of clouds in general circulation models.
- Ozone as a climate gas.
- Targeted ensembles providing boundary values for limited area models.
- The HIRLAM Project.

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Norway is a member of the HIRLAM project. The reference version of the HIRLAM system is implemented on the ECMWF computers. A MPP version of parts of the reference HIRLAM system has recently been implemented. A parallel version of the assimilation system is postponed until the 3D-Var code is operational.

Experiments include:

- The generation of climatological fields.
- Testing of different physical parametrization of precipitation schemes in HIRLAM.

Computers:

- 2 x IBM RS6000 (Communication)
  - disk system: Serial Storage Architecture (SSA) 21 Gbytes
- SGI Origin 2000 (File server/Tape archive/Databases)
  - 2 x 180 MHz R10000 CPUs
  - memory 512 Mbytes
  - disk storage capacity 3 x 34 Gbytes Raid
- SGI Origin 200 (Databases/File server)
  - 2 x 225 MHz R10000 CPUs
  - memory 768 Mbytes
  - disk storage capacity 2 x 34 Gbytes Raid
- StorageTek 9710 (Tape Robot)
  - 3DLT 7000 drives - 588 cassettes
  - Storage Capacity 35 Gbytes per cassette (max, capacity 20 Tbytes)
- SGI Origin 2000 (Operational suite)
  - 4 (R 12000) CPUs
  - memory 2048 Mbytes
  - disk storage capacity 14 Gbytes
- SGI Origin 200 (Mail Server/Backup for Operational suite)
  - 2 (R10000) CPU's memory 768 Mbytes
  - disk storage capacity 26 Gbytes
- Raid disk system for operational suite
  - 32 Gbytes
- SGI 02 (NOAA)
  - 1 (R10000) CPUs
  - memory 320 Mbytes
  - disk storage capacity 8 Gbytes
- VAX3300 (Radar)
  - memory 20 Mbytes
  - disk storage capacity 570 Mbytes
- VAX-station 3 100 (Radar Display Unit)
  - memory 24 Mbytes
  - disk storage capacity 330 Mbytes
- Sun UltraSparc 10 x 2 (Radar Control/Display)
  - memory 128 Mbytes
  - disk storage capacity 9 Gbytes

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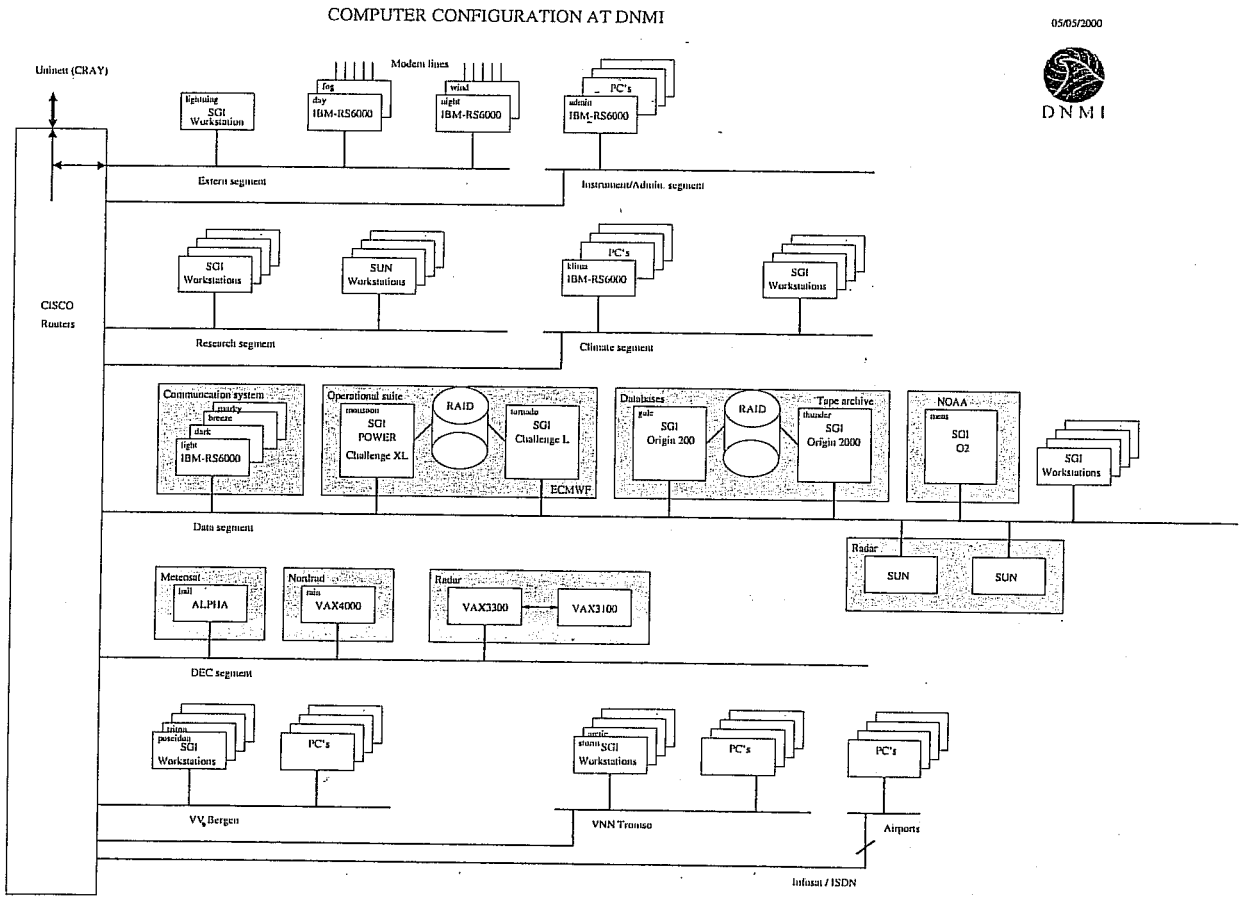
- VAX4000-200 (Nordrad)
  - memory 32 Mbytes
  - disk storage capacity 1.9 Gbytes
- Alpha-200 (Meteosat)
  - memory 64 Mbytes
  - disk storage capacity 2.1 Gbytes
- Workstations x 140
  - SGI O2 and Indys, IBM RS6000
- PCs with Linux OS x 8
- Terminals / PCs
  - approx. 330

Networks:

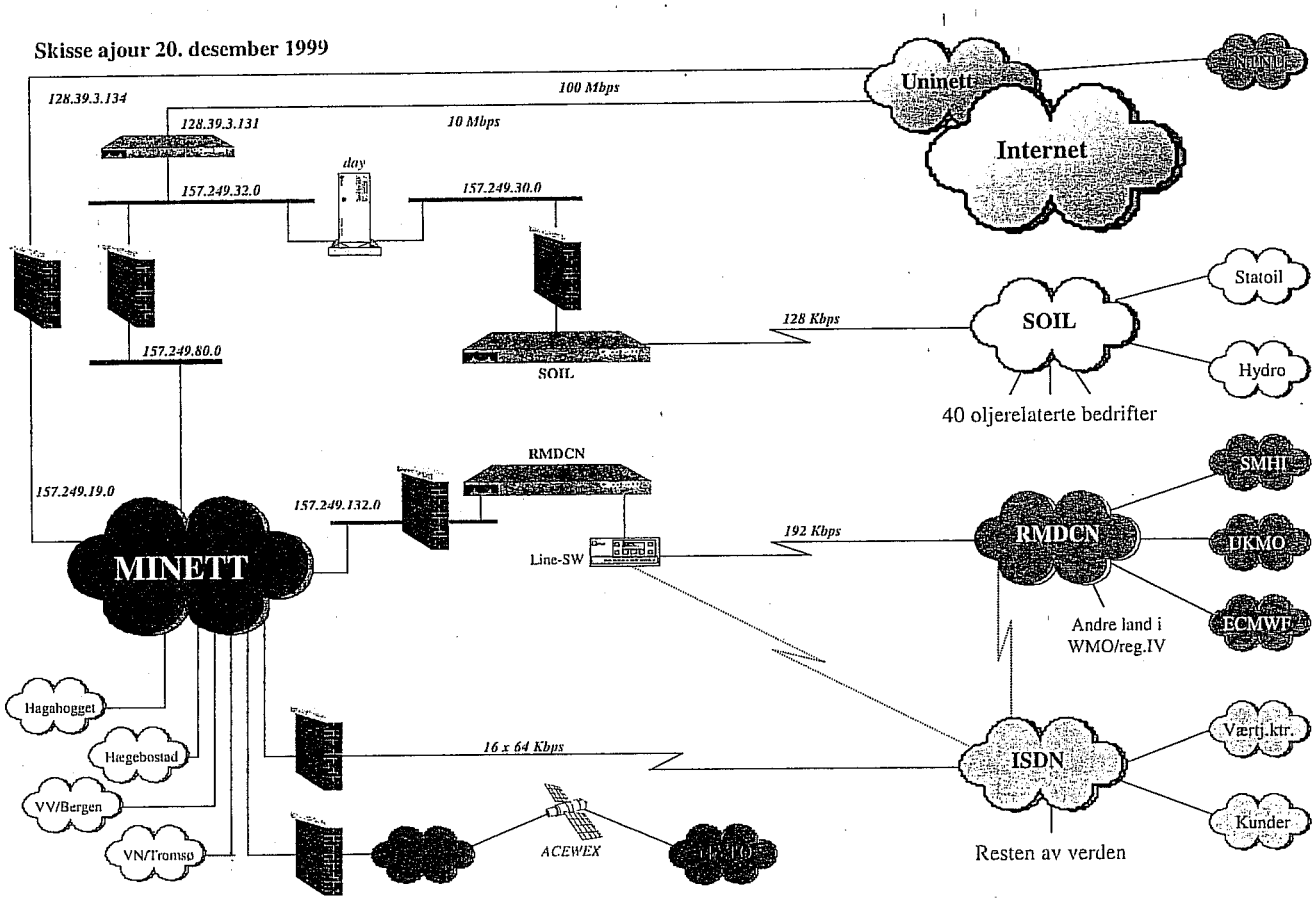
- Ethernet
  - connecting all computers and workstations and several PCs. Most of the network is Switched Ethernet giving 10 Mbps to each machine.
  - connecting the four main SGI Origin 2000/200 computers is a 100 Mbps net.

Graphical Devices:

- Hewlett Packard pen plotters
- A3/A4 laser printer



NORWAY NORWAY



R. Rudsar strongly supported the Netherlands' request to enable viewing of Member States' web pages without the need for registration

SLOVENIA SLOVENIA

Hydrometeorological institute of Slovenia

Vojkova lb, SI-1000 Ljubljana, tel. +386 (0) 1 436-27-84, fax: +386 (0) 1 436-17-13

OpTiM - operational prognostic techniques and models development group

Computing facilities at HMIS

Metod Kožlj [1]

1 The network

Main operations of Hydrometeorological institute of Slovenia (HMIS) are held at its head office in Ljubljana. There are also a small number of regional offices and aviation offices at three airports.

Main computing facilities are located in Ljubljana and are connected to local area network. Network backbone is shrunk to one Cisco switch, so the network topology looks rather like snowflake (multiple levels of star topology). The interconnections are mostly 100 Mbps and 10 Mbps Ethernet.

All regional and aviation offices are connected to central LAN in a WAN through governmental managed network, operated by Government centre for informatics (CVI). The connection to CV1 PoP is leased Telecom, dataline (512 kbps). Regional and aviation offices are connected to CV1 PoPs either via Ethernet or via leased datalines (64-128 kbps). Connections to some governmental institutions and companies are also implemented through this network. At the moment, there are no backups for the lines.

Some of observation stations are connected to WAN through CV1, most of them, however, are connected to WAN via dial-up connections through public telephone network (PSTN).

WAN also offers connections to outside world. Connections to ECMWF, Global Telecommunications Network (GTS) and Zentralanstalt für Meteorologic und Geodynamik (ZAMG) are through managed network RMDCN. The connection from WAN to EQUANT PoP is leased dataline (128 kbps) with ISDN backup. Connection to the Internet (through academic Internet provider ARNES, 256 kbps, no backup) is also available.

2 Computers

HMIS uses a wide range of hardware platforms, including PCs, HP workstations, DEC alpha servers and workstations and VAXs. HMIS also uses wide range of OS platforms, including Windows (95,98, NT), HP-UX, DigitalUNIX, VMS, OpenVMS and Linux.

For larger operational tasks we use:

- two DEC AlphaServers 4100, running OpenVMS, for databases and dissemination

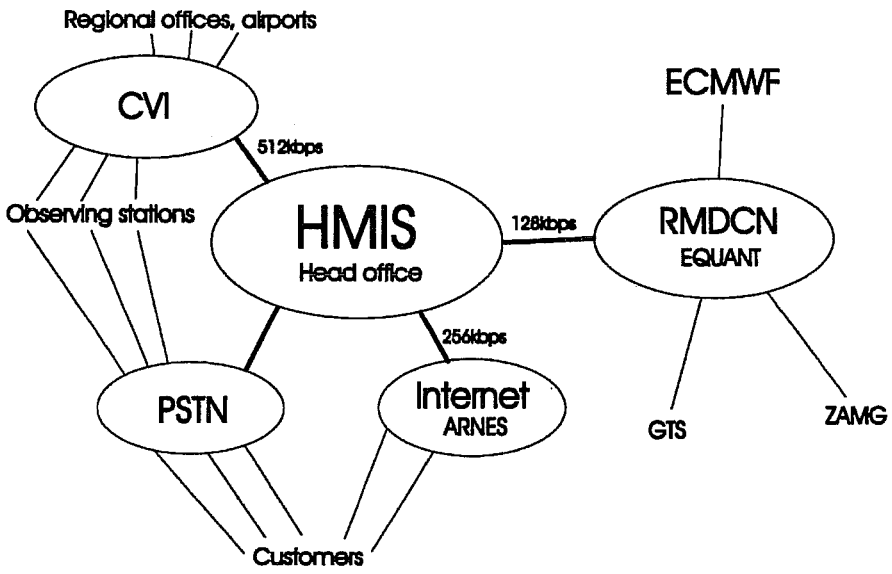


Figure 1: HMIS' WAN topology.

- DEC alpha workstation, running DigitalUNIX, for ECMWF and ALADIN/LACE model output visualisation, radar imagery production and archiving. Serves also as Intranet web server.
- cluster of 5 DEC alpha workstations, running Linux, for ALADIN/SI (distributed memory LAM) operations (model computation and visualisation)

Numerous DEC alpha workstations (running Linux) and PCs (running WindowsNT and Linux) are available for smaller tasks in fields of weather forecasting, end-user products production, research and development.

Personal facilities include PCs (running Windows 95198 or Linux) and DEC alpha workstations (running Linux).

3 ECMWF facilities

Slovenia is a co-operating state. This means that HMIS does not have any direct access to ECMWF computing facilities. At the time being, the only ECMWF computing service we use is our own dissemination of ECMWF model results.

The direct link from HMIS WAN to ECMWF has been established in December 1999. Since February 17th 2000 we have our own dissemination.

The model results (BUFR or GRIB coded) are transferred to our DEC alpha workstation using FTP. A job on DEC alpha breaks the files into several (BUFR or GRIB coded) files, containing individual parameters on single levels or in single model points. After that the model results are visualised using a custom non-interactive graphics package (GROM - GRaphics for Observations and Models), which is built on top of NCAR graphics (v4.01).

Resulting imagery is converted to Portable Network Graphics (PNG) format. Images are accessible through Intranet web server. We also produced an HTML-based Java application for easy access (see figure 2).

4 Short term plans

- We intend to implement Supervisor Monitor Scheduler (SMS) software package for use with our operational tasks.
- We intend to make use of web-based access to ECMWF databases and products.

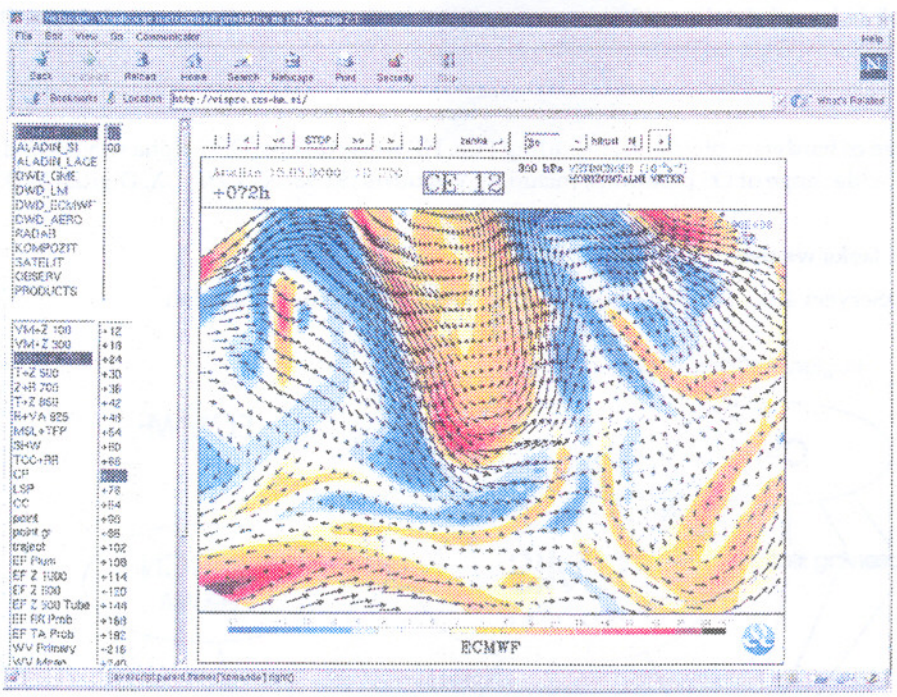


Figure 2: Screenshot of HTML-based Java application for easy access to visualised products (VisPro Visualised Products). It presents image of vorticity and wind field on 30O hPa level as forecast by ECMWF model (analysis 2000-05-15 12 UTC, forecast for +72 hours)

M. Koželj strongly supported the Netherlands' request to enable viewing of Member States' web pages without the need for registration.

SPAIN

SPAIN

Member States Computing Representatives Meeting, 18-19 May 2000

E. Monreal, Instituto Nacional de Meteorología, Spain

1. Computer equipment and connection to ECMWF

The main computing environment at INM is shown in figure 1. The main change since the previous meeting has been the specification enhancement of the data archiving and retrieval system.

Main computer:

The main computer system consists of a 4 processor CRAY C94A configured with 1 Gbyte of memory, 1 Gbyte SSD and 85 Gbytes of disk storage. It is used for numerical weather prediction and climate research. The HIRLAM weather prediction model runs 4 time a day with 0.5° and 0.2° resolution in a nested configuration.

Data archiving and retrieval system:

It comprises two subsystems, a data handling system and a data management system:

Data handling system: The main data repository. It is based on AMASS software running on a 2 processor HP 9000 K570 server now configured with 2 Mbytes of memory and 300 Gbytes of disk storage, used as cache for AMASS, which controls an IBM3494 cartridge library with 10 3590 drives and a total capacity of 17 Tbytes. At present, the system is storing about 2.6 Tbytes in 650,000 files.

Data management system: Designed to manage all operational data in four data bases; observations, NWP model fields, satellite images and products, with an user access interface rather similar to MARS, is near to be fully operational. Data Bases were developed using ORACLE 8 as RDBMS. In June 1999 the specification of the system was enhanced to a high availability cluster of two HP 9000 K460, configured with 2 processors, 512 Gbytes of memory each and 220 Gbytes of shared disk (in RAID 5).

Main UNIX servers:

Sun SPARCserver 1000E:

- 2 processors, 64 Mbytes of memory, 52 Gbytes of disk storage (36 Gbytes in RAID 5).
- NIS master server and file server for SUN workstations.

2 Sun Ultra E-250:

- 2 processor, 512 Mbytes of memory, 36 Gbytes of disk each.
- This two systems handle the data pre-processing and Report DB as well as the reception of ECMWF dissemination, most of graphics production and post-processing.

Sun Ultra Server Enterprise 3000:

- 2 processors, 512 Mbytes of memory, 8 Gbytes of disk storage.
- Applications development and testing.

Sun SPARCserver 1000E:

- 2 processors, 512 Mbytes of memory, 24 Gbytes of disk storage.
- Climate database based on ADABAS DBMS.

Sun Enterprise-10:

- 1 processor, 128 Mbytes of memory, 4 Gbytes of disk.
- Intranet Webserver and anonymous ftp server, secondary NIS server, MarsCache server.

Sun SPARCstation 20/150:

- 1 processor, 160 Mbytes of memory, 2 Gbytes of disk.
- NQE server for job submission to the CRAY C94A. It is also used as a gateway to ECMWF for non-operational usage.

Sun Enterprise-450:

- 1 processor, 256 Mbytes of Memory, 8 Gbytes of disk storage.
- Internet Webserver.

McIdas servers:

The McIdas production system which deals with satellite image processing and serves as operational WS for forecasters runs on a distributed environment. The main McIdas servers, handling data ingestion, are:

3 Sun ULTRAstation 1 170E:

- 1 processor, 256 Mbytes of memory each. and 16G Bytes 4 GBytes of disk storage each.
- GOES images, model grids and observation data ingestion.

2 Sun SPARCstation 20/712:

- 2 processors, 256 Mbytes of memory and 4 Gbytes of disk storage each.
- TIROS and METEOSAT images ingestion.

Other computers.

Message switching. A dual DECsystem 5900, running Ultrix, Based on UMS software deals with GTS, AFTN, MOTNE, etc.

Graphics dissemination. A high availability cluster, comprising two HP9000 k200 configured with 2 processors, 128 Mbytes of memory each and 2 x 8 Gbytes of shared disk storage (disk mirroring) replaced the facsimile dissemination.

Radar Network: A VAX 4500, running open VMS, handles radar images reception and composition from the 13 meteorological radar currently in operation.

Network:

All the computers in the central office are connected through a local area network (see figure 1). The LAN is basically Switched Ethernet, with an ATM backbone at 622 Mbps linking the data archiving and retrieval systems and a small FDDI ring on which the CRAY C94A is connected. A number of Cisco Catalyst switches manage the Ethernet giving 100 Mbps to each of the main UNIX servers and 10 Mbps to the rest of the systems.

All the subsidiary offices, 15 regional centres (CMTs) and 60 airport's Meteorological Offices (OMAs), are connected via Frame Relay (ISDN as backup) to the central LAN in a wide area network. The central office is linked to two different Points of Presence (PoP) through two diversely routed lines rated at 2 Mbps, whereas subsidiary offices have single access lines. As the initial phase of a further enhancement that should be ended in the second half of May, the subsidiary offices' access lines were recently upgraded to 128 kbps for OMAs, 256 kbps for the 4 CMTs with no forecasting activities and 512 kbps for the remaining 11 CMTs In the final phase of this enhancement, the network will achieve the following configuration:

	Access lines: number x speed	**PVCs to Madrid (central office): number x C.I.R. (in/Out)**
Central office	8 x 2 Mbps	N.A.
11 CMTs (forecasting activities)	1 x 512 kbps	2 x 192/32 1 x 32/32 (non meteorological data)
4 CMTs (no forecasting activities)	1 x 256 kbps	2 x 96/32 1 x 32/32 (non meteorological data)
60 OMAs	1 x 128 kpbs	2 x 48/16

Connection to RMDCN is shown in figure 2. Although formal service commenced as from 15 March 2000, no operational use was done until past 26 April when our link to ECMWF successfully moved to RMDCN. Links to Météo-France, UKMO and DWD are still through leased lines, mainly because of some difficulties arisen at INM with X.25 connections.

Connection to internet (a leased line to REDIRIS, the Spanish academic and research network that was upgraded to 2 Mbps late in 1999) is protected by a firewall implementation based on TIS toolkit software which is going to be replaced soon by a completely new one based on firewall-1.

SPAIN

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Connection to ECMWF:

Figure 3 shows the data flow through INM connection to ECMWF. ECMWF dissemination is received in GRIB code on a Sun Ultra E-250 server via ftp, where is decoded and plotted as well as sent to the C94A to be used as boundary conditions for the HIRLAM model, to the data management system to be archived and to the McIdas grid server where is again decoded and ingested. The other Sun Ultra E-250 server is used as backup.

The Sun SPARCstation 20/150 is acting as gateway for all non-operational usage; interactive work, file transfers -ftp and eccopy-, etc.

Submission of operational jobs to ECMWF computers is done, for the most part, in ecgatel through SMS. Ecbatch software runs on the Sun SPARCstation 20/150 for user's job submission and on the two Sun Ultra E-250 servers for operational jobs. Use of MARS remote client software, with the Sun Enterprise-10 acting as cache server, is allowed to any user Workstation within the LAN.

Access to ECMWF computing resources through Internet is limited, for the moment, to a couple of users outside central office in Madrid.

2. Projects run at ECMWF

The majority of our users access the Centre to extract data from MARS for both operational and research work. There is an increasing interest in re-analysis data for research projects and in EPS data for validation and generation of derived products.

A reduced number of users only access the seasonal forecasting products available on the MS Web server.

The poor usage of the FUJITSU VPP700, that even decreased last year although this year is growing up again, is basically due to the following two projects:

- Experimental HIRLAM runs using the reference system.
- Isentropic trajectory computation in the stratosphere for an international project that extended the "Stratospheric Climatology using Ultraviolet-Visible Spectroscopy (SCUV)" project already finished.

The VPP700 was also used to run the KNMI trajectory model in a case study.

3. Experience using ECMWF computers

Spanish users are in general very satisfied with ECMWF computer services, there is only one point we are concerned about:

- eccopy which is very suitable for file transfers in batch mode has only a queue defined on ecgatel for all destinations within the same MS which is scheduled on a FIFO scheme and therefore it can be blocked by a single user sending all at once lots of rather big files. All subsequent transfer requests, even those from operational jobs, have to wait until the last file transfer of that user is ended (up to several hours in same cases).

Our users are very pleased with User Support service – well organised and efficient. They also appreciate all the on-line documentation and help facilities the Centre made available through the MS Web server.

4. Future plans

The use of the VPPs may remarkably increase over next couple of years depending on the start of these new projects:

- Experimental IFS runs through PrepIFS.
- HIRLAM runs in the frame of project DEMETER,
- Enhancement of operational HIRLAM suite at IMN. Tests on different configurations and resolutions would be carried out on the VPPs to evaluate the requirements for a new main computer that will replace the CRAY C94A.

The better HIRLAM turnaround expected on the VPP5000 may also lead to an increase of the use of the allocated computational resources for the usual HIRLAM experiments.

Except for a higher usage of connection through Internet, no changes are envisaged in the future regarding the use of the remaining ECMWF computing resources.

SPAIN SPAIN

INSTITUTO NACIONAL DE METEOROLOGÍA
COMPUTER AND NETWORK CONFIGURATION
May 2000

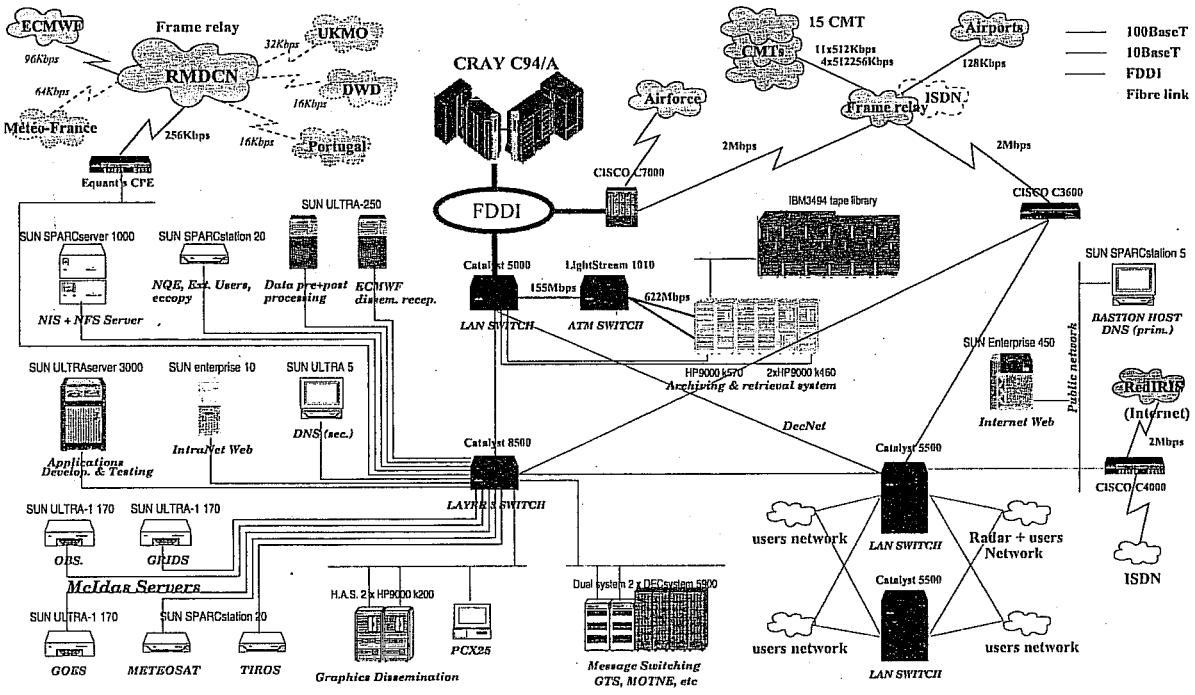


Figure 1

INSTITUTO NACIONAL DE METEOROLOGÍA
CONNECTION TO RMDCN
May 2000

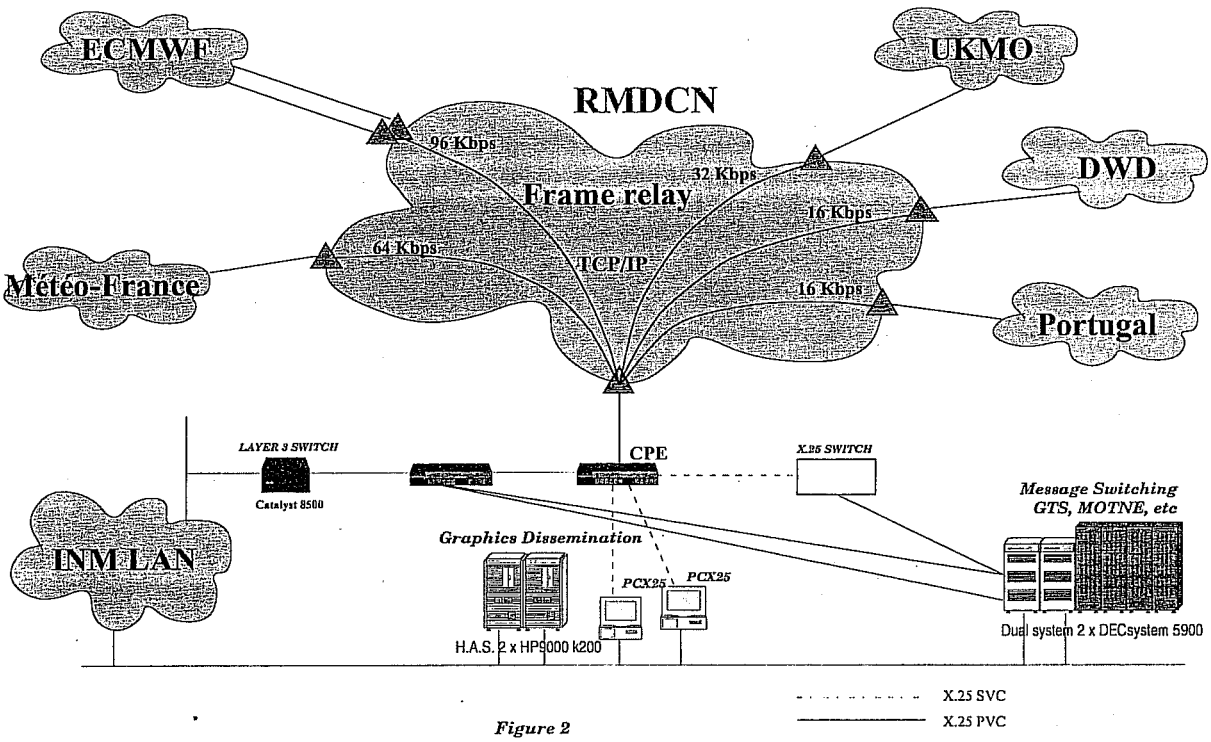


Figure 2

SPAIN

SPAIN

INSTITUTO NACIONAL DE METEOROLOGÍA
ECMWF - INM LINK
May 2000

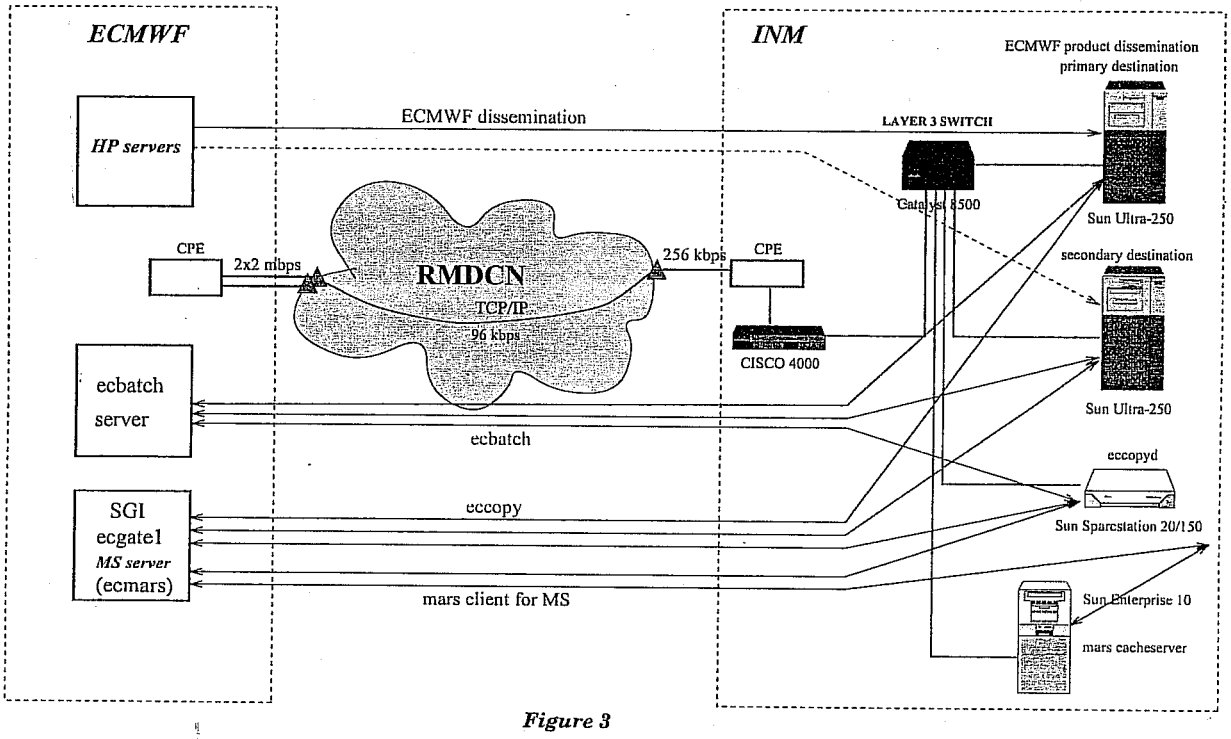


Figure 3

E. Monreal reported problems with users blocking operational work, sometimes for hours, when sending very large files. He was able to discuss their requirements with ECMWF staff, to establish whether they could be met by eccopy via the Internet or whether a prioritisation scheme would be necessary. He also strongly supported the Netherlands' request to enable viewing of Member States' web pages without the need for registration.

SWEDEN SWEDEN

Twelfth Member State Computing Representatives' Meeting 18 - 19 May 2000

Sten Orrhagen, SMHI

Changes since last meeting

Here are some changes and completions:

- Changes since last meeting are not very many due to the major effort that was put into securing all operational systems for the millennium change.
- SMHI is now connected to the Internet via a 2 Mbit/s line.
- The satellite data processing system hardware platform has been replaced. The reason for this was the need for more capacity.
- The system for product distribution to customers and internal users has been upgraded, same reason as above.
- New computing facility for our scientists has been introduced. The hardware is one AlphaServer DS20E with 2 CPUs, 667 MHz and 2 Gb of internal memory.
- The ECMWF-communication is now fully based on TCP/IP. The speed is still 64 kbit/s. The communication around NORDRAD will still be based on DECnet.
- SMHI has put distributed techniques such as CORBA (ObjectBroker & Orbix) and OSF/DCE into operation. New developments are using Java Runtime Environment JRE).
- We are still working with ORDMS Informix Universal Server to replace our systems for real-time data storage and archiving.
- Introducing new production environment based on Windows NT server. Systems such as: Mail-server based on MS Exchange server has replaced our previous mail server, Windows Terminal server has been installed and is used to offer Unix users MS Office environment.
- Growing interest to use Linux-based workstations and freeware such as Phyton and Perl for the purpose of research and development.
- Activities for the RMDCN, Regional Meteorological Data Communication Network is continuously being performed and the present status is as follows: 12 connections over 7 logical IP links through the RMDCN: ECMWF, Offenbach, Copenhagen, Oslo, Helsinki, Riga and Vilnius. (In total 384 Kbps Committed Information rate (CIR). On most of the 7 links we are running both GTS data exchange (on WMO TCP socket) and also product data exchange (on FTP or DECnet). From the RMDCN IP communications level seen, we have had no problems since the site acceptance test in November 1999. 3 FTP connections migrated, without any problems. 2 DECnet (tunnelled in IP) connections are planned to be migrated before summer. (The work starts now). Of 6 WMO TCP socket links, we have some problems on at least 4. We hope to migrate most of them before summer. The FTP link to/from ECMWF is planned to be migrated before summer. We are now working with how to deal with the hosts used for research and development, that use the leased line today, and our router access lists. With this the ETR link follows. The SMHI-ECMWF link CIR is 96 Kbps.

The computer equipment at SMHI

The Cray systems (a C90 and a T3E), provided by the National Supercomputer Centre in Sweden (NSC), is used to run operational models such as the local implementation of the HIRLAM model and HIROMB (High Resolution Operational Model of the Baltic Sea Area), and also climate models. It is still connected to SMHI by means of a 10 Mb line, and also a 155 Mb line, used for research, development and backup.

The Unix environment is still growing at SMHI, but the main computer system is still based on OpenVMS. Migration work, from VAX/OpenVMS to Unix, Alpha/OpenVMS or NT, continuous. As part of this migration the main VAX cluster and the storage system is in the process of being replaced. The new storage system is based on ESA 10000 with two RAIDArray 7000, HSZ70 controllers, and two tape systems, TZ887, with storage capacity of 200 Gbyte. All this served by two AlphaServer 1200 at 533 MHz with 512 MB RAM.

The satellite receiving system comprises two AlphaStation 200 4/166 running OpenVMS, one system for Meteosat data and one system for NOAA data. The system for satellite image processing and for production of various image products is now based on two AlphaServer DS 10 466 MHz, 512 Mb memory with a total of 52 Gb disk space in an Available Server environment (TruCluster). All four computers are connected to the FDDI-network in the computer-room. There is also one AlphaStation 200 4/166 dedicated for maintenance and development of the systems.

Two AlphaServer DS 10 466 MHz, 512 Mb with external disk controller provides the means for distributing data to around 1200 clients with 28,000 products per day. One of the servers is standby.

Important SMHI products are provided by systems based on SGIs and HP UNIX stations (AirViro, Graphics on-line, TriVis and Ultra).

Windows NT based systems provide file/printer service to the PCs placed around the institute. The approximately storage capacity is about 165 Gbyte. New Windows NT based production systems are being introduced. Here the approximate storage capacity will be about 70 GB.

A WinTS server with 512 Mb internal memory provides Unix users with MS office environment. The server has an ability of 40 concurrent user licenses.

Two Unix-based workstation environments, used for the purpose of research and development, exist. One supporting DEC Alpha-based systems and the other one supporting Sun Microsystems workstations. There are presently about 50 Sun- and 40 Alpha-workstations. One AlphaServer serves the workstations 1000 and one Sun Ultra 1. The systems provides file and printer services. The approximately storage capacity is here about 200 Gbyte. Samba is used to provide PC users file services from both Unix and VAX/Alpha systems. Samba has become a mission critical functionality even from our Open VMS systems.

SMHI has the responsibility for running the Swedish system connecting to the GTS. For this purpose there is a powerful Tandem CLX740 system installed called Metcom.

We are still supporting a system for distribution of meteorological data to the Baltic countries. The communication is to Riga from which the products are distributed onwards to identical systems in Tallinn and Vilnius. The presentation of operational products is then done using PC-based systems.

Another system is a system for automatic distribution of and handling of on call requests for fax products and products to PCs. A Vaxstation 4000 supports this system.

A system used to monitor and supervise applications and equipment is implemented and new work will be done on this front in the future.

There are presently five VAX systems supporting weather radar's, one in Norrköping, one in Stockholm, one in Göteborg, one on the island of Gotland and one in Leksand. There are also connections between Norrköping and the military weather radar's in six different locations (Karlskrona, Luleå, Hudiksvall, Örnskbldsvik, Östersund and Kiruna). Norrköping is also connected to the Kastrup weather radar in the vicinity of Copenhagen and the Sindal weather radar on the northern tip of Denmark. The radar in Sweden, Norway and Finland are connected using concentrator nodes in the three countries, which in turn are connected to the computers of each radar system.

Projects run at ECMWF

We have registered about 10 projects at the ECMWF. These projects are, as in earlier years, related to the following areas:

- Aerodynamics and air-pollution modelling
- High resolution limited area model development
- Extraction of data for operational usage
- Research on regional transport Hydrodynamic models
- Atmospheric chemistry
- Trajectory studies

Experience using ECMWF computers

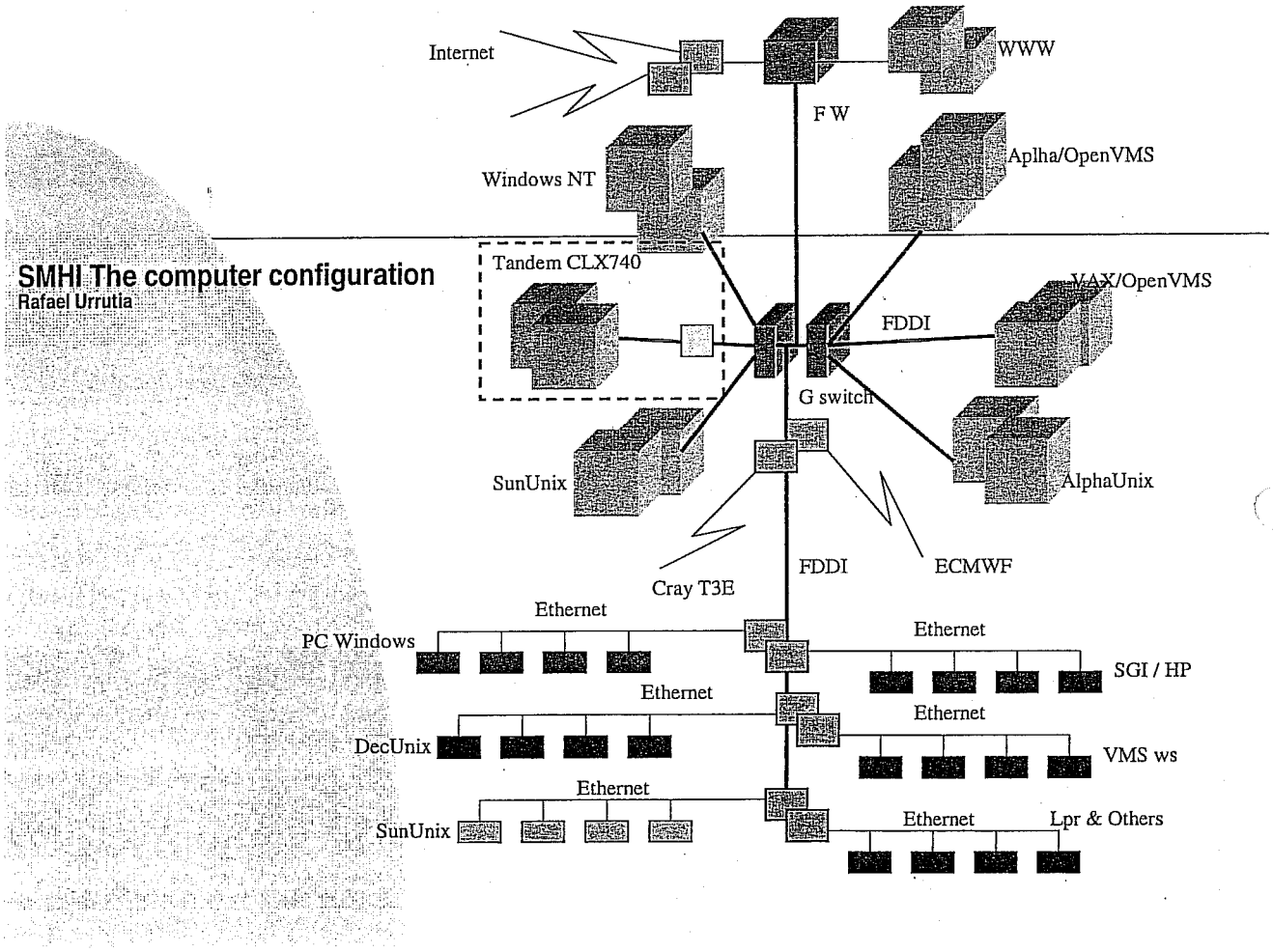
SMHI has around 42 ECMWF users. The assistance and help we get from the support staff, is always very good and usually we get it very quickly. The problem we see is that our users tend to consider it a bit inconvenient to use remote resources. The reason for this is always said to be the slow connection to ECMWF. This really is a pity and means that we only use a tiny fragment of the resources that Sweden is allowed to use. We have over the past years suggested that the Member State Computing Representatives' meeting should become a yearly event because acting as representative demands close contact with and good knowledge of operational work at ECMWF. For that reason we consider it very positive that this has been the case over the last couple of years.

SWEDEN SWEDEN

Future plans

Some futures plans:

- Expanding use of Internet/Intranet. Commercial products based on this technology are under development or being planned, e.g. e-business.
- Implementation of a cross-platform scheduling system and dynamic load balancing system will take place in this year.
- Building a completely new computer room and dividing the equipment between the old one and the new one.
- Designing and implementing a modernised system and philosophy for storage of data. Making it possible to avoid dedicated disks on the various computer systems.
- The researchers in Sweden including these at SMHI will hopefully be accessing ECMWF using university lines and Internet instead of using the leased line. We would like to support routines that makes it easy to send output from this kind of jobs not using the leased line. We want to dedicate the leased line or rather the RMDCN link to operational work e.g. the products from the operational suite.
- New functionality for: RAS, Central backup systems, Unix file/print servers, TCP/IP based printer management, Single Sign-On, Customised automatic logcheck, Introduce Unix-client systems based on free OS such as Linux or FreeBSD and much more, are things we want to dedicate time in the future.



SWITZERLAND

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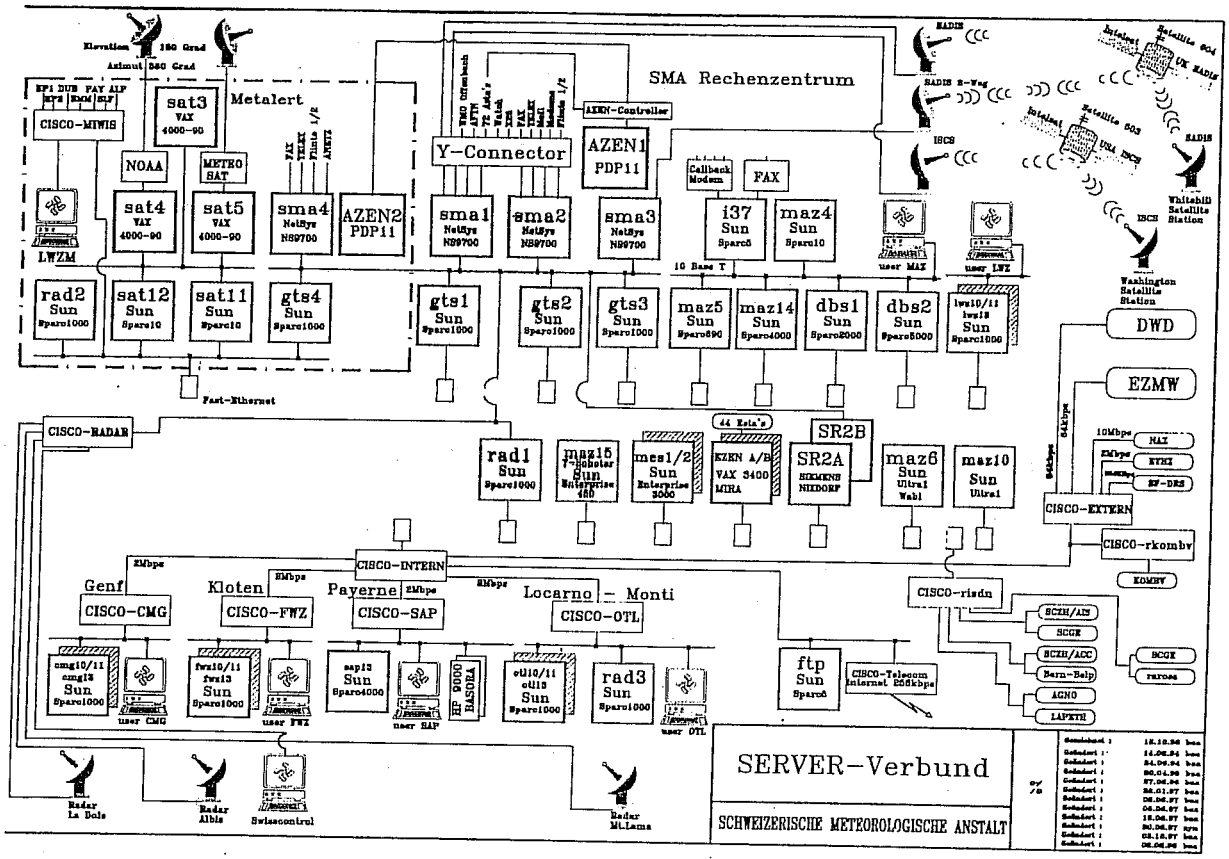

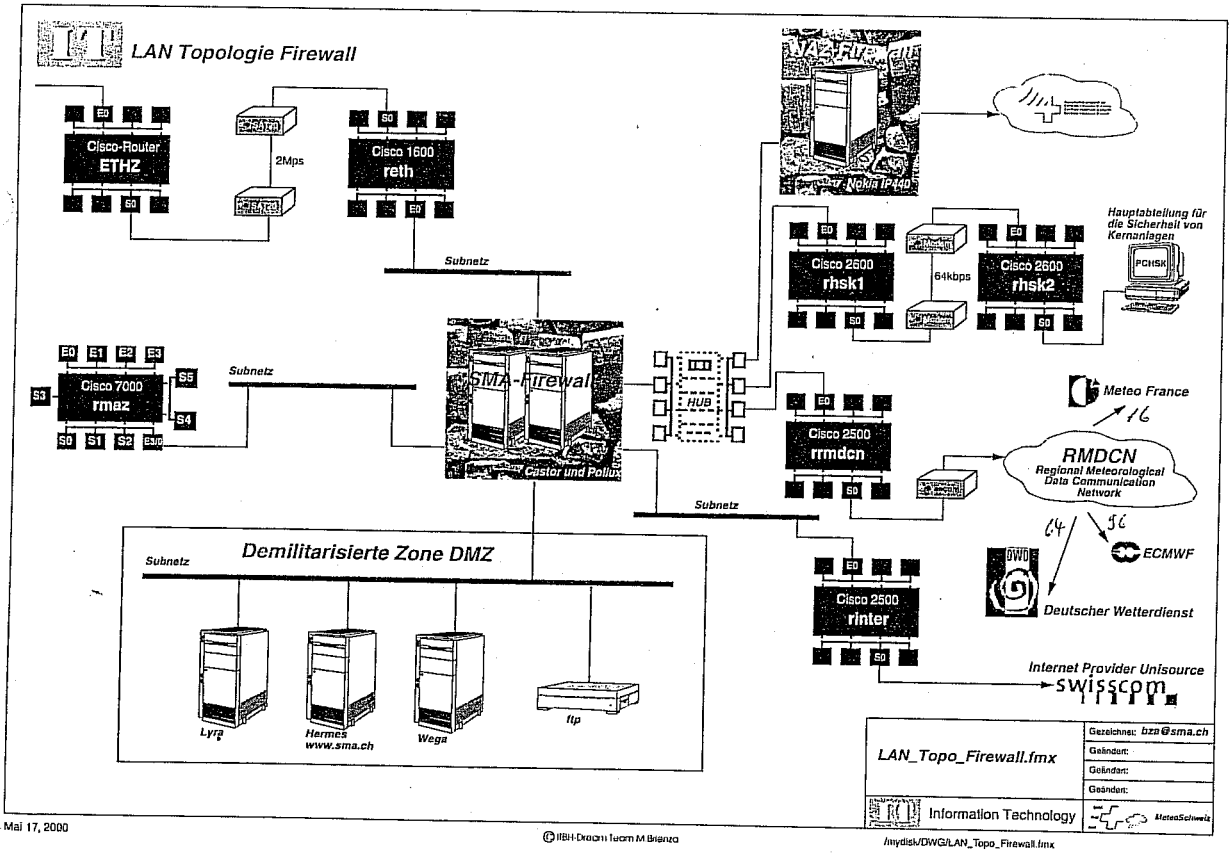

UNITED KINGDOM

UNITED KINGDOM

Member States Computing Representatives' Meeting, 18-19 May 2000

A. Dickinson, The Met. Office

1. Desktop and Central Computing System

The computing environment at The Met Office is shown in Figure 1. The main changes since the previous meeting are that:

- a second large CRAY T3E has been installed,
- our IBM mainframe has been upgraded, and
- a new data handling system is in the process of being commissioned.

The computer configuration currently consists of three mainframe computers:

- IBM 9672 R45 / R25
- CRAY T3E-900
- CRAY T3E-1200

The IBM 9672 acts as the database server for observations and forecast products and controls the flow of data between the CRAY T3Es and the GTS message switch. The R45 module has four CPUs and is split into MVS and UNIX partitions. The R24 module has 2 CPUs and is dedicated to the pre and post processing of operational forecast information.

The two CRAY T3Es are distributed-memory parallel computers. The current configuration of the T3E-900 was installed in October 1997 and consists of 880 processing elements (PE) each running at 450 MHz. The T3E-1200, installed in November 1999, has 640 PEs each running at 600 MHz. All of our climate modelling and numerical weather prediction software is run on the T3Es. Approximately 60% of the capacity of these machines is devoted exclusively to climate prediction and 40% to numerical weather prediction and related research.

All research and development users are connected via a workstation network based primarily on Hewlett Packard C and J class servers and X-terminals. This network and the connection to the mainframes have a bandwidth of 100 Mbits/sec and supports in excess of 200 users. There are around 800 PC users at Bracknell using LANs based on DELL equipment and Windows NT4.0.

A contract to provide The Met. Office with a new data handling system, known as MASS, has been awarded to FileTek. An initial configuration has been installed and is under test to deliver the first stage of an operational system by June 2000 and the final stage by September 2000. The system will use relational database technologies to provide access to model and observational data at the atomic (field, observation group) level. It will also act as the central repository for user files and other data. The amount of data to be managed is expected to grow from 78 Terabytes in the first year to in excess of 400 Terabytes by mid 2003. By 2005 it is estimated that MASS will be managing nearly a Petabyte of data. The system comprises a SUN E6500 multiprocessor computer running StorHouse proprietary software to control the storage and retrieval of data; software to administer the system; and a StorageTek PowderHorn tape silo with up to 32 StorageTek 9840 tape drives.

The MASS system replaces and significantly enhances the functionality and capacity provided via the current computer tape storage facility of a GRAU Automatic Tape Library and the IBM 9672 mainframe.

2. Telecommunications Connections to ECMWF

We do not plan to use RMDCN for our telecommunications link to ECMWF. Instead we will continue to use the existing 2 MBits/sec link as shown in Figure 2 for the exchange of data and products with the Centre as well as for user access to the Centre's computing facilities.

Data is sent to and from an ALPHA SERVER 1200 on the Central Data Network (CDN) at Bracknell with a second ALPHA SERVER 1200 acting as backup. The connection supports the receipt of observational data and the dissemination of ECMWF products. Along with Offenbach, the UK provides one of the connections between ECMWF and the GTS.

The message switch is based on an 8 processor Compaq Himalaya K2000 system. Other Compaq systems act as back up, provide data to commercial customers, and provide facilities for system development.

The migration of our Region VI GTS links to RMDCN is progressing. Six out of the 11 links have now been moved over. The connections use either ftp, IP sockets or X25 for data transfers depending on the capability and preference of the connecting centre. The bandwidth of the RMDCN access line from Bracknell to the EQUANT POP is 384 kbits/sec.

Telnet, FTP, eccopy and ecqsub are available from the HP workstation network and from the CRAY T3Es. We have also enabled remote X-sessions at ECMWF from a small number of our IP addresses in order to facilitate the use of graphical applications such as the User Interface to our Unified Model. All UK university users now access ECMWF via the Internet.

UNITED KINGDOM

UNITED KINGDOM

3. Projects

There has been little change in our plans for using our allocation of Fujitsu units since the last meeting. Our aim is to devote the majority of this computing resource to ensemble forecasting and in particular to exploiting the benefits of using multi-model ensembles. In conjunction with ECMWF, and as part of a multi-centre EU funded project known as DEMETER, we are developing a seasonal ensemble capability using the coupled ocean- atmosphere version of the Unified Model. We are also investigating the use of a technique known as stochastic backscatter to provide alternative ways of perturbing the ensemble.

At the present time we have not used much of our 2000 allocation of Fujitsu units. However, once the seasonal ensemble system is in place, we expect to use most of our allocation.

The majority of our users access the Centre to extract data from MARS. Many of them now access ECMWF data transparently via the MARS client software and Metview. A MARS interface to a variety of Met. Office data has been established using a local installation of the server software on the Unix partition of our IBM mainframe and also on our HP workstation system. We plan to develop this system to interface directly to MASS over the coming months.

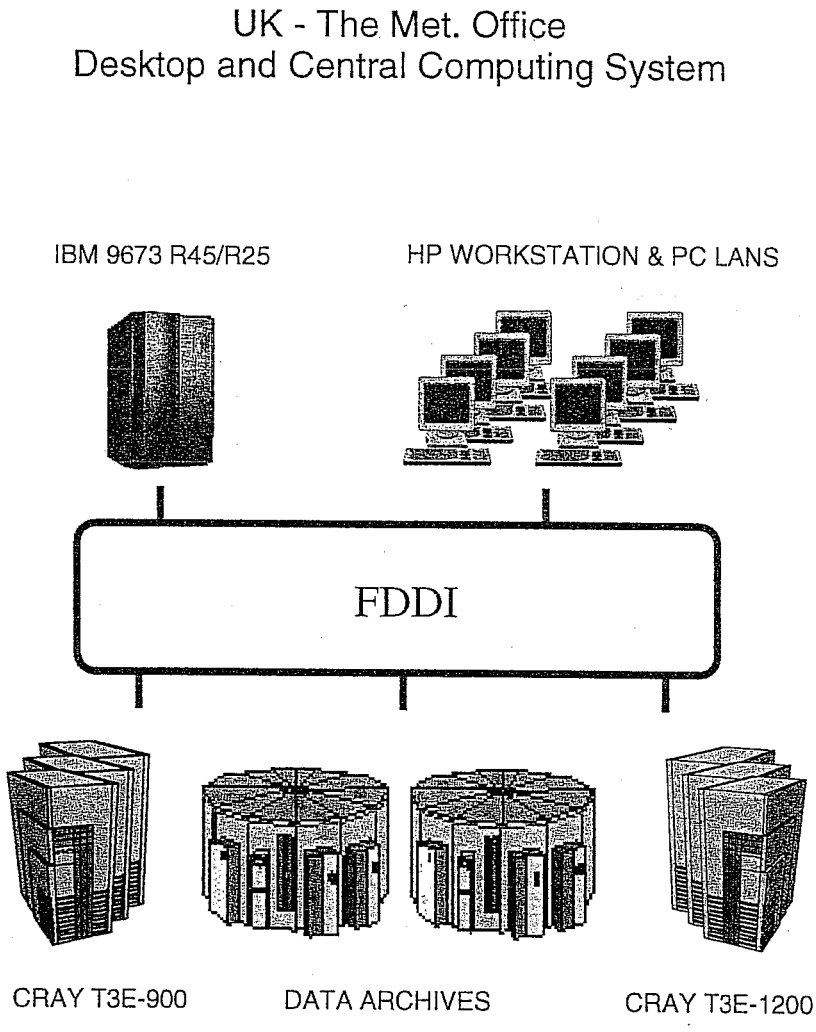

Figure 1

UNITED KINGDOM

UNITED KINGDOM

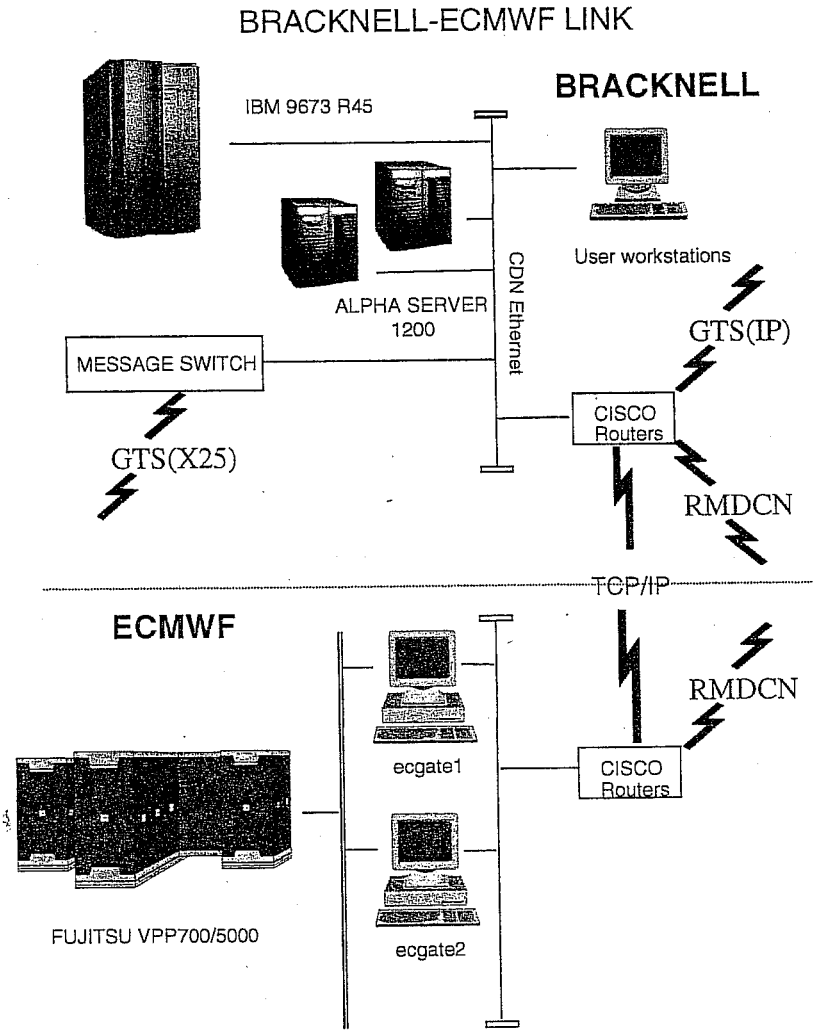

Figure 2

A. Dickinson noted how cumbersome it was to register individually every user making a one-off access to MARS. He also noted that MSCRs are not currently advised of new Special Project users, which occasionally led to communication difficulties. He asked that information on new Special Project users be routinely copied to MSCRs.

ANNEX 1

Twelfth Member State Computing Representatives' Meeting

ECMWF Shinfield Park, Reading, U.K 18 - 19 May 2000

Participants

Austria	Gunter Wihl
Belgium	Liliane Frappez
Denmark	Niels Olsen
Finland	Timo Hopeakoski
France	Marion Pithon
Germany	Elisabeth Krenzien
Greece	Nikos Kamperakis
Hungary	Gizella Duska
Iceland	Sigurdur Kristinsson
Ireland	Paul Halton
Netherlands	Hans De Vries
Norway	Rebecca Rudsar
Slovenia	Metod Koželj
Spain	Eduardo Monreal
Sweden	Sten Orrhagen
Switzerland	Peter Roth
United Kingdom	Alan Dickinson
ECMWF	Tony Bakker
	Jens Daabeck
	John Greenaway
	John Hennessy
	Norbert Kreitz
	Dominique Lucas
	Carsten Maass
	Umberto Modigliani
	Dieter Niebel
	Pam Prior
	Baudouin Raoult
	Heinz Richter
	Neil Storer
	Walter Zwieflhofer

ANNEX 2

Twelfth Member State Computing Representatives' Meeting

ECMWF Shinfield Park, Reading, UK 18 - 19 May 2000

Programme

Thursday, 18 May

10.00	*Coffee*	
10.30	Welcome	
	ECMWF's computer status and plans	*W. Zwieflhofer*
11.30	Member States presentations	

Each representative is asked to speak for a maximum of 10 minutes, outlining their Member State's involvement (actual or planned) in the computer service at ECMWF. This should include:

- diagram of own computer equipment, and of connection to ECMWF
- project runs at ECMWF
- experience using ECMWF computers, including suggestions and queries regarding the present service
- plans (involving ECMWF usage over next couple of years)

12.30	*Lunch*	
14.00	Member States presentations (continued)	
15.30	*Coffee*	
16.00	User Support services and status of the actions agreed during last year's workshop	*U. Modigliani*
	High performance facility update	*N. Storer*
17.30	*COCKTAILS, followed by an informal dinner*	

Friday, 19 May

09.00	Graphics update N. Storer	
09.30	MARS and dissemination update	*J. Hennessy/B. Raoult*
10.00	Web developments	*H. Richter*
10.30	*Coffee*	
11.00	Network developments	*T. Bakker/D. Niebel*
11.30	Discussions	
12.30	End of meeting	