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Editorial Notes

Past experience shows that it is a good policy to have four CNL editions per year (one around Easter, one before and one after the summer, and the last one just before Xmas), unless the number of contributions makes it necessary to have a supplementary issue, or to cancel one. Thus,

the date of the deadline for contributions to the next issue of the CNL is:

<table>
<thead>
<tr>
<th>Issue number</th>
<th>Final date</th>
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<tbody>
<tr>
<td>219</td>
<td>Monday, 20 March 1995</td>
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</table>

Contributions to the CNL are accepted as plain text, although marked-up text in \LaTeX is preferred. Articles, news items and letters intended for publication in the next issue should be sent directly to the editor (cnl.editor@cern.ch) without particular controls on the mail subject line.

The opinions expressed in this newsletter are those of the contributors and are not necessarily those of the CERN management. The editorial board reserves the right to edit, omit or hold-over copy due to lack of space.

This document was produced with \LaTeX and the cern.cn1 style. Compressed PostScript files, containing the complete printable version of this CNL or parts of it can be obtained by anonymous ftp to asisftp.cern.ch as follows (commands to be typed by the user are underlined):

```plaintext
ftp asisftp.cern.ch
Name (asisftp:username): anonymous
331 Guest login ok, send your complete e-mail address as password.
Password: yourusername@yournode.domain.country
ftp> cd cnl/218
ftp> binary
ftp> get cnl218.ps.gz (or get cnl218.ps)
ftp> quit
```

Please note that, if you do not have the gnu gunzip utility on your system you can get the uncompressed PostScript Version by typing the command `get cnl218.ps`, without the `gz` suffix. In order to save Internet bandwidth, you are, however, strongly urged to try and install the gunzip utility since gzipped files are about three times smaller than their unzipped equivalents.

The following files related to the present CNL are available in that directory:

<table>
<thead>
<tr>
<th>File</th>
<th>Description</th>
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<th>Description</th>
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<tr>
<td>cnl218.ps.gz</td>
<td>Complete CNL</td>
<td>edithelp.ps.gz</td>
<td>Editorial and help pages</td>
</tr>
<tr>
<td>general.ps.gz</td>
<td>“General”</td>
<td>central.ps.gz</td>
<td>“Central Computing Services”</td>
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<td>network.ps.gz</td>
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<td>textproc.ps.gz</td>
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<td>qa.ps.gz</td>
<td>“Questions and Answers from the UCO”</td>
<td>pawq.ps.gz</td>
<td>“PAW Questionnaire”</td>
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</table>

We would like to encourage you to subscribe to the announcement of the PostScript version, a service which is becoming more and more popular. You just have to send a mail to cnl@cern.ch (the “CNL server” machine) with the subject line being:

Subject: ANNOUNCE POSTSCRIPT CNL

The CNL server will then send you a mail whenever there is a new CNL ready as a PostScript file.

To know more about what the CNL server can do for you, please send a mail to cnl@cern.ch with the subject line being:

Subject: HELP

On all central systems one has access to the terminal version of the CNL via the command:

```
XFIND CNL 218
```

On CERNVM XFIND will give access to the printable (usually PostScript) version as well.

Responsible editor: Nicole Creml
Technical realization: Michel Goossens
### IF YOU NEED HELP (Contacts at CERN)

<table>
<thead>
<tr>
<th>Service</th>
<th>Name</th>
<th>Address</th>
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<th>E-mail Address</th>
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<tr>
<td>USER CONSULTANCY OFFICE (UCO)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening hours 9.00-17.00 (except Mondays 10:00-17:00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All aspects</td>
<td>Miguel Marquina</td>
<td>513/1-020</td>
<td>4912</td>
<td><a href="mailto:user.support@cern.ch">user.support@cern.ch</a></td>
</tr>
<tr>
<td>Accounting Service</td>
<td>Attila Koppanyi</td>
<td>513/1-019</td>
<td>4933</td>
<td><a href="mailto:user.support@cern.ch">user.support@cern.ch</a></td>
</tr>
<tr>
<td>User Registration</td>
<td>M.C.Perler</td>
<td>513/1-017</td>
<td>5004</td>
<td><a href="mailto:user.support@cern.ch">user.support@cern.ch</a></td>
</tr>
<tr>
<td>Consultancy Office</td>
<td>R.Woolnough</td>
<td>513/1-020</td>
<td>9156</td>
<td><a href="mailto:user.support@cern.ch">user.support@cern.ch</a></td>
</tr>
<tr>
<td>Computer Documentation Office</td>
<td>M.Franceschi</td>
<td>513/1-022</td>
<td>2371</td>
<td><a href="mailto:user.support@cern.ch">user.support@cern.ch</a></td>
</tr>
<tr>
<td>CENTRAL COMPUTER OPERATIONS (24 HOURS)</td>
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<tr>
<td>All aspects &amp; IBM</td>
<td>David Underhill</td>
<td>513/R-035</td>
<td>4920</td>
<td><a href="mailto:d.underhill@cern.ch">d.underhill@cern.ch</a></td>
</tr>
<tr>
<td>Central VAXes</td>
<td>Tim Whibley</td>
<td>513/R-033</td>
<td>4849</td>
<td><a href="mailto:t.whibley@cern.ch">t.whibley@cern.ch</a></td>
</tr>
<tr>
<td>CORE services - CSF</td>
<td>C.Boissat</td>
<td>513/R-031</td>
<td>3195,13+5630</td>
<td><a href="mailto:c.boissat@cern.ch">c.boissat@cern.ch</a></td>
</tr>
<tr>
<td>CORE services - SHIFT</td>
<td>Gordon Lee</td>
<td>513/1-020</td>
<td>4974</td>
<td><a href="mailto:g.lee@cern.ch">g.lee@cern.ch</a></td>
</tr>
<tr>
<td>Distributed Printing</td>
<td>Jean-Louis Vosdey</td>
<td>513/R-049</td>
<td>5011</td>
<td><a href="mailto:Printer.Support@cern.ch">Printer.Support@cern.ch</a></td>
</tr>
<tr>
<td>Networks</td>
<td>Alasdair Ross</td>
<td>513/R-034</td>
<td>4927</td>
<td><a href="mailto:netops@cern.ch">netops@cern.ch</a></td>
</tr>
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</table>

### CERN PROGRAM LIBRARY OFFICE

<table>
<thead>
<tr>
<th>Service</th>
<th>Name</th>
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<tr>
<td>All aspects</td>
<td>Jamie Shiers</td>
<td>513/1-002</td>
<td>4928</td>
<td><a href="mailto:cernlib@cern.ch">cernlib@cern.ch</a></td>
</tr>
<tr>
<td>VMS, VM/CMS</td>
<td>Jamie Shiers</td>
<td>513/1-002</td>
<td>4928</td>
<td><a href="mailto:cernlib@cern.ch">cernlib@cern.ch</a></td>
</tr>
<tr>
<td>Apollo, HP/UX Support, SHIFT, CSF</td>
<td>Gunter Folger</td>
<td>513/1-003</td>
<td>5010</td>
<td><a href="mailto:cernlib@cern.ch">cernlib@cern.ch</a></td>
</tr>
<tr>
<td>DECStation, Sun Support</td>
<td>Ian Mclaren</td>
<td>513/1-003</td>
<td>5010</td>
<td><a href="mailto:cernlib@cern.ch">cernlib@cern.ch</a></td>
</tr>
<tr>
<td>Distribution of CERNlib material</td>
<td>Lysiane Besson</td>
<td>513/1-014</td>
<td>4951</td>
<td><a href="mailto:cernlib@cern.ch">cernlib@cern.ch</a></td>
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### OTHER SERVICES

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<tr>
<td>Desktop Computing</td>
<td>Chris Jones</td>
<td>31/2-020</td>
<td>4884</td>
<td><a href="mailto:chris.jones@cern.ch">chris.jones@cern.ch</a></td>
</tr>
<tr>
<td>Operating Systems</td>
<td>Les Robertson</td>
<td>31/3-007</td>
<td>4916</td>
<td><a href="mailto:les.robertson@cern.ch">les.robertson@cern.ch</a></td>
</tr>
<tr>
<td>Vault &amp; Cartridge operations</td>
<td>R.P. Minchin</td>
<td>513/R-009</td>
<td>13+5559</td>
<td><a href="mailto:ric.minchin@cern.ch">ric.minchin@cern.ch</a></td>
</tr>
<tr>
<td>Cartridge purchase</td>
<td>Jean-Francois Lachavanne</td>
<td>513/R-038</td>
<td>4973 or 13+5617</td>
<td><a href="mailto:j-f.lachavanne@cern.ch">j-f.lachavanne@cern.ch</a></td>
</tr>
<tr>
<td>Experimental Tape Allocation</td>
<td>Hansjorg Klein</td>
<td>13/3-024</td>
<td>2124,2060</td>
<td><a href="mailto:hans.klein@cern.ch">hans.klein@cern.ch</a></td>
</tr>
<tr>
<td>Computer Science Library, mornings only</td>
<td>Jutta Megies</td>
<td>513/1-024</td>
<td>2379</td>
<td><a href="mailto:j.megies@cern.ch">j.megies@cern.ch</a></td>
</tr>
<tr>
<td>Oracle</td>
<td>Sergio Santiago</td>
<td>31/3-011</td>
<td>4134,13+5580</td>
<td><a href="mailto:oracle.support@cern.ch">oracle.support@cern.ch</a></td>
</tr>
<tr>
<td>Computer Security</td>
<td>John Gamble</td>
<td>31/3-030</td>
<td>3105</td>
<td><a href="mailto:j.gamble@cern.ch">j.gamble@cern.ch</a></td>
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<tr>
<td>Central VMS Service Manager</td>
<td>Judy Richards</td>
<td>31/3-009</td>
<td>4983</td>
<td><a href="mailto:j.richards@cern.ch">j.richards@cern.ch</a></td>
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</table>

### ONLINE COMPUTING:

See “ONLINE”, the Newsletter of Data acquisition and Computing for Experiments, Available from Anne Perrelle 31/1-003 2406 a.perrelle@cern.ch

### COMPUTING FOR ENGINEERING:

See the CERN Computing Support for Engineering Newsletter, Available from Monique Tate-Lavergne 513/2-010 2863 m.tate@cern.ch

### COMPUTER TIME ALLOCATION GROUP (COCOTIME):

Secretary: A.E.Ball/ECP 14/6-023 3849 alan.ball@cern.ch

### DIVISIONAL REPRESENTATIVES FOR COMPUTING

<table>
<thead>
<tr>
<th>Div.</th>
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<td>AS</td>
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<td>ECP</td>
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<td>S. Lauper</td>
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<td>PPE</td>
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<td>PS</td>
<td>J. Riche</td>
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<td>TH</td>
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<td>TIS</td>
<td>G.R. Stevenson</td>
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### DIVISIONAL REPRESENTATIVES FOR NETWORKING

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<td>AS</td>
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<td>FI</td>
<td>J. Groz</td>
<td>MT</td>
<td>C. Andrews</td>
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<td>PS</td>
<td>A. Pace</td>
<td>SL</td>
<td>P. Lienard</td>
<td>ST</td>
<td>P. Ciriani</td>
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<td>TIS</td>
<td>B. Moy</td>
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</table>
UNIX Workstations and X Terminals Support

List of Contact Accounts

Team Leader: Alan Silverman  
31-1-030 tel 4955  
e-mail - Workstation.support@cern.ch

UNIX Workstations and X Terminals Front Desk  
Christiane Ball  
31-1-015 tel 3349  
e-mail - Workstation.frontdesk@cern.ch

SUN software  
e-mail - sun.support@cern.ch
DEC's OSF/1 s/w  
e-mail - osf.support@cern.ch
RS/6000 s/w  
e-mail - aix.support@cern.ch
ULTRIX s/w  
e-mail - ultrix.support@cern.ch
HP 700 s/w  
e-mail - hp.support@cern.ch
Apollo/Domain  
e-mail - apollo.support@cern.ch
X terminals  
e-mail - xterminal.support@cern.ch
SGI software  
e-mail - sgi.support@cern.ch
AFS  
e-mail - afs.support@cern.ch
Printers  
e-mail - printer.support@cern.ch

COMMUNICATIONS AND NETWORKS

Please use generic electronic mail addresses whenever possible. These mailboxes will be read even when the usual specialist is absent. It is helpful to use relevant keywords in the subject field of your message. Contact specialists directly only for very urgent cases or for very general consultations.

Service

Software and interface consultancy
Network infrastructure consultancy (backbone and FDDI)
Network infrastructure consultancy (Ethernet in buildings)
Network security alerts (hacking attacks)

General network operational problems

Specific Ethernet problems
Internet (TCP/IP) registration requests
LAT terminal server registration requests
DECnet Registration Requests and Queries
Other registration requests
Queries about electronic mail
Novell coordination and general PC networking advice
Advice on Macintosh networking

E-mail Address

John.Gamble@cern.ch or Mike.Gerard@cern.ch  
Joop.Joosten@cern.ch or Jacques.Rochez@cern.ch  
Leo.Sohet@cern.ch  
cert@cern.ch (if urgent: 4927 or 8665)  
[5011 night/weekend]  
netops@cern.ch (if urgent: 4927 or 8665)  
[5011 night/weekend]  
ethernet.support@cern.ch or 2299  
tcpip@cern.ch  
lat.support@cern.ch (2299 for problems)  
decnet.support@cern.ch (dxmimt:decnet-support)  
etops@cern.ch  
mail.support@cern.ch  
nica@cern.ch  
macnet@cern.ch (2299 for problems)  
[4366 for general Macintosh problems]

SEMINARS AND PRESENTATIONS

Designation

Computing Colloquia (Auditorium / bldg 500)
Computing Seminars  
(CN Auditorium 31/3-005)
Technical Presentations  
(CN Auditorium 31/3-005)

Organizer  
Sverre Jarp  
Douglas Kemp  
Jean-Pierre Porte  
Richard Keyser  
Stanley Cannon

Div.  
CN  
CN  
ECP  
SL  
CN

Address  
31/1-019  
31/1-011  
32/2-C07  
864/1-B23  
513/S-014

Telephone  
4944  
5024  
3457  
4363  
5036

E-mail Address  
s.jarp@cern.ch  
d.kemp@cern.ch  
j.pierre.porte@cern.ch  
r.keyser@cern.ch  
stan.cannon@cern.ch
Following my “Letter from the Editor” published in the last CNL (CNL217) I have received a few comments from you, the readers. I will consequently begin in this edition of the CNL the “Letters to the Editor” section that I was proposing.

In this section, comments from readers will appear in normal type, whereas my reply or, possibly, the reply of the people who are concerned by these comments, will appear in italic. The editorial board reserves the right to edit or omit part or all of the input if it appears to be not of general interest or not relevant to the concept of this “Computer NewsLetter”. In any case all these letters will be published with the agreement of their authors.

I am pleased to see, in this edition of the CNL, more contributions concerning our evolving computing environment, with, in particular, articles on the SP2 central computer, the GPMIMD-2 Meiko CS-2 parallel processor, and various articles from the DCI group concerning UNIX and Desktop Computing. I am also happy to welcome a major contribution from the databases (ORACLE) section. If we regret the absence, for this edition, of a “Tutorial” section, you will discover, at the end of this CNL, a new section that I have called “Questions and Answers from the UCO” with a selection of problems we have to solve in the User Consultancy Office (UCO) at CERN. The UCO answers quite a variety of questions, but usually only a few people see the answers. The initiative for such a section is directly inspired by the “DESY Computing Newsletter”. I will let you judge if you find such a section useful in our CNL. You still are welcome to send all your comments directly to me (cnl.editor@cern.ch).

You may notice also that more and more articles refer to the World-Wide Web (W3) information system when the reader wants of having more precise information on a specific subject. In such cases you are given the exact path of the URL file to open in the WWW browser you are using (e.g. Mosaic). This has the main advantage to have more concise articles in the CNL. We will try also to announce new WWW servers of general interest to the CERN/HEP community as soon as we hear about their creation (e.g. the “CN/ASD group WWW server” in this CNL).

I hope you will have a good and interesting reading, and, at this time of the year, let me wish you

A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

Nicole Cremel CN/ASD, CNL editor

Letters to the Editor

Author List Names

I’ve been through CNL217 with quite some care, and I’d like to comment on it. First of all, I fully support your thoughts towards the further development of CNL. What I dislike is how some of the authors are quoted. For example, in article 7.4 “PAW release (2.05)”, the author list reads “The PAW team CN/ASD”, which is self-evident and does not tell me anything. In fact, the same remark holds for quite a number of articles. I’d suggest to quote names of the responsible persons.

Helge Meinhard ECP/SA

Firstly I would like to thank you for your support for the CNL. I do not disagree with your comment concerning the authors’ names. We indeed try, as much as possible, to quote the names of those responsible precisely. I can understand that, in the vast CERN environment, the CNL is, especially for external users, a good way to know who is involved in what, and who is responsible for a particular project, machine or piece of software. But in some cases, and especially the PAW and CERN library software, this is quite difficult to achieve. The article you are mentioning was written by, at least 5 people, who do have a real responsibility in the PAW development. For CERN library related matters, it is somehow more problematic as the input and responsibility can also come from outside CERN. For keeping it meaningful, we also do restrict the list of authors to two or maximum three names. In any case, we shall try and take your remark into account in the future.

As a further point, let me also note that for some products, such as CERNLIB and GEANT, the best way to contact the responsible persons is, today, to address questions and problems through the electronic distribution lists “HEPLIB” and “LGEOUNT”, which are available on all systems, and accessible via the e-mail or news mechanisms. Questions regarding computing can also be addressed to the “User Consultancy Office” (UCO office, build. 513, tel. 4952, e-mail: user.support@cern.ch), where people can answer directly, or do their best to find the right expert/responsible. Also, on the very first pages (i,ii) of the CNL, “IF YOU NEED HELP (Contacts at CERN)”, we always try to publish an up-to-date list of contact people in various subject areas.
Tutorials

We have been following the interesting tutorials in your CERN newsletter on Fortran 90.

Do you see a problem if we want to use them for our users, of course with acknowledgement to CERN and the authors. If you or the authors can agree, is it then possible to obtain a PostScript copy of the interesting articles?

Anne-Marie De Meyer

All tutorial sets may be found via anonymous ftp from asisftp.cern.ch in the directory /cnl/xxx, where xxx is the CNL issue.

For instance:
/cnl/217/cforttut.ps.gz

The complete f90 tutorial is available via anonymous ftp from cernvm.cern.ch in the directory cnl.200 as the file f90tutor.ps or under World Wide Web with the URL:
http://asis01.cern.ch/CN/CNTUT/f90/Overview.html

As a regular reader of CNL, and with all due respect to Michael Metcalf, I found the Fortran 90 tutorials difficult to follow and obscure. That is too bad, in my opinion, since I have a strong interest in Fortran 90, and wanted to learn what the essential features were which distinguishes it from its predecessor F77. The idea of a tutorial was good, but the tutorial was really too advanced and too brief to really be of help.

I appreciate all the effort of the CNL crew, so keep up the good work!

Matthew Bloomer PPE/IO

---

• Answer from Mike Metcalf:

I am sorry you found this material too terse. It is intended to give people a "taste" of Fortran 90, rather than to teach it comprehensively, and the full details are, of course, obtainable in "Fortran 90 Explained". Since this tutorial has been quite widely copied at other sites, I can only hope that this is a relatively isolated comment, and would be happy to provide you with other summaries that I have available. I present this material twice a year at CERN as a six-hour course, and would welcome you on one if ever you are here at the time (the next is planned for February, 1995).

I liked the LaTeX and F90 tutorials quite a bit, and actually refer back to them from time to time.

Jerry B. Altzman, Columbia University

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CNL Content

I quite appreciate to have everything in one newsletter. I read carefully the tutorial section, and even more carefully the Program Library section. If you delete the last one it will be very annoying.

At least find another place to store the information about changes in the CERNLIB. Today when I type: XFIND 94A, I only get references to previous CNL. Where should I watch in the future because NEWS will disappear?

I do not understand why it cannot be kept in the CNL. If you expect 2 releases per year of the CERNLIB and there are 4 CNLs, is it so difficult to make them coincide within a month?

Florence Ranjard ECP/SA

I think you misunderstood the assessment I had made in my letter concerning the Program Library section. This chapter will not be suppressed but it "will no longer be the reference for release information". This means only that I cannot guarantee that the complete and detailed information concerning a Program Library release will be there, and I will always invite the user to look at the corresponding "news file" (like paw.news2050 for the latest paw release 2.05). Such files are kept on asisftp in the directory "/cern/pros/doc". The life-time of these file is quite long and, in the case of PAW, previous versions of the file are kept in the same directory (e.g. paw.news2030 and paw.news2040 for versions 2.03 and 2.04). The same storage mechanism for release changes can probably easily be implemented for other CERNLIB products of the same importance from the user point of view. Let me also point out that CERNLIB information is now also available via WWW, which is much more up-to-date than a CNL possibly be.

I agree that the CNL is one of the best public places (accessible to anyone) to put information about changes in CERNLIB, as one of the easiest to find by the users (at least with "XFIND" on VM). Consequently we will keep this information in the CNL but only the main and more important points will be described there, together with the approximate date of a forthcoming release. But we do not think the CNL is the right place for a complete and detailed "LOG file" with all the details specific to one product, and which interests only a dedicated part of the readers. This is more the objective of the "news file" mechanism available today and described above. Also, the information concerning a release will now not necessarily be published exactly at the same time the release is taking place, but often before, as it has just been the case for CNL 217 and the announced release 94b of October. I think this can also be an advantage for the users who can take this opportunity to try the new features that interest them (by taking the version in the new area) and possibly report bugs and problems before the release takes place.

Nicole Cremel
1. General

1.1 1994 Computer Centre Christmas Shutdown Schedule

David J. Underhill CN/CIO

This year CERN closes officially on Wednesday 21 December at 17.30 and re-opens on Wednesday 4 January at 08.30. In order to complete necessary work on the electricity distribution system, power will be off in the computer centre on 2 and 3 January except for a special supply to some networking equipment. Power-up of the equipment and progressive re-establishment of services will begin on the evening of 3 January with the aim of completing the process during the following morning.

During the period from 21 December to 2 January, most systems in the centre will be left powered-on but log-on access to services will normally be blocked for security reasons, except in specific special cases where arrangements have already been made with the user communities concerned.

Consequently, the computer centre schedule for the two-week period between 21 December 1994 and 4 January 1995 is as follows:

- The following computer centre services to the user community will be stopped on Wednesday 21 December at 12.00 in order to allow time for backup of all critical system files during the afternoon: CERNVM, the central VMS clusters, DXCERN, SHIFT, CSF, SP2, tape services, PaRC, CAE servers, PIAF, SUNSLDB, SLDBMEAS, VXLIB, AFCERN, central database servers.
- Other services will be left running until 2 January on a best-efforts basis. Users are, however, reminded that coverage by computer centre staff cannot be guaranteed, that there will be no file backups during the period and that the network situation mentioned below may prevent access.
- The last normal (incremental) ADSM backup will take place during the night of 20-21 December. No further ADSM service will then be available until 4 January.

- Concerning the general purpose computer networks (Ethernet, AppleTalk), no service across the site can be guaranteed, due to partial power cuts outside the control of CN Division. In one or two particular cases, connectivity to the Computer Centre has been agreed following special requests. As usual, external transit traffic (Internet, DECnet, EARN) will be maintained. Electronic mail will in principle be accumulated for later delivery. The ACB and RLN services will not be switched off, but they may be ineffective due to other systems being off.

Users are reminded that, when the CERNVM service re-opens on 4 January, it will be running on a machine with half the power of that presently installed (see CNL 217 2.1 for details).

Please contact the undersigned if this schedule seriously inconveniences you, or if you would like more precise information.

David J. Underhill
Central Infrastructure and Operations
Tel : 4920 / E-mail : DJUCT@CERNVM

1.2 User Consultancy Office New Experimental Schedule

Miguel Marquina CN/DCI

The User Consultancy Office started on November 21st a new schedule, aimed to widen the availability of its Help Desk:

Mondays : 10:00 - 17:00
Tue-Fri : 09:00 - 17:00

The goal is to keep it open without interruptions (including lunch time) 8 hours per day, except Mondays (closed exceptionally from 9:00 to 10:00 for a regular operational meeting).

By keeping the Help Desk open over lunch time we are increasing our coverage time from 35 to 39 hours, and hope to satisfy the user demand.

Next year we will review the experience, and confirm the new timetable if it proves to be useful to the user community.

If you wish to express your feedback in either way, please send us your comments to User.Support@cern.ch.
1.3 The 1995 CERN School of Computing

Arles, France, 20 August - 2 September, 1995

Carlo Vandoni CN/ASD

Date and place of the School

The eighteenth CERN School of Computing will be held at the Centre Van Gogh in Arles, France, from Sunday 20 August to Saturday 2 September 1995. The participants will be accommodated in the Hotel Atrium situated in the centre of Arles, a very attractive and historic town. The hotel is modern and has good recreational facilities including a swimming pool, and is a very short walk away from the Espace Van Gogh where the lectures and tutorials will take place.

Participation

The School is open to postgraduate students and research workers with a few years’ experience in particle physics, computing, or related fields. The number of participants will be of the order of seventy, mostly from the CERN Member States or from laboratories closely associated with CERN, but a few may come from countries which are not Member States of CERN. Personal contacts and informal discussions among the participants during leisure time are an important aspect of the School. For this reason, participants are asked to note that they should not be accompanied by family members or friends.

Accommodation

All those participating in the School will be lodged in comfortable double rooms with private bathrooms.

Scientific programme

The programme will be dedicated to the following themes:

- Human Computer Interfaces
- Collaborative Software Engineering
- Information Super Highways
- Trends in Computer Architecture/Industry
- Parallel Architectures (MPP)
- Mathematical Computing
- Data Acquisition Systems
- World-Wide Web for Physics

Exercises/tutorials will be organised around the following themes: Human Computer Interfaces, Collaborative Software Engineering, Mathematical Computing and WWW for Physics.

Language

The working language of the School will be English. There will be no simultaneous translation. Participants should therefore have sufficient understanding of English to enable them to benefit from the School.

Travel

Students should reach Arles for registration during the afternoon or evening of Sunday 20 August. The School will end on the morning of Saturday, 2 September after breakfast. Information on how to reach Arles will be published in the final Bulletin.

Cost

The cost of the School will be 1,500 Swiss francs per student and covers tuition, full board and lodging at the Hotel Atrium from dinner on Sunday 20 August to breakfast on Saturday 2 September 1995, as well as coffee or tea during the morning and afternoon breaks and some social activities. It does not include travel expenses from participants’ home institutes to Arles and back. Details concerning the method of payment will be published in the final Bulletin.

Application

If you are interested in applying to the School in Arles, please send your e-mail address immediately to

SCHOOL@CERNVM.CERN.CH

stating clearly that you would like to have further details and an application form. The final Bulletin containing all necessary information and the application form will be issued in January 1995.

Advisory Committee

G. Barreira, LIP, Lisbon
W. Carena, CERN, Geneva
F. Etienne, CPPM, Marseille
F. Fluckiger, CERN, Geneva
J. Ganouna, IN2P3, Lyon
G. Grosdidier, LAL, Orsay
L.O. Hertzberger, University of Amsterdam
A.J. Hey, University of Southampton, (Chairman)
G. Kellner, CERN, Geneva
M. Metcalf, CERN, Geneva
P. Palazzi, CERN, Geneva
J. Turner, CERN, Geneva (School Secretary)
C. Vandoni, CERN, Geneva (Scientific Secretary)
D.O. Williams, CERN, Geneva

Enquiries and correspondence

All enquiries and correspondence related to the School should be addressed to:
1.4 Availability of the DESY Computing Newsletter

Miguel Marquina CN/DCI

The DESY User Support group publishes a Computing Newsletter about twice a year, the last issue having been published in September.

While having a sizeable amount of information relevant only to DESY users, generic articles are published from time to time which are of relevance and use also at CERN. You may also find it interesting to learn about the developments taking place at DESY in the computing area. Several of you are also working regularly between the two centers.

The User Consultancy Office receives regularly a set of issues for local distribution. You can request a copy via electronic mail to User.Support@cern.ch.

Alternatively, you may find the issues in PostScript form under WWW

URL: http://info.desy.de/UCO/documentation.html from where you may print them yourself.

1.5 The Computer Documentation Office

Michel Franceschi CN/DCI, Miguel Marquina CN/DCI and Roger Woolnough CN/DCI

Introduction

The Computer Documentation Office is a service which runs as part of the Help Desk in building 513 (see CNL 215). It offers users the possibility to purchase selected computing documentation (books, manuals, CD-ROM documents...) at competitive prices.

Purchasing Procedure

Payment may be made via three different methods:

- paper TID,
- the EDH system,
- cash payment to an SBS account controlled by Finance Division.

The last alternative has been set up for those willing to purchase items from our offering for private purposes or when there is no defined procedure (short-term visitors like summer students, etc.).

In order to pay for the books via paper TID, you must be authorized to sign or bring one already signed by one of your budget holders. After standard cross-checking, you will receive the books at the Help Desk counter if they are in stock, or will be notified when they arrive (in most cases delivery is within 7 days if we are out of stock).

The second method is payment via EDH, which is just the production of an electronic TID. All CERN divisions are slowly migrating to this system, and at least the Divisional Secretariats have authorization to enter transactions in this system. In order to collect the books we must have received in advance the electronic TID, and it must have been approved at least by the budget holder. Please check the status of your purchases with our service before coming to pick them up.

Finally, the third method consists simply in paying the amount due to the SBS account CO-148,556.0, which is handled by Finance Division. The bank slip should state the payee’s name and the reason “UCO BOOK”. It constitutes proof of purchase, against which you will receive the books at the Help Desk counter in building 513.

In no case will we deliver the books by internal mail, due to several customer complaints indicating that they did not arrive.

The Book Catalogue

Our current offering (48 titles) comes mainly from two publishers: Addison-Wesley and International Thomson Publishing (distributors of the reputed O’Reilly & Associates se-
ries). We are studying the widening of our offering to others like McGraw-Hill, Prentice Hall, etc. Please keep in touch with us by following the news on this subject in the "cern.computing" newsgroup.

The latest version is stored and can be accessed via WWW: http://wwwcn.cern.ch/UCO/Books.html

The current status of our book catalogue is also printed on page 42 of this CNL.

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### 1.6 UCO Reference Cards

*Catherine Delamare CN/ASD and Miguel Marquina CN/DCI*

The User Consultancy Office offers a collection of short documents, most related to UNIX, which help a first time user to move along without going to the full details of the reference documentation. Notice however that we strongly recommend you to look at the reference manuals if you intend to make serious use of the application or facility documented in such cards.

We would like to thank the DESY User Support Group for providing several of the documents we are making available. Here follows the current list:

- **UNIX introduction**
- **vi editor**
- **Emacs mini-reference**
- **GNU Emacs Reference Card (v.19)**
- **xdvi and ghostview**
- **The make command**

<table>
<thead>
<tr>
<th>Include ps and eps Files into LaTeX</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCSA Mosaic</td>
</tr>
<tr>
<td><em>Basic Introduction to SQL</em>Plus</td>
</tr>
<tr>
<td>Using QuickMail at CERN</td>
</tr>
<tr>
<td>How do I submit a batch job?</td>
</tr>
<tr>
<td>CMZ QuickGuide</td>
</tr>
<tr>
<td>Vax/VMS quick reference card</td>
</tr>
<tr>
<td>VM/CMS pocket card</td>
</tr>
<tr>
<td>Zephyr flyer</td>
</tr>
<tr>
<td>Should I have a dot in my path?</td>
</tr>
<tr>
<td>Customizing your shell / bash specific</td>
</tr>
<tr>
<td>Customizing your shell / tcsh specific</td>
</tr>
<tr>
<td>Customizing your shell / zsh option</td>
</tr>
</tbody>
</table>

You can pick up printed copies of these documents, which are available on the plastic trays at the Help Desk in the User Area of building 513.
2. Central Computing Services

2.1 Plans for the CERNSP and CERNVM Services

_Tony Cass CN/DCI and Harry Renshall CN/PDP_

CERN recently signed the contract for the replacement of the IBM ES9000 running CERNVM by a half-sized machine and the purchase of a 64 node IBM Scalable POWERparallel 2 (SP2) system. The SP2 was delivered to CERN on 30 October. Note that the original plan to install a second set of 64-nodes in 6 months’ time has now been cancelled on the advice of the HEP Computing Coordinating Committee. We will initially dedicate 16 nodes to interactive use, 16 for serial batch, 16 for server functions (disk, tape and network servers and new FATMEN + HEPDB platforms) leaving 16 nodes for running parallel interactive and batch. The main impact of the reduction is on the parallel applications. That part of the machine will now be used to evaluate and demonstrate the foreseen parallel applications but not offer a production service. The machine remains inherently scalable should these parallel applications demonstrate a convincing case for production services.

The ES9000 will be replaced by a 3090-600J over the Christmas shutdown. This machine has 6 CPU units as does our present machine but runs at half the clock speed. We do not believe this will degrade interactive response but batch job turnaround times will increase, with priority being given to interactive work during normal working hours. There will be no Vector Facility on the replacement machine but this was only ever used by a very small community. The 3090-600J will run the full CERNVM system and all user mini and maxi disks will be kept initially. We will reduce the pool of staging disks by about two hundred gigabytes from its current size of three hundred gigabytes but still expect good lifetimes since the main user has been the LEP batch work that will be stopping on CERNVM at the end of this year.

The new 3090 should deliver about 115000 CERN Unit hours per quarter. Each LEP experiment is allowed 15000 hours per quarter combining batch and interactive, leaving 55000 hours for non-LEP usage, which matches their current usage of CERNVM. In this model there is little point in going through the labour intensive exercise of asking groups to make a formal request for CERNVM time next year. The Cocotime committee has agreed to the proposal that groups be allocated CERNVM budgets next year equal to what they have actually used this year and these budgets have now been published (see a recent Computing news).

The SP2 is currently running an experimental service for selected users. We anticipate a general SP2 service from early next year and Cocotime has agreed that its use need not be budgeted immediately but that this should be applied without too much delay. We would like groups who are interested in using this service early next year to contact us (Tony.Cass@cern.ch or Harry.Renshall@cern.ch) for setting up a group environment in AFS. The SP2 public serial node partition will have about seven times the capacity of CERNVM so those groups migrating to it from CERNVM or newly starting small to medium sized experiments should plan their future computing work with this in mind.

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2.2 Future support for VMS

_David Jacobs CN/DI_

At a recent internal CN planning meeting, participants raised the topic of the level and nature of the support for VMS that CN will have to provide to the HEP community. The majority of people do not expect VMS to be still playing a major role in HEP computing in ten years time and for this reason we do not advise new experiments to become dependent on VMS.

Nevertheless, the discussion and subsequent reflection served to reinforce the impression that VMS is still an efficient, effective and much appreciated computing environment on which many teams in the HEP community run important services. Accordingly, steps are being taken to ensure that the present level of support can be maintained at least to the end of 1996. At that time the situation will be reviewed once more.

Present VMS support by CN can be categorised under two major headings:

- Firstly, a central VMS service – VX/CERN – is operated, now based on a small cluster of DEC workstations (three Alphas and a VAXstation). As well as providing log-on facilities to a sizeable user community for VMS mail, DECnet and TCP/IP transfers, and program development, it is also still used to some extent for file and tape access, and for physics analysis. By virtue of the VMS systems and administration expertise that is required for this service, CN has also been able to offer advice in such matters to other owners of VMS systems.
• Secondly, in view of the popularity of the VMS platform in the HEP community at large, VMS continues to be one of the platforms to which new releases of CERNLIB and the packages built on it are regularly ported.

It should be noted that these are quite separate activities and both are seen as important.

Since Julian Bunn has moved to lead the PAW/PIAF team, it became necessary to strengthen the central VXCErn effort. This is now being done, thanks to the co-operation of the L3 collaboration, through the assistance of an experienced VMS system manager, Tami Kramer. It is appropriate to take this opportunity to thank Julian, in particular on behalf of the users, for his successful support and direction of the VMS services over four years.

Similarly, visitor effort is being enlisted to make sure that VMS ports of Program Library software continue to be available in phase with releases for other platforms and that problems encountered with the VMS versions continue to get answered.

2.3 The GPMIMD-2 Meiko CS-2

Eric McIntosh CN/PDP and Michael Metcalf CN/ASD

Back in 1992 a series of discussions on the introduction of parallel computing into HEP was held. The final outcome was the signing, by the then Director-General Carlo Rubbia, of a contract which, among other things, provided for the installation at CERN of a 32-node Meiko CS-2 (Computing Surface 2). This installation was to take place within the framework of a European Union ESPRIT project – GPMIMD-2 – and the computer was to be funded by the European Commission.

The purpose of having such a computer here is to determine whether it is possible to run typical HEP codes easily and effectively on this type of platform. To this end, the Commission is also funding a small group of Fellows who are endeavouring to adapt various long-running codes to the CS-2. Also funded are the manpower to set up a usable service on the machine and that necessary to run the overall project, CERN being the lead partner.

Parallel processing has been traditionally associated with numerically intensive computation and has the reputation of being difficult to implement. At CERN we are talking about parallel processing in the widest possible sense and for typical HEP applications. The principal concept is the allocation of several processors at the same time, “in parallel”, in order to solve a problem or to obtain results in a shorter time. In its simplest form parallel processing just involves running several batch jobs at the same time, as has been done on workstation clusters for some years now, although certain other applications might use a finer grained parallelism taking advantage of the CS-2’s high-bandwidth, low-latency communication system.

The CS-2 was installed last summer and quickly passed its acceptance tests. A lot of work has since been carried out to test and tune many aspects of the operating system and hardware. Each of the 32 nodes is a SuperSparc chip running at 40MHz (four at 50MHz) and each with 32MBYTE of memory (four with 64MBYTE) and 1GBYTE of disc (two with 2GBYTE). It runs standard Sun software – Solaris 2.3 with the usual f77, C and C++ compilers – as well as debugging tools such as BBN’s Totalview. However, to reduce overall costs, the EPC f90 and C compilers have also been installed and these are available on all the 32 nodes without restriction. (These compilers are freely available for use elsewhere at CERN, see CNL 217.) The nodes are connected internally as a fat tree network with fast Elan interfaces acting as 8-way crossbar switches, giving a latency as low as 10μs and transfer speeds of up to 50MBYTE/sec point-to-point. Externally, the CS-2 has the usual Ethernet, FDDI and HIPPI connections. The nodes are partitioned such that some are used for login and others allow large jobs to use up to 24 nodes at a time. The CS-2 does not (yet) provide a general service, but is already being used to perform large amounts of simulation for the NA48 experiment. Its simulation program accesses multiple nodes by making use of CHIMP (an interprocessor communication package from Edinburgh University). There is also a large amount of simulation being carried out for DELPHI with a specially adapted prototype version of GEANT using MPI, a newly-emerging message passing standard. This version of GEANT is based on so-called event parallelism, in which one job controls the scheduling of event processing over many processors. Other applications include second-level triggering studies within the EAST project and the porting of PIAF with the intention, possibly, to extend the production service to this platform.

The CS-2 thus already provides significant capacity for the CERN physics programme and this will be quadrupled next year by an EU-funded replacement of each processor by two new ones running at 90MHz as dual shared-memory symmetric processors. At that time, the project would be happy to entertain further requests for significant amounts of parallel capacity from the physics community.
3. Desktop Computing

3.1 Goals of the User Migration Task Force

*Miguel Marquina CN/DCI*

This task force was born in December 1993 with the reorganization of CERN CN Division. Its mandate is to coordinate the efforts put into migrating the interactive user community off the IBM/VM mainframe.

CN has started a gradual run-down of the CERNVM service in both the batch and the interactive areas. At the end of 1994, the machine will be reduced to half of its present capacity. This decision was taken after arranging that most of the BATCH usage by the LEP Collaborations be moved elsewhere by December 1994, as has been the case.

The UMTF ("User Migration Task Force") has two years to complete its work since it is presently planned that the remaining VM/CMS service will be phased out at the end of 1996. In this time we must address and resolve the migration problems associated with the move of the interactive usage, mostly towards a UNIX Desktop environment.

The activities of the UMTF are available through WWW and will be published regularly through the standard channels (CERN newsgroups, Newsletters, user meetings, etc). You can find the information using your preferred WWW browser and navigating through:

CERN Home: Computing: CN: Projects: UMTF

The information you will find there concerns all the activities launched at CERN in order to propose an adequate interactive environment to the physics users who will move to UNIX-based systems, as well as what is going on in other HEP laboratories who are joining forces (in the HEPIX context) in similar efforts.

We will have a regular section in this Newsletter dedicated to these efforts. If you are interested in giving feedback or sharing your experience with us, please contact the author (Miguel.Marquina@cern.ch).

3.2 Providing a Common Name for Workstations in a Cluster (Interactive Session Support)

*Tony Cass CN/DCI and Dan Pop CN/DCI*

Interactive Session Support (ISS) is a part of IBM's LoadLeveler product that allows users to see multiple UNIX workstations as a single logical service. For example, the three systems *machine1*, *machine2* and *machine3* could be given a service name of *ourclusteriss*—users *telnetting* (or using *rsh*, *rlogin* or *ftp*) to *ourclusteriss* would be routed to whichever of the three systems has the lightest load.

We now provide an ISS service at CERN which provides service names for central UNIX clusters and also one private cluster. For some systems we have also created an alias that points to the ISS service name to make using this service even easier.

<table>
<thead>
<tr>
<th>Use this Service Name</th>
<th>or this alias</th>
<th>For this service or cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>alicelhc.wgs</td>
<td>alicelhc</td>
<td>ALICE Work Group Server (can also use alicelhc.wgs)</td>
</tr>
<tr>
<td>atlas.wgs</td>
<td>atlas</td>
<td>ATLAS Work Group Server</td>
</tr>
<tr>
<td>chorus.wgs</td>
<td>chorus</td>
<td>CHORUS Work Group Server</td>
</tr>
<tr>
<td>cms.wgs</td>
<td>cms</td>
<td>CMS Work Group Server</td>
</tr>
<tr>
<td>na48.wgs</td>
<td>na49</td>
<td>NA48 Work Group Server</td>
</tr>
<tr>
<td>cernsp.plus</td>
<td>cernsp</td>
<td>The IBM SP/2 Public Login UNIX Service (This is not yet a full service; see article 2.1 for details)</td>
</tr>
<tr>
<td>aleph.iss</td>
<td></td>
<td>DEC AXP machines in the aloha cluster running OSF1/2.1</td>
</tr>
</tbody>
</table>

We strongly encourage users of these services to connect via the service name or alias rather than asking for an individual node. Using the service name means that you will be routed to the machine with the lightest load and also that you don't need to worry as nodes are added to (or removed from) the cluster.

Users outside CERN can also use the service name or alias but must, of course, add "cern.ch"—so a user can connect to
the ATLAS Work Group Server from outside CERN using the name atlas.wgs.cern.ch or atlas.cern.ch. This full name can also be used within CERN but the short form should be sufficient. (One exception for the moment is that people connecting from home via the ACB service must give the full name.

This is due to a bug which we hope will be fixed in the near future.)

If you manage a workstation cluster and would like to take advantage of this ISS service please send an Email to iss.support@cern.ch.

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3.3 Desktop Application Support for Physics

Tim Hanlon ECP/RA

Introduction

This is a reminder of the existence of the Desktop Application Support for Physics service, first announced in CNL 214 (article 2.2). The intention is to provide hands-on help and advice for the Research Sector with the sometimes bewildering array of desktop applications currently available on today’s workstations. Advice is available at every stage of the process, from selection and installation of a suitable package, to usage and customisation.

Which Applications?

Just about anything for physics, except programs such as PAW and GEANT for which other, specialist, help already exists. For example, publishing software, scientific packages, PostScript problems, general utilities (FrameMaker, Matlab, drawing software...).

Services

We are planning to keep a record of people’s experiences with various packages, good or bad, so that the information can be shared with other users. Anyone with potentially relevant information is encouraged to send it to us. We will make this information available, along with a FAQ (frequently asked questions) list and other useful documentation, on our web page. In addition, we will be maintaining a number of packages for users to try out and assess for themselves. If we don’t have what you are looking for, let us know – we can but try. If you think you might need help or advice, or if you have a suggestion, please do get in touch.

How to Contact Us?

You can send e-mail to dasp@sunasp1.cern.ch, or contact us directly:

Tim Hanlon, tel. 7158, e-mail: tim.hanlon@cern.ch
Werner Jank, tel. 3457, e-mail: werner.jank@cern.ch
or point your web browser at http://sunasp1.cern.ch/dasp.html.
4. Communications and Networks

4.1 CERN Telecom Board Discusses Document Exchange

Brian Carpenter CN/CS

The CERN Technical Board on Telecommunications recently discussed the issue of electronic exchange of formatted documents. The minutes of that discussion follow.

"In all areas of activity at CERN a large and growing number of heavily formatted documents are handled electronically. These documents may include diagrams, charts, graphs, and other non-textual items. They are produced by various different word processing systems running on several different platforms. The electronic exchange of these documents is non-trivial. Although this is a problem faced by many organizations the situation at CERN is probably quite extreme. This is for various reasons. We have a relatively large number of users, using a variety of systems; we also have to communicate with many external institutes over which we have, naturally, little control. A multinational company, on the other hand, would impose a single system everywhere, and most communication would be closed within the company. There are two types of situation which can be identified. The first is the exchange of documents produced by the same word processing package. This is in effect binary file transfer. This can be handled in several different ways. For example some email packages allow enclosures. In all cases where it is possible to exchange ASCII characters the UUencode/Decode packages can be used, although it is conceded that this is not user-friendly. The second situation is when the documents are produced by different word processors possibly also running on different platforms. Currently in these situations ad-hoc solutions have to be found, possibly including conversion to a third format such as PostScript. In spite of these problems being serious it is felt that it is not CERN's role to solve them. Commercial solutions are being developed, and the situation will be much easier in the next year or so as more and more packages become MIME-compliant. In conclusion therefore it is not proposed that CERN spend significant effort on this problem, but that we await commercial solutions."

A document on this topic is available on paper only (!) from the UCO with reference DocInter (CERN/CN/UCO/160). MIME (Multipurpose Internet Mail Extensions) is the Internet standard for electronic mail including formats other than plain text.

For information, the Telecom Board is chaired by P.G.Innocenti, its Secretary is R.Parker (SL), and the other members are W.Blum (PPE), B.Carpenter (CN), P.Ciriani (ST) and A.Petrelli (AS). C.Jones (CN) also participated in the above discussion.

4.2 Trans-European Research and Education Networking Association (TERENA)

Olivier Herve Martin CN/CS

The two European organizations – RARE (Réseaux Associés pour la Recherche Européenne) and EARN (European Academic and Research Network) – have decided to merge in one new organization: TERENA (Trans-European Research and Education Networking Association). TERENA's aim is to promote and participate in the development of a high-quality international information and telecommunications infrastructure for the benefit of research and education. Together, RARE and EARN can develop a high-speed networking infrastructure that links Europe effortlessly to the information world.

TERENA's membership at its inception on 20 October consists of representative organizations from 38 countries and two international treaty organizations (CERN and ECMWF).

You can access the "TERENA Home Pages" in the World-Wide-Web document URL:
http://www.terena.nl/
and the complete "Press Release" document concerning the announcement of RARE/EARN Merging in:
http://www.terena.nl/terena/terena-press.html

4.3 Installing DECnet/OSI at CERN

Denise Heagerty CN/CS

You are encouraged to install DECnet/OSI at CERN once you are running VMS 6.1. DECnet/OSI is a layered product which needs to be installed once per system disk and configured for each cluster node booting from that disk. A recipe for installing and configuring DECnet/OSI under VMS 6.1 for the CERN network is available on

\$VCRN:/DISK3/CERN:[DECNETOSI]CERN_RECIPE.TXT

Please always check that you use the latest copy of this recipe and send any feedback to DXMINT::DECNET-SUPPORT.
5. Application Software & Databases

5.1 The CN/ASD group WWW server

Janne Saarela CN/ASD

The ASD group’s WWW server has been active since August 1994 and has since improved in many ways. This article will give you a glance at the features which are implemented within the server and which may be of interest to users and webmasters of other servers.

You can access the server by opening URL
http://asdwww.cern.ch/
or by selecting Computing: CERNLIB from the CERN home page. The latter way will take you directly to the Program Library level.

Contents

The server provides users with the following features which are considered useful from the users’ and the maintainers’ point of view.

CERNLIB documentation

The access to CERNLIB software and documentation is made even easier by providing the users with the following links:

- Hot News – what is happening with CERNLIB,
- Release Schedule – dates and platforms for different releases,
- Registration – register to CERNLIB with a FORMS interface,
- Documentation – on-line documentation of libraries and programs.

Latest version of software

Most WWW browsers support ftp links in HTML documents and with those browsers the user is given an easy way to access the latest piece of software he is interested in. By selecting the preferred platform the user can see a list of files which reside in the asisftp server. Just a click on the file and the browser transfers it to the current file system.

Currently all the links refer to the PRO version of the distribution in its tar’ed format.

Frequently Asked Questions

This feature has been implemented with Perl scripts which access a repository of FAQ entries on-line. Selected groups of people are allowed through access authorization to create new entries, delete them or even send them by e-mail to anyone on Internet. This makes it easier for the software maintainers to answer rapidly questions for which they have already given answers.

As the amount of FAQ entries will grow in time, a search script has also been introduced to help users find the correct entry based on their keyword search.

So if you have a problem with PAW, GEANT or CERNLIB libraries, please check the FAQ lists first.
5.2 Distribution of CLHEP and other class libraries through CERNLIB

Leif Lonnlad TH/SP and Jamie Shiers CN/ASD

CLHEP is a project initiated at CHEP'92 to define a general C++ class library for High Energy Physics. A description of CLHEP can be found in the article by Leif Lonnlad, the major mover behind CLHEP, in CERN-TH.7175/94, available in postscript form via


We plan to make the current prototype version of CLHEP available through CERNLIB as of the 95A release.

One of the motivations for making CLHEP available in this manner is to encourage wider use and feedback on the library.

In particular, increased participation in discussions on the future of CLHEP and code contributions are important. Although it is not claimed that CLHEP is the class library for HEP, it makes a good starting point for what is clearly a very important area for the future of software in HEP.

In addition to CLHEP, there are a number of non-HEP specific public-domain class libraries which could also be usefully distributed in the same manner. We are interested in your feedback on this proposal. If you have suggestions for which class libraries could be made available or any other related comment, please send a mail to CERNLIB@CERN.CH.

5.3 Using CVS for the management and installation of the CERN Program Library

Nobu Katayama, Cornell University, New York (USA) and CERN Program Library Office

Introduction

We describe below our experience with converting CERN Program Library source files from PATCHY "card" format to CVS. Problems encountered and implications for the installation procedures are discussed.

Overview

PATCHY is a source code management system that was developed at CERN and has been in use for over 25 years. The vast majority of the CERN Program Library material is distributed in PATCHY format, with a small subset in pure Fortran. Much of the development and maintenance of the code is done using CMZ, which is largely compatible with PATCHY at the level of source code markup.

CVS is a code management system that is widely used outside HEP, and increasingly used by experiments and projects both at CERN and outside (e.g., NA49, RD13, RD41, GEANT-4 and the CLEO collaboration at CORNELL). More information on CVS itself can be found through the World-Wide-Web via the URL http://asdwww.cern.ch/pl/cvs/index.html.

CVS (Concurrent Versions System) is a front end to the RCS revision control system. It extends the notion of revision control from a collection of files in a single directory to a hierarchical collection of directories, each containing revision controlled files. Conditional compilation is normally handled using the C preprocessor (cpp). Installation is typically performed using make.

Conversion of the source files

The source files can be converted in an almost automatic manner using the car2cvs utility, written by Nobu Katayama.

PATCHY conditional compilation statements (+SELF) are converted to cpp statements. Flags are prefixed by CERN_ (the actual prefix is optional) to protect against clashes with
predefined flags. 1

PATCHY sequences are converted to include files. car2cvs is-
issues warnings if multiple include files of the same name are
found. This typically occurs when a sequence is copied from
one source file to another, is a constant source of error and is
strongly deprecated.

Installation procedures

In the current system, there is a PATCHY cradle for each com-
ponent of the CERN library, be it a complete program, e.g.,
PAW, a complete library, e.g. JETSET, or a component of a
library, e.g., HBOOK.

The installation is driven by a master make file, which knows
the dependencies between the different components and the
constituents of compound libraries, such as PACKLIB.

Were cvs/make/cpp to be adopted, the global makefile
would still exist, but the individual cradles would be replaced
by individual makefiles. This change would be more intu-
itive, would simplify the installation procedures and ease the
installation of single components of the library. 2

Correction cradles

Correction cradles are currently only used for GEANT. Correc-
tion cradles perform certain edits on a base version of a source
file and the edited source code is then extracted.

The CVS philosophy is somewhat different. One may extract
any version of a program from the repository. However, by
definition, the required version must have been checked in to
the repository and tagged at some stage.

Handling multiple compiler options

Certain routines have to be compiled with different options to
the rest of the package to which they belong. Typically, this
means lower or no optimisation. Today, these routines are
"diverted" in the PATCHY cradle. A convenient way of han-
dling these cases in the makefiles needs to be found.

Installation on multiple systems

In the current system, the source code is extracted on each
system on which installation is required. This extraction re-
results in a version of the code appropriate for the target system
and which can hence only be used on like systems.

When using the cpp to handle conditional compilation, the
source code could be extracted once and accessed over the
network, e.g., NFS/AFS, from all other systems. This con-
cept would match well with our current master repository
setup, where the PATCHY source files are typically accessed
over the network. 3

Support for non-UNIX systems

On systems which can access the master repository over the
network, support for gmake and cpp is required. In the case
of VMS, for example, there is a choice of 4 make programs
and 2 cpp ones (that imbedded into the C compiler and avail-
able with CC/PREPROCESS_ONLY and the GNU cpp.) In
the limit, the makefile could be replaced by a simple com-
mand file. 4

Similar arguments are valid also for VM/CMS, although less
thought has been devoted to this area. 5

Complex libraries

The new system would permit compound libraries, such as
PACKLIB, to be organised more logically. Currently, the sepa-
rate components of PACKLIB are maintained entirely separ-
ately and only the makefile knows which packages go into
PACKLIB. The new scheme would permit PACKLIB to be
organised hierarchically, e.g.,

PACKLIB/CSPACK/cspack-subdirectories
PACKLIB/HBOOK/hbook-subdirectories
PACKLIB/KUIP/kuip-subdirectories

Summary and conclusions

Although the bulk of this note has discussed source code only,
it is clear that CVS would also be applicable for the manage-
ment of documentation and installation scripts. In the former
case, RCS is already used to some extent. As CVS is a layer
on top of RCS, this migration should be simple to achieve. In
the latter case, no management exists today, other than self-
imposed discipline regarding comments in the scripts them-
selves.

It is our recommendation that CVS be adopted for the man-
agement of the CERNLIB documentation files and installa-
tion scripts as soon as possible.

We plan to start offering the CERNLIB sources in "CVS
checked out format", i.e. .c, .f, and .h files in the appro-
priate subdirectories, progressively as from release 95A of
CERNLIB. These files will be offered in parallel to the ex-
isting CMZ and PATCHY formats.

---

1The cpp on most systems already predefines certain flags. The CERN convention for flags, e.g., IBM, VAX, UNIX, etc. is likely to clash with some of these predefined flags at some stage.

2Today, the entire suite of installation scripts is required even if one wishes to install only a single component, e.g., MINUIT. In the new system, only the appropriate source files and corresponding makefile would be required.

3With the single exception of VM/CMS.

4That generated by FCASPLIT, for example.

5Some problems exist with long file names and directories, e.g., sys/cern_flags.h, which are not supported by VM/CMS. The command CC fn ft (PPONLY FLAGS($)) can be used to perform precompilation.
5.4 Support for PAW and PIAF

Tony Osborne CN/ASD

As announced in the last Computer News Letter, René Brun has left ASD group after the recent Program Library release (94B).

On behalf of the user community and his colleagues, I would like to extend sincere thanks to René for his many years of contributions to GEANT, PAW, PIAF and the vital underlying packages used in CERNLIB, such as HBOOK, ZBOOK, ZEBRA.

It is a pleasure to announce the arrival of Julian Bunn, known to many of you for his VXCERN support, into the ASD group, where he is now the PAW/PIAF project leader. This move, at a time when CN, like many divisions, is hard pressed for manpower, is a sign of a continuing commitment by CN to support PAW and PIAF. As of 1 January 1995 the PAW/PIAF team will consist of Julian Bunn, Pascal Cheung-mon-chan, Olivier Couet, Nicole Cremel, François Dardare, Maarten Ballintijn and Fred James. Gunter Folger, of the Program Library team, now supports KUIP.

At the recent CN program of work meeting, the division fully recognized the importance of PAW/PIAF and to this end will seek to obtain in the new year a staff post for the team. Furthermore, an upgrade path for the PIAF hardware is being actively discussed and improvements are expected to be in place before the end of the year, with more likely coming during 1995.

Users of PAW can be assured that support and enhancements to the system will continue to be provided, but now with even greater emphasis on agreed user requirements. To this end, we are now soliciting input from all PAW users on areas of the PAW software in which they would like to see changes (see next article). This will help us set priorities for the coming year.

5.5 Announcing the PAW Questionnaire

Julian Bunn CN/ASD

As part of our scheme to obtain feedback from PAW users, we offer the bug report mechanism, the cern.heplib newsgroup, and a recent addition, the PAW Questionnaire.

We invite all PAW users to fill out a copy of the Questionnaire, which can be found either:

1. On WWW (use Mosaic or another forms-capable browser), with URL:
   http://asdwww.cern.ch/pl/paw/question.html
   or via the PAW home page with URL:
   http://asdwww.cern.ch/pl/paw
   (We much prefer users to fill in this version, which uses the forms capability of recent browsers.)
2. In the cern.heplib newsgroup. We will regularly post text versions of the Questionnaire, which may then be edited and sent to us in the form of mail to Paw.Support@cern.ch
3. As a paper version at the end of this CNL. The form should be completed and mailed to the undersigned.

Julian Bunn
CERN / CN Division
CH-1211 Genève 23, Suisse

5.6 PAW Miscellaneous

Olivier Couet CN/ASD

The following PAW commands are now supressed in the PAW modules located in the NEW area:

/obsolete/histogram/fit/exponential
  Fit histogram ID with an exponential function
/obsolete/histogram/fit/gaussian
  Fit histogram ID with a Gaussian function
/obsolete/histogram/fit/polynomial
  Fit histogram ID with a polynomial function
/obsolete/histogram/fit/function
  Fit histogram ID with a user defined function

Since the version 2.05/20 of PAW, a warning message has been printed saying that, instead of these commands, the user should use the command /histogram/fit with the corresponding options i.e.,

/histogram/fit id ...
  Fit histogram ID with:
  /histogram/fit id E  | an exponential function
  /histogram/fit id G  | a gaussian function
  /histogram/fit id P0  | a polynomial function
  /histogram/fit id func.f  | a user defined function
5.7 Interactive Visually-Assisted Fitting of Histograms and Vectors

Gregory Kozlovsky CN/ASD

Fitting histograms and vectors is a difficult computational problem. In many cases the underlying minimization problem has numerous local minima and, therefore, the minimization program can miss the global minimum. Even for a relatively simple case of fitting a double-peak histogram with the sum of two Gaussians, as shown in the figure below, the minimizing program fails to converge to the correct solution unless good initial values of the fit function parameters are given.

Often, the user has semantic knowledge of his fitting problem, which the minimizing program lacks. Using the scales and input fields on the panel, the user can set a good initial estimate observing the fit function and the histogram on the screen.

The histogram fit panel (see Figure below) can be opened from PAW++ command line when the histo/fit command has option M, from the Browser popup menu, or from a graphics window pop-up menu. The vector fit panel looks similar to the histogram fit panel, except for the upper line which has text fields for the names of a vector pair to fit instead of the histogram identifier.

The full functionality of MINUIT is accessible from both panels, including save/restore, computing and plotting contours and one-dimensional cross-sections, computing Minos errors, Hessians, correlations, eigenvalues. The panels will be put into the NEW area of CERNLIB by the end of December.

5.8 C++ Classes for Common Scientific Visualization Tasks

Gregory Kozlovsky CN/ASD

Programming a scientific visualization GUI (SVGUI) in raw Motif is not an easy task. Motif was designed for general-purpose use, and its widgets require a lot of effort to be adapted for a specific application. Scientific visualization, although a wide area in itself, has some common tasks which should be identified and addressed. We describe here a library of tools tailored for most common SVGUI tasks which should make writing an SVGUI easier and more uniform.

This library and a more complete description of it can be obtained through anonymous ftp in:

asisftp.cern.ch:/pub/svgui.tar.gz.

Pseudo-widgets for number and identifier input

One of the most common tasks in an SVGUI is clearly the input of floating-point numbers, integers, and identifiers (names). An assembly of widgets (label, text field, scale or another graphical input widget) used for the above tasks must act essentially as a single specialized widget. An identifier or a number typed in a text field must be checked for the correct
syntax. The scale and the text field must be kept synchro-
nized, the appropriate action must be taken when the typed
number is outside the scale limits. A pop-up or fold-out de-
vice for scale interval adjustment must be provided.

We achieve this behavior by encapsulating a combination of
widgets in a set of C++ classes. The set of classes forms an
acyclic graph, displayed in Figure 5.1. The edges show the
inheritance relationships between the classes.

![Diagram of inheritance relationships between classes.]

Figure 5.1: Inheritance relationships between classes. Dashed (dotted) boxes signify (virtual) abstract classes.

Because in C++ these classes become actually new types,
their use is almost as simple as that of integers and floating
point numbers. Assignment operators for the classes are de-

defined in such a way that they can be used in expressions and

assignments exactly as the corresponding base type. For ex-

ample, an instance of ScaleFloatText class can be created and

used as following:

double x0;
ScaleFloatText x0Text(parent,"x0Input","x0");
// code for positioning of x0Text inside its parent
x0Text = 3.1412;
// ...
x0 = x0Text;

Figure 5.2: A pseudo-widget of AdjustFloatText class with the scale interval adjusting device open.

**Event Processing with User-Definable Callbacks**

This class can be useful when different parts of a program
must react synchronously to a certain event which can be
triggered in several different places. While semantically we
want a program to act as one piece, as programmers we al-
ways strive to make different parts of the program as self-

contained as possible. EventProc helps to a programmer to
kill both birds by one stone. It uses the mechanism of call-
backs familiar to Motif programmers. Another area of appli-
cation are libraries which have event-driven parts, for exam-
ple high-level graphics libraries containing graphical user in-


terface features.
5.9 Central Database Servers and Services

A. Osborne and S. Santiago CN/ASD

CN division offers support for the commercial relational databases used across the CERN site. This article will explain some of the history and indicate the present and future evolution of these services. In broad terms the user community consists of the accelerator and engineering community, the users of AS division databases and tools, the users of divisional databases and some experimental physicists. Coordination meetings between CN and the principal users have existed for many years.

History of Commercial Databases at CERN

Relational Database Management Systems (RDBMS) provide end-users with facilities to store, update and retrieve data that is secure, shared and consistent. In 1981 a broad market survey was carried out and the Oracle RDBMS was selected to satisfy the needs of the LEP project. Since then, practically all the sectors of activity at CERN have gradually become users of some of the hundreds of applications making use of multiple databases. Two public and several dedicated services have been in production for many years. Oracle versions for almost all the different platforms in use at CERN have had to be supported. This has implied a very high pressure on human resources for supervision, database administration and expert knowledge, both within CN and in the user divisions. At the end of 1992 a study group consisting of the main Oracle users from all sectors at CERN listed a number of recommendations for the evolution of centrally supported database services. They advocated the establishment of a dedicated and centrally managed database server infrastructure, based on a reduced variety of hardware platforms, to be accessed in a client/server approach. Such an infrastructure should be dedicated to databases and not be mixed with other services (physics...), offer partitions to each major database community and provide full support for operations, systems and database software, as well as central database administration.

Current Status and Future Evolution

The specifications above have been gradually implemented in the following manner:

- The preferred server configuration has been defined as the ORACLE7 RDBMS running on SUN SPARCcenters with Solaris 2.x. Three groups of servers cover the main needs:
  - The Administrative Support Servers. Several SPARCcenter 1000 machines are used for Oracle-based applications managing the accounting, purchasing, goods reception, electronic document handling, the budget holder’s toolkit, import/export of goods, human resources, etc.
  - The Technical Support and General Purpose Servers. The DBLHC01 server, a SPARCenter 2000 run by the AT division, houses two Oracle instances, ACCDB and CASEDB, which manage LEP and LHC applications for project planning, approval and cataloguing of engineering drawings, machine installation logistics, accelerator equipment design, procurement, installation, operation and maintenance, cable management, survey, alarm systems, Oracle CASE support, etc. The DBSRV01 SPARCenter 2000 run by the CN division houses the CERNDB1 instance, which gives support to a great variety of applications and is truly a public, general purpose service.
  - The dedicated Accelerator Control and Operation Servers. Presently two SPARC machines house database applications which are crucial to the daily running of both the SPS and LEP machines. Other similar “mission-critical” databases are being set up for logging and control purposes.

Each server group has different service definitions and different base user populations, although, in practice, many of the users on a certain group need to access data on the other groups. A distributed database model is becoming more and more apparent:

- The Oracle databases which existed in the various mainframe-style central services have been (AIS SGI, VX/CRN) or are being (CERNVM, VX/ENG) migrated to these SUN servers.

THE VMDB1@CERNVM AND ENGDB@VXENG DATABASE Instances WILL BE DEFINITIVELY CLOSED ON 31-MARCH-1995.

The character-mode Oracle tools will be maintained on these platforms to allow existing applications to run in client mode. But, in view of the announced limited life of those services, users are strongly advised to prepare also the migration of the applications to modern GUI versions run from X-terminals, desk-top micros or workstations. The Oracle CDE tools, and many third-party offers, will allow a gradual transition. All tools can be made available on any future central systems offering general purpose interactive services.

- The centralised acquisition, distribution and installation of basic, general purpose, database software and
documentation will be maintained in the CN division, as well as a centralised first-line support team, also responsible for channeling problem reports to the manufacturers. Where possible, the support model is one where the members of CN Applications and Software Group (Database Section) interact most strongly with divisional “experts” who in turn offer more direct support to their local users. Other services offered by the ASD group include consultancy, either by the group, or the bringing in of external consultants where applicable, the identification of training needs and the organization of courses, briefings and presentations on database-related matters. ASD-DB supports EMDIR, the central directory for electronic mail addresses, the User Registration Database for users of CN computing services and various other divisional applications.

How to Obtain Additional Information

Existing news groups for general and specific database related topics include cern.oracle and cern.oracle.cde.

More information, help, advice on these subjects can be obtained by sending electronic mail to:

Oracle.support@cern.ch  general database-related matters
User.support@cern.ch  general computing matters
Xterminal.support@cern.ch  select, install an X-terminal
Workstation.support@cern.ch  select, install UNIX workstation
Nice@cern.ch  find about support for PC’s

Other support accounts are already listed on the front pages of this CNL.

5.10 Garfield Version 5.05

Rob Veenhof LIP, Lisbon, Portugal, and Zhengyong Feng University of Washington, Seattle, USA

Version numbers

OLD: 4.26  PRO: 4.33  NEW: 5.01  EXP: 5.05

Overview of modifications

CELL section:

Up to now, 2 formats could be used to enter a row of wires: using “increments” and using a formula. Only the latter is valid from now on; the 7th and 8th position are now used for the tension on the wire and its length. The two formats are illustrated below:


MAGNETIC-FIELD section:

When entering the magnetic field section, any existing gas data is deleted since the effect of the magnetic field on the transport properties of gases is now taken into account in the Magboltz interface.

OPTIMISATION section:

An instruction, FORCE, has been added to compute the force acting on a wire and its deflection.

GAS section:

The interface with MAGBOLTZ is now operational thanks to the work of Georg Viehhauzer. Gas mixing via MAGBOLTZ can be requested by typing commands like the following:

```
MAGBOLTZ HELIUM-4 30 ISOBUTANE 70
MAGBOLTZ computes the drift velocity, the longitudinal and the transverse diffusion coefficients, the Lorentz angle if there is a magnetic field, and the Townsend and attachment coefficients.

In the presence of a magnetic field, all these quantities are computed for a series of angles between E and B but for a fixed magnetic field strength. When the quantities are required, they are interpolated in a 2-dimensional table in E/p and E-B angle.

The diffusion coefficients should now be entered multiplied by the square root of the pressure in view of the scaling properties for this quantity. This brings the diffusion in line with the Townsend and attachment coefficients which were already entered in a scaling manner. This modification should be invisible if you use built-in gas mixture and if you use MIX or MAGBOLTZ.

An ion mobility can manually be added to the tables prepared by the MIX and MAGBOLTZ commands.

The kind of axes, linear or logarithmic, for the various gas plots has been brought under user control (AXES statement).

DRIFT section:

The ARRIVAL instruction now accepts several selected electrons in a single instruction – without noticable increase in CPU time consumption. Moreover, the selected electrons can now also be set to LAST, ONE-BUT-LAST, etc.

An instruction similar to ARRIVAL has been added, TIMING, which has the functionality of ARRIVAL but for 2 dimensional areas.

The default angular coverage for the initial search in XT- PLOT
has been changed to [-90,+90] degrees.

**Graphics:**

Two options have been added: WAIT-BEFORE-PLT and WAIT-AFTER-PLT which can be used to suppress the prompt before and after the plots.

Zhengyong Feng has written an interface from GKS to HIGZ to simplify the life of GARFIELD users who have a workstation. Details are given below about this interface. The longer term plan is to replace GKS by PHIGS, not by HIGZ.

**Formulas:**

Very small numbers were sometimes incorrectly set equal to zero. A new constant, $a$, appearing in the algebra simplification process is now only set equal to a known constant, $b$, if they do not differ by more than $\epsilon = (|a| + |b|)$.

**Compilation:**

A new PATCHY flag, HIGZ, has been introduced as an alternative to the various GKS flags. A loader message will be issued for routines GTX and ITX: the interface contains a routine called GTX that calls the HIGZ routine ITX which in turn has an entry point called GTX. See below for more general information about the interface.

GARFIELD now runs also on CSF, both in interactive mode and in batch. All UNIX-like machine flags can be used for compilation. GARFIELD jobs for CSF can be submitted from CERNVM via NQS.

**Front-end programs and EXEC files:**

The front-end EXEC and PANEL files for VM has been modified to enable job submission via NQS. These files have also been extended to allow the access of the HIGZ modules. The front-end program for Vax has been extended in a similar way.

**LSE file:**

No longer part of the distribution file.

**HIGZ interface**

As a widely used software tool to study drift-chamber properties, it is a little pity that due to the GKS limitation, GARFIELD cannot be run on some computers, such as SGI, HP and so on. On the other hand, HIGZ, as a part of the standard CERNLIB, is also a graphics tool, and can be run with nearly all types of computers.

The goal of this work is just to use HIGZ for replacing GKS in GARFIELD. This work has been done by introducing a minimized GKS-HIGZ interface (+PATCH, GKS_HIGZ) and modifying some graphics subroutines in GARFIELD (+PATCH, GRAPHICS) with a flag of HIGZ. Some GKS functions (inquiry, PICK, segments) are missing, but they are not vital for the functioning of GARFIELD. Text positions of a picture on screen and on paper (by printing the PostScript file) are different. The positions on paper are mostly as expected. However, problems concerning TEXT and PICK should be the next tasks of this work.

GARFIELD with HIGZ has been tested with SGI and HP machines. There should be no difficulty with other machines. Bugs, questions, critiques and suggestions are highly welcome: FENG@CERNVM.CERN.CH

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**5.11 New version of NAG Fortran library**

*CERN Program Library Office CN/ASD*

The latest version of the NAG double precision Fortran library, Mark 16, has recently been installed on the following systems: VM/CMS, VAX/VMS, AXP/VMS, Alpha-OSF, DEC-Ultrix, Sun/OS, Sun/Solaris, HP/UX, RS6000, SGI versions 4 and 5.

Unfortunately, we have been unable to fully complete the installation and so information on how to access and use this version of the library will be posted later to the HEP-LIB newsgroup and made available through WWW under the CERNLIB home page.
5.12 Program Library

F. James CN/ASD, K.S. Kölblig CN/ASD and J. Shiers CN/ASD

Request for User Feedback

The following subroutine packages will be declared obsolete in CNL 219 unless we receive user feedback to contrary.

<table>
<thead>
<tr>
<th>Code</th>
<th>Package</th>
<th>Library</th>
<th>Last Revision</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>D151</td>
<td>DIVON4</td>
<td>MATHLIB</td>
<td>1985</td>
<td>Difficult to use, problems reported</td>
</tr>
<tr>
<td>D701</td>
<td>FFTRC</td>
<td>MATHLIB</td>
<td>1973</td>
<td>Very old routine</td>
</tr>
<tr>
<td>D702</td>
<td>CFT</td>
<td>MATHLIB</td>
<td>1974</td>
<td>Very old routine, difficult to use</td>
</tr>
</tbody>
</table>

Deletion of Subprograms

The following packages were declared obsolete and are finally deleted from the source and binary with this revision:

<table>
<thead>
<tr>
<th>Code</th>
<th>Package</th>
<th>Library</th>
<th>Declared obsolete</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>D111</td>
<td>GPINDP</td>
<td>MATHLIB</td>
<td>CNL 214</td>
<td></td>
</tr>
<tr>
<td>D115</td>
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<td>MATHLIB</td>
<td>CNL 214</td>
<td></td>
</tr>
<tr>
<td>D115</td>
<td>CSPCAT</td>
<td>MATHLIB</td>
<td>CNL 215</td>
<td></td>
</tr>
<tr>
<td>E401</td>
<td>CTRAD</td>
<td>MATHLIB</td>
<td>CNL 215</td>
<td></td>
</tr>
<tr>
<td>E410</td>
<td>CPSC</td>
<td>MATHLIB</td>
<td>CNL 215</td>
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</tr>
<tr>
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<td>SPPINV</td>
<td>MATHLIB</td>
<td>CNL 211</td>
<td></td>
</tr>
<tr>
<td>F202</td>
<td>LRPC</td>
<td>MATHLIB</td>
<td>CNL 211</td>
<td></td>
</tr>
<tr>
<td>F230</td>
<td>DEFLS</td>
<td>MATHLIB</td>
<td>CNL 211</td>
<td></td>
</tr>
<tr>
<td>F600</td>
<td>SVD</td>
<td>MATHLIB</td>
<td>CNL 211</td>
<td></td>
</tr>
<tr>
<td>H100</td>
<td>SIMPLE</td>
<td>MATHLIB</td>
<td>CNL 215</td>
<td></td>
</tr>
<tr>
<td>H300</td>
<td>ASSIGN</td>
<td>MATHLIB</td>
<td>CNL 215</td>
<td></td>
</tr>
</tbody>
</table>

(*) This very old subroutine had, in fact, been deleted inadvertently some time ago.

Obsolete Subprograms

The following packages are declared obsolete and scheduled for eventual deletion:

<table>
<thead>
<tr>
<th>Code</th>
<th>Package</th>
<th>Library</th>
<th>Last Revision</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>E207</td>
<td>TRISUM</td>
<td>MATHLIB</td>
<td>1969</td>
<td>Use E409 RTRGSM</td>
</tr>
<tr>
<td>E208</td>
<td>LSQ</td>
<td>KERNLIB</td>
<td>1984</td>
<td>Use E201 RLSQPM</td>
</tr>
<tr>
<td>E221</td>
<td>CHEB</td>
<td>MATHLIB</td>
<td>1981</td>
<td>Use E222 RCHEBN</td>
</tr>
<tr>
<td>E255</td>
<td>PARLSQ</td>
<td>MATHLIB</td>
<td>1977</td>
<td>Use E201 RLSQP2</td>
</tr>
<tr>
<td>J509</td>
<td>CNPRNT</td>
<td>MATHLIB</td>
<td>1984</td>
<td>Obsolete</td>
</tr>
<tr>
<td>J511</td>
<td>MAP</td>
<td>MATHLIB</td>
<td>1978</td>
<td>Obsolete</td>
</tr>
<tr>
<td>M231</td>
<td>CVTIB</td>
<td>KERNLIB</td>
<td>1985</td>
<td>See CNL 217</td>
</tr>
<tr>
<td>U100</td>
<td>CLEBS</td>
<td>MATHLIB</td>
<td>1984</td>
<td>Use U112 RTELGN</td>
</tr>
<tr>
<td>U110</td>
<td>CLEBSG</td>
<td>MATHLIB</td>
<td>1984</td>
<td>Use U111 RWIG3J</td>
</tr>
<tr>
<td>V103</td>
<td>IRND01</td>
<td>MATHLIB</td>
<td>1982</td>
<td>Use inline code</td>
</tr>
<tr>
<td>V109</td>
<td>RANGAM</td>
<td>MATHLIB</td>
<td>1979</td>
<td>Use V135 RWGAMA</td>
</tr>
<tr>
<td>V110</td>
<td>POISSN</td>
<td>MATHLIB</td>
<td>1989</td>
<td>Use V136 RNPSN</td>
</tr>
<tr>
<td>V111</td>
<td>BIROMI</td>
<td>MATHLIB</td>
<td>1978</td>
<td>Use V137 RNBNML</td>
</tr>
<tr>
<td>V112</td>
<td>MIROMI</td>
<td>MATHLIB</td>
<td>1978</td>
<td>Use V138 RNBNML</td>
</tr>
</tbody>
</table>
Change of Subprogram Names

For reasons of consistency with the names in double-precision mode, the following subprogram or entry names in single-precision mode are changed in MATHLIB. These names thus become obsolete. Although the old names are kept as additional entry names (listed as Obsolete User Entry Names in the Short Write-ups) until further notice, users are encouraged not to use them in new programs and to change them as far as possible in existing ones.

<table>
<thead>
<tr>
<th>Code</th>
<th>Old Name</th>
<th>New Name</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C200</td>
<td>ZERIX</td>
<td>RZERIX</td>
<td>Available on CDC and Cray only</td>
</tr>
<tr>
<td>C201</td>
<td>SMLEQ</td>
<td>RSMLEQ</td>
<td>Available on CDC and Cray only</td>
</tr>
<tr>
<td>C207</td>
<td>RTEQ3</td>
<td>RRTSEQ3</td>
<td>Available on CDC and Cray only</td>
</tr>
<tr>
<td>C208</td>
<td>RTEEQ4</td>
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</tr>
<tr>
<td>C318</td>
<td>ELFUN</td>
<td>RELFUN</td>
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</tr>
<tr>
<td>C322</td>
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<td>RFRSNIN</td>
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<td>FRCCOS</td>
<td>RFRCCOS</td>
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</tr>
<tr>
<td>C323</td>
<td>FERDR</td>
<td>RFERDR</td>
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<tr>
<td>C324</td>
<td>ATANI</td>
<td>RATANI</td>
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</tr>
<tr>
<td>C330</td>
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<td>RASLGF</td>
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</tr>
<tr>
<td>C331</td>
<td>FCONC</td>
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<td>C332</td>
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<td>RDILOG</td>
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<tr>
<td>C334</td>
<td>GAPNC</td>
<td>RGAPNC</td>
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<td>GAGNC</td>
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<td>C339</td>
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<td>RDAWSON</td>
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</tr>
<tr>
<td>C342</td>
<td>STRHO</td>
<td>RSTRHO</td>
<td></td>
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<td>STRH1</td>
<td>RSTRH1</td>
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<td>C345</td>
<td>BZEJY</td>
<td>RBZEJY</td>
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<td>D104</td>
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<td>RCACUH</td>
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<td>RDEQMR</td>
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<td>D203</td>
<td>RKNYS</td>
<td>RRKNS</td>
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<td>D401</td>
<td>DERIV</td>
<td>RDERIV</td>
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<tr>
<td>E102</td>
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<tr>
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<td>MINFZE</td>
<td>RMINFZE</td>
<td></td>
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<td>LIHOIN</td>
<td>RLHOIN</td>
<td></td>
</tr>
<tr>
<td>U501</td>
<td>DJMB</td>
<td>RDJMB</td>
<td>Available on CDC or Cray only</td>
</tr>
</tbody>
</table>

New/Changed Subprograms

B105 RPLNML: Value of a Polynomial

A new function program B105 RPLNML (Value of a polynomial) written in Fortran, with entries RPLNML and CPLNML, which calculates the value of polynomials \( p_n(x) \), \( p_n(z) \) for real values \( x \) or complex values \( z \), respectively, has been submitted to MATHLIB. A double-precision version DPLNML with entries DPLNML and WPLNML is provided on IBM and similar computers.

C326 RCLAUS: Clausen Function

A new function program C326 RCLAUS (Clausen function) written in Fortran, which calculates the Clausen function \( \text{Cl}_2(x) = -\int_0^x \ln|2\sin \frac{1}{2}t|\,dt \) for real values \( x \), has been submitted to MATHLIB. A double-precision version DCLAUS is provided on IBM and similar computers.
C341  BSKA: Modified Bessel Functions K of Certain Order

A new subroutine subprogram C341 BSKA (Modified Bessel functions K of certain order) written in Fortran, with entries BSKA and EBSKA, which calculates a sequence of modified Bessel functions $K_{\nu+n}(x)$ or of $\exp(x) K_{\nu+n}(x)$ for real argument $x > 0$ and a chosen value $\nu \in \{0, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{2} \}$ has been submitted to MATHLIB for Cray and similar computers. A double-precision version DBSKA with entries DBSKA and DEBSKA is provided on IBM and similar computers.

D102  RADAPT: Adaptive Gaussian Quadrature

A new subroutine subprogram D102 RADAPT (Adaptive Gaussian quadrature) written in Fortran, which calculates, to an attempted specified accuracy, the value of a one-dimensional integral by using the five- and six-points Gauss rules together with subdivisions of the integration interval, has been submitted to MATHLIB. A double-precision version DADAPT is provided on IBM and similar computers.

D106  RGS56P: Gaussian Quadrature with Five- and Six-Point Rules

A new subroutine subprogram D106 RGS56P (Gaussian quadrature with five- and six-point rules) written in Fortran, which calculates an approximation for the value of a one-dimensional integral by using the five- and six-point Gauss rules, has been submitted to MATHLIB. A double-precision version DGS56P is provided on IBM and similar computers.

E102  MAXIZE: Maximum and Minimum Elements of Arrays

Two entries, MAXDZE and MINDZE, which find the position of the maximum and minimum elements, respectively, in double-precision arrays have been added to function subprogram E102 MAXIZE (Maximum and minimum elements of an array) in MATHLIB for IBM and similar computers. Further, the entries MAXFZE and MINFZE have been changed to MAXRZE and MINRZE for consistency. The old entries will be left in MATHLIB for a certain period and will then be deleted.

E201  RLSQPM: Least Squares Polynomial Fit

A new subroutine subprogram package E201 RLSQPM (Least squares polynomial fit) written in Fortran, with entries RLSQPM, RLSQP1 and RLSQP2, which calculates the coefficients of a polynomial $p_m(x) = a_0 + a_1 x + \ldots + a_m x^m$, respectively, by fitting a set of given data points in the least squares sense, has been submitted to MATHLIB. A double-precision version with entries DLSQPM, DLSQP1 and DLSQP2 is provided on IBM and similar computers. This subprogram package replaces subroutine subprograms E208 LSQ with entries LSQ and LLSQ in KERNLIB and subroutine subprogram E255 PARLSQ in MATHLIB, which thus become obsolete. The old routines will be left in KERNLIB or MATHLIB for a certain period and will then be deleted.

E222  RCHEBN: Solution of Overdetermined Linear Systems in the Chebyshev Norm

A new subroutine subprogram E222 RCHEBN (Solution of overdetermined linear systems in the Chebyshev norm) written in Fortran, which calculates the Chebyshev or minimax solution to a set of overdetermined linear equations, has been submitted to MATHLIB for Cray and similar computers. A double-precision version RCHEBN is provided on IBM and similar computers. This function subprogram replaces subroutine subprogram E221 CHEB in MATHLIB, which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.

E409  RTRGSM: Summation of Trigonometric Series

A new function subprogram E409 RTRGSM (Summation of trigonometric series) written in Fortran, which calculates $f(x) = a_0 + \sum a_k \cos kx + \sum b_k \sin kx$ for arguments $x \in [-\pi, \pi]$, has been submitted to MATHLIB. A double-precision version DTRGSM is provided on IBM and similar computers. This function subprogram replaces function subprogram E207 TRISUM in MATHLIB, which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.
U111 RWIGJ3: Wigner 3-j, 6-j, 9-j Symbols; Clebsch-Gordan, Racah W-, Jahn U-Coefficients

A new function subroutine U111 RWIGJ3 (Wigner 3-j, 6-j, 9-j symbols; Clebsch-Gordan, Racah W-, Jahn U-coefficients) written in Fortran, with entries RWIGJ3, RWIGJ, RCLEG, RRCAW, RJAHU, which calculates the Wigner 3-j, 6-j, 9-j symbols, and the (to those related) Clebsch-Gordan, Racah W- and Jahn U-coefficients, respectively, has been submitted to MATHLIB for Cray and similar computers. A double-precision version DWIGJ3 with entries DWIGJ3 etc. is provided on IBM and similar computers. This subroutine replaces function subroutine U110 CLEBSG with entries CLEBSG, WIGNJ3, WIGNJ, WIGNJ9, RACAH, JAHNU in MATHLIB, which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.

U112 RTCLGN: Clebsch-Gordan Coefficients in Rational Form

A new subroutine subroutine U112 RTCLGN (Clebsch-Gordan coefficients in rational form) written in Fortran, which calculates the (signed) square of the Clebsch-Gordan coefficient in rational form and in powers of prime numbers, has been submitted to MATHLIB for Cray and similar computers. A double-precision version DRTCLGN is provided on IBM and similar computers. This subroutine replaces subroutine subroutine U100 CLEBS, which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.

V135 RNFAMA: Gamma or Chi-Square Random Numbers

A new function subroutine V135 RNFGMA (Gamma or chisquare random numbers) written in Fortran, which generates a random number according to the gamma (especially χ²) distribution, has been submitted to MATHLIB. This subroutine replaces function subroutine V109 RANGAM in MATHLIB, which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.

V136 RNPSRN: Poisson Random Numbers

A new subroutine subroutine V136 RNPSRN (Poisson random numbers) written in Fortran, with entries RNPSRN and RNPS, which generates a random number according to the Poisson distribution, has been submitted to MATHLIB. This subroutine replaces function subroutine V110 POISSN with entries POISSN and POISET in MATHLIB, which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.

V137 RNBNML: Binomial Random Numbers

A new subroutine subroutine V137 RNBNML (Binomial random numbers) written in Fortran, which generates a random integer according to the binomial distribution, has been submitted to MATHLIB. This subroutine replaces function subroutine V111 BINOMI which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.

V138 RNMMNL: Multinomial Random Numbers

A new subroutine subroutine V138 RNMMNL (Multinomial random numbers) written in Fortran, which generates a set of random integers according to the multinomial distribution, has been submitted to MATHLIB. This subroutine replaces function subroutine V112 MNOMI which thus becomes obsolete. The old routine will be left in MATHLIB for a few months and will then be deleted.
6. Text Processing

6.1 Installing \LaTeXe\ on all platforms as the standard system

Michel Goossens CN/ASD

As announced in CNL 216 and 217, \LaTeXe\ will be installed as the standard \LaTeX\ system on all supported computer platforms at CERN at the beginning 1995. We have chosen the first weekend in January to make the change-over since computer load is still quite low due to the end of year holidays and we can thus more easily introduce the changes and monitor possible problems.

In practice it means that the commands \texttt{latex} and \texttt{dvips} will then use the Winter 1994 \LaTeX\ format built with the latest \TeX\ and \texttt{dvips} executables. Note that since June 1994 the \LaTeXe\ system has been available at CERN on Linux with the \texttt{latex2e} (and \texttt{dvips2e}) command, on VM and on VMS with the \texttt{latex2e}, and 12\text{e} commands respectively, (and standard \texttt{dvips}, since the "directory" structures are identical with those of \LaTeX\ 2.09 on the latter two systems).

Let us once more emphasize that \LaTeXe\ is backward compatible with \LaTeX\ 2.09, and that documents marked up for that version will run, in all but the most bizarre cases, through \LaTeXe\ without modification, though often a lot slower, due to the compatibility mode emulation.

For new documents users are thus invited to move to the new system as soon as possible (see my article in CNL 216 and in this CNL for an overview of the main differences and the available extensions). If there is a need, \LaTeXe\ conversion courses can be run in February.

Users who "really" have problems with the new system, are invited to contact me as soon as possible to solve them together. In line with the \LaTeX\ support philosophy that versions older than one year are no longer supported we shall keep the \LaTeXe\ 2.09 version available with the command \texttt{oldlatex} (and \texttt{olddvips} on Unix) up to the end of June 1995, but in no way beyond that date. This should give all users enough time to upgrade to \LaTeXe\ or to solve possible problems with their old version in compatibility mode.

6.2 \LaTeX\ and Russian texts

Michel Goossens CN/ASD and Basil K. Malyshev (CERN and IHEP, Protvino, Russia)

A working environment to compose Russian texts in a user friendly way and then to treat them with \LaTeX\ and print them has been installed on the Unix and VMS systems at CERN. The prime aim is to have a setup compatible with what is used in Russia, so that articles and reports can be easily exchanged between Russia and CERN.

Although various 8-bit encoding schemes exist for Cyrillic, the more common one on Unix and VMS is KOI8. It has the Latin letters in the lower 128 positions of the font set-up and Cyrillic in the upper 128 positions (see Fig. 6.1)

Preparing the text

The first step in preparing a text consists of entering the source with an editor. In the case of Cyrillic the editor must be able to display the Cyrillic characters on screen. When using X-windows, one can get such fonts (at CERN) from the \texttt{xtsoft1} font server. In particular, one can add Cyrillic fonts to your X-station by typing:

\begin{verbatim}
xset fp+ tcp/xtsoft1:7014
xset fp rehash
\end{verbatim}

The first command declares the supplementary fonts, while the second has the server reread its font database. Then to actually have \texttt{emacs} load one of the KOI8 fonts you have to issue the command \texttt{ESC set-default-font} and then choose one of the many fonts available via the \texttt{xtsoft1} server. A nicely readable font is e.g.,

![Figure 6.1: Layout of the KOI8 encoding](image-url)

To get a complete list you can (on Unix) issue the command...
xlsfonts | grep koi8
which will list all the fonts known to the X-server that have the
string koi8 in their name (when last running this command there were
133 such occurrences).

Next you need to set up emacs to switch between showing
English and Cyrillic characters on screen. Basil Malyshev
has written an add-on for emacs, that gives one access to the
Cyrillic characters in an easy way. To load his file you should
add the following lines to your emacs start-up file .emacs

; Display accented characters (8-bit codes)
(standard-display-european t)
(autoload 'cyrillic-toggle 'cyrclern
"Toggle between Cyrillic and English." t)
(global-set-key "C-0" 'cyrillic-toggle)

By typing two “Control-C’s”, you will toggle between the
English and Cyrillic character sets (moreover, the first time in
the session that you type "C-C emacs will load the cyrclern
package itself).

As we have no cyrillic keyboards at CERN, one must use a
mapping of the "standard" QWERTY layout to the Cyrillic
characters. This mapping is shown in Fig. 6.2, where the first line
in each case shows the character on the keyboard and the second
the corresponding Cyrillic.

On VMS one should use the MicroEmacs editor, which can
be invoked by the mg command. Moreover, on that system,
you can translate your document from other coding schemes
used in Russia to KOI8 with the help of the RTCU program.

Running \LaTeX

To be able to print Russian with \LaTeX one must make \TeX
aware of the new encoding, and provide glyphs for the
characters at the given code points.

The necessary declarations for \LaTeX are made with the fol-
lowing commands:

\documentclass{article}
\usepackage{russian}

or its (now deprecated) \LaTeX 2.09 variant

\documentstyle[russian]{article}

The \iheprep class for preparing IHEP (Protvino) preprints
is available. To get plain layout use the header:

\documentstyle[14pt,russian]{iheprep}

On Unix you would then run \LaTeX with the command

latex2e myfile

The format does not yet include Russian hyphenation pat-
terns, but it is foreseen to generate several formats for certain
language combinations during the January 1995 change-over
(see section 6.1).

On VMS you should type

$ 12e/format=12emlx myfile$

where hyphenation patterns for English, Spanish, Italian and
Russian are loaded (with format=12emlx English, French and
German are available).

To generate a PostScript file, you can type the command:

dvips2e -psa myfile -o

dvipsprinter=psa myfile

This will use Malyshev’s PostScript type 1 outline fonts. The
output can be printed on any PostScript printer or previewed
with \texttt{ghostview} or any other PostScript previewer.
6.3 Presenting \( \Omega \)

Michel Goossens CN/ASD

The \TeX{} program was originally developed in the mid-seventies by Donald Knuth to typeset mathematical texts in the English language. Since then \TeX{} has made inroads in many areas of scientific and socio-cultural activities in most countries of the world. To make transferring \TeX{} files between various sites easier Knuth froze \TeX{} in 1991 in the interest of stability. However, he allows the \TeX{} code to be used as the basis for further developments, but the resulting system should then be distributed under a different name.

\( \Omega \) is an extension of \TeX{} developed by Yannis Haralambous (Lille, France) and John Plaice (Université de Laval, Canada). Its first release, that is presently in the beta-testing phase, improves mainly \TeX{}'s multi-lingual abilities.

On Thursday March 16th 1995 \( \Omega \), the first generally available extended version of \TeX{}, will be presented to the world at CERN (Geneva, Switzerland). In \( \Omega \) all data and data-structures have 16-bit wide data words, thus eliminating many of the trivial limitations of \TeX{}. \( \Omega \) allows multiple input and output character sets, and uses filters to transform between them. Internally, \( \Omega \) uses the universal 16-bit Unicode standard character set (see my article in CNL 216, “International Character Codes”). All these improvements will not only make it easier for \TeX{} users to cope with multiple or complex languages (Khmer, Arab, Indic, Chinese, Japanese) in one document, but also form the basis for future developments in other areas, such as native colour support.

The presentations on the 16th of March will take place in the CN Amphitheatre (Bld. 31, 3rd Floor). They will start with a general introduction of the \( \Omega \) system and discuss how it is implemented on various computer platforms. Then with the help of examples of high quality typography it will be shown how the use of the Unicode/ISO 10646 character code makes it easier to handle a complete set of Cyrillic, Latin, Greek, Arab, Hebrew, and other characters in one document. At the end of the day a round-table discussion will allow the participants to provide input to the \( \Omega \) team about which features they would like to see improved or added to the system. All participants will obtain a free copy of the software to take home with them. More technical discussions between implementors can be organized on the next day.

6.4 New graphics commands in \LaTeX\ 2e

Michel Goossens CN/ASD

Introduction

\LaTeX\ 2e provides a generalized driver-independent interface for the inclusion of external graphic material, as well as for scaling and rotation of \LaTeX{} boxes. These features are not in the \LaTeX\ 2e kernel, so you have to load the standard supported graphics or \graphicx{} extension packages. The color extension package, that will be discussed in detail in one of the next issues of the CNL, implements basic colour functions. These packages rely on features that are not in \TeX{} itself, but which must be supplied by the “driver” used to print the dvi file\(^1\). Inside a picture environment \LaTeX{} 2e offers the possibility to draw Bezier curves (with the \texttt{\textbackslash bezier} command) or grids (by loading the \graphpap package). Using the possibilities of the drivers, the \texttt{pic2e} removes many restrictions on picture environment commands, such as limitations on the length and slope of lines and arrows.

The graphics package

The graphics package (and its extension \graphicx{}) allow the user to scale, rotate, and reflect \LaTeX{} material, or include graphics prepared with other programs. \LaTeX{} will leave the necessary space for the material after applying the geometric transformation, but it is the device driver (e.g. \texttt{dvips}, \texttt{xdvi}, etc.) which must be capable of performing the transformation in question. Some drivers, such as previewers, might therefore display material overlapping the surrounding text.

Scaling a \LaTeX{} box

The \texttt{\textbackslash scalebox} command lets you magnify or reduce text or other \LaTeX{} material by a scale factor.

\begin{verbatim}
\scalebox{scalefact}\{contents\}
\end{verbatim}

When specified with two (mandatory) arguments, the first one (scalefact) specifies the factor by which both dimensions of the material (contents) have to be scaled.

As an example consider the following:

\begin{verbatim}
\scalebox{2}{Text to be scaled}
\scalebox{0.5}{Text to be scaled}
\end{verbatim}

Text to be scaled Text to be scaled Text to be scaled

If a supplementary optional argument is present, then this is used to specify a separate vertical scaling factor.

\begin{verbatim}
\scalebox{h-scale}[v-scale]\{contents\}
\end{verbatim}

This is demonstrated in the following examples, which also show how multiple lines can be scaled by using the standard \LaTeX{} \texttt{parbox} command.

\begin{verbatim}
\end{verbatim}

\footnote{Unfortunately not all drivers support the same features, and even the internal method of accessing these extensions varies between drivers. Consequently all these packages take options such as \texttt{\textbackslash dvips=\textquoteright\textbackslash parbox} to specify which driver is being used.}
The unstarred \texttt{\resizebox} bases its calculations on the height of the LaTeX material, while the starred \texttt{\resizebox*} command takes into account the total height (the depth plus the height) of the LaTeX box. The next \texttt{\parbox} examples, which have a large depth, show the difference.

\begin{verbatim}
\HR\resizebox(15mm){(20mm)}{K\textsuperscript{\textregistered}on & Lyon & Oxford \hspace{1cm} Rhein & Rh\textsuperscript{\textregistered}one & Thames
\end{tabular}\\\\
\HR\resizebox*(15mm){(20mm)}{K\textsuperscript{\textregistered}on & Lyon & Oxford \hspace{1cm} Rhein & Rh\textsuperscript{\textregistered}one & Thames
\end{tabular}
\end{verbatim}

\textbf{Rotating a LaTeX box}

\begin{verbatim}
\rotatebox(angle){contents}
\end{verbatim}

LaTeX material can be rotated over an angle with the \texttt{\rotatebox} command, whose second argument (\texttt{contents}) is typeset inside a LaTeX box and rotated through \texttt{angle} degrees counter-clockwise around the reference point.

\begin{verbatim}
\rotatebox{45}{rotation angle $45^\circ$}
\rotatebox{90}{rotation angle $90^\circ$}
\end{verbatim}

It is important to realize where the reference point is; the following examples show it can be shifted, using standard \texttt{\parbox} and \texttt{\makebox} parameters. Notice the effect of the placement parameter on the \texttt{\parbox} command.

\begin{verbatim}
\HR\parbox{4mm}{\framebox[4mm]{\parbox[4mm]{3mm}{Red\hspace{1mm}Green\hspace{1mm}Blue}}}
\end{verbatim}
With the extended graphics package graphicx one has more flexibility to specify the point around which the rotation is to take place by using key val pairs.

\rotatebox[key val list]{angle}{IN\TeX box}

One of the possible keys is origin and for the values you can choose one or two amongst the following list:

<table>
<thead>
<tr>
<th>horizontal</th>
<th>vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>l left</td>
<td>t top</td>
</tr>
<tr>
<td>r right</td>
<td>b bottom</td>
</tr>
<tr>
<td>c centre</td>
<td>B baseline</td>
</tr>
</tbody>
</table>

One can also supply x and y coordinates with x=dim, y=dim, which specify the new point (relative to the reference point) around which the rotation is to take place.

x=1cm, y=1cm

You can control the interpretation of the angle argument of \rotatebox, by giving the units keyword. It lets you specify a factor to be applied to the angle, e.g., units=6.283185 changes the degree specification to radians. Similarly, the direction of rotation can be changed to clockwise by putting units=-360 in \rotatebox's optional argument.

Rotating tabular material

Tabular material can also be rotated. The examples below show how the distance between the columns and the vertical placement of the table can be controlled by the use of zero width or zero height rules.

\begin{tabular}{rrr}
\rotatebox[origin]{45}{Column 1} & \rotatebox[origin]{45}{Column 2} & \rotatebox[origin]{45}{Column 3} \hline
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9 \\
\hline
\end{tabular}

% Zero height rule of width of one quad
\newcommand{\IR}[1]{\rule[0pt]{#1}{0pt}}
\makebox[0cm][c]{\rotatebox[origin]{45}{\#1}}
\begin{tabular}{rrr}
\IR{Column 1} & \IR{Column 2} & \IR{Column 3} \hline
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9 \\
\hline
\end{tabular}

Rotation inside tables can be nested, as shown below.

\begin{tabular}{c}
\setlength{extrarowheight}{4pt}
\HR\rotatebox[origin]{90}{%}
\begin{tabular}{|l|}
\hline
11\quad r! \hline
\end{tabular}
\HR
\em Word & \\
\raisebox[depth]{%}
\rotatebox[origin]{90}{\text{Occurrences}} \[imm]
\hline
hello & 33 \hline
goodbye & 34 \hline
\end{tabular}

A more complex example is given in table 6.1 on the following page. The whole table is rotated by a \rotatebox command. Note the use of another \rotatebox command to generate vertically running text. By specifying a zero depth and height for the result of the \rotatebox command \LaTeX is made to think that 'Format classes' takes up no vertical space.

Rotation inside tables

As shown above, material inside a tabular or array environment can be rotated at will. This functionality can be used, e.g., to generate (rotated) braces, that span multiple columns or rows.
The building block in the following examples and in Table 6.2 is the \Bpara macro whose definition is shown below. The principle is to make a \{ in math mode, but hide it from TeX. That is why we use a picture environment of vanishing height and width. It contains a zero-width \makebox (to hide the horizontal dimension), that contains the rotated material, whose height is hidden from TeX by the \smash command. The (zero-width) \rule controls the height of the \{ in math mode (the \left. command is needed to balance the parentheses). Similar commands can be constructed for other large symbols.

\begin{array}{rll}
\setlength{\unitlength}{1mm}
% \#1 x coordinate of reference point of brace
% \#2 y coordinate of reference point of brace
% \#3 rotation angle for large brace
% \#4 total height of brace
\newcommand{\Bpara}[4][%}
\begin{picture}(0,0)\%}
\put(#1,#2){\makebox[0mm]}%
\rotatebox{#3}{%}
\smash{\%}
$\left\{\rule{0mm}{#4}\}$%
\right. \}\%}
\end{picture}\%}
\end{array}\%

\begin{array}{c}
\begin{array}{cccccccc}
\begin{tabular}{|c|c|c|c|}
\hline
6 & 5 & 2 & 74 \% & 52 & 87 & 62 & 88 \% & 57 & 81 \%
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline
A & B & C & D \%
\hline
0 & 84 & 1189 & 1000 & 1144 & 91 & 1297 \%
1 & 594 & 841 & 707 & 1000 & 500 & 707 \%
2 & 420 & 594 & 353 & 500 & 458 & 648 \%
3 & 297 & 420 & 250 & 353 & 324 & 458 \%
4 & 210 & 297 & 176 & 250 & 162 & 250 \%
5 & 148 & 210 & 125 & 176 & 88 & 125 \%
6 & 105 & 148 & 88 & 125 & 52 & 87 \%
7 & 74 & 105 & 52 & 87 & 7 & 52 \%
8 & 52 & 74 & 7 & 52 & 52 & 87 \%
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline
6 & 5 & 2 & 74 \% & 52 & 87 & 62 & 88 \% & 57 & 81 \%
\hline
\end{tabular}
\end{array}
\end{array}\%

\begin{array}{rll}
\begin{tabular}{|c|c|c|}
\hline
A & B & C \%
\hline
41 & 42 & 33 \%
\hline
\end{tabular}
\begin{tabular}{|c|c|}
\hline
13 & 23 \%
\hline
41 & 42 \%
\hline
\end{tabular}
\end{array}\%

Using the ifthen package one can show the effect of rotating a vertical bar over 360 degrees, in 10 degree steps.

\begin{center}
\begin{array}{rll}
\begin{tabular}{|c|}
\hline
13 \%
\hline
41 & 42 \%
\hline
\end{tabular}
\begin{tabular}{|c|}
\hline
23 \%
\hline
41 & 42 \%
\hline
\end{tabular}
\end{array}
\begin{tabular}{|c|}
\hline
33 \%
\hline
41 & 42 \%
\hline
\end{tabular}
\end{center}\%

\begin{center}
\newcommand{\ArrayStretch}{1.1}\%}
\setlength{\tabcolsep}{2mm} \%
\rotatebox{-90}{%}
\begin{tabular}{|c|c|c|}
\hline
A & B & C \%
\hline
1 & 2 & 3 \%
\hline
\end{tabular}
\end{center}\%

% \begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|}
% \hline
% A & B & C & D & E & F & G & H & I & J & K & L \%
% \hline
% 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \%
% \hline
% \end{tabular}\%
Combining effects

Rotation and scaling commands can be combined and nested \textit{ad lib}; we can also apply them to \LaTeX{} picture environment objects.

\begin{tabular}{|c|c|c|c|c|}
\hline
1.4\times10^{-4} & 0.02 & 0.06 & 0.03 & 0.64 & 0.935 & 0.066 & 0.020 & 0.018 & 0.097 \%
1.2\times10^{-4} & 0.04 & 0.09 & 0.07 & 0.65 & 0.922 & 0.051 & 0.030 & 0.018 & 0.097 \%
1.5\times10^{-4} & 0.06 & 0.22 & 0.15 & 0.67 & 0.894 & 0.027 & 0.020 & 0.018 & 0.097 \%
9.0\times10^{-4} & 0.15 & 0.3 & 0.34 & 0.63 & 0.888 & 0.012 & 0.021 & 0.018 & 0.097 \%
3.0\times10^{-3} & 0.15 & 1.2 & 0.61 & 0.917 & 0.009 & 0.009 & 0.003 & 0.030 \\
\hline
\end{tabular}

Table 6.2: Constructing brackets spanning several rows

Including Graphics Files

To make it easier for the user to include any kind of graphics file that can be handled by the different drivers, \LaTeX{} offers a uniform syntax for the inclusion of such files. Generally, it relies on the file having an extension that identifies the type of file. Driver configuration files define a collection of file extensions that the driver can handle. This list can be
extended using the declarations described below. Although most of the examples below use PostScript inclusions, the system also copes with files of type TIFF, PCX, Macdraw, etc. Of course appropriate drivers must also be available for each case.

The basic graphics package

A graphics file file can be included using the graphics package with the command:

```
\includegraphics*[llx, lly][urx,ury]{file}
```

Without optional arguments the size of the graphic will be determined by reading the external file file (containing the graphics itself, or a description thereof, see below).

If [urx,ury] is present, then it should specify the coordinates of the top right corner of the image, as a pair of T\TeX\ dimensions. The default units are big (PostScript) points, i.e., [1in, 1in] and [72, 72] are equivalent. If only one optional argument is given, the lower left corner of the image is assumed to be at [0, 0]. Otherwise, [llx, lly] specifies the coordinates of that point.

The starred form of the command “clipped” the graphics image to the size of the size (bounding box) specified. In the normal form (without the *) of the \includegraphics command, any part of the graphics image that falls outside the specified bounding box will over-print the surrounding text.

To see the effect of the various arguments, we will show the effect of each of them. In the following the framebox corresponds to the “bounding box”, and the baseline is indicated by the horizontal rules. We use a small PostScript program (in a file w.ep.s), that paints a large uppercase letter A, and a few lines. Its source is shown below. Note the BoundingBox command, which stipulates that the image starts at the point 100 100 (in big points), and goes up to 172 172, i.e., its natural size is one inch by one inch.

```\small PostScript picture
\BoundingBox:100 100 172 172
100 100 translate % put origin at 100 100
0 0 moveto % define current point
72 72 rlineto % trace diagonal line
72 neg 0 rlineto % trace horizontal line
72 72 neg rlineto % trace other diagonal line
stroke % draw (stroke) the lines
0 0 moveto % redefine current point
/Times-Roman findfont % get Times-Roman font
72 scalefont setfont % scale it to 1 inch
(W) show % draw an uppercase W
showpage % show the page
```

In this case the picture and its bounding box nicely coincide. Next we are specify a bounding box which corresponds to only part of the picture, so that some parts fall outside its boundaries, and will overlay the material surrounding the picture. If the starred (clipped) form is used then the picture is clipped to the bounding-box, as shown in the case at the right. To make it easier to see what happens a grid is overlaid on the picture.

The next cases show how the \scalebox and \resizebox commands can be used in together with \includegraphics. Note how the image bounding box gets transformed.

```
\left\HR
\framebox{\scalebox{.5}{\includegraphics{w.ep.s}}}%
\HR right
```

```
\left\HR
\framebox{\scalebox{.5}[2]{\includegraphics{w.ep.s}}}%
\HR right
```

```
\left\HR
\framebox{\resizebox{15mm}{!}{%}
\includegraphics{w.ep.s}}%}
\HR right
```
Adding rotations makes it even more fun.

The extended graphics package

When you use the extended graphics package \texttt{graphicx}, the syntax is somewhat more transparent.

\begin{itemize}
\item \texttt{\includegraphics*[key val list]{file}}
\end{itemize}

Possible keys are:

- \texttt{bb} The "bounding box" of the graphics image. Its value field should contain four dimensions, separated by spaces.
- \texttt{bbllx}, \texttt{bblly} Lower left x and y coordinate (obsolete\textsuperscript{1}).
- \texttt{bburx}, \texttt{bbury} Upper right x and y coordinate (obsolete\textsuperscript{1}).
- \texttt{natheight} Natural height of figure\textsuperscript{2}.
- \texttt{natwidth} Natural width of figure\textsuperscript{2}.
- \texttt{angle} Rotation angle (in degrees, counterclockwise).
- \texttt{width} Required width.
- \texttt{height} Required height.
- \texttt{scale} Scale factor.
- \texttt{clip} Clip the graphic to the bounding box. Can be either "true" or "false" (specifying no value is equivalent to "true").
- \texttt{draft} Locally switch to draft mode. Is a Boolean valued key, like "clip".
- \texttt{type} Specify the graphics type.
- \texttt{ext} Specify the file extension.
- \texttt{read} Specify the file extension of the file being read.
- \texttt{command} Specify any command to be applied to the file.

\footnotesize
\textsuperscript{1}Kept for backward compatibility only. \texttt{bbllx=a, bblly=b, bburx=c, bbury=d} is equivalent to \texttt{bb = a \ b \ c \ d}, so the \texttt{bb} form should be used.

\textsuperscript{2}These arguments can be used for setting the lower left coordinate to (0 0) and the upper right coordinate to (\texttt{natwidth natheight}).
Next let us resize the picture. Note that we can only scale the picture globally in both directions.

```latex
\text{left}\ \text{HR}
\framebox{\includegraphics[scale=.5]{w.epsi}}\%
\text{HR right}
```

Adding rotations makes it even more fun.

```latex
\text{left}\ \text{HR}
\framebox{\includegraphics[angle=45]{w.epsi}}\%
\text{HR right}
```

A few more examples are shown below.

```latex
\text{left}\ \text{HR}
\framebox{\includegraphics[angle=240, width=27mm]{Escher.epsi}}\%
\text{HR right}
\framebox{\includegraphics[angle=90, width=27mm]{Escher.epsi}}\%
```

Rotating and resizing a picture can be useful for making it fit a paper size as closely as possible. The example below shows a map of the Gdańsk area, that was made to fit an A4 page by putting it in landscape and making its width (after rotation) equal to the text width that had previously been set equal to the width of the paper size (21 cm). The \texttt{hoffset} and \texttt{voffset} lengths had to be reset, since \LaTeX\ ’s article class has its first printable point approximately at 40 mm from the upper right hand corner of the page.

```latex
\documentclass[a4paper]{article}
\usepackage[dvips]{graphics}
\setlength{\textwidth}{210mm}
\setlength{\textheight}{297mm}
\setlength{\voffset}{-40mm}
\setlength{\hoffset}{-40mm}
\pagestyle{empty}
\begin{document}
\resizebox{\textwidth}{!}{\rotatebox{90}{%}
\includegraphics{gdansk.epsi}}
\end{document}
```
Setting key values globally

If you want to specify a global value for a set of keys, then you can use the \setkeys command defined in the keyval package (described below).

As an example let us consider the case where you would like your figure to be scaled to the width of the line. Then you could specify the following:

\setkeys{Gin}{width=\linewidth}

The first argument Gin of the \setkeys command refers to the \includegraphics command. The result will be that all images include with this command (when the graphics is loaded) will be set to the desired width inside the current group or environment.

In the similar way one could specify any of the possible arguments of the \rotatebox command by using the Grot specifier, e.g.,

\setkeys{Grot}{origin=tc}

Advanced commands in the graphics package

A list of directories where \LaTeX{} should search for graphics files can be specified by the command \graphicspath, whose syntax is:

\graphicspath\{dir-list\}

\textit{dir-list} is a list of directories, each inside a pair of braces \{\} (even if there is only one in the list). For example, \graphicspath\{./eps/\}.tiff\} causes \LaTeX{} to look in the subdirectories eps and tiff of the current directory. By default \LaTeX{} will look for graphics files in the same directories where it looks for other files.

\DeclareGraphicsExtensions{sep}{ext-list}

The \DeclareGraphicsExtensions command lets you specify the behaviour of the system when no file extension is given in the argument of the \includegraphics command. \textit{ext-list} is a comma separated list of file extensions. Full filenames are constructed by appending \textit{sep} and each extension of the list \textit{ext-list} in turn, until a file corresponding to the generated full filename is found. A dot . is the default value for \textit{sep}.

Since the previous algorithm tests for the existence of a file to determine which extension to use, in the case where the \includegraphics command is specified without extension the graphics file must exist at the time \LaTeX{} is run. However, if a file extension is specified, e.g., \includegraphics[gr,eps] instead of \includegraphics[gr], then the graphics file need not exist at the time of the \LaTeX{} run\(^2\). However, \LaTeX{} needs to know the size of the image so that size must be specified in the arguments of the \includegraphics command, or in the file actually read by \LaTeX{} (this can be the graphics file itself, or another file specified with the read= argument or constructed from the list of file extensions). In the latter case that file must exist at the time \LaTeX{} is used.

With the declaration below the \includegraphics command will first look for a file file.ps and, if no such file exists, for a file file.ps.gz.

\DeclareGraphicsExtensions{ps,ps.gz}
\includegraphics{file}

If one wants to make sure that a full filename must always be specified, then the following declaration can be used. Note also that, in the cases below, the size of the (bitmap) image is specified explicitly in each case on the \includegraphics command.

\DeclareGraphicsExtensions{\{\}}
\includegraphics[1in,1in]{file.pcx}
\includegraphics[75pt,545pt][50pt,530pt]{file.pcx}
\includegraphics[bb=75 545 50 530]{file.pcx}

The action that has to take place when a file with a given extension is encountered is controlled by the following command:

\DeclareGraphicsRule{ext}{type}{read-file}{cmd}

Any number of these declarations can be made. The meaning of the arguments are given below.

\(^2\)For instance, it can be created on the fly by the \texttt{command} argument specified in the \texttt{\DeclareGraphicsRule} command described below.
The extension of the file. It can be specified explicitly or, if the argument to `\includegraphics` does not have an extension, from the list of extensions specified in argument ext-list of the `\DeclarationsGraphicsExtensions` command.

The "type" of file involved. All files of the same type will be input with the same internal command (which must be defined in the corresponding "driver file"). For example, files with extensions `ps`, `eps`, or `ps.gz` are all classified as type `eps`.

The extension of the file that should be read to determine the size of the graphics image. It can be identical to `ext`, but, in the case of compressed or binary images, that cannot be interpreted easily by `\LaTeX`, the size information (the bounding box) is normally put in a separate file (e.g., for compressed gzipped PostScript files characterized by the extension `ps.gz` the corresponding readable files could have the extension `ps.bb`). If the `read-file` argument is empty `{}`, the system will not try to locate an external file to determine the size, and the latter must be specified in the arguments of `\includegraphics`. If the driver file specifies a procedure for reading size files for `type`, that will be used, otherwise the procedure for reading `eps` files will be used. Therefore, in the absence of any specific other format, one can specify the size of a bitmap picture by using the syntax for PostScript images, i.e., with a `\%BoundingBox` line.

The command to be inserted in the `\special` command instead of the filename. In general `cmd` is empty, but for compressed files one might want to uncompress the image file before including it in the file to be printed, e.g., with the dvips driver, one could use

```
\DeclarationsGraphicsRule{ps.gz}{eps}{ps.bb} %
  \{\texttt{gunzip \#1}\}
```

where the argument `\#1` denotes the full filename. In this case the final argument causes dvips to use the `gunzip` command to uncompress the file before inserting it into the PostScript output.

Possible possibilities for the various arguments of the `\DeclarationsGraphicsRule` command are shown in Table 6.3.

<table>
<thead>
<tr>
<th>ext</th>
<th>type</th>
<th>read-file</th>
<th>cmd</th>
</tr>
</thead>
<tbody>
<tr>
<td>basic PostScript</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>ps</code></td>
<td><code>eps</code></td>
<td><code>ps</code></td>
<td></td>
</tr>
<tr>
<td><code>eps</code></td>
<td><code>eps</code></td>
<td><code>eps</code></td>
<td></td>
</tr>
<tr>
<td>dynamic decompression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>pz</code></td>
<td><code>eps</code></td>
<td><code>bb</code></td>
<td><code>\texttt{gunzip -c \#1}</code></td>
</tr>
<tr>
<td><code>ps.pz</code></td>
<td><code>eps</code></td>
<td><code>ps.bb</code></td>
<td><code>\texttt{gunzip -c \#1}</code></td>
</tr>
<tr>
<td><code>eps.pz</code></td>
<td><code>eps</code></td>
<td><code>eps.bb</code></td>
<td><code>\texttt{gunzip -c \#1}</code></td>
</tr>
<tr>
<td>DOS related formats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>tif</code></td>
<td><code>tiff</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>pcx</code></td>
<td><code>bmp</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>bmp</code></td>
<td><code>bmp</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>msp</code></td>
<td><code>bmp</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac related formats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>pict</code></td>
<td><code>pict</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>pntg</code></td>
<td><code>pntg</code></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.3: Arguments of `\DeclarationsGraphicsRule`

A declaration

```
\DeclarationsGraphicsRule{\*}{eps}{\*}{\*}
```

will cause all unknown extensions to be treated as EPS files, and the respective graphics files will be read to search for a BoundingBox comment.

Other packages in the graphics bundle

The `epsfig` and rotating packages

Two of Sebastian Rahtz's `\LaTeX` 2.09 style files have been interfaced to the `graphicx` package, so that users of those styles can continue to use the syntax they are familiar with. The rotating package offers also some supplementary high level functionality, like the `sidewaysstable` and `sidewaysfigure` environments.

The `trig` package

The `trig` package is not intended to be used directly in documents. It calculates sine, cosine and tangent trigonometrical functions, that are used to calculate the space taken up by a rotated box. This package is also used by the Alan Jeffrey's fontinst program which converts PostScript files to a form useable by `\LaTeX`.

The `keyval` package

This package is intended to be used by other packages. It implements a generic way of setting "keys" as used by the `graphicx` package, and splitting up the comma separated lists of such values. It is also used by Timothy van Zandt's `pstrick` package.
Bézier approximations

\LaTeX{} allows the construction of quite complicated mathematical curves using the technique of approximations with Bézier splines. Note that the PostScript language also uses (third order, or cubic) Bézier curves as the basis of its curve drawing functions.

\begin{verbatim}
\qbezier[N](AX,AY)(BX,BY)(CX,CY)
\end{verbatim}

The above command defines a quadratic Bézier curve, which is defined by its two end points, \((AX,AY)\) and \((CX,CY)\), with \((BX,BY)\) as the control point. The optional parameter \(N\), if present, specifies that \(N + 1\) points are plotted to approximate the curve. In the first example below \(A\) and \(C\) are the end points and \(B\) is the control point. The number of plotted points needed to obtain a smooth curve is calculated automatically (default case).

Varying the number of dots and the control point has a clear effect. In the second example two curves use the default number of points, while the others explicitly specify the number to use. The position of the control points is indicated by an open circle.

\begin{verbatim}
\setlength{\unitlength}{1mm}
\begin{picture}(55,35)(-3,-3)
  \linethickness{1pt}
  \qbezier(0,0)(10,30)(50,30)
  \thinlines
  \put(0,0){\line(1,3){10}}
  \put(50,30){\line(-1,0){40}}
  \put(0,0){\circle*{1}}
  \put(0,-1){\makebox(0,0)[t]{$A$, (0,0)}}
  \put(10,30){\circle{1}}
  \put(10,31){\makebox(0,0)[b]{$B$, (10,30)}}
  \put(50,30){\circle*{1}}
  \put(50,31){\makebox(0,0)[b]{$C$, (50,30)}}
\end{picture}
\end{verbatim}
7. Questions and Answers from the UCO

by the UCO Team

Such a section, which is present on a regular basis in the DESY Computing Newsletter, appears to have been missing in our CNL. The objective is to publish the answers to questions which were raised at the User Consultancy Office (UCO) here at CERN and that we think are of general interest. By reporting a few of these questions and answers to a larger audience in this CNL might also contribute, in the future, to the constitution of a good data base for “Frequently Asked Questions” (FAQs) regarding computing at CERN, easily accessible from the most popular information systems (XFIN, WWW and Mosaic).

<table>
<thead>
<tr>
<th>CERN’s User Consultancy Office (UCO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail: EARN/ BITNET UCO@CERNVM</td>
</tr>
<tr>
<td>Address: Building 513 CERN - CN Division 1211 Geneva 23 Switzerland</td>
</tr>
<tr>
<td>Telephone: + 41.22.767.49.52</td>
</tr>
<tr>
<td>FAX: + 41.22.767.84.50</td>
</tr>
<tr>
<td>Opening Hours: Mon. 10:00 - 17:00 (except public holidays) Tue.-Fri. 9:00 - 17:00</td>
</tr>
</tbody>
</table>

7.1 About User Registration, Accounting

**Question**

1. I am a new user at CERN. How can I get an account on a CERN “central” machine (CERNVM, VX CERN, AXCRNC, CORE, AFS ...)?
2. I already have an account on CERNVM (or VX CERN, or any of the “central” machines), but now I would like to have a new account on CORE. What should I do?
3. I just want to have my disk quota increased on CERNVM (or VX CERN). What should I do?

**Answer**

In all three cases the person you have to contact is your **group administrator** or the space administrator for question 3). Note that this “computer administrator” is not necessarily (and even very improbably) your group or section leader. It is just someone responsible to give and share computer resources amongst a certain number of users (generally working on a given project or experiment) who are grouped into a computer group, referred to by a 2-letter code (or **group code**, abbreviated to “gg” in the following). Users can have several accounts on different machines with different group codes. See the next question to find your computer administrator.

The action this computer administrator will have to take is a little different for the 3 questions raised. For 1) he/she must first fill a registration form (that you can get from the UCO), sign it, and return it to the UCO. This is an administrative formality and the group administrator still has to perform the user registration on the computer and create the account. For question 2) only this second step (account creation) is necessary. The group administrator can create the account (on any computer) from CERNVM by executing the EXEC “USER-REG” (on the P disk), and must give you, at that time, a **temporary password** that you will have to change the first time you log in.

**Question**

How do I find out the names of the various computer administrators of my group?

**Answer**

Please note that in the following explanations “gg” stands for the code of your computer group (NOT your CERN-group). You can find them:

- Via WWW (eg Mosaic): you start with “CERN’s Combined telephone directory” and click on “your group’s administrators” and fill in the “gg”.
- Via CERNVM: type “XWHO ADMINS gg”.

In both Mosaic and XWHO you may still use an individual approach by searching for your or somebody else’s entry in the phone book and access the list of the administrators from there. To avoid loops, this will not work if you are an administrator yourself. If you do not yet have any account on any central computer you can use this approach (e.g. for someone working in the same experiment or project) to guess which your group code can be.
7.2 About Printing

Question

How can I cancel my print job on printer 513-pub (or any other laser writer)?

Answer

First of all you must be the owner of the job you want to cancel. Then the commands depend on your operating system.

On CERNVM, using the command XPRINT, just type:

\texttt{xprint query ( pr 513-pub )}

This will give you the full list of the jobs submitted to that printer, e.g.:

\begin{tabular}{|c|c|c|c|}
  \hline
  Rank & Owner & Job & Files & Total Size \\
  \hline
  1st & roethl & 266 & su3test.lst & 85884 bytes \\
  2nd & CREMEL & 769 & XPICON.PS.A1 & 11294 bytes \\
  \hline
\end{tabular}

You must then identify your job with its "job id" number (under the column "Job"). If, for example, you are the owner of the last job in the list (Owner "CREMEL"), the job id is 769.

To cancel this job you just have to execute the command:

\texttt{xprint cancel 769 ( pr 513-pub )}

On VAXVMS, using the command "XPRINT/LW" (the CERN written TCP/IP Printing facility for printing on laser writers connected to AppleTalk), just type:

\texttt{xprint/lw/query/pr=513-pub}

which will give, for instance:

\begin{tabular}{|c|c|c|c|}
  \hline
  status: busy; source: LocalTalk \\
  \hline
  Rank & Owner & Job Files \\
  \hline
  active root 19 & Llinfo.txt, Modem.txt \\
  1st & CREMEL 501 & disk:/dy:/[cremel]login.com:61 \\
  \hline
\end{tabular}

Then, to cancel job number 501 for owner "CREMEL" type the command:

\texttt{xprint/lw/delete=501/pr=513-pub}

On UNIX, for printers connected to the AppleTalk (the vast majority of printers at CERN), the procedure depends on the system ("UNIX flavour"). If you are printing with \texttt{lp}, you can issue the command:

\texttt{lpq -P513-pub}

which will give, for instance:

\texttt{Queue Dev Status Job Files ...}

\begin{tabular}{|c|c|c|c|}
  \hline
  513-pub & READY \\
  513-pub: status: waiting; source: LocalTalk \\
  513-pub: rank Owner Job Files ... \\
  513-pub: active root 19 Llinfo.txt, Modem.txt \\
  513-pub: ist cremel 46 ucoaq.art \\
  \hline
\end{tabular}

Then, to remove job number 46 (owned by user "cremel") from the printer’s spool queue, type the command:

\texttt{lpq 46 -P513-pub}

Still on UNIX, when printing with \texttt{lp} (UNIX systems based on System V, such as HP-UX and Sun/Solaris 2), the commands to issue are:

\texttt{lpstat -p 513-pub}

which will display:

\texttt{printer queue for 513-pub}

\texttt{status: busy; source: LocalTalk}

\begin{tabular}{|c|c|c|}
  \hline
  513-pub-19 & root priority ? from sgca02 Llinfo.txt & 11696 bytes \\
  513-pub-773 & cremel priority ? from hpkuipc ucoaq.art & 634 bytes \\
  \hline
\end{tabular}

To remove the job “513-pub-773” owned by “cremel” just type:

\texttt{cancel 513-pub-773}

7.3 About Graphics Tools

Question

I would very grateful if you could tell me if there are any drawing programs that can run on HP-UX machines. I am here thinking of programs like MacDraw on Macintoshes or Designer on PCs. The purpose of these programs will be as an online documentation tool. E.g. an expert is working in an experimental area and needs a technical drawing of the

\texttt{instrument that he works on. He would then go to his X-terminal and call up the drawing.}

Answer

There are public domain and commercial drawing applications on HP.

The public domain applications are usually available on ASIS
for most UNIX workstations. You can try for instance xfig or xpaint.

If you need better but commercial applications, you must contact your local HP salesman.

**Question**

Do you know of any way to view a metafile on CERNVM from an X-terminal (i.e., an option in GRVIEW)?

**Answer**

I assume that by “metafile” you mean “GKS metafile”. Unfortunately there is no way to use GRVIEW for X terminals on any computer, because there is no X-Window driver for GKS/GTSGRAL at CERN. On X terminals/devices you should produce a PostScript file instead of a GKS metafile and use “ghostview” to display it. ghostview (public domain software, available on ASIS) is unfortunately not available on CERNVM, but only on UNIX (type man ghostview) or VMS (HELP GHOSTVIEW) machines at CERN. To use GRVIEW you must connect to another kind of graphics terminal (e.g. Falco, Tektronix, etc.).

**Question**

How can I print a PostScript file in landscape format?

**Answer**

One solution to this problem is to encapsulate your PostScript file (providing it contains the “BoundingBox” instruction, as it usually does) into a \LaTeX\ job, as follows (in this example the PostScript file is called “xpicon.ps”):

\begin{verbatim}
\documentstyle[a4,rotating,epsfig]{article}
\pagestyle{empty}
\begin{document}
\begin{sidewaysfigure}
\begin{center}
\epsfig{file=xpicon.ps}
\end{center}
\end{sidewaysfigure}
\end{document}
\end{verbatim}

Then, to print this file just execute the usual \LaTeX\ commands (available on all central machines, and on ASIS): latex, dvips, and then print the new PostScript file produced with the usual command xprint (or lpr, or lp on UNIX) without any specific option.

The advantage of this method is that you can play, later on, with the size and position of the picture inside the page, with the help of some basic \LaTeX\ commands.

7.4 About Unix (General Tools)

**Question**

What is the difference between AFS and WWW/Mosaic concerning access to documentation?

**Answer**

This user is confusing very different software products, AFS on one hand, and WWW (with Mosaic) and http on the other hand. Users can however read more and more often today, sentences like:

The documentation for this ... is on AFS in the directory
/afs/cern.ch/…

(generally /afs/cern.ch/projects/ …) or statements like:

You can find documentation for this … in the URL document:
http://www..../…/…xxx.html

It is true that you can have access to documentation either through AFS or WWW/Mosaic and even both. The exact answer to the question resides in the definition itself of the two software products that we will briefly give below:

1. AFS, acronym for “Andrew File System”, is a network-distributed file system comparable to Sun’s NFS. It includes a “global name space” which means that, on all machines running AFS (AFS clients), the path name is unique. A typical pathname of an AFS file is:

/afs/cern.ch/user/x/xyz

2. WWW/Mosaic, or W3 (which stands for World Wide Web), is a network-accessible information system. It uses hypertext and multimedia techniques to make the web easy for anyone to roam, browse, and contribute to. WWW has its own protocol called HTTP for data transmission. Mosaic is one popular "WWW browser" available for different graphics systems (X-Window, DOS/Windows, Macintosh).

**Question**

Is there a list of all the products available on ASIS?

**Answer**

Yes. This list is accessible with the command XFIND ASIS on CERNVM, or, with WWW/Mosaic, in the “CERN Home Page”, by selecting the entry (under “Activities”): Systems and Services: ASIS: ASIS Products.
7.5 About Macintoshes

Question
I would like to run Mosaic on my Macintosh at home. Is it possible?

Answer
There are two alternatives to make WWW browsing on your Mac:

If you don’t require viewing images, you may connect (through your standard communications product like VERSATERM) to a UNIX workstation where the “lynx” interface is available (a courses-based WWW browser supporting forms).

Otherwise, you should run one WWW browser locally on the Mac (Mosaic, Netscape). And for that you must use the Serial Line IP (SLIP) protocol via your modem. Modems slower than 14.4 Kbaud will give usually slow performance. Versaterm 3.6.2 and higher, or NCSA Telnet products support SLIP. Configuration steps are given in detail in the “User Guide for Terminal access from Home”.

There is still an alternative (also over an SLIP line) by connecting to a UNIX workstation with Mosaic/X. You will need, in that case, Apple’s MacX, eXodus or any other compatible product, then launch any X-window (including Mosaic) application setting before the DISPLAY environment variable to point to your assigned IP address. This will however be heavier resource-wise than the previous option.

Question
How do I install QuickMail in my Mac?

Answer
Assuming you have already registered a QuickMail account, do the following steps:

1. Select the “Chooser”, go the the AppleTalk zone “Ethernet”, and connect to the Macintosh “AS Server” as “guest”
2. Select the “Mac Support” disk
3. Open it. You will find the “QuickMail” folder, and inside “Install 1”. Open again, and launch “Workstation Install”
4. after the installation is finished, you must restart your Mac (you will be reminded to do this).
5. At restart, you will be presented a panel where you must fill your “MailCenter”, “Name” and password, as provided by the AS QuickMail service.

I assume you mean “how do I process it”, because you could obviously connect to any computer at CERN where you have an account (using NCSA-Telnet, Versaterm or similar products) and “get” your mail by running the local MAIL agent there (MAIL on CERNVM and VXCERN, pine on a UNIX computer, etc).

For the Macintosh, you need to do two things: get the QuickMail software installed, and register an e-mail account. The software is for free, but there is a registration “license” fee.

The AS QuickMail service (x3510) will do the registration under the username of your choice, and send a TID for the cost of the license to the person responsible for your budget. The software will be installed by them, or alternatively you may do it yourself (see Q: How do I install QuickMail in my Mac).
UCO Book Catalogue

Books available through the UCO

Text Processing
PostScript Reference Manual by Adobe
The \TeX\book by E.Knuth
\LaTeX\ User Guide (2nd. Edition) by L.Lamport
The \LaTeX\ Companion by Goossens/Mittlebach/Samarin

Unix
A Practical Guide to the Unix System by M.Sobell
A Practical Guide to Unix System 5 by M.Sobell
Unix for the Impatient by Abrahams/Larson
Unix for VMS users by Bourne
Advanced Programming In Unix Env. by Stevens
Unix for Fortran Programmers by Loukides
Unix in a Nutshell, system V by Gilly/O'Reilly

Unix tools and utilities
GNU Emacs manual by R.Stallman
GNU Make by Stallman/McGrath
Learning Perl by Schwarz
Programming Perl by O'Reilly and Associates
Unix Power Tools by Peek/Loukides/O'Reilly
Essential System Administration by Frisch
System Performance Tuning by Loukides
Practical Unix security by Garfinkel/Spafford
Learning the vi editor by Lamb
sed j by awk by Dougherty
The AWK programming language by Aho/Kernighan/Weinberger
Power programming with RPC by Bloomer
sendmail by Costales/Allman/Rickert

make by Oran/Talbott
imake by Dubois

Programming languages
Practical C by Oualine
A Book on C by Pohl
The Art and Science of C by Roberts
The C Programming Language by Kernighan/Ritchie
C++ Primer by S.Lippman
Scientific and Engineering C++ by Barton/Nackman
C++ Programming Language by Stroustrup
Object Oriented Programming C++ by Pohl
Fortran 90 explained by MetcalflReid
Migrating to Fortran 90 by Kerrigan
XL Fortran for AIX User Guide by IBM
XL Fortran for AIX Language Ref. by IBM

General computing
Encyclopedia of Graphics by Murray/VanRyper
Mosaic Handbook for X windows by Koman/Ferguson
Mosaic Handbook for Macintosh by Koman
Mosaic Handbook for Windows on PC by Koman
The Whole Internet by Ed Krol
Lapack Users Guide by Several authors
Tcl and Tk Toolkit by Ousterhout
TCP/IP Network Admin by Hunt
TCP/IP Illustrated Vol.I The Protocols by Stevens

CD-ROMS
Inside Macintosh by Apple Computer Inc.

The opening hours of the UCO (Bld. 513/R-052, Tel. 4952) are: Mon. 10.00-17.00 – Tue.-Fri. 9.00-17.00.
Payment for books is possible in three different ways:

- paper TID,
- the EDH system,
- cash payment to the SBS account 50-148, 556.0, controlled by Finance Division (reason "UCO BOOK").

The last alternative has been set up for those willing to purchase items from our offering for private purposes or when there is no defined procedure (short-term visitors like summer students, etc).
In order to pay the books via paper TID, you must be authorized to sign it or bring one already signed by one of your budget holders. The EDH system is just the production of an electronic TID: at least the Divisional Secretariats have authorization to enter transactions in this system.
PAW Questionnaire

As part of our scheme to obtain feedback from PAW users, we offer the bugreport mechanism, the cern.heplib newsgroup, and this Questionnaire.

The input you give us will be used to assist us in making our work plan for PAW.

The Questionnaire is intended for feedback from you of a general nature, and not reports of bugs, nor requests for help with specific problems.

Part 1 - General Info

Required information

Family Name : ..................................................
First Name(s) : ..................................................
Home Institute : ..................................................
Experiment : ..................................................
Email address : ..................................................

What scientific field do you work in:

○ High Energy Physics
○ Nuclear Physics
○ Other physics research
○ Other research
○ Other

Optional information

Where do you use PAW:

○ At CERN
○ Elsewhere

Part 2 - Environment

Required information

Which PAW version are you using:

○ Don't know
○ Latest version from CERN
○ An older version
○ A home made version

Which Operating System do you use PAW on:

○ Don't know
○ AIX (IBM)
○ HPUX
○ IRIX (Silicon Graphics)
○ OSF/1
○ Solaris
○ SunOS
○ Other Unix System
○ Ultrix
○ Apollo

○ Linux
○ VMS
○ VM/CMS
○ DOS
○ Windows 3.1
○ Windows NT
○ Other

Optional information

What is the underlying graphics system:

○ Don't know
○ X11
○ GKS
○ GL
○ DJ3000
○ Other

Part 3 - Usage Characteristics

Required information

What level of PAW user are you:

○ Don't know
○ Beginner
○ Average
○ Expert

How often do you use PAW:

○ Every day
○ Several times per week
○ Several times per month
○ Less often

Indicate in which of the following broad environments you use PAW

(Multiple choice possible)

○ Don't know
○ Data acquisition (online)
○ Data analysis
○ Data presentation

Which features do you make use of

(Multiple choice possible)

○ Don't know
○ ntuples
○ histograms and vectors
○ comis
○ fitting
○ function plotting
○ general graphics
Are you using separately any of the PAW related packages
(Multiple choice possible)
- Don’t know
- No
- Yes HBOOK
- Yes MINUIT
- Yes HLOT
- Yes HIGZ
- Yes KUIP
- Yes SIGMA
- Yes ZEBRA

Part 4 - User Interface
Required information
Concerning the user interface which “flavour” of PAW are you using
(Multiple choice possible)
- PAW (Command line interface)
- Paw++ (Motif interface)
- Don’t know

If you answer Paw++ (Motif interface), what command execution feature do you use
(Multiple choice possible)
- Don’t know
- Paw++ Main Browser
- Paw++ ‘Commands panels’
- Paw++ Graphics window
- Histogram Style Panel
- Ntuple Viewer
- Your own defined ‘panels’
- Paw++ Input Pad
- KUIP macros
- Other

Part 5 - Use of Histograms and/or Vectors
Optional information
Do you make use of vectors and the sigma package
(Multiple choice possible)
- No
- Yes for calculations
- Yes for fitting
- Yes for plotting

Do you make use of histograms
(Multiple choice possible)
- No
- Yes: one dimensional histograms
- Yes: two dimensional histograms
- Yes: profile histograms
- Yes: variable bin size histogram

Part 6 - Use of NTTuples
Optional information
Do you make use of ntuples
(Multiple choice possible)
- No
- Yes, row-wise
- Yes, column-wise
- Yes, in chains
- Yes, in PIAF
- Don’t know

If you answered < Yes > to any of the above, estimate the:
- Average number of events in an ntuple (only one value): ........................................
- Average number of columns in an ntuple (only one value): ........................................
- Average size in mega-bytes of an ntuple (only one value): ........................................

Part 7 - Use of COMIS and KUIP
Optional information
Do you make use of the COMIS fortran interpreter:
- No
- Yes

If < Yes >, estimate the:
- Average number of lines of a function (only one value): ........................................
- Average number of functions in your analysis (only one value): ...................................
- Do you make use of KUIP macros ('kumacs')?: .......

If < Yes >, specify which of the following features you use
(Multiple choice possible)
- Simple macros
- Macros with arguments
- Macros which call other macros
- If statements
- Do-loops
- Kuiup built-in functions
Part 8 - Use of graphics

Optional Information
Do you make use of the graphics capabilities of PAW?
(Multiple choice possible)

- No
- For plotting vectors
- For plotting 1D histograms
- For plotting 2D histograms
- For plotting 3D representation

Do you plot analytic functions
(Multiple choice possible)

- No
- Yes with fun/plot
- Yes with fun1 / fun2
- Yes with fun/draw

Do you use colour:

- No
- Yes

Do you use basic graphics primitives (points, lines, etc.):

- No
- Yes

Do you store pictures
(Multiple choice possible)

- No
- Don’t know
- Yes in Postscript
- Yes in HIGZ picture files
- Yes in GKS metafiles

Do you need other formats like e.g. GIF:

- No
- Yes

Part 9 - Fitting

Optional Information
Do you make use of the fitting capabilities of PAW?
(Multiple choice possible)

- No
- Yes with the built-in functions
- Yes with COMIS functions

If you use fitting is it based on:
(Multiple choice possible)

- \( \text{chi}^2 \)
- log likelihood
- Don’t know

If you use fitting are the data stored in
(Multiple choice possible)

- histograms
- vectors
- Don’t know

If you use fitting can you indicate the typical values for:

- the number of parameters you are fitting (only one value): .............................................
- the number of points in the fit (only one value): .......

Part 10 - Evaluation of PAW

Required Information
Rate the PAW system for ease of use:

- No opinion
- Very good
- Good
- Satisfactory
- Poor

Rate the PAW system for features:

- No opinion
- Very good
- Good
- Satisfactory
- Poor

Rate the PAW system for online help:

- No opinion
- Very good
- Good
- Satisfactory
- Poor

Rate the PAW system for reliability:

- No opinion
- Very good
- Good
- Satisfactory
- Poor

Rate the PAW printed manual:

- No opinion
- Very good
- Good
- Satisfactory
Part 11 - Other PAW-like software

Optional Information
Do you use other programs offering capabilities similar to PAW?

- No
- Yes

If <Yes> name the programs:

-
-
-
-

For what do you use the above tool:

-
-