The USENIX Association Newsletter

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The closing date for submissions for the next issue of ;login: is April 25, 1991.
NOTICE

:login: (ISSN 1044-6397) is published bimonthly by the USENIX Association.

The USENIX Association is a not-for-profit organization of those interested in UNIX® and UNIX-like systems. It is dedicated to fostering and communicating the development of research and technological information and ideas pertaining to advanced computing systems, to the monitoring and encouragement of continuing innovation in advanced computing environments, and to the provision of a forum where technical issues are aired and critical thought exercised so that its members can remain current and vital.

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Contributions Solicited

Members of the UNIX community are encouraged to contribute articles to :login:. Contributions may be sent electronically to login@usenix.org or through the U.S. mail to the Association office. The USENIX Association reserves the right to edit submitted material.

UNET Subscriptions
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SUBSCRIPTION for non-members: $40 per year.

First-class permit at Madison, Wisconsin and additional offices. Postmaster: Send address changes to USENIX Association, 2560 Ninth Street, Suite 215, Berkeley, CA 94710.
USENIX Summer 1991 Conference
Opryland Hotel, Nashville, Tennessee, June 10–14, 1991

Tutorial Program: June 10–11

Monday, June 10, 1991

Programming In Perl
   Tom Christiansen, Convex Computer Corporation

An Introduction to the TCP/IP Protocol Suite
   Richard Stevens, Consultant

An Introduction to C++
   Robert Murray, AT&T Bell Laboratories

UNIX System V Release 4.0 Internals Part I:
   Virtual Memory and File Systems
       Steve Buroff, AT&T and Mike Scheer, ProLogic Corporation.

Programming the X Window System, Version 11
   Oliver Jones, Saber Software, Inc.

NEW Offering! An Introduction to UNIX System Security
   Matt Bishop, Dartmouth College

NEW Offering! UNIX Programming Tools
   Kenneth Ingham, Consultant

NEW Offering! OSF/1 Internals
   Thomas W. Doeppner Jr., Brown University

Mach Overview
   Avadis Tevanian, Jr., NeXT, Inc.

UNIX Network Programming
   Richard Stevens, Consultant

C++ Programming Style
   Tom Cargill, Consultant

UNIX System V Release 4.0 Internals Part II:
   Streams I/O and Process Management
       Mike Scheer, ProLogic and Steve Buroff, AT&T

Introduction to Programming With the X Toolkit Intrinsics
   Paul Kimball, Digital Equipment Corporation

Network Security: The Kerberos Approach
   Dan Geer, DEC and Jon A. Rochlis, MIT

Introduction to Hypertext Systems and Hypermedia Applications
   Paul Kahn, Brown University

The Network Computing System (OSF/DCE Remote Procedure Call)
   Nathaniel Mishkin and Paul J. Leach, Hewlett-Packard; Richard Mackey, OSF

New Kernel Facilities in 4.3BSD-Reno
   Marshall Kirk McKusick and Michael J. Karels,
   University of California, Berkeley

Tuesday, June 11

Advanced Topics in Systems Administration
   Evi Nemeth, University of Colorado and Rob Kolstad, Sun Microsystems

Special Note to Full Time Students: Your Immediate Attention is Requested! A limited number of space in each tutorial has been reserved for full-time students at a special fee. Please contact the Conference office for complete details.
Special Exhibition Opportunity:  
Emerging Technology Companies

The USENIX Association is hosting a special exhibits forum for young high technology companies at its Summer 1991 Conference and Exhibition. This program for the 1991 Conference and Exhibition will bring young companies with innovative products in touch with an advanced computing community looking for new solutions.

To help introduce new UNIX-related advanced computing products or products in development to the technical community, USENIX provides young companies with:

- Special exhibitor savings package
- Promotional assistance
- Publicity support

The USENIX Association Summer 1991 Conference and Exhibition will be held June 10–14 at the Opryland Hotel in Nashville, Tennessee. The Association encourages young high technology companies to contact:

Cynthia Deno, Exhibits Manager
USENIX Association
2560 Ninth Street, Suite 215
Berkeley, CA 94710
408/335–5646
email: cynthia@usenix.org, uunet!usenix!cynthia

---

Does your company have UNIX products to sell to a technical audience?

Hurry. Reserve your booth now. More than 60% of exhibit space is already reserved, contracts are coming in daily and the best space is going fast!

Booth rental includes:

- Hook up free of charge to the exhibit hall Ethernet network
- Draped space and booth banner identifying your company
- 24-hour Security and General Aisle Cleaning
- Unlimited complimentary exhibition entrance tickets for your clients
- Invitation to Welcome Reception in the Exhibit Hall
- Complimentary conference registration (4 per exhibitor)
- Invitation to USENIX Conference Reception (4 per exhibitor)
- Hotel and Travel Discounts
- Company listing in the Conference/Exhibition Directory
- Opportunity to advertise in the Conference/Exhibition Directory
- Opportunity to rent mailing lists of conference/exhibition attendees and association members
Call for Papers
Large Installation Systems Administration (LISA) V Conference
San Diego, California, Fall 1991

Papers are being sought for presentation at the Fifth USENIX Conference on Large Installation Systems Administration, to be held this Fall in San Diego, California. LISA conferences address topics of interest to people administering large UNIX sites. Previously, attempts have been made to define “large” in terms of number of machines, gigabytes of disk, or users.

We feel that it is more fruitful to define a large installation as one that has problems that cannot be solved by simply scaling up well-understood solutions used on single machines with few users. We are particularly interested in papers which take a theoretical or comparative attitude, presenting discussions of the relative merits of various approaches to problems. As always, we welcome presentation of specific solutions to specific problems, where they advance the state of the art. We also welcome papers discussing “non-technical” problems dealing with users and management.

Topics of interest include but are not limited to:

- Strategies for managing data - file migration, archive systems, backup systems
- Security issues, especially where multiple people are privileged users
- Human issues of administration
- Integration of heterogeneous systems
- Usage monitoring and accounting systems
- Administration of remote sites
- Network monitoring
- Queuing systems

Papers should be from 5 to 15 pages in length, including diagrams, figures, etc. Complete submissions are due by July 8, 1991. The committee will consider and comment on extended abstracts or outlines submitted by June 17th, but may require full papers to be submitted before a final decision is made.

Extended abstracts or outline deadline: 6/17/91
Submission deadline: 7/8/91
Authors notified: 7/29/91

Program committee:
Steve Romig, Ohio State University
Bjorn Satdeva, /sys/admin Inc.
Steve Simmons, Industrial Technology Inst.
Pat Wilson, Dartmouth University

For more information, please contact the program chair:
Elizabeth D. Zwicky
SRI International
333 Ravenswood Ave.
Menlo Park, CA 94025
zwicky@erg.sri.com
415–859–3290
(9 A.M. to 6 P.M. Pacific time)
Preliminary Announcement and Call for Papers: AUUG '91
Sydney, Australia, September 24–27, 1991

Theme: Just What is an Open System, Anyway?

Everyone is talking about open systems. So what are they? The Australian UNIX systems Users Group Conference '91 wishes to explore open systems from all perspectives, including but not limited to:

Standards: standardisation philosophies, emerging standards, standards deficiencies, experiences with standards implementation

Operating Systems issues: multiprocessor systems, distributed systems, secure systems, fault-tolerant systems

Communications and Networking: protocols, performance, administration and security

Programming environment: user interfaces, windowing, graphics, compilers and language technology, software development and support tools, testing and debugging

Sophisticated applications: databases, transaction processing, commercial, educational, scientific, biological, medical, etc.

Events

AUUG '91 will be a four day conference with the first day devoted to tutorial presentations, followed by three days of papers and work-in-progress sessions.

Tutorials

We have made provision for two full-day tutorials and up to eight half-day tutorials. Tutorials are charged for and tutorial presenters are paid. Please send your tutorial abstracts along with whether you would like a half- or full-day slot.

Papers

We would like to organise double track presentations in the afternoons this year, one track having more relevance to a commercial audience, and the other being of a more technical bent. Many subjects are equally interesting to both audiences, but would benefit from being presented from different perspectives. If you think your topic has both technical and commercial interest and could be presented twice with differing emphasis, your paper will receive priority from the committee and a special recognition from AUUG if it is accepted. The above should not, of course, discourage papers which are either more specifically targeted or are appropriate for both audiences at once.

Work-in-Progress Sessions

In order to schedule work-in-progress sessions we will need some idea of the number of people interested in making a 10 or 15 minute presentation. Please mail expressions of interest to the committee at the address below.

Birds-of-a-Feather Sessions

Time will be reserved at the end of each presentation day for BOFs of about 1 hour, and space will be available. We distinguish two types of BOF: general interest and vendor-sponsored. Please contact the Program Committee if you would like to organise a BOF session.

Form of Submissions

Submissions should indicate whether they are relevant to technical or commercial audiences, or both. In either case they should be in the form of an abstract and an outline. Please provide sufficient detail to allow the committee to make a reasoned decision about the final paper; of course a full paper is also perfectly acceptable. A submission should be from 2 to 5 pages and include:

1. Author name(s), postal addresses, telephone numbers, and e-mail addresses.
2. Abstract: 100–300 words.
3. Outline: 1–4 pages giving details of the approach or algorithms pursued.
4. References to any relevant literature.
5. Time needed for the presentation. Most presentations will be for 30 minutes including a 5
minute question time, although 1 hour time slots could be made available.

6. Audio-visual requirements. Authors whose submissions are accepted will receive instructions for the preparation of final papers for inclusion in the conference proceedings.

Relevant Dates

Abstracts and outlines due: April 18, 1991
Notifications to authors: May 10, 1991
Final Papers due: July 10, 1991

Please submit one hard copy and one electronic copy (if possible) to the address below:

Andrew Gollan
AUUG '91 Program
C/- Softway Pty. Ltd.
PO Box 305
Strawberry Hills, NSW, 2012
Australia
E-mail: auug91@softway.sw.oz.au
Telephone: + 61 2 698 2322
FAX: +61 2 699 9174

Institutional Representative to IEEE TCOS

At its January meeting, the USENIX Board of Directors authorized funds for this year for an Institutional Representative to the IEEE Computer Society Technical Committee on Operating Systems. It then appointed a search committee to fill this position.

The Association is pleased to announce that this position has been offered to Peter Collinson, of Hillside Systems, Kent, UK, and he has accepted.

Peter has been active in UNIX since 1976, and has a strong technical background. His previous employment was as an academic, and he has been active in EurOpen and USENIX for more than 10 years. He is currently a consultant, writer, and lecturer. His knowledge of USENIX and EurOpen, as well as his technical expertise should service him well as the USENIX IR.

Besides his duties at IEEE/CS TCOS meetings, he will coordinate USENIX Standards BOFs, discuss standards issues with USENIX membership, recruit and instruct snitches, as well as work with the snitch editor in publishing the reports.

Peter will be attending the upcoming TAG and IEEE meetings in Chicago. He can be reached in via email: pc@hillside.co.uk or FAX: +44 227 762554.
The USENIX Association is pleased to announce the distribution of a new release of the "Second Berkeley Software Distribution" (2.11BSD).

This release will be handled by USENIX, and is available to all V7, System III, System V, and 2.9BSD licensees. The Association will continue to maintain the price of $200. The release will consist of two 2400 ft. 1600 bpi tapes or one TK50 tape cartridge (approximately 80M) and approximately 100 pages of documentation.

This release is in celebration of the 20th anniversary of the PDP-11! Work has been ongoing since the release of 2.10.1BSD in January 1989. This release incorporates all fixes and changes posted to the USENET newsgroup comp.bugs.2bsd since 2.10.1BSD was released.

Present in this release are several more pieces from the 4.3BSD distribution:

- the kernel logger (/dev/klog)
- the name cache and argument encapsulation calling sequence
- readv(2)/writev(2) as system calls rather than emulation/compatibility routines
- shadow password file implementation (the May 1989 4.3BSD update)
- a TMSCP (TK50/TU81) driver with standalone support (bootblock and standalone driver)
- Pronet and LH/DH IMP networking support
- the portable ASCII archive file format (ar, ranlib)
- the Unibus Mapping Register (UMR) handling of the network was rewritten to avoid allocating excessive UMRs.
- the necessary mods to the IP portion of the networking were made to allow traceroute (which is present in 2.11BSD) to run
- long filenames in the file system

This last addition is the reason a coldstart kit is necessary. The 4.3BSD on-disk directory structure has been ported (along with the utilities that know about on-disk directories via the raw file system: fsck, ncheck, ick, check, dcheck, etc.) and is not compatible with previous versions of UNIX for the PDP-11.

A limited amount of filesystem backward compatibility with earlier versions of 2BSD (2.9BSD, 2.10BSD and 2.10.1BSD) is present in a version of dump(8) which can read old filesystems. The disk partition sizes have not changed from 2.10.1BSD. The restore(8) utility automatically converts old dump tapes to the new format on input.

The constant MAXNAMLEN is now 63 instead of 14. While it is possible the limit could be higher, with MAXPATHLEN at 256, a MAXNAMLEN of 63 was judged sufficient.

Many other fixes and changes have also been made; see the "Changes To The Kernel" document which describes the changes made to both the kernel and the application programs.

If you have questions about the distribution of the release, or require 800 bpi tapes, please contact the Association at:

2.11BSD
USENIX Association
2560 Ninth St. Suite 215
Berkeley, CA 94710
Tel: 415-528-8649
Email: office@usenix.org

If you have technical questions about the release, please contact Steven M. Schultz by either mail address:
wbr!wlv!sms
sms@wlv.imsd.contel.com

†DEC, PDP, Unibus and VAX are trademarks of Digital Equipment Corporation
Report from EurOpen
Alain Williams
<addw@phcomp.co.uk>

EUnet Chief Executive

The EUnet (our mail/news network) has recently had a Chief Executive appointed. This is Glenn Kowack who will initially work in Amsterdam. Glenn’s appointment is part of the increasing professionalism within EurOpen. It will allow EurOpen and EUnet to work more closely and effectively with peer networks, research and network co-ordinating bodies. Glenn can be reached at glenn@EU.net.

Working Groups

EurOpen has set up the framework to support working groups at the national level in order to bring together and coordinate work that is being done by individuals and companies in different countries. A Working Group will work towards satisfying the needs of its members. By working together the members can achieve better results than individuals or people from a single organisation.

If there are not enough people who can devote the time needed to form a full a Working Group, Special Interest Groups are being created. These will receive the full information on what comes out of related Working Groups. As this is still being set up we cannot give a list of groups. Topics are likely to include: Benchmarks, Security, Workstations, Portability, User Requirements, Real Time, Databases, and User Interfaces.

The initial secretariat is being provided by AFUU (the French National Group). Jean-Michel Cornu is doing a lot of the legwork and may be contacted at Jean-Michel.Cornu@enst.fr.

New Publications

The second edition of the European E-Mail directory has been produced.

Tromsø Conference Program

EurOpen is holding its spring conference in Tromsø, Norway on May 20–24, 1991. There will be 2 days of tutorials followed by 3 days of technical sessions.

Wednesday, May 22

Frances Brazier: Opening
Michael D. Schroeder: Overview of Open Systems
Frances Brazier: Operating Systems
Sape J. Mullender: Experience with Amoeba
Simon Patience & Jose Rogado: OSF/1
Dave Presotto: Plan 9
Andrew Schuelke (UNIX International): tba

Thursday, May 23

Bruce D. Shriver: Open Systems, Distributed Computing and Interoperability Fact and Fancy
Brad C. Johnson: Open Distributed Systems—Interoperability Through Enabling Technologies
Dario Avallone: Integration Mechanisms and Communication Architecture in AxIS
Gordon Blair: Incorporating Multimedia in Distributed Open Systems
Wouter Joosten: Design and Implementation of an Experimental Load Balancing Environment
Guy Bernard: A Decentralized and Efficient Algorithm for Load Sharing in Networks of Workstations
Bertil Folliot: Distributed Applications in Heterogeneous Environment
Rob Pike, D. Presotto, K. Thompson, G. Holzmann: Process Sleep and Wakeup on a Shared-memory Multiprocessor
Terje Fallmyr, David Holden, Otto J. Anshus: Capturing the Behaviour of Distributed Systems
Keith Marzullo, Mark D. Wood: Tools for Monitoring and Controlling Distributed Applications

Friday, May 24

A. J. Herbert: Distributing Objects
Henri E. Bal: A Comparative Study of Five Parallel Programming Languages
Guido van Rossum, Jelke de Boer: Linking a Stub Generator (AIL) to a Prototyping Language (PYTHON)
Frank Eliassen, Randi Karlsen: Providing Application Interoperability using Functional Programming Concepts

March/April 1991
V. Tscharmer: Domain-based Support for Service Administration and Server Selection
John T. Kohl: Evolution of the Kerberos Authentication Service
Benoy DeSouza, Nawaf Bitar: Architecture and Implementation of a User-Space NFS

If you would like to know more please contact the EurOpen secretariat at the address below.

Future Conferences

The EurOpen Autumn conference is being held in Budapest (in Hungary) on September 16–20, 1991. The Spring 1992 conference will be in Jersey, one of the British Channel Islands.

The Autumn 1992 conference will be run in conjunction with UniForum. OpenForum Europe 1992 will be held November 23–27, 1992 in Utrecht, The Netherlands. It will combine the traditionally strong EurOpen conference with a major European wide exhibition.

The timing is particularly appropriate in that at about that time all trade barriers in Europe are due to be lowered. The purpose is to create a single European market where companies will not be restricted by inter (European) National regulations from trading and will be able to freely move their goods. Great benefits are hoped to be reaped from the Single European Market.

Who are the National Groups?

You are aware that EurOpen is a federation of National Groups, but do you know who the groups are? The table below lists them in order of the numbers of members per millions of population. This is because a straight membership count and ranking is unfair to the groups in the smaller countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (Millions)</th>
<th>Membership</th>
<th>Members per Million of Pop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iceland</td>
<td>0.25</td>
<td>32</td>
<td>128</td>
</tr>
<tr>
<td>Denmark</td>
<td>5.1</td>
<td>386</td>
<td>76</td>
</tr>
<tr>
<td>Norway</td>
<td>4</td>
<td>225</td>
<td>56</td>
</tr>
<tr>
<td>Sweden</td>
<td>8.5</td>
<td>456</td>
<td>54</td>
</tr>
<tr>
<td>Finland</td>
<td>4.9</td>
<td>235</td>
<td>50</td>
</tr>
<tr>
<td>Netherlands</td>
<td>14</td>
<td>370</td>
<td>26</td>
</tr>
<tr>
<td>France</td>
<td>56</td>
<td>1110</td>
<td>20</td>
</tr>
<tr>
<td>Austria</td>
<td>7.6</td>
<td>129</td>
<td>17</td>
</tr>
<tr>
<td>Switzerland</td>
<td>6.0</td>
<td>71</td>
<td>11.8</td>
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<tr>
<td>Belgium</td>
<td>9.9</td>
<td>108</td>
<td>11</td>
</tr>
<tr>
<td>Portugal</td>
<td>9.8</td>
<td>105</td>
<td>10.7</td>
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<tr>
<td>United Kingdom</td>
<td>57.1</td>
<td>588</td>
<td>10.3</td>
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<tr>
<td>Ireland</td>
<td>3.5</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Germany</td>
<td>76</td>
<td>348</td>
<td>4.6</td>
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<tr>
<td>Italy</td>
<td>60</td>
<td>196</td>
<td>3.3</td>
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<tr>
<td>Hungary</td>
<td>10.6</td>
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<td>1.5</td>
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<tr>
<td>Yugoslavia</td>
<td>22</td>
<td>16</td>
<td>0.73</td>
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<tr>
<td>Czechoslovakia</td>
<td>15.7</td>
<td>10</td>
<td>0.64</td>
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<tr>
<td>Spain</td>
<td>50</td>
<td>26</td>
<td>0.5</td>
</tr>
<tr>
<td>Soviet Union</td>
<td>285.9</td>
<td>32</td>
<td>0.1</td>
</tr>
</tbody>
</table>

There are 20 National Groups in all, some of which are very young. All have their own national identity and in many cases their own language (some countries have more than one language—such as Belgium).

We thus have to work in a way which is often not appreciated by most people from the USA. We have to spend a lot of time and effort in coordination and in resolving conflicts of interests. EurOpen is not unique in this, but merely reflects what happens over here at all levels up to inter-governmental.

We have much more in common than divides us, and, at a personal level the differences of national cultures add a real spice and interest to life. For instance: there is a far greater change of scene to be found by going to a conference somewhere else in Europe than there is in going to one in another state.

A lot of recent work has gone into cementing the National Groups together, including items like aligning National Group Logos so that they are all visibly related.

Do you want to get to understand us? Come and visit us, preferably at a conference or two.

Our Address

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Fax: +44 763 73255
Net: europen@EU.net
Report from UKUUG

Mick Farmer
mick@cd.bbk.ac.uk

Start Bit

The UKUUG is now a limited company and, as such, is organized and run by a controlling Council. Initially this consists of the old Executive Committee (Sunil Das, Mick Farmer, Zdrav Podolski) plus two people who’ve been helping behind the scenes for some time now, Andrew Macpherson (STC Ltd.) and Jim Reid (Strathclyde University). The Council is supported by an Advisory Committee of helpers and, yes, advisors. The size of our Advisory Committee fluctuates but currently numbers eight.

Membership Figures

Membership has continued to increase over the latter half of 1990. Our current membership is 578, broken down into the following categories: academic: 122; commercial: 362; honorary: 5; individual: 74; Student: 15.

After two years with no increase, subscriptions are going to increase by approximately 5%.

What’s in a Name

Now that the change of name from EUUG to EurOpen has taken place we considered changing our name and logo. At a recent meeting of the Executive and Advisory Committees it was unanimously agreed that we would retain our existing name and logo.

Annual General Meeting

Our AGM was held at the Institute of Education, London (England) at the end of November. A lively discussion about EurOpen’s fee structure took place with the following resolution being passed unanimously with no abstentions:

“The UKUUG recognizes that EurOpen is a federation of national groups and, as such, believes all benefits, privileges, and liabilities should be equally shared. Thus the subscription rate per national group member payable to EurOpen should be the same for each national group.”

Winter ’90 Technical Meeting

A very successful meeting was held at Queen’s College, Cambridge (England) just before Christmas. Abstracts of the papers presented are printed elsewhere in this issue and copies of the proceedings, price US$10, can be obtained from:

UKUUG Secretariat
Owles Hall
Buntingford Herts SG9 9PL
England
Tel: +44 763 73039
Fax: +44 763 73255

Dates for your Diary

• July 15–17, 1991 — Summer Technical Meeting at Liverpool University, Liverpool (England).
• December 16–18, 1991 — Winter Technical Meeting at Herriott-Watt University, Edinburgh (Scotland).
• Summer 1992 — Queen’s University, Belfast (Northern Ireland).

news@uk

Yes, that’s the name of our bright, wonderful, witty news sheet to be launched in February this year. It will be a Unigram-style publication appearing six times per year. Among the proposed regular items are:

• News and views.
• People moving around.
• Gossip that’s fit to print.
• Comment on this and that.
• Job adverts.
• Kit for sale.

Obviously, it’s free to UKUUG members but others will have to subscribe. What are you waiting for? Details from our Secretariat (address above).

Stop Bit

At our recent technical meeting in Cambridge a number of delegates said that they had in their possession the words of songs, ballads, poems, etc., concerning the early days of UNIX. We are interested in collecting these before they disappear in the mists of time, i.e., get thrown out on the disk attached to that old PDP-11. If you know any such pieces, please send them to me, Mick Farmer (mick@cd.bbk.ac.uk) together with their provenance if known.
EurOpen Standards Report
Spring 1991
Dominic Dunlop
The Standard Answer Ltd.
domo@tsa.co.uk

Production of this article was funded by EurOpen, the European Forum for Open Systems (formerly EUUG). Copyright EurOpen, 1991.

For the past couple of years, these columns have discussed events and developments in the POSIX-related activities of the International Organization for Standardization (ISO). This time, I'm going to look at a lower, but arguably equally important, level in the standards development process: the Institute of Electrical and Electronic Engineers' Computer Society Technical Committee on Operating Systems Standards Subcommittee. Let's just call it IEEE-CS TCOS SS, or, better still, TCOS.

Last October, EurOpen agreed to provide funding for an institutional representative who would attend the quarterly meetings of TCOS, and provide a means of routing input from European users of open systems into the bewilderingly large variety of POSIX standards being developed by working groups under TCOS. I am that representative, and, since I'm spending their money, I'd better tell you what is going on, why it's important, and how you can help me out.

POSIX Development — Top Down or Bottom Up?

I've referred to the IEEE in my reports on ISO matters, since it is the IEEE which actually develops the ISO standards. The IEEE routes its documents to ISO via ANSI, the American National Standards Institute. Translating this into ISO-speak, ISO has designated ANSI, its U.S. member body, as the development agency for the POSIX standards. ANSI, in turn, has delegated the work to the IEEE, an accredited body which it considers competent to create operating system standards through a consensus process which allows all interested parties to comment.

This makes the process of standards development look as though it proceeds from the top down: somebody associated with ISO decides that the time is right for a POSIX standard, identifies a means of getting the job done, and controls the process in an orderly, structured manner.

Life is not like that. No matter how much those who work at the ISO level would like to believe that they are, and always have been, in the driving seat, the movement towards POSIX started from the bottom and drifted up. It started in the early nineteen-eighties with /usr/group, a U.S.-based organization of suppliers and commercial users of open systems, now known as UniForum. This group created The 1984 /usr/group Standard, a minimal definition of an operating system interface corresponding broadly to the unprivileged services offered by AT&T's UNIX System III, together with selections from the Kernighan & Ritchie C language library. Slim but seminal, this document was passed on to the IEEE (specifically, to the newly-formed TCOS) to provide the foundation of the POSIX standards. It also gave important input to ANSI in the creation of a standard for the C language.

Despite the fact that neither the IEEE nor ANSI puts any nationality requirement on the individuals (in the case of the IEEE) or the organizations (for ANSI) participating in the creation of their standards, both POSIX and C initially were developed in the U.S. with little international input. The costs of travel and of assigning English-speaking technical experts to the task was (and is) one disincentive; another is the feeling, particularly in Europe, that standards activity should begin at home, rather than in the U.S.

By 1987, the international demand for standards for POSIX and C was obvious, and it was natural that ISO should get involved. To be pedantic — and the standards world is nothing if not pedantic — it was natural that Joint Technical Committee 1 (JTC1) of ISO and the International Electrotechnical Commission (IEC) should get involved. (JTC1 had been formed in the mid-eights to end wrangles between ISO and the IEC over the right to create standards for information technol-
ogy.) It was also natural that the project for the international standardization of the C language should be handled by JTC1's Subcommittee (SC) 22, which is concerned with programming languages. SC22 Working Group (WG) 14 was duly set up to do the job.

It was less natural for POSIX to be assigned to WG15, another new group under SC22. An operating system interface, after all, is hardly a programming language. Nevertheless, after an attempt to set up a new SC to handle system interfaces had failed for political reasons, SC22 picked up the work. Both WG14 and WG15 appointed ANSI as the development agency for their respective standards, leaving us with today's situation.

At this point, I shall have to stop discussing C standardization, as it is not a field in which I am active. But I can tell you more than you probably want to know about the activities of IEEE TCOS, which is at the work-face of POSIX development.

**POSIX in the IEEE**

When TCOS was set up in 1985, it had just one IEEE standards creation project under its control — project 1003, known as P1003. (Other well-known IEEE standards projects are 754 for floating point formats, and 802 for local-area networks.) P1003 quickly split into two sub-projects: P1003.1 for the operating system interface, and P1003.2 for the shell and tools. (Recently, these have come to be known as POSIX.1 and POSIX.2.) A working group was associated with each. The working groups were named after the projects: 1003.1 and 1003.2.

This splitting has continued, with over 30 projects currently active. Whenever a possible new POSIX-related standards activity is identified, its promoters can draw up a Project Authorization Request (PAR), and submit it to the Sponsor Executive Committee (SEC) of TCOS. If approved (sponsored in IEEE terminology), and subsequently rubber-stamped by the IEEE Standards Board, a new project is created. Most become sub-projects of the original 1003 project; some initiate new projects, such as P1201 on windowing environments.

If the subject of a new activity is closely associated with the interests of an existing working group, it is assigned to that group; if it is not, a new working group is set up. This means that there are fewer working groups than projects. As an example, the 1003.0 working group is concerned solely with the 1003.0 guide to the POSIX environment, but the 1003.1 working group now handles 1003.1, the operating system interface; 1003.16, C language bindings to operating system services; and 1003.18, a profile for a traditional POSIX-based system.

Once a working group has been formed, its job is to draft standards, making sure that they meet the needs of both suppliers and users of information technology. This is done through a somewhat baroque balloting process:

- Associated with each working group is a balloting group. The balloting group is typically formed shortly before the circulation of the first complete draft of the first standard developed by the working group.
- Balloting groups are drawn from the membership of a balloting pool. The pool has three types of members: individual members of the IEEE who have specifically applied to join the pool; institutional representatives (IRS) accepted by the IEEE Standards Board (see below); and national heads of delegations to the ISO POSIX working group.
- All members of the balloting pool are sent notice of the formation of each new balloting group. Those who respond become members of the group, subject to considerations of maintaining a balance between user and supplier representatives.
- Once a balloting group has been formed, it persists indefinitely with a static membership. Only if there are problems in getting

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2. SC21, which is responsible for the higher layers of OSI, for SQL and for office document architectures and the like, might have been a candidate, but, after a false start with OSMIL, (see my last column), was not interested.
3. Although I can tell you that ISO 9899, the C standard, went to the printers late in 1990, but, at the time of writing, has yet to emerge. It is functionally identical to the U.S. standard, ANSI X3.159-1989.

4. PARS can also be used to request changes to the goals and terms of reference of existing projects.
the required 75% response to ballots is the membership of a group reviewed.

- It is almost never possible to join a balloting group after it has formed.
- Individuals or organisations outside the balloting group can make objections to, or comments on, the content of draft standards, just as can balloting group members. All objections from whatever source must be handled through a formal resolution process. However, only members of the balloting group can vote for or against the acceptance of a draft (or indeed, completed) standard.
- A draft is considered approved if it is accepted by 75% or more of those who vote either for it or against it.

Simple, huh? And I haven’t even mentioned the appeals procedure!

Membership of a balloting group is a considerable responsibility: following notice of a ballot, IEEE rules give just 30 days to review a document which may run to almost a thousand pages, and to return any comments or objections to the balloting coordinator. And unless over 75% of the membership of the ballot group responds, the result is held to be invalid. When one considers that a document is likely to go through a dozen drafts before it becomes an approved standard, it is clear that balloters have to work hard (even if not all of the drafts are balloted). Recirculation ballots, initiated when changes are made to a draft in response to an initial ballot, increase the workload further.

In order to make the task a little easier, TCOS has adopted a procedure called a mock ballot to handle the early drafts of a document. These are similar to mock examinations: the procedures are identical to the real thing, but it doesn’t matter so much if it is flunked. In particular, no alarm bells start ringing in the IEEE’s offices if a 75% response is not achieved.

What has all this to do with EurOpen?

EurOpen feels that it is important that the views of its membership are represented in two forums. Firstly, on the SEC, which decides on the authorization of POSIX-related projects and controls their development and coordination; and secondly, in the balloting pool from which those who vote on the content and acceptance of standards are drawn.

The first objective has already been met: I am happy to be able to tell you that the SEC has unanimously accepted EurOpen’s request for me to become its institutional representative. I join existing IRS from a number of user groups and industry bodies: The Open Software Foundation, OssWG (a group developing a real-time kernel for embedded systems), SHARE (the IBM user group), UniForum, UNIX International, USENIX, and X/Open. (UniForum and USENIX were particularly helpful in the preparation of EurOpen’s application.)

Gaining IRS status in the balloting pool takes longer, as EurOpen’s request must be discussed by the Standards Board, but I hope to be able to report in a future column that it has been approved.

Luckily, this delay gives me a little breathing space to make a request. I need help from volunteers. If you feel competent to help EurOpen’s newly-formed Standards Activities Management Group (SAMG) in formulating responses to IEEE POSIX ballots, please contact me at the mail address at the head of this article. In particular, could experts on secure operating systems please get in touch, as the working group concerned with this aspect of POSIX, 1003.6, is in the process of forming a balloting group.

I hope to see you at the standards birds-of-a-feather session at EurOpen’s spring conference in Tromsø, Norway, where members of the SAMG will be reporting on the latest developments in the Europe, the U.S.A., and the world at large.

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5. If more than 30% of those who return their ballots abstain, things get more complicated. Let’s not go into that.

6. Actually, the acceptance was acclamation, which is even better.

7. The Free Software Foundation (FSF) is likely to join the list later this year.

8. The other members of the SAMG are Johan Helsingius (jull@penet.nl) and Henk Hesselink (henk@ace.nl).
Long-Term Calendar of UNIX Events†

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>1991</td>
<td>Apr 22-25</td>
<td>*USENIX C++</td>
<td>Washington, D.C.</td>
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<tr>
<td>1991</td>
<td>Apr 22-26</td>
<td>DECUS Muenchen Symposium</td>
<td>Hannover, Germany</td>
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<td>1991</td>
<td>May 6-10</td>
<td>DECUS</td>
<td>Atlanta, GA</td>
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<td>1991</td>
<td>May 9</td>
<td>APP/POSE Users Forum</td>
<td>NIST, Gaithersburg, MD</td>
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<td>1991</td>
<td>May 13-17</td>
<td>ISO/IEC JTC1 SC22 WG15</td>
<td>Netherlands</td>
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<td>1991</td>
<td>May 15</td>
<td>IEEE CS SCC/SAB</td>
<td>Austin, TX</td>
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<tr>
<td>1991</td>
<td>May 15-17</td>
<td>Multi-User C Show</td>
<td>UniForum, Toronto, Canada</td>
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<td>1991</td>
<td>May 15-17</td>
<td>IEEE TCOS Cptr Workstations</td>
<td>Falmouth, MA</td>
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<td>1991</td>
<td>May 20-24</td>
<td>EurOpen</td>
<td>Tromsø, Norway</td>
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<td>1991</td>
<td>Jun 10-14</td>
<td>USENIX</td>
<td>Opryland, Nashville, TN</td>
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<td>1991</td>
<td>Jun 17-19</td>
<td>Sun User Group</td>
<td>Atlanta, GA</td>
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<td>1991</td>
<td>Jul 9-11</td>
<td>JUS</td>
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<td>1991</td>
<td>Jul 8-12</td>
<td>IEEE 1003</td>
<td>Santa Clara, CA</td>
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<td>Jul 15-17</td>
<td>UKUUG</td>
<td>Liverpool, UK</td>
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<td>Aug 5-8</td>
<td>Interex</td>
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<td>Oct 30</td>
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<td>1992</td>
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<td>Oct 19-23</td>
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<td>Mar 15-18</td>
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<td>1993</td>
<td>Jun 21-25</td>
<td>USENIX</td>
<td>Boston, MA</td>
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†Compiled with the assistance of Alain Williams of EurOpen and Susanne Smith of Windsound Consulting.
*USENIX Workshops and mini-Conferences

March/April 1991
Report from the USENIX Committee on University Outreach

A committee composed of Dan Geer, Dan Klein, Rob Kolstad, Evi Nemeth, and Sonya Neufel has been looking into new ways for encouraging and increasing student participation in the Association. Presently, students receive discounts on membership, tutorials, and conference registration fees. There are also scholarship programs to assist students in attending workshops and conferences, as well as prizes for the best student paper and presentation.

This past Winter, members of the committee have been enlisting representatives on target university campuses to be spokespersons for the Association. These university liaisons will disseminate information and encourage student involvement in USENIX. They will receive a complimentary educational membership, as well as one free registration to attend either one of the two technical conferences held each year.

The committee is pleased to announce that the following individuals have agreed to serve as campus representatives:

- George Covert (Iowa State University)
- Dr. Stephen Henderson (Auburn University)
- Carol Miller (North Carolina State University)
- Peter Roden (MIT)
- William F. Hogue (University of Wisconsin, Eau Claire)
- Rick Ord (University of California, San Diego)
- Michael Stumm (University of Toronto)

Other universities are being approached, and it is hoped that the above list will continue to grow. The committee would welcome your suggestions for names of potential contacts at universities in the U.S. and Canada. Please forward them to the chairman, Dan Geer (geer@crl.dec.com).

Computing Systems Special Issue

If you are a new member, perhaps you have not yet heard the compact disc that accompanies issue 3:2 (1990) of Computing Systems? It includes classical repertoire and original works. The music was created by Michael Hawley at the MIT Media Laboratory and Peter Langston while he was at Bellcore. Pieces include “Empty Bed Blues” by Robert Johnson, “Some Velvet Morning” by Lee Hazelwood, Liszt’s “Totentanz” played by Jorge Bolet and the London Symphony Orchestra, and “Pecusa Waltz” by Peter Langston.

Single copies, including the CD, are available for $11.00. To place an order send a prepayment (check or money order) to the Association:

USENIX Association
2560 Ninth Street, Suite 215
Berkeley, CA 94710

or call 415/528–8649 and charge your order to your VISA or Master Card.

If you are outside the U.S.A. please make your payment in U.S. currency by one of the following:

- VISA, MasterCard or the foreign equivalent
- International money order
- Check issued by a local branch of a U.S. bank
Summary of Board of Directors' Meeting  
Dallas, TX, January 20–21, 1991

The regular quarterly meeting of the USENIX Board of Directors was convened in Dallas, Texas on January 20, 1991.

Attendance: Rick Adams, Ed Gould, Rob Kolstad, Marshall Kirk McKusick, Sharon Murrel, Evi Nemeth, Michael D. O'Dell, Barry Shein, Alan Nemeth, Deborah Scherrer, Ellie Young, Judith DesHarnais, Cynthia Deno, Daniel Klein, Dan Appelman, Ralph Barker, Peter Collinson, Dominic Dunlop, Michel Gien, Lori Grob, Andrew Hume, Jim Lipkis, Peter Salus

Standards Newsletter Proposal

Ralph Barker of UniForum presented a proposal for funding a standards publication which would be jointly sponsored by UniForum, JUS, EurOpen and USENIX. There was a lengthy discussion concerning the publication's organizational structure, production costs, scope, pricing, legal ownership, and audience. It was decided that USENIX could provide the snitch reports as its contribution, with full credit given; and that USENIX will continue to publish full text of the snitch reports on the net and summaries in :login:.

Dallas '91 Winter Conference

Grob suggested that future program chairs need to decide if it is practicable to have all committee members read each paper/abstract, and that the Association might provide a list of potential readers for the committee. Grob and Kolstad volunteered to do a proposed form for authors which would incorporate the program committee's comments.

DesHarnais reported that 1200 had preregistered as of January 20, and at the 1990 Winter conference, 1253 were registered at this time. Despite the declaration of War in the Gulf, only 42 cancellations had been received thus far (with 35 cancelling before the deadline, which is within the norm).

Klein reported that the system administration and network security tutorials were very popular, and that overall enrollment numbers in the tutorial program matched previous winter conferences.

Nashville '91 Summer Conference

Scherrer requested assistance with attracting papers and presentations with a multimedia emphasis. Slots were available for highly technical multimedia presentations. She has a commitment from Paul Lanksy as keynote. Murrel and Scherrer are working together on integrating and merging invited talks, presentations, and the refereed track.

Deno reported on the exhibition, and asked for the Board's assistance in identifying companies to contact. She is working on a special promotion to attract companies that are relatively new to UNIX and USENIX.

Fall '90 workshops/mini-conferences

Young gave a brief summary of each meeting and reported that attendance at all three meetings was higher than projected: Security: 259; Mach: 195; LISA IV: 268. All three events had been well received by the attendees. Young was working on plans for having a mini-conference on Security, another Mach workshop; and a subcommittee to select the chair for the next LISA conference was reviewing the proposals.

Software Development Environments in UNIX Workshop

McKusick reported that the workshop was very lively and successful. Stu Feldman, the chair, was thinking of submitting a proposal for another workshop analyzing the effectiveness of software debugging methodologies.

Symposium on Distributed & Multiprocessor Systems

Young reported that everything was on track, and the program had just been set. There was a brief discussion which was very positive on Spafford and Leach's handling of the previous meetings on this topic, and it was agreed to approve their proposal to cosponsor a third symposium next year.
Proposals to Chair the Winter 1993 Conference

Proposals were received from Dan Geer and Rob Kolstad. It was decided to accept Kolstad’s proposal, and that Geer should be encouraged to participate and submit another proposal in the future.

Long-Term Conference Planning

DesHarnais went over her written site proposals report for 1995. For Winter most were in favor of New Orleans, with Kolstad favoring San Diego because of its warm locale. For the Summer, most favored Seattle slightly over Denver. DesHarnais would go back to these two sites and choose the most attractive proposal.

Bylaw Discussion

The USENIX attorney, Dan Appelman, said he had reviewed the Association’s bylaws and had suggestions pertaining to the issues raised by the Board at its last meeting (see page 20 for recommended changes to bylaws - EY). Appelman reminded the Board that the Bylaws require a two-thirds vote of directors to amend them, after notice to the membership has been given. He then went over the plan: the Board should decide its intention; publish the intention in ;login; and if there are not a lot of objections from the membership, the Board can pass them at its next meeting.

It was decided that we designate the open meeting with the Board of Directors at the Summer conference to be the Annual Meeting of the Association and the Executive Director should notify the membership as required by the Bylaws.

Proposal for Reallocation of Scholarship Funds

Kolstad’s proposal was in response to the Board’s desire to gain better leverage of its goals. In lieu of an annual scholarship, funds would be allocated for cash prizes for both the best paper and best presentation at the conferences. Full-time students would have their own division in these competitions. His proposal was adopted.

Other Business

It was decided to award UUNET with a Supporting membership. Young reported that the book program’s editorial board would be holding its first meeting in Dallas.

Institutional Representative to IEEE TCOS

Salus said the proposal received from Suzanne Smith to reinstate funding for a USENIX IR represented the discussions of Barker, Dunlop, Haemer, McKusick, Quarterman and himself. Salus said that USENIX having an IR to IEEE TCOS is important because there are five other organizations that have IRs to TCOS. These have vested interests, and USENIX’s IR is seen as standing above this. He suggested: 1) vote for some financially viable level of support for a USENIX IR to TCOS, and 2) ask some group to select a name and approach someone to be that IR. Michel Gien said that EurOpen has just appointed Dominic Dunlop as its IR to SEC. Everyone present favored the principle of having an IR.

It was decided to fund an IR position for this fiscal year, and a search committee was appointed to fill the position by March 1. (see page 7—Ed.)

Budget - FY 1990

The reports reflecting preliminary year-end figures were discussed. A deficit of $60,000 was anticipated. Kolstad congratulated Young on her efforts in reducing the projected net deficit in the membership category. Final statements to the Board and membership would be ready in the Spring.

Budget - FY 1991

Young presented the revised budget for FY 1991 which reflected adjustments made during the previous meeting. She also congratulated the Board on its efforts at that meeting which reduced the projected deficit by more than two-thirds.

Press Relations Proposal

It was agreed to fund Frey’s proposal to provide services for for press relations at the Summer Conference.

Tutorial Fees

Young’s report contained comparative figures of tutorial fees charged by other organizations. Since USENIX tutorial fees were last increased at the Winter 1988 conference and costs for this program have increased, it was decided to raise tutorials fees from $225 to $245 for one day tutorial, and from $395 to $445 for two days.

-EY
Proposed Changes to USENIX Bylaws

The USENIX Board of Directors at its January, 1991 meeting, approved amending the Bylaws as follows:

It was moved by Sharon Murrel, seconded by Ed Gould to notify the membership of the Board of Directors’ intent to modify the Bylaws as follows:

In Article 1, Footnote 1:
Change to: “UNIX is a Trademark of Unix System Laboratories (USL).

In Article 4:
4.2 Number, Term of Office and Qualification

. . . . The term of office of each director shall begin at the [Add: conclusion of the] Annual Meeting following his election and end at the [Add: conclusion of the] Annual Meeting of the next even numbered year.

4.4 First Meeting

Each duly elected Board of Directors shall hold its first meeting for the purpose of organization and the transaction of other business, if a quorum be present, without notice of such meeting, [Delete: on the same day and at the same place as] [Add: immediately following] the Annual Meeting next occurring after the election of said Board of Directors . . . .

4.5 Regular and Special Meetings

[Replace entire section as follows:

Regular meetings of the Board of Directors shall be held at such times and such places as may be fixed from time to time by resolution of the Board of Directors. Upon request of the President or any three Directors, the Secretary shall call a special meeting of the Board of Directors. Such meetings may be in person or may be held by telephone or by electronic mail provided that if such meetings are held by telephone or electronic mail each of the Directors is given the opportunity to fully participate in the discussion of the issues presented.]

4.6 Notice of Meetings

[Replace entire section as follows:

Notice of regular meetings of the Board of Directors shall be by resolution, in writing or by electronic mail and if in writing or electronic mail shall be sent to each Director at least ten days before the time designated for such meeting. Special meetings shall be held at any time, and if held in person at any place, unanimously agreed upon by the Directors.]

4.9 Quorum

Four directors in office, personally present, [Add: or in the case of meetings held by telephone or electronic mail, fully participating], shall be necessary and sufficient to constitute a quorum for the transaction of business at any meeting of the Board of Directors, but a smaller number may adjourn any such meeting to a later date. Notice of [Add: the resumption of] such adjourned meeting shall be [delete remainder of existing section] [Add: by resolution prior to adjournment, or, otherwise, at such time and, if held in person at such place, as may be thereafter unanimously agreed upon by the Directors.]

4.10 Action by Majority Vote

Except as otherwise expressly required by law or by these By-Laws, the act of 4 or more directors who are a majority of the directors present [Add: or fully participating] at a meeting at which a quorum is present [Add: or is fully participating] shall be the act of the Board of Directors.

In Article 5:

5.3 Term

The term of office of each officer shall begin at the [Add: conclusion of the] Annual Meeting following his election and end at the [Add: conclusion of the] Annual Meeting of the next even numbered year.

5.9. The Treasurer

The Treasurer shall collect, and keep account of all monies (spelling correction) received and expended for the use of the Corporation; he shall deposit [Add: or invest sums received by the Cor-
poration in the name of the Corporation.] [Delete: in such depositories as shall be approved by the Board of Directors.] [Add: according to the then current Fiscal Procedure Policy approved by the Board of Directors.]

It was moved by Ed Gould, seconded by Evi Nemeth, to propose to the membership that we adopt the Bylaw changes as follows:

In Article 10

10.1 Execution of Contracts and Payment of Expenses

[Replace entire section with:

The Board of Directors may, from time to time, by resolution and except as otherwise provided in these By-Laws, delegate its authority to enter into contracts and pay expenses of the Corporation to one or more Directors and/or employees of the Corporation, as it deems prudent.]

10.2 Checks, Drafts, etc.

[Replace entire section with:

All checks, drafts and other orders for payment of money out of the funds of the Corporation shall be signed in conformance with the resolution described in 10.1 above.]

10.3 Deposits.

The funds of the Corporation not otherwise employed shall be deposited [Add: or invested from time to time to the order of the Corporation] [delete: in such banks, trust companies or other depositories as the Board of Directors may select] [Add: according to the then current Fiscal Procedure Policy approved by the Board of Directors.]

It was moved by Ed Gould, seconded by Sharon Murrel, to propose to the membership to amend Article 11, paragraph 11.1 by the Bylaws to read:

In Article 11:

11.1 Books and Records

[Replace entire section with:

The books and records of the Association shall be kept at the principal place of business of the Association, or at other such locations as may be designated by the Board of Directors.]

Amendments require prior notice to the membership. If you object to any of these changes, please notify the Secretary of the Association by May 15, 1991.

Rob Kolstad
Secretary
USENIX Association
2560 Ninth Street, Ste. 215
Berkeley, CA 94710
Internet: (kolstad@usenix.org)
Reports on Work-In-Progress: Dallas Conference
Lisa A. Bloch

Fast String Searching
Andrew Hume, AT&T Bell Labs, andrew@research.att.com

Andrew presented some preliminary results from joint work with Dan Sunday of Johns Hopkins/ APL on fast, portable string search algorithms. The result is a toolkit from which you can construct algorithms with different properties. The recommended algorithm is 40% faster than that used in modern greps.

Status of Plan 9
Rob Pike, AT&T Bell Labs, rob@research.att.com

Rob gave a short talk about the status of the Plan 9 distributed system. The system is designed to be economical, scalable, and portable and to support a heterogeneous computing environment.

It runs on 'terminals' (really small workstations—Gnats, Sun SLC's, MIPS Magnums, NeXTstations), CPU servers (SGI Power series MIPS-based multiprocessors), and file servers (SGI's again and a MIPS 6280), interconnected by a variety of networks including Datakit, Ethernet, and point-to-point DMA links. The operating system provides functionality comparable to other systems but with fewer than 20,000 lines of C.

The Plan 9 window system is about 4000 lines. Plan 9 has been ported to several different architectures and includes (newly written) compilers for the MIPS, 68020, and SPARC instruction sets. Its developers invite applications from a few academic sites to receive source distributions of the system.

Application letters should be addressed to:
Rob Pike
AT&T Bell Laboratories
Room 2C 524
Murray Hill, NJ 07974
rob@research.att.com

Providing Debug Support in a MIPS environment
Michael Meissner, Open Software Foundation, meissner@csf.org

The MIPS compiler system uses its own debug format (originally from a company called Third Eye), and the talk covered the experience of modifying GCC to add this debug format.

Best Student Paper Award

Margo Seltzer won the Best Student Paper Award for her and Ozan Yigit's "A New Hash Package for UNIX", presented at the USENIX Winter 1991 Conference in Dallas, Texas. Margo is a Ph.D. student at University of California, Berkeley and Ozan is a software engineer at York University (Toronto). Congratulations!
An Update on UNIX–Related Standards Activities

Jeffrey S. Haemer
Report Editor, USENIX Standards Watchdog Committee

1003.14: Multiprocessing

Bill Cox <bill@attunix.att.com> reports on October 15–19, 1990 meeting in Seattle, Washington:

P1003.14 (Multiprocessing) Summary — Seattle

Dot14 is working toward a first draft of its document, a multiprocessing Platform Environment Profile (PEP). (The terminology has changed; this is more or less what used to be called an Application Environment Profile.)

Bob Knighten (Chair) and Bill Cox (I’m the Secretary) are going to edit the most final UI Multiprocessing Working Group (MPWG) report and replace the copy apparently sent in error by UI. The working group adopted the to-be-delivered version as a base document for the standard.

The UI MPWG document does not address coherence, sequentiality, or the management of a multiprocessor, all of which are important areas to the Dot14 working group. Non-Uniform Memory Architecture (NUMA) issues are also a consideration; the UI MPWG report deals primarily with Uniform Memory Architectures.

The group is starting to produce a coordination ballot for P1003.4A Pthreads, which was released for ballot by the Seattle meeting. Since the Pthreads work has now wound down (the draft standard is now in the hands of the technical reviewers, not the working group), many of the partisans that were attending Pthreads will start attending Dot14, and therefore will have a role in shaping the coordination ballot on their own handiwork. There will be a separate effort to create a Common Reference Ballot, similar to the one produced on Dot4, but due to the changing composition of Dot14 that work will take place informally and outside of Dot14.

Note that a coordination ballot from another POSIX group can only be a "NO" ballot, and presumably draws significant attention (as do all of the institutional ballots).

The work items for the New Orleans meeting are:
1. Prepare coordination ballot for Pthreads.
2. Review draft 2 of Dot14 PEP.
3. Review state of the "TIMS" PEP.
4. Coordinate with the Dot13 AEP.
5. Continue working on modifications to and issues with Base Standards.
6. Continue to coordinate with other working groups.

The current list of coordination issues with other POSIX working groups is:

Dot2

- Parallel utilities, including make, fsck, grep, and find.
- File system directory tree walk.
- How to specify parallelism (command line flags, environment variables,...).
- Specification of the effects of parallelism. Does a "parallel" version have to be faster if processors are added?
- To what extent can parallelism change the effect, e.g., output order?

Dot1 and Dot4

- Resource reservation.
- Processor binding and scheduling.
- The plock function.
- Shared memory interfaces.

Dot4A (Pthreads)

- Microtasking models (finer than Pthreads).
- Resource query and brokering.
- NUMA configuration and control.
- Synchronization primitives, e.g., barriers, that are not in the Pthreads draft.
- Re-entrant interfaces and functions.
- Memory model (the Pthreads model is overly restrictive in a multiprocessor).
- Scheduling (this seems to have cleared up with recent changes in Pthreads).
Dot7

- Resource query (see also Dot4A list).
- Statistics gathering and display.

Dot8

- Resource brokering (again).

X3J16: C++

Mike Vilot <mjv@objects.mv.com> reports on the November, 1990 meeting in Cupertino, California:

Current Status

The ANSI X3J16 committee closed out their first year of discussions by completing the definition of the C++ language. At the November meeting, they agreed to incorporate the terminating exception proposal (the text from Chapter 15 of The Annotated Reference Manual, minus the annotations, plus some minor clarifications). C++ vendors can now regard templates and exceptions as officially part of the language, and provide their users an opportunity to work with this feature.

We saw some progress on the review of language ambiguities and inconsistencies, and are beginning to get some idea of how difficult it will be to ANSI-fy the document. We also saw some specific proposals on library contents (the most substantial suggestion to date has been a simplified version of the iostreams library).

November meeting

Hewlett-Packard hosted the Cupertino meeting. The week's major activities focused on setting the debate surrounding the design of the exception-handling facilities in C++. There was also a rather long discussion of internationalizing the development of the C++ standard.

X3J16's sub-groups focus on the key topics listed in the goals statement developed at the March meeting. They worked by electronic mail between meetings, and reported their progress.

International Concerns

Steve Carter of Bellcore presented the major international concerns.

Steve explained the differences between "Type D" (domestic first) and "Type I" (international) procedures in preparing an international standard. His group suggests converting to a "Type I" process, which results in simultaneous review and standardization at the national and international levels.

One aspect of this conversion that caused the most discussion was the ISO requirement to provide a detailed explanation of the "incompatibilities" between C and C++. As Bjarne Stroustrup observed, that term is loaded and causes a shift in the group's emphasis to defining the "not C" elements of C++ and defending why they are there. He also pointed out that X3J11 was not required to go through this sort of exercise.

The committee formally moved and tabled a decision to make the conversion. This puts the group on record as having considered the idea, but expresses their reservations about the various implications of such a decision.

We also discussed the alternative to trigraphs proposed by Keld Simonsen and Bjarne Stroustrup. There is some confusion among X3J16 members regarding the extent of systems supporting ISO 646 and the Latin-1 character set. X3J16 will investigate the issue in more detail at the March meeting.

There was also some discussion of the normative addendum to ISO C proposed by the Japanese. Since this will affect the goal of maintaining compatibility between C++ and C, this issue will bear watching.

Editorial

Jonathan Shopiro of AT&T presented the Editorial group's work.

The most significant change since the July meeting was a clarification in Chapter 11 regarding protected derivation. The language described as of the 2.1 release of cfront slightly generalized the language to allow all three access specifiers for derived classes. Jon described the changes to the language specification as clarifying this point and simply explaining the semantics involved.

An important development was the lack of progress on the Rationale document. John Dlugosz had volunteered to edit this document, and has not been heard from since the July meeting. He was not present at the November meeting.
Formal Syntax

James Roskind, an independent consultant, presented the work of the Formal Syntax group.

He continued to lobby X3J16 to accept his copyrighted yacc grammar for C++ as the formal definition of the language. He produced little evidence that the group worked on reviewing either relevant formal methods or the applicability of those methods to the development of the standard.

Mark Langley of Microsoft presented ten examples that illustrated what he considered problems in the language. Bjarne Stroustrup and others pointed out that most of the issues are answered by the text of the language specification. The committee expressed a general dissatisfaction with the group’s process of random fault-finding, and strongly urged the group to present specific proposals for language changes and/or clarifications in the language specification.

Tom Penello of MetaWare presented an analysis of the impact of the template syntax on the LR(1) properties of the grammar, using a grammar analysis tool of his own design. While the committee appreciated the value of automated tools to pinpoint problems in the grammar, the consensus of the committee was that an entirely grammar-based specification of the language was unrealistic — even if the grammar could precisely and unambiguously specify the language, the result would likely be too complex to be useful to either implementors or users.

Core Language

Andy Koenig of AT&T presented the Core Language group’s work.

The group came up with a list of almost 80 issues that need further clarification. They also adopted a policy of not considering purely aesthetic changes.

An example of the kind of issue they are discussing is a clarification of the rules concerning creation and destruction of compiler-generated temporaries. These rules need to be clarified, because construction and destruction of temporary objects of user-defined types can be potentially expensive. It is also important to avoid placing too many limits on an implementation, precisely because vendors would like to be able to optimize away unneeded temporaries.

Environment

John Vasta of HP presented the work of the Environment group.

Much of their discussion revolved around precisely specifying the interaction with the environment during linking and execution. They devoted considerable effort to the “one definition rule,” which requires exactly one copy of each function and object. There was also some discussion of the semantics of static initialization, especially in a mixed C+/non-C++ program.

The emerging consensus of the committee seems to be against requiring all implementations to provide “hooks” to underlying details of implementation. These include non-C++ access to static constructors and destructors, a standard “de-mangling” function, and a required type-safe linkage encoding scheme.

Jerry Schwarz of Kubota Pacific (formerly called Stardent), presented some of the group’s discussion on the topic of mixed C and C++ environments. Some of the issues include type equivalence between C and C++, name aliases between the languages, and details of function invocation in a mixed-language program. This topic overlaps both the C compatibility issues and the C library topics.

C Compatibility

Tom Plum of Plum-Hall presented the work of the C Compatibility group.

He presented a list of definitions from the C standard that should be incorporated in the C++ standard, as document X3J16/90–0088. The committee accepted his suggestion that Jon Shopiro incorporate the definitions in the next revision. The challenge will be to review the document to ensure consistent and appropriate use of terms throughout.

Libraries

I presented the Library group’s work.

The main results so far are proposals for standard definitions of three library areas: lan-
language support, iostreams, and strings. Documents X3J16/90-0077, -0078, and -0079 contain the details of the proposals.

Alain Beale of SAS provided many comments on the streams proposal. Some aspects of these classes contained UNIX dependencies, and were difficult or impossible to implement in other environments. Jerry Schwarz also suggested incorporating exceptions in a way that preserves current practice — the choice of whether to throw exceptions or set a state variable could be under programmer control.

Steve Clamage of TauMetric presented a summary of the issues surrounding support for the ANSI C library within the C++ standard (document X3J16/90-0105). Progress on this issue has been slow, because each person who has volunteered to address the issue at one meeting has left X3J16 by the next meeting.

Aron Insinga of DEC presented his proposal for a standard string class. There are many members of the committee who have implemented successful string classes, so there was much useful comment on Aron’s proposal. Many of the suggestions exploited advanced features of C++, such as templates. Bruce Eckel of Revolution2 suggested that at least one of the standard string classes be kept simple enough to be useful as a tutorial example for new C++ programmers.

Jim Howard of Mentor Graphics provided a string class he developed. Notable aspects of Jim’s library included support for Japanese characters and the success the library has enjoyed with clients around the Pacific Rim. This library could provide valuable input for addressing the international concerns about multinational character handling. It may be possible to avoid a language extension by providing the necessary support in the library.

Language Extensions

Bjarne Stroustrup of AT&T presented the work of the Extensions group, which was by far the most active.

The key discussion of the week was of course the design of exceptions for C++. Since the March meeting, the issue had been whether to incorporate just the terminating model, or also incorporate resumable exceptions. At the July meeting, Martin O’Riordan of Microsoft had asked for time to do further research on the topic. He proposed adding constructs to allow programmers to specify resuming and non-resuming exceptions and handlers.

The key point in the discussion came during a discussion of exceptions by Jim Mitchell of Sun Microsystems. His long experience designing languages with exceptions, using such languages to build large systems, and efforts to document and teach the use of resumable exceptions, all helped to clarify the discussion. The final vote was 30–4 in favor of accepting the text of Chapter 15.

The next substantial language extension will be consideration of a standard way to provide run-time access to type information. Mark Linton of Silicon Graphics outlined one proposal in his Dossier concept (see: “Runtime Access to Type Information in C++” at the 1990 USENIX C++ Conference, San Francisco, April 1990).

Next events

Now that the major design decisions are completed, the task of standardizing C++ will get down to details. We can expect that any changes to C++ will be relatively minor — certainly less than, say, the introduction of function prototypes in ANSI C.

The target date for delivering a draft C++ standard will be affected by the involvement in ISO. One informal estimate is an additional year to complete the standardization process (which would mean a simultaneous national and international review in 1993). The next three X3J16 1991 meetings (and their hosts) will be:

- March 11–15, Nashua, NH (Digital)
- June 17–21, Lund, Sweden (Lund Institute of Technology)
- November 11–15, Toronto, Canada (IBM)

Texas Instruments will host the March 1992 meeting in Austin, TX. Zoritech announced plans to host one of the other two 1992 meetings, in London.

Membership on an X3 committee is open to any individual or organization with expertise and material interest in the topic addressed by the committee. The cost for membership is $250. Contact the chair or vice chair for details.
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In an effort to advance the state of the art in UNIX and open systems in the areas of computer science and management science, UniForum, the International Association of UNIX Systems Users, is offering its second annual UniForum Research Award Program. Awards, up to two years in duration, will include a stipend of up to $10,000 per year. Two awards will be given each year, one to a candidate seeking an advanced degree in the technical study of computer sciences and the other to a candidate seeking an advanced degree in management sciences as they apply to information management. The award is designed to help students research solutions to problems in the UNIX/Open Systems community. Preference will be given to research which concludes with demonstrable results that can be shown at the UniForum show and is of value to UniForum Association sponsors.

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March/April 1991
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CA – Fresno: the Central California UNIX Users Group consists of a uucp-based electronic mailing list to which members may post questions or information. For connection information:
Educational and governmental institutions:
Brent Auerhimey  
(209) 294-4373
brent@CSUF Fresno.edu or csufres/brent
Commercial institutions or individuals:
Gordon Crumal  
(209) 875-8755
csufres/gordon  
(209) 298-8393

CA – Irvine: the UNIX Users Association of Southern California meets the 2nd Monday of each month.
Rich Bergstedt  
(714) 582-0768
26755 Dulcinea
Mission Viejo, CA 92691
attmail.com/bergstedt

CO – Boulder: the Front Range UNIX Users Group meets monthly at different sites.
Steve Gaede  
gaede@sda.com 
(303) 444-9100
& Analysis, Inc.
1113 Spruce St., Ste. 500
Boulder, CO 80302

FL – Coral Springs:
S. Shaw McQuinn  
(305) 344-8686
8557 W. Sample Road
Coral Springs, FL 33065

FL – Fort Lauderdale/Miami: The South Florida UNIX Users Group meets the 2nd Tuesday of each month.
Tony Vincent, John McLaughlin  
(305) 776-7770
(sun.novanax.gould)@sunvice!tony
jmclaughlin@sun.com
John O'Brien  
(305) 475-7633
gatech!uforida!novanax!john

FL – Jacksonville/Northeast: UNIX Users of Jacksonville meets the 2nd Thursday of each month.
Tom Blakely  
(904) 646-2820
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Emilie Olsen  
(904) 390-3621

FL – Melbourne: the Space Coast UNIX Users Group meets at 8pm on the 3rd Wednesday of each month at the Florida Institute of Technology.

Bill Davis  
bill@ccd.harris.com  
(407) 242-4449

FL – Orlando: the Central Florida UNIX Users Group meets the 3rd Thursday of each month.
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codas!sunflam!mike  
(407) 862-0949
Ben Goldfarb  
goldfarb@hcx9.uce.edu  
(407) 275-2790
Mikel Manitius  
(codas,attmail)!mikel  
(407) 869-2462

FL – Tampa Bay: the Tampa UNIX Users Group meets the 1st Thursday of each month in Largo.
Bill Hargens  
unet!pdnl!hargens  
(813) 530-8655
George W. Leach  
unet!pdnl!reggie  
(813) 530-2376

GA – Atlanta: meets on the 1st Monday of each month in White Hall, Emory University.
Atlanta UNIX Users Group
P.O. Box 12241
Atlanta, GA 30355-2241
Marc Merlin  
(404) 442-4772
Mark Landry  
(404) 365-8108

MI – Detroit/Ann Arbor: The SouthEastern Michigan Sun Local Users Group meets jointly with the Nameless UNIX Group on the 2nd Thursday of each month in Ann Arbor.
Steve Simmons  
scc@lokkur.dexter.mi.us  
home: (313) 426-8981
K. Richard McGill  
Bill Bulley  
rich@sendai.ann-arbor.mi.us  
web@app-lga.uucp  
office: (313) 769-4086

MI – Detroit/Ann Arbor: dinner meetings the 1st Wednesday of each month.
Linda Mason  
michigan/usrgroup  
(313) 855-4220
P.O. Box 189602
Farmington Hills, MI 48018-9602

MN – Minneapolis/St. Paul: meets the 1st Wednesday of each month.
UNIX Users of Minnesota  
Robert A. Monio  
17130 Jordan Court  
pressutt@dnshq.mn.org  
(612) 220-2427
Lakeville, MN 55044

March/April 1991
MO - St. Louis:
St. Louis UNIX Users Group
Plus Five Computer Services
765 Westwood, 10A
Clayton, MO 63105
Eric Kiebler
(314) 725-9492

NE - Omaha: meets monthly.
/usr/group/nebraska
P.O. Box 31012
Omaha, NE 68132
Eric Johnson
eric@null.uucp
(402) 422-5489

New England - Northern: meets monthly at different sites.
Peter Schmitt
Peter.Schmitt@dartvax.dartmouth.edu
Kiewit Computation Center
Dartmouth College
Hanover, NH 03755
(603) 646-2085

NJ - Princeton: the Princeton UNIX Users Group
meets monthly.
Peter J. Holsberg
mccclpjih
Mercer County Community College
1200 Old Trenton Road
Trenton, NJ 08690
(609) 586-4800

NY - New York City: Unigroup of New York City
meets every other month in Manhattan.
Unigroup of New York City
G.P.O. Box 1931
New York, NY 10116
Peter Gutmann
(212) 618-0973
peterg@murphy.com

OH - Columbus: The Columbus Local UNIX Group
meets the 1st Monday of each month.
Mark Verber
verber@mps.ohio-state.edu
Physics Department
Ohio State University
Columbus, OH 43210
(614) 292-8002

OK - Tulsa: the Tulsa UNIX Users Group, SUSR,
meets the 2nd Wednesday of each month.
Stan Mason
tulsixtms@drd.com
(918) 560-5329
Mark Lawrence
mark@drd.com
(918) 743-3013

PA - Philadelphia: the UNIX SIG of the Philadelphia Area Computer Society
meets the morning of the 3rd Saturday of each month.
G. Baun UNIX SIG
rutgers!(bpac,bcmvax)!
c/o PACS
(310) 331-3781
temvax@pasbbl!(gbaun,whutchi)
Box 312
La Salle University
Philadelphia, PA 19141

TX - Austin: CACTUS meets the 3rd Thursday of each month.
Capital Area Central Texas UNIX Society
P.O. Box 9786
Austin, TX 78766-9786
officers@peyote.cactus.org
(512) 331-3781

TX - Dallas/Fort Worth:
Dallas/Fort Worth UNIX Users Group
Seny Systems, Inc.
5327 N. Central, #320
Dallas, TX 75205
Jim Hummel
(214) 522-2324

TX - Houston: the Houston UNIX Users Group (Hounix)
meets the 3rd Tuesday of each month.
Hounix answering machine
(713) 684-6590
Bob Marcum, president
(713) 270-8124
Chuck Bentley, vice-president
(713) 789-8928
chuckb@hounix.uucp

TX - San Antonio: the San Antonio UNIX Users
meets the 3rd Thursday of each month.
Jeff Mason
gatechpetrolhsatbjeff
Hewlett Packard
(512) 494-9336
14100 San Pedro
San Antonio, TX 78232

WA - Seattle: meets monthly.
Bill Campbell
(206) 232-4164
Seattle UNIX Group Membership Information
P.O. Box 820
Mercer Island, WA 98040-0820
uw-beaver!tikall!camco!bill

Washington, D.C.: meets the 1st Tuesday of each month.
Washington Area UNIX Users Group
9811 Mallard Drive
Laurel, MD 20708
Alan Fedder
(301) 953-3626

CANADA - Toronto:
Evan Leibovitch
413 Baronwood Court
Brampton, Ont. Canada L6V 3H8
(416) 452-0504
evan@telly.on.ca

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