# AUUGN

AUUG Inc. Newsletter

Volume 14, Number 5

October 1993

The AUUG Incorporated Newsletter

Volume 14 Number 5

October 1993

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AUUG General Information

Memberships and Subscriptions

Membership, Change of Address, and Subscription forms can be found at the end of this issue.

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AUUG General Information

Next AUUG Meeting

The AUUG'94 Conference and Exhibition will be held from the 7th to 9th September, 1994, at the World Congress Centre, Melbourne.

Advertising

Advertisements to be included in AUUGN are welcome. They should conform to the standards of other contributions (see page 5). Advertising rates are $120 for a quarter page, $180 for half a page, $300 for the first A4 page, $250 for a second page, $500 for the inside cover and $750 for the back cover. There is a 20% discount for bulk ordering (ie, when you pay for three issues or more in advance). Contact the business manager for details.

Mailing Lists

For the purchase of the AUUGN mailing list, please contact the AUUG secretariat, phone (02) 361 5994, fax (02) 332 4066.

Back Issues

Various back issues of the AUUGN are available. For availability and prices please contact the AUUG secretariat or write to:

> AUUG Inc.
> Back Issues Department
> PO Box 366
> Kensington, NSW, 2033
> AUSTRALIA

Conference Proceedings

A limited number of the Conference Proceedings for AUUG'92 and AUUG'93 are still available, at $50 for members and $60 for non-members. Contact the AUUG secretariat.

Acknowledgement

This newsletter was produced with the kind assistance of and on equipment provided by the Australian Nuclear Science and Technology Organisation. A copy of FrameMaker for use in the production of the newsletter has been provided by Platform Technologies.

Disclaimer

Opinions expressed by authors and reviewers are not necessarily those of AUUG Incorporated, its Newsletter or its editorial committee.

AUUG Newsletter

Editorial

Welcome to AUUGN Volume 14 Number 5.

Well AUUG93 is over, hope everyone that attended the conference enjoyed it and found it worthwhile. In this issue we have comments from both Phil McCrea and Adrian Booth on the conference. Adrian also has some *happy snaps* from the conference dinner, and Michael Paddon has printed the faces *saved* on the face saver stand (very useful for recognising some of those characters).

As usual, there are notes on a number of local chapter activities, including some calls for participation in the summer conferences. I've also included the USENIX announcement and call for papers for their 1994 summer conference, and a note about the UniForum NZ'94 conference (see the footnote to the paper from UniForum NZ'93, page 52 in this issue).

For the more technically oriented, there are a number of papers, some that were presented at various of this year's summer conferences and one presented at UniForum NZ'93.

Finally, we also have a reprint (from AUUGN Volume 1 Number 2) of John Lion's second letter from Bell Labs, and a number of book reviews that Frank has arranged.

Jagoda Crawford

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AUUGN Book Reviews

The AUUGN book review editor is Frank Crawford. Anyone interested in reviewing books or with book reviews to submit for publishing in AUUGN please contact Frank. His address can be found on page two of this issue. Remember, that any books you review, you keep.

Contributions

The Newsletter is published approximately every two months. The deadline for contributions for the next issue of AUUGN is:

Volume 14 No 6   Friday 26th November

Contributions should be sent to the Editor at the above address.

I prefer documents to be e-mailed to me, and formatted with troff. I can process mm, me, ms and even man macros, and have tbl, eqn, pic and grap preprocessors, but please note on your submission which macros and preprocessors you are using. If you can't use troff, then just plain text or postscript please.

Hardcopy submissions should be on A4 with 30 mm margins, and 30 mm left at the bottom so that the AUUGN footers can be pasted on to the page. Small page numbers printed in the footer area would help.

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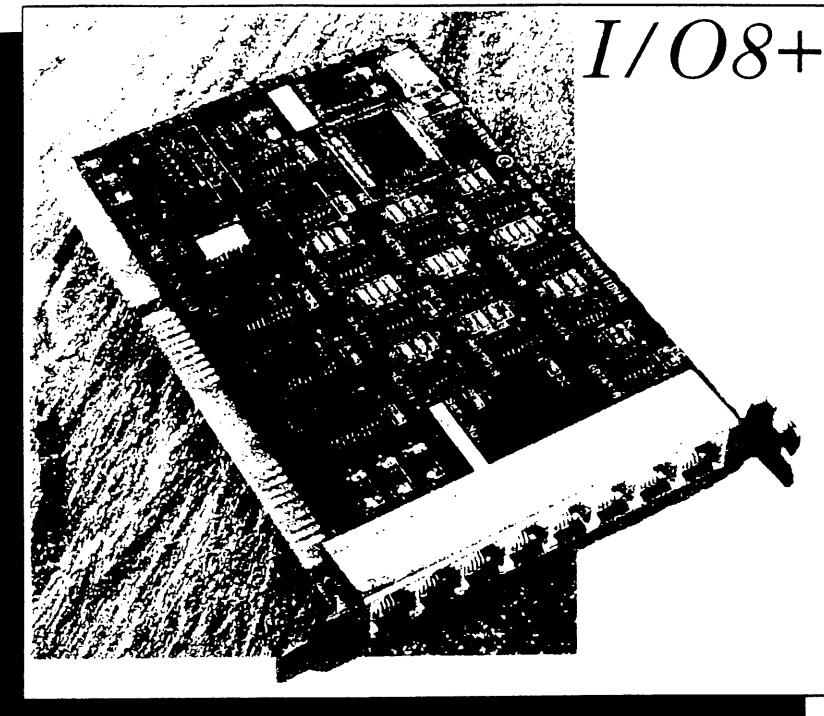
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Western Mining Corporation
Woodside Offshore Petroleum
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AUUG President's Page

I have seen a glimpse of the future

... and the future is good!

There were many highlights of AUUG '93, almost too numerous to mention. The Conference keynote speakers were just great. I will never forget the Clifford Stoll event - one hesitates to call it a talk! And I have a confession to make - when the suggestion was made late in 1992 to have Cliff speak at the conference, my first impression was Cliff who?? A copy of The Cuckoo's Egg was hastily thrust into my hand, and after pouring through it in an evening, I was convinced we needed Cliff at AUUG '93!

On the non-cabaret side of things, we had the voices of the Open Systems industry in the form of Geoff Morris of X/Open from the UK, Dave Tory from OSF, and Don McGovern of USL/Novell. It's a pity we couldn't actually get the alliance between X/Open and Novell formally announced at AUUG '93. It was leaked all over the place, but we appear to have been a week or two too early.

Only Ken Thompson could get away with being a plenary speaker at a UNIX conference, and not talk about UNIX! It was great to have Ken there - he was ubiquitous at all the conference activities, and it was a pleasure to have him in our midst.

The Exhibition side of AUUG '93 was pleasing from my perspective - perhaps because I had put a fair amount of effort into that side of things. We had a larger number of exhibitors than before, but in the main, they tended to take smaller booth sizes - no more 12 metre yachts like IBM had at AUUG '91 in Sydney! This is partially a reflection of tougher economic times, and partially a reflection that the interest in open systems is now more focused in the middleware area, rather than at the UNIX operating system level.

But the highlight of AUUG '93 for me was WABI! I came across it in operation at the IBM boat - yes, IBM had a ferry moored all the time just a stone's throw from the Exhibition Hall, attendees being lured aboard by leaflets distributed by several roller-bladed emissaries! Initially I thought it was the usual 'look how fast our machine is' pitch, but I became intrigued after seeing Windows applications running on an X terminal attached to an RS6000. Yes, this was the much vaunted 'Windows Application Binary Interface', or WABI, which allows Microsoft Windows applications to run, untouched, on an X terminal, regardless of the architecture of of the machine underneath.

My interest (read excitement!) in WABI is for two reasons: firstly, a personal one - I am still suffering withdrawal symptoms from losing my X terminal, an event precipitated by a change of job. Seeing applications which I now use regularly, such as Microsoft Word and Power Point, running blindingly fast on an X terminal, which could also be used for other activities such as reading mail and news etc, had me more than intrigued. I have become disillusioned with MS Windows based mail and news readers, and have now resorted to using two terminals - a Windows based PC for word-processing, and a Motif based X terminal for traditional UNIX activities. As you can imagine, this is quite a hassle - and hence my interest in seeing WABI work.

But my excitement at seeing WABI actually work is fuelled by a second and much more far reaching reason - WABI is truly liberating technology! It will remove the stranglehold that Microsoft currently has on the desktop. Microsoft's position is to dominate all sectors of the computing hierarchy, from the operating system, through communications software, to the applications area. There is nothing wrong with this ideal - indeed capitalist economies are fuelled by it. However, even aficionados of Microsoft would agree that the IT world is not a level playing field at present (to use another currently popular analogy). True, WABI is proprietary technology - it is owned by SunSelect, one of the Sun subsidiaries, and that is some cause for concern, I guess. But this is overshadowed by the liberation that it will provide to users who will now be able to have the best of both worlds on their desktop - being able to run the popular Windows packages, and having access to the benefits of a real operating

system underneath!

The consequences of WABI are far reaching. It has been selected by quite a few hardware manufacturers, and is well on the way to becoming the desktop standard. Imagine the next major Federal Government re-equipment tender that comes us (such as Defence...). It is not too far fetched to imagine UNIX sitting on desktops where, in the eyes of this (totally impartial) observer, it belongs.

At AUUG '93 I saw a glimpse of the future ... and the future looks good!

P. McCrea

Ramblings about the AUUG93 Conference and Exhibition

Adrian Booth

Liz Fraumann Fan Club

What a cool conference! Over 600 people attended; by the end of the conference I felt that I had met them all!

I didn't attend a huge amount of talks since I was busy putting faces to names most of the time. (I found that the best way to do this is to spend a bit of time personing the AUUG Stand within the exhibition!).

Highlights selected at random:

- Ken's talk - really interesting! Ken described one of his latest research interests, a global positioning system. I wonder what Ken does when he isn't working?

- Roger Fraumann's talk - subtitled "Business is War" - gets my vote as the best Management stream talk. He described military, private sector and government strategies for maximising competitiveness - applying modern computing to the decision cycle, making you more responsive to change than your competitors. I can't do it justice in one paragraph - grab a copy of the paper for yourself.

- I found Glenn Kowack's talk about EUnet interesting for two reasons - the talk itself, and the tremendous amount of discussion I heard about it at the Cocktail Reception. Opinions seemed sharply polarised between those who strongly believed Glenn's comments on how Internet access should be provided by a range of suppliers, each of whom would service particular market niches - and those who dismissed them as right wing anti-government propaganda. I hope we have someone equally thought (and argument :-) provoking immediately before the cocktail reception next year!

  Unfortunately by this time, all of the excitement of the conference, being in a new city, and meeting lots of new people was having strange effects on my short-term memory. Glenn Huxtable and Janet Jackson were very helpful in reconstructing the latter part of the evening - I have apologised to everyone I now remember meeting that night :-)

- The best technical talk from an international speaker was undoubtedly Rob Kolstad's on system administration. Rob spent 45 minutes destroying the illusions of the management in the audience by telling them what we as system administrators *really* have to do to keep things going. Cool.

- I thoroughly enjoyed the conference dinner, and have some cool photos which I hope to make generally available somehow. After I took a few photos of the people at the table at which Cliff Stoll was sitting, Cliff mentioned that he was thirsty. I left my camera in his capable hands for one minute to get him a drink - when I got back all the rest of my roll of film had been used up!

  Cliff is a really cool and amazing guy!* I had meant to buy a copy of his book, "The Cuckoo's Egg", and read it before the conference, but I think I got more out of it having met him before I read it. Cliff espoused his theory about how books wear out and start accumulating spelling mistakes every time they are read. This means that if you want to read his book, you should buy a copy of it (preferably in hard cover), to make sure you don't get a copy which has been read before. And it is wise to buy a fresh copy every time you want to re-read it too, for the same reasons :-) I lowered the tone of the conversation at Cliff's table tremendously by asking him a single serious question - how many copies of his book had he sold? Over a million. Wow.

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* My first impression upon meeting Cliff was of "A Muppet on uppers" - in the nicest possible way of course.

It would be remiss of me to neglect to mention one great photo of the conference promotion and marketing person (whose name I never did find out) and Cliff - both she and Cliff were very pleased to be presented with a copy, but I suspect she wouldn't have minded the negative as well!

- Undoubtedly the best local technical talk (nothing to do with the fact that it was the only one I attended :-) was Ken McDonell's on tracing real-time system events. I always enjoy Ken's speaking style: he just gets up, tells you what he did, treads on some toes, and sits down again - Ken, come back next year!

- I thought that there was only one disappointing aspect of the conference - I would have liked to see both Liz Fraumann and our aforementioned promotions officer receive a similar gift to that presented to each speaker (a boxed Australian wine plus two AUUG93 glasses). Rest assured that the Liz Fraumann Fan Club is actively striving to rectify this ugly incident.

The highlight of the exhibition was undoubtedly the Microsoft account manager on the I.T. Connexions stand. After she asked me if she could help, I asked whether there were any machines running Windows NT on the stand. There were, so I started looking at them. I then asked why someone already using UNIX might want to run Windows NT. Oh - she would have to get someone else to answer that question†. Someone else came over, and she told him that I was *interested* in moving to NT from UNIX, and that I wanted some reasons to do so.

Firstly, I was told, NT was multitasking, which means that you can run more than one program on the computer at a time. Secondly, when an NT application fails, it doesn't crash the whole machine. Also, NT is multithreaded, and has C2-level security. After pondering these insights into what the 21st century has in store for us, I suggested that Unix had these things too. The account manager took a step back and asked wide-eyed, "Is UNIX multitasking?"!

She then showed me a hypertext CD containing information on Microsoft's products - the one that I would get when I became a Microsoft reseller. The "Top Ten reasons to move to Windows NT" only had eight!

Actually (and I can't believe I am saying this), the best exhibition I saw was the IBM Power Boat. I wandered on to a chorus of, "You're just in time, they've just started". Oh no - a formal IBM brainwashing! Actually, it was nothing like that at all. The speaker was excellent, and IBM have some *very* cool stuff coming out. Just wish they ran UNIX :-)
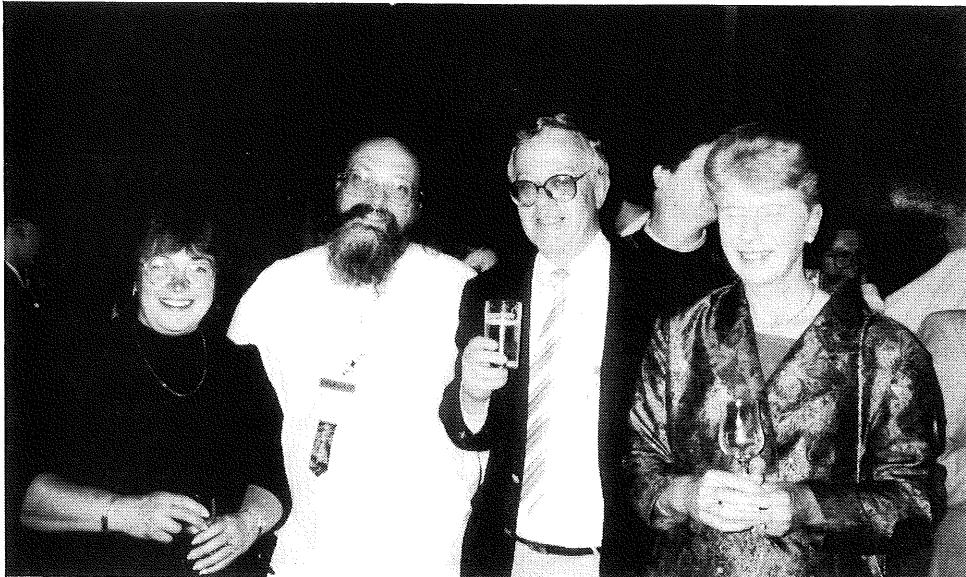
Speaking of IBM, a nice gimmick they had at the exhibition was some young girls roller blading around in blue bodysuits, handing out invites to the Power Boat. This was much nicer than the large software company who imported two models to lure middle-aged [male] managers to their stand - I couldn't help being reminded of those religious sex cults who send their children out "Fishing for Jesus". Their software must be good if they have to stoop to such tackiness.

Oooh, I won a Novell Multiprotocol Router T-shirt on the Novell stand too. Unfortunately, the logo (two crossed bent arrows) on a black T-shirt makes it look just a little bit too right-wing for my wardrobe :-)

As I write, there are mutterings on aus.auug from people who think that the commercial and technical streams should be separated into totally different conferences. I don't want to see this happen - it was great having such a spectrum of people to meet. I thought that this year's conference demonstrated an ideal compromise - fairly middle ground, but a good spread across the whole spectrum from commercial to technical. AUUG is in a unique position to leverage the synergy that can be generated from such a mixture. Glenn Kowack (of EUnet) described our conference as better than any in Europe - I'm sure that this is largely due to its variety. Let's keep it that way!

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† This was an answer I would become very familiar with over the next few days.

Bonnie & Ken Thompson,
John & Marion Lions

Rob Kolstad

Cliff Stoll
and Mark White

Don't just stand there,
all our glasses
are empty!

Who are these people-
I was trying to take
a photo of the other
photographer!

Piers Lauder
and friend.

Male bonding
at the dinner

Native fauna
impersonations

I must ask Cliff
what after shave
he uses ...

The AUUG 93 Face Saver

Michael Paddon

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October 12, 1993

This year, 117 brave faces were digitally immortalised at the AUUG 93 Conference. This is slightly down on last year's total of 170, but a lot of people told me that they weren't bothering to get photographed two years in a row.

The faces were captured using an off-the-shelf PAL video camera. The composite video signal was digitised by a DECstation 5000 (with an add on board) and displayed in a 24 bit X11 window. The face saver application grabbed each image from the live video window, associated it with information entered on a form and stored the results on disk. I found gzip to be quite useful as a lossless compresser (the images were reduced anywhere between 30% and 50%).

Once stored on disk, the images were converted into X.desktop icons which were periodically downloaded to the X terminal server. Ongoing hassles with the server led to this scheme being less that foolproof, but eventually most people got to see their face when they logged in.

Quality-wise, the images are much better than last year while using the same hardware and software, and in spite of a ridiculous chain of technical hitches that occurred early on. The only problem I found with the images was that the red channel was a little strong, but some simple image processing soon took care of this.

The results are shown in the following pages. In the next week or so I'll be mailing out a single JPEG encoded image to each person who provided an email address when they were snapped. If you forgot to supply an address, or your image doesn't show up, or you can't handle JPEG's, please contact me and I'll work something out. The images will also eventually make their way to an FTP site for general public access. I'll be supplying updates on all these activities in both **aus.auug** and AUUGN.

On behalf of AUUG, I would like to thank the sponsors of the face saver project, Digital Equipment Corporation and Iconix Pty Ltd for supplying the necessary resources for this popular feature of the conference.

AUUG Faces 1993

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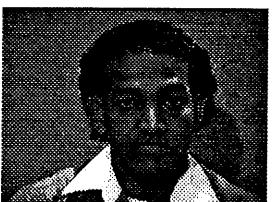
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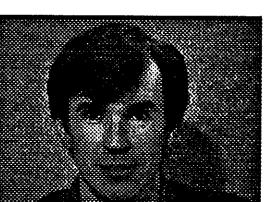
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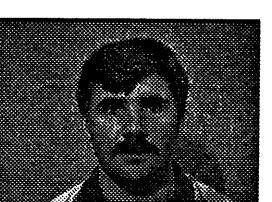
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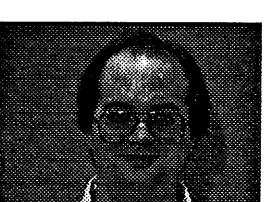
Name:	Ralph Billes
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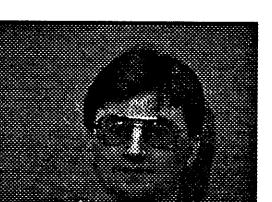
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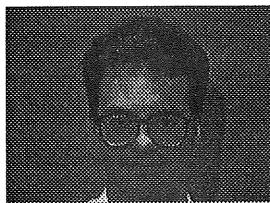
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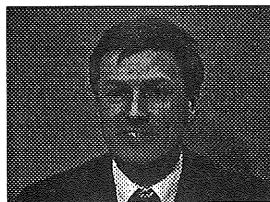
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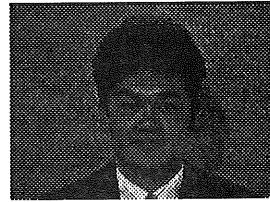
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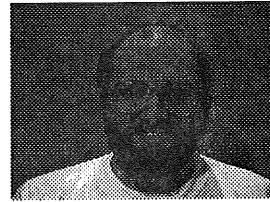
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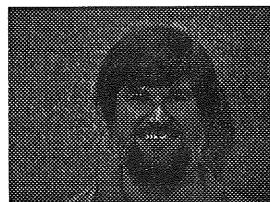
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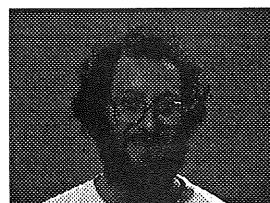
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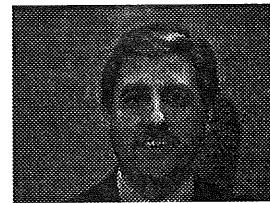
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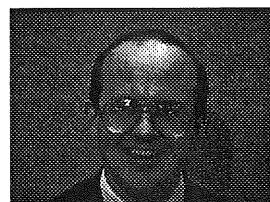
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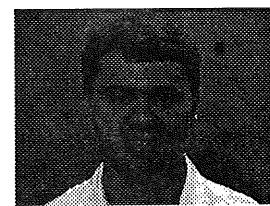
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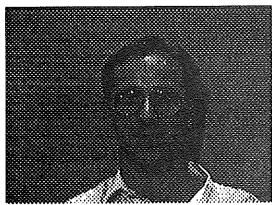
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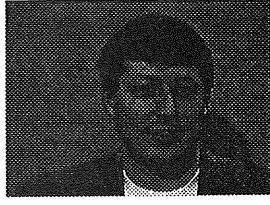
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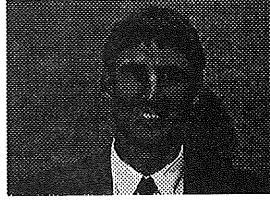
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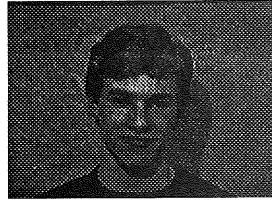
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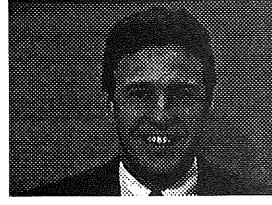
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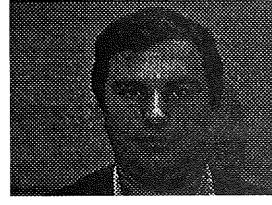
Name:	Jeremy Fitzhardinge
Title:	Software Engineer
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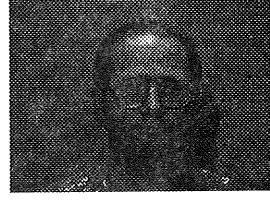
Name:	Peter Fitzsimon
Title:	Computer Systems Officer
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Snail:	Trails Project QLD Department of Transport Ground Floor, 477 Boundary Street Spring Hill QLD 4000
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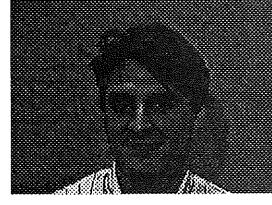
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Name:	Roger Fraumann
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Phone:	(02) 953 7838
Fax:	(02) 953 3542
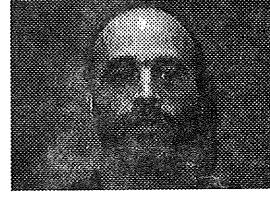
Name:	Michael A Gigante
Title:	Director, Advanced Computer Graphics Centre, RMIT
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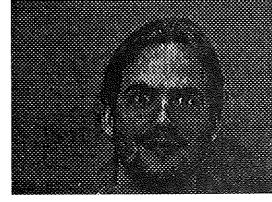
Name:	Stephen Giles
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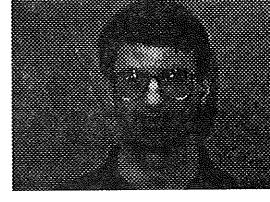
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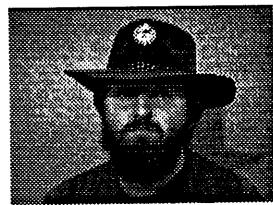
Name:	Stephen Gowing
Title:	Systems Programmer
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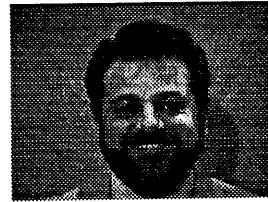
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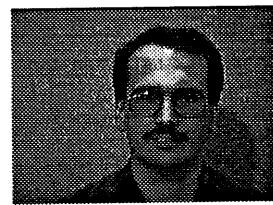
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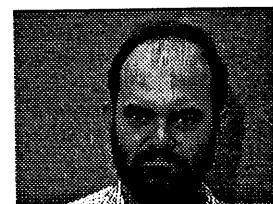
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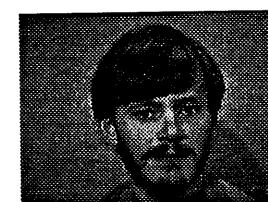
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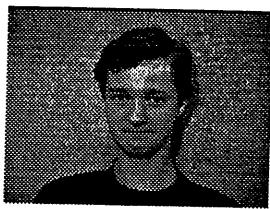
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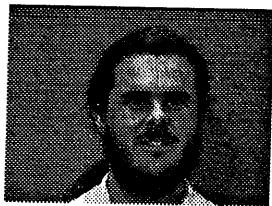
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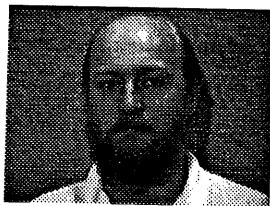
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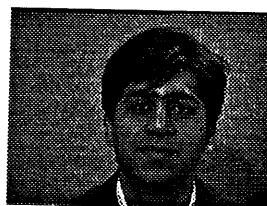
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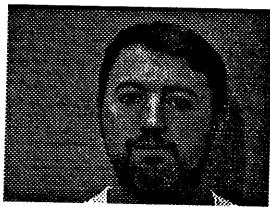
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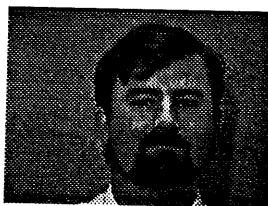
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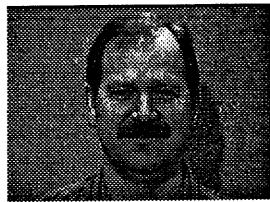
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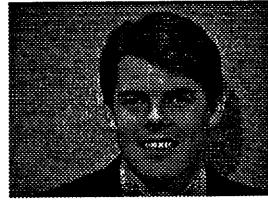
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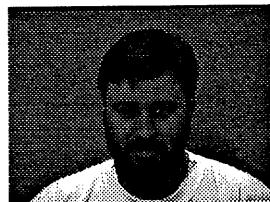
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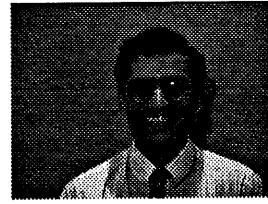
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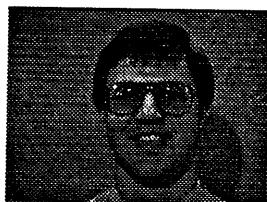
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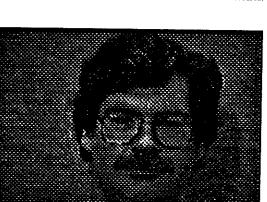
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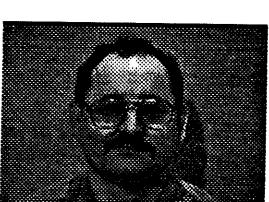
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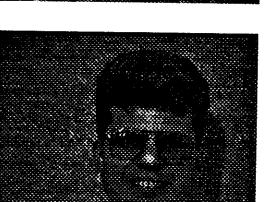
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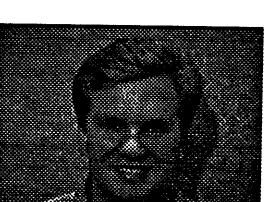
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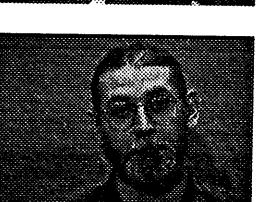
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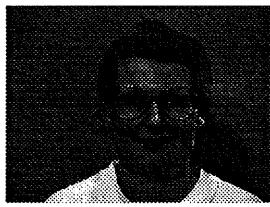
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	UniSys hardware and software support

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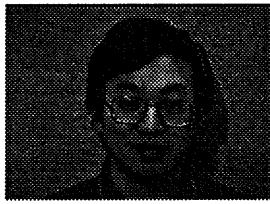
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AUUG Inc. - Canberra Chapter

Fifth Annual Conference and Workshops

Call For Presentations and Workshops

The AUUG Summer Conference is a series of one day technical meetings held in regional centers around the country. The general topic is, of course, oriented around the UNIX operating system. The meetings will attract not only local speakers, but will include invited interstate speakers, and this year will (hopefully) include an overseas speaker.

The Canberra Chapter of AUUG Inc. is holding a summer conference on February 16th 1994, in Canberra, ACT. This notice is a "call for papers" - we would like all people interested in giving a presentation to contact us and discuss the ideas you have. The conference talks should be about 20 minutes long (unless the topic is stunning) and the workshops should be 3 hours long (maybe 6 hours if required). Contact details are given towards the end of this message.

The current schedule is:

Monday	Feb 14th	- one day tutorial on "UNIX Kernel Internals"
Tuesday	Feb 15th	- other 1/2 day tutorials
Wednesday	Feb 16th	- conference

Programme Chair: Jeremy Bishop
ph 06 2650431
fax 06 2650485

Workshop Organiser: David Baldwin
ph 06 2495026
fax 06 2493992

John Barlow, Secretary
Canberra Chapter of AUUG Inc
GPO Box 2692
Canberra 2601.

AUUG Inc. - NSW CHAPTER

A NSW chapter of AUUG has just been formed.

The NSW Chapter of AUUG will be holding monthly meetings at the Novotel on Darling Harbour, 100 Murray St Pyrmont. The Novotel is easily accessible by all forms of transport: car,ferry,monorail,bicycle,foot. The Novotel is just behind the Exhibition Centre where the Winter Conference is held.

Meeting time is 7pm. Meetings for 1993 will be:

> Wednesday November 10
> Tuesday December 7

At the October meeting Don Lowe from Sun Microsystems will be talking about WABI, Sun's solution to running Microsoft Windows applications under X windows on Unix.

We are grateful to Sun Microsystems for their support. Sun will be sponsoring some light refreshments. A cash bar will also be available for drinks.

The meetings will be fairly informal with a presentation each month and time to allow fellow Unix and Open Systems professionals to meet and talk.

The other two 1993 meetings are looking for a speaker. If you have something to present please tell us, the chapter runs on local support and we need your input. There is a diverse range of interests in AUUG and at a local level the chapter will be exactly what the members make it. If you feel that AUUG is either becoming too technical or too commercial you can make things change at a local level. Your input will characterise the chapter.

The local chapters of AUUG are also responsible for the Summer Conference. The NSW Summer Conference is provisionally set for the last week in February 1994. More details and a Call for Papers will be sent out in the very near future. We also aim to run a tutorial programme in conjunction with the Summer Conference. If you are able to run a half or a full day tutorial on any topic that would be of interest to AUUG members we would also like to hear from you.

The NSW AUUG Committee is made up of the following people:
Mark Cole, NCR Australia
Farrell McKay, OTC
> Farrell.McKay@nms.otc.com.au

Brenda Parsons, Prospect Electricity {Treasurer/Secretary}
> parson@coulomb.pcc.oz.au

Julian Dryden, CSIRO {Chairman}
> julian@dwt.csiro.au

The committee can also be contacted as nsw_auug@dwt.csiro.au

AUUG Inc. - Victorian Chapter
(formally SESSPOOLE)

AUUG-Vic is the official Victorian chapter of AUUG Inc. It was the first Chapter of the AUUG to be formed, then known as SESSPOOLE, and its members have been involved in the staging of the Victorian AUUG Summer technical meetings every year since 1990. AUUG-Vic currently meets approximately every six weeks to hold alternate social and technical meetings. It is open to all members of AUUG Inc., and visitors who are interested in promoting further knowledge and understanding of UNIX and Open Systems within Victoria.

The purpose of the social meetings is to discuss UNIX and open systems, drinking wines and ales (or fruit juices if alcohol is not their thing), and generally relaxing and socialising over dinner. Whilst the technical meetings provide one or two "stand-up" talks relating to technical or commercial issues, or works in progress of open systems.

The programme committee invites interested parties wishing to present their work, to submit informal proposals, ideas, or suggestions on any topics relating to Open Systems. We are interested in talks from both the commercial and research communities.

Social meetings are held in the Bistro of the *Oakleigh Hotel, 1555 Dandenong Road, Oakleigh*, starting at about 6:30pm. Venues for the technical meetings are varied and are announced prior to the event. The dates for the next few meetings are:

Wed, 24 November '93	Technical
Thu, 16 December '93	Social
Tue, 25 January '94	Social
Wed, 2 March '94	Technical
Thu, 14 April '94	Social
Tue, 24 May '94	Technical
Wed, 6 July '94	Social
Thu, 18 August '94	Technical

Hope we'll see you there!

To find out more about AUUG-Vic and its activities, contact the committee or look for announcements in the newsgroup **aus.auug**, or on the mailing list **sesspoole@clcs.com.au**.

AUUG-Vic Committee *<auugvic-exec@clcs.com.au>*			
President:	Stephen Prince Chancery Lane Computer Services Phone: (03) 608 0911 Email: sp@clcs.com.au	**Secretary:**	Neil Murray Webster Computer Corporation Phone: (03) 560 1100 Email: neil@wcc.oz.au
Treasurer:	John Carey Labtam Australia Phone: (03) 587 1444 Email: john@labtam.oz.au	**Programme Chair:**	Michael Paddon Iconix Phone: (03) 571 4244 Email: mwp@iconix.oz.au

Update on AUUG Inc. - Victorian Chapter Activities

by Stephen Prince
President, AUUG-Vic.
<sp@clcs.com.au>

As a result of my last article in v14n4, I've been asked a number of questions that are something along the lines of: *Company XYZ is a paid up member of AUUG, so do I have to pay extra fees to AUUG-Vic?* In short, the answer is no you don't have to pay extra fees providing you are one of the nominated representatives. AUUG-Vic (like all the chapters in the other states) is just a way of providing member benefits on a local level. The chapter is financed by a portion of the subscription you pay to the national body: AUUG Inc. So the regular technical/social meetings are free to AUUG members. But things like the summer conference (and maybe some one-off events) may have to be charged for.

Up until this point in time, the AUUG-Vic committee has been focusing on three main events, which I'll describe briefly below.

Regular Meetings

Since my last update, there have been no further technical meetings, only one social event, which I'm happy to report, was well attended. The next technical meeting is scheduled for Tuesday October 12. In keeping with the trend of different venues, this meeting will be held at the MTIA, 509 St Kilda Road. The speaker is *Enno Davids*, talking about Global Positioning Systems. Since this talk will be longer than the usual talks, we would like to round off the night with a few short Work In Progress (WIP) talks. If anyone is interested in presenting a WIP, please contact the committee.

The following meeting (on November 24) is also a technical meeting, it is planned for the Geelong area in order to benefit of our country members. The date will be moved to November 20 (a Saturday) and will be changed to make the event an afternoon, followed by dinner somewhere in Geelong. Our programme chair, *Michael Paddon* is organising this one in conjunction with *Craig Bishop*.

Michael tells me they are still looking for speakers. Just as a reminder, the committee reserved a small amount of $$'s for each meeting as a "speaker honorarium" to help encourage potential speakers.

Kirk McKusick Workshop

It's looking like 1994 will be very busy for AUUG in Victoria, with the year starting off with a special event; *Dr Marshall Kirk McKusick* has

expressed interest in visiting Australia in 1994. For those not familiar; Kirk McKusick has been one of the principle architects in the development of 4.3BSD and 4.4BSD at the Berkeley Computer Systems Research Group.

We are planning a three day schedule, around early February, in which Dr McKusick will run a tutorial on an introduction to UNIX kernel internals. The first two days are planned as an introduction with the last day as an advanced session. It is our intention that members may choose to attend either or both sessions.

This course will be most useful to those who need to learn how the UNIX kernel provides its basic services. The course will provide a firm background in the UNIX kernel, including coverage of most BSD-derived kernels including USL's SVR4, Sun's Solaris, and DEC's Ultrix. The POSIX kernel interfaces will be used as examples where they are defined.

More details on this event as they come to hand.

Summer94 (Vic) Conference

I'm happy to report that Victoria will once again be staging a summer technical conference to complement the AUUG winter meeting. Work has already started on the organisation, with *Arnold Pears* volunteering to organise the programme. If you would like to contact Arnold:

Email:	pears@latcs1.lat.oz.au
Phone:	+61-3-479-1144
Address:	Computer Science Dept.
	La Trobe University
	Bundoora Vic. 3083

There is no firm date for the conference at this stage, however, it is envisage that it should be sometime early March 1994. So please keep that time free.

We are still looking for other volunteers; two would be nice. One person is needed to organise the venue. Also, for the first time, we would like to try running a day of tutorials, so a volunteer is needed to organise them. Remember, the more volunteers we have, the easier the work-load will be on everyone.

If you have any thoughts, ideas, comments on any matters, please feel free to contact the committee, preferably via email: *auugvic-exec@clcs.com.au*.

WAUG and Perth News

If I don't write this column tonight, there won't be one. What with travelling to AUUG'93, immediately followed by a folk festival, then next weekend's orienteering championships, free time has lately been elusive. And to make matters worse I picked up a cold in Sydney, despite the nice weather. Damned foreign bugs:-)

WAUG enjoyed a very good talk in September, by Jim Longwood of Fujitsu, on Unix I/O performance tuning. The talk contained plenty of useful information for those trying to get the most out of their systems, and especially their disks, but didn't overwhelm us with detail.

In October Julian Elischer is talking about 386BSD, one of the free PC Unix systems. Julian is apparently quite an expert in this area, so it should be good. He is also planning to distribute copies at the meeting to those who bring media. It'll be interesting to see how many do.

WAUG's members have taken to their text editors lately, so we have quite a few contributions for AUUGN and our local newsletter YAUN. This is great, and I'm sure Jagoda will agree that it would be even better if we had more contributions from other local chapters in AUUGN. The most likely way to succeed is if each chapter nominates its busiest member as its AUUGN sub-editor!

I'm now editing the User Support Mailbox / Unix Tricks & Traps column in AUUGN. Please send me a short contribution if you've answered an interesting question or come across a useful idea lately. If you have a long script or program I'd rather have a description (preferably with details of how to obtain the code) than a listing.

Speaking of contributions, I think all the speakers at AUUG'93 deserve our thanks, from the glitziest Keynotes and Footnotes to the littlest Works in Progress. The standard of presentation was excellent. The variety of successful presentation styles goes to show that to give a good talk you don't have to have stunning visuals, and you don't have to be experienced or confident. All you really need is to believe in your ideas, face the audience and make sure the microphone is working.

I'm starting to rant, and tomorrow I have three meetings. I'd better sync the disk, halt the system and get some sleep.

Janet Jackson <jackson@cwr.uwa.edu.au>
From WAUG, the WA Chapter of AUUG

FYI: WAUG's postal address is PO Box 877, WEST PERTH WA 6005.
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waug-newsletter@uniwa.uwa.edu.au.

AARNet General Manager's Perth Visit

[AARNet General Manager Peter Saalmans visited Perth in August. Mike Schulze attended his presentation at Curtin University -- JJ]

The AVCC is a company whose members are the Vice Chancellors of Australia's universities. The AVCC are the owners and operators of the Australian Academic Research Network (AARNet), which essentially interconnects Australian universities and affiliate AARNet members via a nationwide TCP/IP based network, connected to the Internet in the USA.

Recently, the AVCC advertised for the position of AARNet General Manager and subsequently employed Mr Peter Saalmans to fill it. Given the rapid expansion of AARNet over the past few years, I was hardly surprised to learn Mr Saalmans has a strong managerial background in banking and finance, rather than the more obvious choice of network guru.

As part of his first months of employ, he decided to tour the country to ascertain what the future requirements of AARNet users will be. In his own words, he was looking for the "holy grail" which would provide a future AARNet networking strategy. In his Perth visit, I had an opportunity to listen to his views as to what he would like to see AARNet become, albeit guided by the technical insight provided by AARNet's technical manager Geoff Huston.

AARNet operations commenced in 1990 with all the universities receiving a 48K connection to their regional hub. There was also a 128K satellite link which connected AARNet to the Internet in the USA. In its initial form it was slow, but the connectivity was in place; things could only get (much) better. To quote Saalmans, "The greater achievement was to get 36 universities to agree on something".

The growth of AARNet since 1990 has been phenomenal. Saalmans showed an overhead which mapped a theoretical exponential curve against actual monthly usage statistics - "it fits very well... and unfortunately we are stuck with this exponential growth" (holiday periods caused plots to dip slightly :-). According to Geoff Huston, the amount of data passing through the AARNet doubles every 8 months.

Saalmans claims that one of the reasons that usage figures have increased so dramatically was not necessarily because there were so many new users, but more so new (bandwidth hungry) applications. He suggested that multi-media types of (distributed) applications, such as video conferencing, are responsible for the current usage figures that AARNet is experiencing. I tend to feel that more traditional applications (such as ftp), combined with an increased number/awareness of users is a better explanation of current usage patterns.

In light of the current usage trends, Saalmans also outlined that as soon as links are upgraded they become saturated within a short period of time. This is especially true of the previous upgrade of the USA link which was to 768K and saturated within two weeks. This kind of usage is what prompted the AVCC to employ Saalmans to oversee the future growth of AARNet. Saalmans is currently developing a strategy, which will handle the expected growth.

Saalmans sees the future AARNet as a telecommunications service provider, akin to commercial services such as Compuserve, but continuing to provide low cost, high bandwidth services to universities. At present, he claims the AARNet affiliate access policies restrict users to the academic and research sectors -- to quote Saalmans "Affiliate memberships must have a compatible interest with the academic and research community". I'm not quite sure how this is supposed to be interpreted, as almost anyone who can afford affiliate membership usually gets it, compatible interest or not. By next year, Saalmans hopes to remove this policy in order to give AARNet a more commercial flavor.

The short term network upgrade policy includes the immediate upgrading of several problem areas. Perhaps the most important of these is the USA link which was recently upgraded to a (North American standard) optic fibre T1 link (1.544M/sec). From September onwards, each of the 18 remaining 48K tail loops will be replaced with an aggregated ISDN service providing 128K/sec. Perth users have also enjoyed an upgraded connection to Melbourne from 48K to 2M/sec, something that was long overdue. The Northern Territory also received their promised upgrade to 192K/sec from 48K/sec.

The ISDN upgrades are seen only as a temporary measure. Saalmans' vision for a better AARNet includes the widespread adoption of Telecom's Fastpac service together with line-of-sight microwave radio within metropolitan areas. His reasoning was that current upgrade strategies are no longer cost-effective; leased lines have reached their economies of scale. As part of the strategic plan, Saalmans hopes that all universities (and affiliates who can afford it) will be provided with a "to the door" 2M/sec or 10M/sec Fastpac service or up to 34M/sec microwave link, and the ISDN aggregation equipment will be re-cycled for future/current affiliate members. It was also suggested that with the passage of time, the Fastpac service could be replaced with 140M/sec microwave links where appropriate.

The notion of AARNet providing a "to the door" service rather than encouraging the development of regional networks seemed to upset a few people, myself included. Several options were discussed, but Telecom submitted an offer which, at the present time, is too good for AARNet to refuse. The current feeling amongst Western Australian educational institutions and certain AARNet affiliates is that a regional network should be owned, developed and maintained locally, rather than AARNet providing a fixed 2M/sec link to each site. This regional network would be built from a series of microwave links stretching from Joondalup to Murdoch inter-connecting all tertiary institutions and certain AARNet affiliates. The basic service would initially be 2M/sec, which would later be upgraded funds permitting.

Obviously, this could be construed as a threat to the success of the new AARNet, which will no longer receive government funding and will be expected to support itself. According to Saalmans, the new AARNet must operate under a "proper business footing", provide users with a flexibility of service, and realise its competitors. Being the sole provider of AARNet connections would almost guarantee the survival of the new AARNet financially. Therefore, "hanging" new sites off a regional network connected to AARNet is seen as a potential future loss of customers.

A few miscellaneous issues were discussed. The idea of AARNet providing telecommunications services such as phone/fax were put forward. Saalmans claimed that certain universities were very eager for such services to be put in place. I don't think this offering really carried much weight with the audience; if anything it may serve as a minor annoyance to Telecom. A "user pays" scheme was also discussed. To me, this idea seems flawed with technical difficulties, and would be very unlikely to enter into operation.

Although Saalmans kept an open mind to suggestions, he made his strategy clear. The new AARNet is to be run as a business, profits and all. Commercial affiliate interest will be attracted via a new connection policy, and "level of service" will dictate the cost. The new AARNet will be built upon customer requirements, although the Vice Chancellors will ensure that AARNet continues to provide low cost services to the universities. It is hard to tell whether these changes will be good or bad, or indeed if the approach is the right one to take. We can only hope that the new policy outlines will allow enough latitude for "good things" like regional networks, and AARNet will not become a cost prohibitive information resource for future affiliates.

Mike Schulze <mike@cs.curtin.edu.au>
From WAUG, the WA Chapter of AUUG

WAUG Meeting Review

September
Getting Better Value out of Unix I/O
Jim Longwood, Senior Systems Engineer, Fujitsu Australia

Jim Longwood comes from a mainframe background and has had a lot of experience in performance tuning large Oracle databases. His talk dealt with applying that experience to optimising Unix filesystem I/O.

Mainframe Systems Administrators have for a long time been concerned about I/O performance issues, but it is an area that has been given scant attention on most Unix systems.

By comparison, Unix systems have limited tools for monitoring and diagnosing I/O performance problems. Jim discussed the information presented by tools like "iostat" and "vmstat" and showed how high disk utilisation can lead to queueing delays, how careful disk partitioning (more active partitions in the middle of the disk) can reduce seek latency, why we should backup and restore filesystems occasionally to localise files, and much more that eludes me right now.

While I was familiar with many of the individual points that Jim made, he was able to put them nicely into perspective. His talk has inspired me to look again at my disk performance and partitioning policies.

It was a very good talk and well presented. Jim presented the technical issues in a manner that would have been understood by even the less technically minded in he audience. Having been tipped off, Jim was careful not to commercialise the talk, but did manage to point out that Fujitsu was able to provide their services in performance testing your filesystem problems. An unusually well balanced talk.

Glenn Huxtable <glenn@cs.uwa.edu.au>
From WAUG, the WA Chapter of AUUG

Open System Publications

As a service to members, AUUG will source Open System Publications from around includes various proceeding and other publications from such organisations as

AUUG, UniForum, USENIX, EurOpen, Sinix, *etc.*

For example:

EurOpen Proceedings		USENIX Proceedings	
Dublin	Autumn'83	C++ Conference	Apr'91
Munich	Spring'90	UNIX and Supercomputers Workshop	Sept'88
Trosmo	Spring'90	Graphics Workshop IV	Oct'87

AUUG will provide these publications at cost (including freight), but with no handling charge. Delivery times will depend on method of freight which is at the discretion of AUUG and will be based on both freight times and cost.

To take advantage of this offer send, in writing, to the AUUG Secretariat, a list of the publications, making sure that you specify the organisation, an indication of the priority and the delivery address as well as the billing address (if different).

AUUG Inc.
Open System Publication Order
PO Box 366
Kensington, NSW, 2033
AUSTRALIA
Fax: (02) 332 4066

ACSnet Survey

1.1 Introduction

ACSnet is a computer network linking many UNIX hosts in Australia. It provides connections over various media and is linked to AARNet, Internet, USENET, CSnet and many other overseas networks. Until the formation of AARNet it was the only such network available in Australia, and is still the only network of its type available to commercial sites within Australia. The software used for these connections is usually either SUN III or SUN IV (or MHSnet). For the purposes of this survey other software such as UUCP or SLIP is also relevant.

At the AUUG Annual General Meeting held in Melbourne on September 27th, 1990, the members requested that the AUUG Executive investigate ways of making connection to ACSnet easier, especially for sites currently without connections. This survey is aimed at clearly defining what is available and what is needed.

Replies are invited both from sites requiring connections and sites that are willing to accept connections from new sites. Any other site that has relevant information is also welcome to reply (*e.g.* a site looking at reducing its *distance* from the *backbone*).

Please send replies to:

Mail: Attn: Network Survey   *FAX:*   (02) 332 4066
         AUUG Inc   *E-Mail:*   auug@atom.lhrl.oz
         P.O. Box 366
         Kensington N.S.W. 2033

Technical enquiries to:

Michael Paddon   (mwp@iconix.oz.au)   (03) 571 4244
or
Frank Crawford   (frank@atom.lhrl.oz)   (02) 717 9404

                                                   Thank you

=====

1.2 Contact Details

            Name: _____
        Address: _____
                     _____
                     _____
          Phone: _____
            Fax: _____
        E-Mail: _____

1.3 Site Details

               Host Name: _____
         Hardware Type: _____
Operating System Version: _____
                 Location: _____
                             _____
                             _____

New Connections

If you require a network connection please complete the following section.

Please circle your choice (circle more than one if appropriate).

A1.   Do you currently have networking software?   Yes   No

A2.   If **no**, do you require assistance in selecting   Yes   No
      a package?

A3.   Are you willing to pay for networking   Yes   No
      software?
      If **yes**, approximately how much?   _____

A4.   Do you require assistance in setting up your   Yes   No
      network software?

A5.   Type of software: SUNIII   MHSnet   UUCP
                                 TCP/IP   SLIP
                                 Other (Please specify): _____

A6.   Type of connection: Direct   Modem/Dialin   Modem/Dialout
                                    X.25/Dialin   X.25/Dialout
                                    Other (Please specify): _____

A7.   If **modem**, connection type: V21 (300 baud)   V23 (1200/75)   V22 (1200)
                                              V22bis (2400)   V32 (9600)   Trailblazer
                                              Other (Please specify): _____

A8.   Estimated traffic volume (in KB/day):   < 1   1-10   10-100
      (not counting netnews)   > 100: estimated volume: _____

A9.   Do you require a news feed?   Yes   No
                                           Limited (Please specify): _____

A10. Any time restrictions on connection?   Please specify: _____

A11. If the connection requires STD charges (or   Yes   No
      equivalent) is this acceptable?

A12. Are you willing to pay for a connection   Yes   No
      (other than Telecom charges)?
      If **yes**, approximately how much (please   _____
      also specify units, *e.g. $X/MB* or flat fee)?

A13. Once connected, are you willing to provide   Yes   No
      additional connections?

A14. Additional Comments:

Existing Sites

If you are willing to accept a new network connection please complete the following section.

Please circle your choice (circle more than one if appropriate).

B1. Type of software:

SUNIII   MHSnet   UUCP
TCP/IP   SLIP
Other (Please specify): _____

B2. Type of connection:

Direct   Modem/Dialin   Modem/Dialout
X.25/Dialin   X.25/Dialout
Other (Please specify): _____

B3. If **modem**, connection type:

V21 (300 baud)   V23 (1200/75)   V22 (1200)
V22bis (2400)   V32 (9600)   Trailblazer
Other (Please specify): _____

B4. Maximum traffic volume (in KB/day):
     (not counting netnews)

< 1   1-10   10-100
> 100: acceptable volume: _____

B5. Will you supply a news feed?

Yes   No
Limited (Please specify): _____

B6. Any time restrictions on connection?

Please specify: _____

B7. If the connection requires STD charges (or
     equivalent) is this acceptable?

Yes   No

B8. Do you charge for connection?
     If **yes**, approximately how much (please
     also specify units, *e.g. $X/MB* or flat fee)?

Yes   No
_____

B9. Any other restrictions (*e.g.* educational
     connections only).?

B10. Additional Comments:

ANNOUNCEMENT AND CALL FOR SUBMISSIONS

USENIX Summer 1994 Technical Conference
June 6-10, 1994
Boston, Massachusetts, USA

Come join us in celebrating the 25th anniversary of UNIX!

Our emphasis at the USENIX Summer 1994 Technical Conference in Boston is on UNIX in the real world: Describe experiences developing portable applications, running businesses on UNIX, or using UNIX as an educational platform. Share the trials and tribulations of migrating complex applications into a UNIX environment. Describe the network protocols necessary to make the networking superhighway a reality. Or, take a foray into the future of computing:

- What to do when your toaster runs UNIX: Does cat still work?

- What should we do now to prepare for the 21st century?

- Of Mice and Pen: Human-computer interaction

- UNIX for the Masses

- Terabytes a Day: What's a disk to do?

Our traditional focus on UNIX remains, but we also encourage submissions about systems other than UNIX, that have a significant impact on the world of open systems. As always at a USENIX conference, we are interested in papers describing new and interesting developments in and around open systems, including networking, new languages, tools, and software engineering. As at all USENIX conferences, papers that analyze problem areas and draw important conclusions from practical experience are welcome.

Note that the USENIX conference, like most conferences and journals, requires that papers not be submitted simultaneously to more than one conference or publication and that submitted papers not be previously or subsequently published elsewhere.

DATES FOR REFEREED PAPER SUBMISSIONS

Submissions due:	January 28, 1994
Authors notified by:	February 21, 1994
Camera-ready papers due:	April 8, 1994

CONFERENCE PROGRAM COMMITTEE

Program Co-Chairs:

Margo Seltzer	Harvard University
Keith Bostic	University of California, Berkeley
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John Bongiovanni	Stratus Computer, Inc.
Glen Dudek	Object Design, Inc.
Peter Honeyman	University of Michigan
Michael Jones	Microsoft Research, Microsoft Corporation
Kent Peacock	Consultant
Rob Pike	AT&T Bell Laboratories
Joseph Provino	Sun Select, Inc.
Greg Rose	Australian Computing and Communications Institute
Win Treese	Massachusetts Institute of Technology
Ozan Yigit	York University

CASH PRIZES

Cash prizes will be awarded for the best paper at the conference, the best paper by a full-time student, and the best presentation.

HOW TO SUBMIT A REFEREED PAPER

It is important that you contact the USENIX Association office to receive detailed guidelines for submitting a paper to the refereed track of the technical sessions; e-mail to summer94authors@usenix.org

In addition, enquiries about submissions to the USENIX Summer 1994 Conference may be made by e-mail to margo@usenix.org

The schedule for reviewing submissions for the conference is very short, so our preferred submission is an exteded abstract (although we will accept full papers). The object of an extended abstract is to convince the reviewers that a good paper and 25-minute presentation will result. They need to know that authors: - are attacking a significant problem

— are familiar with the current literature about the problem

— have devised an original or clever solution

— if appropriate, have implemented the solution and characterized its performance

— have drawn appropriate conclusions about what they have learned

The extended abstract should be 5 manuscript pages (single-sided) or less in length. It should represent the paper in "short form." It should include the abstract as it will appear in the final paper. Please include references to establish that the authors are familiar with related work, and, if appropriate, performance data to establish that they have a working implementation and measurement tools. If the full paper has been completed, it may be submitted instead of an extended abstract. Full papers should be limited to 12 single-spaced pages.

Every submission should include one additional page containing:

— the name of one of the authors, who will act as the contact for the program committee

— contact's surface mail address, daytime and evening telephone numbers, e-mail address and (if available) fax number

— an indication of which, if any, of the authors are full-time students

Authors of accepted submissions will be notified by February 21, 1994. They will promptly receive instructions for preparing camera-ready copy of an 8-12 page final paper, which must be received by April 8, 1994.

WHERE TO SEND SUBMISSION Submit one copy of an extended abstract or full paper by January 28, 1994 via at least two of the following methods

— E-mail to summer94papers@usenix.org

— FAX to +1-510-548-5738

— Mail to:
>
> Summer 1994 USENIX
> USENIX Association
> 2560 Ninth St., Suite 215
> Berkeley, CA 94710
> U.S.A.

IMPORTANT DATES TO REMEMBER

DATES FOR REFEREED PAPER SUBMISSIONS

Submissions due:	January 28, 1994
Authors notified by:	February 21, 1994
Camera-ready papers due:	April 8, 1994

PRE-REGISTRATION SAVINGS DEADLINE   Monday, May 16, 1994
HOTEL DISCOUNT RESERVATION DEADLINE   Monday, May 16, 1994
REGISTRATION MATERIALS AVAILABLE   mid-March, 1994

CONFERENCE SCHEDULE IN BRIEF

Tutorial Program:	Monday and Tuesday June 6-7, 1994
Technical Sessions:	Wed. through Fri., June 8-10, 1994
Birds-of-a-Feather Sessions:	Tues. through Thurs., June 7-9, 1994
USENIX Reception:	Thursday evening, June 9, 1994
Vendor Display:	Wednesday and Thursday, June 8-9, 1994
Product Demonstrations:	Wednesday and Thursday, June 8-9, 1994

TUTORIAL PROGRAM

USENIX's well-respected program covers topics essential to your professional development. These intensive tutorials emphasize practical information of immediate usefulness. Tutorials are taught by skilled instructors who are hands-on experts in their topics. At Boston, USENIX will offer skill-building tutorials in topics such as:

Topics in systems administration
Distributed computing: DCE, DME, DFS
UNIX programming tools
Systems and network security
Kernel internals: OSF/1, SVR4, 4.4BSD
Developing and debugging X-based applications
Network program maintenance and design
Introductions to Perl and systems programming
Micro-Kernel technologies
Overview of GUI technologies and builders

To continue to provide the best possible tutorial slate, USENIX is soliciting proposals for new tutorials. If you are interested in presenting a tutorial, contact the Tutorial Coordinator: Daniel V. Klein 412-421-2332, E-mail: dvk@usenix.org

TECHNICAL SESSIONS

The conference technical sessions include one track presentations of papers selected by the Program Committee. These refereed papers are published in the Conference Proceedings, distributed free to technical session attendees.

INVITED TALKS

A parallel track of Invited Talks complements the refereed paper track within the technical sessions. These survey-style or tutorial-type talks by invited experts range over a variety of interesting topics, such as harnessing programming tools, resolving system administration difficulties, or employing specialized applications. Invited Talks Submitted Notes are published and distributed free to technical sessions attendees. This second track includes selections from the best presentations offered at recent Symposia.

The Invited Talks Coordinators welcome suggestions for topics as well as request proposals for particular Talks. In your proposal, state the main focus, include a brief outline, and be sure to emphasize why your topic is of general interest to our community. Please submit to: Brent Welch, Xerox PARC (1-415-812-4405) and Bob Gray, US WEST Advanced Technologies (1-303-541-6014) via e-mail to: ITusenix@usenix.org

WORK-IN-PROGRESS REPORTS

WIP Reports, scheduled during the technical sessions, introduce interesting new or ongoing work. The USENIX audience provides valuable discussion and feedback.

Do you have interesting work you would like to share, or a cool idea that is not ready to be published? Works In Progress Reports are for you! We are particularly interested in presenting student work. To schedule your report, contact Peg Schafer via e-mail to wips@usenix.org

BIRDS-OF-A-FEATHER SESSIONS

The always popular Birds-of-a-Feather sessions are very informal gatherings of persons interested in a particular topic. BOFs often feature presentations or demonstrations followed by discussion, announcements, and the sharing of strategies. BOFs are offered Tuesday, Wednesday, and Thursday evening of the conference. BOFs may be scheduled at the conference or in advance by telephone to the USENIX Conference Office at 1-714-588-8649 or via e-mail to conference@usenix.org

SUMMER 1994 VENDOR DISPLAYS & PRODUCT DEMONSTRATIONS

In Boston, in scheduled 30-minute product presentations in a theater-style setting, vendor representatives will demonstrate the technical innovations which distinguish their products. In the USENIX Vendor Display, emphasis is on serious answers from technically savvy vendor representatives. Here, in a relaxed environment, conference attendees can "kick the tires" and be sure the products and services on display really do what they're said to do. Plus, you can review the newest releases from technical publishers.

Vendors: this is an exceptional opportunity for receiving feedback on new development from USENIX's technically astute conference attendees. If your company would like to demonstrate or display its products and services, please contact: Cynthia Deno 1-408-335-9445, FAX: 1-408-335-2163, E-mail: cynthia@usenix.org

SPECIAL HOTEL RATES

The Boston Marriott Copley Place Hotel is headquarters for the USENIX Summer 1994 Technical Conference and will be the location for all conference activities, including on-site registration, tutorials, technical sessions, Birds-of-a-Feather sessions, vendor displays/product demonstrations, and the terminal room. The Boston Marriott Copley Place will be offering special room rates to USENIX conference attendees.

FOR MORE INFORMATION

Materials containing all details of the technical and tutorial program, conference registration, hotel and airline discount and reservation information will be mailed at the end of March 1994. If you wish to receive the pre-registration materials, please contact:

    USENIX Conference Office
    22672 Lambert St., Suite 613
    Lake Forest, CA USA 92630
    1-714-588-8649, FAX 1-714-588-9706
    E-mail: conference@usenix.org

Book Reviews

As I said in the last book review column, we are now back into the swing with the reviews and you can expect many more in future issues. We currently have agreements with Prentice Hall and O'Reilly & Associates (through WoodsLane) for discounts on these and other books, details of which are published in your members handbook and elsewhere in AUUGN.

Aside from this we also regularly review books from other publishers, *e.g.* X/Open, that are relevant to the AUUG membership. Finally, I'm also happy to publish any other reviews people may send me.

I hope you find these reviews useful, but you may ask why you should consider doing one. For a start, you get to keep the book you review, but more than that, it is both good experience and you get your name seen by many others.

What this means is that you should keep an eye out for suitable books for you to review. The current practice is to post a note to the newsgroup *aus.auug* when we have new books available. Unfortunately, this disadvantages members without network connections, or on the end of a low speed link. For people in such a position, either mail, via the AUUG PO Box, or fax me on (02) 717 9404, with your contact details and preferences.

Frank Crawford

Learning the Korn Shell

by Bill Rosenblatt
O'Reilly & Associates, Inc.
ISBN 1-56592-054-6

Reviewed by
Frank Crawford
ANSAMS
<frank@atom.ansto.gov.au>

This is another book in the well respected Nutshell Handbook series, this time giving a thorough introduction to the Korn shell (or *ksh*). For those who are unaware of the Korn shell, to quote from the book:

> *The Korn shell, or ksh, was invented by David Korn of AT&T Bell Laboratories in the mid-1980s. It is almost entirely upwardly compatible with the Bourne shell, which means that Bourne shell users can use it right away, ...*

The version of *ksh* described in the book is the 1988 version, which is distributed with Unix System V Release 4, although there is an appendix which describes the differences with other common shells (*e.g.* the Bourne shells and *bash*) and versions common versions (*e.g.* *pdksh*, *wksh* and MKS's *ksh* for PC's).

The book is written in a tutorial style, beginning with the basics of shells on Unix, through customisation of *ksh*, to shell programming and some of the advanced programming features in

ksh. The writing style and examples are clear and, in general, easy to follow, with numerous problems for the reader (usually of the form *extend the previous example to do ...*).

As this is the first print run of the first edition, there are a couple of typo's which can cause confusion to novices, or even experienced readers (at least one still has me stumped as to what it means :-(). More of a problem is the uses of '*' to designate footnotes. Often this conflicts with the shell's wild card which leads to confusion.

This book is aimed at a widely varying audience, from new Unix users to experienced users wishing to just learn about the *ksh*, and it is able to offer something to them all. New users are introduced to many of the basic concepts of Unix, while learning shell features (*e.g.* a discussion of multitasking while explaining what '&' does). As an experienced Unix user, and in fact a long time *ksh* user, I learnt the details of many features that I was previously only aware of. I even learnt about the *ksh*'s *emacs* mode, which previously has been very poorly documented.

On the whole, this book is a very worth while addition to the library of anyone using, or even just having access to, the Korn shell. It provides an excellent introduction to the most powerful shell commonly available, and, while not a must have book, it is one that would be a valuable book in any Unix library.

Internetworking with TCP/IP, Volume III
Client-Server Programming and Applications

by Douglas E. Comer and David L. Stevens
Prentice Hall, Hardcover, 497pp.
ISBN 0-13-474222-2

Reviewed by
Michael Paddon
Iconix Pty Ltd
<mwp@iconix.oz.au>

This third and latest book in a superlative sequence explores the world of TCP/IP from the point of view of a programmer who needs to design and implement applications in an internetworking environment. In the two previous installments of the series, Comer and Stevens laid bare the technical details and implementation specifics of the IP protocol suite with precision and adroit clarity; in this book they take on an arguably more difficult task and provide a reference that surpasses their earlier efforts.

The first few chapters deal with the mechanics of client-server programming using the ubiquitous socket abstraction from BSD Unix. In fact, on the cover of the book, it states "BSD socket version", which leads me to believe that there may also be an edition forthcoming that deals with streams.

The issue of sockets versus streams is soon forgotten, however, as the book begins to delve into the design parameters of a network application. Issues such as datagram versus connection-oriented transport, concurrency (both single and multiple process) in servers and clients, and multiprotocol servers are discussed in detail. Scenarios are constructed to highlight the need for different design mixtures and example code fragments clearly show how they can be implemented.

Living with networks that may not completely support the IP protocol suite is a fact of life for many of us, and this is the next area that the book addresses. It examines the pros and cons of both protocol tunneling and of application gateways.

The final part of the book describes common higher level protocols such as XDR, RPC, NFS and TELNET. Not only do these make excellent reference material, but the authors use them to

provide real world examples of design and implementation. Programming using remote procedure calls receives especial attention with a detailed tutorial-like approach.

This is the book I wish I could have read when I started writing my first networked application. The final chapter, in particular, distills all those little pieces of experience that take years to gain the hard way. In short, everyone has something to gain from this book.

Unix Software Development Tools

Unix System V Release 4.2 Documentation Series
Unix Press/Prentice Hall
ISBN 0-13-017690-7

Reviewed by
Zoltan Somogyi
<zs@cs.mu.oz.au>

The documentation of Unix substantial programs traditionally consists of a man page for quick reference and a supplementary document to be used as a tutorial. This book is a collection is supplementary documents for the programmer's tools that one should know about before starting to develop software on Unix systems. Some of the chapters in fact borrow heavily from previous editions of the Unix Programmer's Manual Supplementary Documents.

The topics covered by the book are:

- shell programming using the Korn shell
- awk programming using nawk
- using the lexical analyzer generator lex
- using the syntax analyzer generator yacc
- using make
- using SCCS, the Source Code Control System
- application software packaging
- integrating a package into the sysadm tool

The introduction states: [this book] does not attempt to teach you how to develop software. This is true. The book's objective rather is to give you a tour of all the significant features of these tools, trusting that the reader's prior experience with software development in general will enable him or her to select the features he or she needs in given cases.

As a consequence of this orientation, the examples in the book (of which there are plenty) concentrate on the mechanics of using features

and mostly avoid the question of why the feature is there and under what circumstances and how one should use the feature. For example, many of the examples in the chapter on lex tackle tasks for which sed or awk would be better suited, and neither the lex nor the yacc chapter even mentions the fact that these tools are frequently used to implement small, special-purpose languages such as Pic and Eqn rather than big, general-purpose languages such as C. An obstacle to the intended use of the examples is that a fair number of them have mistakes (I counted about a dozen).

The quality of the explanations in the book is variable. The chapter on awk is quite good, most of the rest of the book is adequate, but several parts of the chapters on SCCS and sysadm are confusing. The SCCS chapter makes too many forward references, while the sysadm chapter describes how to modify the sysadm interface (to let it administer the software package being installed) without explaining fully how that interface works. The chapter on packaging is a bit frustrating because it waits too long before giving full examples, but it does have several good examples at the end. In any case, it is good to see packaging and installation tools considered a normal part of software development.

The book includes copies of the man pages of most of the commands it covers; it omits the man pages of awk and SCCS but includes the man page of csh (which is not mentioned in the rest of the book). The long glossary is clearly a glossary for the entire System V Programming book series, as it includes many entries that deal with graphics, networks etc. The short index covers only this book and is not very useful.

My major gripe about the book is that it does not seem to think portability is important. It talks only about the functionality of the SVR4.2 versions of the tools and does not mention which of these features are available in earlier versions. Neither the introduction nor the chapter on shell programming tell you that the tool being discussed is the Korn shell and that some of the features being explained do not exist on machines that have only the Bourne shell. The chapter on awk does mention that nawk is an enhanced version of the original awk, but it is silent on what the differences actually are. The only place the book touches such differences is

in the chapter on software packaging, the reason being that the installation tool has to be able to handle packages prepared with previous versions of the packaging tool.

I cannot recommend this book as a generic introduction to software development tools because of its focus on the how to the exclusion of the why and because the book does not even mention any alternatives to the tools covered (perl, flex, gmake, cake, RCS etc). It has little of interest to experiences Unix programmers because they should already know most of the material in the book, and can pick up the rest more cheaply from the online manual pages. The one place where I see this book being useful is for people who are already familiar with similar tools that exist on different operating systems who want to switch to SVR4.2 as a development platform.

INTERNET: Mailing Lists
1993 Edition

Edited by Edward T. L. Hardie and Vivian Neou
SRI Internet Information Series
Prentice Hall
ISBN 0-13-327941-3

Reviewed by
Geoff Huston
Technical Manager
Australian Academic and Research Network
<G.Huston@aarnet.edu.au>

Books on the Internet now appear to be all the rage. Indeed it would now appear to be a technical editor's rule these days to insert the word "Internet" somewhere in every computing publication, and publications which are described as "Internet books" appear to have the publishers worked up into a frenzy. Like every frenzy there are excesses, and this publication is one of them.

To find this book useful you need to have a connection to the Internet - and if you have a connection to the Internet you can get a free and up to date copy of the information contained in the book. So why publish this data as a paper book? Quite frankly it makes as little sense as buying it!

However now we've established that the book itself serves no useful purpose as a book, that does not mean that the contents are not of interest. The book is a reproduction of the list of

Internet Mailing Lists, where each one of the 800 or so entries describes the general subject area of the list, how to join the list, and any other details, such as archives and list moderators.

So what mailing lists are there out there on the Internet? The short answer is just about everything from 78RPM records to the use of expert systems in agricultural production and management. From personal experience I can add that what this catalogue does not indicate is the general level of list activity. Some lists are quiet (if indeed they are even alive!) while others have the potential to generate such volumes that your mailbox will suffer from a chronic case of electronic indigestion. If you use mailing lists carefully you'll find them a highly productive way to keep in touch with your colleagues and their activities both professionally and recreationally.

However you don't need to buy this book to use mailing lists on the Internet - instead send the message "send HELP" to mail-server@nisc.sri.com

Networking Applications on
UNIX System V Release 4

by Michael Padovano
Prentice Hall
ISBN 0-13-613555-2

Reviewed by
Adrian Booth
Adrian Booth Computing Consultants
<abcc@dialix.oz.au>

I am one of many people faced with the sideways step (you can hardly call it an upgrade) to Sun's new SVR4-like Solaris 2.

One major area I have found it difficult to come to grips with is networking under SVR4. Until recently there don't seem to have been many books covering this area (except for the wafer-thin STREAMS Programmer's Reference Manual).

This void has been filled by a new book from Prentice Hall, *Networking Applications on UNIX System V Release 4*.

The book started much as I expected, reviewing STREAMS, ports, port monitors, and that particularly elegant-in-concept-but-gross-in-

implementation "Service Access Facility". This is followed by a complete chapter on STREAMS.

A surprising (but not unwelcome) part followed next - several chapters reviewing applications built by combining existing networking applications using shell scripts. A file archival/retrieval utility is built using ftp, rcp, and then the UUCP suite.

RFS and NFS are covered next, with useful discussions about the design goals and the pros and cons of each system. I couldn't help thinking that RFS would be a big winner if it wasn't so *ugly* to configure and administer. Since "they've" made it that way, though, we all have to cope with vendors who can't even get *lockd* (required under NFS) working right, even after issuing ten patches to it. But I digress.

Next comes a thorough discussion of remote procedure calls (RPC). The chapter covers the RPC architecture, XDR, RPC security issues, the RPC compiler, and RDL. A sample RPC application is developed and explained. The available RPC security models are also described.

By far the longest part of the book (almost one third of its total content) covers the SVR4 Transport Level Interface (TLI). TLI allows you to write networking applications that will work over TCP, UDP, or OSI. As you'd expect, this flexibility comes at a price - complexity. Still, these chapters give a good overview, a lot of detail, and useful examples of TLI (although I confess I only briefly skimmed the 40+ pages of "Details of TLI Routines").

The next short chapter describes network selection (what networks are available on the current machine?) and name-to-address mapping (network-transparent ways of finding the addresses of services).

Socket routines are provided in SVR4, but are relegated to an independent, standalone (and last) chapter. Perhaps the author's bias is showing here, but I find it understandable given the book's focus on SVR4 networking (as opposed to UNIX networking). The coverage of sockets seems complete and adequate.

This is an excellent book that would serve as either (or both) an introduction to or a reference on SVR4 network programming. Recommended.

Linux Installation and Getting Started

by Matt Welsh, 1993

Linux, if there is anyone who hasn't heard, is a free Unix clone which runs on 386/486 machines. The kernel was written by Linus Torvalds in Finland. His efforts initiated a multitude of contributions that have made Linux a comprehensive and widely admired operating system. A thousand Linux-related letters are posted on the Internet per week. System components, upgrades, utilities, and applications, are appearing in overwhelming abundance. A deluge of READMEs threaten to engulf the newcomer to Linux. What do you read first? Where do you start?

Now, like the feel of solid ground in this informational morass, there is a book that will serve as a slipway to launch myriads of new Linuxers. Matt Welsh has written clearly and simply about the what, where, and how, of Linux.

The first chapter introduces Linux, covering aspects such as copyright, features of the system, hardware requirements, and how to pronounce the name (Linus Torvalds' suggestion, lin... as in Finn). Yes, you still can use MS-DOS after you've installed Linux, and if you do have problems there are plenty of helpful Linuxers around.

Chapter two tells you where d'ya get it, and there are many sources. Several distribution sets have been put together and are available on floppies, CD-ROM, bulletin boards, and by ftp or mail; of course experienced Unix people can assemble their own system from the components. However, this book keeps it simple by concentrating on the popular SoftLanding Software (SLS) distribution set.

The next chapter is all about the specific details of installation. How to partition, or repartition, your hard drive so that you can have both MS-DOS and Linux OS living happily together, setting up swap space, and loading Linux. Matt Welsh has given a straightforward description of the task and, judging by my own experience with both the SLS and the SLACKWARE distributions, it presents no significant difficulties.

Chapter four is a Linux tutorial covering all the basic aspects you would expect in a Unix tutorial. In itself, this is an excellent introduction to using any Unix system, and it will put the neophyte at ease, as well as providing a ready reference as their experience grows. An introduction to the vi editor and shell scripts round out this tutorial.

The fifth chapter concerns the real stuff - system administration. The author's experience shows clearly here as he writes about topics which range from details such as adding users to a well- thought-out philosophy of running a complex system without being carried away on a power trip. Lilo, the multisystem booting program, provides the key that allows you to select from the systems, such as MS-DOS, OS/2, Linux, or others, that you may have on your machine. It also will default to whichever system you have chosen. The chapter ends with What To Do In An Emergency, a subsection that will receive a lot of attention.

The final chapter discusses the installation and configuration of advanced features such as the X window system, TCP/IP, UUCP, electronic mail, and USENET. These are aspects that will be relevant for more experienced Unix users, and provides something to look forward to for the newbies.

Five appendices provide additional tips and trouble shooting hints, a bibliography, ftp tutorial, the Linux BBS list, and the GNU public license. All and all, this book is 150 pages of information that would be a bargain even if it weren't free :-)

Linux Installation and Getting Started is the first of a set of books about Linux from the Documentation Project. I expect the others, as they appear, will be equally useful and interesting; just what Linux users need. Linux Installation and Getting Started can be obtained by ftp from tsx-11.mit.edu /pub/linux/ALPHA/LDP and other Linux sites.

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From WAUG, the WA Chapter of AUUG

The following letter is reprinted from AUUGN Volume 1 Number 2. This is Jonh Lion's second letter from Bell Labs. The first letter was reprinted in AUUGN Volume 14 Number 2.

Letter from New Jersey

January, 1979

We have now passed the half-way point in our stay in New Jersey. My "special studies project" at Bell Laboratories is continuing to be most enjoyable and personally rewarding.

At the end of November, on the Thanksgiving weekend, my family and I decided to forsake the opportunity of eating more turkey than we should, and drove to Canada instead. Thanksgiving is traditionally on a Thursday and the following Friday is a holiday, at least at Bell Labs and in the Madison school district. By leaving here at noon on Wednesday and returning on the following Sunday we managed to spend three full days in Waterloo and Toronto. The distance from here was more than 450 miles, and with a maximum speed limit throughout the U.S. of 55 mph (100 kph in Canada), the journey takes more than nine hours.

We stopped the first night at Niagara Falls, just across the Canadian border. This is a very popular tourist area in the summer, but at the end of November ... well, there is definitely room to move! We arrived at the Falls about 8 pm, to find them lit most attractively with coloured lights -- but at -3 degrees, it was not appropriate to linger long. The next morning we travelled on to Waterloo, through driving rain and mist -- not the most pleasant conditions at all. (At least it wasn't freezing rain.)

We arrived just in time for lunch and a 1pm appointment with Randall Howard. He is with the Computer Communications Networks Group, which is part of the Engineering Faculty, and I spent an interesting and stimulating afternoon in his and Charles Forsyth's company. The University of Waterloo is rather better supplied with computing hardware than the University of NSW. As a result, UNIX has been used mainly by post-graduates and staff, though some enterprising undergraduates have infiltrated onto the system of course, and are doing some interesting things. Johann George who is an EE u/g has just developed a ``troff'' output previewer which is of interest at BTL since it uses an HP 2648 terminal and its verisimilitude is somewhat better than the Tektronix previewer currently in use here.

They seem to have a number of very interesting local modifications to their UNIX systems (they have two) and an interchange of software between them and UNSW would certainly be useful. They have implemented file access lists as an extension to the normal access checking performed within the file system -- and system calls for ``mkdir'' and ``schizio'' (interchanges real and effective user-ids). Charles Forsyth has an assembler generator which means they are not so committed to M6800's as some places.

A major project at the moment is to devise an network to inter-connect most of the major campus computer installations. In their machine room, they have a stack (three high, as I recall) of LSI 11's, (part of the future network), but what really caught my eye -- large as life -- was ye olde Diva disk controller which they are actually using successfully. The secret is to get the necessary updates from Diva -- which for some reason Diva have been reluctant to supply!

I was able to catch up briefly on the recent fortunes of THOTH, the portable real-time operating system being written at the University of Waterloo. It is now running on two machines, and its owners seem reasonably happy with it, but they are not yet ready for distribution. One reason is that they are recoding it in a new language, Z, which also derives from B, via A! Whereas A was typeless, Z has types, and their experience has been quite interesting. From a programming point of view they still prefer A, but the compiler is able to compile significantly better code for Z. I didn't see a working system, but I did hear about their experiences using THOTH as a vehicle for some real-time programming exercises. Apparently students find the problem of controlling a model train (sorting the freight cars in particular) to be rather challenging -- the problem is not in the algorithm, but in anticipating all the various ways the train set will fail!

After staying overnight with friends, I caught the early train (7:15 on a cold, frosty morning!) to Toronto, leaving my family to drive up later in the day, and I spent the day at the University of Toronto, initially with Pat Hume (head of the Computer Science department; he is currently planning a revision of his programming text to use Pascal), and then, for most of the day with members of the Computer Systems Research Group. About a year and a half ago, the University of Toronto had a major fire in the building that housed their main computer centre. Fortunately very little equipment was destroyed, but it has been rather dislocating for the computer science people who are now scattered across the campus.

The Computer Systems Research Group (CSRG) is an amalgam of computer scientists and electrical engineers who cooperate in various ways. Currently there are two major projects: an implementation of the language Euclid, for the U.S. and Canadian Departments of Defence, and computer graphics, with special emphasis on music synthesis. Both the graphics and the Euclid implementation at being carried out under UNIX, on an 11/45. The CSRG has just acquired a second system, a business oriented (special cabinets) 11/50, which they are going to use to provide a general service to PGs and staff. They are using a variety of CRT terminals of various origins, but I don't believe that any of the ordinary terminals was better than the local UNSW product. However the HP vector display which they use for graphics is rather nice.

The primary use for the Euclid compiler will be to write a secure operating system kernel, (to be be done by Ford Aerospace, if everything goes according to plan). It is very likely this kernel will look like -- you guessed it -- UNIX (and this is part of the basis for the rumour in the Canadian DECUS report). The second major project is sufficiently well developed that they have several real composers, including Yehudi Menuhin, very interested in ``buying one''. Their graphics display is reputed the fastest vector display around, (with a controller built by the "Three Rivers Computer Corp.", out of Carnegie Mellon) and is impressive in its resolution and speed.

The music synthesis system uses mainly graphical input, via a hand-held ``mouse'' on a tablet. The movements of the ``mouse'' are translated into cursor movements on the screen (i.e. they do not used a light pen). The cursor is used for selection from menus, and for drawing curves (e.g. to specify the attack on a particular musical note). Histograms for the spectral density of sounds can be specified. Finally everything can be brought together and the sound ``played''. Complete scripts can also be played, of course. The advantage from the practising musician's point of view is that he doesn't have to bother with numbers, or programming languages, or any of that sort of thing, and he gets immediate feedback. And it all runs under UNIX.

We spent the Saturday looking around Toronto and seeing more friends (we only made it about half way through our list). Toronto is now a big city - around three million - and compared with most U.S. cities, it is clean and tidy. By and large things seem pretty prosperous - there are numerous new buildings, some of them very attractive - and of course there is the CN tower, which can be seen from all over the city, which is not surprising, since it is the tallest man-made structure in the world. On a cold Saturday morning in winter, a very good place to take the family is the Ontario Science Museum, which has many fascinating exhibits on various aspects of science and technology. The children found plenty to see and do, since most of the displays invite participation and interaction.

We resisted the temptation to stay an extra day and to travel back on the Monday, when the roads would have been less crowded. For once, we really did the right thing! On Sunday, the roads were crowded, but the traffic was moving at the speed limit. On the Monday it snowed -- in this area we had 5" of slippery stuff (which didn't melt for nearly a week), and it took nearly an hour, instead of the usual fifteen minutes, to get to work. (I bought snow tires the next weekend, and of course it did not snow again for five weeks.)

In the first week of December, I was able to attend the ACM National Conference, which was held in Washington, D.C. This is a fairly large general conference (attendance about 1500), and being in a government town, a lot of the programme was government oriented, but with ten parallel sessions, that wasn't a problem.

The opening session took all the first morning and had some interesting moments. I had been looking forward to hearing Robert Floyd's Turing Lecture, but found it somewhat disappointing. His theme was that we should look for better computational paradigms upon which to base programming languages.

The sessions themselves were the usual kind of mixture, with some memorable parts. E.P. Miles showed some slides he had made using an Intercolor system mapping contours for various mathematical functions into eight colour combinations: most interesting and apparently quite effective for teaching mathematics. At a session on Computer Architecture, I heard Yaohan Chu talk some platitudes on "Direct Execution in a High-Level Computer Architecture", and Per Brinch Hansen speak in a surprisingly modest fashion on "Multiprocessor Architectures for Concurrent Programs". An interesting panel session was chaired by Al Aho on "Tools for Automatic Compiler Generation", with presentations by Steve Johnson, Susan Graham (U.C. Berkeley & Pascal), and R. Cattell from CMU. I think the session I enjoyed most was on "DBMS" with Barbara Liskov (MIT), Jack Minker (U. of Maryland), and most impressively, Jeffrey Ullman (Princeton; now writing in the field of DBMS).

There were two dominating impressions that I gained from the conference: firstly, the low profile exhibited by the major (leading?) computer manufacturers. Maybe the ACM conference is not a place where they would come on strongly anyway, but even so, apart from various hardware developments, they seem to be contributing relatively little to the overall pattern of evolution. Secondly, there is a rapidly increasing, apparently insatiable, demand from industry for computer Science graduates, including those, or especially those, with post-graduate experience. The Bell System alone apparently has requirements for more than a third of all the potential PH.D. graduates in CS in the next five years; and I met at least two people who had turned down offers from Bell, to take better offers elsewhere. In particular, academia in the U.S. is not competing successfully - there are reportedly 150 academic positions in Computer Science currently available - and at least one school (University of Illinois!) has recently lost a significant number of tenured staff to industry.

The part of the conference that I enjoyed most was the Ninth National Computer Chess Tournament. Not being a chess fanatic, I was not really expecting too much, but in the event, it proved fascinating. I guess the fact that Ken Thompson with his little (suped-up) PDP11 was able to take on and conquer the reigning giants, notably "Chess 4.7", running on a Cyber 176 helped to hold my interest and to keep me out of bed past midnight on two nights running.

There were twelve competing programs, of which two were running on microcomputers which were simply carried into the tournament area. The rest were connected to "big brother" back home via telephone. (I expect the conference picked up the 'phone bill, which must have been quite substantial.) At the front of the room, there were six desks with the contestants and their paraphenalia huddled around. Beyond them were six large vertical boards (I would estimate about six feet square) against the back wall, and the state of play was reproduced on them, for everybody to see. The pieces where represented by circular painted styrofoam disks, which adhered to the boards as if by magic, (but I think it was magnetism). Thus the audience seated well away from the immediate area had no difficulty in viewing the action.

Interest was generated and sustained by David Levy, British chess master,

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who is well-known for his successful wager with McCarthy, Michie et al. that no
computer would defeat him at chess in the ten year period that ended last Au-
gust. Levy gave running commentaries on the progress of each game (at least so
long as he found it interesting), gave ad lib evaluations of positions, and his
understanding of the strategies being followed by the contestants, and their
likely future moves. (He did not foresee everything - and the fact that he was
occasionally wrong about some interesting tactical moves just added to the in-
terest.)

The most interesting game was the contest in the second round between
"Chess 4.7" and "Belle" (Ken Thompson's program). The middle section of this
game kept most people engrossed, including Levy, who neglected all the other
games for more than an hour. "Belle" runs as two processes, and as soon as it
has decided its own move, it forks off a new process to analyse the consequences
of what it predicts its opponent's response will be. The climax of the game
came when, after a very long pause during which "Chess 4.7" analysed more than 2
million positions, it announced its move, and "Belle" responded immediately.
Talk about gamesmanship! Soon after Levy lost interest and more or less ignored
the remainder of the match.

The second night (third round) was not so exciting, when "Belle" was
matched with "Chaos" running on an Amdahl 470/V6. "Belle" lost position early
and was lagging most of the game, so I didn't see much point in staying up
beyond 1 a.m. in order to see it lose. (Such loyalty!) However just after I had
left, the end came rather suddenly, when "Chaos" missed a discovered check, and
"Belle" was able to pounce.

The final round was somewhat anticlimactic compared with the previous two,
when "Belle" made short work of its final opponent. The win for Ken Thompson was
a popular one around BTL, as might be imagined. Quite a few people had been
following the progress of the matches from home, by logging in from their home
terminals.

A very interesting part of the contest was the performance of the two
microcomputer-based systems, especially "Sargon II" which scored two and half
points out of four for the match, and was by no means outclassed. Many of the
basic algorithms used by "Sargon" have been published, with the aim of encourag-
ing new entries into the field, especially with microcomputers. It is not hard
to foresee computer chess championships in the near future, where the contes-
tants will all be carried into the room and plugged in. I think it would be
most interesting to develop such a competition in Australia in the very near fu-
ture. However there is no doubt that the largest computers will continue to be
used for chess for many years to come. Ken Thompson, for one, is not at all
confident of being able to beat all comers, human or otherwise, in the next few
years.

                                        John Lions,
                                        Madison, New Jersey,
                                        15 January, 1979.

Community Computing †

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April 1993

Abstract

Technology is now in all our homes. Modems are cheap and reasonably common. But how is this technology used in our communities, should it be used? This paper discusses experience in making information and Internet access available to the public.

1   Introduction

Market Research shows that 95% of New Zealand homes have a video recorder. Also 65% of homes have a home computer of some sort, and 5% have a modem to allow it to communicate with other computers. In the Wellington area, these figures add up to around 45,500 computers and 3,500 modems.

Many people would argue that most of these home computers are being used for games and other recreational activities. They are probably correct. But the number of modems does not reflect this. In addition, the sheer volumes of computers does make you stop and wonder at what point do they become a significant force in our method of communicating information.

In addition, there are moves in the government sector to force departments to provide electronic access to information. For example the US GPO WINDO project specifies that all departments will allow access to public information via computers. This requirement basically continues the concept that government material is largely public information. Today we exchange this information using paper as a cheap low cost exchange material. But with the constantly falling cost of computers and modems, perhaps this needs to be revised.

The concept of "highways of the mind" is also applied. State organisations supply the 'highways' for the movement of freight and physical products. Our water and sanitary services are provided as a part of the local community infrastructure, roads are taken for granted. In general larger users pay a premium for this use through water taxes or road user charges, but the 'highway' is available for free access for all.

But what exists for the movement of information or knowledge products? Data networks exist, but access has not always been easy. There is no method for the population in general to access the 'highway' at no cost for small personal activity.

As a result, many communities are investigating starting gateways for people to access computer networks. These are called Community Networks and the whole subject area is often known as Community Computing, Public Telecomputing, or Public Access Services (or Systems).

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2 What?

Most communities have a number of computer bulletin boards which are operated by volunteers, generally with their own capital, and normally at a loss. These provide a range of facilities for the computer hobbyists and are often networked using a system known as FIDO net.

Larger communities are often fortunate that their local university is keen and willing to support the bulletin boards, by acting as a relay point for electronic mail and news files.

But what of larger public access systems? What facilities do they provide? Most public access systems provide access to local data unique to that organisation. The local library catalogue is an obvious example. In addition electronic mail and a local 'forum' facility is generally provided.

The mail provides for communication between users, while the forum provides a public way of discussing topics of mutual interest. In larger cities, most of the bulletin boards become focussed on areas of interest, such as genealogy, environmental issues, etc.

The basic facilities remain, information access, forum discussion and mail.

3 WCC City Net

On 1 Jan 1992, Wellington City Council opened a part of City Net to the Public. This allows them access to

- electronic mail
- NOTES – Council's Bulletin Board
- Usenet NEWS – an international forum on 1200 topics
- Internet Chat – real-time chat via a keyboard
- File copy facilities – from Internet FTP
- Access to Internet databases

In NOTES we now have the Transitional District Scheme, and the By-Laws. We have experimented with Council minutes and reports, but there is a huge education task ahead of us. This is in the area of advising the public that the material is there and available, and Council staff need convincing that the (small) effort needed to make the material available is worthwhile.

Working with Divisions, we now distribute monthly postings of

- New Books in WPL
- What's On in the Harbour Capital
- Facts about NZ and Wellington
- Promotional material on Wellington
- Routine Public Notices

Some readers of these have now asked for the material to be emailed to them as they find the 3–4 days news takes to be too long. One such request is from Canada.

Wellington City Council is a member of Internet. This is the network of networks, linking 650,000 computers, 6,000,000 people in 38 countries. There are over 300 library catalogues on-line along with

databases of NASA, the General Accounting Office, House of Representatives, etc. In addition there are discussion lists via Email on 300+ topics. The problem is not what to look at, but how to filter it to a manageable level.

Internet also has file archives where data or software is available for copying. We allow the public to access these, copy them down to City Net and then to their PC. Strict rules on usage are imposed to preserve the costly international link.

However, the result is that City Net users are now able to access this international information freely and unencumbered. In addition, material developed in New Zealand can be easily moved overseas by 'small scale' players.

Thus we see that City Net has most of the features common with other bulletin boards. We have unique local information, the forums for discussion, as well as a file transfer and access facility.

At the time of writing (April 1993) we have approximately 1200 users. Another 100 join us each month and our biggest bottleneck is the delay in processing registrations. We do have complaints that some users find it difficult getting a connection to the system, but that is largely dependent on the method they use to connect.

The users are very active. We see them active in a number of international forums discussion a large number of issues in a very wide range of topic areas. We have had users join on-line 'chat' sessions and conferences, linking simultaneously with users in 12 countries. As an example, the Borough of Richmond, Thames (UK) held an Ecology Fair, with an on-line chat on display. Users from Wellington, were able to link in and exchange ideas.

4 Kidsnet

In the minds of many users WCC is closely related to Kidsnet. This is because we have introduced it into NZ and promote its use.

Kidsnet is a mail discussion on the educational uses of computers, and networks. It has a number of associated projects such as Kidlink and K12net, but in reality they are autonomous groups each with their own flavour, and areas of activity.

WCC's involvement is to bring these into NZ and then relay them to local computers, so that multiple copies do not appear here, reducing the load on the international leg of the network.

Equally, we provide a contact point for people wanting to get involved. In addition, we provide some facilities, when the group has a focussed event, such as the Kids-92 Communications Festival.

5 Cost

Internet is not a traffic based system, but connection based. WCC pays for a data circuit to Victoria University and we use this for our daily work.

The computer used for public access is used for other work. The public access is a by-product type of work. We do have modems which the public use, but these were bought in previous years and are low cost. The public always call us, so we do not incur telephone charges.

Most of the software we use is "public domain" to avoid cost. This also allows us to use 'state of the art' software which is readily available over the network.

Staff time is minimal. We register users and then encourage them to support each other. We have run 'night classes', but do not advertise them or the system. Most of our users hear about the system by word of mouth from other users.

As we add access to information that is clearly 'commercial' in content or value, then we will introduce an access or usage charge for that material. For access to the 'basic' services (ie the basic highway) we will retain free access.

6 Other Systems

Similar systems are operating in Santa Monica, California and in 6 other locations. These are generally members of the National Public Telecomputing Network (NPTN) of which we are an affiliate. NPTN operate systems run by local coordinating committees, funded by sponsorship and grants. These are large systems and fascinating to use. Cleveland Freenet is perhaps the largest, with around 12,000 registered users, of which around 5,000 access it each day.

The area of activity is new, but generating a high degree of activity internationally.

7 The Future

There is a short list of new features we plan to introduce in the coming 12 months. As usual most of it is either public software, or access to Council data, which is in the public domain.

Access to the Wellington Public Library catalogue continues to be a major frustration and a high demand topic. This is blocked by legal issues which we hope to resolve sometime this year.

We now have one commercial activity, which is the relaying of Council job advertisements to Haines recruitment. This is encouraging both Lower Hutt City Council and Porirua City Council to join us in the network. Christchurch City Council is already linked and Dunedin is very keen.

More council information is being readied for allowing access. Some will be charged for as allowed by the Resource Management Act. Ideally, this is one way in which Council can easily satisfy the requirements of the Act. Providing quick access to Council information.

Access via Public Access terminals in branch libraries is an ideal way of expanding the access, particularly if it is integrated with the existing terminals. This has been investigated and was planned for 1991. Funding constraints has caused this to be delayed unless some sponsorship can be achieved.

Areas under consideration include installing network links into the New Venture units or establish links with our Sister Cities, in order to promote technology or knowledge based industries in Wellington. This has not made much progress, but discussion is starting as more and more people become aware of the potential of the system.

8 Conclusion

City Net opened its doors to the public as a trial. When we started, we were unsure what was required, what would be needed and would there be any interest. Now we feel that by following the lead of the bulletin boards, and using software developed by the network, we are able to satisfy their needs.

It may not yet be a 'highway of the mind', but at least it's a footpath.

MUDs - Serious Research Tool or Just Another Game *

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Abstract

MUDs (Multi-User Dungeons) have been getting quite a bit of press recently, much of it heated, and much of it negative. In part, this has generally run along the lines that they are simply a waste of bandwidth, and that people have better things to do with their time. Whilst there is certainly a large element of truth in this, does it mean we should write them off altogether? Well, I believe we should not, and that in fact MUDs are a very powerful tool for doing some quite interesting research. A MUD provides a controlled, user extensible environment in which a number of people can interact. The design of the programs running MUDs, the design of usage of the environments created in a MUD, and the way people interact, all involve some fascinating realms of inquiry.

In this talk I intend to introduce the concepts and history of the MUDs, and then provide an overview of some uses for MUDs. These range from an on-line conference room in my own MUD, to testing garbage collection algorithms, experimenting with economic models, simulating a Mars colony, and investigating the psychology of user interactions on MUDs. I'll try to conclude with an idea of where they are going, and some hints for responsible MUD management.

1 Introduction

MUDs (Multi-User Dungeons) have been getting quite a bit of press recently. In part this has been because many regard them as just a game that is capable of consuming significant amounts of network bandwidth, CPU cycles, memory and disk. Even that they can pose a security threat to the host. Whilst I do not deny that these can indeed be problems, I would like to consider whether there are some serious academic uses for MUDs. I believe a MUD provides a controlled, user extensible environment in which a number of people can interact. The design of the programs running MUDs, the design of usage of the environments created in a MUD, and the way people interact, all involve some fascinating realms of inquiry, aspects of which I will survey in this paper.

2 What are MUDs?

A MUD is a multi-user, real-time environment which permits a number of participants from disparate network locations to be connected to a common environment in which they can interact with each other [1]. The mechanics of the interaction shares a common heritage with text-based adventure games (cf the original Colossal Cave in Fortran), however the style of interaction has evolved significantly. The MUD provides a structured yet extensible environment, one that the participants can build extensions in, perhaps even program new forms of interaction. This can allow a group of people to collaborate in building, describing and developing an interactive model community as a simulation study. They can also be used to

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*This paper was presented to the AUUG Canberra Summer Conference, 17 Feb 93
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investigate aspects of computer mediated interaction, and as a prototype of possible group decision making tools and on-line conferencing.

A range of services have developed which allow people to interact over the network. Originally there were mail and news services which provided off-line (non real-time) interaction. Then came talk (for 2 people only) and IRC (Internet Relay Chat) for many people. These latter services allowed text to be exchanged in real-time between participants, but operated with no surrounding context, effectively in a cultural vacuum. However people are more comfortable when there is a context or environment to operate in. This is the goal of virtual reality systems, to provide an on-line environment. A MUD provides one means of implementing this using text-based interactions. As such it is a low technology, but high involvement system. It is also cheap, easily supported on existing systems and interfaces, and yet one capable of useful and usable degrees of environment modelling and simulation.

A MUD is a client-server system. The main MUD server, which holds all the information of the participants and the environment runs on one system. The participants connect to it using a MUD Client program (which may just be telnet, or may be a specially written program with additional capabilities) running on their local system. There are a number of MUD servers running around the world. Each has its own characteristic environment, and at present there is little interaction between them. Your virtual character on one is distinct from that on another, although participants often maintain the illusion of a common persona. There is some research into a MUD server system that allows the transfer of information between servers, but that is still in early development.

3 Text Based Virtual Reality

I have described a MUD as a text-based virtual reality. Most of the research, and most of the hype associated with Virtual Reality systems has involved multi-media presentation systems using 3-D sensors and 3-D displays (usually bulky and/or awkward). However I believe that some aspects of VR can be researched without such expensive (both monetary and computationally) resources. As anyone who has read a good book knows, it is perfectly possible to engender sufficient suspension of belief through a text only media to immerse oneself in another world. And after all, this is the goal of VR systems. As Waldern [2] notes "The goal of Virtual Reality is to create a simpler, more effective, human-computer interface ... whereby the human operator becomes totally immersed and unencumbered by real world distractions". Waldern claims that this requires the use of complex displays, a point on which we then disagree. He describes the elements of VR as including the following:

- Space - a 6D (x, y, z, roll, pitch, yaw) space, representing real or abstract data, which is decomposed into worlds.

- Objects - existing in the Space, with programmed behaviour controlling their interaction with other objects. May be combined into hierarchies of objects.

- Agents - programs that respond to changes in the environment.

- Views - which provide reference points for perspective control.

- Maps - of the Space which assist the user in navigating through it.

- Sensors - both tracking (position) and kinetic (motion) which provide feedback from the users interacting with the Space.

Now consider which of these elements are present in some form or other in MUDs. MUDs certainly include a space, comprising a large number of locations (rooms) which may be connected in any topology required. These locations are usually static, although the users of the system can add or modify locations. These locations can contain objects, which have attributes, and which can be programmed to interact with the users (who are also a special form of object), and with other objects. MUDs can contain agents, either controlled entirely within the MUD, or in the form of special users who are controlled by an external program, rather than by a person. A users' view of the MUD is determined by the location and object

descriptions, and users can easily return to a given location. The user can construct maps of the space to assist in navigating around it. Finally the user interacts with the MUD via a keyboard and screen, often with the assistance of a MUD client program, which provides special formatting, macro, highlighting and automatic response facilities to assist in reacting with the MUD.

In summary, MUDs provide many of the elements necessary for a Virtual Reality system. Whilst these are technically less sophisticated than full sensory immersion VRs, it means that you can concentrate on the interactions possible in the system, rather than fighting with the technology. There are no goggles, no gloves, no fancy graphics, just descriptions of places, things and people, along with a range of possible actions to take. Your imagination provides the rest. Because of this simplicity, participants can concentrate on the world-building aspects of the system, on building simulations with many participants, and in interacting with them.

4   A Partial Genealogy of MUDs

MUDs have grown out of earlier work on multi-user computer games. A partial genealogy of the MUDs is given in Fig 2, taken from Bartles's report [3]. The earlier generations were written in the UK and Europe, and are mainly running on commercial systems. Then with AberMUD, we see the first Internet accessible MUD, and the start of the trend to the MUDs known and used today. At this point also, much of the development crossed to the USA, although significant contributions have also been made in Europe. The major MUD servers running today tend to include a programming language which allows the semantics of the MUD to be extended, and many also have elements of an object-oriented system. Work continues refining these aspects.

5   Some Real Examples of MUDs

In this section I will briefly introduce several MUD systems currently being used, which illustrate some of the possibilities for these systems.

5.1   MUD Uses - Conference Room

In the MUD I run, I have created an on-line distributed conference facility. The environment is that of a conference centre with a meeting room. The room is furnished with a conference table, chairs, and even a view out the window. It also includes some support infrastructure, especially a whiteboard. This is an object in the MUD configured so that any participant can add text to it, and all others can read it. It thus functions as a whiteboard normally does in a conference room. However this is one feature not present in the predecessors (eg IRC) of the MUDs.

5.2   MUD Uses - Newsletter

Also in my MUD I have produced a newsletter. The system keeps a master copy of the contents of the newsletter, whilst each participant can purchase an instance which keeps information, such as which page they have it opened to. The content of the newsletter is added using a master update program, which authorised participants can run.

5.3   MUD Uses - Monash MUD

A MUD is being run at Monash University by the Computer Science department. It is being used for several projects. One of the more interesting is to evaluate an economic model developed by Les Goldschlager (their HOD), which concentrates on banking algorithms and their impact on the economy. In the simulation, students are asked to submit programs to run to try and make money, to test the effectiveness of the model.

The MUD is also being used to trial some alternate tagless garbage collection algorithms, as part of a PhD project on a new persistent object-oriented programming language (Chi), which may also be implemented in the MUD.

5.4 MUD Uses - MicroMUSE

MicroMUSE is a simulation run on a MUD at MIT of an orbital colony "Cyberion City". It includes a charter for the colony, a model of government, the economy, and of aspects of the society. Participants interact with the simulation to judge the effectiveness of these models.

5.5 MUD Uses - NAU Mars Colony

One of the most interesting projects to me is the Mars Colony simulation, hosted by Northern Arizona University, but with participants from a number of institutions. It also includes a model of the economy, several governments, and a number of smaller settlements that interact with each other. It forms the major practical component of an interdisciplinary Honours course "Cultural Simulation - The Mars Mission" offered by the departments of Anthropology, and of Computer Science at NAU [4]. It is now running for its third year, having grown out of the previous CONTACT cultural simulation project which was based on more traditional role-playing techniques. The aim of both of these projects was to simulate cultural conflict between societies, in this case, the various colonies. As part of their assessment in this course, the students are required to design and implement a socio-cultural simulation for the Mars settlement project. They have to build on the initial assumptions, develop realistic persona with researched areas of expertise and job descriptions, design a political economy and a method of self-government, and finally run the simulation. There are groups of participants from various campuses, each developing a separate colony. In 1993 these included NAU (Mars), U Dayton (Artic Submarine city), Intl Space Uni (L4), Cabrillo-UCSD (L5), and others. In addition there is a team of independent consultants supporting the simulation, providing advice, and evaluating the results. Within the simulation they are the "Board of Virtual Consultants", with expertise including linguist, NASA engineer, VR specialist, SF author, Futurist, Anthropologist, meta-law specialist, and others. There are also several alumni from previous courses assisting by representing key corporations (and creating some sources of conflict). Following the simulation, the students are debriefed, and use the results to produce reports and education material based on their researches and experiences in the simulation. A dialog excerpt from this simulation when I visited it in February 93, is given in Fig. 3.

5.6 MUD Uses - MOO

MOO is an object-oriented MUD run by Pavel Curtis at Xerox PARC research labs. It includes a full object oriented programming language, used for both language development, of to investigate aspects of the inheritance of attributes in this environment. Pavel has run a production server for some years, and has used it to study social interactions amongst participants in such a computer mediated environment where many of the usual non-verbal clues are obscured by the system [5]. The MOO server has also been used by others to investigate its suitability as a possible groupware environment, its advantages and limitations.

6 MUDs - Where Next?

I hope I have shown in the previous section that MUDs are being used in some very interesting applications, especially in simulations, and as a forum for on-line interaction between participants (see comments given in Fig. 1). I believe these applications will grow in importance, and the MUDs show in prototype form how they may be implemented. Advances are needed, particularly in the interface. The current text-based, single output interfaces can lead to confusion when trying to track three or more conversations. The development of smarter client programs, able to separate and track conversations may well help here. Also I expect to see some interaction with the more traditional VR community, with a merging of technology

as more powerful hardware and greater network bandwidth becomes more common. There is already some work on graphical MUDs, although these require significantly greater efforts to build environments in.

```
DrRiner says "Yes, I can sympathise. Our Anthro meetings have gotten so
big, hence big, expensive hotels, that I've had to write them off. I
guess small conferences are going to be the thing of the future."

LBrown nods "for at least some of it. But the problem is its nice to go
to a big conference to meet everybody, and find out whats happening in
areas other than your own. So I guess we'll just have to balance between
them in future.

DrRiner says "I think that's where computer mediated communications has
a lot to offer! I am trying to build a continuing electronic conference
for my regional anthro association..."
```

Figure 1: Dialog on On-line Conferencing

7 Responsible MUD Management

The use of MUDs has raised some security concerns. In particular some of the earlier MUDs allowed access to underlying OS facilities, and thus formed an avenue of attack. However most of the more recent MUD servers run as a single process, totally isolated from the rest of the system, accepting and authenticating their own users, and providing no means of interacting with the host system apart from the MUD server. Hence any security lapse only compromises the MUD server, not the rest of the host system. Obviously, as with any program, the MUD server needs to run with priority and resource limits appropriate to its use.

8 Conclusion

MUDs exist, and are used for a variety of applications. They can be regarded as a text-based virtual reality, with an emphasis on low technology but high involvement with the system, and can be accessed and run on many systems now with only modest resources. They have quite interesting uses in simulations and in providing an on-line environment for participants to interact in, forming the forerunner of future distributed conferencing, groupware and simulation systems.

9 References

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[4] R. D. Riner, "Chaos with Feedback: The NAU Solar System and Mars Settlement: A Simulation," Dept. Anthropology, Northern Arizona University, Technical Report, Feb. 1993.

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```
MUD1    # the original by Roy Tubshaw & Richard Bartle, Essex Uni UK 1980
|
+---MUD2    # advanced MUD1 rewrite by Bartle & Trubshaw for BT in 1984
|
+---Shades    # various UK commercial games. mostly run on Prestel 1985+
|    +---Bloodstone
|    +---Sector 7
|    +---Trash
|    +---Zone
|        +---Void
|
+---MirrorWorld    # BBC PC based server, 1986
|
+---Federation II    # CompuNet (UK), SF game, 1989
|
+---Gods    # Prestel (UK), Fantasy, 1985-88
|    +---Future Life    # SF setting, commercial, 1990
|
+---MIST    # MUD1 clone, Essex Uni, JANET access, 1987+
     |
     +---AberMUD    # first Internet MUD, by Alan Cox, Uni Wales, 1988
         |
         +---LPMUD    # combat oriented, Swedish rewrite of AberMUD, 1988
         |    +---DUM II
         |
         +---TinyMUD    # interaction oriented with user extension, 1989
         |    +---Cthulhu    # OO LISP based
         |    |
         |    +---TinyMUCK    # MUF programming
         |    |    +---TinyMOO    # OO programming
         |    |
         |    +---TinyMUSH    # added daemons to react to events
         |    |
         |    +---UberMUD    # U programming
         |
         +---YAMA    # attempt at a meta-MUD, partially successful
```

Figure 2: A Partial MUD Genealogy

```
Ship Main Corridor
The corridor is featureless except for doors forward and aft.
There are access tube entrances both up and down. The gravity in
this section is zero.
[ Exits: Crew's Quarters,  Access Tube 2,  Access Tube 1,
Shuttle, DrRiner's Office,  HoloCom ]

>>> Shuttle
Shuttle Poseidon
Tiny and cramped, but what acceleration!
[ Commands: take suit off,  put suit on ]
[ Exits: Surface Shuttle Pad,  Orbiter ]

>>> Surface Shuttle Pad
Surface Shuttle Pad(#2276 ROOM Unwanted)
Hope you've got your suit on!
[ Exits: Shuttle,  door in dome,  door in hillside,  downhill,  uphill ]
Contents:
HARDHAT

>>> door in dome
Entry Airlock
Welcome to the Mars Mission - take your suit off!
[ Commands: put suit on,  take suit off ]
[ Exits: Inside,  Shuttle Pad ]

>>> inside
Control Room
Maps on the wall, a drafting table, and a conference table.
[ Exits: out ]
Contents:
Azra
Elijah
Ravi
DrRiner

Azra says "What are you doing by yourself down here?"
You say "I'm one of the Virtual Consultants, so I get to wander
everywhere, poking my nose into things"
You say "can you tell me how you think the simulation is going"
Azra says "I think it is going well."
Azra says "I think it is incredibly useful talking to people, I
am here and I have used the DragonMud, which is wonderful. As
far as the simulation goes, It really helps solidify what we are
doing, make it seem real. As I said, there isn't much here right
now, and not too many people to log on."
You say "are there many in the mars simulation class?"
Azra says "In our class there are 19."
```

Figure 3: A sample dialog from the NAU Mars Simulation

What Ken and Dennis Did Right

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ABSTRACT

The UNIX system was originally developed by Ken Thompson and Dennis Ritchie who were later supported by a cast of thousands. The original underlying philosophy was that UNIX would run on a single computer. Such systems were initially isolated. The idea of networking has put an expiry date on many standard UNIX features. Many things will be different in Plan 9.

This paper attempts a retrospective assessment of the features of the UNIX system, especially those that are starting to appear a little frayed at the edges.

1. Introduction

In 1968 Ken Thompson and Dennis Ritchie were working on the Multics project, jointly sponsored by MIT, General Electric and Bell Laboratories. When Bell Laboratories withdrew its support for Multics, Ken and Dennis needed something else to do. In 1969 Ken happened upon an unused PDP-7 computer, and started to create a comfortable environment for the pursuits that interested him: programming research (or how to build better computer systems, not necessarily bigger ones).

As we know, their efforts were successful, and by 1973 they were ready to tell the world. In their now classic paper (Ritchie and Thompson, 1974) originally presented at the Fourth ACM Symposium on Operating Systems Principles, Yorktown Heights, NY in October, 1973, they described an interactive system with 144 K bytes of core memory (the kernel program occupied 42 K bytes) that provided:

   i.   a hierarchical file system incorporating demountable volumes,

   ii.   compatible file, device and inter-process I/O,

   iii.   the ability to initiate asynchronous processes,

   iv.   a system command language selectable on a per-user basis,

   v.   over 100 subsystems including a dozen languages.

The claim of 'over 100 subsystems' is of course a little arbitrary. Clearly there are many more than that now. 'A dozen' languages also seems a little arbitrary. Any list today would include both C and C++, but no one is much interested in the number of assemblers any more.

The decision to treat files as a string of characters and to conceal all internal details of the implementation of the file system have survived intact. Other features such as process management and signal handling have evolved over the years.

2. What Did They Do Right?

2.1 The File System

Ordinary files are recorded on one or more segments of disk that can be written and read. The same conventions for referencing disk files can be used for referencing peripheral devices: output devices are writable but not readable, while input devices are readable but not writable. Raw

disks may be both readable and writable e.g. for efficiency when backing up file systems.

The important feature of the file system is that all implementat ˄ details are concealed. Different versions of the system can use different strategies for formatting the disk, and accessing its contents. The size of storage blocks has changed over the years from 512 bytes to 4K bytes or 8K bytes or more (but always a multiple of 512 bytes).

Access to files is via a directory hierarchy. File name searches can begin in the current directory (a useful innovation) or at the root of the directory tree.

2.2 Processes

The use of multiple processes is so fundamental that it is hard sometimes to remember what life would be like without them. Yet every *MS-Dos* user is reminded everyday.

Multiple processes are needed for pipes. Pipes may be used to combine tools into useful combinations. Pipelines may be formed by head-to-tail combinations of processes (via their standard inputs and standard outputs). Many useful tools (e.g. *more, less*) owe their existence to pipes, and hence to UNIX's support for multiple processes.

Separate processes are inherently asynchronous, though the limits on buffer space between processes in a pipeline can enforce a large degree of synchronisation. Genuinely asynchronous processes can be invoked, e.g. to run in the background to perform many useful tasks.

2.3 Command Interpreters

A key decision was to separate the command interpreter from the main kernel of the operating system. Both the term *shell* and the idea came from Multics. For UNIX the address space limitations on the PDP-11 made it an unavoidable option.

Separating the command interpreter from the kernel allowed new interpreters to be developed during normal system operation. Innovations in command syntax thus occurred much faster. To support the command interpreter properly, the interface between the kernel had to be enriched (especially to support *fork* and *exec*).

The separation of *fork* and *exec* has proved a happy decision. Each new child process can remodel its old environment before it starts a new program. Although the two operations often appear in pairs, this does not have to be. However creating a new process image only to throw it away again almost immediately does seem wasteful, so strategies such as UCB's *vfork* do have more than a superficial attraction. The idea for a separate *fork* operation came from the Berkeley Time Sharing System.

2.4 World-wide Community Support

In 1973 AT&T may have already been in the communication business (i.e. not the telephone business) but it was definitely not (yet) in the computer business. Because there was no commercially-inspired management dictating the future, 'the UNIX kids were free to play in the street' until it was too late.

3. What Did They Fail To Do Right?

The short answer (in my mind) is 'Very little'. However many of their decisions have a 'Use by' date that has expired or is about to expire. To the extent that some decisions may not last forever, you might say they have failed. However decisions that have stood unchallenged for nearly twenty years cannot be that far wrong.

The original underlying philosophy was that UNIX would run on a single computer system. Such systems were isolated initially. When this was no longer true, tools such as *uucp* were developed to enable transfer of information between machines that were no longer alone. More than anything else, the idea of networking has put an expiry date on many standard UNIX features. Many things will be organised differently in Plan 9, the system now being developed at Bell Laboratories in Murray Hill, NJ, where the team of Thompson and Ritchie has now become Thompson and Pike. Plan 9 is pointing in the new direction:

Because a new, sixteen bit character set (*Unicode*) has replaced the seven bit American Standard Code for Information Interchange, the veneer has changed so Plan 9 users are now concerned with an different set of problems from those of UNIX users.

Plan 9 systems have no concept of *super-user*. There are many problems with controlling access to files via a network so one should see this as a laudable decision. However there is a downside to this as users who forget their passwords can learn.

Plan 9 files do not have separate inodes, nor can they have multiple links.

However, more deeply, although individual Plan 9 machines can still exist, Plan 9 is a networked system in a way that UNIX never was. Communications and computers are now inexorably intertwined into a global network that can now cover potentially the whole world, like a blanket of *kudzu*.

Conclusion

I have seen the future and it is unreal.
The mainframe is finally joining the dinosaurs.
IBM has just declared a massive loss for the year.
Unix System Laboratories has just been sold by AT&T to Novell.
Long life to the folks at the telephone company who brought you UNIX ... !

Reference

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NETWORK BACKUP AND ARCHIVAL STRATEGIES
Paul Templeman, Sequel Technology

ABSTRACT

"Oh, I'll just knock up a couple of scripts to do that!" Probably one of the most widely used phrases in today's Unix world. Scripts control a vast array of day-to-day Unix administrative tasks, doing everything from cleaning up log files automatically, to shutting down the system.

One of the main tasks for which scripts have been used in the past are backup, restore and archive functions. This is fine when you have the scenario of one server with a locally attached tape drive, where the drive has a larger capacity than the system's fixed disk capacity. But how does an administrator handle things when the scenario gets more complex; backing up over a network, using remote devices, scheduling automatic backups, restoration by users, file revisions, and backing up of large disk farms.

This paper looks at backup and archiving strategies that can be employed by system administrators, and how an administrator can assess the strategy that best suits their own environment. Available utilities, both standard UNIX ones, and third-party utilities, are covered. Hardware options, such as tape, optical, and jukebox facilities are also reviewed.

A number of sample scenarios are analysed, to see what combination of software and hardware systems combine to give the 'best fit'. This will include looking at some of the problems faced by administrators on a day-to-day basis, including; backing up of live and raw RDBMS filesystems, tape management, and performance issues.

Finally, the paper looks at future direction of backup and archive solutions, including looking at such ideas as the 'Epoch' strategy.

This paper aims to highlight the importance of thinking seriously about defining an organisation's backup and archival strategy, and what tool can be employed to ensure data integrity of systems.

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Network Backup & Archival Strategies

SOFTWARE - STANDARD UNIX UTILITIES

Until recent times, UNIX tools have mostly been command line based. UNIX data management tools are no exception. With all the talk of client/server, GUI, LAN's and WAN's, in today's UNIX environment the predominant data management tools haven't changed very much over recent time. UNIX systems administrators still mainly use dump and backup, cpio, tar or dd to backup their systems.

A major part of a system administrator's job involves creating shell scripts that utilise one of the standard backup utilities, to backup and restore data of the systems being administered. By combining additional commands, such as rsh and find, with one of the standard backup utilities, administrators can create complex routines to meet the majority of an organisations data management requirements.

There is the question however whether these tools, although very powerful, are suitable as a standalone backup and archive solution in today's complex networking environments. Most of these standard tools are over fifteen to twenty years old, and today's complex environments did not exist and were not considered in the design of the tools.

SOFTWARE - THIRD PARTY TOOLS

Like all tools that have been around for some time, someone always feels they can build a better mousetrap. Data management tools are no exception, with a myriad of software companies producing replacement and add on utilities.

These utilities either are designed to conform to existing standard UNIX utilities and interfaces, or have elected to provide replacement utilities that use proprietary technology to provide increased functionality and performance to users.

Some common reasons for administrators to choose third party applications are;
- data verification
- data compression
- performance
- file history
- network support
- advanced hardware support
- tape management functions
- graphical user interface
- security
- live file system backup
- raw and RDBMS file system backup
- archiving functions

Some backup applications support only a subset of these features, with the standard situation of the more features, the greater the price tag. It is therefore important that prior to working out which backup application to use, you need to design a backup strategy for your organisation. Once you have a backup strategy completed you can make an informed decision about which backup product is most suitable. For example, if you have a heterogenous UNIX environment you don't want a product that will support only a subset of your equipment. If you have a single server with character based terminals, a product that was designed around a network environment may not be appropriate.

Some of the more common third party backup solutions available are;
- Budtool from Delta Microsystems Inc.
- Networker from Legato Systems Inc.
- C Tar from Microlite Corporation
- BRU from Enhanced Software Technologies Inc.
- Backup.unet from Raxco Inc.
- Arcserve/open from Cheyenne Software Inc.

Budtool, BRU, and Backup.unet have been designed around the open systems concept, and act as wrappers around standard UNIX utilities, such as dump, cpio, tar and dd. CTar is a replacement for UNIX's standard tar utility, and is suited to a single server environment where network and archive capabilities are not required. Networker and Arcserve/open are two network based products that have introduced proprietary backup solutions for the UNIX environment. Interestingly enough, Arcserve/open has originated from the NOVELL network arena, and has moved from that environment to encompass the UNIX market. All have situations where they fit well and are appropriate for, but it is essential you know what your requirements are before you decide which products to evaluate. Spending some time looking at the issues up-front will stop a lot of heart ache later on.

HARDWARE

Hardware is the other side of the backup coin, and again you need to be aware of what your requirements are before you can choose what hardware environment you need.

There are three main technologies currently being used for backup and archive solutions;
- Tape Drives
- Optical Drives
- Jukeboxes (Robotic Media Handling Systems)

Network Backup & Archival Strategies

HARDWARE - TAPE DRIVES

There are a number of tape drives being used in today's computing environment, the main drive types being used are;
- 1/4" streaming tape drives
- 1/2" reel - to - reel tape drives
- DAT (4mm) tape drives
- Exabyte (8mm) tape drives

The 1/4" and 1/2" tape drives have been around for a long time and are common drives to be used for backing up small servers, or individual workstations. Tapes tend to be low in capacity and performance.

DAT (Digital Audio Tape) and Exabyte tape drives are now the most commonly used tape drives for large capacity backup solutions. Both drives backup between 1.3GB to 5GB of data per tape, are high performance and have random search facilities.

Traditionally DAT has tended to be somewhat slower in performance to the Exabyte units, and until recently only had 1.3GB and 2 GB tape sizes, whereas Exabyte used 2.5GB and 5GB drives. DAT drives used compression to get up to 10GB's of storage per tape, until recently, when a 5GB DAT model was introduced. It is still worth checking, though, whether the capacity of the drive a salesman is quoting you is before or after compression.

Both DAT and Exabyte tape drives have advanced features that also need to be supported by custom device drivers and application software. Such features as high speed search and Table of Contents are two examples of hardware features that need support at the device driver and application level. It is not possible for tar, for example, to do a high-speed restore without additional driver and application support, as the physical tape block number that the file(s) starts on is needed and this can only be recorded in some sort of file history database that was generated when the backup was created.

HARDWARE - OPTICAL DRIVES

Optical storage, when launched, was supposedly going to be the backup media of the future. It has taken off to a slow start however. There are two types of technology for optical storage, WORM (Write Once Read Many) and Erasable Optical. Although a lot faster than tape, optical storage is still relatively slow (around 35ms access time) compared with magnetic drives. Capacity is also relatively low, around 500MB per side of optical disk, compared with 5GB on a 8mm tape, and up to 20GB with compression. Optical media is also relatively expensive compared with tape storage. As a side issue, because of the low capacity issue, jukebox hardware is often required which is still pricey for the handling of optical platters.

Network Backup & Archival Strategies

HARDWARE - JUKEBOXES (ROBOTIC MEDIA HANDLING SYSTEMS)

The latest in backup hardware is optical and tape robotic media handling systems. The units come in two flavours, either a stacker unit or a jukebox unit. The main difference between the two units is that a stacker unit is purely sequential, it loads the first tape, then the second, and so on. The jukebox on the other hand, utilises intelligent robotic media handling facilities, and combined with appropriate software drivers allows individual tape recognition and selection.

Which hardware option you choose depends on what you are using the device for. If you are simply doing backups, then a stacker is probably most appropriate. If however, archiving or fast file restoration is a priority then a jukebox unit will be more appropriate. A jukebox does need greater software support to provide this increased functionality, however. This support is being supplied by a number of third party software companies.

BACKUP VS ARCHIVING

This is probably one of the important issues when determining your backup strategy and accessing what products may suit your needs.

A backup, networked or otherwise, is simply a method of data security and only needs to be restored on an infrequent basis. A backup may consist of one or multiple tapes, and tapes may be grouped and rotated. If this is all that you require then neither optical drives nor intelligent robotic jukeboxes are usually required. A single tape drive or tape stacker is probably the most appropriate depending on capacity required. Advanced features such as rapid file retrieve, tape append, file history, graphical user interfaces and user backup/restore functions may not be necessary.

Archiving, on the other hand, is the removal of files from hard disk to offline storage to free up disk space, but allows selection of individual files or groups of files and rapid restoration. Archiving requires greater hardware and software support, and therefore puts the solution into the higher price bracket. Optical drives and intelligent tape jukeboxes with high speed search facilities are the most appropriate hardware components for archiving, depending on how quickly you need files restored. With Optical system retrieval can be done in a couple of seconds, whereas a tape jukebox equipped with high speed search will take about three to four minutes to restore a file. The optical storage method is also much more expensive to implement, as is to be expected, due to the lower capacity compared with tape, and the increased complexity of the optical platter handling mechanisms.

Often an organisation's needs require a combination of backup and archiving facilities, in which case an intelligent tape jukebox solution is probably most appropriate.

Regardless, it is important for you to work out which solution is appropriate, backup or archiving, or a combination. It is important to note that consultation with end users is often important regarding this, as a need for archiving facilities may not be intuitively obvious. For example a project group may be generating large data analysis files, which are currently being stored on disk "in case" they are needed later, and because of the long time span required to regenerate the results it is not feasible to be wiped off the disk. This is a classic case for the use of archiving, but unless the user tells IT what they are doing, the need may not be apparent.

COMMON BACKUP AND ARCHIVING ISSUES

UNIX based servers and workstations are becoming more and more popular. UNIX networks are appearing all over the place, and no longer are UNIX systems put into the academic and technical pigeonhole. Whether we like it or not, UNIX systems are now big business and big dollars. UNIX systems power is ever increasing, with ever larger disk capacity, and ever more complex applications.

On the backup front, administrators are still using the standard UNIX backup facilities such as dump, cpio, tar and dd. These utilities haven't changed much since they were introduced to the UNIX environment fifteen to twenty years ago. Although still very powerful, they are not on their own sufficient for corporate and government backup and archiving requirements. In today's world of graphical user interfaces, a User simply won't wear having to enter 'cpio -icvbdum "project1*" < /dev/rst0' to restore a file from tape, after he or she has organised for the operators to insert the correct tape into the drive. This is just not acceptable to a user, who quite often, has no concept of the underlying operating system or network. He or she may only know how to use the application that is being run.

Another common problem in today's commercial UNIX environment is the increasing disk capacity being used, and the decreasing time available to perform system backups on a daily basis. ie. the backup 'window' is becoming smaller. Thus we are seeing the situation, where administrators are required to backup larger amounts of data in less time. Even with the newer backup hardware, with increased performance, it is often not possible to backup the required data in the available time, with a hardware only solution.

Another major issue confronting the modern UNIX administrator is the problem of variations of command syntax and data formats. SunOS uses dump as it's main backup method. IBM's AIX uses backup, and has no dump command as under SunOS. AIX and Intergraph's version of System V both have cpio, but Intergraph uses the -local switch on the find command to backup local file systems, whereas AIX's find command uses the -fstype switch to do this, and so the list goes on. Heterogeneous networking is not always as easy as vendors would like us to believe.

Network Backup & Archival Strategies

In some organisations even combining hardware and software solutions still doesn't allow them to backup their system in the time available in the backup window. This may be due to the large amount of data, or that the system is a 24-hour on-line system. The only solution then is to backup a 'live' filesystem. Normally a UNIX system is best backed up in single user mode, but mostly this is inconvenient, and in a network environment is often almost impossible. To backup a live filesystem requires the use of flock() and lock(), and to be effective needs kernel modification to do this. Sun's Backup Co-pilot is an example of such a kernel modification.

Backing up live filesystems is often the only option for large disk farms. As an example, consider the following environment;

- networked UNIX workstations
- a 36GB 'Disk farm'
- weekly full backups with Daily incremental
  (where an incremental = 20% of a full backup)
- full backups are staggered
- moderately active filesystems
- a 250 to 300 kb/sec sustained transfer rate per backup

This example would result in 11GB's being backed up each night, taking ten hours using a single backup stream, or five hours with a dual backup stream. Thirty six GB's seems a lot of disk, and it is, but we are already seeing 1.3GB drives being shipped as standard with some workstations, so 36Gb isn't so large after all. If all this seems so so, consider the dilemma of needing to backup a 100+GB disk farm in a 8 hour backup window.

If you are in a network environment, you also have the added problem of network saturation. The previously mentioned example on an ethernet backbone would mean near total bandwidth saturation. This is fine if the backup is being done at night and nothing else wants to use the network, but on a cluttered corporate-wide backbone, transferring 11GB's over a network to be backed up can cause extensive network traffic problems.

Another common problem encountered by administrators is the backup requirements of RDBMS partitions, ie. raw partitions. Often, administrators export the database information to log files, and then simply to backup the log files as part of the normal backup procedure. It does have a downside, you need to keep sufficient disk space available for the logs, and it also requires processing time to do this. The other option is to backup the raw partition which means the database can't be in use, or that special backup utilities for the RDBMS vendor need to be used. If possible your backup software should allow for the use of these special utilities.

Network Backup & Archival Strategies

A CASE STUDY - BUDTOOL FROM DELTA MICROSYSTEMS INC.

To see how some of the third party software vendors have tackled the problem of data management let's look at Budtool, a product from Delta Microsystems Inc. in the US.

Budtool acts as a wrapper around the collection of UNIX utilities, such as dump, tar, cpio and dd. The application has been designed to adhere to the major industry standards and utilises an X Windows based graphical user interface. Budtool is available for Sun, IBM RS/6000 and HP 9000 series systems, and can backup/archive any system that supports rsh or NFS. Budtool, as it is based on X11, can be displayed on any workstation or terminal that supports X11, Motif or Open Look.

There are three main concepts in Budtool;
- a backup server
- a media server
- a backup client

A backup server is the system where Budtool is run. Normally this is where all the volume, media, file history and request databases are kept, along with miscellaneous configuration files.

A media server is a machine that has tape units physically attached to it, and is responsible for the physical tape or optical hardware, jukebox or otherwise. This is accomplished through custom device drivers supplied by Delta Microsystems for a range of supported hardware. Multiple Media Servers can be controlled by a single Backup Server, and a Backup Server can also act as a Media Server.

A Backup (or Restore) Client is a machine on the network that is required to have it's data backed up or archived. Budtool requires no special software to be installed on a Client, with the only requirement being that the Client system has one of the standard backup utilities, and supports rsh or NFS.

Budtool allows the setting of backup or archive 'requests' which can specify what is to be backed up, using what method e.g. dump, and which Media Server should be used. These requests can then be grouped together and referred to as a single entity.

Backup requests/ backup groups can be run manually or can be scheduled. Budtool includes a full calendar based scheduler to allow backups to be scheduled for up to a year in advance, and allows for the inclusion of Public Holidays (something which a standard cron entry cannot do).

Network Backup & Archival Strategies

Budtool by default supports three backup utilities or 'classes'; dump, cpio, and tar. This includes support, via additional utilities, for file history, rapid file search, and true append to tape facilities for each of the three standard 'classes'. Other backup 'classes' can be added by the administrator to allow for support of additional backup utilities such as dd and backup. In addition, each 'class' allows pre and post processing, e.g. to allow the use of RDBMS utilities such as Oracle's exp utility. This concept of backup 'classes' that supports any utility that uses standard input and output allows a great deal of flexibility and customisation.

On the user side of things, due to the use of X11, users can be provided with a GUI on their own workstation that allows them to backup and restore files of choice, as long as he or she has the correct security permissions.

For every backup run by Budtool, a file history database is created, and when combined with the volume database, not only allows users to select a file and have Budtool automatically retrieve the file, but also allows the user to select which revision of the file to restore. Budtool allows the creation of database size rules to automatically control the size and amount of disk space taken up by file history and volume databases.

Budtool also incorporates media management, and utilising Budtool's label expression utility, allows for automatic recycling, periodic duplication for off-site storage, automatic tape retirement, and volume expiration dates.

For live filesystem backups, Budtool is compatible with such products as Sun's Backup Co-Pilot.

Budtool supports a number of output devices, including; DAT and Exabyte tape units, optical drives, UNIX filesystems, tape stackers, and optical and tape intelligent jukeboxes.

A CASE STUDY - EPOCH FROM EPOCH SYSTEMS INC.

Epoch is an innovative move into the arena of automatic network backup and file migration that provides one possible solution to the problem of backing up large disk farms now and in the future.

Epoch consists of an Epoch-2 data server, Epochmigration, and Epochbackup. The Epoch-2 data server consists of a Sun SPARCstation 2 with an array of disk drives, optical and tape jukeboxes. Epoch-2 appears as a standard NFS server on your network.

The basic premise of Epoch is that users can NFS mount the Epoch-2 data server from their workstation, and use it as a very large normal UNIX filesystem. Behind the scenes it's a different story. Epoch is constantly looking at file usage, and as a first stage moves least used files from disk to optical, and then at a later stage from optical to tape.

Epoch also includes Epochbackup. Epochbackup backups any workstation on the network that allows it's drives to be NFS mounted by the Epoch-2 data server. Templates are provided for backup scheduling, and should a workstation be inaccessible when a backup is attempted, Epochbackup will automatically reschedule the backup for a later time.

Another tool from Epoch is Epochmigration. Epochmigration runs on Sun and DEC workstations and acts as another tier in the migration path. Files are automatically moved from the local disk to the Epoch-2 disks, and then to optical and tape as appropriate.

Epoch heads in the right direction in terms of future backup and archiving requirements. However, with only two sites in Australia, and a base price of AUS$ 125,000, Epoch is still not for the faint hearted. But as the product matures, Epoch will be a major player in the backup and archive race.

Network Backup & Archival Strategies

CONCLUSION

Standard UNIX utilities such as dump, cpio, and tar, have been with us a long time, and although powerful when wrapped into a shell script, they cannot address some of the issues that are affecting organisations data management. We need to look at third-party applications which still utilise the standard UNIX utilities, but provide the advanced network and advanced hardware support that is required if we are to keep up with the ever increasing data sets that need to be managed.

Organisations need to be aware of data management issues and look at their own internal requirements, and those of it's users. By completing a backup strategy, organisations will be much more aware of what their backup and archiving requirements are, and what third party products they should review.

Users are no longer prepared to put up with cryptic command lines and applications are now required to be intuitive, and preferably be graphically based. Minimisation of operator intervention can now be achieved with advanced optical and tape jukebox hardware, which is supported by a number of third party applications via custom device drivers and utilities.

Organisation's disk farms are becoming increasing large. More and more information is required to be backed up, in ever decreasing amounts of time. Network saturation is increasingly becoming more of a problem, as is management of data from large RDBMS installations. With the newer generations of workstations and servers becoming available with larger and larger disk capacities, new data management technology will be required, combining software with multiple hardware formats to provide an adequate solution.

Paul Templeman is Technical Director of Perth based Sequel Technology. Sequel Technology provides open systems solutions to the Corporate and Government marketplace, and is the exclusive agent for Budtool in Western Australia. Paul can be contacted on (09) 417 5713.

SAGE Humor †

My Top 20 Favorite Things About Remote Site Administration

by Wendy Nather
<wendy@il.us.swissbank.com>

20. Negotiating all those site licenses.

19. Forgetting to change the voltage before shipping the server out.

18. Those 2:00 am calls from Tokyo.

17. Users who put umlauts in their filenames and wonder why UNIX can't find them later.

16. It's always lunch hour somewhere in the world.

15. Vendors who wax eloquent about their fancy diagnostic displays on equipment that you will have locked away in a steel vault on the other side of an ocean when it breaks down.

14. Those 3:00 am calls from Tokyo.

13. Territorial impulses on the part of the local staff: "I claim this server in the name of Prince Wackadoo and I'm going to delete the root file-system if I feel like it!"

12. Losing the coin toss on who gets to pay a maintenance call on Sydney in January.

11. Security guards who do not speak your language and who do not believe that you were authorized to be in the computer room all night.

10. Those 4:00 am calls from London.

9. Explaining to nonnative speakers of your language over a noisy telephone line, in a noisy computer room, how to reboot a machine. "Press 'b' ... No, not 'p,' 'b'!! 'B' as in 'basketball!' What's a basketball? Oh, never mind ... "

8. Trying to decide whether a whole city fell into the ocean or whether it's just a problem with your router.

7. The joys of touch-typing on different language keyboards.

6. More national and multinational standards than you can shake a stick at.

5. Those 5:00 am calls from Frankfurt.

4. Having error messages spelled out, letter by letter, over the phone.

3. Trying to direct someone to a particular machine when you've never seen the machine, its location, the building or the city.

2. Swearing in four languages.

and finally:

1. Monday lasts at least 46 hours.

System Administration Tools Your Vendor Never Told You About: The Squeaky Octopus

by Elizabeth Zwicky
<zwicky@erg.sri.com>

Well, OK, a squeaky octopus is not actually necessary. On the other hand, I find that it makes an invaluable addition to the user help desk. Dangle it from the ceiling with a sign that says "Squeak octopus for service." This gives it an actual purpose and provides amusement for somebody every time a new person enters the room. (Some users are more bemused than amused, but the sight of someone attempting to determine whether or not squeaking a plastic octopus is compatible with their dignity is worth a lot to the onlookers.) It is hard to squeak an octopus with the sort of moral indignation one can apply to ringing a bell, making a squeaky octopus easier on the help desk staff than a bell would be. It's also easier to mount an octopus out of the reach of small children.

Call for Submissions

UniForum Monthly will be publishing a regular column on Systems Administration and is seeking submissions from USENIX members and others. There is no honorarium involved, although some expenses may be defrayed. Column length is approximately 1,000 words. Topics to be addressed can include, but are not limited to, specifics on what systems administration issues, tools and solutions are working (or not working) in today's open systems environment. For complete information on content and style please contact:

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Opinion on NT †

by Bjorn Satdeva
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Whenever I hear someone mention the new Windows NT operating system from Microsoft, I get a strong feeling of deja vu. The trade press is reporting on this latest and greatest operating system ever written. If the press is to believed, NT is just about to wipe UNIX off the face of the earth. However, this is old news, heard many times before, by other commercial operating systems.

Back in the early eighties, the microcomputers of the time were based on the Intel 8080 chip, and ran an Operating System known as CP/M (Control Program/Monitor). This was a single user, single process.system. According to the trade press at that time, the operating system of choice was a multi-user version of CP/M, called MP/M. However, all the talk remained just talk, and I have never met anybody who used MP/M for any extended length of time.

Now, fast forward to the late eighties. Both CP/M and MP/M are long gone, maybe with a few exotic exceptions. MS-DOS is the king of the PC, and UNIX is starting to be used outside the engineering community. However, according to the trade press, both MS-DOS and UNIX are on the way out, to be replaced by OS/2. At that time, OS/2 claimed to be better than any other OS, and took full advantage of the latest OS technology. I bought one of the first books available on OS/2, written by one of its developers. According to the sleeve, OS/2 was a completely new kind of OS, designed by a genius (who was also the author of the book). One can imagine what a disappointment that book was! There was nothing new (at least nothing which I did not already know from UNIX); OS/2 was a severely scaled-down single-user version of UNIX.

Today, we all know that OS/2 never became the UNIX killer the trade press first it acclaimed to be. In fact, Microsoft chose to discard OS/2 in its current form before it ever became usable, leaving only IBM to continue supporting it. The story of OS/2 makes me think of OS/2 being to MS-DOS what MP/M once was to CP/M.

And now, again, the trade press is reporting about the killer operating system based on brand new technology. This time it is Windows NT, a system which will remove MS-DOS and UNIX from the known universe. However, the story of NT has many similar trends to the story of MP/M and OS/2, including delays, bugs, and lack of functionality. In addition, if the grape vine can be trusted, NT is nothing more than a marriage between Microsoft Windows and OS/2. If this is to be believed, I would like to know where the superior technology comes in to this equation.

Many years ago I chose to study computer science and some years later to work in the UNIX environment. Both choices were based on my obtaining an interesting and challenging work environment, with neither promising a great financial return. I was told that making a career as a UNIX System Administrator would be both professional and financial suicide. And further that it would be impossible to find any work as a UNIX system administration consultant. Now I am being told that UNIX is about to be replaced by Microsoft NT.

I see no reasons why I, as a UNIX professional, should run scared of an OS, which is still not fully released, and which will most likely take several years to become reasonably reliable. It is very likely that NT will achieve some level of commercial success, but this will most likely be caused by a large marketing budget, rather than new attractive technology.

In summary, I believe that NT will be just another UNIX imitation from Microsoft. Considering the marketing budget supporting the sales of NT, it may succeed as a replacement for MS-DOS and will hopefully integrate more easily into networks. In the unlikely case that NT becomes so successful that it truly replaces UNIX, I will cross that bridge at that time.

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† This is a re-print from ;login, the USENIX Association Newsletter, Volume 18 Number 4

An Update on UNIX-Related Standards Activities †

by Nicholas M. Stoughton
USENIX Standards Report Editor

Report on POSIX.5: Ada Bindings

*Del Swanson <dswanson@email.sp.paramx.com>
reports on the April 19-23, 1993 meeting in Irvine,
CA:*

The POSIX.5 group has been working to produce
Ada language bindings to POSIX standards. The
Ada binding for the POSIX.1, POSIX.5, has now
been published as an IEEE standard, and we are
now working on bindings to the Real-Time
Extensions standards being developed by the
POSIX.4 group.

The binding to POSIX.4 has been designated as
POSIX.20. Draft 1 was circulated for mock ballot
last December, and comments have been incor-
porated into the document. Registration for real
ballot was open in May and June, and the ballot
draft was to be circulated June 18, with a close of
balloting scheduled for the end of July. We hope
to have this approved immediately after the
approval of POSIX.4.

Meanwhile, work has begun concurrently on the
binding to POSIX.4a (threads extensions). An ini-
tial draft has been prepared, and was debated at
the January meeting. Significant changes to it are
now expected to be put on hold until the ballot
resolutions and the next version of POSIX.4a.
The POSIX.5 group met with the POSIX.4 group
in January to get an update on the status of the
threads work.

Orthogonal to this update, some members of the
POSIX.5 group are becoming concerned about
the relationship of the threads interface and the
updates to the Ada standard that is commonly
called Ada 9x. Some significant changes and
enhancements are expected in the tasking model
for Ada 9x, and in some respects they have
adverse impact on the ability to implement an
Ada runtime library using POSIX threads. These
concerns are being provided to the POSIX.4
group, for consideration in the ballot resolution
process.

In April, the group was updated on the interpre-
tation process for POSIX.5. A few errors have
been found in the standard by implementors
(e.g., missing parameter, missing function defini-
tion, error condition oversights). The only way to

make "substantive" changes, even for errors, is
to revise the standard, which means balloting,
etc. The group decided to incorporate corrections
in our binding for the updated POSIX.1a. We
have initiated a Project Authorization Request
(PAR) for this work.

The group also composed a coordination ballot
in response to POSIX.4a, the threads extensions.
This is evidently the first time such a ballot has
been submitted. It grows from the fact that the
POSIX.5 group is a coordination group listed in
the POSIX.4a PAR. The group consensus was to
object to the proposed standard in seven areas:

1. Issues associated with finding the status of
   mutexes within signal handlers, and the
   asynch-safety of mutex operations
2. Obtaining the effective priority of a thread
   which has had its priority changed by priority
   ceiling locking
3. The options:
   `_POSIX_THREAD_PRIO_PROTECT` and
   `_POSIX_THREAD_PRIO_INHERIT`
   should be independent of one another.
4. The implications of unlocking mutexes not in
   the reverse order of their locking, on the
   implementation of priority protection schemes

   (If the standard specified LIFO order as nor-
   mative, implementation of priority changes
   could be very efficient.)
5. The scheduling implications for priority
   changes due to priority inheritance
   (A special rule should exist in the standard to
   require that an executing thread be inserted at
   the head of the queue for the appropriate pri-
   ority when its effective priority changes due to
   inheritance only. This is as opposed to explicit
   priority changes, for which the rules are given
   already and require the thread to go to the tail
   of the queue.)
6. The relation of the clean-up routines to thread
   cancellation
   (There are times when it should be safe to do
   the equivalent of a *longjmp* from a cleanup rou-
   tine.)
7. The relation of signal masks to threads and
   processes
   (We think that there should be an interface to
   mask delivery of asynchronous signals for the
   whole process.)

IEEE Standards Board

Mary Lynne Nielsen <m.nielsen@ieee.org> reports on the March, 1993 meeting.

The March 1993 IEEE Standards Board meeting was the occasion for the approval of the largest number of documents ever from PASC, the Portable Applications Standards Committee of the IEEE Computer Society, along with action on other information pertinent to the development of information technology standards.

A New Year, a New Board

As this was the first board meeting in 1993, the composition of the IEEE Standards Board and its committees went through their annual changes. Appointment to the Standards Board is for one year only, although members can be appointed for up to three years in a row. As such, there was a melange of both old and new faces at this meeting. Of interest to PASC is the fact that two of its members are now members of the Standards Board, Lorraine Kevra and Jim Isaak. Other Computer Society members include Clyde Camp from Microprocessors, Gary Robinson and Don Loughry from 802, and Leonard Tripp from the SCCs. Steve Diamond from Microprocessors is also a committee member, though not a board member. This was also the first meeting run by new Board Vice-president of Standards Wally Read. (The previous Board Vice-president Marco Migliaro had served for three years, so this was quite a change.)

Wally made a number of changes to the chairs of various Board committees. For instance, Gary Robinson is now the chair of RevCom (the IEEE Standards Board Review Committee, which approves balloted standards for publication), and Clyde Camp, who used to be RevCom chair, is now chair of NesCom (the IEEE Standards Board New Standards Committee, which approves Project Authorization Requests, or PARs). As a matter of fact, very few previous chairs maintained their positions for this year, so there will be a real change in the dynamic and in the manner that these committees operate during the year. Each chair has his or her own way of wanting to run a meeting, not to mention any extra goals that he or she may want to accomplish. This first meeting was a time for establishing the groundwork for the rest of the year, for understanding the role of each committee under a new chair and with different members, and for evaluating the previous work that a committee may have done.

NesCom

For instance, the new NesCom chair Clyde Camp was previously chair of RevCom. During his ten-ure as RevCom chair, Clyde instituted a department-wide review of all standards that were over five years old and that had not been reaffirmed. That review resulted in the removal of a lot of "dead wood" standards that had been sitting on the books for years with no changes, no reaffirmations, no revisions, and no withdrawals. Clyde is now aiming to do the same thing for NesCom by examining all PARs that are over four years old to see if any activity is occurring under them. This is directly attached to the IEEE Standards Operations Manual instruction that a PAR is only active for four years. It is uncertain at this time what will result from this review, but this should become clear in future meetings when NesCom has a chance to review actual figures about PARs.

NesCom has also appointed a subcommittee to examine the issue of producing an electronic PAR form. Jim Isaak is on this committee and can bring forward PASC's views on this subject.

NesCom also took some specific action on PASC PARs at this meeting. Three PASC PARs were approved and four were not. The four PARs that were not approved were missing the original copies of required permission release letters. (This is the kind of seemingly small detail that can stall approval of a PAR, and working group members should always make sure to double-check the submissions forms to see that they have provided all necessary information.)

RevCom

RevCom was introduced to PASC activity in a big way by the approval of twelve documents in the 1224 family. These standards deal with Open Systems Interconnection (OSI) and X.400 based messaging systems. Congratulations to the chairs and working group members involved with these standards; they were produced quickly and were able to be approved straightforwardly!

These standards will now be fast-track balloted to become international standards. (Fast-track balloting takes about half the time of regular balloting.) This ballot is going through ISO/IEC JTC1 SC21, which is the international information technology working group covering information retrieval, transfer, and management for OSI.

Hopefully, this will result in these twelve standards becoming international standards before the end of the year.

JTC1 Guide

As mentioned in previous snitch reports, the IEEE Standards Board International Committee (IntCom) has been working on guides about how to develop standards in parallel with other stan-

dards-developing organizations. The first of these discusses working with ISO/IEC JTC1 (the international committee in charge of information technology standards). A final version of this guide was approved by letter ballot of the committee in January. It contains, among other things, information relating to the POSIX/WG15 scheme of parallel development. It will be made available to any interested party and will be included on the new IEEE Standards process automation system.

Mechanized Development

Speaking of which, the IEEE Standards Department is continuing progress with developing a process automation system that will make various of its publications available online and that will eventually serve as a means for developing standards online through the use of SGML (Standard Generalized Markup Language). This system is available currently only through a modem connection (from 2400 bps up to 14.4K bps-V.32bis) and will hopefully be available through Internet connections in the fall. Among the publications available online are the IEEE Standards Board Bylaws, the IEEE Standards Operations Manual, the IEEE Standards Style Manual, and the aforementioned IntCom JTC1 Guide. If you'd like more information about this developing system, contact <j.iorio@ieee.org>.

Organizational Representatives

The issue of organizational representatives (ORs, also known as IRs in PASC) was raised by Gary Robinson on behalf of the Computer Society last December at the IEEE Standards Board. The topic was then passed to ProCom for discussion in March. The subject concerns a recommendation from the Computer Society Standards Activities Board (SAB) that asked for revision or clarification of the OR policy to 1) limit OR voting rights to voting on sponsor ballots of draft standards, and 2) state that IEEE Standards Board approval of voting rights for ORs is granted for a specific standards-development effort identified by one or more specific PARs. ProCom began to discuss this item in March. Among the items mentioned were the growing number of ORs in the PASC Standards Executive Committee (SEC), the possibility of approving ORs for a project and not a committee, the possibility of creating a time limit for OR terms, and the information the Standards Board may need to be able to judge qualifications for OR approval. This topic will be discussed further at the ProCom meeting in June.

Approved PARs:

- P1003.15a, Draft Standard for Information Technology-Portable Operating System Interface (POSIX)-Part 2: Shell and Utilities-Amendment: Batch Environment

- P1003.21, Draft Standard for Information Technology-Portable Operating System Interface (POSIX)-Part 1: System Application Program Interface (API)-Amendment: Real-Time Distributed Systems Communications

- P1003.22, Draft Guide to the POSIX Open Systems Environment-A Security Framework

Withdrawn PARs:

- P1238.1, Draft Standard for Information Technology-OSI Applications Program Interfaces-Common Connection Management and Supporting Functions

Approved Standards:

- P1224, Standard for Information Technology-Open Systems Interconnection (OSI) Abstract Data Manipulation-Application Program Interface (API) [Language Independent]

- P1224.1, Standard for Information Technology-X.400 Based Electronics Messaging Application Program Interface (API) [Language Independent]

- P1224.2, Standard for Information Technology-Directory Services Application Program Interface (API) [Language Independent]

- P1326, Standard for Information Technology-Test Methods for Measuring Conformance to Open Systems Interconnection (OSI) Abstract Data Manipulation-Application Program Interface (API) [Language Independent]

- P1326.1, Standard for Information Technology-Test Methods for Measuring Conformance to a X.400 Based Electronics Messaging Application Program Interface (API) [Language Independent]

- P1326.2, Standard for Information Technology-Test Methods for Measuring Conformance to a Directory Services Application Program Interface (API) [Language Independent]

- P1327, Standard for Information Technology-Open Systems Interconnection (OSI) Abstract Data Manipulation C Language Interfaces-Binding for an Application Program Interface (API)

- P1327.1, Standard for Information Technology-

X.400 Based Electronics Messaging C Language Interfaces-Binding for an Application Program Interface (API)

- P1327.2, Standard for Information Technology-Directory Services C Language Interfaces-Binding for an Application Program Interface (API)

- P1328, Standard for Information Technology-Test Methods for Measuring Conformance to Open Systems Interconnection (OSI) Abstract Data Manipulation C Language Interfaces-Binding for an Application Program Interface (API)

- P1328.1, Standard for Information Technology-Test Methods for Measuring Conformance to a X.400 Based Electronics Messaging C Language Interfaces-Binding for an Application Program Interface (API)

- P1328.2, Standard for Information Technology-Test Methods for Measuring Conformance to Directory Services C Language Interfaces-Binding for an Application Program Interface (API)

Report on POSIX.22: POSIX Security Framework

David Rogers <drogers@datlog.co.uk> reports on the April 19-23, 1993 meeting in Irvine, CA:

At the January meeting, the Portable Applications Standards Committee (PASC) approved the Project Authorization Request (PAR) for POSIX.22 to produce "A Guide to the Open Systems Environment — A Security Framework". This work has been assigned as a subgroup of POSIX.6 Security Working Group.

The objective is to complete the work started by the Distributed Security Study group and define a framework for security within POSIX. This is intended to bring together the concepts of security as system service enhancements, as currently addressed by POSIX.6, and as security services in a distributed environment in a single description of security.

The work will produce a document that will eventually be included in a future version of POSIX.0. It is also intended to provide POSIX.6 with an aid to identifying and planning future work.

The April meeting discussed the general concepts of the framework in terms of the concepts of security domains as outlined in the White Paper released by the Distributed Security Study Group last year.

The July meeting will be considering the representation of security within the POSIX.0 model, and a joint meeting with POSIX.0 has been arranged to facilitate this. In addition, a proposal on a method for assessing the impact of security on existing APIs will be discussed.

POSIX Standards

The latest volume in UniForum's POSIX Standards publications series is available. *Standards Based Procurement: Using POSIX and XPG*, by Kevin Lewis of Digital Equipment Corp., has just been published.

Abstract: Open systems are being sought by many segments of industry at large. Given the many players involved in the development of standards and specifications that are playing a role in open systems, it became apparent that some focus was needed on specific areas of the open systems debate. *Standards Based Procurement* describes the key standards development issues, examines procurement considerations, and offers suggestions on how users should approach the task of acquiring open systems technology.

Standards Based Procurement has been sent to all UniForum members. Copies may be purchased from UniForum: $5 for UniForum members; $10 for nonmembers; call UniForum Customer Service at 800/255-5620, or 408/986-8840. USENIX members are eligible to get member rates for UniForum's publications.

Unix Tricks & Traps

I invented the following trick while I was waiting for bits to whizz around a token ring:

Often, you wish to add a directory to your PATH environment variable, so the easiest thing to do is to whack it on the end. This is however not very efficient because the shell searches directories for executeable programs until found, even if it's searched them before. i.e. it doesn't remember what it's done before.

This is no big deal except that it takes more time and system resources to not find non-existent commands.

An alternative to buying a newer, bigger and faster system, is to check the PATH to see if it already includes the required directory before adding new elements. In the Bourne and Korn shells this is trivial, as illustrated by the following shell function:

```
addpath ()
{
case $PATH in
        $1:*|*:$1:*|*:$1|$1)
                : already there
                ;;
        *)      # add directory to PATH
                PATH=$PATH:$1
                ;;
esac
}
```

Everything is done with builtin functions so it runs really fast. The speed-trick is to do the pattern matching in a case statement.

I prefer to call the function once for each PATH component, then do an export "manually". Others may like to have the addpath function handle multiple components and then do the export within the function.

Such extensions are left as an exercise for the student. :-)

BTW: If you put some ": comments" in shell scripts for do-nothing cases and conditions, then you can see them in an execution trace (-x option).

Bernd Felsche <bernie@metapro.DIALix.oz.au>
From WAUG, the WA Chapter of AUUG

ddsplit

Here's a little slice'n dice script for sites which don't have binary split programs (or perl installed for those adept at typing line-noise :-)).

It's useful for splitting very large files into smaller ones, usually for data transfer purposes over UUCP, or even floppies.

Bernd Felsche <bernie@metapro.DIALix.oz.au>
From WAUG, the WA Chapter of AUUG

```sh
#!/bin/sh
# @(#) ddsplit 1.3 Created at 92/08/18 15:15:00
####################################################################
#
#       Metapro Systems Job and Source File Control System
#       Copyright (c) 1990-93
#       All Rights Reserved by
#       Metapro Systems, Perth, Western Australia.
#
#       The information in this software is subject to change without
#       notice and should not be construed as a commitment by Metapro.
#
#       Permission is hereby granted to distribute this software
#       as long as this header remains intact, and that it is not
#       distributed as part of a commercial product.
#
#       You may charge for providing this software, but you must
#       advise the purchaser that it is available free of charge,
#       and where it may be obtained as such.
#
####################################################################
#

# use dd to split a file into nominal chunks

# only one option allowed, the size of chuunk

prog='basename $0'
TMP=${TMPDIR:-${TMP:-/usr/tmp}}
TRACE=$TMP/$prog.$$
SIZE=${DS_BLOCK:-128k}

LONG_NAMES=$TMP/12345678901234567890
SHRT_NAMES=$TMP/12345678901234

set -- 'getopt s: $*'
if [ $? -ne 0 ] ; then
   echo "usage: $prog [-s size] file" 2>/dev/null
   exit 1
fi

for i in $* ; do
   case $1 in
   -s) SIZE="$2" ; shift 2 ;;
   --) shift ; break ;;
   esac
done
```

```
if [ $# -ne 1 ] ; then
   echo "$prog: no file named" 1>&2
   exit 2
fi

if [ ! -f $1 ] ; then
   echo "$prog: $1 is not a regular file" 1>&2
   exit 3
fi

FILE=$1

trap 'trap 0 ; rm -f $TRACE $LONG_NAMES ; exit' 0 1 2 3 15

# test for long names and if supported
touch $LONG_NAMES
if [ 'ls $LONG_NAMES' = $SHRT_NAMES -a 'expr $FILE : '.*'' -ge 12 ] ; then
   echo "$prog: input filename $FILE too long. get flexnames?" 1>&2
   exit 4
fi

OOPS='echo $FILE.?'

if [ "$OOPS" != $FILE.\? ] ; then
   echo "$prog: possible file collision. May over-write $OOPS - ABORT" 1>&2
   exit 7
fi

RESULT='
for EXT in 0 1 2 3 4 5 6 7 8 9 \
         A B C D E F G H I J K L M N O P Q R S T U V W X Y Z \
         a b c d e f g h i j k l m n o p q r s t u v w x y z ; do
   if [ -f $FILE.$EXT ] ; then
     echo "$prog: file collision.. will not over-write $FILE.$EXT - ABORT" 1>&2
     exit 9
   fi
   if dd of=$FILE.$EXT bs=$SIZE count=1 2>$TRACE ; then
     :
   else
     echo "$prog: problem copying." 1>&2
     sed 's/^/'$prog:'/' $TRACE 1>&2
     exit 10
   fi
   case \'sed -n 's/ records in$//p' $TRACE\' in
   0+0 ) rm -f $FILE.$EXT ; echo 0 ; exit 0;;
   esac
done < $FILE'

[ X"$RESULT" = X0 ] && exit 0
echo "$prog: Too many output files" 1>&2
exit 20
```

AUUG MANAGEMENT COMMITTEE

SUMMARY OF MINUTES OF MEETING 27th August 1993

Present: Phil McCrea, Chris Maltby, Glenn Huxtable, Frank Crawford, Peter Wishart, Michael Paddon, Greg Birnie, Chris Schoettle.

Guests: Liz Fraumann, Wael Foda, Lachie Hill.

1. Welcome

PM welcomed Chris Schoettle to his first meeting.

2. AUUG93 Update

Organisation is going well. The proceedings are currently missing around 10 papers, but 3 of those are keynotes and so are not expected to submit.

There was an error in the brochure, as discussed in e-mail. There is nothing Telecom can do about redirecting the number since it is a non-existent exchange. An update has been made in the Aust. diary entry and ACS has been contacted and will issue a correction in their next newsletter.

Student volunteers are in hand and a task list will be produced so they have details of what they should do.

Clipping service: articles have appeared in Open Systems Review, MIS Magazine, Informatics, PC Week. Some other features were submitted but did not get run.

The AUUG93 entrance way will have light boxes with AUUG93 (x2) and AUUG94 (x2) logos. The AUUG94 light boxes can be used again next year. Next's years logo and theme were presented and discussed.

AFUU: Sylvan cannot attend conference due to personal difficulties. John Judge and Stu Taylor will take the TU5 slot. PW is to write to Sylvan expressing AUUG's best wishes and also to notify Amanda and ? @ AFUU that due to time constraints we have selected a local speaker here. ACTION: PW.

The conference will start @ 8.30am, doors open @ 8.15am. Liz and Piers will have a conference breakdown at the level of every 5 minutes. There will be walkie talkies to contact organisers.

AUUG94 Chair: Discussion on who should be invited to chair AUUG94.

MOTION: That Ian Hoyle be invited to be the program chair for AUUG94. Moved: GH/CM. CARRIED.

PR: Lachie Hill reported that Exhibition and Conference were being treated as one for PR purposes from now on. Coming items: MIS, Informatics, PC Week, Computer World major feature 17/9, Pacific Computer Weekly, Australian feature 28/9. AUUG93 program passed out to an organisation dealing with talk-back shows. It had picked up on Clifford Stoll. Pan McMillan (publishers) are promoting Stoll via NCR poster through their resellers.

Speakers Gifts: Discussion on what gifts to get for AUUG93 speakers. It was decided we should get gifts. Perhaps a drinking vessel with AUUG logo. Budget of up to $25 per item. EF to have discretion in selection of gift. ACTION: EF.

May need to pay Telecom for network link for AUUG93 (around $500). It is covered by the budget. We have lots of sponsors for the network connection. We are looking at providing access to AUUG membership data on AUUG stand.

WF reported we had already taken around $2,000 in AUUG membership fees through the conference.

Students will man AUUG booth. MP will train students to run face saver stand.

3. Matters Arising From Previous Minutes

3.1. Assistant Returning Officer

MOTION: That Greg Bond be appointed to fill the vacant position of Assistant Returning Officer. Moved: GH/MP. CARRIED.

PW to advise Greg of his appointment. ACTION: PW.

3.2. Kirk McKusick Visit

GH has sent out e-mail to Kirk about the issues raised in the last meeting. No response yet. The matter will be discussed at chapter council tomorrow.

3.3. Exhibitors Meeting

Event was very good. Organised by Steve Capper from CA. About 25 people from 20 organisations came. It was suggested it would be good to have a post-mortem for the exhibitors as well.

3.4. NSW Chapter

A petition had been received for the formation of a NSW chapter.

MOTION: That the proposal to form a chapter for NSW be accepted. Moved: PW/CM. CARRIED.

During discussion it was noted that the NSW chapter did not conflict with SWIGS, which remained an unfunded chapter (as allowed in the chapter rules and policy).

4. Treasurers Report

We are over the worst of the cash flow problems. We had good conference pre-registrations and membership income so it was not as great a problem as anticipated.

5. AUUGN

Back cover of AUUGN is sold for the next 7 issues. We also have a full page ad in AUUGN. But we need more contacts for advertising. ACTION: ALL.

There was discussion about a monthly newsletter to augment AUUGN. Could be more timely and focussed on chapter issues. To be discussed at chapter council.

The cover of AUUGN was discussed. It was suggested that perhaps the AUUG94 logo could be used somehow. EF will look at getting a B&W copy of the AUUG94 logo. ACTION: EF.

Should we have themes for AUUGN issues? Could have more emphasis on departments as well.

Adrian Booth has requested permission to take on the role of AUUG Historian. He has done an e-mail interview with Greg Rose for AUUGN. It was noted that a Historian should probably also be the holder of back issues of documents as well (i.e. a librarian).

MOTION: That Adrian Booth be appointed AUUG Historian and that he write a summary of the responsibilities of the position. Moved: CS/GH. CARRIED.

6. BSD T-Shirts

Adrian Booth is coordinating bulk purchase of BSD T-shirts on behalf of AUUG. Need to consider the tax issues.

7. CMGA

CMGA (Computer Measurement Group of Aust.) have been mainframe oriented but now moving to UNIX. Wants closer contact with AUUG. They have a particular interest in capacity planning, which is considered a weak area in UNIX. It was suggested that contact at the chapter level was appropriate.

PM will write to CMGA advising chapter contacts. ACTION: PM.

8. Membership Drive

How do we use AUUG93 to advantage? Put AUUG Info sheet and membership forms into AUUG93 show bags for exhibition attendees.

9. Network Access

Network (e-mail, news) access for AUUG members was discussed. Should we provide such access? There are a number of options depending on location of members. connect.com.au, ACS facility (TBA), chapter based facilities. It needs discussion with chapters.

MOTION: That the management committee encourages proposals from chapters for network access for their members. Moved: CM/GH. CARRIED.

10. Australian Articles

MP has talked to Jeremy Horey at Australian. Articles will be submitted electronically. One article a week of around 700-1000 words. It is a mass media audience. Perhaps talks from the AUUG94 keynote speakers can be massaged into articles. Submissions needed from management committee. Chapter people should also be involved. All suggestions and submissions to MP. ACTION: ALL.

11. Woodslane Agreement

Catalog sent out in AUUGN. Woodslane are O'Reilly books distributors. Also sending books for review.

12. Other Business

12.1. Telecom Yellow Pages Entry

We have received a letter from NSW Consumer Affairs stating that our entry in the Telecom Yellow Pages for Sydney uses that name "Aust. UNIX-systems Users Group" which is not a registered trading name. We must register the name, change it or get fined. PW to get name changed in Yellow Pages to "AUUG Inc.". ACTION: PW.

13. Next Meetings

The next meeting will be on Fri 29th October 1993 at Softway. The following meeting will be on Fri 10th December 1993 at Softway.

Peter Wishart
AUUG Inc - Secretary

Calendar of Events †

1993

Aug 17-20 INET '93, San Francisco, CA

23-27 INTEROP, San Francisco, CA

Sept 9 UKUUG LISA Conference, London

20-23 * Microkernels II-SEDMS IV
San Diego, CA

22-24 GUUG, Wiesbaden, FRG

26 - ACM OOPSLA, Washington, DC
1

27-30 AUUG, Sydney, Australia

30 - 1 GURU Open Systems Conference,
Clujnapoca, Rumania

Oct 4- 6 * UNIX Security Symposium IV,
Santa Clara, CA

18-22 IEEE 1003, Bethesda, MD

25-29 INTEROP '93 Europe, Paris, France

26-28 UniForum's COSE Developer's Conf.
San Jose, CA

Nov 1- 5 * LISA VII, Monterey, CA

3 -5 * NOSSDAV Workshop, Lancaster, UK

29 -3 FedUNIX, Washington, DC

Dec 4-10 DECUS, San Francisco, CA

7-9 Sun User Group, San Jose, CA

8-10 JUS UNIX Fair, Japan

1994

Jan 10-14 IEEE 1003, Irvine, CA

17-21 * USENIX, San Francisco, CA

Mar 23-25 UniForum, San Francisco, CA

Apr 11-14 * C++, Cambridge, MA

25-28 * UNIX Applications Development
Toronto, Canada

Apr TBA * SANS III, Washington, D.C. area

May 2- 6 Networld+INTEROP 94, Las Vegas, NV

7-13 DECUS, New Orleans, LA

Jun 6-10 * USENIX, Boston, MA

" Networld+INTEROP 94, Berlin

Sept 12-14 Networld+INTEROP 94, Atlanta, GA

21-23 UNIX Expo, New York , NY

Oct 23-27 ACM OOPSLA, Portland, OR

Nov 12-18 DECUS, Anaheim, CA

1995

Jan 16-20 * USENIX, New Orleans, LA

Feb 21-23 UniForum, Dallas, TX

May 13-19 DECUS, Atlanta, GA

Jun 19-23 * USENIX, San Francisco, CA

Nov 2- 8 DECUS, San Francisco, CA

1996

Jan 22-26 * USENIX, San Diego, CA

May 18-24 DECUS, Orlando, FL

Nov 16-22 DECUS, Anaheim, CA

This is a combined calendar of planned conferences, symposia, and standards meetings related to the UNIX operating system. If you have a UNIX-related event that you wish to publicize, please contact <login@usenix.org>. Please provide your information in the same format as above.

* = events sponsored by the USENIX Association.

ACM: Association for Computing Machinery
AUUG: Australian UNIX Users Group
DECUS: Digital Equipment Computer Users Society
FedUNIX: Council of Advanced Computing Systems
Technologists in Government

FIRST: Forum of Incidence Response & Security Team
GURU: Roumanian UNIX User Group
GUUG: German UNIX Users Group
IEEE: Institute of Electrical and Electronics Engineers

IETF: Internet Engineering Task Force
INET: Internet Society
JUS: Japan UNIX Society
LISA: USENIX Systems Administration Conference

NOSSDAV: Network and Operating System Support for
Digital Audio and Video
OOPSLA: Object-oriented Programming Systems,
Languages, and Applications
SAGE: System Administrators' Guild

SANS: System Administration, Networking & Security
SEDMS: Symposium on Experiences with Distributed
and Multiprocessor Systems
UKUUG: United Kingdom UNIX Systems Users Group
UniForum: International Association of UNIX and
Open Systems Professionals

AUUG Membership Categories

Once again a reminder for all "members" of AUUG to check that you are, in fact, a member, and that you still will be for the next two months.

There are 4 membership types, plus a newsletter subscription, any of which might be just right for you.

The membership categories are:

Institutional Member
Ordinary Member
Student Member
Honorary Life Member

Institutional memberships are primarily intended for university departments, companies, etc. This is a voting membership (one vote), which receives two copies of the newsletter. Institutional members can also delegate 2 representatives to attend AUUG meetings at members rates. AUUG is also keeping track of the licence status of institutional members. If, at some future date, we are able to offer a software tape distribution service, this would be available only to institutional members, whose relevant licences can be verified.

If your institution is not an institutional member, isn't it about time it became one?

Ordinary memberships are for individuals. This is also a voting membership (one vote), which receives a single copy of the newsletter. A primary difference from Institutional Membership is that the benefits of Ordinary Membership apply to the named member only. That is, only the member can obtain discounts an attendance at AUUG meetings, etc. Sending a representative isn't permitted.

Are **you** an AUUG member?

Student Memberships are for full time students at recognised academic institutions. This is a non voting membership which receives a single copy of the newsletter. Otherwise the benefits are as for Ordinary Members.

Honorary Life Membership is not a membership you can apply for, you must be elected to it. What's more, you must have been a member for at least 5 years before being elected.

It's also possible to subscribe to the newsletter without being an AUUG member. This saves you nothing financially, that is, the subscription price is greater than the membership dues. However, it might be appropriate for libraries, etc, which simply want copies of AUUGN to help fill their shelves, and have no actual interest in the contents, or the association.

Subscriptions are also available to members who have a need for more copies of AUUGN than their membership provides.

To find out your membership type, examine your membership card or the mailing label of this AUUGN. Both of these contain information about your current membership status. The first letter is your membership type code, M for regular members, S for students, and I for institutions, or R for newsletter subscription. Membership falls due in January or July, as appropriate. You will be invoiced prior to the expiry of your membership.
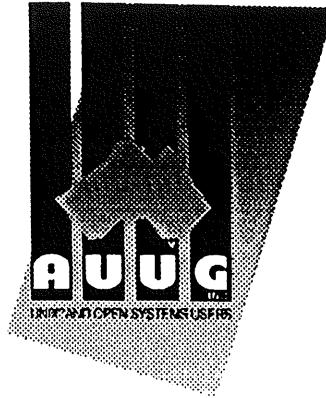
Check that your membership isn't about to expire and always keep your address up-to-date. Ask your colleagues if they received this issue of AUUGN, tell them that if not, it probably means that their membership has lapsed, or perhaps, they were never a member at all! Feel free to copy the membership forms, give one to everyone that you know.

If you want to join AUUG, or renew your membership, you will find forms in this issue of AUUGN. Send the appropriate form (with remittance) to the address indicated on it, and your membership will (re-)commence.

As a service to members, AUUG has arranged to accept payments via credit card. You can use your Bankcard (within Australia only), or your Visa or Mastercard by simply completing the authorisation on the application form.

MEMBERSHIP APPLICATION
INDIVIDUAL

To apply for AUUG membership, complete this form and return it with payment in Australian Dollars to:

REPLY PAID 66, AUUG MEMBERSHIP SECRETARY,
P.O. BOX 366, KENSINGTON, NSW 2033, AUSTRALIA
Tel: +61 2 361-5994 Fax: +61 2 332-4066

Tick this box if you wish your name withheld from mailing lists made available to vendors. ☐

NOTE: Please do not send purchase orders - perhaps your purchasing department will consider this form to be an invoice. Foreign applicants please send a bank draft drawn on an Australian bank, and remember to select either surface or air mail.

INDIVIDUAL OR STUDENT MEMBERSHIP:

I, _____ do hereby apply for:

Renewal/New membership of AUUG	☐ $ 90.00
Renewal/New Student membership	☐ $ 25.00 (please complete certification portion)
International surface mail	☐ $ 20.00
International air mail	☐ $ 60.00
UniForum affiliate membership	☐ $ 20.00

TOTAL REMITTED: AUD$_____ (Cheque, or money order, or credit card)

I agree that this membership will be subject to the rules and by-laws of AUUG as in force from time to time, and that this membership will run from time of joining/renewal until the end of the calendar or financial year.

_____
Signature

_____
Date

LOCAL CHAPTER DESIGNATE:

You can participate in the activities of a local AUUG Chapter. Part of your fee will be given to the chapter to support those activities. By default a regional chapter will be selected for you. If you would rather nominate a chapter, please specify here _____
(indicate NONE for no chapter).

TO BETTER SERVE YOU, PLEASE PRINT YOUR CONTACT INFORMATION:

Name/Contact: _____

Position/Title: _____

Company: _____

Address: _____

_____ Postcode _____

Tel: BH _____ AH _____

Fax: BH _____ AH _____

email address: _____

Over for Institutional Membership

STUDENT MEMBER CERTIFICATION: *(to be completed by a member of the academic staff)*

I, _____ certify that
(administrator)

_____ is a full time student at
(name)

_____ and is expected to
(institution)

graduate approximately _____.
(date)

_____
Signature

_____   _____
Title   *Date*

Please charge $_____ to my

☐ Bankcard,   ☐ Visa,   ☐ Mastercard

Account number: _____

Expiry date: _____

Name on card: _____

Signature: _____

AUUG Secretariat Use

Chq: bank_____ bsb _____

a/c _____ # _____

Date: _____ $ _____

Initial: _____
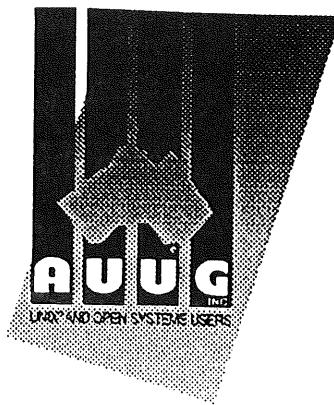
Date processed: _____

Membership # _____

AUUG Inc. as a user group, exists to provide UNIX® and open systems users with relevant and practical information, services, and education through cooperation among users.

MEMBERSHIP APPLICATION
INSTITUTIONAL

To apply for AUUG membership, complete this form and return it with payment in Australian Dollars to:

REPLY PAID 66, AUUG MEMBERSHIP SECRETARY,
P.O. BOX 366, KENSINGTON, NSW 2033, AUSTRALIA
Tel: +61 2 361-5994   Fax: +61 2 332-4066

Tick this box if you wish your name withheld from mailing lists made available to vendors. ☐

NOTE: Please do not send purchase orders - perhaps your purchasing department will consider this form to be an invoice. Foreign applicants please send a bank draft drawn on an Australian bank, and remember to select either surface or air mail.

We, _____
(Company Name)

do hereby apply for:

Renewal/New* Inst. membership of AUUG   ☐ $350.00
International surface mail   ☐ $ 40.00
International air mail   ☐ $120.00

TOTAL REMITTED   AUD$_____

(Cheque, money order, or credit card)

I/We agree that this membership will be subject to the rules and by-laws of AUUG as in force from time to time, and that this membership will run from time of joining/renewal until the end of the calendar or financial year.

I/We understand that I/we will receive two copies of the AUUG newsletter, and may send two representatives to AUUG sponsored events at member rates, though I/we will have only one vote in AUUG elections, and other ballots as required.

Signed_____Date _____

Title _____

INSTITUTIONAL MEMBER DETAILS:
To be completed by institutional members only.

Following are our specified contacts. The primary contact holds the full member voting rights. The two designated reps will also be given membership rates to AUUG activities including chapter activities. By default a regional chapter will be selected for you. If you would rather nominate a chapter, please specify in space provided (indicate NONE for no chapter).*(Please print clearly or type)*

Primary Contact_____

Position/Title _____

Address _____

_____Postcode_____ .

Bus. Tel: _____ Bus. Fax:_____

e-mail address _____

Local Chapter Pref. _____

1st Rep._____

Position/Title _____

Address _____

_____

Bus. Tel: _____ Bus. Fax:_____

e-mail Address _____

Local Chapter Pref. _____

2nd Rep._____

Position/Title _____

Address _____

_____

Bus. Tel: _____ Bus. Fax:_____

e-mail address _____

Local Chapter Pref. _____

Please charge $_____ to my
☐ Bankcard,   ☐ Visa,   ☐ Mastercard

Account number:_____

Expiry date:_____

Name on card:_____

Signature:_____

AUUG Secretariat Use

Chq: bank_____ bsb _____
    a/c _____ # _____
Date: _____ $ _____
Initial: _____
Date processed: _____
Membership #_____

AUUG Inc. as a user group, exists to provide UNIX® and open systems users with relevant and practical information, services, and education through cooperation among users.

AUUG Incorporated
Application for Newsletter Subscription
AUUG Inc.

Non members who wish to apply for a subscription to the Australian UNIX systems User Group Newsletter, or members who desire additional subscriptions, should complete this form and return it to:

AUUG Membership Secretary
P O Box 366
Kensington NSW 2033
Australia

• Please don't send purchase orders — perhaps your purchasing department will consider this form to be an invoice.

• Foreign applicants please send a bank draft drawn on an Australian bank, or credit card authorisation, and remember to select either surface or air mail.

• Use multiple copies of this form if copies of AUUGN are to be dispatched to differing addresses.

This form is valid only until 31st May, 1994

Please *enter / renew* my subscription for the Australian UNIX systems User Group Newsletter, as follows:

Name: .... Phone: .... (bh)

Address: .... (ah)

....

.... Net Address: ....

....

.... *Write "Unchanged" if address has*

not altered and this is a renewal.

For each copy requested, I enclose:

☐ Subscription to AUUGN $ 90.00

☐ International Surface Mail $ 20.00

☐ International Air Mail $ 60.00

Copies requested (to above address)   _____

Total remitted   **AUD$_____**

(cheque, money order, credit card)

☐ Tick this box if you wish your name & address withheld from mailing lists made available to vendors.

Please charge $_____ to my ☐ Bankcard ☐ Visa ☐ Mastercard.

Account number: __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ . Expiry date: __/__ .

Name on card: _____ Signed: _____

Office use only:

Chq: bank _____ *bsb* _____ - _____ *a/c* _____ # _____

Date: __/__/__ *$*   *CC type* ___ *V#* _____

Who: _____

                                             Subscr# _____

AUUG
Notification of Change of Address
AUUG Inc.

If you have changed your mailing address, please complete this form, and return it to:

AUUG Membership Secretary   Fax: (02) 332 4066
P O Box 366
Kensington NSW 2033
Australia

Please allow at least 4 weeks for the change of address to take effect.

Old address (or attach a mailing label)

Name: ....   Phone: .... (bh)

Address: .... (ah)

....

....   Net Address: ....

....

....

New address (leave unaltered details blank)

Name: ....   Phone: .... (bh)

Address: .... (ah)

....

....   Net Address: ....

....

....

Office use only:

Date: ___ / ___ / ___

Who: _____   *Memb#* _____