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EurOpen *E-mail Directory*

EurOpen – The European Forum for Open Systems – has published the second edition of the European R&D E-mail Directory.

Edited by Anke Goos and Daniel Karrenberg this large perfect bound volume of around 200 pages serves as a reference of all organisations reachable by EARN and EUnet, the two major electronic mail networks serving the research and development community.

The main sections of the directory cover:

- Networks and Contacts
- A User Introduction to Electronic Mail
  * *Message Format*
  * *Address Syntax*
  * *Networks Peculiarities*
- Bibliography
- Main Index
  * *Organisations listed by address arranged by country and location*
- Keywords Index of Organisations

The European R&D E-mail Directory is invaluable to anyone connected to the network. It costs 30 ECU's (£20) including postage and packing and is available from:

EurOpen
Owles Hall
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Telephone +44 763 73039
Facsimile +44 763 73255
E-mail europen@EU.net

Please send me one copy of the second Edition European R&D E-mail Directory.

Name *(in block capitals)*

Address

Telephone

E-mail address

Please see over for payment details

Payments

EurOpen is a European Federation of National Groups and as such prefers to use the European Currency ECU's for payments. To pay note the three methods of payment.

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Card Account Number

Card date of expiry

Date

Signed

Editorial

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Pierre Scheuer

Pierre has been appointed as Executive Director of EurOpen, he will be responsible for the budgeting, financial and general administration of EurOpen at director level, reporting through the Executive Committee to the Governing Board.

Pierre is also looking at ways in which EurOpen can provide a better service to its members.

Pierre's appointment is a welcome development as all of the executive and governing board are voluntary and can only give as much time as their jobs will allow.

By working full time at a high level Pierre should be able to generate and maintain the momentum necessary for improving existing EurOpen services and starting new ones.

Helen Gibbons fills you in on page 20.

Welcome aboard Pierre.

Newsletter Reader Survey

You will find in the envelope that contained this newsletter a survey form - please *don't* throw it away.

Why a survey ?

I believe that this newsletter is an important part of EurOpen membership, but I would do, I am the editor. What is more important, is what do **you** think about it. Pierre Scheuer is determined to find out so that we can provide you with what you want.

So your views are needed, fill it in now, if you delay you may forget.

An envelope is provided for you to return the survey.

Note - if you reply you may win yourself a free dinner!

Working Groups

Jean-Michel Cornu has been busy and the first real fruits of his work were seen at the Budapest conference in September with the formal creation of 5 working groups.

There is now a Working Group contact in every National Group, this is who you should speak to on WG matters at a national level.

Jean-Michel reports on page 48, and lists Working Group and National Group contact points.

Remember, the first fruits are now visible, but won't ripen without the active involvement from people like you.

Standards

Stephen Walli is the EurOpen Institutional Representative to IEEE POSIX. He writes on page 46.

He is there to represent you, and to ensure that European needs are not forgotten in what is an industry dominated from the USA.

Do read his column, and do help him by telling him your points of view.

Conferences

The Autumn '91 Conference took place in Budapest, Hungary, in September.

Weren't you there ?

Shame on you, Aarron Gull apparently defies death to bring you a report of what you missed. Read if on page 12.

The abstracts of the papers presented are printed starting page 71.

List of Contact Points

There is a new quick reference guide at the back if this newsletter. It is there to provide you with some help in contacting people within EurOpen and related organisations.

This will be a regular feature. If you can not find an address there that you need, please let me know.

DTP Product Review

Due to to production problems, this section has been held over to the next issue.

Advertising space is available and may be booked in the same issue.

All those interested in participating should contact me by 2 January 1992, final copy will be expected by 13 January.

An International Hotel Reservations System Using Loosely Coupled UNIX Systems

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Abstract

This paper describes the design and implementation of the latest version of an international hotel reservations system.

The system allows reservations staff in offices around the world to make reservations as though they were permanently on-line to a central information database, with up-to-date information. In fact, each office runs independently, and the International Packet Switching Service is used to communicate with other locations on a batched up basis.

After a brief discussion of the business needs and the hardware environment, we will look at the resulting data and transactional requirements. This leads to a discussion of the in-house infrastructure, written in C++ under UNIX. Finally, an analysis of performance will be given.

Introduction

This paper describes the implementation of a new computer system for a large independent Hotel Representation company. Travel Agents or members of the public can call its offices around the world to make immediately confirmed hotel reservations at almost 10,000 properties. In addition, the company operates a sophisticated prepayment scheme which allows payment in local currency by the client, and offers immediate commission payment to the travel agent.

As well as handling telephone bookings, the system is connected to most of the world's major electronic booking systems, including all of the world's largest airline reservations systems, Prestel in the UK, and similar systems elsewhere. Indeed, anyone who books a hotel through a travel agent with airline connections may well have been a customer without knowing it.

Before 1983, the company used the GEISCO timesharing service to handle its DP requirements. Information about hotels was disseminated to offices on a weekly basis in the form of a manually produced microfiche. Staff would use the fiche to check hotel information, availability etc, and fill in manual forms which were batched, and processed overnight by GEISCO. Confirmations for hotels were printed in the office nearest the hotel, and the head office in London obtained daily and monthly accounting and management reports.

In 1983, development began of a fully computerised system. The first stage was to automate the microfiche production and the management and accounting functions. Then, a reservations program was written to allow the automation of the hotel selection and booking functions. The entire system was written in C on PDP11s running UNIX System III and later System V.0

Offices around the world ran independently of each others, but once a day each office would perform a file transfer to the London head office. At that time, London would receive all bookings made, and would send all updates to hotel information. This of course meant that bookings were made on the basis of information which was up to 2 days out of date, and it could be even longer before the hotel knew of the booking. Nevertheless, it was a considerable improvement over the weekly fiche, and compared favourably with the alternatives available from competitors.

During the course of the next few years, the market became much more sophisticated. Major airlines started offering hotel reservations services to their on-line agents, and there was pressure to improve the frequency of updates and the amount of data available. The existing system was modified, adapted, and hard-coded, but it became clear that it was only a matter of time before it ceased to be viable, and in late 1988 the decision was made to re-implement it. The result of that reimplementation is the subject of the rest of this paper.

The Business Needs for which the System was Designed

A small (3 person) design team, headed by the author, spent 3 months devising a strategy for the new system. The new system had to remain broadly upward compatible with the existing system described above. In addition, it needed to satisfy a number of other requirements.

- The system must be able to run essentially stand-alone on cheap hardware in isolated or badly served areas.

One of the features which distinguishes the company from its competitors is its ability to offer its services in small markets and in developing countries. This put a great strain on the design. It must be possible to obtain the necessary equipment in places like Bombay, Sao Paulo, and indeed Eastern Europe while remaining cost effective in small markets like New Zealand. This requirement alone ruled out any possibility of a mainframe and leased lines.

- No pre-set limit on the amount of information held about a hotel.

The old system had fixed length limits on the amount and format of the information held about hotels. Only full-price rooms were available, and no more than six categories of accommodation could be offered. These limits originated from what could be put on a microfiche frame, and were hopelessly out of date. We felt that simply to increase those limits to a higher number was asking for trouble in the future, and instead we decided to allow arbitrary amounts of all types of data per hotel. This decision probably had a greater effect on the design of the user interface than any other,

since it meant that The application had to support displays of potentially huge lists in a sensible way.

- Operational flexibility in controlling the frequency of update to remote offices.

Ideally, any change of rates, availability or whatever notified to the company should take immediate effect in all offices around the world. However, in practice it is still not necessary to be quite that efficient, especially when the destination office is small. It it vital to be able to control costs by batching up several changes and sending them all at once. On the other hand, the traffic in some areas may justify a dedicated line, in which case data should be transferred immediately.

- Offices should not be dependent on working comms to function.

This requirement relates to the earlier one of being able to function in difficult locations. The company needs to continue to be able to take bookings even if all communications failed for an extended period. Also, each location needs to be able to restore itself to full working order after a hardware failure without other systems being involved.

- Except in major offices, no computer literate operations staff should be required.

This requirement had a significant effect on a number of areas. The old system had reached the point at which it was often necessary to have operators in London or Omaha connect to other office machines in order to solve local problems. Often, the integrity of the system itself was at risk. Our new design was required to be able to function reliably, even after hardware problems, with minimal danger of unskilled operators causing irremediable damage.

Other Factors

In addition to the above, there were a number of other important factors we wanted to take into account. Wherever possible, we wanted to be able to use existing hardware, and we certainly wanted to preserve our hard-won expertise in running UNIX based systems. At the time, almost all of the offices were running Motorola Delta series systems and UNIX System V.2 or V.3. However, the largest locations - London and Omaha Nebraska had recently moved to Sequent Symmetry running Dynix. The Sequents are really BSD machines, so it was important that our software should run properly under BSD and System V kernels. Furthermore, we were keen to assure ourselves that our eventual implementation would not seriously restrict our choice of UNIX hardware, which needed to be cost effective in locations ranging from the one-person Zurich office, to the 200 person Omaha office.

From a software development point of view, we were keen to ensure that our approach was easy for new recruits to learn, so that they could be productive quickly. One major problem with the existing system was that it was almost impossible to obtain a reasonable idea of how it worked without spending months learning by osmosis.

In particular, we had become increasingly disillusioned with C as a programming language for our purposes. The limitations of C as an application development langage are well known, and need not be addressed here. Suffice it to say that we felt that it was appropriate, at the very least, to examine alternatives to the continued use of C as a sole development language.

Third Party Package Evaluation, and its Conclusions

By this time, our outline specification, in the form of a user document, had been discussed and approved by the company, and we had a few more months to finalise our software development strategy. We decided to approach various vendors of database and/or communications software to see whether we could use their products effectively.

It became clear quickly that one particular area was going to cause major problems. For every hotel, and every valid room/rate combination in that hotel, it is necessary to store the availability of the accommodation for every date from now, typically up to a year in the future. Availability is usually either open (yes) or closed (no), but sometimes other values are required - there are about 10 possibilities in all. In addition it is necessary to distinguish dates which are known to be open from dates for which no information is yet available.

To store that information in a relational table would therefore require typically records of length 10 + bytes (4 for the hotel, 2 for the room, 2 for the date and 1 for the availability itself) allowing 1 overhead. The number of records would be 365 for a year * 10 roomtypes per hotel * 10,000 hotels. Thus, the storage requirement for this table alone would be at least 365*10*10000*10 or about 400 megabytes. Allowing for indexes, and other bookkeeping and we were looking at about 1GB for this table alone. Furthermore, that table is the most volatile in the system, and would require frequent backing-up.

Against that number, we knew that if we stored the availability in a packed binary record, using sensible compression techniques, the same information per room would occupy about 50 bytes for a year, resulting in a total table size of 50*10000*10 or 5MB - say 20MB including indexes etc. Furthermore, our knowledge of the requirements of the application made it certain that availability would need to be accessed only within the context of a preselected hotel record. Other parts of the system would have been subject to similar overheads although not quite as dramatically.

When we broached this problem with the vendors, we were offered the chance of storing the information as a BLOB of binary data, and packing/unpacking it ourselves. This seemed like a viable solution, but it would have meant losing the ability to write our code in their database access languages, SQL or whatever, and would force us to revert to C for what was likely to be a large part of the code.

Another problem was that of the distributed nature of our application. It was already clear that none of the database vendors could offer us a means of allowing distributed transactions where most of the systems were not permanently on-line or available in real-time. Fortunately, as described later, we had identified a way in which individual transactions could be safely processed on one machine and transmitted subsequently to others without compromising the integrity of the system as a whole. This would allow us to use a standalone database package on each machine, with well defined hooks for distributing needed data to other machines. We hoped to find a system which would integrate with our chosen database to allow reliable message passing between systems which were not permanently on-line to each other.

Despite going as far as advertising our requirements, we were unable to find what we wanted in that area. There were a number of packages available which offered what amounted to sophisticated mail and which could perhaps have been kludged into shape. Indeed, we purchased evaluation copies in one case to see what we could do. However, none of the available alternatives offered us much over what we felt we could do ourselves, and all were rather pricy.

It had become clear that what we really wanted wasn't available from anybody yet, and the cost of licenses for what we could get would be hard to justify in terms of reduced development time or better running. In the meantime, we had become very interested in the possibility that C++, now at last becoming widely available, might allow us to escape the worst problems of C, while maintaining the degree of control we required. After much discussion it was decided to adopt C++ as a base and to develop in-house an infrastructure on top of which the application could be built. Accordingly, the project team split for a while into two groups. The author headed an infrastructure team, while a colleague headed an application design team. Communications between the two teams was maintained by all members of both teams sharing an open-plan office.

The Methodology

At the same time as we decided to adopt C++ and our own infrastructure, we had finalised the details of our methodology for the application development. Each member of the team would be involved in several stages of the process - nobody would be programming exclusively, but everybody would do some coding. Following a successful in-house course on structured analysis and design, we began the process of turning our requirements into entity-relationship diagrams for the data, and higher-level dataflow diagrams for the processing. The eventual result of these was a set of tables (about 200 in all) and a set of program module outline specifications.

Meanwhile, the infrastructure development had resulted in a series of class libraries, and proforma examples of how to use them to implement each of the different categories of program module which the applications team had identified. In many cases, it turned out that the entire module could be specified as a simple parametrized form, which could then be coded by rote, resulting in a lot of boring but very productive work. In other cases, the module coding was more complicated, but was seldom more than a day or so's work.

It would be nice to claim that this hybrid approach had been fully worked out in advance, but it was not the case. During the year which the design process took, there was a constant to and fro between the application and infrastructure teams trying to delineate the exact boundaries. Little was specified in advance, and there were a few awkward problems when important areas were in danger of slipping through the gaps.

Nevertheless, the combination of bottom-up infrastructure and top-down design worked well in practice, and probably resulted in a better eventual interface boundary than could have been planned in advance.

The Way Data is Distributed

The data tables which resulted from our analysis fall into several categories, depending on how they are distributed among the various machines worldwide. We have:

- 'Static' global tables: e.g. lists of currencies, countries etc
- Hotel related tables
- Reservation related tables
- Local administration tables (passwords)
- Internal control tables (routing, machine PSS addresses etc)
- Temporary tables (pending reports)

Copies of the static global tables are held on each machine. These tables are updated only rarely, and updates almost always consist of additions rather than changes.

Copies of the hotel related tables are kept on each machine too. Every record in these tables relates to a specific single hotel, and only those machines in offices which have booking agreements with that hotel keep that information.

The reservation related tables on each machine similarly only contain the reservations relevant to that office. However, the London office has a master machine which contains a copy of every reservation made, and uses this for management reporting etc.

Local administration tables are used by each office to set up their configuration. These tables are not visible from elsewhere.

Internal control tables are used by the parts of the infrastructure responsible for sending data to/from machines. They are like static global tables in that they are held everywhere, but they require special care when updating.

Finally, each machine will have temporary tables, containing, for example lists of telex messages which have been generated but not yet sent.

Transactions

All updates to the tables above are defined in terms of transactions.

One of the most important factors about our application was that it did not require multi-system access in order to guarantee the correctness of transactions. Since this is a key feature of the system, it is worth describing in more detail.

In the general case, a distributed database may require access to some or all of the systems over which it is distributed before a transaction can be checked for validity and allowed. This requirement places a heavy burden on the level of connectivity between systems, and if it applied to us would have made it impossible to operate quasi-independent systems.

Fortunately, we were able to find a way of ensuring that a transaction would be valid without access to more than one machine, by restricting the possible transactions. The idea we

adopted was that of ownership. Almost all transactions on the system fall into one of two categories - hotel update or reservation. By designating a single system as the 'owner' of each hotel, or reservation, we insist that all updates to that entity must be processed first on the owning machine, and only then can subsequently be sent to any other machines which need to know about the transaction.

Of course, some transactions cannot be treated in the above way. Changes to certain global tables, changes of ownership, or transactions whose legitimate originator does not own the data etc, need to be handled more carefully. However, these exceptional transactions are rare, and seldom urgent, and a clumsy but workable solution was found in the form of a several stage process, which mimics two-phase commit.

One factor which simplified a lot of the analysis of transactions was the decision to handle consistency problems by using a singly-threaded transaction process. One of the consequences of not buying into a proprietary DBMS was that we lost those systems' sophisticated locking/rollback mechanisms. Instead, we created several server processes, each handling certain category of transaction which were always mutually compatible, and each processing one transaction at a time.

As part of its processing cycle, a transaction server may decide that one or more remote machines must receive transactions (either a direct copy of the current one or one or more different ones). The transaction server will generate these remote transactions, and send them via the infrastructure to the destination machine. The comms-in-out feature of the infrastructure acknowledges transactions as soon as they are queued, and guarantees that all transactions sent between any given pair of machines will be processed in the same order as they were generated. Thus, two hotel updates generated on a single machine for the same hotel, in which the second partially contradicts the first, will be transmitted in the correct order to all interested other machines.

The exact time taken for those transactions to reach each other machine depends on the frequency of communication between those machines, and on the load at the destination.

Audit and Backup

In any system it is important to have a properly thought-out strategy for backup of data, and for the provision of an audit record which can be used to investigate any mysterious events. Our single-threaded transaction server on each machine made it easy to incorporate a simple transaction logging feature. Every transaction is logged to a separate device (in some cases to optical disk). The transaction log also notes the times and media on which full backups are done. A special option to the transaction processor allows a transaction log to roll forward from the last available backup.

The same strategy is used to log data as it is sent from or received by the machine by the comms-in-out system described below. Care is taken to ensure that when a transaction is passed from one part to another that agreement exists about what has happened.

The most important consequence of this way of working is that an office which breaks down does not need its comms to be up in order to restore its state. This contrasts with the old system, where a lot of information could only be restored from London if a local office had problems.

The Infrastructure

We are now ready to describe the infrastructure from the point of view of what it offers the programmer. Unfortunately, space does not permit a full discussion of the internals.

The infrastructure can be divided into several distinct areas.

- The uimake program
- The types system and tycpp
- The file access method
- The message protocol
- The transaction processor
- Comms in and out
- Windows

The Uimake Program

The first problem we faced when moving to C++ was that C++ imposes a much more rigid requirement than C on such things as declaring functions before use and including class definitions in the right order. It became clear that the traditional include file and makefile approach was going to cause problems, and we therefore wrote a program called uimake. uimake brings to C++ something similar to the Pascal UNIT concept. Every module contains a program file and a header file, together with a unit file ending in .u. The unit file specifies which other modules are required by the current one, and whether the current module is a main program. Once modules are set up, a call of uimake modulename will make the module, including all necessary headers in the right order, and if appropriate linking the objects to form an executable. While not perfect, uimake has proved invaluable in keeping track of the interrelationships between the different code elements.

Another benefit of uimake is that it guarantees that modules are loaded into a final executable in a consistent order vis-a-vis their relative dependencies. This allows safely the automatic calling of static constructors in the correct order.

The Types System and tycpp

One of the major objectives of the infrastructure was to allow the storage of complex data structures as records in tables, and to allow general purpose access programs to understand those structures and display them. Unfortunately, C++ provides no way of interrogating the compiler to find out the internal structure of objects. We got round this problem by introducing a class called type, which describes a type in an accessible way. In order to generate the correct type information for the structures we were using, we wrote a simple preprocessor, tycpp, which accepts definitions of a large subset of C++ structures, and generates a module which defines the structure and a type describing it.

We also defined a class object, which consists of an arbitrary data value and a type, and wrote routines to convert objects into binary and ascii representations of their values.

The File Access Method

Built on top of the types system, we introduced a generic class called table. A table(type) inherits a value of that type together with traditional imperative style functions for updating and fetching the value from an underlying table of that value. By default, tables are held entirely in memory, but a derived class reltable

allows them to be associated with disk files. The tycpp facility was upgraded to allow easy creation and definition of these tables. At this point it may help to look at Program 1.

```
#include "example.x"
  // This file is created by uimake with all
needed headers
#definitions
   // This section is interpreted by tycpp
STRUCTURE hotel
int code;
string name 30;
ENDSTRUCTURE
KEYINFO hotel_keys;
KEY 1:
code;
KEY 2:
name;
ENDKEYINFO;
TABLE hotel USING hotel_keys;
#enddefinitions
/* the rest of the file is passed */
/* unchanged to C++ */

declare(reltable,hotel);

main()
{
reltable_create("hotel.dbf",hotel_type,hotel
 _keys);
  /* hotel_type is created automatically */
  /* by tycpp */
  /* This has created an empty table */
myhot.open("hotel.dbf");
  /* myhot is now associated with the */
  /* empty table file */
myhot.code = 23;
myhot.name = "TWENTY THIRD HOTEL"
if (myhot.insert() != TRUE) cerr << "Error
inserting hotel \n";
....
myhot.close();

return(0);
}
```

Figure 1: Example table program

Obviously, the system does not provide a full set of relational-style features, but in practice this was not a problem. The programming side seemed to be well served by an 'old-fashioned' way of getting at the data, and the transaction server handled both concurrency control and distribution in a comprehensible way.

The fundamental benefit of what we did is that we allow fields of a table structure to themselves be tables and so on.

Thus, if the type hotel_tab has a field rate of type table(rate_tab) and h is a table(hotel_tab), h.rate is a fully fledged table, which can be used just as though it were standalone. The way in which such a subtable is stored within its parent record can be easily customised to allow end-user invisible storage optimisation. This is of course how we solved our problem with the storage of availability.

The Message Protocol

One of the most annoying 'features' of UNIX is that it provides many different ways for processes to communicate, but no standardised, efficient, reliable message passing scheme. Shared memory, semaphores, message queues, pipes, streams drivers, and sockets are all contenders, but none of these is universally available. Accordingly, we built a layer in the form of a reliable message class, which allows processes to communicate directly and reliably with each other. The underlying implementation has been coded in several ways.

There are three classes of rmp message: immediate, reply, and mail. All three are ways of sending arbitrarily long data from one process to another. The differences are that immediate messages must be destined for a process on the same machine and are unidirectional, while reply messages allow the receipt of a reply from the destination process. Mail messages may be destined for a process on any other known machine. They are acknowledged by the comms-in-out system described below, and delivery is guaranteed provided that the destination machine knows about the destination process. Undelivered mail mounts up at the destination, and eventually triggers operator intervention. Mail messages also guarantee that they will arrive in order between given source and destination processes.

The message protocol is used extensively in the transaction server. The server waits for a message which may either be a local reply message or a remote mail message. It processes that message, possibly sending other messages as it does so. Finally, if the inbound message was a reply message, the success or failure is reported back. Since it is a serious error for a remote mail message to fail, no reply need be sent back.

As an example of the user interface, a code fragment (Program 2) may be of interest.

```
#include "rmptest.x"
   // as before, this file is created by uimake
main()
{
rmp_out myrmp(rmp_reply);
myrmp.sendto("dev","service1");
  /* names looked up as machine and service */
myrmp.start();
/* at this point myrmp is a c++ ostream,
logically connected to the other side */
myrmp << "This is a request";
myrmp.end();
int i; /* We assume the reply is an integer */
myrmp.reply() >> i;
myrmp.reply().end();
cout << "The reply was " << i << "\n";
return(0);
}
```

Figure 2: rmp example program

Comms-in-out

This feature of the infrastructure allows messages to be sent between processes on different machines, without a permanent connection between those machines. The user interface has

already been described, being the mail option to the message protocol. What actually happens is that each message is sent as a local message with reply to a transaction server for the comms-in-out system. This server puts the message into a local data file of outgoing messages. Under user selectable conditions, all messages destined for any particular system are batched up, converted into a file, and transmitted via any suitable file transfer program.

Received messages are put into an inbound message file, and are forwarded to the ultimate destination program by a forwarding daemon. The system includes logic to allow delivered messages to be purged from the originating system, and copes with the file transfer method not preserving the order of files transferred, or losing the occasional file.

The actual program used to transfer the files is called ftasync. It was written to allow uucp style operation with a protocol which is optimised for X.25 environments where a PAD is involved at one or both ends. Top level acknowledgements are minimised, but total reliability is not assumed, and partially complete transfers can be restarted without loss.

Windows

Finally, it is worth mentioning the windowing software we have written. Although it doesn't directly relate to the distributed application, it is the basis of what the user of the system actually sees.

The software provides text based windows on which forms, including scrolling areas, can be defined, and a fairly nice way of associating a scrolling area with a table. The usual ability to define specific actions on key or field events is provided as well. To date, no attempt has been made to provide a graphical front end for code generation.

Performance

The performance of a complex software system is always hard to judge, except in the sense that it is or is not good enough given the available hardware. What seems clear so far is that we have achieved our basic objective of gaining acceptable performance without sacrificing good structure. The disk space required to store tables compares extremely favourably with other schemes, and in fact on expected volumes the space required will actually be less than in the former system. Also, the CPU load on the system is fairly low, mainly because knowledge of the data has allowed sensibly defined access paths for data to be implemented explicitly.

On the other side of the coin, the performance of the message passing system is not as great as might be hoped, and in particular, the common problems of excessive context switching might come to the fore as the system is extended. Probably the most serious difficulty is that the applications are extremely memory hungry. This is primarily due to the sheer number of screens coded into certain key programs, and the total number of tables. As a result it does not seem reasonable to run the full system on a machine with less than 8MB of memory, which is a problem because the existing Motorola kit has only 4MB and no room for expansion. On the other hand, the application fits happily onto a 386 PC.

Conclusion

Anyone who choses to implement facilities at the level we did must be prepared to defend themselves from a charge of suffering from the NIH (not invented here) syndrome. It is quite likely that before too long, well written products will be available which would have made our own development unnecessary. However, the total cost of the infrastructure development has amounted to less per machine than a basic proprietary database system license would have been. Furthermore, we now have a well-understood basis from which we can develop and enhance the application, without fear of falling foul of the limitations of a proprietary package. If there is any lesson here, it is that extensibility is more important than a fixed set of features, however rich.

As telecommunications costs fall, there may come a time when commercial organisations no longer need to worry about the costs of remaining permanently connected across international distances. Until then, there will always be a desire to reduce connectivity without sacrificing functionality.

In this paper, we have shown how it is possible to distribute a suitable application over multiple locations in a way which allows independent operation of each location, but which still allows the system to function as a coherent whole.

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Conference Report: EurOpen Autumn 1991

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UNIX goes East

Budapest, Hungary

Monday 16th - Friday 20th September

The Mission

I wasn't taking any chances. I knew the danger. Equipped with an antidote for poisoned umbrellas, a trench coat and a pair of shades, I was flying to Budapest, Hungary, on MA164 out of Heathrow. A wad of crisp ten pound notes was in my pocket.

The brief was simple. Using the cover of presenting a Wafer-Scale Integration paper at the EurOpen Autumn Conference in Budapest, I was to arrange a rendezvous with the Turkish Ambassador who would give me an important package to bring back to the UK.

As always, my preparation for the mission had been meticulous; I studied the Berlitz guidebook as if my life depended on it. "Formally the capital of Eastern bloc countries, Hungary gained its independence two years ago. Since then it has changed rapidly. Budapest, once a grim, repressed city, has been transformed into one where carefree lovers stroll hand in hand in the early morning." I wasn't fooled. This wasn't going to be easy. I kept repeating the Hungarian for 'thank you'. I had to be able to blend in.

A short bus ride from Budapest Airport took me to the conference hotel, the Korona. This modern glass building contained so many panes of glass and (two way?) mirrors that it resembled an eight storey goldfish bowl. It was plushly furnished. Exciting, glamorous and sophisticated. These are the only words I could use to describe my on-suite bathroom. I searched it for bugs. Then I searched the indoor swimming pool, the solarium, the fitness room, all four bars and the high quality restaurant. In this business you can't be too careful.

The conference hall was on the other side of the Danube, a short walk from the hotel. The guidebook was right; Budapest is a beautiful city, a good choice for an Autumn conference. The climate is continental, warm enough to drink beer in the parks during the evenings. Sightseeing was easy; the public transport was crowded, but punctual and cheap, as were the trams and metro. Furthermore, the public buildings were spectacularly lit at night. (Obviously an attempt to prevent nocturnal espionage activities.) The Buda Castle district was a fairy tale land.

The cordial atmosphere was only a facade, however. The true danger became apparent soon enough when sunil@cs.city.ac.uk, UKUUG's top operative, staggered into the conference three hours late. It appears that someone spiked the four bottles of wine that he drank the previous night. Now where had that Soviet delegate disappeared to?

Connoisseurs will already appreciate the excellence of Magyar cuisine. The conference lunches were good. Too good. To reduce the number of delegates sleeping in the afternoon sessions I recommend that in future EurOpen cut down on free wine and beer served. The Hungarian restaurants were about a third of the price of English ones, but for those who preferred cooking in the field, Istvan Krepler and the mysterious KTP included traditional recipes in the daily newsletter. Does everyone in Hungary really eat 1.3 Kg of green peppers with every meal?

Things deteriorated fast. On the second day news broke of a major security leak. It was revealed that someone has been passing important documents to the Soviets. Translations of the works of sunil@cs.city.ac.uk have been appearing in the Soviet UNIX press. We intensified security - no-one was to leave the bar without written permission.

The conference dinner, an informal buffet meal, was held in the Summer Palace on the evening of the second day. Afterwards the delegates relaxed with a series of team games. Both the dancing competition and the lottery, open to all those who flew with the Hungarian Airline MALEV, were won by Dennis Ritchie. Those Americans are sharp. The Hungarian general knowledge quiz, however, was won by my team; my mission preparation had not been wasted. I celebrated the win by investigating the colourful night-life. There were numerous late-night clubs, shows and discos. Very enjoyable.

The conference finished on Friday, but I still had a job to do. A telephone call was all it took to arrange the rendezvous with the Turkish Ambassador. We made the exchange outside the Hilton Hotel. He was so impressed by my fluent Turkish that he invited me to the Residency for coffee. After a conducted tour of Budapest, I was chauffeured to my hotel. So much for my cover.

I returned home to Heathrow on a cold and wet Sunday morning. A short taxi ride later the Ambassador's package, a Hungarian Salami and a bottle of wine for a friend, was delivered successfully. Mission accomplished.

The Technical Programme

Seriously though, the technical programme of the conference occupied three days. Over 30 presentations were given, each being limited to around 30 minutes. The sessions were well chaired, few speakers being allowed to exceed their time quota. This ensured both fairness and a punctual finish to each day's events. In total, the technical programme was attended by 261 delegates representing 23 counties. Furthermore, 36 companies demonstrated new and existing products at the conference exhibition.

The themes of the conference were:

- Distributed Applications
- Security
- Standards - Internationalisation
- User Interfaces and design tools
- Object Management

Although papers were presented on each topic, the majority, nine, were related to distributed applications. This gave the conference a distinctive bias.

I think it would be inappropriate for me to give a definitive list of the 'best' presentations. A good speaker, after all, can make any topic sound appealing, while with less adept orators, it helps if one is interested in the subject matter. This makes any selection subjective. However, the presentations that I found most interesting were given by (in alphabetical order - no favouritism here :-):

- Gary Bilkus (UK): An International Hotel Reservation System

Gary presented the design and implementation of an international hotel reservation system. The subject matter was not really applicable to me -- I just thought it was a neat example of a commercial distributed system that had to cope with real data coherence issues, and that it was presented in an intriguing way.

- Dick Bulterman (Netherlands): Multimedia Synchronisation

Dick talked about achieving multimedia synchronisation using UNIX. This was an interesting topic, presented in an excellent way. Dick's smooth delivery, aided by his beautifully colourful slides and unusual choice of examples, made this a thoroughly enjoyable presentation.

- Dag Johansen (Norway): The StormCast Weather System

Dag spoke about StormCast, a real distributed system for weather monitoring and forecasting in Norway. This is probably the only networked system in the world that was designed to be Polar Bear proof!

Dag's presentation style was both humorous and appealing, while he illustrated his talk with stunning photographic 35 mm slides. Very enjoyable.

- Mike Karels (USA): The 4.4 BSD Architecture

Do you want to know what Mike Karels had to say during his Keynote speech on the 4.4 BSD architecture? So do I! The previous night out on the town was so good that I didn't wake up the next morning until my maid came into my room to clean. By that time I had already missed Mike's speech. Hearsay, however, said that the subject matter covered in the talk was stimulating, even if the presentation style was somewhat lacking.

- David Matthews (UK): The ML Functional Programming Language

David talked about a distributed concurrent implementation of ML, a functional programming language. He expressed his belief that it is best to teach university students a functional system as their first programming language. This is an attempt to both teach something that is new to all the students and to try to steer computer science away from the image of BASIC programming as taught in schools.

- Richard Mitchell (UK): Virtual Reality

Presenting the work of his PhD student Mike Griffin, Richard talked about LOKI, a system for supporting virtual reality (Cyberspace) environments under UNIX. I found this talk fascinating from a human-computer interaction viewpoint as electronic music, one of my personal interests, is a sphere of computing where poor interfaces often inhibit creativity.

- Dennis Ritchie (USA): The State of UNIX

Dennis was invited to deliver the Keynote speech that opened the technical programme. His choice of title, "The State of UNIX", was deliberate woolly and allowed him to ramble on about a wide range of historical topics. Dennis's talk itself was not particularly exciting, but he concluded with a surprisingly good sleight-of-hand trick that really did steal the day.

- David Tilbrook (Canada): Software Component Management

David Tilbrook is well-known for his entertaining presentations and he didn't disappoint at Budapest. He stands out in a crowd. Not only does he habitually turn up late for his presentation, but he is one of the few speakers who insists on using handwritten slides.

A typical Tilbrook quote:

"You 'phone up H.P. and say that you want to buy a Snake, and they send you a salesman."

David spoke about his pet topic - software component management - or how to manage massive software systems efficiently. He has been beavering away at this problem for a long time. Every so often he comes up for air and tells everyone how far he has progressed. My only disappointment was that his paper was not ready in time to be included in the proceedings.

- Martien van Steenbergen (Netherlands): Automounting

Martien's presentation, a guide to file system automounting, was one of the few that really taught you something that you wanted to know. He showed how to capture the simplicity, consistency and efficiently that automounting promises.

This was the talk of its day. It was well presented, using clear slides which showed just the right amount of information. In a word - professional.

The technical programme divided into two parallel sessions on the afternoon of the second day: 'Industry Directions' and 'Work in Progress'. In my opinion, this provided good value for money, allowing delegates to select the session that they found most interesting. I attended the latter of the two. In this, delegates were encouraged to present their work without the trouble of having to prepare papers - again an excellent idea.

Open discussion sessions, or BOFS, were held at the end of each days' technical sessions. The intended subjects of these were topics such as standards, the EUnet and performance measurement, but the focus of discussion often wandered. The BOFs, aimed at encouraging audience participation, were remarkably successful, fostering lively and intelligent debate.

The Tutorials

The two days preceding the technical programme were devoted to tutorials. I can't say what these were like - nobody paid for me to go to one :-(.

The Competition

The conference competition, arranged by Alain Williams, was to submit the most amusing exchange (preferably true) between a customer and a service department engineer. The best entries were:

- Third runner up: Dominic Dunlop (UK)

Customer: "When I move my mouse from side to side, the cursor goes up and down."

Engineer: "You're supposed to hold it with the wire pointing away from you."

- Second runner up: Guido Aerts (Belgium)

Customer: "Your support staff have been ignoring me; when I press the HELP key on my keyboard no-one turns up."

- First runner up: Wolf-Dietrich Schmook (Germany)

Customer: "The fault-tolerant computer you supplied doesn't work."

The engineer turns up to find the building holding the computer has been demolished by a truck.

- Winner: Adam Hamilton (UK)

Customer: "I found this core dump lying around. I don't know what caused the crash, or what happened, but I thought you might be interested."

Engineer: "We found this patch lying around. We don't know what it does, but we thought you might like to see if it cures the problem."

The Debriefing

All in all the Hungarian EurOpen conference was the one of the most enjoyable that I've been to. It was well organised and Budapest was an excellent choice of venue. My biggest disappointment was the lack of female speakers. I think that a serious attempt should be made in future to attract the ladies to submit papers.

Finally, many thanks to those people who helped make the conference so enjoyable. In particular, the John von Neumann Society's help with hotels and general navigation around Budapest was invaluable. More importantly, Edinburgh's Adam and Rob, whose uncanny abilities to sniff out the best bars and restaurants in town, were much appreciated.

Report on SUUG

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Trip Report: The Second SUUG conference, Vladimir, USSR

Introduction

The second Soviet UNIX Users' Group (SUUG) Conference was held from 23 September to 27 September 1991 in Vladimir, USSR. Vladimir is a small city (pop. about 300,000) about 300 kilometers northeast of Moscow. The conference was held in the Klyazma Hotel on the outskirts of Vladimir. This provided a comfortable, if somewhat isolated, site for the conference. The conference was attended by nearly 150 Soviet delegates and nine invited foreign guests.

What is the SUUG?

The Soviet UNIX Users' Group was established in 1990 to bring together those who were interested in the UNIX system and other similar systems. The first SUUG conference, which I also attended, was held in Moscow at the end of October, 1990. The SUUG currently has about 35 institutional and 50 individual members. SUUG members include academics (professors and students), working programmers and other interested people from all over the Soviet Union. This includes some individuals from the newly independent Baltic states (Lithuania, Latvia and Estonia), which could eventually form their own users' groups. A large proportion of the SUUG board is made up of employees of DEMOS and RELCOM, or people with connections to that organisation. DEMOS is a cooperative software venture that gave birth to RELCOM, a computer networking service cooperative. These organisations are especially influential in the SUUG's management.

This conference was one of two major meetings planned by the SUUG this year. In November the SUUG will hold a workshop on "UNIX Applications Systems" in Moscow.

The Road to Vladimir

Registration for the conference opened in Vladimir on Monday 23 September. Although that may have been the official start of the conference, the conference really began that same day on the bus that brought most of the SUUG's officers, the foreign guests and other assorted insiders from Moscow to Vladimir. The bus started from the Sputnik Hotel in Moscow, where a major part of the SUUG board embarked, rolled to the University of Moscow Department of Computer Science, where an overhead projector was obtained, picked up more delegates on Lenin Prospekt (yes, it is still Lenin Prospekt), proceeded to Georgiy Ostapenko's apartment, where the proceedings were waiting, and finally filled the bus at Sheremyetovo airport, where the last of the foreign guests had just arrived. From Sheremyetovo to Vladimir was a three and a half hour drive. Conversation on the bus consisted of one part technical to one part political to one part catching up with old friends.

We arrived at the hotel late Monday evening, a day when the restaurant at the hotel is normally closed. No one had had supper, so we were hungry. The SUUG arranged for some sandwiches to be served in the second floor snack bar as a kind of opening night reception. The snack bar was small: three tables, twelve chairs, but

soon we had about sixty people packed into it, munching sandwiches, toasting the success of the conference with vodka and getting acquainted and re-acquainted.

The Conference: Day One

The conference itself began on Tuesday with a keynote speech by Professor Ivannikov, editor of the prestigious journal "Programmirovaniye" and Member-Correspondent of the Academy of Sciences. In his speech Professor Ivannikov recalled the early days of Soviet computing on large mainframe machines like the BESM-6. In those days there was a spirit of cooperation and mutual assistance that he felt has been lost in recent times. He attributed the change to the explosion of new technology and a new interest in commercial gains, especially among the newest generation of programmers. Citing the Free Software Foundation, which in his opinion adheres to good Marxist principles, Professor Ivannikov called for the establishment of a similar effort in the Soviet Union and suggested several ways in which such work could be funded. This could help establish a "world brotherhood of programmers" and place computing on a more solid moral footing. Although some people in the audience are actively involved in work related to the FSF[1], the keynote speech got a lukewarm reception.

The keynote speech was followed by a call by Sergei Kuznetsov, president of the SUUG, to establish a variety of working groups for computing in the USSR. This was inspired by the call for working groups at the EurOpen conference. Several possible examples were mentioned: networking, standards, and so on. These were also taken from EurOpen discussions. Working groups were promoted as an opportunity for SUUG members to work within an international context and to mix with the wider world.

All of the technical papers in Tuesday's schedule were presented by the foreign guests of the SUUG. The morning session was titled "UNIX -- new approaches", while the afternoon was devoted to topics concerning object-oriented programming.

Session 1: "UNIX - new approaches"

The first speaker, Mike Karels of Berkeley University, presented the same overview of the 4.4 BSD kernel architecture that he presented at the Budapest EurOpen Conference the week before. I had heard the presentation there, but two things were quite different in Vladimir. First, no speaker was limited in the amount of time allocated for a presentation. This meant that, with consecutive translation, the presentations often took 45 minutes or more. Second, the audience eagerly asked questions and the question and answer period after a talk frequently would take an additional half hour.

The 4.4 BSD effort is moving towards an implementation of the UNIX kernel that can be distributed free of UNIX Systems Laboratories license requirements[2]. The audience asked many probing questions about licensing requirements for the 4.4 BSD kernel and other UNIX systems. This proved to be a hot topic throughout the conference. More questions were asked about the official export status of BSD networking technology. The United States government, through COCOM, is trying to restrict access to dynamic routing technology and other related technology. Naturally, this audience, which is the target of such restrictions, is very interested in these restrictions and eager to find ways around them.

Additional questions covered technical issues. These included questions about suitable hardware, memory management, conformance to standards and performance characteristics.

The second speaker of the morning was Peter Newland from the European office of USL. He spoke on USL's efforts to internationalise UNIX System V Release 4. The goal is to be able to provide localised versions of SVR4 for the European market. This work has to proceed on several levels, from chosing standard character set definitions to providing error messages and user interfaces in local languages and includes generating about 10,000 pages of documents for SVR4 in translation. Newland gave an effective overview of the nature of internationalisation, and how it was being accomplished.

Some of this was not very satisfactory from a Soviet point of view. SVR4 internationalisation is being done around ISO standard character sets, with ISO 8859 suggested for providing a Latin (ASCII style) character set wedded with a 8-bit Cyrillic representation. This raised several interesting questions. There is a similar character representation in use as a standard in the USSR: KOI-8. There are at least two other competing codes in the Soviet Union. It is unclear what relation KOI-8 has to ISO 8859, and no one offered to comment on what input the Russians have had to the ISO committee that defined a Cyrillic standard.

A Latvian delegate raised another interesting question: what good is a standard that allows him to write English text and Russian text, but does not provide a character set in which he can write Latvian text? For a worse case, consider an Armenian computer user who would routinely need to use two scripts (for the Russian and Armenian languages), both of which are significantly different from Latin characters. From this viewpoint, the ISO standards are clearly anglocentric. Unicode, an attempt to insert all possible characters into one universal character set, was only briefly mentioned.

Peter Newland brought up some of the rather sticky legal issues of exporting software to a country where there are no or few legal protections for intellectual property. Many Soviet UNIX system users have acquired their systems without benefit of licenses. This makes it difficult to develop and market applications either within the USSR or for sale to the West. It also makes it difficult for companies like USL to sell such applications within the Soviet Union. Given the legal situation and the scarcity of hard currency for software purchases, the Russian language market is not one that is being aggressively pursued.

The discussion following this talk was lively and touched on all of these topics. Peter Newland, as a representative of USL, had to deal with aggressive questioning about USL licensing and sales

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1 *IPIAN, an institute associated with the Soviet Academy of Sciences, is cooperating with the Cygnus corporation, which supports FSF software, in a commercial venture.*

2 *Formerly users would have required licenses from AT&T to run this code. This year USL was created and acquired ownership of the UNIX system, so USL now sells the required UNIX licenses. The distinction between USL and AT&T is not well understood in the Soviet Union, and I am not convinced that it is well understood elsewhere.*

policies. These questions spilled over onto the two representative of Bell Labs in attendance (Jaap Akkerhuis and myself). Neither of us were qualified to answer those kinds of questions. Since Peter Newland could answer such questions, I was relieved that I could refer them back to him.

Session 2: Object-Oriented Programming and UNIX

The afternoon session contained two papers on aspects of Object-Oriented Programming, which could be regarded a UNIX application. The first of these was my talk on Object-Oriented Redesign, that is the reengineering of older C programs in C++ to get the benefits of object technology. In general, this talk was well received, although I had to defend myself against the familiar complaint that object-oriented technology is nothing new and that the basic techniques have been known since Parnas. My defence was to point out that although the techniques have been known, little of the software being maintained today was written using those techniques and that relatively few programmers are using those techniques even today. The end effect is that there is a large body of code that needs renovation and few effective procedures offered for doing that work. My presentation was an attempt to explain a bridging technique for programmers that were not OOD insiders.

Other questions involved issues concerning building massive systems using OOD and some specific questions about C++. A significant portion of the audience was aware of C++ and object-oriented programming and very interested in practical, industrial experience with OOP. As indicated above, there were a fair number of sceptics as well. The discussions about OOD, OOP and related issues continued in the lobby well after the session ended.

Many in the audience remembered the presentation I gave in Moscow last year about the C++ Information Abstraction system (CIA++) and I answered several questions about the development of that system over the past year. CIA++ generates a database of information about structural aspects of a program. The database can the be used for program analysis. I discovered that similar program analysis tool projects are underway in the Soviet Union.

The second paper concerning object-oriented topics was presented by Gerhard Steinke of the University of Passau. Part of this talk reviewed the multilevel security model promulgated by the US Department of Defense (the so called "Orange Book"). The rest discussed the protection of information stored in objects organised into hierarchies by inheritance. Steinke showed how inheritance semantics and its implementation create problems for specifying and implementing secure, consistent access controls in object-oriented data bases. I found this to be a very interesting talk, as did the Soviet audience.

These talks were followed by a poster session in the lobby. There were over a dozen short papers taped to the walls. The authors of these papers were prepared to discuss them with any interested parties. The poster papers included papers on UNIX based real-time control systems, document preparation, compilers and language processors, device drivers and several posters on networking and on various user interface designs. The poster presentations presented a broader cross section of computing in the Soviet Union than was generally apparent in the regular conference papers. Presenters came from Moscow, St. Petersburg (formerly Leningrad), Kiev, Kharkov, Novosibirsk and Protvino.

In general, the membership of the SUUG represented at this conference mostly came from the Russian Republic (primarily from Moscow, secondarily from St. Petersburg) with some attendees from Ukraine and the Baltic States. There was no one I could identify as coming from the Central Asian republics, but there also was no list of attendees provided to help confirm my impressions. The location of the conference may have skewed attendance this way. It may also be true that since the SUUG board is largely Muscovite, the center of gravity of the organisation may be as well. The SUUG board is aware that their membership base is geographically skewed and they are interested in attracting more participation from other regions of the USSR.

Evening Interlude: The UNIX system's future in the USSR

The evening of the first day was devoted to a general, open discussion of the future of the UNIX system in the Soviet Union. This started with some comments by Mike Karels about the further development of the BSD line of UNIX systems and more discussion of USL's position on selling UNIX systems in the Soviet Union by Peter Newland. The open discussion was very frank and sometimes heated. Licensing, documentation, export controls and the cost of buying Western commercial software all were provocative issues.

The Soviets seem to be facing a choice of either trying to purchase UNIX or UNIX-like technology from the West, and so lagging behind the technology curve, or trying to develop indigenous systems. There are arguments for both positions. Commercially, applications built on international standards may be easier to exploit. With that comes the problem of chosing an appropriate standard, since even with POSIX, there still seem to be several. On the other hand, the Soviet computing environment is quite different than the typical Western UNIX environment, as it is largely built around personal computers rather than networks of workstations. Moreover, indigenous systems can be developed free of license fees that drain scarce hard currency.

The final question that dissolved the meeting into a free for all was: "Why do we need a UNIX system at all? Why not something else entirely?". Shortly after this the moderator lost control of the meeting, which finally broke into discussion groups clumped in various corners of a rather small room. In general, these issues tend to be presented as mutually exclusive choices and compromises are not offered.

By late evening the meeting had spawned a number of parties in various rooms throughout the hotel. I found myself drinking vodka with the SUUG board and singing Russian folk songs with some of the Russian women present. The evening ended singing duets with one Russian fellow who had an amazing repertory of American folk songs and blues. This was a happy ending to a full working day.

Day Two: Vladimir and Email

Wednesday, the second day of the conference, was not as heavily scheduled. The morning was devoted to a business meeting for the SUUG. The afternoon session offered a selection of papers on communications and electronic mail.

A Tour of Vladimir

As Western guests, we were not expected to be interested in the internal doings of the SUUG, so the conference organisers planned a tour of the city of Vladimir for us and other interested parties. Vladimir has a history that goes back nearly 900 years. Early in its history it was the capitol for several of the most powerful of Russian princes. This legacy has left Vladimir and its immediate vicinity with a fair number of interesting churches and buildings from the 12-19th centuries. The largest of the cathedrals in Vladimir is a functioning Russian Orthodox church with an active congregation.

Vladimir is built on a prominent hill so that there are many places to get a good view of the surrounding countryside. One interesting view included a train heading north (away from Moscow) carrying about 30 armoured military tanks on open flatbed cars. I pointed this out and was informed that this is routine. People in military uniform and military vehicles are much more common sights in the Soviet Union than is generally true in the United States or Western Europe.

The area surrounding Vladimir is primarily agricultural, and the potato harvest was underway during our visit. However, Vladimir is the administrative center of a province and an industrial center. The heavy industry and traffic in Vladimir proper generate a visible haze of smog. The air quality is not good. Some consumer goods seem easier to find in Vladimir than in Moscow. Our guide and our translator both spotted some good deals in shoes, a scare commodity, and stopped the tour bus long enough to snatch them up. The foreign contingent hunted souvenirs with a lot more success than we had in Moscow the year before.

Session 3: Communications and email

The afternoon session of the conference contained two papers by SUUG members and one by an invited guest. All of these talks were related to networking of one kind or another. This is clearly a major interest of the SUUG membership. The talks by the Soviet speakers were given in Russian with translation either haphazardly provided or not provided for the non-Russian speaking guests. In general, no microphones were available either, so although I speak Russian, these particular talks were occasionally hard to follow.

The first of these was a short paper by V. Shaudkulis of INEUM (Moscow) that seemed closely related to the discussions of the previous evening. Like all of the talks given by the SUUG members, was unaccompanied by any visual aids of any kind. Overhead transparencies and transparency pens are expensive and hard to get. The Soviet speakers presented their papers from memory without notes, something most of us would not want to attempt.

This speaker discussed some of the issues involved in building a native, license free, UNIX-like system from scratch in the Soviet Union. Part of the problem is simply the cost of mounting such an effort. Such efforts are underway in the USSR, and Soviet universities are involved. The goal of the speaker's work is to design an original UNIX-like system to run on multiprocessors using shared memory and synchronous communications. There are some initial results, but a lot of work remains to be done.

The second report of the day was presented by Micheal MacConmara of Dublin City University, Ireland. He gave a fascinating comparison of the kinds of telecommunications services available in the West and the lack of services provided in the USSR and an analysis of the systematic changes that would be required to bring Soviet telecommunications services up to Western standards. MacConmara is well qualified to discuss these issues: besides being the director of computer and communications services for Dublin City University, he is active in several advisory boards concerned with that topic, including the Information Center Mathematica (ICM) in Moscow. That is a Soviet Academy of Sciences project directed at improving the level of telecommunications and computer networking technology in the USSR.

Parts of this talk had deeply political overtones, as the issue of who in the Soviet Union is provided with what level of service is deeply intertwined with the political system and the idea of "distribution"[3]. A second factor complicating the provision of phone services is the lack of metering on most Soviet phone lines. This part of the talk provoked a lot of highly animated discussion.

The second half of MacConmara's talk discussed computer systems and networking in the Soviet Union. For the most part, Soviet networking seems to refer to email-like connections between personal computers. There are several such networks in the Soviet Union. RELCOM operates the largest one. Others include VNIIPAS, SPRINT, Glasnet and Fidonet. The elaborate networks of large mainframes, workstations and assorted PCs connected by high-speed data lines are not familiar there. Nor are remote logins or database services generally available.

The last presentation of the session was by Valerii Bardin of RELCOM. This talk was an update of the growth of RELCOM since his presentation at the first SUUG Conference last November. Many more sites have been added to the RELCOM network, and Bardin claims that RELCOM is now the largest computer network in Europe, if not in Asia as well. The role that RELCOM played in communicating to the world about the August attempted coup was also discussed. RELCOM became highly visible throughout the world because of that.

RELCOM is an independent enterprise that currently receives no assistance from the Soviet government. It provides communications services for anyone willing to pay their fees. This includes academic, commercial and governmental customers. The cost of providing electronic communications services is very high. Bardin attempted to explain their cost structure, as some of RELCOM's customers and potential customers feel that their fees are too high.

By Wednesday, Vadim Antonov of Demos (and RELCOM), had managed to find a phone line in the hotel that would allow him to dial into the Moscow RELCOM computers. Using a pair of notebook computers and a relatively slow modem, Vadim provided us with limited electronic mail facilities at the conference. Vadim would receive the message over the phone line, unplug from the line and carry the computer to the person it was intended for. The recipient could type a reply on the spot. Later in the day the laptop would get reconnected to the phone line, and the reply would go out. As awkward as this sounds, it worked better for me than the phones did. I never successfully managed to schedule and complete a phone call home. I did

3 The word distribution has an entirely different meaning in Russian than in English. It refers to the way that people in privileged positions are given access to better goods and services through a highly elaborated system of special shops and institutions. The average Soviet citizen does not have access to the distribution system.

managed to send and receive several email messages. This was a vivid, real-life illustration of MacConmara's and Bardin's theses.

Day Three in Suzdal... Who's Minding the Store?

On Thursday a day-long tour of Suzdal was planned for all interested parties. Suzdal is a small town about 30 kilometers from Vladimir. In the 11th-13th centuries, Suzdal had major political significance. For centuries after this it remained an important religious center. Today it is a major tourist attraction due to its many cathedrals, churches and monasteries. Suzdal is indeed very picturesque. Our hosts did not want us to miss a very important and uniquely Russian treasure.

As a matter of fact, the entire SUUG board and many of the Soviet delegates took advantage of the opportunity as well. The bus to Suzdal was very much like a rolling conference center. The technical discussions continued as we took in the sights. Back at the Klyazma Hotel there were papers presented, but the audience for those papers had to have been greatly diminished. Thursday's agenda contained four papers, all related to UNIX toolkits and applications.

Day Four: Workstations and Miscellany

By Friday attendance at the conference had thinned out. The audience for the last two sessions was approximately half the size of that of the first day. It was unfortunate that two of the most interesting papers submitted by Soviet contributors were presented on Friday.

The first of these was a paper by A. Giglavyi and V. Leonas that presented a deep analysis and comparison of the development of workstations as opposed to personal computers. Very few aspects of the history, architecture or marketing of workstations were missed in Giglavyi's presentation. This included a discussion of the various flavours of UNIX systems for RISC architectures, peripherals, graphics and windowing systems, audio and multimedia applications. Giglavyi discussed a good deal of the politics of workstations that has led to such strange marriages as Apple and IBM's joint development venture. Sitting in the USSR, he has a unique perspective on these events. Unlike most of the papers presented at the conference, this one appeared in full in the conference proceedings. It would be worthwhile to translate this one into English and give it a wider audience.

Talks by Jaap Akkerhuis (AT&T, Bell labs) and by J. T. Pfenning (University of Bielefeld, Germany) addressed different aspects of managing large networks of heterogeneous workstations and PCs. Pfenning presented plans for a large network being installed at his University. This was a good illustration of what can be done using off-the-shelf technology. Akkerhuis's paper described work he did at the mt Xinu company on a product that would allow UNIX systems to be networked together with MacIntoshes. The goal was to create a system where either system had equal access to the facilities present in the network.

V. Podsvirov presented the last paper of the conference. His thesis was that programming work inherently produces unhealthy mental states in its practitioners. These unhealthy mental states are conducive to poor physical health and bad moral health. Much of this results from the trance-like state induced by staring at a computer screen transfixed by deep abstract problem solving. Podsvirov suggested that it would be good mental hygiene for programmers to practice some form of mental exercise after a hard day's hacking to prevent permanent mental damage. This was a very entertaining talk and it was sometimes hard to gauge how serious the speaker's intent was. From subsequent conversations, I know he was quite serious. This is another paper that should be translated from the Russian and given a wider audience.

Conclusion

Although the conference officially ended with a closing dinner on Friday night, the real end was the long bus ride back to Moscow on Saturday. This was fairly quiet as most of us were exhausted.

I spent a fair amount of time discussing the translation of common English (and specifically American) programming jargon with the conference interpreter. Some terms, for example: process threads, are truly difficult to render in Russian. Moreover, some writers use very colloquial language and jargon that is generally unknown to non-native English speakers. The translator had a plea for all English-language technical writers: "Please be kind, and don't forget there are unfortunate people like us who will have to understand and translate what you write"!

This conference was quite different from the first SUUG conference in Moscow. It was definitely on a smaller scale and a lot more loosely organised. Like usual, the value of attending this conference was less in the content of the presentations than in the communication those papers provoked. I was very happy to have the opportunity to participate.

Executive Report

Helen M W Gibbons
European Forum for Open Systems (EurOpen)
Buntingford
Hertfordshire
United Kingdom

E-mail europen@EU.net

Helen Gibbons is the business manager of EurOpen and is contactable at the EurOpen secretariat.

Appointment of Executive Director

It is with pleasure that we can announce that Pierre Scheuer has joined the EurOpen team as Executive Director. Living and working on the outskirts of Paris, Pierre will establish a second EurOpen base in France - separate from the Secretariat which remains in the UK - and will be responsible for the general management of EurOpen services and operations, including financial and general administration at director level, reporting through the Executive Committee to the Governing Board.

Pierre, who is 38 years old and has an 8 year old son, studied management sciences and econometrics at University, gaining his Master's degree. After 2 years of research within the University, he gained 10 years marketing experience with several EDP multinational companies such as Xerox, Ericsson and Bull. He feels he is particularly experienced in launching activities on a market which implies good expertise of the life cycle process, consistency in fixing the market mix parameters (Pricing, Promotion, Placement and Product) and above all management of teams composed of very different people from different backgrounds.

When asked about his motivation in joining EurOpen, Mr. Scheuer replied that he sees the industry as moving from an offer driven market to a demand driven market, thereby giving users more power; also he feels that it is important to help user groups in particular to express themselves in a way that is understandable to the other market player.

"EurOpen", said Mr. Scheuer "is composed of members belonging to different environments - nationalities, cultures, jobs, skills, companies - but the common point is that they are all high level people, which gives EurOpen a unique strength and credibility in the market place. It has an association spirit, which means that it is not driven by a short term profit logic, but its actions must none the less be driven in a totally professional way. Indeed the members, Executive Committee and Governing Board are primarily interested in developing a VISION rather than a business".

Mr. Scheuer believes that EurOpen is already very successful and he looks forward to the challenge of making it progress even further. He sees its wide base of 6,000 members, its worldwide network and popular Conferences as an excellent basis on which to build additional services to give ultimately more value to the members through the National Groups.

Conferences

The Autumn '91 Conference took place in Budapest, Hungary on 16 - 20 September. Some 250 delegates came to listen to the technical programme and the event was accompanied by an excellent Exhibition. Copies of the proceedings, which include papers on Distributed Systems, Performance Measurement, Security, Networking and Systems Administration can be ordered from the EurOpen Secretariat, Owles Hall, Buntingford, Herts SG9 9PL, UK at a cost of 37 ECU's or 25 GBP.

A Call for Papers has already been sent out for the next important event which will be a workshop held in co-operation with USENIX in Jersey, Channel Islands, on 6 - 9 April, 1992. Several offers of papers have already been received.

We would also like to remind all members that a major event "OpenForum '92" organised jointly by EurOpen and UniForum will be held from 23 - 27 November, 1992 in Utrecht, The Netherlands. The event will include 2 days of Tutorials, 3 days technical Conference and a large trade show.

Governing Board

A meeting of the EurOpen Governing Board was held on 14th and 15th September, 1991 in Budapest. Representatives were present from Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK, USSR and Yugoslavia.

The Chairman, in his general overview to the Governing Board, reported that there had been many significant achievements made since the last meeting. Among these were the re-writing of the By-Laws, the appointment of an Executive Director, the introduction of tighter budget control mechanisms, the setting up of a Governing Board commission to look at National Group contributions, the signing of a contract with UniForum on co-operation for OpenForum '92 and contracts with Royal Dutch Fairs and Reed Exhibition companies for the organisation of it. The Chairman further reported that EurOpen Working Groups were being set up and were progressing, and that studies were being undertaken with a view to setting up new types of EurOpen events in the future.

At the Governing Board meeting it was agreed that investigations should be undertaken into the financial and practical implications of registering EurOpen as a non-profit making organisation under Belgium law, instead of its being a company registered in the UK, as at present. The consensus of the meeting was that a move should be made towards Belgium law.

A new affiliation agreement is being drawn up which each National Group will be asked to sign, accepting the conditions of membership defined by EurOpen.

With the acceptance of the new By-Laws, a new membership status has been created. This is Associate Status. Its purpose is two- fold - to allow other bodies such as USENIX and UniForum to belong, and to act as an intermediate status for the National Groups, who will, from now on, be accepted into Associate Status for their first year of membership.

In September 4 new groups were offered Associate Status. These are Turkey, Israel, Poland and Bulgaria.

At the next Governing Board Meeting in April 1992 the present Executive will all stand down under the new By-Laws, and a new Executive of 5 will be elected. Nomination forms will soon be sent out to National Groups to enable them to put forward candidates.

The Governing Board has passed an increase in subscription levels retrospectively for 1991 from 61 ECU's to 65 ECU's.

World Forum for Open Systems Users

It has been agreed that EurOpen should enter into discussions with UniForum and USENIX to see if it might be possible to formulate an umbrella structure called the World Forum for Open Systems Users.

New Groups logo Requests

All new Groups have been requested to provide logos within the framework of the new House style and where no logo appears in the Newsletter it is because the Secretariat has not received them. National Groups are also requested to see if they can, where possible and desirable, bring their name into line with the EurOpen concept rather than the old EUUG styling.

The Executive Committee

The present Executive Committee consists of Michel Gien (Chairman), Frances Brazier (Vice Chair), Nigel Martin (Treasurer), Ernst Janich, Norman Hull and Kim Biel-Nielsen, with Teus Hagen as ex-Chairman in charge of the House style.

They will sit again on 15th November to carry out the numerous actions arising from the recent Governing Board decisions.

Correction

From: Jean-Luc Archimbaud <jla@imag.fr>

Subject: Security article error

There is a very big error in my security paper in EurOpen newsletter, Summer issue, (due to the translation).

Replace : * Remove the file /etc/hosts.equiv if you don't need it. If you do, verify that this file contains only one line only consisting of the single character : "+". By : * Remove the file /etc/hosts.equiv if you don't need it. If you do, verify that this file does not contain any line consisting only of the single character: "+".

OpenForum 1992

The Pan-European Exhibition & Conference for Open Systems

Utrecht, The Netherlands

23rd - 27th November, 1992

OpenForum '92 is the first event of its kind to be co-sponsored by EurOpen and UniForum.

OpenForum '92 will combine a major International Conference with a Pan-EurOpean vendor Exhibition to promote Open Systems.

Tutorials	23 and 24 November
Conference & Exhibition	25, 26 and 27 November

For further details of this important event please contact the following:

Tutorials and Conference	**Exhibition**
EurOpen Secretariat	Marjolein Jacobs
Helen Gibbons	Robert Schotema
Owles Hall	Royal Dutch Fairs
Buntingford	PO BOX 8500
Hertfordshire SG9 9PL	3503 RM Utrecht
United Kingdom	The Netherlands
Telephone +44 763 73039	Telephone +31 30 955 911/662
Facsimile +44 763 73255	Facsimile +31 30 940 379

EurOpen and USENIX Spring 1992 Workshop

Jersey, Channel Islands

6-9 April, 1992

Jersey is the most southerly of the British Isles and lies in the English Channel approximately 160 kilometres south of the English Coast and 22 kilometers from the west of France in the great bay of Normandy and Brittany.

Although a small island, 14 X 8 kilometres, it is a very picturesque island, not only renouned for its duty free prices and tourist industry but also for its offshore financial centre and its horticultural and agricultural produce.

Venue:

Hotel de France
St Saviours Road
St Hellier
Jersey

Topics:

System design and development issues

- Software design
- Portability tips and techniques
- Standards ? Help or hindrance

System Administration and management issues

- How to cope with the old world
- Migration tools
- Resource sharing
- Public procurement
- Migration strategies

End user issues

- Availability of tools and applications
- Education and training
- Why Open Systems ? Why Proprietary Systems
- Migration and organisation from a proprietary environment to an Open Systems environment

There will be Tutorials on Monday 6th and in the morning of Tuesday 7th April.

The Conference will take place from mid-day Tuesday, 7th until mid-day Thursday 9th April.

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Call for Papers and Participation

Micro-Kernels and Other Kernel Architectures

27-28 April 1992, Sheraton Seattle Hotel and Towers, Seattle, Washington

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The USENIX Association's workshop on Micro-Kernels and other Kernel Architectures is aimed at comparing and contrasting existing micro-kernels and their macro-kernel counterparts. Industry pundits are claiming that microkernel technology is the next step in kernel design. This workshop intends to make a detailed technical investigation of the microkernel technology to discover whether the claims have merit or are just this year's buzzword. The intent of the workshop is to identify micro-kernels strengths and weakness in comparison to each other and to the macro-kernels that they hope to replace. The comparisons will include functionality, modularity, ease of extension, maintainability, and performance.

The first day of the workshop will be devoted to talks of a tutorial nature on currently important microkernels and other kernels. Already committed are talks on Mach, Amoeba, Chorus, and Plan 9. Other talks will be added.

The second day will be devoted to papers on all aspects of microkernels or kernel architecture. Papers are being solicited in areas including but not limited to:

- Distribution
- Performance
- Fault tolerance
- Multiprocessing
- Scalability
- Real-Time on Micro-Kernels

If you are interested in submitting papers for either day, please send an extended abstract with an outline of your paper (email preferred) to the program chair (Lori Grob).

Program Committee

Lori S. Grob, Program Chair
Chorus systemes
E-mail grob@chorus.fr/grob@usenix.org

Edward D. Lazowska
University of Washington

Robbert van Renesse
Cornell University/Vrije Universiteit

Avadis Tevanian, Jr.
NeXT Computer, Inc.

Dates to Remember

- Abstracts Due: 10 January, 1992
- Notification to Authors: 14 February, 1992
- Papers Due: 13 March, 1992

USENIX Winter 1992 Technical Conference

20-24 January 1992, San Francisco, California

USENIX, the technical and professional association of UNIX users, invites you to its 1992 Winter Conference at the San Francisco Hilton. The conference focuses on innovative change and the innovations necessary to cope with that change. Pervasive networking, big disks, fast and cheap workstations, optical archives, multiprocessors, and ever higher expectations are just a few of the challenges addressed. The bent is practical, the emphasis is on real results. Topics range from applications through programming tools down to kernel changes.

Important conference dates to remember

- Pre-registration Deadline

Thursday, 2 January 1992

- Hotel Discount Reservation Deadline

Thursday, 2 January 1992

- All-day Tutorials

Monday	20 January	9 am-5 pm
Tuesday	21 January	9 am-5 pm

- Technical Sessions

Wednesday	22 January	8:30 am-5:00 pm
Thursday	23 January	8:30 am-5:00 pm
Friday	24 January	8:30 am-5:00 pm

- Birds-of-a-feather Sessions

Tuesday	21 January	6-10 pm
Wednesday	22 January	6:30-10:30 pm
Thursday	23 January	9-11 pm

- USENIX Reception At The Exploratorium

Thursday	23 January	6:30-8:30 pm

The UniForum Trade Show/Conference, scheduled concurrently with the USENIX Winter Technical Conference, takes place 22-24 January at San Francisco's Moscone Convention Center.

A continuous shuttle will run between the Moscone Convention Center and the San Francisco Hilton Hotel during UniForum's Trade Show hours. USENIX Conference attendees will receive complimentary registration to the Trade Show.

Invited Talks

USENIX is continuing its popular Invited Talks program. This track within the technical sessions program provides free introductory and tutorial information on a wide variety of topics of interest to programmers, system administrators, and users.

Work-in-Progress Reports

Present your interim results, novel approaches, or current work and receive valuable feedback. Schedule your 10 minute session in advance by email to lab@usenix.org or on-site by contacting Lisa Bloch.

Birds-of-a-Feather Sessions (BOFS)

Birds-of-a-Feather sessions (BOFs) bring together devotees of many varied disciplines for announcements, mingling, discussions and strategies sharing. Schedule a BOF in advance by contacting the USENIX Conference Office at +1 714 588-8649. BOFs may also be scheduled on-site and are encouraged. BOF sessions are available on Tuesday, Wednesday and Thursday evenings.

Tutorial Program

The USENIX Association's well-respected tutorial program offers you introductory as well as advanced, intensive yet practical tutorials. Taught by leading UNIX experts, tutorials are targeted to an audience of computer professionals and technical managers. The tutorials at San Francisco provide in-depth coverage of essential areas of UNIX- related technology.

Combining the two-day tutorial program with the three days of technical sessions provides conference attendees the opportunity to learn from an expert at a convenient time and at a reasonable cost.

The USENIX tutorial program continues experience a high demand for its offerings. Several tutorials sell out even before pre-registration closes. Attendance is limited, and pre-registration is strongly recommended. On-site registration will be allowed ONLY if space permits.

- Monday, 20 January

Introductory Topics in Systems Administration
Instructors: Evi Nemeth, University of Colorado and Rob Kolstad, Sun Microsystems

Distributed File System Administration With AFS and DCE DFS
Instructors: Linda Walmer and Phil Hirsch, Transarc Corporation

Network Security: The Kerberos Approach
Instructors: Dan Geer, The Vision Thing, Inc. and Jon A. Rochlis, MIT

Device Driver Design
Instructor: Clement Cole, Locus Computing Corp.

OSF/1 Internals
Instructor: Thomas W. Doeppner, Jr., Brown University

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

Beyond Xt: Developing and Debugging X-based Applications
Instructor: Oliver Jones, PictureTel Corporation

An Introduction to C
Instructor: Carol Meier, XVT Software

The Internet and its Protocols
Instructor: William LeFebvre, Northwestern University

Parallel Programming and Scalable Software
Instructor: Stephen C. Johnson, Athenix

Programming in Perl
Instructor: Tom Christiansen, Convex Computer Corporation

- Tuesday, 21 January

Advanced Topics in Systems Administration U92
Instructors: Rob Kolstad, Sun Microsystems and Trent Hein, XOR Computer Systems

Writing Portable Applications Using the POSIX.1 Standard
Instructor: Donald Lewine, Data General Corp.

An Introduction to UNIX System Security
Instructor: Matt Bishop, Dartmouth College

UNIX Network Programming
Instructor: Richard Stevens, Consultant

4.4BSD Preview: Kernel Internals
Instructors: Marshall Kirk McKusick and Michael J. Karels, University of California, Berkeley

System V Release 4.0 Internals Part 2 P Selected Topics
Instructors: Steve Buroff, AT&T and Mike Scheer, ProLogic

Advanced Motif Programming
Instructor: Dan Heller, Z-Code Software

An Introduction To C++
Instructor: Robert Murray, AT&T Bell Labs

UNIX Programming Tools
Instructor: Kenneth Ingham, Consultant

Computer Software Law: Knowing Your Rights
Instructor: Daniel Appelman, Heller, Ehrman, White and McAuliffe

- Wednesday, 22 January

8:30-10:00 Keynote Address

Building the Open Road:
The Internet as a Testbed for the National Public Network

Mitch Kapor, Electronic Frontier Foundation

10:30-12:00 Libraries

Session Chair: Greg Rose, IBM Thomas J. Watson Research Center

COLA: Customized Overlaying
Eduardo Krell and Balachander Krishnamurthy, AT&T Bell Laboratories, Murray Hill

LIBTP: Portable, Modular Transactions for UNIX
Margo Seltzer and Michael Olson, University of California, Berkeley

Exploiting the Advantages of Mapped Files for Stream I/O
Orran Krieger, Michael Stumm, and Ron Unrau, University of Toronto

Invited Talk: A Technical Overview of Open Look
Fred Horman, UNIX System Laboratories, Inc.

1:30-3:00 File System Implementations

Session Chair: Andrew Birrell, Digital Equipment Corporation, Systems Research Center

The Episode File System
Sailesh Chutani, Owen T. Anderson, Michael L. Kazar, Bruce W. Leverett, W. Anthony Mason, and Robert N. Sidebotham, Transarc Corporation

An Implementation of Large Files for BSD UNIX
Dave Shaver, Eric Schnoebelen, and George Bier, CONVEX Computer Corporation

Storage Efficient Reliable Files
Walt Burkhard and Petar D. Stojadinovic, University of California, San Diego

Invited Talk: TeX in the UNIX Environment
Anthony Starks, Merck & Co.

3:30-5:00 Innovative Applications

Session Chair: Bob Gray, U S WEST Advanced Technologies

Multimedia Mail From the Bottom Up -or- Teaching Dumb Mailers to Sing
Nathaniel S. Borenstein, Bellcore

archier: An Electronic Directory Service for the Internet
Alan Emtage and Peter Deutsch, McGill University

X Widget Based Software Tools for UNIX
Doug Blewett, Scott Anderson, Meg Kilduff, and Mike Wish, AT&T Bell Laboratories, Murray Hill

Panel Session: Intellectual Property Who Should Own Your Work?

Invited Talk: Can UNIX Designers Learn Anything from PCs?
Marc J. Rochkind, XVT Software

- Thursday, 23 January

8:30-10:00 Practical Points

Session Chair: Rick Adams, UUNET Technologies, Inc.

Purify: A Tool for Detecting Memory Leaks and Access Errors in C and C++ Programs
Reed Hastings and Bob Joyce, Pure Software

Creating MANs using LAN Technology: Sometimes You Gotta Break the Rules
Stanley P. Hanks, Technology Transfer Associates

Realtime Workstation Performance for MIDI
Robin Schaufler, Silicon Graphics, Inc.

Invited Talk: Portability in the 90s
Morven Gentleman, Institute for Information Technology, NRC of Canada

10:30-12:00 Hacking And Cracking

Session Chair: David Rosenthal, SunSoft

agrep A Fast Approximate Pattern-Matching Tool
Sun Wu and Udi Manber, University of Arizona, Tucson

An Evening with Berferd in Which a Cracker is Lured, Endured, and Studied
Bill Cheswick, AT&T Bell Laboratories, Murray Hill

Hijacking AFS
P. Honeyman, L.B. Huston, and M.T. Stolarchuk, The University of Michigan, Center for Information Technology Integration

Invited Talk: Tcl and Tk
John Ousterhout, University of California, Berkeley

1:30-3:00 UNIX Meets the Real World

Session Chair: Pat Parseghian, AT&T Bell Laboratories, Murray Hill

An Information Bus Architecture for Large-Scale, Decision- Support Environments
Dale Skeen, Teknekron Software Systems, Inc.

Application Software: Project Management and Privileges
Bernard Wagner, Ciba-Geigy AG and Bruce K. Haddon, Storage Technology Corporation

Applying Threads
Jay Littman, Hewlett-Packard

Invited Talk: Standards Without Putting You to Sleep
Jeff Haemer, Interactive Systems Corporation

3:30-5:00 Hardware Issues

Session Chair: Thomas Ferrin, University of California, San Francisco

Open Boot Firmware
Mitch Bradley, Sun Microsystems Computer Corporation

Loge: A Self-Organizing Disk Controller

Robert M. English and Alexander A. Stepanov, Hewlett-Packard Laboratories

How and Why SCSI is Better Than IPI for NFS
Bruce Nelson and Yu-Ping Cheng, Auspex Systems

Invited Talk: A Technical Overview of DCE
Jennifer G. Steiner, Open Software Foundation

Work-in-Progress Reports

- Friday, 24 January

8:30-10:00 Load Balancing

Session Chair: Steve Johnson, Athenix

Process Control and Communication in Distributed CAD Environments
Douglas Rosenthal, Wayne Allen, and Kenneth Fiduk, Microelectronics and Computer Technology Corporation

Supporting Checkpointing and Process Migration Outside the UNIX Kernel
Michael Litzkow and Marvin Solomon, University of Wisconsin, Madison

The OpenSim Approach Tools for Management and Analysis of Simulation Jobs
Matt W. Mutka and Philip K. McKinley, Michigan State University, East Lansing

Invited Talk: System Administration Discussion
Rob Kolstad, Sun Microsystems

10:30-12:00 Filesystem Performance

Session Chair: Brent Welch, Xerox PARC

Multi-level Caching in Distributed File Systems -or- your cache ain't nuthin' but trash
D. Muntz and P. Honeyman, The University of Michigan, Center for Information Technology Integration

A Trace-Driven Analysis of Name and Attribute Caching in a Distributed System
Ken Shirriff and John K. Ousterhout, University of California, Berkeley

NFS Tracing by Passive Network Monitoring
Matt Blaze, Princeton University

Invited Talk: Open Systems and System Administration
Martin Kirk, X/Open Co. Ltd.

1:30-3:00 Scheduling

Session Chair: Teus Hagen, OCE

Issues in Implementation of Cache-Affinity Scheduling
Murthy Devarakonda and Arup Mukherjee, IBM Thomas J. Watson Research Center

Control Considerations for CPU Scheduling in UNIX Systems
Joseph L. Hellerstein, IBM Research, Yorktown Heights

Realtime Scheduling in SunOS 5.0
Sandeep Khanna, Michael Sebre?, and John Zolnowsky, SunSoft

Invited Talk: Hints and Kinks for the UNIX Professional
Organised by Ed Gould, Digital Equipment Corporation

3:30-5:00 Off The Beaten Track

Session Chair: Andrew Hume, AT&T Bell Laboratories

Camels and Needles: Computer Poetry Meets the Perl Programming Language
Sharon Hopkins

3DFS: A Time-Oriented File Server
William D. Roome, AT&T Bell Laboratories, Murray Hill

Faster String Functions
Henry Spencer, University of Toronto

A History of the COSNIX Operating System: Assembly Language, UNIX 1970 to July 1991
Alan E. Kaplan, AT&T Bell Laboratories, Murray Hill

Conference Committee And Coordinators

Program Chair

Eric Allman, University of California, Berkeley

Program Committee

- Rick Adams, UUNET Technologies, Inc.
- Andrew Birrell, Digital Equipment Corporation, Systems Research Center
- Tom Ferrin, University of California, San Francisco
- Bob Gray, U S WEST Advanced Technologies
- Teus Hagen, OCE
- Steve Johnson, Athenix
- Pat Parseghian, AT&T Bell Laboratories
- Dennis Ritchie, AT&T Bell Laboratories
- Greg Rose, IBM Thomas J. Watson Research Center
- David Rosenthal, SunSoft
- Brent Welch, Xerox PARC

Invited Talks Coordinators

- Tom Cargill, Consultant
- Andrew Hume, AT&T Bell Laboratories

The Usenix Association

USENIX, the UNIX and Advanced Computing Systems Professional and Technical Association, is a not-for-profit membership organization made up of systems researchers and developers, systems administrators, programmers, support staff, application developers and educators. USENIX is dedicated to:

- sharing ideas and experience relevant to UNIX, UNIX related and inspired systems, and the C programming language;
- fostering innovation and communicating technological developments and research;
- providing a forum for the exercise of critical thought and airing of technical issues.

Founded in 1975, USENIX sponsors two annual conferences and frequent smaller conferences, symposia and workshops addressing special interest topics. The Association publishes proceedings of its meetings, ;login: its bi-monthly newsletter, and Computing Systems, a refereed technical quarterly. USENIX is currently expanding its publishing role with a new book series on advanced computing systems. USENIX also actively participates in and reports on various ANSI, IEEE and ISO standards efforts.

Upcoming USENIX Workshops, Symposia and Conferences

- 3rd Symposium on Experiences with Distributed and Multiprocessor Systems
  26-27 March 1992, Marriott Hotel & Tennis Club, Newport Beach, California
- USENIX Micro-Kernel Workshop
  27-28 April 1992, The Sheraton Hotel, Seattle, Washington
- USENIX Security Workshop
- USENIX C++ Conference
- USENIX Large Installation Systems Administration VI Conference
- USENIX Summer 1992 Technical Conference
  8-12 June 1992, Marriott Hotel, San Antonio, Texas

For More Information...

To receive a registration booklet and for additional conference or registration information, please contact:

USENIX Conference Office
22672 Lambert St
Suite 613
El Toro
CA 92630
USA

Telephone +1 714 588-8649
Facsimile +1 714 588-9706
E-mail conference@usenix.org

Office Hours: 8:30 am-5:00 pm Pacific Time

EurOpen Publications

EurOpen publications may be ordered from the Secretariat at Owles Hall.

The publications available are listed on the following page, it is planned that EurOpen members will be able to also order National Group publications from one single point: the secretariat.

The EurOpen publications available are:

EurOpen Newsletter
Your EurOpen National Group membership gives you one free copy of this newsletter, you may order extra copies of the newsletter for distribution within your organisation. Please contact your national group who will arrange this for you.

Proceedings
Proceedings from some past conferences are still available. The list of those that you can order is on the next page.

European E-Mail directory
This is a must if you are a serious e-mail user. It provides you with a way of referencing e-mail sites thoughout Europe by means of several different indexes.

The second edition is now available.

USENIX Publications

We receive requests for USENIX publications and, as a result of our close cooperation with that organisation, we are pleased to announce a service by which a range of publications can be ordered through EurOpen. The range includes:

;Login:
This is the USENIX newsletter which is published every two months, and carries articles on a variety of topics of interest to UNIX users everywhere and usually runs to around 40 pages.

Computing Systems
This is the journal of the USENIX Association, a quarterly publication which is devoted to the analysis and understanding of advanced computing systems. It is perfect bound with a printed spine for ease of reference and usually runs to around 100 pages.

Proceedings
Some proceedings from past USENIX conferences and workshops are available from stock - the current list is enclosed with the attached order form.

4.3 BSD Manuals
These manuals have proved popular with EurOpen members. We now new have stocks at the EurOpen Secretariat.

UniForum Publications

EurOpen is pleased to provide a service for ordering UniForum publications. The newly named UniForum Monthly (previously CommUNIXations magazine) can also be subscribed to through EurOpen.

We can offer a monthly magazine or if you only require the quarterly international edition which we can also supply.

Various other publications are available including the 1992 UniForum Products Directory (formerly UNIX Products Directory), a number of guides to POSIX, Network Substrata and Applications. A complete list with prices is detailed below.

Ordering procedure. An order form is enclosed with details of how payment can be made by credit card, by direct payment to the bank or by certain types of cheque or banker's draft.

All prices quoted are for EurOpen members. Non-members of EurOpen will pay 50% extra on all published prices.

Publications available though EurOpen

			£	ECU
;Login:	The USENIX newsletter	6 issues/year	20.00	30
Computing Systems	The USENIX Journal	4 issues/year	30.00	44
USENIX	C++ Conference	1991	25.00	37
Proceedings	USENIX Conference	Summer '91	30.00	44
	Anaheim Conference	June '90	25.00	37
	C++ Conference	Apr '90	30.00	44
	Washington DC Conference	Jan '90	27.50	40
USENIX Proceedings	Graphics Workshop V	Nov '89	19.00	28
	Dist & Multiproc Workshop	Oct '89	33.50	49
	Large Inst Sys Admin III Workshop	Sept '89	15.00	22
	Baltimore Conference	June '89	24.00	35
	UNIX Trans Proc Workshop	May '89	13.50	20
	Software Management Workshop	Apr '89	24.00	35
	San Diego Conference	Feb '89	33.50	49
	C++ Conference	Oct '88	33.50	49
	C++ Workshop	Nov '87	33.50	49
	Graphics Workshop IV	Oct '87	17.00	25
	Washington DC Conf	Jan '87	20.00	30
	Graphics Workshop III	Dec '86	17.00	25
4.3 BSD Manuals	User's Manual Set			
(EurOpen Members	Programmer's Set		60.00	88
Only)	System Manager's Manual			
EurOpen	Dublin	Autumn '83	2.00	3
Proceedings	Nijmegen	Spring '84	5.00	7
	Cambridge	Autumn '84	5.00	7
	Paris	Spring '85	5.00	7
	Copenhagen	Autumn '85	10.00	15
	Finland/Sweden	Spring '87	20.00	30
	Dublin	Autumn '87	20.00	30
	Munich	Spring '90	20.00	30
	Nice	Autumn '90	25.00	37
	Tromsø	Spring '91	25.00	37
	Budapest	Autumn '91	25.00	37
Directories	European E-Mail directory, 2nd edition		20.00	30

All prices include post and packing. The price for ;Login: and Computing Systems is for a one year subscription.

EurOpen Sweatshirts	M/L/XL	White, Grey, Black	12.00	16

AFUU Publications available fromEurOpen

The following publications are written in the French language

		£	ECU
Dossier Benchmarks AFUU 1989 Results - 132 pages	Edition Mars 1990 Summary sent upon request	24.00	35
	Edition Mars 1991	34.00	50
Réussir avec UNIX	Edition 1988 - 15 pages	4.00	5

Petit guide destiné aux directeurs informatiques
d'organismes ayant fait récemment le choix d'UNIX.

Il traite de - L'environnement de développement sous UNIX
L'environnement d'exploitation sous UNIX La formation

		£	ECU
La portabilité Les outils d'UNIX Les outils du marché			
Vivre avec UNIX 2 - Administration du Systéme	Edition 1988 - 16 pages	4.00	5
Petit guide destiné aux techniciens des organismes qui ont fait récemment le choix d'UNIX			
Sommaire - Introduction Systéme de fichiers configuration de l'espace disque Création du systéme de fichiers Gestion des périphériques Gestion des impressions Administration quotidienne Assistance et environnement de l'utilisateur Sécurité Performances			
(Vivre avec UNIX 1 - Utilisation du systéme (Epuisé))	Edition 1988 - 16 pages	34.00	50
CONVENTION UNIX 90 - Conferences proceedings		14.00	20
End-users and solutions conferences proceeding	Edition Mars 1990 - 165 pages	14.00	20
Technical conferences proceeding	Edition Mars 1990 - 198 pages	14.00	20
CONVENTION UNIX 90 - Tutorials			
The following tutorialsare available (the others are no longer available)			
Sendmail, Annexe 1 et 2	Edition Mars 1990 - 112 et 205 pages Par Yves Devillers (Inria)	11.00	15
Postcript	Edition Mars 1990 - 119 pages Par Gilles Dauphin (Telecom Paris)	11.00	15
Langage C++	Edition Mars 1990 - 77 pages Par Frédéric Lung (Consultant)	11.00	15
UNIX Systéme V administration	Edition Mars 1990 - 160 pages Par Michel Wurtz (Institut Géographique National)	11.00	15

UKUUG Publications available from EurOpen

	£	ECU
UNIX — The Legend Evolves 1990 Summer Proceedings, Royal Lancaster Hotel, London	30.00	44

UniForum Publications available from EurOpen

		£	ECU
Your Guide to POSIX		7.00	10
POSIX Explored: System Interface		7.00	10
POSIX Update: Shell and Utilities		7.00	10
Network Substrata		7.00	10
Network Applications		7.00	10
1992 UniForum Products Directory (formerly UNIX Products Directory)	Available early 1992	70.00	105
UniForum monthly (formerly CommUNIXations)	Cost per issue	5.00	7
UniForum monthly - International edition - quarterly	Cost per issue	5.00	7

NLUUG Publications available from EurOpen

		£	ECU
UNIX en Standaardisatie	November 1988	17.00	25
UNIX & Mens-Machine Interaktie	May 1989	17.00	25
UNIX & Connectivity	November 1989	17.00	25
Systeem Beheer "Gaan Open Systemen enVeiligheid samen?"	May 1991	17.00	25

i2u Publications available from EurOpen

		£	ECU
Proceedings of the i2u annual Convention	Mainly written in Italian 867 pages	160.00	225
Catalog of UNIX products and suppliers in Italy	Written in Italian - 1100 pages	80.00	115

EurOpen Tape Distribution

	£	ECU		£	ECU
EurOpenD1 R6	42.00	60	EurOpenD13	42.00/60.00	60/86
EurOpenD2	42.00	60	EurOpenD14	42.00/60.00	60/86
EurOpenD3	42.00/60.00	60/86	EurOpenD15	80.00/120.00	120/172
EurOpenD4	50.00/60.00	72/60	EurOpenD16	42.00/60.00	60/86
EurOpenD5	42.00	60	EurOpenD17	42.00/60.00	60/86
EurOpenD6	78.00/96.00	112/114	EurOpenD18	42.00/60.00	60/86
EurOpenD7	24.00/60.00	35/86	EurOpenD19	42.00/60.00	60/86
EurOpenD8	42.00/60.00	60/86	EurOpenD20	24.00/60.00	35/86
EurOpenD9	52.00/60.00	75/86	EurOpenD21	42.00/60.00	60/86
EurOpenD10	33.00/60.00	48/86	EurOpenD22	42.00/60.00	60/86
EurOpenD11	42.00/60.00	60/86	EurOpenD23	42.00/60.00	60/86
EurOpenD12	42.00/60.00	60/86			

The first price listed is for $^1/_2$" 9-track reel tapes, the second one is for $^1/_4$" QIC-24 Sun format cartridge.

Please note that for distributions D1, D2 and D4 a copy of your source licence agreement with AT&T for at least UNIX version 7 should be enclosed.

All 1/2", 9-track, reel tapes come in tar format, 1600 bpi. 800 bpi is possible on request. Cartridge tapes come in tar format, written with dd, with a blocking of 126b. This is a so-called QIC-24 format, written on a Sun. QIC-11 is available on request.

Order Form for Publications and Software

This page may be photocopied for use. Please use capitals.

Name _____

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_____

_____

Company name _____

Email address _____

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I would like to order the following publications:

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I would like to order the following tapes:

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Tape format, either 1/2" 9-track, or 1/4" cartridge: _____

Copy of EurOpen (or national UUG) membership (or payment) form enclosed? Yes / No

Copy of AT&T source licence enclosed? (For D1, D2, D4.) Yes / No

"I declare to indemnify the European Forum for Open Systems for any liability concerning the rights to this software, and I accept that EurOpen takes no responsibilities concerning the contents and proper function of the software."

Date _____

Signature _____

*I enclose my payment in the sumof £/ECU_____
*I have completed my credit card details below

* Delete as applicable

Payments

EurOpen is a European Federation of National Groups and as such prefers to use the European Currency - ECUs - for payments. To pay in ECUs please note the two methods of payment.

1 By Direct Payment to EurOpen's ECU Bank Account

The Bank of Scotland
International Division
Operations Dept
PO Box 86 120
St. Vincent St.
Glasgow G2 5DZ
Scotland

Account Number: 41791 ECU 01
Bank Sort Code: 80-20-13

Please tell your bank that you will pay all charges so that EurOpen will receive the full amount.

2 By UK Cheque or Bankers' Draft, made payable to EurOpen and drawn on a UK bank. Eurocheques are acceptable, but each cheque must be for 170 ECUs or less.

EurOpen is setting up facilities in Europe for delegates paying by Credit Card in ECUs, but unfortunately this is a very new facility and not fully functional at the time of printing this newsletter. If you have real difficulties in paying in ECUs you may pay in £ sterling using the following methods of payment:

3 By Direct Payment to EurOpen's bank. Please tell your bank that you will pay all charges so that EurOpen will receive the full ammount due. The Bank of Scotland, Account Number: 00613997, 61 Grassmarket, Bank Sort Code: 80-31-50, Edinburgh, Scotland EH1 2JF

4 ☐ By VISA
☐ By ACCESS/EUROCARD/MASTERCARD

Name as it appears on the card (block capitals)

_____

Address of card holder _____

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_____

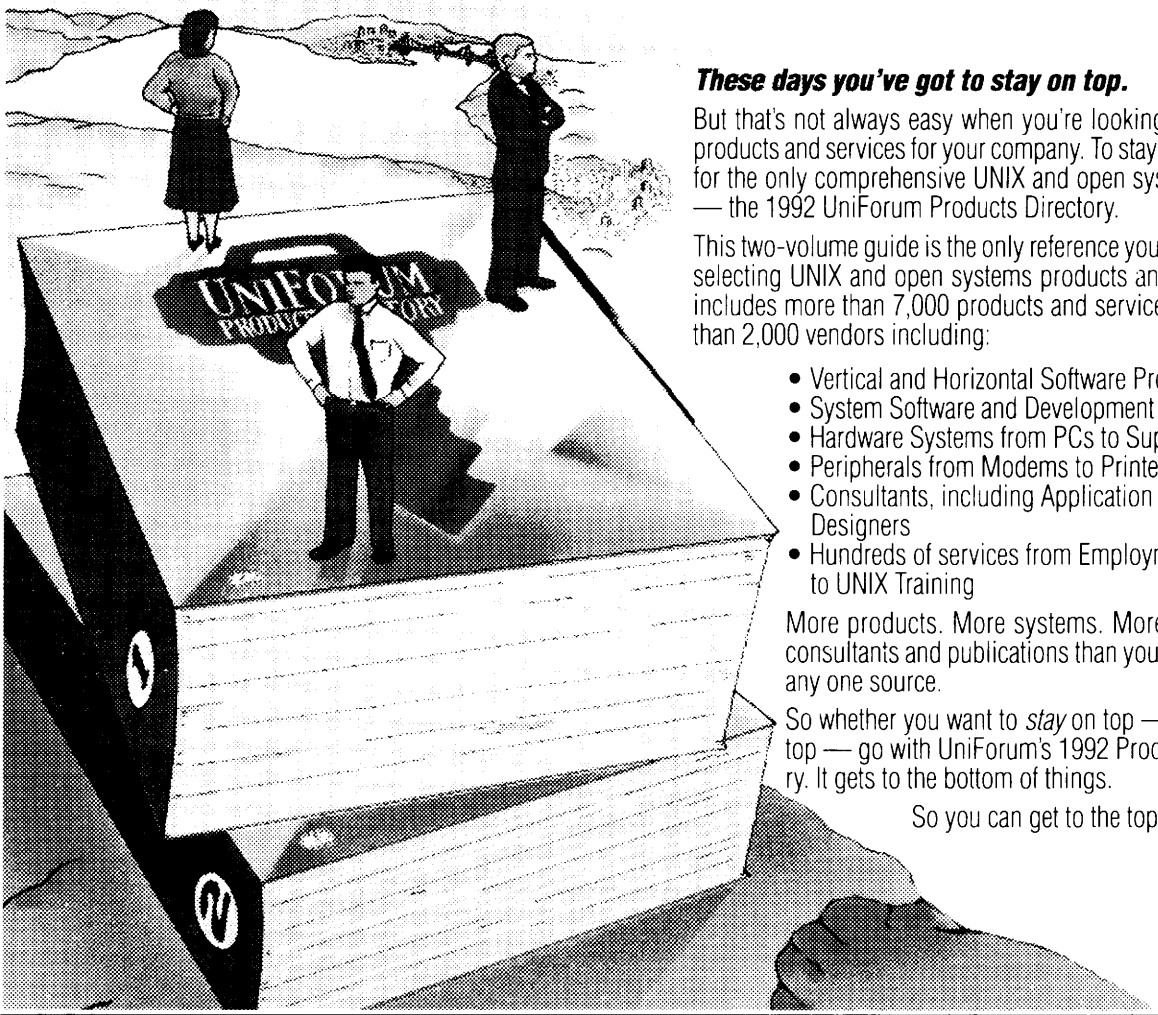
Card Account No _____

Date of Expiry _____

Signed _____

Date _____

The View Is Better From The Top



These days you've got to stay on top.

But that's not always easy when you're looking for the best products and services for your company. To stay on top, reach for the only comprehensive UNIX and open systems source — the 1992 UniForum Products Directory.

This two-volume guide is the only reference you'll need when selecting UNIX and open systems products and services. It includes more than 7,000 products and services from more than 2,000 vendors including:

- Vertical and Horizontal Software Products
- System Software and Development Tools
- Hardware Systems from PCs to Supercomputers
- Peripherals from Modems to Printers
- Consultants, including Application Software Designers
- Hundreds of services from Employment Search to UNIX Training

More products. More systems. More developers, consultants and publications than you'll ever find in any one source.

So whether you want to *stay* on top — or *go* to the top — go with UniForum's 1992 Products Directory. It gets to the bottom of things.

So you can get to the top.

The 1992 UniForum Products Directory will be available early in 1992.

You may order it from the EurOpen secretariat at Owles Hall at a special price of £70 (105 ECU), this includes all shipping costs.

Please see the EurOpen order form elsewhere in this newsletter.

AlUUG

Noureddine Oulmi
28 Rue Abane Ramdane
Alger 16000
Algeria

The AlUUG was founded on 10th February 1991 and has been a EurOpen member since the Tromsø conference in May this year.

We currently have 53 members, membership consists of:

- Academic Institutions
- Industry
- Governmental Institutions
- Working Groups (no fee subscription)
- AlUUG Office (no fee subscription)

Goals

AlUUG members and all Algerian users are quite new to UNIX and Opens Systems concepts, and have little understanding of this world. The AlUUG thus has a challenge in this situation and will offer its members:

- information
- training
- software production
- communication

as services to promote Open Systems in Algeria.

To reach these goals we have defined the following

Objectives

Set up the following:

- Special Interest Groups (SIG)
- Working Groups
- Documentation Center
- Software Distribution
- AlUUG Newsletter
- Algerian Backbone : Al.Unet
- Events:
  Tutorials
  Forums
  Conferences
  Exhibitions

Progress

This, of course, will be a continuous process. Achievement depends on the motivation of AlUUG members and on the money available.

Our country is living though a deep social, political and economic crisis, no help can be expected from the government.

Money should be provided though "International Cooperation" programs. An application has been sent by AlUUG to some important international official representatives. ?? I am still unsure about the last word above. French and EEC representatives in Algeria are examining AlUUG needs, and have adopted a positive attitude.

This project, once completed, will solve all our problems, and will provide the AlUUG with all the means to rapidly achieve these objectives.

We are currently preparing for two events:

- A two day "C Language Tutorial"
  16-17 Nov in Algiers

- The Annual Algiers UNIX show
  4 days of tutorials,

- Conferences and Exhibition.
  2-5 May 1992 (but this may be postponed to start on 9 May)

Network

During the last Governing board meeting in Budapest EurOpen decided to help the AlUUG set up its network backbone. EurOpen, AFUU and INRIA will work together to provide the AlUUG with a computer and necessary technical assistance. We should thus soon be able to communicate via e-mail.

Contact Points

President	Noureddine Oulmi
Vice-presidents	Mahiedine Ouhadj Mohand Tafat
Secretariat	Touaffik Derradji Farah Askar
Working Groups	Benchmark
	Mr Ben Bouzid Mustapha
	Arabisation
	Mr Abdelali Benhadouga

Address

28 Rue Abane Ramdane
Alger 16000
Algeria

Telephone +213 264 78 87/+213 271 41 12
Facsimile +213 263 87 75

Algiers UNIX EXHIBITION and CONFERENCE

2 - 5 May 1992 Call For Papers and Invitation to Exhibit

The Algerian UNIX Users Group AlUUG will host a conference with tutorials and an exhibition on UNIX and Open Systems from 2 May to 5 May in Algiers, Algeria.

Conference

The AlUUG has identified three fundamental issues of great interest for local executives and managers. These are needed to help them make the best decisions for their organisations:

- Understanding of Open Systems and its trends, current options and strategy implications.
- Communications and UNIX Networking
- Information Systems Conception: Methodologies, tools and Programming environment.

Suggested topics include:

- Open Systems
- UNIX and Open Systems
- X/OPEN directives
- POSIX
- UI
- OSF
- Real Time UNIX
- Implementing an Open Strategy
- Establishing an Open Architecture
- GUI: Motif, Open Look
- Communication
- UNIX networks
- Services (Mail, News, SIG, ...)
- Internetworking
- Security Strategies
- X25, Videotex Servers, X400, X500
- Multiserver PABX
- LAN versus MultiUser Systems
- Client/Server Architecture
- Software Development
- Methodologies
- Tools
- Distributed Applications
- RDBMS under UNIX (commercial offerings, choice criteria and evaluation)
- IS Administration and Security Issues

Tutorials

These will cover most of the needs for programmers either new to UNIX or with some experience. The emphasis, however, will be made at the introductory level.

The working languages will be English and French. Translation will be provided.

Tutorials will be:

- Introduction to UNIX (1 Day)
- C programming (1 Day)
- Advanced C programming (1 Day)
- Introduction to X Window System and Toolkit Programming (1 Day)
- Object Oriented Programming (1 Day)
- C++ (1 Day)
- System Administration (1 Day)
- Networking (2 Days)
- SQL Language (1 Day)
- Benchmarks (1/2 Day)
- Arabisation (1/2 Day)

Submission

Please send an abstract or resume of your paper before 20 December to:

AlUUG - May 92 Exhibition
28 Rue Abane Ramdane
Alger 16000
Algeria

Telephone +213 261 99 66
Telephone +213 264 78 87
Telephone +213 271 41 12
Facsimile +213 263 87 75

NUUG Report

Arne Asplem
Oslo
Norway

E-mail aras@nuug.no

Arne Asplem was born in Trondheim in 1966. He is now the vice chairman of the Norwegian UNIX User Group, and a freelance UNIX consultant, specialising in applications and systems for the financial market.

Introduction

I think that this is the first report from the Norwegian UNIX User Group ever published in the EurOpen newsletter, and it is definitely about time! The NUUG was established in October 1984, and has since grown to an organisation with 280 members, consisting of 236 institutional members and 44 individuals.

Oslo Conference, 7-9 October 1991

On 7-9 October the NUUG arranged its first "real" conference for local members, including tutorials, two technical sessions, a conference dinner and an accompanying mini-exhibition. The conference was held in the Royal Christiania Hotel in Oslo.

Monday 7 October - Tutorials

Monday started with tutorials on managing UUCP and NetNews. Our network is growing fast and there has been a strong demand for these topics. In particular the tutorials focused on how to set up and test a UUCP link to our backbone, and how to install and configure NetNews. The UUCP tutorial used HonneyDanBer UUCP as an example, and also included modem configuration - in particular the Trailblazer. Cnews was used as an example in the NetNews tutorial.

35 members attended to these tutorials.

Tuesday 8 October - Distributed Systems

Tuesday's technical session was about Distributed Systems. The first lecturer was Dag Johansen from the University of Tromsø. He delivered a very good overview of what distributed systems are, explaining the different concepts such as virtual machines, resource sharing, load balancing/sharing, transparency, fault-tolerance, etc. He also explained the difference between distributed systems and distributed applications.

Gunnar Hartvigsen from the University of Tromsø, continued where Dag left off and gave an overview of todays distributed systems, like Plan 9, Amoeba, Chorus, etc.

After lunch, Lori S. Grob, Chorus Systems, France, gave an introduction to the Chorus distributed system.

Dag Johansen completed Tuesday's technical session with a presentation of StormCast, a typical distributed application. StormCast is a distributed application for monitoring and predicting the weather.

Wednesday 9 October - Graphical User Interfaces

Wednesday's technical session was Graphical User Interfaces, and focused on development tools for building X-Windows and OSF/Motif user interfaces.

Peter Bengtson, from Telea Research, Sweden, presented TeleUse. Phillip Gwinnel, from Imperial Software Technology, UK, gave an introduction on how to select graphical user interface builders. He also presented IST X-Designer. Olav Folkestad, Digital, presented DEC VUIT and also gave an introduction to UIL and the advantages/dis-advantages of using UIL versus C.

After lunch Lars T. Flikkeid, HP, presented Interface Architech. In his lecture he used Interface Architect to develop a graphical user interface to "mailx". He also addressed the process of porting old character based applications to OSF/Motif.

Sigbjørn Skjervold, National Institute of Public Health, talked about object oriented design of graphical user interfaces and in particular Glockenspiel CommonView. He also addressed the problems of developing applications targeted to different platforms and user interfaces, like Microsoft Windows, Presentations Manager, and the X Window system.

Conference Exhibition

During the conference we had an accompanying mini-exhibition, with a presentation of development tools for graphical user interfaces.

The Annual General Meeting 8 October

The Annual General Meeting saw the election of 5 new members to the NUUG board. The new board consists of the following:

Chairman	Tage Stabell-Kulø, University of Tromsø
Vice Chairman	Arne Asplem
Treasurer	Finn Drolsum, Alcatel-STK
Secretary	Heidi Isbell, Ogilwy & Mather Direct
Backbone manager	Hans Petter Holen, University of Oslo
Newsletter editor	Bjørn Myrhaug, Digital
Members	Tore Austråt, Industri Systemer
	Torkjell Hasle, Bibliotek Systemer
	Beni Ruef, Tollpost-Globe

The NUUG Starter Kit

At the Oslo conference we also introduced the NUUG Starter Kit Tape. The tape is very much like the EurOpen Starter Kit, and includes mail and news software, utilities, documentation (RFCs) and other applications. A total of about 20 MB of compressed tar-files.

Network

Our backbone machine (nac.no or nuug.no), a SUN 3/280, is located at the University of Oslo, and now connects 71 sites to the rest of the world. By the time that you read this the backbone will have 5 modems, mostly Trailblazers. We're also working on a mail and archive server for the backbone.

Sweden Reports

Anders Tjäder
FörsvarsData (Defence Data Systems Agency)
Stockholm
Sweden

E-mail anders@f109a.mil.se

EUUG-S is dead. Long live EurOpen.SE !

EUUG-S is no more.

At our general meeting which was held in Stockholm from 30 September to 1 October 1991 EUUG-S died and, as Phoenix rising from the ashes, EurOpen.SE was born. The new name shows our affiliation to EurOpen and also indicates that EuNet is our most important activity. It is also the domain name of the organisation (see email addresses further on).

There have been some changes in EurOpen.SE, both on the backbone side and on the board. Two people that have been with us from the very beginning, chairman Björn Eriksen and secretary Hans Johansson have now taken a step down from the board. Give them a big hand for long and faithful service in EUUG-S (clap clap clap). Björn Eriksen will however still be the contact person concerning the management of the backbone.

Our new chairman of the board is Peter Röstin, DynaSoft AB, Stockholm and new secretary is Lennart Söderberg, Statskontoret, Stockholm.

You'll find e-mail addresses in the end of the article.

Population figures

Here's the latest population figures (August 1991)

Category	Members
Academic/Commercial	437
Individuals	65
Students	12
Total	514

Backbone information

Here is some interesting statistical facts about the backbone of EurOpen.SE as of 30 June 1991.

The total number of nodes is 219

- 175 of those are directly connected to the backbone
- 74 nodes are subscribers of NetNews
- Our backbone sends 5 Gb and receives 150 Mb per month via UUCP

Commercial Internet Service

In the beginning the backbone for EurOpen.SE (EUUG-S at that time) was hosted by a company called ENEA. That was because the system administrator, coordinator and chairman Björn Eriksen worked there. He then moved to the Royal Institute of Technology (KTH) in Stockholm and the backbone moved with him.

During the last years the need of a commercial IP service has grown larger and larger. Up until now only the university world has been able to use the global Internet. This is no longer true. A private telecommunication company, Tele2 AB, has formed a subsidiary called SwipNet AB, Swedish IP Network. EurOpen.SE has met an agreement with SwipNet AB in which SwipNet AB will take over the daily management of the EurOpen.SE backbone. However EurOpen.SE will still have full control over it. This means that the backbone is moved to the premises of SwipNet AB and in conjunction the name of the backbone will be changed from sunic to seunet. This move will be completed at the end of 1991.

E-mail addresses

Here are the email addresses to the members of the board.

The entire board
E-mail board@EurOpen.SE

Chairman
Peter Röstin
E-mail chairman@EurOpen.SE

Treasurer
Johan Widen
E-mail treasurer@EurOpen.SE

Secretary
Lennart Söderberg
E-mail secretary@EurOpen.SE

Newsletter editor
Johan Hjelm
E-mail editor@EurOpen.SE

EOT

That's all folks

Merry Christmas and a happy new year!

UKUUG Column

Mick Farmer
Department of Computer Science
Birkbeck College
London
United Kingdom

E-mail mick@cs.bbk.ac.uk

Mick is the Secretary of the UKUUG. His primary interests are Ornithology (restricted to the Western Paleartic at the moment because of cost) and Oenophilism (especially pre-1962 Bordeaux, pre-1980 Burgundy, and 1945 Port). His secondary interests include Software Consultancy (to pay for the above primary interests) and Distance Learning Methods (especially interactive video and hypertext). When not pursuing these and other interests he can be found at Birkbeck College (London) where he teaches in the Department of Computer Science.

He lives in Lewisham (South East London) with his wife Sue and a TV called Sonya. His neighbours have two children and a dog.

Start Bit

This quarter's report concentrates mainly on some of the services we provide for our members. The UKUUG recently provided Imperial College with *another* gigabyte disk for the Software Distribution and Archive service. We are working on providing better access to the service and I hope to be able to report on this in the next issue.

The UKUUG Software Distribution Service

You are free to take copies of any readable files in this area subject only to whatever license restriction are inherent in the files themselves. Neither the UKUUG nor Imperial College accept any liability for the use or storage of any files or programs copied from this archive. The archive here is growing rapidly. If you are interested in being kept in touch then there is now a mailing list:

E-mail archive-info@doc.ic.ac.uk

to join, send e-mail to:

E-mail archive-info-request@doc.ic.ac.uk

The archive is available via JANET, the internet, and e-mail (see below).

- guest niftp (command usually **cpf**, **hhcp**, **fcp**):

host: **uk.ac.ic.doc.src** [janet 000005102000]
user: **guest**
password: your e-mail address
Type: binary or text as appropriate
Filename: **<PUB>**filename (this file is: **<PUB>README**)

- anonymous ftam (command usually **ftam**):

host janet: 000005102000
host internet: 146.169.3.7
host IXI: 204334504108
user: **anon**
filestore: **unix**

- anonymous ftp (command usually **ftp**):

host: **src.doc.ic.ac.uk** [146.169.3.7]
user: **anonymous**
password: your e-mail address
type: binary

- interactive (via **rsh**, **telnet**, **pad**):

host janet: 00000510200001
host internet: 146.169.3.7
host IXI: 204334504108
login: **sources**

- e-mail (inside the uk only!):

e-mail **info-server@doc.ic.ac.uk** with a **Subject: wanted** header line and a message body of (replace *thingy* with the package that you are after):

```
request sources
topic scanfor thingy
request end
```

Once you know the pathname then send a request like (with *pathname* replaced by the pathname returned by **scanfor**):

```
request sources
topic path pathname
request end
```

This allows all files up to one megabyte to be returned.

If you are outside the UK then the info-server will not talk to you (it costs money to e-mail Europe and we cannot afford to let the info-server generate bills).
E-mail **ukuug-soft@doc.ic.ac.uk** and a person will reply.

We also do tape distributions inside Europe. If you are in the UK and want details about tape distributions please e-mail **info-server@doc.ic.ac.uk** with a **Subject: wanted** header line and a message body of:

```
request sources
topic ordering
request end
```

You will be sent an automatic reply.

If you are outside the UK or you get no reply from the info-server then e-mail **ukuug-soft@doc.ic.ac.uk**. Please note that files in this area are not to be modified without consulting **ukuug-soft@doc.ic.ac.uk**.

FaceSaver Archive

The UKUUG FaceSaver system was present at the recent EurOpen conference in Budapest where, for the first time, a delegate list was produced that included the delegates' faces. This was our first attempt at such a task and many lessons were learnt, particularly concerning the availability of computer cables, tools, and xerox facilities in a foreign country! We have now expanded our toolkit and increased the number of spare cables carried; the problem of duplication facilities is something we're actively investigating.

In Budapest we had to take every delegate's picture because, in the time available beforehand, we weren't able to load the faces archive onto the disks being shipped to Budapest. This was obviously not ideal and meant that some delegates were missed out (their faces were replaced with a tasteful reproduction of a famous statue in the town :-)! The archive has now been updated and revised which means our full archive will be available at future conferences and workshops. The knock-on effect is that only "new" delegates will have their picture taken, unless you feel an update is necessary.

Information on accessing the UKUUG Software Archive is given above. The face information is stored by e-mail address. Each person has their data stored in a directory, such as **faces/data/cs.bbk.ac.uk/mick**, which is where my face data is kept. The compressed Usenix format is in a file named **usenix.Z**, and the raw picture data is in a file named **raw**. If you experience problems accessing the faces data send e-mail to the archive contact address given above.

Finally, if you'd like to have the FaceSaver system available at one of your events, producing delegate badges or a delegate list, please contact me at the usual e-mail address.

Edinburgh Conference, 16-18 December 1991

Our winter conference is being hosted by Hugh Conner at Herriott-Watt University. Although the winter meeting is traditionally about networking, Hugh tells me that this event will have a marked Scottish flavour as well. For further details contact our secretariat at Owles Hall or send e-mail to **ukuug-conf-edinburgh@uknet.ac.uk**. All our events are open to EurOpen members at the same price as UKUUG members.

LISA Workshop, February 1992

We intend to hold a workshop in February 1992 concentrating on aspects of Large Installation System Administration (LISA), connected with being part of a networked environment. It is hoped that topics such as configuring and running a Domain Name Server (DNS) and multi-protocol mail routers will be discussed. For further information contact our secretariat at Owles Hall or send e-mail to **ukuug-wshop-lisa@uknet.ac.uk**. All our events are open to EurOpen members at the same price as UKUUG members.

Belfast Conference, Summer 1992

For further information contact our secretariat at Owles Hall or send e-mail to **ukuug-conf-belfast@uknet.ac.uk**. All our events are open to EurOpen members at the same price as UKUUG members.

Manchester Conference, Winter 1992

For further information contact our secretariat at Owles Hall or send e-mail to **ukuug-conf-manchester@uknet.ac.uk**. All our events are open to EurOpen members at the same price as UKUUG members.

Stop Bit

How many UKUUG members read the EurOpen Newsletter? How many bother to read the UKUUG Report? If you do, please send me a short e-mail message saying just that to the usual address. Ta.

Calendar of UNIX Events

This is a combined calendar of planned conferences, workshops, or standards meetings related to the UNIX operating system. The information here is collected by those listed below after an idea by John S. Quarterman of Texas Internet Consulting. The information comes from the various conference organizers, ;login:, Communications of the ACM, CommUNIXations, and many others. We encourage others to reuse this information, but we ask for proper acknowledgment, for example by including this statement.

If you have a UNIX related event that you wish to publicise then contact either John S Quarterman at *jsq@tic.com*, Alain Williams at *addw@phcomp.co.uk*, Susanne W Smith at *sws@calvin.wa.com*, or Carolyn Carr at *carolyn@usenix.org* giving brief details in the style that follows.

Abbreviations:

APP	Application Portability Profile
C	Conference or Center
CC	Computer Communication
G, MD	Gaithersburg, Maryland
GM	Generam Meeting
LISA	Large Installation System Administration
MHS	Message Handling Systems & Application Layer CommunicationProtocols
OSE	Open Systems Environment
S	Symposium
SEDMS	Symposium on Experiences with Distributed and MultiprocessorSystems
T	Tradeshow
U	UNIX
UG	User Group
W	Workshop

1991

December 2-6	IETF, *LANL, Santa Fe, New Mexico, USA*
December 3-4	JUS UNIX Fair, *Tokyo, Japan*
December 4	RevCom, NesCom, *IEEE HQ, New York, New York, USA*
December 5	IEEE Standards Board, *IEEE HQ, New York, New York, USA*
December 8-11	Sun User Group C, *San Jose, California, USA*
December 9-13	DECUS S, *Anaheim, California, USA*
December 11	IUUG C, Large Systems Administration, *Dublin, Eire*
December 16-18	UKUUG C, *Edinburgh, Scotland*
December 27	Sinix, GM, *Hilton Hotel, Singapore*

1992

January 13-17	IEEE 1003, *Irvine, CA (location tentative)*
January 20-24	USENIX, *Hilton Square, San Francisco, California, USA*
January 20-24	UniForum, *Moscone Center, San Francisco, California, USA*
January 22	Sun UKUG, Databases, *Sun Watchmoor Park, UK*
February 6	DKUUG C, Executive information systems, *Denmark*
February 19-21	PCI (Publication & Communication), *Chicago, USA*
March	INDC 92', *IFIP TC6, Finland*
March 4-7	Computers in Libraries, *Meckler, Westport, Connecticut , USA*
March 11-18	CeBIT 92, *Hannover, Germany*
March 18	Sun UKUG, Migrating from PCs to Suns, *Venue Unknown, UK*
March 24-27	AFUU, Convention UNIX 92, *CNIT, Paris-La Defense, France*
April 6-9	EurOpen, *Jersey, UK*
April 6-10	IEEE 1003, *Atlanta, Georgia, USA (location tentative)*
April 27-28	USENIX Micro-kernel, *Seattle, Washington, USA*
May	USENIX, Filesystems Workshop, *Location Unknown*
May 2-5	AIUUG, CT, *Algiers, Algeria*
May 4-8	DECUS S, *Atlanta, Georgia, USA*
May 18-22	ISO/IEC JTC1 SC22 WG15, *New Zealand (tentative)*
May 20	Sun UKUG, Paper In, Paper Out, *Venue Unknown, UK*
Summer	UKUUG C, *QueensUniversity, Belfast, Northern Ireland'*
June 2-4	UNIX EXPO West, *Anaheim CC, Anaheim, California, USA*
June 8-12	USENIX, *Marriott, San Antonio, Texas, USA*
June 21-24	Sun Users Group, *Washington DC, USA*
July	PCI, *Boston, USA*
July 13-17	IEEE 1003, *Chicago, Illinois, USA (location tentative)*
August	USENIX C++, *Location unknown*
September 8-11	AUUG C T, *World Congress Centre, Melbourne, Australia*
September 22 - 24	SUKUG C, *Birmingham, United Kingdom*
Autumn	USENIX Security III, *Location unknown*
Autumn	ISO/IEC JTC1 SC22 WG15, *Denmark*
Autumn	USENIX LISA VI Conference, *Location Unknown*
October 6	WG15, *Denmark*
October 19-23	IEEE 1003, *Montreux (location tentative)*

October 26-30	Interop, *Moscone C, S.F., California, USA*
November 25-27	EurOpen/UniForum, *Utrecht, Netherlands*
December	UKUUG/UKnet, *Manchester, UK*

1993

January 11-15	TCOS WG, *New Orleans, Louisiana, USA (location tentative)*
January 25-29	USENIX, *Town & Country, San Diego, California, USA*
March 15-18	UniForum, *Moscone Center, San Francisco, California, USA*
March 24-31	CeBIT 93, *Hannover, Germany*
April 5-19	TCOS WG, *Boston, Massachusetts, USA (location tentative)*
April 26-30	EurOpen, *Southern Spain (tentative)*
June 21-25	USENIX, *Cincinnati, Ohio, USA*
July 12-16	TCOS WG, *Hawaii (location tentative)*
Autumn	Europen/UniForum, *Utrecht, The Netherlands*
October 18-22	TCOS WG, *Atlanta, USA (location tentative)*
October 25-29	Interop, *Moscone C, S.F., California, USA*

1994

January 17-21	USENIX, *Hilton, San Francisco, California, USA*
February 14-17	UniForum, *Dallas CC, Dallas, Texas, USA*
March 16-23	CeBIT 94, *Hannover, Germany*
March 23-25	UniForum, *San Francisco, California, USA*
April 18-22	EurOpen, *Switzerland (tentative)*
June 6-10	USENIX, *Boston, Massachusetts, USA*
September 12-16	Interop, *Moscone C, S.F., California, USA*
Autumn	Europen/UniForum, *Utrecht, The Netherlands*

1995

January 16-20	USENIX, *Marriott, New Orleans, Louisiana, USA*
February 21-23	UniForum, *Dallas CC, Dallas, Texas, USA*
May 1-5	EurOpen, *Scotland (tentative)*
June 19-22	USENIX, *Hilton, San Franciso, California, USA*

1996

March 11-14	UniForum, *Moscone Center, San Francisco, California, USA*

1997

March 10-13	UniForum, *Moscone Center, San Francisco, California, USA*

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EurOpen National group addresses can be found at the back of this newsletter.

Here is a list of acronyms that you might find useful:

ACE	Advanced Computing Environments
ACM	Association for Computing Machinery
AFUU	The Association Française des Utilisateurs d'UNIX
AUUG	The Australian UNIX systems Users Group
DECUS	The Digital Equipment Computer Users Society
ECUG	The European C++ User Group
EurOpen	The European Forum for Open Systems, (was EUUG)
EXUG	European X User Group
FNUG	Federation of NCR User Groups
GUUG	The German UNIX Systems User Group
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
Interex	The International Association of Hewlett-Packard Computer Users
JUS	Japan UNIX Society
MCNTI	Moscow International Center of Science and Technical Information
NCR UUG	NCR UNIX User Group, Inc.
NIST	The National Institute of Standards and Technology
NLUUG	The Netherlands UNIX Users Group
NSF	National Science Foundation
SAB	Standards Activities Board
SERC	NSF/Purdue/Forida Software Engineering Research Center
SUUG	Soviet UNIX Users' Group
Sinix	The Singapore UNIX Association
UKUUG	The United Kingdom Unix systems Users' Group
USENIX	The Professional and Technical UNIX Association
UniForum	The International Association of UNIX Systems Users

POSIX Unveiled!

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POSIX represents a family of standards for sourced code portability. It defines the application programming interface by which a programmer accesses system services. It is being developed by the Institute of Electrical and Electronic Engineers (IEEE), an accredited body for developing *de jure* standards through a consensus process.

This article introduces the standards development project structure, the connection with the International Standards Organisation (ISO), and how EurOpen participates in the process. It is based upon a short presentation made during the Standards BOF at the EurOpen Conference in Budapest.

Heading POSIX Structure

POSIX is big! There a approximately 25 separate development projects spread across 15 IEEE working groups. These working groups meet together quarterly for a week at a time. Approximately 400 people attend. The draft documents together, which will hopefully one day become standards, number several thousand pages at this time.

Many of the current draft documents which are under development depend upon one another. All of these draft documents are relatively unstable, since they are being developed as we speak. The co-ordination effort between working groups is substantial.

The projects break down into the following groups:

- base standards, describing programmatic or command line interfaces,
- language bindings, describing the functionality of the standards in terms of other programming languages.
- profile documents, describing functional mappings onto the base standards for particular application domains,
- support documents, describing conformance test methodologies and a general guide to open systems environments.

Let's look at each group briefly. The base document projects are:

- POSIX.1 Basic System Interfaces,
- POSIX.4 Real-time extensions,
- POSIX.4a Threads extensions,
- POSIX.6 Security extensions,
- POSIX.8 Transparent File Access extensions,
- POSIX.12 Protocol Independent Interfaces,
- POSIX.15 Supercomputing Batch Interfaces,
- POSIX.17 Directory Services
- POSIX.2 Shell and Utilities
- POSIX.2a The User Portability Extensions to POSIX.2
- POSIX.7 System Administration

The current language bindings projects are:

- POSIX.1/LIS -- Programming Language Independent Specification of POSIX.1
- POSIX.5 - Ada Binding to the C-based POSIX.1
- POSIX.9 - Fortran-77 (with Fortran-90 long names) binding to the C-based POSIX.1
- POSIX.16 - C Binding to POSIX.1/LIS
- POSIX.19 - Ada Binding to the C-based POSIX.4 Real-time extensions.

The profiles currently under way include:

- POSIX.10 Supercomputing Profile
- POSIX.11 Transaction Processing Profile
- POSIX.13 Real-time Profile(s)
- POSIX.14 Multi-processor Profile
- POSIX.18 Programming Environment Profile

The support documents include:

- POSIX.0 The Guide to Open Systems Environments
- POSIX.3 POSIX Conformance Testing Methodologies
- POSIX.3.1 Conformance Test Methods for POSIX.1
- POSIX.3.2 Conformance Test Methods for POSIX.2

Of all of these projects in play, only two, POSIX.1 (Base) and POSIX.3 (Test Methodologies), are ratified standards. POSIX.2, (Shell), POSIX.2a (UPE), POSIX.3.1 (POSIX.1 Test Methods) POSIX.4 (Real-Time), POSIX.4a (Threads), POSIX.5 (Ada), and POSIX.9 (Fortran) are all in ballot. The rest are still under development.

The ISO Connection

The International Standards Organisation has a working group dedicated to POSIX. This working group (WG15) sits under the Subcommittee on Programming Languages (SC22) of the Joint Technical Committee (JTC1) on informatics standards with the International Electrotechnical Commission (IEC). The whole long-winded structure is shortened into the name ISO/IEC JTC1/SC22/WG15! We will call it ISO POSIX.

The intent of the ISO POSIX working group is to have the IEEE POSIX documents developed in such a way as to be acceptable as international standards. Indeed, the first piece of POSIX to become a standard (POSIX.1) is both an IEEE standard (IEEE 1003.1-1990) and an international standard (ISO/IEC 9945-1:1990) and the two documents are identical with the exception of the white ISO cover.

There is an elaborate synchronisation plan in place to attempt to produce the documents once as international standards. To date, the plan is slow and awkward.

Part of the problem is that the ISO POSIX working group is a considerably smaller group of people, numbering around 30, which meet twice a year. This makes it hard to synchronise two very large bureaucratic processes. These processes are important, just hard to harmonise.

ISO POSIX does not completely map the IEEE projects one to one. Many of the current IEEE projects are beyond the scope of ISO's interest. Essentially, ISO 9945-1 maps the base IEEE interface documents: POSIX.1 (base), POSIX.4 (real-time), POSIX.6 (security). The other base interfaces do not map into 9945-1 yet. ISO 9945-2 maps POSIX.2 (the shell and utilities). ISO 9945-3 maps POSIX.7 (system administration).

ISO ideally wants all of 9945-1 (Base interfaces) presented in programming language independent form, as functional descriptions, and future ISO standards will represent the C, Ada-9X, and Fortran-90 bindings to 9945-1.

Conformance test methodologies and methods are strictly the interest of an ISO POSIX rapporteur group. Functional profiles do not yet have any status within ISO POSIX. The POSIX.0 Guide is being considered for eventual status as an ISO Technical Report. There is in addition rapporteur groups on internationalisation (WG15 RIN), and security.

The EurOpen Connection

EurOpen has institutional status with the IEEE POSIX working groups. This means EurOpen has a voice in the development process of building POSIX. As of this writing, EurOpen also has been recently granted balloting status on the draft documents.

I am your institutional representative to the IEEE POSIX process. What I hope to do is to help EurOpen co-ordinate its voice to provide the European input into POSIX in a timely fashion. By the time the ISO POSIX working group gets the draft documents for comment, it is often painful to begin making substantive changes to the IEEE documents. EurOpen is not hampered by the lengthly synchronisation plan.

To help this process I will provide basic information, such as this article, to give members who are interested in POSIX standards, but not familiar with them, basic educational material. I am somewhat available to talk to the national groups. The Dutch and Finnish user groups have already invited me to speak about POSIX this November.

As well as the basic information, I will report in writing to the membership after IEEE POSIX meetings, and in person at the EurOpen conferences. This is more status type information, so that the membership is aware of the latest occurrences in the POSIX standards development world. Through this report back mechanism I can flag topics which may require your attention. The report on the July meeting of the IEEE POSIX projects should be in this issue.

Lastly, I am your voice into the IEEE POSIX working groups. If the national groups or EurOpen as a whole want to feed input back into the IEEE POSIX process, they can do so through me. At the Standards BOF in Budapest there was a clear indication that the members were uncomfortable with the current Windowing API projects. The fate of that particular project will likely be decided at the next (October) IEEE meeting. I will vote to remove sponsorship of the project as was indicated in the BOF.

If a national group or particular technology working group have comments on an IEEE POSIX draft document that they wish forwarded to the POSIX working group, I will carry those comments to the appropriate people. This might be on topics such as real-time, security, or internationalisation.

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Dominic Dunlop

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Three weeks early, at 11:30pm on 4th October, Joseph Malcom (sic) arrived, weighing 6lb 3/4oz and looking pretty annoyed and confused by the whole procedure.

Mother and baby are doing well. I'm not so sure about the father: he's been too busy running around for the last three days to be sure of his own state..

We wish him a Nappy time.

EWG News

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EurOpen working groups are growing.

The last EurOpen conference in Budapest was very succesfull for EWGs. The EWG meetings on Tuesday and the EWG conference on Thursday led to the creation of 5 EWGs (at the EurOpen level).

That means that even if you don't yet have a WG on your topic of interest, in your own country, you can participate to the work at EurOpen level with representatives from other national groups. Of course, if a national WG exist, it is simple to prepare contributions to the work of the EWG. Your national representative can share your experiences and ideas with the other contributors.

The first five EWGs are:

- INTERNATIONALISATION — with participants from DKUUG, IUUG, AIUUG, EUUG-S, AFUU
- BENCHMARKS — with participants from AFUU, GUUG, AIUUG, Turkey, SUUG, i2u
- COPYRIGHT LEGISLATION — with participants from GUUG, UKUUG, SUUG, NLUUG
- SECURITY — with participants from AFUU, UKUUG, SUUG, IUUG, AIUUG, BUUG, GUUG
- MARKETING — with participants from AFUU, EUUG-S, SUUG, UKUUG

Following are the forms describing these groups.

To participate to a group, simply send your name, address, telephone number, fax number and Email to the chair of the group. You will be put on to the list of the group and receive information.

The groups work mainly through Email to produce output. If you don't have an Email connection, a fax gateway allow you to receive the documents by fax. The group may also organise meetings (especially during The EurOpen conferences).

When the group produces some output, it will be sent for a wide review and comment through the newsletter and the news. It will then become the "EurOpen voice".

EWGs are a good opportunity to exchange information, coordinate with others, and, why not, to launch a WG in your own country.

Do not hesitate to contact the chairmen or myself for further information on any of the groups.

Jean-Michel Cornu
EWG coordinator

EurOpen Working Groups - Mailing List

Name: ewg-nation@eu.net

EWG National Contact Point

Date: 1991-10-04 (first version)

Name	E-mail OR Facsimile	Comment
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Javier Romanach	jromanach@tid.es	UUES WG coordinator
Friedrich Kofler	kofler@tuvie.can.ac.at	UUGA chairman
Milan Palian	milan@parex.yu	YUUG chairman

Description Of A EurOpen Working Group

Topic: Internationalisation

Scope: Definition of national locales of EurOpen members for ISO/IEC 9945

POSIX international standard.

Study of internationalisation and localisation aspects

Outputs Expected:

first output: guide for producing national locales

next outputs: National locales for ISO/IEC 9945-1 & -2

Chairman: Keld J. Simonsen

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Creation Date: 1991-09-19

This group will exchange informations by Email on: ewg-i18n@eu.net. If you don't have an Email, you will receive informations by fax.

The outputs produced by the group will be published in the EurOpen Newsletter and the newsgroup (tbd) for review and comment.

If you want to join this group, please send your name and address to ewg-i18n-request@eu.net.

Description Of A EurOpen Working Group

Topic: Benchmarks

Scope: Gathering benchmarks, put them in order to be of use, create tapes

Outputs Expected:

first output: starter kit

next outputs: benchmaks tapes, publication of results guideline to use the results.

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This group will exchange informations by Email on: ewg-bench@eu.net. If you don't have an Email, you will receive informations by fax.

The outputs produced by the group will be published in the EurOpen Newsletter and the newsgroup (tbd) for review and comment.

If you want to join this group, please send your name and address to ewg-bench-request@eu.net.

Description Of A EurOpen Working Group

Topic: Copyright Legislation

Scope: Analysing of documents on Interface Copyrights, and defining

EurOpen Position.

Outputs Expected: EurOpen statement on copyright legislation, sent to the CEC and the national governments.

Chairman: Dr Anton Gerold

Address: TU Munchen, Informatik
Arcis str 21, D-8000 Munchen, GERMANY

Telephone: +89 21058187
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E-mail gerold@informatik.tu-munchen.de

Creation Date: 1991-09-19

This group will exchange informations by Email on: ewg-cprght@eu.net. If you don't have an Email, you will receive informations by fax.

The outputs produced by the group will be published in the EurOpen Newsletter and the newsgroup (tbd) for review and comment.

If you want to join this group, please send your name and address to ewg-cprght-request@eu.net.

Description Of A EurOpen Working Group

Topic: Security, UNIX and TCP/IP Security

Scope:

- Study of IEEE P1003.6 (security services) and IEEE P1003.7 system administration) draft, as well as security aspects in the other drafts. contributions to IEEE, definition of the EurOpen vote on security.
- Statements on secure UNIX, security software
- Technical studies on administration techniques, IP routing techniques, intrusion detection, security evaluation, etc...
- Debate about UNIX security.

Outputs Expected:

first output : EurOpen position on 1003.6 current draft

next outputs : Articles in the newsletter, EurOpen vote on security.

Chairman: Herve Schauer

Address: AFUU, EWG Security
11 rue Carnot, F-94270 Le Kremlin Bicetre, FRANCE

Telephone: +33 1 46 38 89 90
Facsimile: +33 1 46 38 05 05

E-mail Herve.Schauer@enst.fr

Creation Date: 1991-09-19

This group will exchange informations by Email on: ewg-secur@eu.net. If you don't have an Email, you will receive informations by fax.

The outputs produced by the group will be published in the EurOpen Newsletter and the newsgroup (tbd) for review and comment.

If you want to join this group, please send your name and address to ewg-secur-request@eu.net.

Description Of A EurOpen Working Group

Topic: Marketing

SCOPE: Defining user requirements in coordination with CEC, identifying the barriers for the development of open systems.

Outputs Expected:

first output: collection of first user requirements.

next outputs: presentation of requirements align on other organisations contributions to Xtra and other requirements studies.

Chairman: Pierre Scheuer

Address: (see EurOpen secretariat)

Telephone
Facsimile

E-mail

Creation Date: 1991-09-20

This group will exchange informations by Email on: ewg-market@eu.net. If you don't have an Email, you will receive informations by fax.

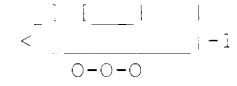
The outputs produced by the group will be published in the EurOpen Newsletter and the newsgroup (tbd) for review and comment.

If you want to join this group, please send your name and address to ewg-market-request@eu.net.

EurOpen Software Distribution

Frank Kuiper
EurOpen Software Distribution
Amsterdam, The Netherlands

E-mail europen-tapes@EU.net



It's been a while, but here again is some information from the Software Distribution front. Again there has been a conference, and again there has been a conference tape. The theme of the Budapest tape was "Starter Kit". This is largely the same as the already available EurOpenD3 tape. It was my impression that many people in east Europe would appreciate a tape with lots of tools to help them connect to the outside world.

Due to not enough possibillities in making copies of the conference tapes in Hungary, and expected problems with customs, in shipping many dozen tapes into Hungary (which in most case would leave the country several days later anyway), the decision was made to send the tapes seperately to all those who requested the tape before or during the conference.

If you haven't received your tape yet, please don't hesitate to contact me.

HOT NEWS! Something people have been waiting for, for a while: X11R5 is now available as a EurOpen distribution. X11R5 will replace release 4 on the distribution EurOpenD15. As the X11R5 is even bigger than release 4 (did we really expect otherwise :-), it now doesn't even fit anymore on one cartridge. Unfortunately this also means that the price will be higher.

In order to be a bit more prepared for the next conference, there will probably be a check-box for those who pre-order the tape on their conference registration form. This will be so you can indicate whether you want to collect the tape at the conference, or whether the tape should be send seperately, directly to your home or office.

One last thing to not, is that all orders for tapes should now be directed to Owles Hall. In this Newsletter you will find a seperate section, dedicated to make it easier for you to order things. You can still inquire with me for any questions or remarks you might have. I can be reached at:

EurOpen Software Distributions
c/o Frank Kuiper

Telephone +31 20 5924121 (or: +31 20 5929333)
Facsimile +31 20 5924199

E-mail europen-tapes@EU.net

Below you'll find the usual list of available distributions. As always, anyone is invited to make their own tools, games, etc. available for publication on an EurOpen tape. Please contact me for more details. Don't hesitate, just put the results of many nights of serious programming and hacking in the public domain, and you might even become famous!

This is a list of all the current (October 1991) EurOpen Software Distributions. It is a short description of the available tapes. Any changes to the contents of the tapes, as well as announcements of new tapes will be placed in the EurOpen Newsletter. Those of you who have ftp access to the outside world, be aware that on mcsun.eu.net (192.16.202.1), you can find in the ~ftp/EurOpenD-index directory, files with contents lists of the available EurOpen distributions. These files are compressed tar tv listings. I am working on a method so you can automagically, by e-mail, easily find out which program is on which distribution. For the moment you will have to e-mail, call, or write me to find out.

Prices of the tapes are in ECUs and Pound Sterling.

The first price listed with each distribution, is for 1/2", 9-track, reel tapes in tar 1600 bpi format, the second one is for distributions on 1/4" cartridge tapes in (Sun) QIC-24 format.

Note that you have to be an EurOpen member (or a member of a national UUG) to obtain tapes at list prices. Non-members will have to pay an extra handling fee per tape.

EurOpenD1 R6:
UNIX V7 system, specially made for small DEC PDPs (11/23, 11/34, etc.). The Kernel supports the UK terminal driver. You need at least a source licence for V7 to obtain this distribution. The tape is PDP-11 bootable format, so take care.
Price: £42 60 ECU - (No cartridge version available.)

EurOpenD3:
"Starter Kit" aka "Budapest, autumn 1991 conference tape". The tape contains many public domain mail, news, networking utilities, tools, attributes and information. It is THE tape for all who want to share in the joy of really feeling connected to the world in general, and the Unix TM world in particular! Programs you will find on this distribution are:

mail:	mh, elm2, sendmail (5.61 currently), smail, ida, mailway
network:	ka9q, snmp, uupc, uucp over x25
news:	bnews, cnews, nn, nntp, rn, vms, tmnn
gnu-tools:	gawk, grep, make, mh, tar
docmentation:	iso3166, ethernet-info, several RFC's
misc:	kermit, tn3270, vacation

In regard to the documentation a note. It is our intention to have National Groups supply information for the tape, in the local language, about how their network is set up, how to connect, what is and what is not (yet) possible, and some further guidelines. As we still have to build this database of local information, it will (hopefully frequently) happen that this Starter Kit distribution will be kept up to date and incorporate new software and documentation over time. This of course depends largely on the amount of time I can make available for this and how input the local groups give. I will do my best.So far I have only had one serious contribution! Dave Gray, from the University of Surrey, who was so kind to supply a small user guide for Unix, which they hand out to their new students. It's is a little bit targeted to the specific situation at the University of Surrey, but I'm sure it will be of help to others. At least as a starting point in making their own user guide. Thanks Dave.
Price: £42/£60 60/86 ECU

EurOpenD4:
Software tools, sampled (in 1982) by the Software Tools Users Group. Most of the software is written in Ratfor, for which a Fortran support tool is included. This tape is available in different formats: DEC RSX, DEC VMS, UNIVAC, IBM MVS, UNIX tar, MIT line feed format, and MIT card format (80 columns).
Price: £50/£60 72/60 ECU

EurOpenD5:
Currently not available. See tape EurOpenD20 for new benchmark software.

EurOpenD6:
(USENIX 83.1) USENIX tape, containing contributions from various UNIX System Group Members. Created in 1983. This is a licence dependent distribution: V7, V32, SIII, V6 or no licence disclosure available.
Price: £78/£96 112/140 ECU

EurOpenD7:
UNIX|STAT Version 5.2. A collection of about 25 data manipulation and analysis programs written in C by Gery Perlman (1985).
Price: £24/£60 35/86 ECU

EurOpenD8:
A collection of useful software, based on the so called Copenhagen tape (EurOpen UNIX conference autumn 1985).
Price: £42/£60 60/86

EurOpenD9:
A collection of useful software, based on the so called Florence tape (EurOpen UNIX conference Spring 1986).
Price: £52/£60 75/86 ECU

EurOpenD10:
MMDFIIb. Multichannel Memo Distribution Facility (version IIb). This is a powerful, domain oriented mail system with access control and the ability to communicate over a variety of network systems including TCP/IP, JANET, UUCP, PHONENET, etc. It has been ported to a variety of UNIX's including but not limited to 4.[123] BSD, 2.9 BSD, System III/V on a variety of different hardware. You should first obtain a licence agreement by sending a message to euug-tapes@EU.net. Return the signed licence with your order.
Price: £33/£60 48/86 ECU

EurOpenD11:
This is the 'Boat' tape; the Helsinki EurOpen 1987 spring conference. It contains about 25 Megabytes of programs, games, etc. Including: jove, less, nag, news, rn, uEmacs, uuencode and larn.
Price: £42/£60 60/86

EurOpenD12:
This is the Dublin EurOpen 1987 autumn conference tape. It contains about 26 Megabytes of programs, games, etc. Including: copytape, crc_plot, fastgrep, jove, kermit, notes, uupc, nethack, cron, sendmail, mh, Recipes, brl-gw, isode, pcip, pctelnet.
Price: £42/£60 60/86 ECU

EurOpenD13:
The conference tape for the London EurOpen 1988 spring conference. It contains, amongst others, the following items: cake, chat, config, copytape, graphedit, kermit, little- st, mcc, mstools, news, pd-diff, pdtar, perl, postscript, psfig, pshalf, shar, rpc, moria4.85, omega, arc, backup, smail, sush, watcher, and much, much more.
Price: £42/£60 60/86 ECU

EurOpenD14:
ISODE. This is version 7.0 of this non-proprietary implementation of some of the OSI parallel protocols suites as defined by the International Organisation for Standardisation (ISO), the International Telegraph and Telephone Consultative Committee (CCITT), and the European Computer Manufacturer's Association (ECMA).

This release is coded entirely in C, and is known to run under the following operating system without kernel modifications:

BSD 4.2 and 4.3, Ultrix, AT&T UNIX SVR2 and SVR3, AIX, HP-UX, ROS, Pyramid OsX

Since a Berkeley UNIX system is the primary development platform for ISODE, the documentation and source are somewhat slanted towards that environment. The tape contains some 12Mb of both tools and documentation in machine readable form. The EurOpen will send you a tape only. Documentation is available on the tape in PostScript format.
Price: £42/£60 60/86 ECU

EurOpenD15:
The complete X11 Windowing system, as distributed by MIT, release 5: X11R5. Do to the vast growth in user contributed software, this distributions now totals 80 Mb in compressed form. This results in two 1/2", 9-track tapes, and one 450 ft, Qic-24, 1/4" cartridge tapes. Thisdistribution includes the core system, as well asall the contributed software as supplied by MIT. No patches are supplied, however.
Price: £82/£120 1120/172 ECU

EurOpenD16:
This is the Brussels EurOpen 1989 spring conference tape, and consist entirely of software from the GNU project from the Free Software Foundation. Last update: autumn 1990. On this tape you will find: ispell, g++, awk, gcc, gdb, Cscheme, emacs, lisp-manual, libg++, binutils, bison, ghostscript, gas- dist, gawk, gnews, gnuchess, make, oops, pace, ps-emacs, scheme, sed1, tar and torture.
Price: £42/£60 60/86 ECU

EurOpenD17:
This tape contains the software for ET++. From the abstract of the "Autumn 1988 EurOpen Conference Proceedings": "ET++ is an object-oriented application framework implemented in C++ for a UNIX environment and conventional window system. The architecture of ET++ is based on MacAPP and integrates a rich collection of user interface building blocks as well as basic data structures to form a homogeneous and extensible system." It totals some 18Mb of software that the people of the Institut fuer Informatik of the University of Zurich were so kind to let us, mere mortal souls, play with. Have fun.
Price: £42/£60 60/86 ECU

EurOpenD18:
This is the "Vienna EurOpen 1989 autumn conference tape", and consists entirely of games! There is a SUN specific set, a set for the X Windowing System environment, and a general useable set. All the games supplied are working, and have been tested at CWI by our "Games Keeper <play@cwi.nl>". For many games he added additional features, not found in the originals. Some of the games included are: for SUN: Asteroids, Mahjongg, Othello, Qix, Sdi, Tetris. For the X environment: Xtrek, Xgo, Xwanderer, Xrobots. General games: Nethack, Adventure, Atc, Empire, Reversi, Yahtzee, Trek73, Backgammon, Corewars, MazewarsV, Vtrek, and lots, lots more. If this doesn't bring some fun back into using computers, I don't know what else can:-)
Price: £42/£60 60/86 ECU

EurOpenD19:
This is the "Munich EurOpen 1990 spring conference tape", and consist entirely of graphics material. Conversion programs, display tools, toolkits to build you own display program, and off course images, lots of pictures to play around with.
Price: £42/£60 60/86 ECU

EurOpenD20:
This tape contains benchmarking software and is named "AFUU/SSBA 1.2, benchmarks". The French group have done a good job creating a tape with all the necessary tools, so you can finally bring your machine down to it's knees, and see what it is really worth.
Price: £24/£60 35/86 ECU

EurOpenD21:
This is the "Nice EurOpen 1990 autumn conference tape", and consist of a number of different kinds of software, like: dtree, abc, new versions of various mail and news utilities, and PP5.0.
Price: £42/£60 60/86 ECU

EurOpenD22:
This is the "Postman Pat PP5.0" distribution. PP is a Message Transfer Agent, intended for high volume message switching, protocol conversion, and format conversion. It is targeted for use in an operational environment, but may also be useful for investigating Message related applications. Good management features are a major aspect of this system. PP supports the 1984 and 1988 versions of the CCITT X.400 / ISO 10021 services and protocols. Many existing RFC 822 based protocols are supported, along with RFC 1148 conversion to X.400. PP is an appropriate replacement for MMDF or Sendmail.
Price: £42/£60 60/86 ECU

EurOpen D23:
The "Tromsø EurOpen 1991 spring conference tape". Also as the "Network" tape. On this distribution you will find a large number of programmes having to do with networked environments, like" amd, athena, routed, python, ftp, telnet, ncsatelnet, osi, pcbridge, pcip, pcrout and some other little gadgets.
Price: £42/£60 60/86 ECU

Linking Other Worlds with X

Raymond Anderson
IXI Limited
Cambridge
United Kingdom

Raymond Anderson is managing director and founder of IXI Limited, a software house which develops X Window System applications and technology. Previously, Ray was Development Director of Torch Computers where he masterminded the OpenTop man machine interface for Torch's UNIX computers. Ray is an internationally renowned expert on Open Systems and Graphical User Interfaces.

One of the big benefits of the X Window System is that you can sit at you display device and use software on remote systems elsewhere on the network as if it were running on your desktop system. If you have a PC such as a Macintosh or an MS-DOS machine, you can only display software that is running locally, and if you have a VT100 or 3270 display, although you are connected to remote system, you can't use several computers at the same time.

More and more devices or software packages will emerge which bridge from non-standard protocols to X, and the dream of a single display with access to all the information in an organisation can become a reality.

There is now a good deal of third party software which allows businesses to integrate their PCs, Macs, workstations and IBM Mainframes into one inter-communicating X Windows-based matrix. Some of these are described in this article.

Character Screen Based Software

Character based software is well served by X, primarily because the UNIX community had a wealth of character based software to move over to X in a hurry, and also because character screen displays are inherently simple.

However, an X terminal or any X display only understands the X networking protocols, so if you want to bring in character-based software, you need some additional software to convert the output into a form that X understands.

"xterm" takes VT100 character sequences and images them using X protocols. More advanced tools such as IXI's Deskterm allow the character interface to be encapsulated by a fully "GUI'ed" graphical interface.

IBM Mainframe Software

The most popular terminal in the world is the IBM 3279 display. IBM mainframes typically support screen based interactions using the 3270 protocols, which are usually passed over a co-ax cable to the display devices using an IBM protocol.

To connect the co-ax cable to your X terminal is no easy task. If you have a workstation, there may be a special card you can plug in which takes the connection. More likely, you will not want to add hardware to support the connection. Fortunately, there are other options.

There are products on the market which bridge between the IBM world and other protocols - a popular option being a device which supports 3270 emulation on VT100 or ANSI displays. Some of these protocol converters plug directly into your network, while others generate character based output on serial cables that have to be connected to a gateway. The VT100 emulation, using "normal" characters can then be handled using an X terminal emulator such as xterm.

Companies, such as Spectragraphics, also make software available which directly emulate the full capabilities of the 3270, including its protected fields and special functions. You can then bring up a full

3270 terminal as an X window. The only difficulty might be getting used to the different keyboard layout.

Getting to DOS Software

If you want to access software that runs under MS-DOS, you not only have to run the software, but there has to be some way of converting the BIOS (Basic Input Output System) character stream into X protocol calls so that the display output appears in an X window. In addition, if the software works by writing into graphics memory, those operations have to be faithfully reproduced in a window on the X server by making one or more graphic calls.

Software to make this happen is hard to write because many DOS programs are "badly behaved" and the complexity of reproducing every nuance of even an EGA display is not to be underestimated. However, some vendors have succeeded in producing acceptable emulations provided certain constraints are adhered to. Most of these are designed to run on Intel 80386/486 workstations where the software runs locally.

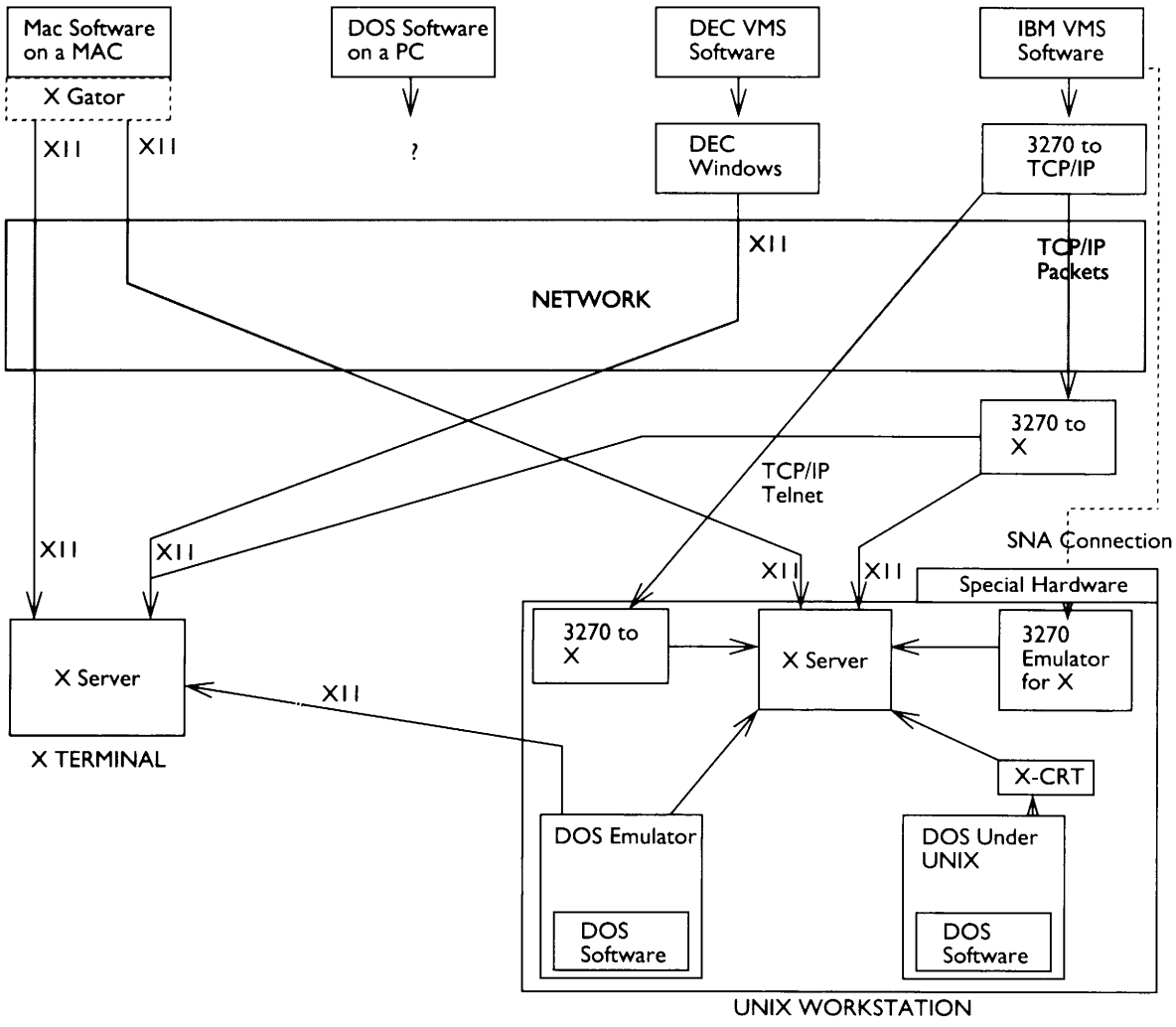
DOS software often relies on "scan-codes" from the IBM keyboard, so it is necessary for the software to have intimate access to the X protocols to handle the emulation correctly, and there can be strange effects when the mouse is moved outside the PC emulation screen.

An alternative route is to emulate the whole screen graphically, simply monitoring the memory area that would be mapped onto the hardware display of the PC and then copying it pixel by pixel using x protocols to the X server. Using clever algorithms, the load is not nearly as high as it would be with a "brute-force" approach, but nevertheless the load may be too high to run across a slow network.

The technique for capturing the screen image or the BIOS character stream is usually part of the DOS under UNIX emulation - for example interactive's VP/ix or Locus's DOS Merge.

Products such as Insignia's Soft PC emulate an Intel based processor on another processor type, with MS-DOS running under emulation. The screen output is produced using X calls on most UNIX machines. This means that any X user with access to a machine running Soft PC can execute DOS programs in a window.

We don't know of any DOS software which can run as a background (Terminate and Stay Resident - TSR) function on a PC and connect directly to an X server without have to run the DOS system under the UNIX environment. This may be because of the shortage of memory on DOS systems.



Microsoft Windows 3 Software

MS Windows software is much harder to emulate under X because it is much more tightly integrated with the hardware environment. This represents a bigger challenge for producers of bridging products.

Another solution may be to use an X server which runs under Windows 3, and to run the X software on a Pc with the X software running remotely. Products from Visionware, Hummingbird, Integrated Inference Machines and JSB Computer Systems are available today.

Macintosh Software

A recent product from Cayman Systems called "Xgator" runs software on the Macintosh which intercepts the screen calls produced by mac software, and generates suitable X protocol messages to display the Mac screen on a remote X display. By conforming to all the relevant X standards, the software works with the Motif or Open Look window managers, but each individual Mac window must run inside the screen emulation window. Transforming the Mac window manipulations faultlessly into X call is not supported, and would be much more complex.

If you have a Mac on your desk, you can always run the software locally and use of the X server products for the Mac which let you access your X software at the same time.

Other Environments

There are many other screen access modes which you also want to use including Tektronix graphics, ICL-CO3, CEPT-Videotext, Teletex and a wide range of other screen control sequences.

In almost all cases there is some way of bringing these protocols to your X display, either by running a tailor made terminal emulation package, such as Pericom's TeemX, or by using an emulator which produces ANSI terminal sequences and then passing that through a further stage.

Looking Ahead

We can expect to see a wide range of new terminal emulation products for X, and as more X devices arrive on users' desks, more products which directly generate X protocol messages on to a network will be produced.

Telephone exchanges and network bridges today sport a serial connector for attachment to a terminal. Soon, these will be supplemented by a network connection, and the software will have an option to generate X protocols for X terminal users.

More and more devices or software packages will be produced which bridge from non-standard protocols to X, and the dream of a single display with access to all the information in an organisation will become a reality.

Contact Points

Cayman Systems	US: +1 617 494-1999
Hummingbird	US: +1 416 470 1203
Insignia Solutions	US: +1 408 522-7600
Integrated Inference Machines	US: +1 714 978 6776
Interactive	US: +1 213 453 8649
JSB	UK: +44 625 433618
Locus	UK: +44 296 89911
Pericom	UK: +44 604 232223
Spectragraphics	UK: +44 203 694869
Visionware	UK: +44 532 788858

USLE Column

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Introduction

As the Open Systems market expands, the need to customise individual solutions in an efficient, cost effective manner is increasingly necessary to meet user demands, but users are not willing to throw out their investment in software. In order to provide new functionality, they must be able to do so in a manner which protects their installed application base.

UNIX System V Release 4.1 (SVR4.1) provides a "plug and play" software configuration, the modular add-on functionality to SVR4.1 allowing customers to evolve and provide solutions as their customers' needs change. It is a modular base operating system designed to reduce development costs, provide consistent source code across multiple architectures, allowing faster time to market. The new SVR4.1 base provides standard interfaces by supporting the interfaces that are available today in SVR4.

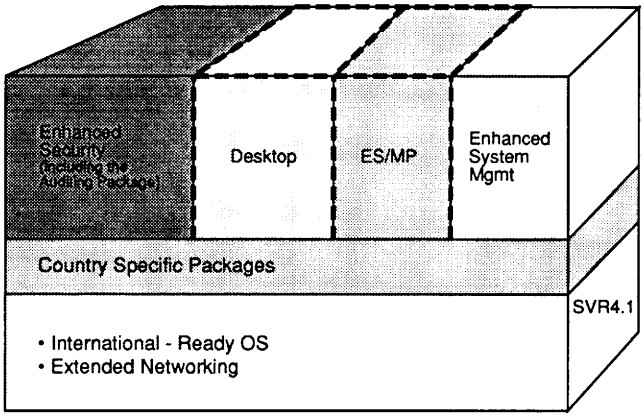
Figure 1 lays down the essential components of SVR4.1. Building on the modular work which began in SVR4, further restructuring has taken place to meet modularity requirements of security agencies. Additional functionality has also been included in the base operating system to address changing market needs.

Firstly, Internationalisation is no longer an option in system software, but a necessity to effectively compete in worldwide markets. SVR4.1 is now an "international-ready" Operating System (OS) — reducing development costs, and allowing quicker delivery of systems to the international market. SVR4.1 extends the internationalisation functionality in SVR4 and incorporates the Multi-National Language Supplement (MNLS) add-on product into the new base OS. All of the most frequently used UNIX System V commands and all new SVR4.1 commands, have been internationalised. Native language support is provided through country specific add-on packages. The country specific add-on packages provide the localised version for the international-ready commands that are in the OS.

Secondly, SVR4.1 Base OS extends the networking support found in SVR4. The new functionality in SVR4.1 provides additional tools to support distributed application development in a UNIX environment. It addresses the need for increased network security services, giving a framework to support multiple authentication services.

A new interactive remote execution mechanism, plus an extension to existing networking functionality (RFS, NFS, uucp, Service Access Facility) work not only with the above functionality but also with Enhanced Security features.

The move to SVR4.1 involves a minimal amount of development investment as the majority of the SVR4 source code has remained the same. Seventy-four per cent of the kernel code is the same as SVR4; 15 per cent has been enhanced to support the new modular design of the kernel, making it easier to locate and modify code and 11 per cent was added to support the new functionality in the base operating system and to provide the hooks to support the add-on options. SVR4.1 provides a common source tree for all reference ports and machine specific code is located in separate source trees where it is easy to find and modify.



SVR4.1 Base Operating System supports add-on modules which will specifically provide the following:

- Enhanced Security
- An Auditing Package
- Desktop
- Multiprocessing (the future SVR4.1 ES/MP)
- Enhanced System Management

The Enhanced Security Auditing and Enhanced System Management package options will be available this quarter.

In this article, I will look particularly at the Enhanced Security option and examine its characteristics.

SVR4.1 Enhanced Security Option (SVR4.1 ES)

The security of computer systems is becoming more and more important. The increasing costs of potential damages has lead to security requirements in all commercially available systems.

An estimated 75 per cent of all security risks are accounted for by human factors, according to the Datapro Research Corporation (see Figure 2). SVR4.1 ES minimises the threats of human negligence or maliciousness with the introduction of extensive security features to meet both business and government user needs. National bodies have been formed to set up computer security evaluation criteria and to perform such evaluations. The "Orange Book" has been published by the US NCSC, while in Germany, the IT Security Criteria are available. Work on harmonised European Criteria (ITSEC) is ongoing and this criteria is being adopted throughout Europe.

The NCSC evaluates commercial operating systems against the TCSEC, using security ratings in four divisions (D, C, B, & A from the least to the most secure) containing numerical classes (e.g. B1, B2 & B3 from the least to the most secure). Although its main concern is with government and defence computer systems, the TCSEC also addresses a wide range of concerns shared by non government users. USL has also found in discussion with customers that commercial requirements for security are similar to government requirements and UNIX Systems implemented to the TCSEC specifications answer the needs of both commercial and government users. USL has chosen a B2 level of assurance with additional B3 level features for SVR4.1 ES because this combination provides the best balance of functionality and assurance for both commercial and government users.

The key features of SVR4.1 ES are as follows:

Identification and Authentication Facility (IAF) provides user authentication at login time. It helps an administrator handle one of the most critical security jobs, insuring that only authorised users gain access to a system. The Enhanced Security option provides a mechanism that allows flexibility in the choice of authentication schemes so that administrators can custom tailor the login procedure for particular needs.

Discretionary Access Control (DAC) allows the data owner the discretion to determine who to grant access to their data and what kind of access to grant. The owner may set each of the three file protection modes (read, write, and/or execute) for other users. These modes also protect against human errors like accidentally changing data.

Access Control Lists (ACL) extend the typical UNIX System user/group/other access control by allowing a data owner to define a custom list of users and groups with access permission for each.

Mandatory Access Control (MAC) restricts access to resources, based on the sensitivity of the data and the system defined formal authorisation of a user to access information of that sensitivity. Every resource, including processes, files, segments, directories, and devices, is assigned a security label, which combines a hierarchical "classification level", and non-hierarchical "categories". MAC manages access to resources so users cannot compromise security by moving information from a higher classification to a lower one or reading information at a higher level than they are permitted, or in a category they do not have permission to access. MAC is especially useful in highly sensitive and security conscious commercial applications where tight control is needed over access to data. Corporate resources,

for example, could be classified hierarchically with levels like "public", "proprietary", and "Proprietary - restricted", then further categorised in groups like "personnel", "finance", and "engineering".

Trusted Communication Path ensures that the communications path between the user and computer during login is secure, and that no unwanted process can access that path, protecting against Trojan horses during the login process.

Trusted Facility Management (TFM) allows separation of administrative roles so that the person performing a given role has only the amount of privilege needed to do his/her job.In commercial and government environments, TFM significantly limits the potential for a malicious or incompetent administrator to damage or otherwise compromise a system and its security.

The Audit Trail and Report allows administrators to audit a wide range of events in the system. A system administrator can monitor user actions and identify possible security problems. For examples, the audit trail records both successful and unsuccessful logins and the commands that each user executes.

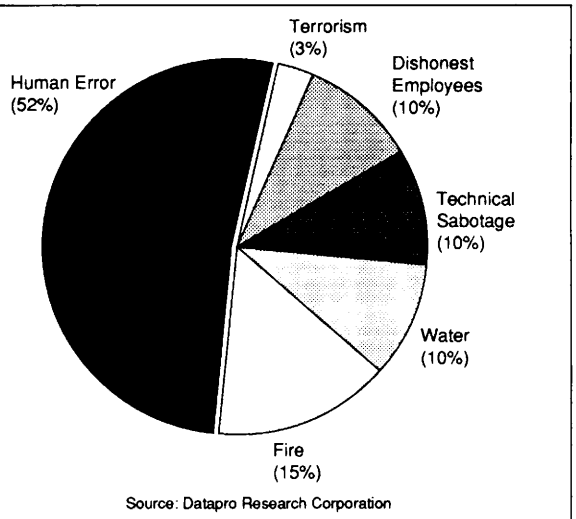


Fig : 2 Threats to Information Assets
Common Causes of Damage to Information

Security Assurance

In addition to the security features, government and some commercial computing environments require extra assurances that the system meets their security needs. SVR4.1 ES has been developed to conform to stringent government standards and is undergoing formal evaluation with the US National Computer Security Agency. For both commercial and government users, the assurances that this evaluation brings is just as important as the security features of the system. All USL's development processes have been analysed to ensure that the correct quality is achieved.

Assurance comes through having quality processes in place during requirements design, implementation and testing. The greatly increased assurance of the system provides a level of quality that can not be found in an unevaluated product. Without the assurance, a product that hasn't been evaluated may be no more secure than a house without an unpickable lock on the front door and all of its windows open. In addition to submitting SVR4.1 to the NCSC, USLE has made an agreement with Siemens Nixdorf Informationssysteme AG to co-operate on the reference port for the Intel 386 and add the additional features and functionality appropriate for achieving an F4/Q4 certificate with the German Information Security Agency (GISA).

SVR4.1 Enhanced System Management

This additional add-on to SVR4.1 will further enhance the functionality. It provides new remote system management services; for example software distribution installation and remote message logging and management. It also provides a framework to develop additional remote system management software that can work independently of the underlying network service therefore reducing software development time.

The B2 Rating Kit

The B2 secure rating kit provides all security relevant documentation and tests used to certify the system with the NCSC. This kit will speed the process of testing and certifying your systems with the NCSC. The tests include a complete set of interface and functionality tests for the entire Trusted Computing Base (TCB). Documents include NCSC Security Architecture that details the internal operation of the system, the Security Test Specifications, and the TCB Test Design Specification. The Rating Kit also includes the covert channel analysis tool.

How do I migrate to the Security product?

As previously described, the modularity of SVR4.1 has substantially reduced the porting effort required by OEMs moving from an SVR4 base operating system. Additionally, different customers may require differing levels of security, dependent upon their market need. The modularity of the security offering allows customers to provide specific secure options (i.e. C2, B1 or B2). For those who do not require full B2 level security, the C2 level auditing package is available separately to run on the SVR4.1 base. Additionally, via our technical consultants the C2 Auditing package may be back ported to a Release 4 base, for those customers wishing to retain their current kernel systems.

Summary

SVR4.1 is the next stage in the development of the SVR4 product line, with the incorporation of significant security and internationalisation features in the base product. Future feature development will be built on this base. For those already developing products on SVR4, movement to SVR4.1 is comparatively easy, and the investment made in developing software on SVR4 is protected. The Enhanced Security add on module has been developed to meet the functionality demanded by the government and commercial sectors. It simply provides the most advanced security protection available in the UNIX market today.

Puzzle Corner

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Mick is the Secretary of the UKUUG. His primary interests are Ornithology (restricted to the Western Paleartic at the moment because of cost) and Oenophilism (especially pre-1962 Bordeaux, pre-1980 Burgundy, and 1945 Port). His secondary interests include Software Consultancy (to pay for the above primary interests) and Distance Learning Methods (especially interactive video and hypertext). When not pursuing these and other interests he can be found at Birkbeck College (London) where he teaches in the Department of Computer Science.

He lives in Lewisham (South East London) with his wife Sue and a TV called Sonya. His neighbours have two children and a dog.

Solution to Puzzle Number 21

The poorest shot, Peter, has the best chance to survive. Alfred, who never misses, has the second best chance. Peter's two opponents will aim at each other when their turn comes, so Peter's best strategy is to fire into the air until one opponent is dead. He then gets first shot at the survivor, which gives him a strong advantage.

The entire duel is graphed in Figure 1.

From this we get that Alfred's chances are 3/10, Brian's chances are 8/45, and Peter's chances are 47/90.

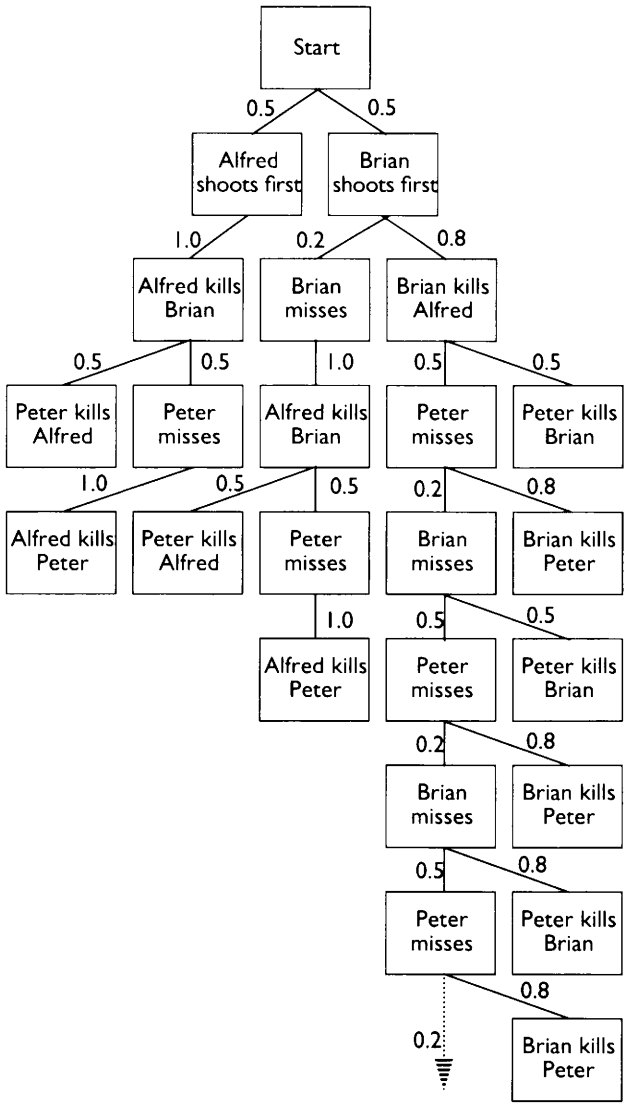

Figure 1

Solution to Puzzle Number 22

This puzzle is a slight variation on an older version which is the same except that in the morning, when the final division is made, there is again an extra coconut for the monkey. If N is the original number of coconuts and F the number each sailor receives on the final division, then the puzzle can be expressed as the six indeterminate equations below.

N = 5A+1
4A = 5B+1
4B = 5C+1
4C = 5D+1
4D = 5E+1
4E = 5F+1

These reduce to the Diophantine equation below.

1024N = 15625F+11529

Our task is to find the smallest positive numbers satisfying this equation! This is too difficult by trial and error so we invoke the concept of *negative* coconuts.

Since N is divided six times into five piles, it is clear that 5^6 (15625) can be added to any answer to get the next highest answer. There is no small positive value for N which meets our conditions, but a bit of trial and error yields a simple negative answer, -4.

The first sailor approaches the pile of -4 coconuts, tosses a positive coconut to the monkey, leaving -5 coconuts. These he divides into five piles and, after hiding his pile, this leaves -4 coconuts! Continuing the process we find that each sailor ends up with two negative coconuts while the monkey ends up with six positive cocobuts. To find the lowest positive integer solution we add 15625 to -4, yielding the solution of 15621.

Now you can tackle the original problem!

Solution to Puzzle Number 23

Using three matrices, one for husband names, one for wife names, and one for sibling relationships we can deduce the facts given below.

Marguerite White is Brown's sister.
Helen Black is White's sister.
Beatrice Brown is William Black's sister.

Note that we have to leave undecided the first names of White and Brown.

Puzzle Number 24 — the old ones are best

Last year the London local UNIX User Group (LUUG) held a quiz for a number of teams. Questions were submitted from a number of sources and disciplines (in order to show that LUUGers had a wide and diverse range of interests :-). My recollection is that Imperial College's team, led by Jan-Simon Pendry, won mainly because Jan-Simon could remember obscure acronyms faster than anyone else!

Now that winter is upon us, here's the unabridged set of questions for you to use with your own quizzes. Answers next time.

1 What picture appears in Frank Kuiper's signature?

2 What is the Wilson measure of computing power?

3 What is or was PEP?

4 What does the -v flag do to grep?

5 Who connects MOD-1 with Transputer?

6 What is the wheel arrangement of an Atlantic steam locomotive?

7 What is the crypt algorithm based on?

8 What does the -h flag do to diff?

9 Expand the acronym 'EDSAC'.

10 Name the computer that accounted for the tea and cakes.

11 State the Chinese Remainder Theorem.

12 Define ORAC.

13 What ed command reverses the order of the lines?

14 What is the connection between Chad and Didcot?

15 Who or what is or was RIP?

16 What is 'ast' known for?

17 What is the wheel arrangement of a Pacific steam locomotive?

18 Who found uses for inverted indexes?

19 What does the -t flag do to sh?

20 What is the ISO layer above transport?

21 Write a C expression that evaluates to one if comments nest and to zero if they don't?

22 What RFC is recursive?

23 What is the title of RFC162?

24 What ed command replaces "ATT" in the current line by "AT&T"?

25 Expand the acronym ICMP.

26 Where does SMTP listen?

27 The 6800 had a few unassigned op-codes. One of these became famous; what was it called?

28 In troff, what does the '.de' command do?

29 What is the nickname of the chief engineer aboard the starship Enterprise?

30 What is the word length of a PDP-8?

31 What does the -b flag do to troff?

32 What is McKusick's first name?

33 Who invented termcap?

34 What ed command finds the next 2-or-more digit number?

35 What part of UNIX is often noted as being patented?

36 Who wrote patch?

37 Kernighan & Pike describe a rudimentary shar. What do they call it?

38 In C, what does a+++++b mean?

39 UCB did BSD, what did UCSD do?

40 What is inode 2 used for?

41 What is a trigraph?

42 What is the csh equivalent to '.' in sh?

43 What is 'rc'?

44 What would Ken & Dennis do differently if starting again?

45 What ed command deletes every line that doesn't begin with "A"?

46 What is mode 0200?

47 When is or was the epoch?

48 What is the quote convention in M4?

49 In troff, what does '.po +4.0' do?

50 Can the "expression" (x) ((x)-1) ever be a valid C expression?

51 What device was troff designed for?

52 A certain error code now tends to be rendered as 'Inappropriate ioctl for device'. What is its mnemonic and original rendering?

53 What is SIGWINCH?

54 What is the nickname of the chief medical officer aboard the starship Enterprise?

55 What is EMLINK?

56 What is the latin name for the Kestrel?

57 What is EPROTOTYPE?

58 How many characters does the BSD file system permit in a file name component?

59 What does 'OX' do in sendmail.cf?

60 What ed command exchanges the current line with the previous line?

61 What is RFC968?

62 What is TTL doing in IP?

63 What is 'net 10'?

64 What is another name for ISO-10021?

65 Most C compilers now grok the void type. Who coined the word 'grok'?

66 What is the type of the third argument to main()?

67 What is the third word in the expansion of the acronym of the thing that is replaced by Bison?

68 'g' is the norm. 'f' came later. Who invented 'f'?

69 How many crew aboard the starship enterprise?

70 GCC now has a use for '#pragma'. This was not always the case. What did the 1987 version of GCC do on encountering #pragma?

71 Who is the last-mentioned author of Honey Danber?

72 What is an O/R?

73 Expand the macro ASN.1?

74 What ed command prints lines from the next ".TS" to the following ".TE"?

75 What is the bang-form equivalent to: @a,@b:c@d ?

76 What class is 191.192.193.194 ?

77 What is wrong with alloca()?

78 What does the printf construct "%*x" do?

79 What is the latin name for the Common Buzzard?

80 What is not UNIX?

81 Who created Multivac?

82 What would vi do if you typed >{ ?

83 Given a directory containing several files, what command would remove only the file with a single space in its name?

84 In sh, what is the effect of: echo ${fred:-bill} ?

85 What ed command replaces each string of x's in the current line by one x?

86 How many arguments may be passed to a process?

87 What causes ELOOP?

88 What is the proper name of the Multi Machine Destruct Function?

89 What was Eric Allman's major contribution to the UNIX community?

90 Where is unido?

91 What does the -s flag do to cat?

92 What does the -M flag do to cc?

93 What invocation of tr implements rot13?

94 What happens if you type 'have you got a light'?

95 What ed command places a copy of the current line at the end of the file?

96 What does AWK stand for?

97 What is the smallest shell regular expression that will match foo.c, foo.h, bar.c, bar.h, AND NO OTHER FILE?

98 How many characters in the 'create file' syscall function name?

99 A 'fork' call splits one process into two. What differences are there between the processes?

100 Why is the 'Delete' code 127?

101 What does this shell script print?:

```
false
echo $?
```

102 What ed command prints the line after each ".AU"?

103 What is dubbed a 'silly window syndrome'?

a TCP/IP packet acknowledgment confusion
b X11 window SHAPE extension overuse
c when attempting to run NeWS on a SunOS 4 Sun-3/50

104 What is the MTU of the ethernet?

a 1024 bytes
b 1500 bytes
c 2108 bytes

105 What does NNTP stand for?

a Network News Transfer Protocol
b Network Node Transaction Processing
c Neural Network Task Processor

106 What does TMNN stand for?

a Transfer Memory No Negate (from M56001 instruction set)
b Tanenbaum Minix Network Nucleus (part of Minix O/S)
c Teenage Mutant Ninja Newsreader (alternative news software)

107 What ed command combines the previous line with this one?

108 What does comsat tell you?

a you have new mail
b details of packets received on socket with SO_DeBUG set
c console messages (in "xterm -C" or "consoletool")

109 What does the "r" in "rsh" stand for?

a remote
b restricted
c er...well...it depends

110 What is bash?

a a VAX processor instruction (Byte Arithmetic SHift)
b Imperial College Hope compiler UNIX front end (BASe Hope)
c a replacement for ksh (Bourne Again SHell)

111 What colour were Ultrix manual binders before the current DEC grey?

a dark blue
b white
c orange

112 What ed command looks for another line containing what you just looked for?

113 Who or what are Topcat and Catseye?

a HP workstation colour graphics subsystems
b Acorn video digitiser hardware (as used by UKUUG facesaver)
c famous UNIX hackers (responsible for the NFS worm)

114 What is crt0?

a filter for stripping newlines from nroff output
b device special file for the first graphics display on IBM PC/RT

115 object file automatically prepended to all C programs

116 What does MS/DOS stand for?

117 What does CP/M stand for?

118 Who was Dr. Logo?

119 In the C programming language, what character is denoted by the sequences '\s' '\t' '\033' ?

120 What is the Oracle?

121 What ed command places parentheses around the current line?

122 What are (or were) em, and ned?

123 What was the operating system that UNIX was derived from, and who was it developed by?

124 Where is Cyfarfod?

125 What does the -s flag do to cmp?

Best of luck!

EUnet Report

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In the three months since the last newsletter, there has been an explosion of activity inside EUnet and in the networking community at large. Let's start with discussions and decisions taken at this summer's backbone assembly meeting in Budapest which took place just after the EurOpen Governing Board meeting.

New Board of Directors Elected

A new board was elected to one-year terms, consisting of:

Chairman	Michael Nowlan / Ireland
Vice Chairman	Axel Pawlik / Germany
Treasurer	Joy Marino / Italy
Secretary	Ted Lindgreen / Netherlands

The new board represents a good mix of large and small countries. They are already injecting new energy into EUnet, especially the working groups. If you are interesting in becoming active on a working group, or wish to get more information, please look in the back of this newsletter for a list of working groups and addresses.

EUnet to "Incorporate" a European-Level Organization

In Budapest we agreed that it is now time to create a formal EUnet organization at the European level, most likely a non-profit company. Under this approach there will still be independent user groups and national nets, plus a new "EUnet-Europe" which will provide a variety of services and a forum for coordination between the national nets. Our goal is to clarify our internal structure and decision-making process (e.g., board structure and membership), our relationship to EUnet-related organizations, and to position ourselves for future changes and growth. A major decision such as this always forces 'fuzzy' organizations like EUnet to take a long hard look at their current activities, work and decision processes, and future directions. The resulting debate will critically improve our potential for future successes.

The final decision, which we hope to reach by the middle of 1992, will require the input and agreement of the national nets, user groups, and EurOpen at the European level. We encourage each national user group and national net to begin considering their interests and desires in the new shape of EUnet. We recommend that this be near the top of the agenda at your future meetings.

Pricing and Internal Cost Structure Reorganized

As stated in the Autumn '91 Newsletter, this year's backbone assembly in Breukelen decided to analyse and recommend changes to our internal pricing structure, and to discuss these at the September backbone assembly in Budapest.

In the past, we had two types of charges from Amsterdam for each backbone: different monthly subscription charges for E-mail, News, and IP services, plus a separate fixed charge for use of the Amsterdam-UUnet (USA) link. All income was put in a single general fund which paid for all EUnet European-level activities, including operations, meetings, and equipment purchases.

Our new structure for supporting European-level costs breaks the budget in two. The first part consists of "federation activities": non-operational EUnet work such as backbone assembly and executive committee meetings, and also part of the chief executive's time. The federation activities are to be paid for from a yearly contribution by each of the national nets; the size of the contribution is roughly proportional to the size of the national net (some backbones have been especially generous in their support of group activities). Federation activities will not be paid for out of network operational funds.

The second half of the budget consists of operational income and costs: lines, equipment, CWI support for our centre in Amsterdam, and most of the chief executive's time. These operational costs are paid for by a yearly "EUnet access charge", and by subscriptions for E-mail, News, and IP services. The access charge is a fixed contribution which is based upon the projected bandwidth of traffic between the national net and Amsterdam, measured in ECUs per kilobyte. Each national net has been asked to commit by 15 November to a maximum level of monthly use in 1992. This prior commitment approach will make it possible for our operations centre in Amsterdam to plan for lines and equipment for the following year.

The internal subscription rates have also been adjusted. The price of News subscriptions has been reduced by over one third and the price of E-mail subscriptions have been raised by one quarter. The price of IP subscriptions (which provide E-mail, file transfer, and remote login) before any traffic is taken into account has been reduced to less than one-eighth of the previous rate. These internal subscription price changes, which are separate from traffic volume, are in part compensated for by the "EUnet access charge". We hope that the IP changes will make it much easier for smaller nets and organizations to take advantage of IP technology; we expect to substantially increase the number of IP users during 1992.

The creation of two distinct halves of the budget clearly distinguishes between running the network and running the organization. It also makes EUnet finances more easily analyzed by business methods since the "business" (operations) and "group activities" (federation) are now distinct.

These new internal prices and structure improve EUnet's European and national relative shares of risk, income, and provide for a "smooth pricing curve" -- that is, European-level charges which mirror each national net's level of income. We expect that the vast majority of national nets will change their user fees to reflect these changes.

Administrative Changes

The new EUnet-CWI Technical Management Agreement calls for the movement of all billing from CWI to EurOpen/Owles Hall. We are in the midst of that transition and are preparing the bills for each of the national nets for the third quarter of this year.

Archive Service Progress

EUnet is in the process of hiring Martijn Roos Lindgreen to re-design our archiving system. His goal will be to design and implement a system which will integrate the operations of our Amsterdam archive and all of the EUnet national net archives. This will be a half-time position which we expect will be completed during the middle of 1992. Martijn will be doing this work in conjunction with a project at the University of Amsterdam.

Martijn works the other half of his time as the operator of NLnet, based at CWI.

While Martijn is working on future archive design, we hope to involve others in making improvements to the existing Amsterdam archive. These improvements will concentrate on content, currency, basic tools, organization, and support. Persons interested in providing ideas for Martijn, or in participating in the archive working group, should contact Martijn at martijn@nluug.nl.

We are also just beginning a number of new activities in the area of higher-level service, and in particular, enhanced Network News. The goal of this latter effort will be to improve the quality of both news retrieval techniques and the quality of articles. This subject is still too new to talk about in detail; we expect to have more information in an upcoming Newsletter.

Changes Among the National Nets

- Austria Backbone Change

The Unix Users Group Austria at their October general meeting voted to set up a new backbone organization and a new operations centre. The new organization will be registered as an Austrian Limited Company, since Austrian law does not allow non-profit organizations. This decision was taken in order to prepare for significant increases in the number of users, the range of services provided, and improvements in service quality.

The present backbone operates out of Tuvie -- the Technical University of Vienna. We and the group at Tuvie expect to complete a smooth transition by early 1992; Tuvie will continue to provide services to academic users in Austria. Our thanks to Tuvie for doing their part in making EUnet a success in Austria.

- Ireland Donation

Digital Equipment Corporation Ireland has donated a DECsystem 5100 to the IUUG. this donation will make a big difference in networking service for members of the IUUG. Our thanks to the people at Digital for their generous gift.

- Improved Connectivity to Switzerland

As you will recall, EUnet participates in the CERN-Amsterdam link consortium along with CERN, IBM, SURFnet, NORDUnet, and HEPnet. That link is presently operating at 256kb. EUnet and the Swiss User Group, CHUUG, recently completed discussions with CERN to permit CHUUG to connect to Amsterdam via the link. By the time this article is printed, we expect that CHUUG will be dial-up connected to the link. By the end of the year a leased-line should be in place.

The new CHUUG-operated backbone continues to grow and provide quality networking services since forming earlier this year.

New Backbones

We are beginning new contacts and seeing new activity coming from Turkey, Egypt, the Ukraine, Estonia, Romania, and Algeria. We expect to see steady growth in the number of EUnet countries over the next few years.

However, EUnet needs to clarify one issue which has caused some confusion of late: we did not materially encourage the break-up of the Soviet Union in order to just have more national nets. Our maniacal plans are of an entirely different sort...

Ebone, RARE, and the Protocol Wars

Three major changes have occurred of late in the European networking world.

The first is that there has been a recent acceleration in adoption of IP networking. It is as if, in the protocol wars between IP and ISO, the gunfighter wearing the hat marked "ISO" had blinked. At major conferences, people who were once strong advocates of ISO now joke about how it is being swamped by IP users. Attendance at RIPE, the European IP coordinating body, has nearly doubling at recent meetings. A RIPE Network Coordinating Centre is being created and should be running early next year.

The second is that RARE, the European academic network coordinating body, has just proposed the formation of an Operational Unit. This unit will be formed in order to provide international networking and information services to the academic community in Europe. This could include multi-protocol services, MHS/X400 services, and information database and directory services.

Finally, a subset of the RARE community, including EUnet, HEPnet, SURFnet, EARN, and others, has come together to form the seed of a pan-European 2Mbyte backbone known as Ebone '92 (for E1-backbone; E1 is the term for a 2Mbyte telecom line). This backbone will initially be based upon the existing Stockholm-Amsterdam and CERN-Amsterdam links (EUnet participates in both), and additional and upgraded lines from DESY in Hamburg to Stockholm and CERN. During 1992 Ebone will offer only IP services. Interested networking organizations are being asked to volunteer funds in order to participate. Some of these organizations are expected to add links to the Ebone structure. Ebone '92 was announced in September at CERN, where there was substantial support from throughout much of Europe.

During 1992, the Ebone group expects to put out a call for tender for Ebone '93, which should include support for x.25 and CLNS. Ebone '93 will also have a standard business approach to fees and internal operations. It is not clear whether or not Ebone '92 and '93 will fully merge with the RARE Operational Unit. Any merger will certainly have interesting and unexpected twists and turns.

EUnet expects to participate in Ebone '92. We will likely provide at least our present contributions to the Stockholm-Amsterdam and Amsterdam-CERN links. Our interest in involvement is due to the possibility that Ebone participation may reduce EUnet's cost of international connectivity. This would allow us to put more money into new and improved services, or to reduce our user charges.

We will use our experience during 1992 to decide if we will be involved through '93 and later.

Technical Developments

Trans-Atlantic Link Upgraded from 56k to 128k

As planned, the link was upgraded from 56k to 128k during the middle of September. The moment the connection was established our line use went from 56kb to 70kb and is now running approximately 80kb during prime time - clear evidence that the line was a useful acquisition.

EUnet Amsterdam Router Upgraded

EUnet's Cisco router is primarily responsible for processing IP traffic. During the summer we upgraded the router by adding both additional interfaces (a 4T card), and a processor/memory upgrade. The processor 'CSC-3' card has a Motorola 68020 processor, and 4MB of memory. The upgrade was motivated by a need for additional IP connections, to support increasing traffic, and to provide sufficient memory to run line statistics.

We are now keeping regular statistics on line behaviour, which is helping us make decisions on line purchases. In addition, the router is now handling increasing IP traffic quite well -- the new processor is impressively fast.

Our increasing investment in IP router equipment is further evidence of the steady trend toward IP providing for more and more of our services and operating income when compared with our traditional UUCP services.

EUnet Public Presence

This last quarter has also seen an increase in public presence by EUnet. We were invited to make presentations to general meetings of EurOpen Groups in Sweden, Germany, and Austria. These presentations included EUnet history, present status, an overview of the European and international networking scene, EUnet future directions, and a bit of wild speculation about the future of networking in ten years and more.

Being present at these meetings has been very useful: we have been able to answer questions about EUnet, and to find out more about national net issues and priorities. we expect that we will continue to increase our presence at these and other meetings.

EUnet held a Birds-of-a-Feather (or BoF) session during the EurOpen meeting in Budapest, which was attended by approximately 50 people.

A public relations working group was formed at Budapest. Their goal will be to improve public and user awareness of EUnet. The working group will accomplish this primarily through programs which will facilitate national net and national user group promotional and public relations activities.

EUnet Discovers Teleconferencing

There is a running joke in the international networking community that if you want to see the world you can either become a rock star, join the French Foreign Legion, or start working at networking. Network managers spend a tremendous amount of time and money on travelling to meetings at distant sites. EUnet also suffers from the costs of managing a continent-sized cooperating network. We have for many years, of course, heavily used News and E-mail in the management of EUnet. In recent months we began to try to make even more of our decision-making occur via the net. For example, the recent internal price changes were ratified over the net; more net votes are planned for the future. The EUnet Executive Committee is also planning to hold regular real-time meetings by multi-user talk. This will allow us to even further reduce the costs of distributed management, and more importantly, to make better decisions more quickly.

EUnet and Democracy

During the recent failed coup in the Soviet Union, our backbone at Demos in Moscow played a significant role in keeping open communications flowing. EUnet certainly can't take any credit for the failure of the coup, but we are pleased to have been able to make a contribution to the creation of an open society.

Kudos

The Budapest backbone assembly was hosted by Nandor Horvath, who manages EUnet in Hungary. This was our first meeting in recently-opened central Europe. The meeting was held at Csilleberc, a former pioneer camp and now a park in the hills of Buda. Our thanks to Nandor and the HUUG for doing a terrific job.

Good Things Still Come In Small Packages

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Introduction[1]

It was ten years ago. It was yesterday. It was Version 7 from AT&T. It is Coherent from Mark Williams Co. UNIX was small, simple and cheap. UNIX is still small, simple and very, very cheap.

This paper takes a close look at the youngest and smallest kid on the block, and compares it with its older and bigger brothers, as well as its opponents. This is a review of Coherent UNIX.

It was a long time ago, almost ten years ago in fact, when John Lions published what was a complete, annotated listing of AT&T's Version 7 kernel in the form of two booklets that together are no larger than this issue of AUUGN. Those documents, along with the University of New South Wales' "1980 UNIX Companion" [UNSW], and "The C Programming Language" [R&K], more than anything else provided us with an extraordinary insight into UNIX, the UNIX philosophy, and its implementation language. For many, including myself, those documents were in a very real sense invaluable. Those documents, however, also represented something else; they were terse. The size of those notes made it possible to have them on hand virtually everywhere we went.

It is significant, therefore, that Coherent UNIX is supplied with a single 1100 page manual that is on one hand very reminiscent of those early works, yet on the other borrows much from the more modern and accessible styles such as that found in the Kernighan-Pike "The UNIX Programming Environment" [K&P]. The Coherent manual contains all the information that the user needs to install, use and, importantly, learn UNIX. The manual covers the traditional UNIX sections, namely the supported commands, system calls and subroutines, as well as excellent chapters providing tutorial like presentations. These include system administration, UUCP, awk, the C language, ed, lex, the m4 macro processor, make, MicroEMACS, text formatting, the shell and yacc.

I am placing special emphasis on the quality of the supplied manual for one very important reason; this variant of UNIX potentially has a very ready market niche in the way of a low-end UNIX training platform. Coherent also comes into its own through its use as a cost effective UUCP node or to provide the DOS user with an alternative vista.

"Coherent, A Multi-user, Multi-tasking Operating System For The IBM-PC/AT And Compatible 286 Or 386 Based Computers" [Coherent]. This brief product sketch printed on the cover jacket of the manual provides the PC enthusiast with enough flavour of UNIX to encourage further curiosity. Coherent UNIX comes from the 13-year-old compiler vendor Mark Williams Company, based at 60 Revere Drive, Northbrook, Illinois 60062 (uunet!mwc!sales). For US$99.95 you receive a 60-day money back guarantee UNIX look-alike, and excellent user manual and free technical telephone support. This system is shipped on four 3.5 inch high density floppy disks and a single copy of the Coherent system manual. A registration card contains a nine digit serial number that the install program prompts for during the installation process.

The hardware requirements for this system are very modest when compared with even some DOS applications such as Microsoft Windows. The system requires an IBM AT or clone with 100% compatibility. It does not work on any of the MicroChannel platforms. One high density 3.5" or 5.25" floppy drive, a hard disk with at least 10MB free space, and a minimum of 640K RAM. The manual claims that the system will work with RLL, MFM and most ESDI disk controllers. It should also work with some SCSI host adapters. Coherent includes device drivers for line printers, HP laser printers, COM1 to COM4, RAM disks, tape drives, and the Adaptec SCSI disk controller. ESDI controllers include Ultrascope, Western Digital, and multiport from Arnet, Emulex and SEFCO. I suspect, however, that you need to take a close look at exactly what is and isn't supported. The release notes list more than 100 compatible systems, memory boards and disk controllers.

The preparation and installation took me approximately two hours to complete. In theory the actual Coherent install should only take about half an hour, depending on your CPU, but if you, like me, decide to partition the disk between DOS and UNIX then you will need to backup your whole disk before you commence the installation. I carried out the installation on a very old 286 clone with 640K and a 40MB disk running DOS 4 with the Gemini EGA 2.4 BIOS. The provided install program drives the user through the installation process from start to finish. It is no more difficult to install Coherent than it is to install any DOS application. Absolutely no prior knowledge of UNIX is required. By far the trickiest section of the installation is when you are asked to re-partition the hard disk. Here you can nominate how much space you wish to allocate to Coherent and DOS, as well as defining the active partition. The operating system mounted on the active partition is booted automatically on start-up. The install program copes very well with the system it is being run on, and tries very hard to prompt you with specific and helpful messages as you go.

Once a partition has been allocated to Coherent, the install process bad blocks the nominated partition and makes the file system. You are now ready to reboot the system. The operating system on the active partition boots by default. If you load Coherent on the non-active partition, then you will need to press the number corresponding to the Coherent partition while the

1 This article was originally published in the AUUG Newsletter and is reprinted with

system is booting. If Coherent comes up OK, then the remaining three floppies are copied. This step takes a significant part of the overall installation process time. Uncompressing the man pages and the spell dictionary etc. is slow. Coherent with man pages and dictionary takes up 7MB. This leaves me 13MB of user file space on the Coherent partition, and a further 20MB DOS space. I should mention that the Norton Utilities [Norton] came in very handy at this point because the data remaining on the 20MB DOS partition was almost unusable. It took only minutes for Norton to make sense of the broken directories and help repair them.

Coherent UNIX comes up multi-user after carrying out a rather slow (3 minutes for 7MB on 286) fsck and prompts for a login with "Coherent login:" At first you get the feeling that you are using a dumb terminal connected to a large AT&T SYS V rel 2 site. /bin looks quite comprehensive. But a closer inspection soon tells you why this is the small kid on the block. No POSIX compliancy, X-Windows or NFS. The C compiler is fast, but does not support medium and large models on the 286. Source code is not included, csh is not available, nor is off the shelf software.

Coherent does, however, fit into 640K of memory (it can address up to 16MB) with the kernel using up a whole 77K. It does give you text formatting facilities through nroff with ms. The manual also provides a 65 page chapter introducing nroff with very relevant examples. UUCP, as mentioned earlier, is supplied via uuinstall, uucp, uucico, uuxqt, uulog, uuname and uutouch. Once again, the large Remote Communications Utility chapter takes away a lot of the black magic from establishing uucp links. The public domain MicroEMACS is included, as is kermit. The stream editor sed, ed and elvis (vi) are well implemented. I especially found the yacc presentation and program examples quick to implement and easy to learn from. The C compiler, an assembler (for subroutines only), awk and the shell provide a well rounded development suite for training if not for developing real systems. No single platform supporting a dual operating system is complete without a data communication mechanism. Coherent provides a tar like utility called dos which allows the Coherent user to manipulate an MS-DOS file system. It can format or lable an MS-DOS file system, list the files in it, transfer files between it and Coherent or delete files from it. If you wish you can also buy a device driver toolkit for US$39.95.

Yes, there are other kids on the block. However Coherent is by far the best dressed for the price. I am going to take a quick look at three other products which Coherent contends with. The first is not really an operating system, but rather a suite of layered utilities called the MKS (Mortice Kern Systems) Toolkit. MKS sits on top of DOS and provides over 100 System V commands including the Korn shell and vi. However there are no development tools, and because of its dependence on DOS there is no multi-user/multi-tasking facilities. MKS costs $250.00. The second player is Minix (Mini UNIX) from Prentice Hall, which is based on AT&T's Version 7 and is supplied, with source, on 12 3.5" floppy disks. Minix sits on the host hardware and requires at least a 10MB partition if source is to be included. Although there is no UUCP support, Minix does feature networking, rcp and Ethernet. The third, SCO (Santa Cruz Operation) XENIX [SCO] is really a heavy weight in features and price when compared Coherent. SCO has a 198K kernel and requires at least 1 to 2MB of memory and 30MB of disk. It costs $1495.00.

In conclusion, Coherent UNIX from Mark Williams Co. is a truly high performance for value product. It combines the power and flexibility of UNIX with the accessibility of PC based technologies. The manual is excellent and it alone is comparable to many speciality books costing many tens of dollars. The training sector is by far the most suitable environment for this product. Not only can this system be used to provide UNIX concepts and training, but other areas such as C, shell, systems administration and text formatting can be mastered. The systems also lends itself as an ideal UUCP node.

The Mark williams Company claims it already has 10,000 satisfied users... make that 10,001.

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Book Reviews

The Open Book: A practical perspective on OSI
Marshall T Rose
Prentice Hall, 1990
ISBN 0-13-643016-3.
(UK) Price £36.95, Hard Back, 651 pp, large type

Reviewed by Andrew Macpherson of BNR Europe Limited

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The OSI protocol stack is daunting the sheer generality of services is overwhelming even before wondering what actually travels 'on the wire.' The books which purport to lead one through this mess have been turgid at best. In this context 'The Open Book' is a very welcome breath of fresh air. It is *the* introductory text one needs to read the ISODE manuals, and the background to understanding what OSI was trying to achieve. All examples and code fragments are drawn from the practical experience of ISODE.

The most useful sections of the book are the extensive *soapboxes* in which practical reality is compared with the intentions of the standard and its world-model. These sections, and in particular the final chapter "The Politics of Open Systems" should be required reading for anyone participating in the standards process.

In painting the picture the effort expended on the bottom layers is refreshingly brief - the focus is on the higher layer services and heterogeneous interworking. In bringing the reader to this level Dr Rose amazingly manages to avoid repeating the same phrases to describe what are essentially the same operation at the differing layers of the OSI model. Despite this, there is a lot of detail in the description of the various layers, and of how they may be used.

Part four 'The transition to OSI' takes much of the heat out of the wars between proponents of existing systems, and their equally fanatical counterparts in the OSI camp. Just as no-one will switch until the services they require are available, equally no-one will throw away an existing network just to make use of the improved facilities offered by a new service.

Anyone working at all seriously with ISODE will benefit from this book; particularly from the clear exposition of the ASN.1 Basic Encoding Rules. Those who must form a strategic plan for their in-house networking will also gain, though to a lesser extent.

The Simple Book
An Introduction to MANAGEMENT of TCP/IP - based internets
Marshall T Rose, Prentice Hall, 1991
ISBN 0-13-812611-9
(UK) Price £35.95, Hard Back, 347 pp, large type

Reviewed by Andrew Macpherson of BNR Europe Limited

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"So you want to run a Network? Then you need SNMP." That's probably why you will buy this book, indeed it's how the book is promoted. If this is your reason, you will be sadly disappointed.

This book is about what SNMP is, how you can write code round it, what the clever features are. It is not a cookbook for how SNMP is used to manage a network. In fact it is very much not about how you manage a network.

On the other hand, if you **do** know how to manage a network, how to configure your routers, what to look for when things start going wrong, then this will give you the lift up to see what SNMP may be able to do for you. You will also get insight into the processes on the network management stations, and when you begin talking with management station vendors, you may become disgusted with the proliferation of private Management Information Bases, or the private redefinition of publicly defined entities.

The history and capabilities of SNMP are explained, a sideline on the parallel CMOT development gives another glance at the difference between the 'If it has been shown to work, let's standardise it' approach of the IAB, and the 'Let's write a standard for how we will do this' methodology of the national and international standards groups.

SNMP is an IP/OSI hybrid. The messages are on IP transport, but their content is ASN.1. There are chapters to summarise enough ASN.1 and Basic Encoding Rules (BER) for SNMP, owners of 'The Open Book' will find them familiar, but then the reader is directed to 'The Open Book' for a fuller explanation.

Do you need the book? If you have more than three routers (that's routers not subnets), and they are well separated, you qualify. You might be interested too if you have ISODE and want to know what you might do with 'SNMP capable gawk,' or what 'mosy' is for.

Limited Audience.

Book Reviews

Typesetting Tables on the UNIX System
Henry McGilton and Mary McNabb
Trilithon Press, 1990,
ISBN 0-9626289-0-5
UK Price £21.95 (cover price $20.00), Soft Back, 283 pp,

Reviewed by Andrew Beattie

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The thing that sticks in my mind about Typesetting tables is not any of the revelations about the inner working of tbl but instead, it is the three review quotes that they chose for the back cover: "You're a pair of lunatics!", "Good grief!" and "Three Hundred Pages on TBL?!?". These quotes just about sum up the book - it covers more than you might reasonably expect.

For anyone who doesn't know, tbl is a preprocessor for troff, a tool designed to make it easy to do table layout, you basically tell tbl the attributes of the table, how many columns, whether the columns are alphabetic, numeric, justified or centred, together with the information to be contained in the columns and let tbl take care of the details like widths, centring and making boxes the right size.

My manual for tbl occupies 18 pages, of which about half is examples. To fill nearly three hundred pages, McGilton and McNabb have covered every possible angle in depth. They start off very gently, taking the novice reader by the hand, explaining carefully why tbl is a good idea, and going on, through a series of examples to introduce them to the full set of features. They cover issues of style, explaining the rationale behind their opinions, to help the user without training in typesetting to produce tables that look more professional. The book covers the problem of debugging tables, again by means of example, by going through the common mistakes and illustrating the error messages that surface (this is worthwhile, because tbl error messages often point only indirectly towards the problem).

Most of the book is occupied by detailed explanation and examples of the various tbl facilities but towards the end, the authors start to explore more adventurous possibilities, involving other pre-processors, illustrating techniques for putting equations inside tables, pictures inside tables, equations inside pictures inside tables, tables inside tables and tables inside pictures. (The last paragraph in the book congratulates you for making it so far!)

In all, the book serves well as both an introduction for novices and as reference and cookbook for experienced users who want to push tbl as far as it will go.

POSIX Programmers Guide
Donald Lewine
O'Reilly & Associates, Inc.
ISBN 0-937175-73-0
Paperback, pp 597pp.

Reviewed by Lindsay F. Marshall

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Readers of my reviews in these pages will know my distaste for the manual page syndrome that besets UNIX books. I really thought I had another victim on my hands with this volume as much of it consists of manual pages for POSIX defined functions. On the verge of pouring out my contempt and loathing I found that not only were these genuinely useful but fun to read as well. In fact this an excellent book that will be appreciated by anybody involved in writing portable UNIX programs.

There are lots of clear, interesting examples that really do bring out the points that the author is trying to get across. Moreover the examples come as close to being "real life" as is practical in a textbook. Each chapter closes with a short set of exercises that help readers to review the material that they have just covered. Again these are mostly well chosen and helpful, my particular favourite being the one that asks the reader to write a complete Japanese word processor using multi-byte and wide-character functions.

The guidance on portability goes well beyond the use of POSIX defined functions and provides succinct coverage of the essential areas of which C programmers should be aware. The chapter on internationalisation is extremely useful and the author's decision to discuss the X/Open functions for Native Language Messages Q an area where the POSIX working group chickened out Q is to be welcomed. The only bit of bad advice that I could find in the whole book was the suggestion that strncpy/cmp would be the correct substitution for bcopy/cmp in a portable program. A sure fire recipe for disaster and probably a typo (but one that really ought to be fixed).

As you might expect I dislike the formatting style chosen for the program examples, but at least the author did not use the hideous BSD style. The typeface used for code is, predictably, Courier, but in rather too small a size, making the examples a little hard to read. However, a larger size would have made the book as thick as the Great American Novel, so perhaps this explains the choice. The diagrams are clear and well presented, though the presence of a couple of flowcharts for one of the examples is rather out of place. Altogether the presentation is good and makes for an attractive book that delivers what it promises. If you want to get to know your way round POSIX (and you should) this is a good place to start.

Abstracts

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UNIX and Virtual Reality

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With the growth of interest in Virtual Reality systems, current implementations are based around customised, or experimental processing platforms. This is not an ideal state of affairs, as it tends to reduce compatibility to a bare minimum, and prevent the utilisation of cheap mass storage and processing units.

If a Virtual Reality system is based on a UNIX platform, such that support and communication layers are used, then this tends to reduce the cost of development of the overall system, and allow automatic compatability between differing designs.

In this paper, the proposed design of a UNIX supported virtual reality system is presented. Practical implementation details are discussed, as well as the current research progress on this project to date.

Interactive User Interface Design The Teleuse Approach

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Designing user interfaces for new applications is not an easy task. Not only the complexity of software components for implementing user interfaces (e.g. like the X Window System and OSF/Motif) have to be considered, human factors also play an important role. Lots of work has been done to implement tools for helping designers and developers to implement user interfaces.

A study of modern computer software came to the result that about 60% effort is needed for the user interface part and only 40% for the application code. This can be measured either in lines of code or time of development.

If one looks closer into the user interface part, it can be divided into the following three portions:

- The static part or the presentation layer
- The dynamic part or the dialog layer .
- The API or the application interface layer

The paper will give examples of all three layers and discuss the benefits of each.

The presentation layer can be built by an interface graphical editor (WYSIWYG). The result can be written to a file by generating C code or generating a specific user interface language.

The usage of a dialog manager for specifying the dynamic behaviour is compared to C coding. Finally the paper looks into the application interface. The extensibility with new objects (widgets) is also discussed.

The QEF/QEI Model for Software Component Consistency, Dependency Determination and Construction Recipe Ordering

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This presentation investigates the problem of determining when and if a process within a software construction system should be invoked. Within the UNIX community, the best known approach to this problem is that employed by *make*. *make* invokes a process to update a target file **when** the files on which it depends exist and are themselves up to date, and **if** the target file is older than any of its dependents. This approach has the advantage of being very simple, both to implement and to understand. But it is far from adequate, as is discussed in this presentation.

This presentation analyses the difficulty and importance of ensuring software component consistency and completeness. It defines the problem and discusses its relevance and implications. A model and definition of consistency is presented. Problems with that definition are then examined with respect to tradeoffs and complexity, the concept of versioning, and the difficulties of strict application of the consistency model. Suggestions for circumventing some of the problems presented by the model, such as propagating gratuitous time stamp changes, are presented.

Any consistency model is highly dependent on the derivation and/or expression of the dependencies. Various approaches to both aspects are discussed.

Given models for consistency and dependencies, the problems in determining the order of execution can be discussed.

Finally, strategies for software organization that simplify or improve the performance of the construction process, while ensuring the integrity of the product, are presented.

Many of the solutions and approaches presented in this presentation are based on the authors systems for software construction'and version management, Quod Erat Faciendum (*qef*) and Quod Erat Inveniendum (*qei*) respectively.

Give a Process to your Drivers!

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This paper presents how the modular architecture used for the CHORUS/MiX V.3.2 system enables system writers to encapsulate UNIX device drivers within UNIX processes, and the possibilities offered by this feature.

The CHORUS architecture is designed to support a new generation of open and distributed operating systems. A microkernel provides generic services allowing servers that cooperate within subsystems to offer standard interfaces: a UNIX SVR3.2 interface is available and a UNIX SVR4 interface is under development. The CHORUS microkernel provides services to manipulate actors and threads (memory management, scheduling and so on). It also offers a distributed Inter-Process Communication (IPC) facility and services to dynamically connect user provided functions to hardware interrupts and traps.

CHORUS/MiX V.3.2 is implemented as a set of the following servers: a Process Manager, a File Manager, a Terminal Manager and a Socket Manager (to provide BSD sockets). In addition to standard UNIX services (which have been transparently extended to distribution), one can also use CHORUS services to take advantage of CHORUS real-time features and multi-threaded processes.

The CHORUS/MiX V.3.2 has been experimentally enriched by the introduction of a new kind of server named a 'Driver Actor' (DA). A DA allows one to encapsulate device drivers within independent actors. This new kind of server has been (experimentally) used to separate the disk driver from the File Manager.

As a consequence, this separation removes the constraint placed on the File Manager to reside into the machine supervisor address space, as privileged instructions are executed only by the driver itself. Thus, the File Manager can run as a UNIX process either in user or supervisor address space, communicating with the driver through CHORUS IPC accessible at UNIX interface level. This allows one to take advantage of standard debuggers, such as sdb and gdb, to debug the File Manager.

Using CHORUS IPC between the File Manager and the Driver Actor permits them to be transparently distributed over a network of processors. Therefore the driver may be loaded on a dedicated board while providing this driver with an environment compatible with that of a UNIX native kernel. This kind of configuration is used within the MultiWorks Esprit project.

In addition, the CHORUS/MiX subsystem permits one to dynamically load processes running in the supervisor address space usually reserved for use only by the UNIX kernel. Thus from a shell, one can dynamically load, locally or remotely, UNIX drivers as if they were 'common' processes.

Multimedia Synchronization and UNIX — or — If Multimedia Support is the Problem, Is UNIX the Solution?

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This paper considers the role of UNIX in supporting multimedia applications. In particular, we consider the ability of the UNIX operating system (in general) and the UNIX I/O system (in particular) to support the synchronization of a number of high-bandwidth data sets that must be combined to support generalized multimedia systems. The paper is divided into three main sections. The first section reviews the requirements and characteristics that are inherent to multimedia applications. The second section reviews the facilities provided by UNIX and the UNIX I/O model. The third section contrasts the needs of multimedia and the abilities of UNIX to support these needs, with special attention paid to UNIXs'problem aspects. We close by sketching an approach we are studying to solve the multimedia processing problem: the use of a distributed operating system to provide a separate data and processing management layer for multimedia information.

Using a Wafer-Scale Component to Create an Efficient Distributed Shared Memory

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Within a decade a revolution will have occurred in computing: for by then, byte for byte, the cost of semi-conductor storage will be lower than that of magnetic discs. When this happens, it is argued that magnetic storage will be totally replaced by wafer-scale integrated silicon-based mass-storage devices.

In preparation for this day, a method of creating Dynamic Random Access Memory (DRAM) wafers which combine shared storage and communication properties is proposed. These can be stacked like conventional disc platters to form storage devices called Wafer Discs.

This paper describes Wafer Disc and shows how it can be used to construct a scalable multi-computer based on a shared optical disc cache.

Performance Evaluation: The SSBAs at AFUU

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The SSBA, Suite Synthetique des Benchmarks de lAFUU,'is an ever flourishing activity. The SSBA 1.21 is still widely appreciated and its influence is increasing everyday. The SSBA 2.0, its

multiprocessing companion, is about to start its life. We present here a new status report about Benchmarking activities at AFUU.

Near Real Time Measures of UNIX-like Operating Systems

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UNIX was originally designed for multitasking and timesharing; however presently there is a lot of research going on trying to extend it to real time both for handling real time situations and because real time capabilities add robustness and reliability also to non real time applications. Several designs are proposed; this paper approaches the problem of benchmarking them. Standard tools as well as specific real time ones are not suitable for these systems: the former because too generic and the latter because too specific. Therefore a new set of tests is introduced and it is applied to a wide range of architectures. The results that have been obtained are interesting and, under certain point of views, quite surprising.

Steppingstones: Some Remarks on Measuring X11 Performance

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After a short overview of *xbench* and *x11perf* this paper gives an early report on *steppingstones*, an Xperformance tool under development at IBMsAIXFSCin'Munich. Line-drawing performance is used to illustrate the approach to Xperformance taken by *steppingstones*, as well as to illustrate some aspects of Xservers relevant to performance but missed with other performance-measurement tools. The final sections briefly describe multi-user extensions currently under development and the data-reduction techniques currently in plan for further refinement of the measured results.

Security and Open Working in the Networked Academic Community

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Even though academics thrive on the publication of their work, there is still a need for security services. This paper summarizes some work that has been done in assessing the perceived threats in the UK, and looks at possible defences against such threats. The emphasis in this paper is upon defence against attack rather than recovery from damage caused by a successful attack.

International standard solutions will not be available, for a long time and may well not properly recognize the multi-protocol nature of international academic networking, and Kerberos seems to be the best available system.

Even Kerberos has its problems and limitations, and this paper discusses some of them, including password guessing and non-Internet protocols such as X.29.

A system such as Kerberos is just a tool to aid in the implementation of a security policy. The role of a security policy is examined.

phLOGIN, Why, What and How

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The paper will discuss the history, aims and design philosophy for the program. An overview of the major program features and how they are to be used will be given.

Porting issues on a utility like this are unusual and will also be covered. I end with an indication of where further work is needed.

This paper was first delivered at the NLUUG conference of 8 May 1991.

MANIFOLD: A Language for Specification of Inter-Process Communication

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Management of the communications among a set of concurrent processes arises in many applications and is a central concern in parallel computing. In this paper, we introduce a language whose sole purpose is to describe and manage complex interconnections among independent, concurrent processes. In the underlying paradigm of this language, MANIFOLD, the primary concern is not with *what* functionality the individual processes in a parallel system provide. Instead, the emphasis is on *how* these processes are interconnected and how their interaction patterns change during the execution life of the system.

It is interesting that the conceptual model behind the MANIFOLD language immediately leads to a very simple, but non-conventional model of computation. Contrary to most other models,*computation* in MANIFOLD is built out of *communications*. As such it advocates a view point reminiscent of the connectionist view: that all (conventional) computation can be expressed as interactions.

A Distributed Concurrent Implementation of Standard ML

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Standard ML is a functional programming language used extensively in universities and increasingly in industry. This paper discusses a concurrency mechanism which has been implemented

in the Poly/ML implementation of Standard ML and has been used on uniprocessors and shared memory multiprocessors. It is now being implemented on a distributed network of UNIX workstations. Each of these implementations is described.

The aim of this work is to produce a distributed system that will allow large ML programs to be run on a network of processors. Although eventually such a network might be a closely-coupled network of transputers, the initial design is intended for the sort of system that many organisations have, namely personal workstations on a local network. Making use of these out of office hours will provide a substantial improvement in the computing power available.

Load Balancing Survey

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The field of load balancing has been the target of many interesting research efforts. Quite a few important theoretical conclusions and significant implementations have been achieved. However, no widespread used or commercially available load balancing has evolved. In order to investigate this anomaly, the authors have surveyed four most promising and complete load balancing implementations. Critical hints for further research in contemporary environments are discussed. The paper also discusses standard UNIX and its impact on future load balancing implementations. A potential support of the state-of-the-art distributed operating systems is presented.

A Public Access Interface to the OSI Directory

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This paper describes a user interface to the OSI Directory. Although there are a considerable number of user interfaces already available, system administrators have complained that none of these interfaces is specifically intended for use as a 'public access' interface. Such an interface must be very simple to use. This requirement leads to a set of key design goals: when there is a conflict of aims, simplicity must be favoured over functionality; ergonomic issues are of vital importance; the on-line help system must be simple but comprehensive.

The search strategy employed by the interface is also discussed in some detail. The way that the strings provided by the user are mapped onto sets of X.500 operations and matched with Directory entries is described.

The development of this interface has been funded by the PARADISE project, which in turn is funded by COSINE. PARADISE has a number of goals, including the coordination of directory service pilots. In addition, PARADISE is providing a number of central services, one of which is a public access interface to the Directory.

Managing the International X.500 Directory Pilot

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For over two years now there has been an X.500 Pilot Directory Service spanning many countries. The operational management of the pilot service has been ad-hoc, coordinated by the author. In March this year the *PARADISE* project, which is part of the European *COSINE* initiative, started to manage the top level country data for the participating *COSINE* countries, and to coordinate with the North American and Australian pilots. This paper discusses the problems with the service before the *PARADISE* project, the steps that have already been taken by *PARADISE* to manage the top level DSAs and the work that will be needed in the future to manage the expanding X.500 pilot project. Extensions to X.500 needed to keep the pilot running reliably are discussed.

A Design Overview of XLookUp

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XLookUp is an interface to the X.500 directory service which runs under X Windows. XLookUp is intended to cater for many modes of directory usage: casual look up of addresses, administration of local data, as a public access service. Thus the interface needs to combine a high level of functionality with simplicity and user friendliness. It is still under development at the present time (June 1991), although a release is expected before August 1991. This paper offers an overview of the current design and presents some examples which give an idea of the appearance of the interface.

An Implementation of a Process Migration Mechanism using Minix

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This paper describes an implementation of a process migration mechanism realised on a network of PCs running under Minix.

The design of Minix incorporates modern operating system design concepts (micro kernel, message passing, client-server model) and insures a good process encapsulation which is necessary for such a realisation.

Remote execution is achieved by using surrogates or stub processes so that the lack of integration of the platform can be overcome. Despite the drawback of leaving a residual dependency on the node where the migrating process has been created it

appears to be an appealing approach particularly suitable to this system. The isomorphism between the built-in message passing mechanism and the add-on Amoeba communication protocol implementing RPC has been extensively used to this purpose.

Minix, even enhanced with the Amoeba network communication facility is certainly not a distributed system. However, it features some of the properties which makes feasible the realisation of a process migration facility. Furthermore, Minix does not require an actual network to develop and test networking software which can be done on a standalone system. It therefore is a suitable and inexpensive platform to conduct such experiments.

HAWKS — A Toolkit for Interpreted Telematic Applications

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On-line information retrieval systems offer a wide range of information. Many companies relay on these informations for their strategy planning. Since most of these systems differ in their structure and interface, their use is not as trivial as wished. The workstation HAWKS, presented in this paper, offers a unique interface for information retrieval on a large selection of services. This interface can be used directly by end-users in a fully graphical supported environment. At the same time, HAWKS offers an environment which enables the rapid development of interpreted applications in the domain of on-line information retrieval, without the need to know the targeted service in detail. At the basis of both environments are the HAWKS Access Language and the Global Dictionary. In this Global Dictionary all the On-line services are modelled according to a conceptual model, and implemented in a C++ objectspersistentenvironment.

Virtual Swap Space in SunOS

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The concept of swap space in SunOS has been extended by the abstraction of a 'virtual swap file system', which allows the system to treat main memory as if it were backing store. Further, this abstraction allows for more intelligent choices to be made about swap space allocation than in the current system. This paper contrasts the existing mechanisms and their limitations with the modifications made to implement virtual swap space.

The Art of Automounting

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Who isnt familiar with the problem of installation and management of application software, users, home directories, etc. The strive for a consistent, scalable, efficient and simple working environment has our contiuous attention.

Problems are known to be caused by architecture dependencies, no distinction between various classes of data, disk partitions that fill up and disk fragmentation. Furthermore, various variants and versions of the same application software, different locations of data also cause headaches sometimes.

All this and more is covered in this paper, leading to a 'Plug and Play' computing environment that leaves system and network administrators time to do more important things.

Monitoring Network Performance in a Heterogeneous Environment

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The widespread adoption of Local Area Networks has meant that network performance measurement, which was previously the sole preserve of large installations with expensive monitoring equipment, must now be performed by many more computer installations without such equipment and expertise, if acceptable levels of performance are to be consistently achieved. This paper will discuss the design and use of a monitoring and management system which by analysing the actual network stations to collect data on the current status of network traffic, uses the real data collected to provide a full description of current network performance. In addition, allows changes in both the physical network configuration and traffic densities can be simulated, by providing suitable additional data.

A suite of software to perform these functions is currently being developed in the Department of Computer Science, at the University of Liverpool. By providing much more accurate information about the present and anticipated future performance of the network, the approach discussed in this paper will considerably improve the quality of management decision making.

StormCast — A Distributed Application

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The objective of this paper is to present the architecture of the distributed application StormCast. StormCast has been designed and implemented to enable an evaluation of the proposed architecture as well as the underlying operating system mechanisms. StormCast consists of a set of modules monitoring weather data and a set of sub-applications using this data. StormCast is running in both local area and wide area networking environments.

Location-Independent Object Invocation in Open Distributed Systems

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Open distributed computing in an internetwork environment has gained considerable attention in the past few years. This paper presents COMET, a *Common Object Management EnvironmenT*, that serves as a testbed for investigating basic problems associated with open distributed computing in an internet environment with mobile objects.

Object naming and location schemes are of vital importance in an open distributed system, since they provide the basis for all interactions between objects in distributed applications. In this paper we present the COMET naming scheme, which is tailored to an open environment. This naming scheme is complemented by a location scheme, that ensures efficient mapping of location-independent names on object addresses.

Special care is taken to provide open-ended solutions. This permits a seamless integration of application specific naming and location strategies within a general framework.

Communicating Database Objects

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We address the problem of establishing communication between databases created independently with no preliminary agreement concerning the adaption to an appropriate convention. An interactive algorithm is provided for databases with a simple data scheme in aid of accomplishing a partial mapping and based on this, data communication protocols automatically.

UNIX in Novell Environment

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Through the new concept of their Open Network Architecture with NetWare 386 as well as the agreement made with IBM to make a closer communication between SNA, OS/2, UNIX and the NetWare, Novell netware operating systems go on strengthening their leading position on the world market.

The lecture intends to present the transparent integration facilities of the NetWare and UNIX systems (through NetWare 3.11 and NetWare NFS) and will also outline the declared plans of Novell to deepen the communication between the two systems.

An International Hotel Reservations System Using Loosely Coupled UNIX Systems

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This paper describes the design and implementation of the latest version of an international hotel reservations system.

The system allows reservations staff in offices around the world to make reservations as though they were permanently on-line to a central information database, with up-to-date information. In fact, each office runs independently, and the International Packet Switching Service is used to communicate with other locations on a batched up basis.

After a brief discussion of the business needs and the hardware environment, we will look at the resulting data and transactional requirements. This leads to a discussion of the in-house infrastructure, written in C++ under UNIX. Finally, an analysis of performance will be given.

EurOpen Electronic Mailing Addresses

An e-mail list address is an address to which if e-mail is sent, the e-mail will be forwarded to all the members on the list. This is a convenient way of sending mail to a whole group of people who share a particular interest or do a particular job, without needing to know exactly who they are, or if they have moved recently.

Several e-mail addresses have seen set up to make communication with people within EurOpen.

europen@EU.net	EurOpen Secretariat, Owles Hall
europen-jersey@EU.net	Jersey Conference
europen-exec@EU.net	EurOpen Executive Board Members
europen-gov@EU.net	EurOpen Governing Board Members
europen-papers@EU.net	Where papers for conferences are to be sent
europen-tapes@EU.net	Requests for Tape Distribution

EurOpen Working Groups. Each group has a mail address that expands to all the members of the working group. To be included in the expansion (ie to receive mail sent to the Working Group's address), add "-request" to the name; eg to join the benchmarks group (address "ewg-bench@eu.net") send mail to "ewg-bench-request@eu.net".

Working Group	Mail Address
Internationalisation	ewg-i18n@eu.net
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Security, UNIX and TCP/IP Security	ewg-secur@eu.net
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