

Technical UNIX User Group

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newsletter of the
Technical UNIX[®]
User Group

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Hewlett Packard
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Thoughts From The Editor

By Susan Zuk

This month's newsletter includes an interview of the AT&T Vice President of Research. The article provides some insights into what Arno Penzias feels are future growths in the industry as a whole. Arno also mentions what he hopes to see in future operating systems as well as what he doesn't want to see as a future operating system. Hope you enjoy the article.

Our April meeting was very interesting. We were treated to a session of usenet. Kathy Norman, of the University of Manitoba, showed us how usenet works and the various types of subscriptions available to its users. Thank you Kathy for your demonstration, maybe we'll have the capability to allow our members to have access to usenet in the near future.

Eric Carsted also provided us with some helpful hints on using

the sed utility and regular expressions. This was a really good presentation for those of us who are always trying to find quicker ways of manipulating information. Eric discussed such items as how to use grep with wildcard sequences and characters as well as ways of stripping out information you don't require. Thanks Eric for those great tips.

Our meeting in May will be held at Hewlett Packard and will discuss OSF/1. This is always a hot topic of conversation. Questions are always asked as to whether UNIX is following this standard or that standard. Should people be investing in AT&T UNIX or OSF/1 UNIX? Let's see what questions and answers we can receive on Tuesday.

Well, that's all I have for now. See you at the meeting!

Group Information

The Technical Unix User Group meets at 7:30 pm the second Tuesday of every month, except July and August. The newsletter is mailed to all paid up members 1 week prior to the meeting. Membership dues are \$20 annually and are due at the October meeting. Membership dues are accepted by mail and dues for new members will be pro-rated accordingly.

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ANNOUNCEMENT...

Meeting Location:

The May meeting location will be provided by Hewlett Packard. HP is located in the Hewlett Packard Building at 1825 Inkster Boulevard. Please enter at the front door. See you at the meeting.

President's Corner

Submitted By Eric Carsted

I am guilty.

Of what? you may ask. Well, ever since the formation of the OSF (Open Software Foundation) and their announcement of OSF/1, I have completely ignored any announcements regarding features and specifications. Basically, I have been preaching Open Systems but had a closed mind.

I have felt that the OSF was formed for two specific reasons, greed and greed. I felt that IBM's motive was to cause fragmentation and confusion in the Unix market, to give OS/2 time to catch up and to try to take over in the Unix arena. I did not take into account the increase that AT&T was going to charge for its licence, or the advantage SUN would have by working on the development of the kernel (six to twelve months). At the time of its formation, OSF/1 was based on AIX, a crippled OS controlled by Big Blue Brother. I have a thing about IBM, especially since the Micro Channel bus and OS2 (another move motivated by greed). If IBM is involved, I am very suspicious. When the OSF announced it would use the Mach kernel, I was pleased and relieved but was still resentful of the confusion that the split in the market was causing. Many announcements have been made in the intervening time but if the title of the story had "OSF" in it, I skipped on right by. Until now.

While attending the product release of the HP 700 series of computers, I got a glimpse of what the OSF has been doing in the way of distributed computing, networking, and network management. I've stopped to take a second(first) look. What I didn't know was how many of HP's products have been accepted as the components of OSF, such as Motif (HP Window Manager), OSF's Distributed Computing Environment (HP Network Computing System), and X/Open's XPG3 and OSF's DCE (HP LAN Manager/X). At the presentation I saw two products, Task Broker (a program that finds the best machine on the network to run a program), and NCS (distributed processing on a network at a subroutine level). Task Broker will run with existing programs, whereas programs have to be designed to take advantage of NCS. I was impressed. I was also impressed by the HP 700 series of computers, both in price and performance.

I have had my eyes opened, and will follow more closely the developments of the OSF. You will see in the agenda that our next meeting is at HP, and the topic will be OSF/1, with a look at one of the new HP 700 workstations. I am very excited to see what else OSF/1 is going to pull out of its sleeve and I hope all you AT&T SVR4 bigots out there like myself can get a chance to attend and have your eyes opened and your horizons broadened (not to mention the free pizza).

The Latest Information

Reprinted from /usr/group CommUNIXations May1991

A conversation with Arno Penzias, Vice President of research at AT&T Bell Laboratories

Arno Penzias joined Bell Laboratories in 1961, conducting research in radio communications and satellite technology. He has a Ph.D. in Physics and numerous honorary degrees. For his work in radio astronomy he shared the 1978 Nobel Prize in Physics. He has been Vice President of Research at Bell Labs since 1981 and is the author of Ideas and Information (Norton, 1989)

Why have you gone from astrophysics to informations systems?

All the disciplines that underlie the AT&T technology base merge at higher levels, so when I got promoted, I got broader responsibilities. There is this notion that a good manager can manage anything but I don't believe that. You have to have some understanding of what you are doing. I started out as a physicist and ended up in astronomy. To help my astronomy along, I started teaching at Princeton. One of the best ways of learning

something is to teach it. I wrote my book to try to teach others what I thought I knew.

I continue to be interested in science. I'm currently writing another book on science, which again tends to take a social view. It discusses issues such as global warming and nuclear power, in addition to things like why people ought to believe in science, why they don't and why the scientific method is not a natural way to behave.

How much of the research work at Bell Labs that you direct is related to computers?

If you're talking about computing and systems architecture, probably about half. The other half is physics and materials. We have four approximately equal divisions - devices, materials, computing and systems. The devices and materials increasingly find their way into products that process information. Somebody who is working on two-dimensional states in layered semiconductors may ultimately be trying to build a layered, high performance gallium arsenide transistor to up the clock rate on a particular decision circuit. So most of what we do will get into productst having to do with computing.

On the other hand, much of our work is still what you call "voice," (as in telecommunications) but I suspect that the distinction between voice and computing is disappearing. One of AT&T's strengths is signal processing. We have world-leading voice recognition and voice synthesis capabilities and integrating those in other forms of informational modalities is a big part of the job. This notion of integration is happening not just between systems but between disciplines and businesses.

How close is ISDN to widespread implementation?

A few years or so. Another way of saying it is, as close as the first dramatic, widespread use. The wide acceptance of new facilities is usually accompanied by a dramatic service improvement, not an incremental one. For example, the telephone really is different from what there was before, so everybody wanted it right away. The fax machine is another example. The old fax machine took up the space of a desk and was off in the corner, but the fax machine that you could put on a corner of your desktop was so much better that everybody wanted it.

Companies like McDonald's have ISDN and are doing fine with niche applications. But widespread deployment is going to be driven by a dramatically different application. The one that I see is low-bit-rate television - conference-quality TV where you put a board in your PC and see your friends. This will be something that makes a dramatic difference in the way you behave with your telephone. It isn't just something like high-fidelity voice.

How much of your work responsibility involves UNIX?

A relatively small amount. Most of us use UNIX, but under 10 percent of the organization is actually working on future operating systems. Many more people use UNIX in their everyday lives. Take some of the people who do C++; you don't really count them in UNIX even though most C++ programmers work in a UNIX environment. In another sense, the people who sell UNIX packages will want to sell C++ along with it.

How directly do the people at UNIX System Laboratories (USL) interact with people Bell Labs?

We have a hierarchical organization of divisions. The computing division has organizations which are usually called laboratories. Peter Weinberger is a director of one of my research lab organizations. He is also chief scientist of USL, so that is an indication of the close collaboration.

Some rival computer vendors have been skeptical about how fully AT&T can link its computer systems with its telecom networks. Will there be a transparent connection between computers and telephone systems?

Bob Kavner said that that link turns out to be tougher than people have thought. Integration is the long-term goal and we are still working toward it. Once ISDN is fully deployed, we will be providing good connectivity links. When we get to broadband ISDN, I can imagine a network in which local-area networks link to ATM routers and there will be integration of the two. But you are still left with cooperation rather than synergy.

Synergy will come when we bring multimedia to the desktop. That is going to be decided less on architecture issues than on what range of services the user will want. If you end up in a situation where people routinely expect voice and video, collaboration with other people and interpersonal reactions as part of their computing environment, then you will find opportunities for integration that you don't see now. The integration of voice and text is not a big deal. You typically hear voice and see data - they don't really work well with each other. It is when telephony becomes verbal that you have the difference.

When you end up speaking to your computer conversationally then the interface differences merge, but right now we are using different senses for the tow. I think it is rather naive to say, "You've always bought telephones from us, now you can buy computers." That works about as well as saying, "Since we've taken care of all your information processing, you should now get telephones from us."

Will UNIX be a successful platform for full-scale multimedia?

UNIX can play an important role in the multimedia applications. The underlying UNIX paradigm in the present system, of treating everything as a file, can be extended. We are doing this in our research and some of that will begin to find its way to commercial versions. That is, once you are allowed to dynamically change the name of a file in a process so it refers to your file and you've got ways of tracing it back to you, the location of the file becomes independent and can be anywhere. A "file" can ultimately be a piece of videotape. Once the notion of file is expanded to include all kinds of modalities independent of both the kind of modality and its location, you can extend the UNIX paradigm out from the single machine. That seems to me to be the wave of the future. It's not my idea; it's from Dennis Ritchie.

What do you see as the value of the Plan 9 system Ritchie and others are developing in the labs? Will it ever turn into a commercial or general-use system?

I hope not. I hope, as Dennis does, that the ideas of Plan 9 will find their way into commercial products. When we did Plan 9, we started over but it was the same people who started over, so it is a lucky coincidence that the paradigms of UNIX can stretch in this direction? I am confident that we can look forward to important lessons from Plan 9, especially the notion of dynamic naming on a process basis.

As an example, take the old simple paradigm that everything is a file - if you want me to listen to you, behave like a file. Moving into the future, it is, if you want me to listen to you, behave like a file *and call me*. Then the machine that is doing the listening also pays attention automatically without the file doing anything else. All you learn how to do is file; the new system adds the path identification, so it knows who is talking and also has enough context understanding to be able to translate that name. It's like at the beach, every kid yells, "Daddy." You need to know which use of "Daddy" belongs to who. The machine does all that instead of you climbing up and down trees and knowing exactly where you are. That is what I see as the promise of UNIX, and bringing that into some product. The same thing happening in System V, Mach and some of the other versions.

In your book, you say repeatedly that what we need are good interfaces of one kind or another. What sorts of interfaces are being explored now at Bell Labs?

Probably the place where we are doing the most good in the human interface is in the area of speech and hearing, the signal processing interfaces to the real world. The other area is mathematical. I used to think about the friendly interface but as I get older, I worry more about the interface inside the machine than the ones of the machine with people. Human interfaces are slowly getting better

because customers demand them. The place where research can add the greatest value today is in the inter-process interfaces. We have done this on an ad hoc basis, which is nonsensical. You devise some tests to see if the program does what you think it does and if it passes those tests, you sell the program. Then afterward you ask how many bugs did the customer find, you test it again and find there are going to be some bugs forever. My main thrust now is to put some science behind that. We are trying to do more with provability.

To anticipate these kinds of problems?

To prevent them. We want to actually try to prove some theorems about programs. That is very tough. The breakthroughs I am looking for are about the interfaces between processes so they will not break every time they talk to each other. As the machines get bigger, more complicated and more interdependent, the levels of quality that we've had aren't good enough. That is why I am paying so much attention to provability.

Is the idea of open systems more than a matter of marketing and sales?

It is marketing and sales in the sense that the customer is demanding it. Beyond that it is a question of the maturity of the industry. We cannot expect to run a modern society in which the pieces don't fit together. The ultimate issue for this decade is integration. Proprietary systems by and large, while they are going to continue and we have to live with them, constitute an overhead burden. The expense of that burden becomes increasingly difficult to bear because with every nonstandard interface, you can fix only until you find the next bug. Like with plumbing, the more joints there are in the system, the more places that could leak, so you would like to have as few joints in your system as possible. It is really reliability, maintainability, how much training you have to do and how many different people have to know about stuff. It's not buying it but living with it. Closed systems cost too much to maintain.

Last year AT&T chairman Bob Allen called for a redefinition of Bell Labs so it will "respond more directly to the demands of the marketplace." How are the people in the labs doing this? Does it threaten the independence of the labs and the purity of its research?

I welcome the opportunity. In my own organization we have done quite a bit to redefine our roles. If "pure research" mean *isolated*, it certainly is a threat. I don't think isolated research is what the company or our society needs. We want to be insulated from day-to-day cares of the businesses but not isolated from them. The complaints that I get from folks are not so much that they are interfered with but that they are not listened to and are not

part of the team. I am getting fewer of those complaints as we move forward. When you are fat and happy, people tend to reinvent a lot; as you begin to see the common goal, you find everybody working together. We have always continued to do a small amount of academic research because we want to make sure we keep our links with universities. All the good research labs do. But that is a tiny fraction of what we do. Most of it has been and will continue to be responsive to business needs. Over the past year we've done a certain amount of reorganization to streamline and it's made us into a better organization. People who come to visit see what the morale and the spirit are like. We are responding faster than we used to. That is all for the good.

Is there a downside to society's dependence on information systems? What would happen, for example, in the case of a massive disruption in our electricity supplies or telephone connections?

One of the things we've got to understand is that safety and comfort are relative. In the influenza epidemic of 1918, one percent of the world's population died. Lots of people remember 1918. Those mothers who want their kids to be fat grew up seeing that the fat kids survived respiratory diseases and flu, while the thin kids died. There are still all sorts of risks in our society today. We depend more on our city water supply because we don't get wells by ourselves. We have power blackouts in the middle of surgical operations, so we try to have backups. We depend on electricity in office buildings and people on the 80th floor have to get out when the power goes. We have replaced our susceptibility to nature with susceptibility to machinery.

It doesn't make us vulnerable because we are now dependent on the reliability of machinery. Again, that is why I'm spending so much time on provability. The existing methods of reliability will be very heavily stressed and we've got to come up with new standards. There are going to have to be qualitative differences and one of them is that we will have to start proving theorems about our software if we are ultimately to trust software. You have to prove that it works and not just have a bunch of people signing affidavits, because they could all be wrong.

What are the limits of what computers can or ought to do? You write, for example, about how you can't teach a computer creativity.

There is nothing wrong with studying creativity; the important thing is to not let the metaphor interfere. When we use the human being as a metaphor for the rest of the world, that is fine. When we use the machine as a metaphor for ourselves, that is dangerous. We can really understand creativity, as long as we are doing it with an open mind, not with a preconceived notion that creativity

is at its base mechanistic. Then it can be destructive. I don't want to limit the spirit of inquiry but I want to make sure that we don't take notions in advance that somehow constrain us to look for misleading or destructive solutions.

What will the UNIX of the future or its replacement do that today's versions don't do?

It will give users the global village environment. To the user the world will look as if there is a single machine, with all sources and everybody else in the world logged into it, and you only hear about them when they want to send you mail. Whatever machine you go to, your customized environment pops up in front of you. It will tame this hyper-complex environment. Plan 9 can't do it so I hope there will be a Plan 10, 11 and 12. And I hope that the ideas of those plans will continue to move into what we call UNIX.

I get into fights with trademark people when I say UNIX is just an idea but there is ultimately a UNIX philosophy. They used to say that "small is beautiful" and I hope we can maintain that philosophy. *Small* has to be redefined, of course, and the way we have to keep it small is in terms of the number of constructs to which the user and even the system administrator are exposed. As we make those constructs more powerful and more flexible, we can try to keep the smallness. As long as we do that, I think we are moving in the right direction.

Do you mean that the idea of the relatively small kernel and appended utilities will endure?

No, size depends on what you mean by a construct. Is it going to be 5,000 bytes or 5 billion bytes? I don't think you can count it in those terms; you count it in terms of the number of ideas that are in the number of things that you have track of and the number of interactions they have with each other. You can say, for instance, that Greek science was very simple because all they had was 15 gods but each of these gods had a very complex behavior, so you couldn't predict anything. Those were not particularly well-behaved entities. What I'm talking about here are powerful paradigms and constructs, which are themselves entities that interact in simple ways. That is what I mean by *small*.

What do you hope to accomplish by the end of the century?

I hope for the integration of information modalities. Going away from this notion of voice-based telephony and visually based computing, to where the full range of human senses is engaged in both. That integration is what I look for in the rest of this decade as a kind of overarching goal.

**Technical UNIX User Group
Second Quarter Financial Statements
October 1990 to March 1991**

Gilles Detillieux, Treasurer

Balance Sheet
Mar. '91

Assets:	
bank account	\$ 899.13
cash (to be deposited)	<u>76.00</u>
	\$ 975.13
	=====
Liabilities:	
due to Unisys	115.35
Equity:	
net income to date	426.15
retained earnings	<u>433.63</u>
	859.78
Total Liabilities + Equity	\$ 975.13
	=====

Income & Expenses
Oct. '90-Mar. '91

Income:	
membership dues	\$ 596.00
Expenses:	
Christmas party	52.61
bank charges	1.89
stationery:	
envelopes	0.00
mailing labels	0.00
paper	<u>9.77</u>
	9.77
postage	<u>105.58</u>
Total Expenses	\$ 169.85
Net Income:	\$ 426.15
	=====



Technical UNIX® User Group

TUUG Business Meeting Minutes

Tuesday, April 9, 1991

Attendance:

10 present.

Minutes of March Meeting:

Minutes have been accepted.

Membership Secretary's Report:

Membership Secretary is not present.

Newsletter Editor's Remarks:

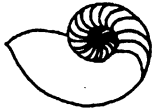
We are always in need of more material for the newsletter. Any contributions are welcome. Please contact Susan Zuk if you have anything to submit.

Treasurer's Remarks:

Gilles was not present but he plans to have the financial statements prepared no later than June.

New Business:

Possibilities of obtaining access to usenet, through the University of Manitoba link, were discussed.



Technical UNIX® User Group

Agenda
for
Tuesday, May 14, 1991
7:30pm
Hewlett Packard
Hewlett Packard Building
1825 Inkster Blvd.
(See Page 2 - Announcements for Details)

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|---|------|
| 1. Round Table | 7:30 |
| 2. Business Meeting | 8:00 |
| a) Minutes of April's Meeting | |
| b) Membership Secretary's Report | |
| c) Newsletter Report | |
| d) Treasurer's Report | |
| 4. Break | 8:30 |
| 5. Presented Topic | 8:40 |
| OSF/1 and | |
| a demo of the HP Apollo 9000 Series 700 | |
| Presented By Grant Sidwall | |
| 6. Adjourn | 9:30 |