

The COOK Report on Internet →

NREN

The FNCAC May 15 Meeting and the Backbone Solicitation

An Analysis of the Process and Plans

From extensive notes of the FNCAC May 15 1992 meeting obtained by *The COOK Report*, we must conclude that plans for the NREN are being laid down deep inside the maze of the Federal science bureaucracy. At one level this is not surprising or alarming. However what should give cause for concern is that the process is being done without significant input from the broad range of NREN constituencies on behalf of which Congress was convinced to enact the legislation.

FNCAC's Role a Minor One

The notes make it clear that the FNCAC was summoned to react to policy and not to participate in the making of policy. Its meeting had been postponed from the NET92 March 1992 meeting because more than two years after the formation of the FNC, its management plan wasn't quite finished. Once the plan was ready to distribute, the meeting was apparently called with such haste that only 9 of the 21 FNCAC members were able to attend. (Although it was a public meeting, it was announced to the com-priv mail list less than 48 hours before it was held.)

When the FNC Plan was handed out, it apparently made many references to a document known as the HPCC Terms of Reference. Dr Ken King, President of Educom is reported to have indicated to the FNC that he believed the FNC Management Plan was incomplete without the Terms of Reference. While John Cavallini from the Department of Energy supposed that it could be supplied, Nico Haberman from the NSF suggested that the ab-

sence of the Terms of Reference could be handled by changing all references to the "Terms" in the plan to "HPCC Program." MCI's Richard Liebhaber then joined the rest of the advisory committee members in asking to be supplied with the actual document.

At this point Dr Haberman pointed out to the committee that, while it might recommend whatever it wished, it was only advisory. The FNC, he asserted, had more interest in its opinion in some areas than in others. Somewhat surprisingly, a bit later, MCI's Liebhaber suggested that the FNC draft management plan gave the Advisory Committee too much freedom to speak out on any issue rather than on only those for which the FNC requested advice. Haberman brushed aside Liebhaber's concern reporting that since the FNCAC was advisory only it would be easy for the FNC to ignore any extraneous advice that it received.

When Ken King decried an over emphasis on grand challenges and a lack of emphasis on building a national information infrastructure, Steve Wolff pointed out that he believed the role of NREN was to catalyze the private sector into producing a commercial national high speed infrastructure rather than actually to create one. No matter what one's position on the correctness or incorrectness of Wolff's point of view, as the rest of the meeting would make clear, Wolff and the NSF are designing a structure into which commercial, production TCP/IP internet-working will be "plugged." While the NSF may protest as much as it wants, what it is doing will alter the national information infrastructure. (Cont. p.2)

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The K-12 Net View from iNET 92

by Janet Murray

The first annual meeting of the Internet Society, held June 15-18, 1992, in Kobe, Japan, was attended by six hundred delegates from 69 countries. Publications referred to the conference as "iNET'92" - the lower case "i" symbolizing the networking of a variety of international telecommunications systems represented by the attendees. [The upper case "I" - Internet - is generally understood to refer to the global-connections between and among university, government, and some commercial institutions. Internet access provides three important functions: e-mail, telnet (to remote systems), and ftp (file transfer protocol - from remote systems).]

In the opening session, Dr. Larry Landweber (University of Wisconsin) projected slides of statistics from John-Quarterman's *Matrix News* (2/92)

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Organization of NREN within the Executive Branch.

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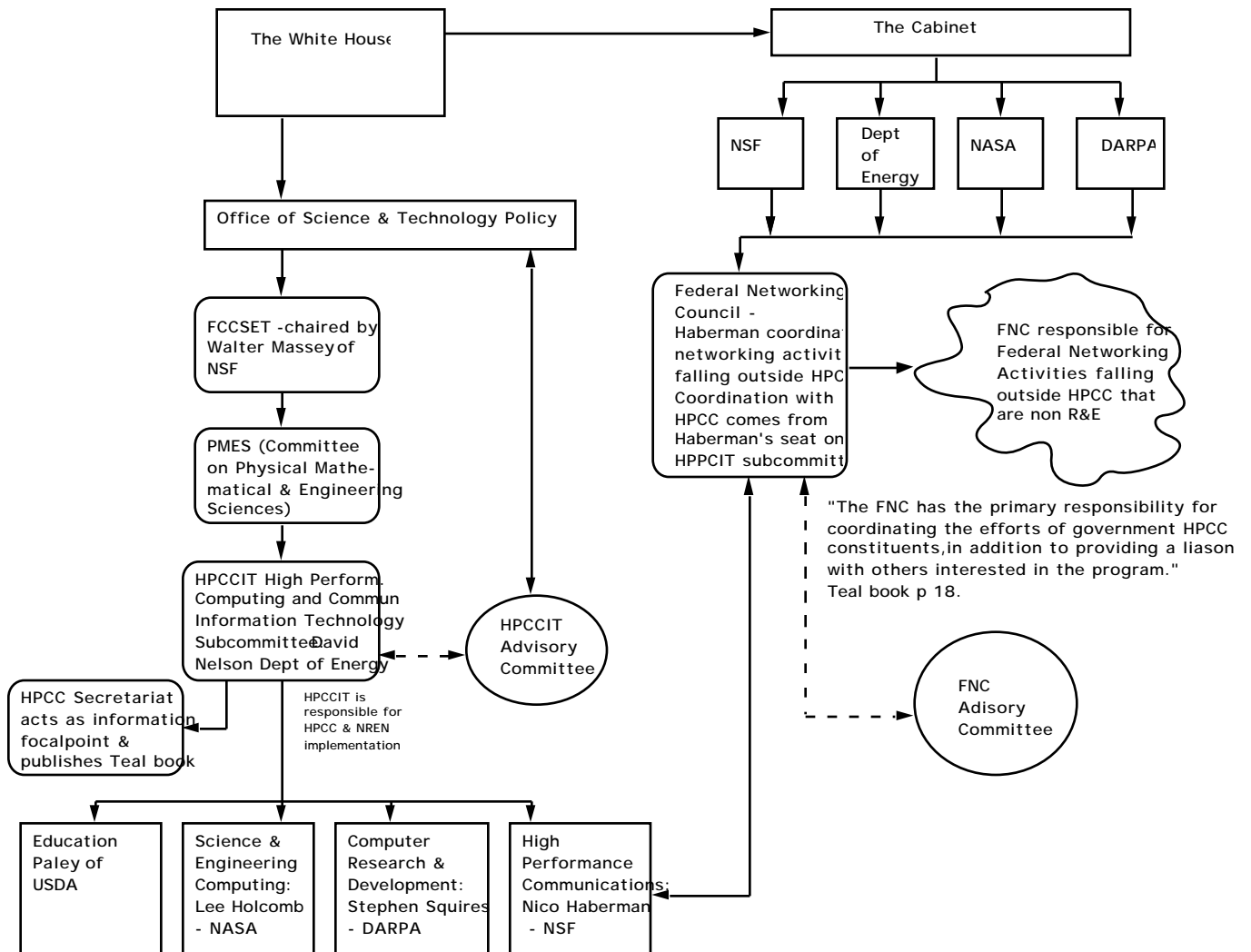
The nine members of the FNCAC were treated to an overview of how the executive branch is organizing the NREN. The organization is welling up from deep inside OSTP, in the bowels of a subcommittee of a subcommittee of the FCCSET. (See the chart Network Lab-

yrinth.) As the chart shows, there is to be yet another committee, a HPCCITT Advisory Committee filling, no doubt, a role that members of the FNCAC thought they were fulfilling.

Before the May FNCAC meeting, most observers thought the FNC was coordinating the planning and implementation of the NREN. The 1993 HPCC propaganda piece known as the 'Teal Book' from PMES states "the FNC has the primary responsibility for coordinating the efforts of government HPCC participants and other NREN constituents, in addition to providing a liason with others involved or interested in the program."

During the meeting persistent probing by Ken King revealed that FNC existed

now only to coordinate federal networking activity falling outside the HPCC rubric. It was also stated that NSF had taken advantage of an ability to set up a committee (the FNC) that would be free of restrictions imposed on FCCSET chartered committees. (What those restrictions were, apparently were not mentioned.) However, when Ken Klingenstein from the University of Colorado asked if all Federal non NREN networking activity was the responsibility of the FNC, representatives from several other agencies present said that they had networking activities which were not related to Research and Education therefore didn't come under the aegis of the FNC. Taken literally this would mean that the scope of FNC activities was narrowed to non NREN Research



The Layout of the Network Labyrinth

and Education networking activities. No one apparently had the temerity to say what those might be.

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It was revealed that NREN would be planned within the Network subcommittee of the HPCCIT sub - sub committee of the FCCSET which in turn is a committee of OSTP. Not surprisingly both the Network subcommittee of HPCCIT and the FNC are chaired by Nico Haberman of the NSF. Some of the significance of the HPCC "Terms of Reference" as a planning document was revealed when Haberman read a paragraph that stated that by July 24, PMES should receive an NREN management plan that had the concurrence of the FNC and FNCAC. King had to ask how the FNCAC would provide input to the NREN management plan. He was told that its response to issues raised by the current meeting would be due by June 15 and would then be incorporated into the plan. The meeting reporter wryly noted that the FNC management plan states that the NSF is responsible for drafting the NREN plan and is to send it to the FNC Executive Committee and on to the full FNC for approval before sending it on to the PMES.

John Cavallini from the Department of Energy suggested that the FNC management plan could be used as the NREN management plan. Dr. Habermann is reported to have responded that this suggestion was too optimistic because, for example, the FNC management plan has no dates in it as an NREN management plan should have. However by the end of the discussion, it was agreed that the FNC management plan should be part of the NREN implementation plan.

The Network Access Points, Form and Function

Robert Aiken, formerly of the Department of Energy and currently reporting to Steve Wolff at the NSF, presented the plan for the NREN Backbone solicitation. The plan centered on Network Access Points (NAPs). The NSF is apparently calling for six to be provided by the enti-

ty that wins the routing authority cooperative agreement. Asked whether there would be a limit of six NAPs, Bob Aiken is reported to have responded that he believes that "a whole hierarchy of NAPs will crop up by themselves." The high speed backbone, which would be required to be at least 155 megabits per second, would be subject to the standard NSF acceptable use policy for research and education. Aiken then, it is reported, made an unusual disclaimer stating that while it was his personal opinion that the high speed backbone should be implemented in ATM at level two, ATM would not be a solicitation requirement.

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Aiken's statement bears extremely close scrutiny. IBM has had a high speed switch under development since 1987 called first PARIS and more recently PLANET. It is based on something called PTM rather than on the CCITT international telephony standard of ATM. In 1991 it was re-engineered to accommodate ATM packets encapsulated with PTM packets.

An ATM over SONET based public switched telephone network (PSTN) could interface with a network based on the IBM switch. However, it would not be a comfortable interface. It would provide further impetus toward deployment of NREN as a private network rather than as part of the PSTN. This is a prospect that chills AT&T and the RBOCS, because it could position the phone companies so that they could deliver only commodity priced services at level 1 of the protocol stack while ANS and other private network providers were free to scoop up the profits inherent in the higher level, value added network services.

In addition to the expected hierarchy of Private NAPs, there would be at least 6 NSF sponsored Network Access Points. The NSF apparently will set the rules for its NAPs. Rules governing private NAPs are not the responsibility of the NSF. In declining

to become involved in rule making for private NAPs the NSF seems to ignore the point that the winner of the backbone solicitation will apparently then be in a position to determine the rules for private NAPs desiring to connect to its backbone. A private NAP implies a gateway to the research backbone for a competing network service. One would wonder why the backbone provider would be interested in granting a private NAP reasonable terms of access?

NAPs - Unanswered Questions

Two other very significant questions arise from these points. One assumes that when the final solicitation is issued (perhaps by December of this year?), it will specify the exact location of the six NAPs. Why? Because the NAPs will be "owned" by the winner of the routing authority. One must assume that in preparing its proposal the would-be routing authority would need to know where the NAPs would be. Of course the NSF could say: that's up to the routing authority to decide. Fine. But what about the entity bidding the backbone? In calculating the cost of its bid, one would think that it would be useful for it to know where the NAPs would be. (The NAPs after all are presumably nodes on the backbone." One would assume that it would be a violation of the NSF's announced intentions of separation of "powers" for a would-be backbone bidder to find out in advance from a would be routing authority where its NAPs would be positioned.

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It doesn't seem likely however that these questions will be resolved before the solicitation is issued. Aiken is reported to have said that even the form of the NAPs (a FDDI room, or an SMDS cloud) would not need to be resolved before the final solicitation is issued.

Network service providers and other federal networks are expected to be the primary entities connecting to NAPs. Public data internets (likely to be members of the CLIX) appear to be considered network service providers.

A network service provider that connects to all six NSF NAPs will be allowed to provide alternative backbone service. Regional networks may connect to a network service provider or directly to a NAP.

The regionals, especially the ones operating as backbone nodes, should be also concerned about the location and number of the NAPs. Unanswered questions include whether the six NSF NAPs will be located at current NSFnet backbone nodes. One would think that the likely candidates for the NAPs would be the four national supercomputer center nodes, the NCAR node (also a supercomputer center), and MERIT. Regionals that currently connect at these nodes would presumably have a cost advantage over those who do not.

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Under the new network topology a regional presumably has to find a way to connect both to one of the six NSF NAPs for research backbone access and, since the research backbone will still be saddled with AUP to a commercial service provider that can provide it with access to a commercial backbone. One would assume that as the number of interconnections for backbone service that a regional must make increases, the cost that it will need to pass along to user will also increase. Determining what the cost of the NAPs will be should be a challenging task

The NSF is paying for a Routing Authority which will also own the NAPs.

One assumes therefore that the NSF is also paying for the NAPS. The NSF apparently will pay for 100% of the regional's share of connecting to a NAP or a network service provider in year one and will phase out support in each successive year arriving at zero

support in 1996. If I were preparing a bid for the routing authority, what would not be clear to me is when and under what conditions I would be allowed to start collecting from those who connected to my NAPs a "prorated" share of the cost. I would presumably be free to start charging a public data internet a pro-rated share from day one. One hopes that the final solicitation will define what allowable charges would be.

Impact of NAPs on Costs - Unknown

Danger signals however should go up for all concerned. For in response to a question by Ken Klingenstein, Bob Aiken is reported to have said that he had no idea how much it might cost a regional network to connect to a NAP. Even with the NSF paying the full cost of the year one connection, one wonders how the regionals are, in the face of increasing uncertainty, expected to plan future budgets -- budgets that may include financial commitments to the IXC's that provide their backbones for as long as five years.

The uncertainty faced by the regionals is further increased by the fact that the mechanism used for pro-rating the cost of NAP (fixed, per pipe, per byte, etc.) is apparently undecided. As Ken Klingenstein pointed out, deciding whether cost sharing will be fixed, or by the size of connections or by the amount of traffic passed will have a powerful influence on how costs at other levels of the network are addressed. Hopefully, the NSF will be cognizant of the impact of the pro-rating policy on K-12 entry into the net and on the ability of small information service providers to use the network to disseminate information.

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The backbone provider will certainly want to be able to influence these decisions. Why? Because, since the very high speed backbone provider is also allowed to resell its surplus backbone capacity for commercial service, the provider is given, courtesy of the National Science Foundation, an incentive

to see that costs are prorated in such a way as to make interconnection at a NAP as expensive as possible. The backbone provider will wish to keep its competitors costs as high as possible. For this reason alone there needs to be a firewall between the owner of the NAPs and the owner of the backbone. Since MERIT and ANS have interlocking boards of governance, one would hope that the NSF would recognize the inherent conflict of interest involved in even considering a grant of the backbone to ANS and a grant of routing authority to MERIT.

Bob Aiken is reported to have said that the 155 Mb/s speed of the research backbone could be a collection of 3 or 4 DS-3 pipes grouped together with ATM switching and inverse multiplexers.

The NSF seems to be determined to have as little responsibility for the operational components of the network as possible. Capacity planning will be the responsibility of the research backbone provider. If there is an overflow, it is assumed that the regionals will be able to get any needed additional capacity from commercial service providers connected to NAPs. The NSF will set the rules for its six NAPS but will not attempt to set any rules for private NAPs.

The May 15 presentation and the draft solicitation leave many questions unanswered. However, on June 25th, in Com-Priv, Bob Aiken did provide a very interesting elaboration on the use of the NAPs: "If a private service provider connects to all NAPs it then has its own backbone and it can peer at the AUP free NAP with other private sector service providers. As a result the R&E community will have viable access to Information services provided by the private sector. It will also have a place for the private sector service providers to freely interoperate with each other and to provide alternatives to the AUP encumbered Research Backbone for those not wishing to deal with the problems associated with a Federal AUP. If all the Private sector service providers connect to all NAPS and they agree to exchange traffic with each other (and with the Fed R&E backbone) - guess what - you have just started the National Public Data Network and it is not based on the NSFNET Backbone anymore, but the backbones of the private sector service providers."

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One hopes that we will find out that not only shall there be no connection between the provider of a NAP and a service provider using the NAP, but also that the winner of the R&E Research Backbone award and the winner of the routing authority award be absolutely independent entities. One would not want to feel that there could be any temptation for the provider of the NAP & Routing Authority to apportion NAP costs in a way to benefit the commercial service provider connecting to the NAP. One would also not want to feel there could be any reason for the NAP Provider to apportion costs in a way that would benefit the Research Backbone Provider at the expense of any of the commercial service providers connecting to the NAPs.

The AUP that Wouldn't Go Away

The Acceptable Policy was an issue that came up for discussion. Apparently there is an FNC wide acceptable use policy under discussion. The draft NREN AUP presented by Tony Villasenor evidently alludes to it. Ken Klingenstein asked if the inventory of mission agency AUPs that the FNC had agreed to compile had been completed. John Cavellini is reported to have answered that the inventory was not available because the AUPs were still in draft status.

Ken King is reported to have asked if Congressman's Boucher's idea of relaxing the AUP has had an effect on agency discussions. Dr. Wolff said that language had not passed the Congress. (One infers from this remark, that the answer is "no they have not had any effect.") King asked if NSF funding of AUP-free NAPs would be a problem. Dr. Wolff said this would be no prob-

lem because of the "localization and specialization of NAPs."

One wishes that the NSF would explain AUP. Why something that is localized and specialized (whatever this means with regard to the NAPs) doesn't need an AUP and everything else does, is a mystery to this observer. The FNCAC is supposed to have made its opinions on AUP known to the FNC by June 15th. We wish them luck.

Impact on Telecommunications Policy Denied

At three different points in the meeting members of the Advisory Committee pointed out their concern that what the FNC and HPCC planners are doing especially now that they are planning for the incorporation of commercial services into the NREN, is designing a data networking infrastructure for the nation for the next century. Stewart Personik is reported to have said the plan is "essentially a plan for data communications in the United States and should be reviewed more broadly by organizations like the FCC, Congress, and Bellcore." Bob Aiken is reported to have dismissed Personik's concern by saying that "the plan is an opportunity for connection" and noting that "national networks could choose not to connect to NSFnet."

Take it or leave it. We have the money and we are going ahead, like it or not, seems to be the attitude of far too many of those who have the responsibility for implementing the NEN. *The COOK Report* believes that Personik, who has testified before Congress on NREN and who is Bellcore's major spokesman on the importance of standards in telecommunications, has a very important concern and should be listened to very carefully. The NSF is auctioning off the implementation of NREN to the lowest bidder. In an unregulated marketplace that bidder is free to choose whether or not to serve its short term interests by adopting proprietary solutions rather than the national interests by adopting international standards.

The NSF however seems to be very well aware of the selfish and short term view that it is taking to satisfy its immediate interests on behalf of NREN. It was reported later that "Dr. Habermann asked the FNCAC to make its comments from the incremental standpoint of how to make the next step in NSFnet

evolution and not from the standpoint of global networking evolution and how the national information infrastructure should be implemented. The committee took issue saying NSFnet is the only extent model and that NSFnet will, de facto, set the standards and environment around which the national information infrastructure will grow." Dr. Wolff is reported to have said the "current plan includes the key idea of neutral NAP points which does not in any way bias future development."

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One wonders what a "neutral NAP" is? Whatever it is, what is happening is that the National Science Foundation apparently is (with what seems to be the full concurrence of the OSTP and the White House) being allowed to put out to lowest bid the structuring of the most critical components of a national data network. Rumors say that the Department of Energy is very unhappy with the NSF's efforts at the design of the NREN. Bob Aiken who came from Energy to the NSF a year ago to plan the NREN implementation, is resigning from NSF effective July 31.

All the maneuvering outlined in this article is being done outside of the purview of the telecommunications committees of the US Congress, outside of the regulatory framework and, because of the seemingly arcane nature of the subject matter, outside of any significant national discussion of telecommunications policy. The one brief and pathetic attempt on the part of Congress to exert oversight was the hearing of March 12, 1992. Unfortunately it seems to have vanishing without leaving the slightest trace on the landscape.

What will the NREN be? Musings of Alice in Electronic Wonderland

a guest editorial by Dave Hughes,
Old Colorado City Communications, Colorado Springs, CO 80904

Posted to Com-Priv on June 20, 1992

Gee, here I am a week from addressing 500 members of the American Library Association, to be followed by presentations, or acting as a panel member to at least 5 other national conferences in the next 3 months - all of whom want my views about the 'NREN' among other telecom subjects.

But at this point - even after two years of following this subject off line as well as on, face to face, as well as electronically, contractually, as well as voluntarily, reading presumably verbatim transcripts of laws, regulations, Congressional hearings, and reports from those hearings - I feel ready to tell the world I feel like Alice in Electronic Wonderland at the NREN Mad Hatters table, where nothing makes sense, although everyone talks soberly as if it did, words, promises and agreements seem to mean only what their authors want them to mean at the time.

I mean are we seeing the telecommunications policy equivalent of the Heisenberg Principle, where the observers are altering the observed? Everything is in Virtual Unreality, where laws don't

seem to apply, intents of Congress are irrelevant, the text of passed bills are Rorschach Ink Blots, and cross-membership in one another's deals or organizations are so convoluted as to appear incestuous. And those who ought to be speaking out the loudest against NREN being implemented wrong, are the quietest for fear they won't be in good favor by one winner-loser faction or another when it is implemented. And nobody that I can see, is looking out for the broadest, long range, *public*, rather than private interest.

While we all dance around the NREN Maypole - in utter darkness.

For while, in spite of the fact that the NREN involves Public Dollars and Public Policy - which has to be fair, open, and competitive, the real decisions seem to be tilted, closed, ever changing, and yet pre-ordained. The original questions remain constant. Its just that the answers are always changing. Its *bizarre!*

Anybody wonder why the American voter is so mistrustful of what is going on in Washington - private and

public? I wonder what H. Ross Perot would do/think of the NREN and the HPC actions of the Federal Government and its advisory bodies to date? I can't *believe* he wouldn't bring down his fist on its fragile teacup, leaving broken crockery all over the place.

Somebody is going to spend - at the top, a billion real dollars of taxpayers money - and schools, businesses, governments, individuals are going to have to pay at the other end unknown amounts for unknown services with unknown rules, benefitting unknown sectors.

That's the reality that will greet everybody when they wake up.

So what do I tell them at the ALA - just as everyone wants 'on the Internet?' Sorry folks, its all a dream, a terribly expensive labyrinthian dream where the money you put under the pillow for the dream, will be gone in the morning no matter what. And your tooth may still ache.

So help me out, com-privers. There are thousands of you out there. Since we all seem to be blind at the NREN elephant, perhaps it would help if we described to each other what we now 'see' is, and will be, the NREN.

How about a paragraph each, telling the rest of us, what *you* think the NREN is going to be. Not *should* be, but *will* be?

ANS Responds to Late Filing -- Reveals CO+RE Directors

On June 19 I posted the following to com-priv:

In a telephone conversation between 2 and 2:15 pm today, June 19, 1992 Ms. Noel Poore, Corporation Assistant, Franchise Tax Division, Secretary of State, Dover Delaware informed me that neither Advanced Network & Services, Inc nor ANS CO+RE Systems Inc have filed annual reports for the year 1991 as required under Delaware law.

One hundred and eleven days late in filing required annual reports. I am surprised since I assume that ANS's position would be that it would be just an oversight on their part that these reports

had not been filed when I called this to the attention of com-priv on May 27, 1992. One would think that 23 days would have been adequate time to correct the oversight.

I would think that in making the policy decisions needed to implement the NREN components of the HPCC legislation it would be useful for the Congress and the NSF to know who the officers of ANS CO+RE are as well as how the expired terms of Liebhaber, van Houweling and Armstrong on the ANS Inc. board have been filled. This information won't be known until ANS either files the missing reports in Delaware or makes some other kind of announcement.

Surely it is not asking too much for ANS to comply with the requirements of the state in which it chooses

to incorporate?

On June 26 ANS replied in com-priv:

o Gordon Cook is correct in saying that we are late in filing the Corporate Franchise Tax Report for the state of Delaware. This happened because we did not receive the necessary forms, and frankly, we forgot to ask for them. These reports are one page long, and for failure to file by the deadline, we will be assessed a \$50 penalty. (The forms will be mailed this week.)

o The corporate officers of ANS CO+RE are a subset of ANS officers; they are Al Weis, President and CEO, Bob Harris, VP of Finance and Treasurer, Al Hoover, VP, and Jim Parker, Chief Counsel and Secretary. Msrs. Weis, Harris and Hoover comprise the ANS CO+RE Board of Directors.

Some Falacies Behind the "Buy-in" Model of Backbone Funding

An Editorial

In a telephone conversation on the afternoon of June 19th, when I asked Steve Wolff to explain why the NSF solicitation had one backbone provider instead of two, Steve replied: "you all have convinced us that we have no business continuing to support services that are no longer precompetitive."

Talk about a sudden about face!

What Steve tried to get across was that the NSF believes that choice is desired. It further believes that by allowing commercial competitive backbone services between Network Access Points, it will keep one part of its constituency happy *and* by providing a precompetitive high speed backbone it will keep another part of its constituency happy.

So far so good. The editorial in the first issue of *The COOK Report* called for as much. Where the plan fails is that it perpetuates the advantage given ANS in the current backbone by allowing the resale of commercial service and by incorporating the AUP so that the provider of the backbone is able to offer would-be experimenters something that no one else can: use of the backbone in a capacity that will be free of AUP restrictions. Thus the same mistakes made since the fall of 1990 appear to be waiting in the wings ready to be repeated once more.

In explaining why the NSF was supporting a high speed precompetitive backbone, Steve added that our computational scientists have applications right now that needed clear channel 155 megabits *asap*. I interpret his words somewhat differently. We have put the rights to \$50 million dollars worth of government subsidies for a national B-ISDN testbed up for sale to the lowest bidder.

Saving the treasury a few million now for this scenario is the same Republican thinking that brought us the privatization of Landsat with the results that the very researchers who were intended to be served by Landsat can no longer afford to buy the photos. The same thing is on the verge of happening, with the Securities & Exchange Commission data where privatization via something called Edgar will make it prohibitively expensive for

public interest groups to get data that would help to expose whose hand was in what cookie jar as we deal with the continuing consequences of the financial excesses of the 1980s that have by no means disappeared in the 1990s.

The rich nobleman used to go to Louis XVI and offer to build the roads that the bankrupt French crown could no longer afford. The deal was that the rich nobleman got *letters patent* from the King that allowed him to charge the commoners tolls on the roads that royalty used for free. This is the image that the proposed policy for the backbone calls to my mind. I want no part of it.

Brian Kahin wrote: "If the contractor keeps the right to exploit the technology in the private sector, the government gets the technology for less." This is a very short term view that once again invites us to mortgage our future. For if the taxpayers don't pay a little to level the playing field now they may pay untold sums in the future to those who can use their position now to buy a leg up in the marketplace.

Nevertheless "cost sharing" has apparently become an accepted part of NREN implementation. An with the backbone rebid, it is here with a vengeance with the NSF stating very clearly in advance what it is prepared to spend for backbone and routing services. What one must realize is that this puts an interesting filter on who can afford to play. BBN, which certainly knows what it is doing in the internet, apparently can't afford to buy into five years control over the backbone.

But a huge company like IBM can afford to make an investment in the future in order to acquire a testbed for the development of its routing technology. As those who have read the page 1 article in the June 8 *Communications Week* will have seen, IBM's 6611 router apparently needs a great deal of further development.

Now if ANS did not have IBM and MCI as corporate sponsors, there would be little cause for concern. On April 22, MCI vice president Jerry Edgerton stated that MCI wanted ANS to become financially independent as soon as possible. He also refused to rule out further assistance to ANS. Given IBM's technology stake

in what ANS is doing, it is impossible to imagine as scenario where ANS will not get whatever help from IBM it needs to remain in business.

Nevertheless *The COOK Report* believes that structuring a project so that it is attractive for a bidder to buy in is *bad* and discriminatory in that, if the purpose of what is being done is *really* technology development, that it is the small and new companies like Wellfleet or Ultra Network Technologies that very likely have the ability to take leading edge of the technology and push it further and faster than does ANS working on behalf of IBM. For I would imagine that these and many other able companies are lacking the ability to deliver what the NSF wants for a price of well under 10 million a year.

In the Darwinian marketplace the financially most fit and technologically most fit are not necessarily the same companies. Is the purpose of NREN technology development or is it designed to allow a venerable old company like IBM to play technology catch up?

Congress should be made aware of the choices inherent in allowing our largest and most wealthy corporations to buy into the backbone and exploit their purchase in the marketplace. Someone should suggest some hearings. Let Ed Kozel come and talk about how Cisco could apparently develop a clear channel T-3 router in well under 2 years. Let someone from IBM come and explain why their 6611 router cannot measure up to products offered by the competition. Let Congress decide if the net were sold at true cost, and it were really interested in furthering technology development, whether Cisco or IBM should be the provider.

Could it be a case of the government getting what it pays for? Alex McKenzie of BBN has some disagreements with the NSF's concept of cost sharing. Let him and any other like minded high technology company executive come to the Hill and educate Congress on the trade offs of encouraging large amounts of cost sharing on the NREN cooperative agreement. If Congress then realizing that the cost sharing comes with strings attached, says it wants to give market place advantages to the bidder who will share the most cost, fine. Let it be done. But let it be obvious to all (including Con-

gress) *what* is being done.

A new example of what is being done by "cost sharing" came to light on June 27 when Brian Lloyd, a consultant to BARRnet complained to com-priv that the RISC 6000 based routers in the T-3 backbone were presently incapable of connecting to FDDI Lans, in effect limiting the throughput of any one application to less than 10 mbits per second.

Apparently IBM, now two years into trying to build working clear channel T-3 routers based on its RISC 6000 boxes, can't even begin to achieve the performance that Cisco did last November with the release of its clear channel T-3. Consider the front page article by Saroja Girishankar in the June 8 *Communications Week*: "after months of fine tuning by IBM, the 6611 routes data at less than half the speeds of competing products, according to sources familiar with the results of performance tests conducted by IBM. At best the 6611 will route TCP/IP data at 10,000 packets per second, the sources said. Routers from market leaders Cisco Systems Inc and Wellfleet Communications Inc. do the same job at a rate of 20,000 to 30,000 packets per second."

On the one hand the NREN folk tell the Congress that the goal of NREN is tech-

nology development, but on the other hand they appear to be quite willing to extend the cost sharing concept entered into with MERIT nearly 5 years ago -- this time for another five years. The companies who ought to be benefiting from the continued use of tax dollars for technology development - Proteon, Wellfleet, Cisco - to name a few are doing reasonably well without the direct investment. Meanwhile the increase of \$7 million per year in NSF spending goes to benefit technology development by a company that looks more and more like the GM of the computer industry.

If folks who tell Congress about the needs of our computational scientists for network applications in the 15, 20 and 30 megabit per second and up range are really serious, then why don't they tell ANS: take the RISC 6000 boxes out and install Ciscos? I'd guess they don't, because they can't. With the NSFnet now being delivered over ANSnet, it looks like the NSF doesn't have the authority to tell ANS what to do?

But ANS has waxed eloquent about existing to solely to serve the research infrastructure needs of American science. Here is a splendid chance for ANS to show the Internet community that it really means what it says. *And* here is

also a splendid chance for ANS to show that it does not exist just to serve the interests of IBM. Let ANS on its own install Cisco's clear channel T-3 routers directly into the T-3 backbone. It is time that we really had the 45 megabits per second that advocates for the network say is there.

Cost sharing is *certainly* getting NSF what it paid for. Pity is it looks like no one in Congress understands.

Internet Society Establishes Link with ITU

The June 16, 1992 decision of the Board of the Internet Society to establish a cooperative relationship with the Geneva-based U.N. specialized agency known as the International Telecommunication Union (ITU) is a welcome one. The advisory liason relationship between the IAB and the CCITT is especially significant. Since the CCITT is the most important standards body in the telecommunications world, the link with the IAB should serve to remind anyone who might be tempted by the apparent short term profit potential of proprietary protocols, of the importance American adherence to international telecommunications standards.

Wonders of Privatization

As NSF Policy Continues to Evolve the Appendage Has Now Become the Body

June 18 1992 - In answer to a question posted on com-priv Steve Wolff writes that NSFnet backbone services are implemented over ANSnet. How is one to interpret this? ANS is the provider of the service, NSF the purchaser. This seems to me to be a strange way of describing *precompetitive* technology -- ie for sale from a commercial service provider.

I think we are seeing a significant new policy statement here from the NSF.

Something rather different is described by Steve in his Sept 10, 1990 letter to

Doug van Houweling -- a letter written 3 days before ANS filed its incorporation papers. There Steve says:

"NSF agrees that the new corporation may solicit and attach to the *NSFnet-Backbone* new users, including commercial users, and may connect them to existing nodes on the backbone, with the understandings that:" Nothing about ANSnet here. The backbone is NSFnet. Period, end of discussion. NSF is giving ANS the authority to attach its own customers to what is still seen as an NSF structure.

By May 24 1991 we read about the T-3 backbone - not yet operational for sure - but apparently now belonging to and under the control of ANS despite the fact that NSF is paying an extra \$7 million a year for the t-3:

"NSF agrees that ANS may move commercial traffic in both directions across NSF sponsored Backbone gateways, providing that:"

The backbone is now neither referred to as NSFnet nor as ANSnet. Only the gateways clearly remain under the NSF's authority.

Now we get to June 18, 1992 and we hear that the NSFnet is provided over ANSnet. Not a co-equal part of but a subset of a commercial entity with a profit making arm and a would-be non profit arm. What started as an appendage (ANS) has now become the body and we have some folk on capitol hill applauding the seeding of a private enterprise with tax payer money as saving taxpayers untold sums. The body (NSFnet) is now the appendage.

Such are the wonders of privatization! It would be fascinating to audit the books on this example of government private sector synergy. Perhaps the staffers on the Hill are right. The US treasury is getting a great deal. But is there anyone from PSI or UUnet who believes this?

(K-12 View at iNET - from p.1)

which indicated that Internet access extends to 107 countries with more than five million users. Many of these, however, only have access to e-mail, and a significant number achieve that access through gateways from FidoNet and uucp. These so-called "amateur" networks are much more highly regarded in developing and southern hemisphere countries than in the U.S., where K-12 educators often feel like second class citizens in envious awe of their university-based counterparts who have "real" access to Internet, with all three flavors of functionality.

One important theme of the conference dealt with the need to extend Internet connectivity to developing countries, the southern hemisphere, and K-12 schools, all of which are currently under-represented in the Internet community. A preconference workshop for developing countries attracted 70 participants. I was fortunate to have the opportunity not only to attend the conference, but to present the "vision of K12Net" in a session entitled "Networks and Social Change".

The first session I attended at iNET'92 was devoted to "The Role of National Libraries in Evolving Global Information Infrastructure & Environment". Dr. Eric Wainwright, the Deputy Director General of the National Library of Australia, described the problems of document delivery in a nation where half the population is concentrated in the metropolitan areas, and the rest scattered over a country the size of the United States. (Sounds like Oregon!) The National Library is illogically located in Canberra rather than Melbourne or Sydney. Notable quote: A "library is a *mechanism*, not a place: its function is to link people to the information they need." I like this dynamic description, which is one which will become even more accurate as electronic document delivery evolves.

Larry Press (Cal State) described the role of RELCOM (a uucp network) during the attempted coup in the Soviet Union. RELCOM maintained its link throughout the crisis, and was virtually the only vehicle for the timely distribution of incoming, outgoing, and internal information. Juan Miguel Stefanich described the uucp network in Argentina in a session devoted to low-cost entry-level solutions. Both speakers defined "appropriate technol-

ogy" networks as those which are established using existing equipment and human resources. In developing countries, the equipment is most likely to be personal microcomputers and phone lines, while users and technicians are likely to be relatively unsophisticated.

In this context, my presentation on K12Net was wholly appropriate and well-received. K-12 educators often find themselves in a similar situation, with primitive equipment and serious budget constraints as barriers to their vision of a global electronic village. Attendees at iNet'92 from Argentina, Czechoslovakia, India, Ireland, Japan, New Zealand, Papua New Guinea, and Thailand expressed their intent to establish K12Net nodes or acquire the usenet newsgroup in their home countries as soon as possible.

On June 17th, a panel chaired by Richard Mandelbaum (University of Rochester) discussed the "Future of the Internet". Vinton Cerf, President of the Internet Society, introduced the topic by courageously making his predictions regarding the scope of the Internet in the year 2,000. Other panelists included David Farber (University of Pennsylvania), Frode Greisen (UNI-C, Denmark), Kees Neggers (SURFNET, Netherlands), and Jun Murai (Keio University, Japan).

The traditional analogies to the U.S. highway system, the international telephone and postal systems were invoked at various points in the discussion. Vint Cerf contributed an historical perspective when he noted that the U.S. highway system was federally funded because the military complex desired a reliable way to move missiles. Professor Farber offered the opinion that commercialization of the Internet would, at some time, require testing the end user's willingness to pay for the service. Frode Greisen estimated the actual per user fee at \$100 per year.

During the question period, I commented that the panel's perspectives seemed to be representative of the attitude of industrialized nations in the northern hemisphere, and asked how they envisioned equitable access for nations in the southern hemisphere, developing countries, and pre-university (i.e. K-12) students, with the comment that at \$100/year for 1600 students in my school, Internet access would not be available in the foreseeable (or even visionary) future. Professor Farber as-

sured me that they "were working on it," but Professor Mandelbaum questioned whether or not the U.S. educational system was as incapable of paying as I had implied.

At the banquet that evening, a number of people from other countries expressed their appreciation for my remarks, as did two (2) Americans. In subsequent discussions, I was persuaded that e-mail connectivity *is* appropriate for K-12 users - for now - and that our efforts in K12Net have made a significant impact on the awareness level of university-based Internet users.

Although e-mail may be adequate and appropriate at the present time, consider the future of such information-seeking interfaces as WAIS, gopher, and what Vint Cerf refers to as "knowbots". These applications have significant potential in educational settings, *even* at the pre-university level, so I believe we should continue to pursue "real" Internet teleconnectivity while appreciating the opportunities provided by the existing gateways.

The iNET'92 conference was extremely well-organized; the "terminal room" staffed by Jun Murai's WIDE students was well-equipped to provide the daily fix required by e-mail junkies; the food was generally wonderful; and there were many thought provoking presentations and general sessions. In the first keynote address, Dr. Toshitada Doi (Sony) challenged the audience of techies to remember the importance of human interactivity in effective communication; face-to-face discourse is enriched by the nonverbal cues and vocal expressiveness which cannot be duplicated in telecommunications. In Wednesday's keynote speech, Mitch Kapor (Electronic Frontier Foundation) described the new virtual "communities" unbounded by geographic location which are emerging as a result of global telecommunications.

These two themes are both reflected in the many new friends I made: K12Net will soon expand to many more parts of the world *because* of the face-to-face discourse between people of similar interests which transcend geographic and cultural boundaries. My dream is that if we can extend that teleconnectivity to K-12 students, they will grow up with international friendships and become less bigoted and stereotypical than their parents.

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