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CIX on Again off Again Filtering: What's at Stake? Board Member John Rugo's Unreported Resignation Symbolic of Erratic Policy Making

Strains Caused By Entry of Major New Players into ISP Market

The only clear policy that is emerging from the CIX is a lack of predictable policy. From public comments and off the record statements to us from some of the principals involved, it is possible to piece together the following chronol-

ogy. At some point not long after the September 14th membership meeting the Board met and elected John Rugo as CIX Association President and Chairman of the Board. Some have told us that Rugo's mission was to craft a reform program. On October 24 the Board met to consider Rugo's agenda. Results of the meeting were expected by close of business on October 26. None came. The meeting was not harmoni-

ous. We had been told that Rugo would "walk" if the reform agenda did not progress.

On November 1, a week after the abortive October 24th meeting began, Rugo "walked" by resigning from the Board. Also on November 1, the Board elected Bob Collet from Sprint-Link to replace him. The same day Collet, acting as new chairman, announced that filtering would be implemented against the routes of non members on November 15. He also announced that a laundry list of other concerns were being addressed by the Board and that decisions would be available "soon."

Tom Jennings Describes Growth of Little Garden Small Bay Area Hackers Network Becomes Major Low Cost Area ISP

Editor's Note: For months we had been hearing good things about the Little Garden as a model of good service and low cost connectivity. Finally one evening in early November we caught up with Tom Jennings who has been directing its growth for two years

COOK Report: What got you into the Internet services business?

Jennings: I never really did decide to do it. It just sort of happened. The Little Garden started before I did. John Gilmore [formerly of Sun Microsystems and EFF Board member], John Romke [UNIX wizard and first person to connect a toaster to a network] and Steve Crocker of Trusted Information Systems all said "gee, I bet

we could get on the Internet for less than five grand." This was around 1990 - 1991.

So they strung together some hardware - it cost them ten grand of course - and got either a 56 kbs or fractional T-1 connection to UUNET. Because the \$1,000 a month charge was expensive, Rick Adams allowed them to split the cost three ways. The original email said essentially I don't care what you guys do. Just don't cause me a lot of support grief - a reasonable answer all things considered.

COOK Report: We have heard that concerns about having to provide unreasonable amounts of support are one

November 10, 1994

On the 10th the Board met by telephone conference call. It accepted

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Rugo's resignation and observed that that his election as Board Chair and Association President had never even been reported to themembership.

The Board also [what follows is a direct quote from theminutes] "Reaffirmed decision to filter non member routes. Agreement was reached with Vixie Enterprises to assume software management of the CIX router where he will implement the filtering. Vixie Enterprises assumes control Dec 1. The contract with Vixie Enterprises is month-by-month to provide the CIX optimal management flexibility when securing a contract via competitive procurement. Agreed 15 business days notice will be given to an affected party prior to activation of filtering (Suggestion that connected service providers provide AS numbers of all attached networks and note those who are customers).

Agreed the router will stay operational through August 31st, 1995 to provide connected networks adequate notice for other arrangements, e.g., peering across the SMDS cloud, or access via another CIX member. The CIX router will stay collocated in PSI/Wiltel facilities. Noted that there are 22 directly-connected networks. The Board agreed that no new members will be accepted directly into the router. New members will be invited to connect via the SMDS network or through another service provider." [End quote from minutes.]

The Minutes also announced that the results of the much touted CIX member survey were "inconclusive." It reviewed candidates for executive director and "discussed CIX Board Chair and Association President options and agreed to hold election 11/17." A week later the Board proved to be unable even to deliver on this promise.

November 16, 1994

On November 16 after a com-priv participant observed that there were no detectable signs of filtering, Collet responded that the Board had been unable to both meet its deadline of the 15th and do the filtering correctly. He added that violators (those with access to the CIX router who were not CIX members) were being identified and would be given a reasonable chance to remedy the situation before being filtered. Although Collet signed his statements to com-priv "for the Board," nothing was said about his election or Rugo's resignation. While the results of the Septem-

We believe that those in the middle suddenly saw the CIX as their only defense against the squeeze being engineered by the large IXCs from above and the small new providers being enabled by them from below. Perhaps the CIX could be made to play traffic cop? The middle could defend itself from this onslaught by insisting that everyone had to join the CIX. To put teeth its defensive argument the board announced a new policy that it - acting as the CIX - would now enforce routing and would hunt out violators of its decree.

ber membership survey were released to the members but not to com-priv, none of the other information promised on November 1 was released.

November 18, 1994

On November 18, Rugo apparently tired of people wondering whether he was condoning the ongoing policy making, announced his resignation to the CIX Members list. The announcement was leaked to us immediately and we notified com-priv. Rugo was diplomatic, wishing the CIX well and blaming the time pressures on him of BBN's acquisition of Nearnnet. We only add that those time pressures were surely as obvious to him 5 or 6 weeks earlier when he took the position as they were on November 1. When we asked Collet why the announcement had not come from the Board, he replied: " We had wanted to complete the search for the vacant board seat and Executive Director and announce the new Chairman of the Board and President in one nice tidy package. We were supposed to do this on Thursday [11/17] but our plan for filling the board seat and executive director fell through. So, I guess John couldn't wait any longer and made his announcement."

November 19, 1994

At noon on November 19, Collet was hard at work to recover from the embarrassment of the preceding day. First he released only to CIX members the following pledge to reinvent the CIX. "As you know, I have been elected by the CIX Board to be the Chairman of Board and President of the Association. I am

looking forward to working with the Board and the Membership to evolve the organization to where it is optimally responsive to present and future requirements.

As John Rugo pointed-out, the organization is at a critical stage given all the changes happening in the industry: regulatory, structural, e.g., NSFNET decommissioning, technical, e.g., WWW, Video, IPv6, and economic, and social, e.g., use of Internet as media for general purpose use. Accordingly, our organization should be at the vanguard of these changes and position the membership to derive maximum economic benefit. Therefore, the Board is forming a Task Force to reinvent the CIX mission and develop a corresponding strategic plan.

The task force will consist of the Board and 10 volunteers from the membership. Volunteers are solicited and inquiries should be directed to Lou Scanlan (lscanlan@cix.org). Participants should expect to physically attend three meetings: at Internet World, Comnet and Interop Europe. The plan is to provide to the membership a draft plan in March.

As a starting point for this endeavor, the Board has developed a draft mission statement and strawman strategic plan. The objective is to address issues such as CIX routing, other services, e.g., route registration, .com and IP address assignment, organizational structure, fee structure, regulatory and lobbying agenda, commerciality demonstrations, e.g., within framework of NII, a bilateral agreement format, settlement policy (if any), membership scope, and other areas of interest to the membership." [End of Collet message.]

Collet then sent the minutes of the Board meeting of November 10 to the membership.

Our Assessment

That CIX members would have to wait nine days to find out the details of the most debated decision the organization had ever taken is symptomatic of the Board's continuing inability to respect the rights of its own members to timely information concerning planned actions that will in some cases negatively affect their welfare. The Board could have got-

ten minutes out within 24 hours. Once again it failed to do so and in failing deprived its members of five days lead time to prepare for what became public knowledge on November 16.

More than two months after its Executive Director resigned and three weeks after one of five Board members leaves, the CIX finds itself unable to replace them. We are not surprised. The Executive Director will need to be a person of stature within the industry. We have difficulty imaging any such individual casting his or her lot with an organization apparently unable to get its house in order. Finally with Rugo gone we wonder even more about what, if any role, Glen Kowack of EUnet is playing from Europe. Kowack has several large members who will be subject to filtering should the Board be serious about notifying violators. Kowack however has been as silent as Rugo.

We see two possible explanations for what is happening within the CIX Board. Either the Board is bitterly divided or it is trying to find a way to back out of the filtering corner into which it has painted itself. Lending support to the division hypothesis is (1) the lack of consistent policy announced in advance of implementation; (2) absence of announcement of specific Board votes; and (3) a stance where there appears to be (or at least to have been) three factions to the five member board. The first represented by PSI and UUNET as strong advocates of filtering. The second by BBN and EUNET whose Board members have been absolutely silent as to their views. (We now know why Rugo was silent.) The third by Collet who found himself in the position of spokes-

Either the Board is bitterly divided or it is trying to find a way to back out of the filtering corner into which it has painted itself. . . it is also possible that the Board could be unifying around a policy that would give it an opportunity to silently withdraw from the controversial corner into which it has painted itself. The withdrawal could simply be accomplished by doing nothing - since the process we are looking at now envisions private one-on-one negotiation with no announced deadlines.

man for policies that he and Sprint oppose. However it is also possible that the Board could be unifying around a policy that would give it an opportunity to silently withdraw from the controversial corner into which it has painted itself. The withdrawal could simply be accomplished by doing nothing - since the process we are looking at now envisions private one-on-one negotiation with no announced deadlines.

In any case underlying what one level looks like a vaudeville comedy routine is a deadly serious exercise in the use of naked power that may change the landscape of the emerging commercial network in ways that are difficult to predict. Essentially the struggle is about the right to resell network connections and the ability of the middle sized providers to survive in the face of the movement into the marketplace of the large telephone companies. Like a diamond it has many facets. Reality is reflected according to one's market place position. There are about as many ways to interpret what is happening as there are perspectives to view the situation from. Understanding reality is almost impossible without talking to participants from all levels of the marketplace and becoming very adept at following the intricacies of Internet peering and routing arrangements. We have been buried in these arguments for the past three weeks. Here is a summary of what we observed followed by our conclusions.

Collet's November 1 announcement gave relatively little information on how the filtering would be carried out and no information on the origin of the decision to do so. On the list a "good cop - bad cop" scenario unfolded. CIX Board members UUNET's Rick Adam's and PSI's Marty Schoffstall wrote the nastiest of flames back to comments criticizing their position while Board member Collet began to respond in a conciliatory way to all questions - signing his remarks as given "on behalf of the Board."

After a few days Collet offered some consensus building feedback on a revised dues structure and plans to take the CIX out of the routing business by the 4th quarter of 1995. This feedback began to elicit comments of approval from list participants. It was a very strange spectacle where, without actually committing itself to anything, the normally secretive CIX Board appeared to be making policy in public. However in view of the contrast between the public stance of Collet on the one hand and Ad-

ams and Schoffstall on the other - combined with absolute silence from Glen Kowack and John Rugo, we would caution against placing too much stake in the sanctity of the public discussion.

Big Against Little or the Middle Trying to Protect its Market Share?

Meanwhile we have concluded that what has tended to be seen at first glance as the action of large established providers raising a barrier to entry against new small providers is, in reality, a more complex dispute involving reselling and the entry of Sprint and MCI into the marketplace.

Sprint joined the CIX very early on. When it was making SprintLink sales primarily to US government customers, its policies posed no threat to other board members. However in 1993 it started selling in the general commercial market place and began to connect small Internet service providers or resellers to the net in a major way. It did so when PSI refused to do business with resellers and UUNET charged them much more than normal customers. Sprint very quickly gained market share at the expense of CIX Board members PSI and UUNET. It also offered its customers CIX router access courtesy of its CIX membership.

PSI, UUNET, and the regional members of the CIX found themselves squeezed on both sides by these events. On the one hand, the third largest IXC was selling service to anyone and everyone. By using portions of its national backbone as its infrastructure, it was able to offer inexpensive service to downstream resellers. It could squeeze the players in the middle, both at the national backbone level, and from beneath by making it possible for anyone to become an ISP very cheaply. On the other hand, the CIX, touted as the friend of the small service provider by making it possible for that service provider to join and immediately gain full and open peering with all CIX members, was in a position by the end of 1994 where PSI, UUNET and the regionals could use it to protect their own interests.

ANS had been regularly selling to

smaller ISPs and allowing those ISPs to resell. All done within the frame work of access to the CIX router where, when ANS joined the CIX in November 93, it was glad to start sending non member packets. Furthermore by July 1994 it was becoming clear to insiders that MCI was gearing up for a major entry into the market. It seemed safe to assume that to compete with Sprint, MCI would have to copy its policies. All this meant much increased pressure on the middle of the market.

ANS and the 2nd and 3rd largest IXC's were either developing or had national backbones fed by the very small providers that the CIX was theoretically designed to serve. Left in the middle and seeing their market share gobbled from above and below were PSI and UUNET the only ISPs who were not also telephone companies that had bills for national backbones to pay. Also left in the middle were Netcom and many regional members of the CIX. The regionals, still based in their academic settings, were finding it difficult to adjust their way of doing business to the demands of the commercial marketplace.

We believe that those in the middle suddenly saw the CIX as their only defense against the squeeze being engineered by the large IXC's from above and the small new providers being enabled by them from below. Perhaps the CIX could be made to play traffic cop? The middle could defend itself from this onslaught by insisting that everyone had to join the CIX. To put teeth its defensive argument the board announced a new policy that it - acting as the CIX - would now enforce routing and would hunt out violators of its decree. Among the violators would be many of those small providers that Sprint and ANS, and soon MCI were connecting to the net. If someone starting up out of his bedroom with total costs of between \$5,000 and 10,000 and essentially free routing to the Internet courtesy of Sprint had to pay \$7,500 a year to the CIX, plus a few hundred a month in transit costs to the CIX router or a \$5,000 router attachment fee plus the costs of a leased line to the router, then the cost of that person's entry into the market is increased considerably and tidal wave of new entrants would be slowed.

Sprint had never been telling people it was mandatory to join the CIX. But suddenly the CIX was saying that, if small provider customers of Sprint did not join CIX, they would find that their packets fell on the floor when route filtering began. Perhaps the CIX router

became a weapon to be used both against net new comers and against the expansionist plans of the IXC's?

Peering Arrangements - Costs and Complexities

Under these conditions, we found ourselves wondering about the relevance of the CIX router. The major service providers met at MAE-East, PSI and UUNET had a new inter-exchange point among their networks at SWABB (SMDS Washington Area Backbone By Pass). ANS and Sprint peered at FIX East. The larger regionals had peering agreements with PSI and UUNET.

But peering we found out represents a whole hierarchy of network relationships. ANS - with market share because of its NSFnet clients; Sprint - with market power because of the major IXC behind it; and MCI - preparing a major new push, could peer and expect a full exchange of routes with everyone anywhere. They could do it with no settlements and could generally accept and receive full transit of packets anywhere. PSI and UUNET, we are told were generally in this league, at least at MAE East.

With the CIX router foundering and seen as a place to avoid, many providers began to get interested in MAE-East as an alternative. We have heard from several sources that Net-99 was substantial enough when it started operation to peer and get full route exchanges at MAE-East without settlements or other significant restrictions imposed by ANS, Sprint, MCI, PSI, UUNET, Netcom or Suranet.

But we have also become aware a flow of other small providers many of whom want to run a leased line to MAE-East, pay the \$25,000 a year attachment fee and seem to expect that they will get the same kind of transit their larger network brethren do. When they plug in and approach each of the other members to exchange routing tables we are hearing that they may be in for nasty surprises. For peering can take many forms for the smaller players. It can be designed to enable packet exchange between my customers who want to reach addresses on your network and vice versa. Or it can establish routing to facilitate customer exchange as well as transit for these customers to certain other agreed upon networks and their customers - a form of limited transit. Or it could include the preceding and transit to all other networks. Possibilities include unlimited

permutations of these. In defining relationships with smaller providers what larger providers will be watching for very diligently is someone who wants to point default routes at its backbone -- that is to use its backbone as transit to the rest of the net.

In contrast to these complicated and potentially expensive arrangements, the apparent benefit of the CIX router for those who can afford to connect there is that peering is complete and settlement free to all other CIX members. While many providers are trying now to avoid the CIX router, it remains to be seen whether they can get routing through the MAE or any of the NAPs as cheaply. The answer is probably not. We know of one provider who wants to connect at the Sprint NAP. However that provider will almost certainly have to pay Sprint transit fees to carry its traffic to the rest of the Internet. There is another group of 16 providers most of whom are unhappy CIX members and many of whom had connected directly to the CIX router. This group has formed an entity called the Packet Clearing House. It is arranging alternative connections through the California NAP. The complexities faced and prices to be paid will likely be higher than at the CIX. At least at a CIX that was working smoothly. But the current CIX is not working smoothly so they may be prepared to pay the price.

People asked what the Internet would be like without the CIX and many replied that without the CIX it would really be tough for the little guy. Why? Because the little guy would have to go to great trouble and great expense to get peering arrangements that would give him adequate connectivity to the rest of the world. This seems to be a very speculative assessment for several reasons.

First an ISP could buy service from multiple backbone providers. In 1994 the little guy had ANS, and especially Sprint. (By year's end it appeared that ANS had stopped selling to ISPs.) These folk would carry his packets everywhere that they went and they had peering arrangements that got them to the whole world. Well before the end of December MCI would join in the same kind of welcome to the small player. Buy a link to MCInet, resell to your heart's content and see the world! Net99 was also emerging as a source for

the small ISP. Second: NET99 announced on November 15 that it would have MAE - East like "super sites" up and running in Seattle and San Francisco before the end of the year and that it had three for five additional such hubs planned for elsewhere in the US. With the Seattle and San Francisco "super sites" connected to the California NAP, these developments meant that the cost of the kind multilateral peering represented by the CIX router would decline to a point where it would be unlikely to cost more than joining the CIX.

For the middle sized companies this meant that the packets of companies which under other conditions would have paid CIX fees and gone through the CIX router were now traveling their backbones encased in SprintLink CIDR blocs and soon in MCI or NET99 CIDR blocs. Squeezed from above and below - caught in the middle with no where to go. But for the small provider - general transit in the post NSFnet world. The transit being a free ride on MCI's, Net99's and Sprint's peering agreements with everyone else.

Routing Arrangements - Can CIX Router Be Taken Advantage of by Non Members?

When we asked what might happen to non CIX member packets carried by Sprint in the event of a blockage at the CIX router, a regional network replied: For example, Sprint may come and peer with us in Anywhere Ville (just as another sizable commercial net does today). THIS net and Our Net swap the routes of our clients, but we do not provide transit services to each other except in emergency. Hence, I see routes from those providers which pay THIS net for transit, but not those routes of those networks which THIS net simply peers with. If Sprint were to peer with us, it might be for simply Sprint's direct customers, particularly if I indicated to Sprint that accepting their traffic "blind" and carrying it anywhere (e.g. Virginia?) would result in our normal service charge for the appropriately sized connection. You're asking a question about how Sprint's traffic would be treated, and the only answer is "based on the bilateral agreements in place at the time".

Another issue (which is probably somewhat peripheral) is whether non CIX members can point default routing at the CIX router and see their packets delivered to all CIX members as a result. To

the extent that this is true, we can understand why CIX members would be concerned at this kind of appropriation of their resources.

If a small service provider is served for example by Sprint, the provider gets its routing through Sprint. If the provider is not a CIX member and is worried about filtering and Sprint's ability to protect it from unpleasant consequences, it may apply to the Internic and receive an autonomous system (AS) number for its router. Using Border Gateway Protocol Version 4 (BGP4), it then has the ability to do its own routing independent of its upstream provider. If it found some of its routes blocked through its upstream provider, it would have some degree of ability to "dig" its way out including directing traffic at the CIX router - some of which would probably make it through.

But this is not a solution for the weak hearted or the technically inapt. Doing one's own routing that works and doesn't create routing loops or route flaps for one's neighbors is very very demanding from the technical point of view. In the opinion of many, if a provider who doesn't know what he is doing tries this and creates problems, he will find that his network neighbors will no longer cooperate with him. Sprint's Vadim Antonov said that he considered it to be "antisocial" and ill advised in general. However UUNET's Louis Mamakos added that UUNET encourages some of its resellers to do it under certain conditions. While we don't pretend to understand at any level of detail the nuances of the routing techniques involved, we mention it because it is another part of the complex equation that some providers can take advantage of.

Boundaries of Filtering - is the CIX Router Still Relevant?

With the NAPs coming on-line, with MAE- east, with SWAB, with Net-99 interconnecting to the NAPs and announcing regional hubs in California and Seattle and at three other spots around the country, Internet exchange points certainly seem to be springing up like weeds. From these events several questions emerge.

1. What damage to non CIX members will be done by filtering?

As long as the filtering is done only at the CIX router it is hard to imagine

damage being done to non CIX members. The story would be different if PSI an UUNET tried to implement filtering at MAE-east as well. Given the legal risk of doing so we believe that this will not happen.

2. Then why filter at all?

This is a much more difficult question to answer. Back in late September Rick Adams was saying that a special member survey was being taken to determine if the members wanted filtering. The results were never released but when, on November 1, filtering was announced, it was justified on the grounds that the CIX attorney had decreed that the CIX Board could be legally liable if it did not filter. If this is anything other than a conclusion requested of the attorney from the CIX Board, it is hard to understand why it was not announced as policy at the end of September.

Perhaps filtering is a move by PSI and UUNET as well as Netcom and large regional CIX members like NEARnet to express their total frustration with the policies of Sprint and ANS that we mentioned above. Is it designed also to serve as a warning to MCI and Net99? If so it is hard to see how it can be effective because the big carriers have so many ways around the CIX router should the Board attempt to use it as a choke point.

Could it be a move done in a frustration that is designed to kill the organization and allow PSI and UUNET to replace it with something else? Possible - but purely a speculative assumption on our part.

3. Can Net99, by offering contractual rights to resale and guaranteed peering among all customers, expand into offering CIX like interconnects around the country and

People asked what the Internet would be like without the CIX and many replied that without the CIX it would really be tough for the little guy. Why? Because the little guy would have to go to great trouble and great expense to get peering arrangements that would give him adequate connectivity to the rest of the world. This seems to be a very speculative assessment for several reasons.

fulfill the need for settlement free low-cost of entry into the Internet Service provider business?

This seems possible. But as with any start up business, Net99 can make mistakes. It's management's ability to build a business on the fly is a completely unknown factor. Furthermore the way it as a new entrant to the field will be treated by the other players is unclear. To make our point, one small example should suffice. In the late evening of Sunday October 9 an ANS engineer walked into the ANS NOC and commented NET99 out ANS' routing tables. NET99 which had come up live at MAE-East for the first time earlier that weekend was rendered blind and non functional by this action. In the early morning hours of October 10 we were awakened by an on record phone call from an infuriated Net99 management. By that evening ANS rescinded the previous evening's action and the problem went away. While its unlikely that this particular problem will be repeated other surprises are certainly possible.

4. Will the trend toward the creation of other Internet connect hubs continue regardless of Net99's fate?

Absolutely. One of the largest unanswered questions is how the Internet business will sort itself out into retail and wholesale. Almost all CIX members would have to be counted as retailers - that is people who sell to end users - who do not permit resale. The major exception is Sprint, and possibly MCI. Depending on whether or not MCI joins.

ANS can be thought of as a wholesaler whose infrastructure was paid for by the US government. With NSF payments to ANS to end very shortly, ANS will have a backbone that is very expensive to maintain. Unless it gets major new subsidies from Northern Telecom, IBM or MCI it will need to off-load traffic from its backbone to other customers as rapidly as possible. It has very few sign ups from the NSF regional connections program. So one must assume it will be interested in either using its NAP connections to pick up as much paid for transit traffic from other networks as possible - or, much more likely, in off loading it to Sprint and MCI as quickly as possible. People to whom we talk don't think ANS will have staying power as a major player.

This analysis is confirmed by Rob Hertzberg's summary from the November Internet Business Report posted to

Com-priv on November 8: "After NSF Switch, ANS Is Looking For An Answer." "An analysis of the changes going on at Advanced Network & Services as funding from the National Science Foundation is diverted to other sources. A big hint of the company's strategy may lie in its decision to hire Salomon Brothers to help find an equity partner--or perhaps even an outright parent."

The IXC's are clearly wholesalers. WilTel is a major provider for PSI, Net-99, Netcom and other's. As is Metropolitan Fiber Systems. One unanswered question is how soon these players (as IXC and CAP) may decide to try to get into the retail business on their own. If they do and, if they join MCI and Sprint, will the current enormous power to squeeze the middle from above and below aggregate itself into their hands in such a way that they become tempted to choke the smaller providers?

5. So if the CIX folds where does this leave the rest of us?

Internet traffic exchange hubs will grow. Whether they will be CIX like "no settlement" places of multilateral peering is uncertain. NAP or MAE East models where settlements and peering are negotiated are perhaps equally likely.

The point is that the folk in the "middle," the retailers, need them as a place for them to shed transit traffic not for their own customers at the earliest moment. While most retailers will have to have their own backbones, they will need to keep expenses on them to a minimum. The more directly traffic can be switched from originating to receiving network, the better it is for the retail members of the CIX. However the rub comes when there is only one such inter-exchange point in the world. By accident of geography some are closer than others and have less expense.

For example Netcom has been peering at MAE-East since early his year. From what we hear its seems to have been large enough to get in and get full router exchange there without settlements. Thus Netcom radiates circuits into the CIX in California and into MAE-East in the eastern US. Transit between Netcom customers on the east coast and the west coast is via a WilTel backbone. By going into the CIX and MAE- East exchange points Netcom exits traffic for other networks from its own as quickly as possible and keeps its transcontinental WilTel traffic at a minimum. If the CIX dies, the need for such exchange points will not. The NAPs,

MAE West, Net-99 hubs, Packet Clearing House and other as yet unborn exchanges that grow out of locations where several providers have pops will fill the breach. Hopefully they will continue to do it in a such a way as to preserve the ease of multilateral peering without settlements. But without a single central universally adhered to CIX will this be possible? It is hard to say.

On com-priv on November 8 a provider from Kansas asked if in the absence of a central CIX router whether 'association members [would] still be committed to "no settlement" connections? Where? Anywhere they meet? Bob Collet's reply on behalf of Sprint was not terribly reassuring. "We'll need Network Service Providers to weigh-in on this. As a member of one (Sprint) I can tell you that it would be impractical to do this in more than just a few places because of the cost associated with the bandwidth and the complexity of routing."

Without the CIX long term prospects are uncertain. The big IXC's (Sprint and MCI), who have been the friend of the little guy up to this point, would have unlimited power in their hands to break the very group which had depended on them. They could in any case impose restriction on resale if they chose. Settlements and restrictive peering arrangements could be used to clamp down on the little guys. The implementation of kilobyte charging would be a possibility.

November 15 Passes with Nary a Ripple

On November 12 Dick St. Peters stated: "At last count, those of us who aren't CIX members will lose 38 routes out of 32000, or 0.12%. (The 38 are all unaggregated routes to individual nets, 33 class Cs and 5 class Bs.)" We asked why the concern about CIX members that only had connections to the CIX router and no where else? Our understanding was that only non member resellers attached to members could be filtered. At this point Karl Denninger came back and said that this was not quite true - that the CIX would apply filters to its own members who harbored resellers.

We replied: "it sounds as though you are saying that a net like Fibercom in Texas that ran a line to the router di-

rectly will be adversely affected itself rather than any non CIX member reseller customers of Fibercom?? True? If so, please explain in more detail."

Denninger answered: "Simple. I am a reseller. I have a class "B" or a block of Class "C"s. I don't let my customers have their own ASN, I announce for them as a single aggregate route. Some of them are resellers. I do this to circumvent the blocking, knowing what the result is going to be. The CIX has [now] no choice but to block me and my direct customers, as well as my resellers, even though I am a member, to get to those [non-member] resellers. That is the way CIDR works, unfortunately for them." [CIDR or classless inter domain routing is a means of aggregating class c addresses into clumps to avoid using class b address which are in short supply. - editor]

Denninger continued: "If you think that people haven't been doing exactly this kind of address aggregation and assignment for the last three months, think again. They have and will continue to do so. Policy-based blockades are inherently evil and cause asymmetrical routing at best, or complete loss of connectivity at worst, even when unintended."

On November 14 Bob Collet answered Denninger's remarks by agreeing with him on all counts: "you are again correct. This is one reason why the router doesn't make sense anymore. Thanks. Your analysis is correct. Bob Collet for the CIX Board." This reply brought gasps of amazement from many list readers. Indeed during the preceding two weeks Collet had begun to agree with those who said the CIX should get out of the routing business. However because some members had just paid for connection at the router, Collet emphasized that it would likely be a year before the router would either be withdrawn or have its operation contracted to an outside service. This while the Board's position continued to be: we will filter because legal counsel advises that we must.

That the CIX's lawyers were forcing it to take action to hurt its own members strained the credulity of most observers. Especially while the CIX was providing another way around its own router by providing an SMDS cloud for members to attach to in California. Nevertheless the board remained publicly committed to filtering. Yet when on the morning of November 15 there was no sign that filtering had occurred we asked what had happened. Collet replied: "Proce-

Listening to Collet it would seem that the CIX was asking its own members to turn in their customers or be themselves denied services that they had paid for with their membership fee and router connect fee. Such members seemed to be finding themselves in the ironic position of being worse off as a result of having joined the CIX.

dures need more refinement. Soon, suspect violators will be notified and be provided a reasonable period of time to remedy the situation before filtering begins." But why could you not deliver on the promise to filter today after the first date of November 1 was missed? we wondered. Collet responded: "We're trying to implement a quality process. We feel it is better to be a little late with good product in contrast to on-time but with mistakes."

Listening to Collet it would seem that the CIX was asking its own members to turn in their customers or be themselves denied services that they had paid for with their membership fee and router connect fee. Such members seemed to be finding themselves in the ironic position of being worse off as a result of having joined the CIX. However what is going on here seems to take the CIX out of public deadline pay-up-or-be-filtered scenario's. It moves discussions to a private basis where the Board if it choose could simply not bother to notify "suspect violators." Such a policy would amount to quietly dropping the filtering threats that had brought the CIX so much negative publicity and anger from the network community. If the CIX meanwhile moves the filtering threats to a back burner, it just might, if it is serious, be able to turn its attention to building a trade organization and offering the kinds of member services that Bill Washburn suggested in his interview with us last month.

In the meantime the CIX seems to be still attracting new members. Fujitsu has been a member of the CIX since mid September. During October Advantis, British Telecom, Nec and MCI were among the joiners! Big and powerful companies who probably don't understand what the fuss is all about and regard paying the annual CIX fee as merely a meanings of acquiring the Good House Keeping seal of approval for their operations. How many of the new members have paid up because of the filtering threat and how many indicate a kind

of blind inertia is unclear. If new members keep wandering in the door, this that could keep the CIX going for longer than we would otherwise expect. But if a faction serious about needed reforms can gain control of the Board, such inertia may give the CIX time save itself.

Conclusion

Certainly if the CIX can act as a break in the marketplace against movement in the direction of charging by the kilobyte, it is desirable to save it. Tempers however have deteriorated so badly that it is may not be salvageable. When renewals are due on memberships in January, many will not respond. In early November we posted a call for a "continental congress" to salvage the CIX and gather all interested parties into one place until reform was achieved. The basic response we received was that everyone was too busy. When, saying that we didn't exactly see a band wagon forming, we asked one CIX member for his opinion of our call, he replied:

I liked it! But no you will probably not see a bandwagon forming because people are either scared or don't want to publicly state their position. Typical! Also, I believe that, even after all the constructive emails of what to do, how to do it etc., the Board has absolutely no obligation to follow up on any of it. In other words such a Congress it will be a repeat of the CIX meeting fiasco. They will be just killing time going through the motions of "Aaaah ha ... great idea... what about this ooops!... oh gee look at the time ... excuse me while I implement filtering." Great effort Gordon, meanwhile... I have a business to run and contracts to sign.

So it would appear that something called CIX will survive well into the new year. But whether it will have any significant power and cohesion is uncertain. In such a world, ironically, the small provider might be more at risk. The critical question may then become how quickly new CIX like interconnect points are formed. For the long run the most important question becomes: how long Sprint and MCI will act as members responsive first to the interests of the Internet community and only secondarily to pressures applied by their own corporate financial planners.

Russian and CIS Internet Community Meet & Discuss Cooperative Networking Framework

Impact of Nato Sponsored Meeting Should Be Positive

Introduction October 6, 1994

We are over Maine nearing the end of a nine hour and forty minute flight from Moscow to New York. These visits are now nearing a routine that we never imagined would be possible. Evidence? We felt no compunction to begin writing anything immediately on take off. Another sign of changing times? The earlier flights have been filled with missionaries. This one has a sizable contingent from Ben and Jerry's - the ice cream moguls.

A very good and successful visit. Three intensive days on the politics of the Russian Internet at the NATO sponsored meeting at Golitsyno, and a day with the FREENet people in Yaroslavl and an afternoon seminar to net users in Saint Petersburg. Other than this hard work as a tourist in Moscow, Rostov Veliki, Yaroslavl, St Petersburg and Novgorod.

Our Russian friends tell us that life continues unchanged from May. High inflation but, for those who can acclimatize to the new economy, plenty of consumer goods. In 1992 Andrei Sebrant showed us slides of his most recent Siberian vacation. Yesterday he showed us a desk top published diary, with scanned photos, two albums of color prints, and an hour long tape from a cam-corder that one of his friends took on this summer's journey to the Arctic regions of the Urals. Were it not for the craziness of Russian politics and the continued lack of a stable economic infrastructure, one could be completely confident of Russia's future. At the airport this morning a Caltech professor who works part time for NASA and has made 16 trips here since 1986 says that while the cities look good and supplies are good, even in the country side, most factories are still abandoned. Not surprisingly he finds this to be troublesome.

Thoughts on the Golitsyno Conference - November 1994

NATO involvement in the Russian Internet is a by product of NATO programs to provide technical assistance to

Russian scientists involved in defense industry conversion projects and in the clean up of environmental problems left over from the cold war. Communication with western colleagues is essential. The Internet is by far the most cost effective way of achieving such communication. The NATO Secretariat of Scientific and Environmental Affairs responsible for these efforts finds that the more infrastructure which is added to the Russian network and to the networks of the CIS, the easier it is to accomplish its scientific and technical tasks for which the network is an enabling technology.

Consequently NATO has begun a series of conferences designed to help introduce the worldwide context of the Internet to Russia and Russian Internet providers to each other. NATO hopes to be able to lubricate the unfolding process inside Russia - to encourage it work smoothly and to build up a spirit of cooperation and trust. The first conference was an exploratory meeting in Budapest a year ago.

This meeting is a full assemblage of the commercial and research network providers and the principal investigators from all the major institutes and geographically situated projects in Russia and almost all the other independent states of the former USSR. On the Western side Dr. Steve Goldstein Program Director (International Connections) at the NSF is Co - Chair. On the Russian side, the Co - Chairman is Academician Spartak Beliaev - one of Russia's most outstanding nuclear physicists (some of whose most recent work includes long term follow up studies on the outcome of the Chernobyl disaster). A very energetic man who has just turned 70, Beliaev is very likable person who because of the large number of important scientific positions he holds, is considered more of an example of a leader from the community that NATO wants networking to serve than an expert in networking per se. Nevertheless, he clearly recognizes the importance of the subject. Advising Beliaev on the Russian side is Dr. Marat Guriev whom we had met and interviewed in April 1992 when his position was with the Ministry of Higher Education and who was responsible at that time for plans for getting Russian universities networked

to each other and to the Internet. He is currently an advisor to Yeltsin on these subjects.

The Western delegation includes Internet guru Larry Landweber from the University of Wisconsin, Peter Knight from the World Bank who is interested in using the Internet for World Bank training programs in Russia, and Jim Russo who is getting the Agency for International Development at the State Department on the network. Gary Tydings attended as the Director of Telecommunications, Education and Training Project of the United States Industry Coalition. This is a new organization formed by the nuclear weapons laboratories of the Department of Energy for working with their Russian counterparts in the conversion of military research to civilian purposes. Tydings is going on to Arzamas 16 and Cheliabinsk 17 the Russian equivalents of Los Alamos and Lawrence Livermore Labs where earth stations are being installed to send E-1 (two megabit per second) direct satellite connect channels to Los Alamos and Lawrence Livermore so that Russian researchers can have direct use of our best super computers at each center.

Hans Frese and Hans-Martin Adler attend as representatives from the DFN Desy German High Energy Physics community that is funding the link to Radio MSU. Robert Blokzijl is there as Chairman of RIPE the European Research Network Consortium and Chair of next year's conference scheduled for Alma Alta, Uzbekistan. Peter Bakyoni who organized the preceding conference and Rolf Nordhagen of Nordunet and chair of the University of Oslo project for networking in the Baltic states are here - as is Christian Michau from Renatir, the French research network; Peter Villemoes the General Manager of Nordunet and Jean Paul Nadreau, Program Director for Computer networking within the Scientific Affairs Division of NATO.

On the Russian side all commercial and research networks are represented except for Sprint and Demos. Sprint because of its very high cost is not seen as a network feasible for use by

Russian research and education groups. The reason for Demos' exclusion is less clear. ELVIS+ is here representing wireless. Networking projects in Dubno, St. Petersburg, and Novosibirsk are discussed as well as the new Russian University Network project.

Ilia Mafter the Director of Telecommunications programs at the International Science Foundation attends and spends most of the meeting with Andrei Mendkovitch of the FREenet and Alexander Rusakov of Yaroslavl University. Rusakov is the Principal Investigator for an ISF funded Civic network in Yaroslavl. Given his intervention a year earlier in the Moscow backbone, it is unfortunate that Alexander Goldfarb, Mafter's immediate superior within the foundation is not there in order to get to know the larger Russian networking community in which ISF programs are having a considerable impact. (Goldfarb was in Moscow preparing for an ISF Board Meeting in Kiev. Unfortunately both Mafter and Goldfarb could not attend because the Moscow portion of ISF was allotted only one slot by the conference planners. In mid November we were told that Viacheslav Shkarupin the ISF Director for the Ukraine has assumed Mafter's position.)

At the end of June the ISF funded city network projects in Kiev and Akademgorodok near Novosibirsk as well as in Yaroslavl. In all cases the infrastructure that will be installed appears to be quite substantial. Natalia Baranova is the Executive Director of the ISF in Novosibirsk. Sam Musher is the Telecom Director and PI of the Novosibirsk network project. Viacheslav Shkarupin is the Telecommunications Director for ISF in the Ukraine and the PI of the Kiev project. Rusakov, Baranova, and Shkarupin all gave good presentations and were among the most enthusiastic attendees of the conference. (Musher had a schedule conflict and arrived only on the last day.)

Conference Presentations

The 75 attendees met in an auditorium where translations were handled by individual ear phone equipped radios operating in the infra red spectrum. The first day was devoted to International Networking, Satellite and Wireless, and Users and Support Issues. Rolf Nordhagen gave an excellent talk on the Nordunet experience. He emphasized the cooperative aspects of networks,

communication and the need to work across organizations and share responsibilities. Unfortunately, by the end of the conference it would be clear that cooperation, although desirable was probably not yet attainable in Russian networking.

The second day began with four and one half hours and fourteen presenters on Networking in Russia. That afternoon was scheduled for sessions on networking in the Ukraine, Belarus, Georgia, Kazakhstan, Uzbekistan and Kirgizstan. Single speakers from each state had been scheduled. However the Ukraine asked that all five of its delegates be allowed to speak. This set off a chain reaction where six speakers rapidly grew to nearly 15, and as a result the second panel on International organizations was moved to the next day.

On the evening of the second day two meetings were held. One was a session with service providers aimed at discussing how to increase cooperation with each other. The second was a smaller discussion of organizations that would have grant money available for the expansion of Russian networking. We went to the first meeting which was rather contentious and filled with complaints about government promised aid not being delivered to the various groups for which it had been targeted. Again and again there was an emphasis that commercial and academic networking could not be allowed to mix. Again and again academic and commercial groups were building separate infrastructure in a country with capital hardly sufficient to adequately support either.

On the third and final morning Drs. Beliaev and Guriev summarized the findings of the evening meeting. An umbrella organization would be created to coordinate the plans of network providers and government ministries. We were pleasantly surprised to be thanked publicly for the contributions in our paper - a very useful bird's eye over view according to Guriev. In keeping with the proper neutrality of the conference organizers, the paper officially handed out had been shortened drastically and stripped of our opinion and analysis. However, because they had commented on various drafts, many of the principal network providers were well aware of the longer version. We had brought a dozen copies of the complete version with us and found that they went quickly in answer to private requests from providers and policy makers. At the end of the day Dr. Guriev,

saying that he felt it important to distribute the larger paper as widely as possible, asked our permission to translate it into Russian. We agreed and are now in touch by email with the translator in Moscow.

The Moscow Backbone

The Moscow backbone was discussed later on the final day. Dr. Nikolai Repin, a mathematician based at the Academy of Sciences, has become the Principal investigator for the backbone project. In a report, where many in the audience asked and received an opportunity to present their own points of view, what Repin described was a broken backbone. An academic one connecting the research institutes in the southern half of the city. The commercial networks in the northern half are finishing their backbone. There are no immediate plans to connect the two! The opportunity for what could have been a unified infrastructure in Moscow to serve as an interconnect and traffic exchange point among all Russian networks - academic and commercial- appears for the time being to be lost! Traffic from scientists connected to Relcom - the largest commercial network - to colleagues at research institutes connected to academic networks elsewhere in Russia must, instead of flowing across the Moscow backbone, takes up already crowded international satellite bandwidth traveling to the US and back instead of from one side of the Russian capital to the other.

This problem was brought home in a forceful way when the subject of increased satellite bandwidth into and out of Moscow was discussed. Various westerners said that an E-1 (two megabit per second channel) would be the most cost effective and therefore best way to go. They added however that at the western end the cost would have to be shared by the groups using the link. They also pointed out that the Moscow situation now posed what for the time being is an insoluble problem - the lack of a place to land traffic where such traffic could get to all constituents of the funding agency. If the connect point were in the north, then academics in the south would be unreachable. If in the south, then academics connected to Relcom would be left out. In short the broken nature of the Moscow

backbone means that unless the ISF installs more links on its own, there is unlikely to be any major additional sources of international connectivity.

The Cooperation Bottleneck

On the final evening we asked several friends who work at various levels for Russian providers: Will it work? Who will take the lead in forming the umbrella organization? They looked at us sadly. No. It won't work. If there is to be an umbrella organization, someone must be the head of such an organization. By implication that person would be the head of the Russian Internet. We would all like to be such a person but we know that no one will allow us to and we will not allow anyone else to take such a role. To accomplish anything real an umbrella organization must have power. We will not allow it. What about an informal organization we asked? One that would just be the occasion for monthly face to face discussions among the Moscow providers? Oh this is possible and may be it will happen. But it may not lead to anything more significant than the on line talks we have now.

They tell us that the chief difficulty of the Russian Internet which has made enormous strides in the past two years turns out to be psychological. After 74 years of collective behavior enforced by the state no one is interested in cooperating with anyone else and everyone is out to build his own empire. In networking providers are not yet ready seriously to consider whether the more con-

On the final evening we asked several friends who work at various levels for Russian providers: Will it work? Who will take the lead in forming the umbrella organization? They looked at us sadly. No. It won't work. If there is to be an umbrella organization, someone must be the head of such an organization. By implication that person would be the head of the Russian Internet. We would all like to be such a person but we know that no one will allow us to and we will not allow anyone else to take such a role. To accomplish anything real an umbrella organization must have power. We will not allow it.

nectivity everyone has the more valuable it is to all.

A comparison with the American experience is instructive. In the US DARPA and then the NSF built the Internet through years of cooperative funding. Here, when the Internet was precompetitive and largely government funded, it was much easier to work over time on building a cooperative culture. In Russia the time span has been collapsed. There the Internet is seen as a competitive structure from the very beginning. As a result providers think more of advantage over competitors than of cooperation. And while the American Internet is mature enough so that the advantages of data exchange points like MAE East are well known, the current arguments about the CIX shows that even here cooperation has its limits.

In short the Golitsyno Conference certainly did some good by bringing the key people from the Russian Internet into a three day meeting where many met each other for the first time. Did they all suddenly "see the light?" Will they now somehow all act very differently? Very doubtful. Were channels of new communication opened? And do people understand each others points of view better? Almost certainly. As such the conference was a desirable step along a road of uncertain length.

The Moscow Backbone as a Missed Opportunity

Finally, we must point out that the Moscow backbone begun a year ago was a golden opportunity that has fallen far short of its potential payoff. We have earlier published the views of the various sides including, in August, those of Alexander Goldfarb. Dr. Goldfarb and Dr. Valery Soifer were the two Russian emigre biologists who approached George Soros at the end of 1992 with the idea that there should be an International Science Foundation. When the Foundation began serious operation in June of 1993, Soros hired Dr Harley Balzer as its Executive Director. Balzer, who believed that significant investment in Internet infrastructure inside of Russia and other states of the CIS would be necessary to enable to ISF to do its job of assisting Russian scientists, went to the National Science Foundation and obtained the loan of the services of Steve Goldstein who had developed the International Connections

Program of the NSF over the preceding four years.

Beginning in July, with budgets approved by ISF, Goldstein met in Moscow with the major Russian providers to set up a satellite channel as well as plans for a Moscow backbone that would link commercial and academic providers and institutions running from Relcom at the Kurchatov Institute in the north western part of the city to IKI and the M-9 telephone switching station in the south west. The purpose of the backbone was to link the city's commercial and research sites to each other and to an international channel that brought Russia "live" onto the Internet for the first time. Including commercial providers was appropriate because - with Relcom especially - the only access for thousands of Russian scientists was through commercial networks.

More than anyone else in the US Goldstein had developed a track record of assisting foreign research and academic establishments in making the necessary infrastructural decisions to join the Internet. In August 1993 the ISF made commitments to various parties in Moscow to pay for the lions share of the backbone working with the NSF's Goldstein as adviser and Aleksei Platonov of RosNIIR - a entity designed to funnel Russian government support for use of the network to Russian service providers. Having received the ISF commitments Platonov gave the go ahead and work began in September. We can not imagine a more appropriate or professional way for ISF to have been proceeding - one that had it been allowed to go through to its termination would have produced a complete and unified backbone before the end of the spring of this year.

Unfortunately for the fate of the backbone Alexander Goldfarb became interested in acquiring an operational role in the Foundation during the summer. In September Balzer was removed as the ISF Executive Director. The international portion of his job was given to Goldfarb who had never been a strong supporter of the telecom projects. In October a critical point of no return was passed when funds committed to the project under Balzer's leadership weren't paid under Goldfarb's. The cash flow shortfall very quickly threatened to bring the project to a halt for the winter unless money could be found.

At this point Aleksei Soldatov, the CEO of Relcom made Platonov as PI of the backbone project an offer he couldn't refuse. With Platonov's approval he would invest \$70,000 in continued work on the backbone. Platonov was already indebted to Soldatov for \$300,000 in credits extended to Platonov's constituency - scientific users of Relcom. The government, having promised subsidies to Platonov, had failed to deliver. Soldatov meanwhile was keeping the accounts running on credit. Platonov agreed to accept the 70,000 so that work on the backbone could continue. Some believe that in accepting the money Platonov exceeded his authority. Whatever the case may have been, considering Platonov's indebtedness to Soldatov, his acceptance of the offer is not surprising. This act however became the cause celebre against which the ISF would complain for much of the rest of the year. "We can't continue to support the backbone because it is now partly a commercial project." Unfortunately ISF and Relcom rapidly developed very unfriendly relations. Relcom's contribution was quickly expended and by the time of our visit in May work on the backbone had been halted for two months.

We have chronicled the controversy in

considerable detail in our earlier reports and won't do so again here. Instead we will offer our opinion that although Alex Goldfarb certainly believes that he did the right thing, his unexpected involvement overturned a project that had been earlier underwritten by ISF using the foremost experts in the US. Had he stood aside rather than intervened, the project could have been finished. Had he not liked the results he could have blamed his predecessors. While ISF has done much good for Russian scientists and while it stand poised to do good in Yaroslavl, Novosibirsk and Kiev, it has adopted a position that has kept the most critical piece of Internet architecture in Moscow from completion.

ISF has stated that it must adopt and maintain a strict non profit orientation because of the US tax laws that affect Mr. Soros. This is fine. However we note that there is a principal of dual use infrastructure pioneered here by the NSF that ought to be applicable to the ISF's work - at least from the point of view of American tax law. Two networks - one commercial and one academic - can use the same physical infrastructure without difficulty for a non profit tax-supported academic network if that infrastructure is jointly paid for by both. We are sure that, if it were a

high priority within the ISF, Mr. Soros could find a lawyer and accountant who could easily keep him out of trouble with the IRS. We hope ISF in particular will listen to calls for cooperation in Russia in 1995.

After Golitsyno we visited Alexander Rusakov in Yaroslavl. There we were impressed by the thoroughness with which he has developed alliances in his local infrastructure that seem likely to be able to get with ISF funds important segments of the scientific, research, cultural and education institutions in his city of 700,000 on the Internet within the next year. It was also interesting to spend four hours logged into the terminal server at the university there in a telnet session to Moscow and from Moscow by satellite to Chicago. The response time was good -- solid proof that the Internet extends well beyond Moscow and St Petersburg. It would give us great pleasure if we were able to return to Russia next year and report that ISF programs had blended without further controversy into a more cooperative Russian community. In the meantime we hope that the first major accomplishment of the two sides will be to find a way to connect the "broken" Moscow backbone.

Continued from bottom p. 1

of the reasons that some providers don't want resellers.

Jennings: Well that's a crock. Because what you simply say is Trusted Information Systems is our customer. We will only accept calls from them. If people downstream of TIS like Gilmore have trouble, they have to work it out with TIS. All there needs to be is a single point of contact for the Altnet service. Little Garden has resellers going two and three deep now. We do occasionally get calls from people who don't realize the hierarchy and we gently point them back to the appropriate level.

So to get back to the story, they had the leased line from UUNET to TIS in Mountain View and from there a 56 kbs line went to an apartment in Palo Alto where Cygnus Support was. Cygnus started out by renting an apartment and, as they needed more space, they rented more apartments in the same complex and ran Ethernet between them. Then John also ran a 56 kbs line from these apartments to his San Francisco house - otherwise known as Toad Hall and on the net as toad.com.

Over the next year so they connected a bunch of friends and co-conspirators: Rich Morin, Kenton Hoover, Tim Pozar, and Ed Elhauge. These were all connected as 9600 baud dial-up sites. For routers they were using a bunch of Pcs running NOS with Phil Karn's KA9Q protocol. It was all very kludgy and unreliable. And for a while it was quite stable at 6 to 8 users and I don't think Rick Adams even knew what we were doing or, had he known, that he would have cared.

But by late 1992 or early 93 John Gilmore started to get expansionist ideas about the Little Garden - which, by the way, is named after a Chinese restaurant in Palo Alto. John's ideas had to do with the behavior of the commercial Internet people who appeared to be reluctant to do whatever had to be done to drive down the cost of connectivity to the network. Gilmore wanted to use what we had developed in Little Garden to enable as many small people to get on the net as we possibly could. So in 1992 we did add some more people but not very many because most of us had other full time jobs and doing our home brew networking was time con-

suming.

COOK Report: Would it be fair in those days to describe it has a hackers network - par excellence?

Jennings: Oh absolutely! It served people's needs. They came up with numbers. Originally a thousand dollars a month. The original three split the cost of the thousand dollars three ways. When they added the modem sites they did some back of the napkin arithmetic and said lets call the dial up charges \$70 a month. We have added some charges for phone line costs but are still basically using these figures.

COOK Report: Your are getting more people involved. Are you increasing your usage with UUNET?

Jennings: They measured your usage. If it stayed below a very conservative average, they billed you at one rate. When it went above it for more than 30 days they billed you at the next higher rate.

Interview with Tom Jennings to be concluded in January.

Wireless as an On Ramp to the Internet - Concluding Installment -

Part Four

Tetherless Access - How Close to the Internet Model?

Tetherless Access is the only other company that we have identified that is specifically targeting wireless access to the Internet. Located in California's Silicon valley (Fremont), it was formed in March of 1990 to develop products and services for the wireless communications market. Dewayne Hendricks (President and CEO) and Charles Brown (Chief Operating Officer) are the Joint founders of the company. Earlier this year it obtained an infusion of capital from a San Francisco-based investment firm in exchange for a minority equity share of the company. The company, operating out of offices in Palo Alto and Fremont California, has now expanded to 14 employees in preparation for bringing products to market by late this year.

According to the July 1994 TAL company profile TAL's mission is: "to help expand the benefits of the Internet to new users worldwide by delivering economical solutions on multiple platforms for high speed, wireless TCP/IP connectivity." "At the core of the business is a proprietary software technology by which a basic spread spectrum packet radio - a "virtual wire" typically used for telco by pass with a range of up to 20 miles - is transformed into a TCP/IP - compliant packet radio routing device." TAL has a partnership with a California based manufacturer [Cylink] of spread spectrum radio equipment [902-928 Mhz] to produce a packet radio router/modem called the SubSpace 2001 with a through put into the customer's computer of 64,000 bits per second.

While the price of 3,500 dollars is considerably more expensive than the Metricom radios, the speed is greater and range longer. The TAL radio can easily function on a line of sight basis of 20 miles and has reached 30 miles.

The radio/router itself measures 9 by 9 by 3 inches and is intended to be used with a roof top mounted directional or omnidirectional antenna.

Network Topology

Proposed TAL networks consist of a collection of nodes owned by customers, by TAL, and potentially other service providers and used for exchanging data among geographically separated computers. Data packets travel through this network from node to node according to addressing information contained in each packet's header and networking mapping information known to each node.

The TAL prospectus states that "the TAL network will consist of the following:

End nodes with TAL SubSpace units located on customers' premises and interconnected with customers' host computers and LANs via industry standard interfaces. Initially these will be fixed point sites, although TAL's intention is to accommodate mobile devices in the future.

Base stations employing TAL technology and operated by TAL or another service provider (a TAL alliance partner). These will be established at appropriate locations within a metropolitan area to provide adequate geographic coverage to all customer sites.

Interconnections among the base stations, either using wireline or wireless technology, that ultimately link to the Internet.

Within the TAL network each node not only sends and receives its own traffic but also relays the transmissions of nearby nodes. In other words the TAL network operates as a mesh network rather than in a star/hub configuration that is more commonly used for wireless networks. The efficiency of TAL's software allows relaying to take place while holding latency to acceptable levels within the network. This approach minimizes transmitter power and, consequently, the interference to nodes at other locations in the network that are trying to send traffic at the same time."

"As the node density in a given area increases, the average distance between nodes decreases." Under these conditions "the SubSpace 2001 automatically adjusts its power output downward, thus decreasing the potential interference. This effectively increases the carrying capacity of the network to help accommodate the additional users. In other words the TAL approach is highly scalable."

TAL is targeting the following markets: (1) small to medium sized businesses that want a high speed internet connection at less cost than that of a telephone company based leased line connection; (2) businesses with multiple satellite sites in an urban area that are looking for TCP/IP and Internet connectivity for the satellites as well as for the "main office"; (3) large businesses that rely on TCP/IP networks and are in need of a backup to their wireline systems as part of a disaster recovery plan; (4) businesses operating in areas where the telecommunications infrastructure is poor or non existent; (5) K-12 school systems, community colleges, and libraries looking for an economical way to interconnect their schools and branches and deliver the internet to their students and the public.

In an August 1 telephone interview Dewayne Hendricks told us that between now and year's end TAL will be opening a commercial wireless network in the south bay area of San Francisco and one in the Arlington Virginia area. He also pointed out that TAL had completed a beta test for Apple Computer's Library of Tomorrow program where they linked together some of the public libraries in San Diego. In Arlington TAL has a joint venture with VITA (Volunteers in Technical Assistance) which will involve ground links for a third party low earth orbiting satellite venture in return for a share of the satellite bandwidth.

The Telluride Infozone Project

In cooperation with Apple Computer TAL is due to install within the next two weeks wireless connections to

Telluride's local computer net. We interviewed Richard Lowenburg the Project Director.

Lowenburg told us that he came to Telluride in the late 1970s at the invitation of John Lifton and Pamela Zoline who were involved in town planning. We have been telling the local folks to consider their communications infrastructure as being just as critical to their future as they would sewers and utilities. In 1985 we formed the Telluride Institute which counts folk like Amory Lovins and John Naisbitt on its board and is involved in a number of issues having to do with community building.

We have been conceptualizing a project that we call the Infozone as a means of modeling at least some of what an information society would be like. About three years ago with the beginning of the information highway talk our project became real. We got some funding from the Colorado Advanced Technology Institute as the first Rural Colorado Telecommunications Program they funded. CATI initially had the creation of a telework center in mind. We suggested that the project should fund an internet connection instead and see what grew from that.

In 1992 we got some fast track funding from them and at about the same time we were awarded an Apple Library of Tomorrow grant which

Dewayne Hendricks told us that between now and year's end TAL will be opening a commercial wireless network in the south bay area of San Francisco and one in the Arlington Virginia area. He also pointed out that TAL had completed a beta test for Apple Computer's Library of Tomorrow program where they linked together some of the public libraries in San Diego. In Arlington TAL has a joint venture with VITA (Volunteers in Technical Assistance) which will involve ground links for a third party low earth orbiting satellite venture in return for a share of the satellite bandwidth.

placed public access terminals in around eight different locations in the community. The CATI award subsidizes our connection to the Internet (a 56 kbs POP to Colorado Supernet) and provides us with some development funds. It looks hopeful that our funding through CATI will run for another two years.

We do want to extend outside the town of Telluride itself and are very tuned into the work of Dave Hughes and Frank Odasz in Big Sky Telegraph. We have no specific intent to model our work here after them but we certainly share common ideas and goals. Our project covers the entire local calling area of about 60 by 60 miles and serves ranching and mining communities as well as the resort of Telluride. Now the majority of our users are in Telluride and in the town of Norwood (via an Apple system in the Agricultural Extension Office) about 37 miles from here.

We are so small and so isolated that we see ourselves as ideal for modeling an entire community network. Thus among the 1500 year round citizens of Telluride we brought our schools into this, our historical museum, our local and county government, the medical center and the arts community. About 150 people have accounts on the system. To grow further we believe that we have to improve applications and content of what we offer. Our library has one of the Apple systems of course and is well plugged into CARL and CARL Uncover.

Starting late last year various people including Steve Cisler at Apple had been indicating to Tetherless Access that they ought to be looking at what we were doing as a good testbed for TAL to explore. Dewayne came here during the winter took a look around and agreed to proceed. They plan to give us high speed wireless connectivity between each of our apple-donated systems at the library, conference center, medical center, schools, the public access radio station and so on. The wireless connected machines then function as dial up terminal server nodes in the network. They have the radios and antennas in place and are finishing the necessary software to enable the system to be turned on.

[Later the same evening Hendricks explained to us that the software is serial port drivers for the Macintoshes that will enable them to accept data at rates greater than 56 kbs. He anticipated that they are a week or less away from completion and that the network should be turned on by August 15. Norwood he added would be reached by an intermediate radio placed at a ridge top that would then beam down to Norwood on the other side.]

Conclusion:

So What Difference Will Wireless Make?

The technology to make a difference is clearly here. The infrastructure is not. And the rules by which the infrastructure will be built and technology sorted out are not yet clear.

Access to the Internet via wireless is clearly here. However it tends to be more expensive now than wireline access because the entire infrastructure is still telephone company dependent especially within the local loop.

Right now wireless access to the Internet via Metricom makes economic sense only to the person who really needs higher than 14.4 speed *and* the ability to log in to a base station easily from stationary locations were a physical connection to a phone line is not practical. (If such a person lived in New York City or in Chicago or any other place where charges per minute for local calls existed, this equation may be significantly different even now.)

Right now access to Metricom *can* make sense for a small service provider if Metricom in turn is bridging to a larger Internet service provider that allows resale - depending of course on what that service provider charges the Metricom attached customer. We think the same is generally true for Tetherless Access, although since they are not quite as far along with product and network roll outs as Metricom, we can not speak about them with as much certainty.

A year from now, if the Metricom roll out is successful, there should be Ricochet Networks in many of our largest cities. If Metricom then links these cities via its own leased lines, it can

then function as a wireless data network provider on a national scale. At this point, if it hired the technical talent, it could also function as an internet services provider and offer the most powerful form yet seen of data network by pass of the IXCs and RBOCs.

Its low cost modular technology is suited to the provision of internet access in a way that no one else's (except perhaps for Tetherless) is. Despite the appearance of some government actions to the contrary, smaller companies the size of Metricom are much better equipped to play in the Internet sphere than the huge telecom conglomerates that are about to invest billions in PCS spectrum license the cost of which will then have to be recouped from system users. Metricom is the only company that appears to have both low cost technology and a delivery mechanism unencumbered by high cost licenses. For these reasons we can expect that it will be able to deliver Internet connectivity at or below current wireline costs.

[A reviewer of our draft commented: "I think that your conclusion is still too USA-centric to suit me. In fact, its too urban centric. You seem to forget that this is a big country and there are lots of potential Internet customers in rural areas. Wireless can make a real difference in those places. I don't see how either Metricom or TAL will be able to compete in the dense urban areas against services like residential ISDN. When you add in PCS and CDPD, its going to be a real tough competitive environment for us all. Lots of choices for the user and lots of opportunities to make mistakes."]

At some point, as far as the Internet is concerned, Metricom is likely to have to face a strategic decision of whether it itself becomes a service provider or more likely whether a separate company like RadioMail allies with it to function as a service provider.

Metricom currently makes no major difference to a regional network like BARRnet. In otherwords BARRnet has no particular reason to give good pricing to Metricom, because BARRnet and its customers are as dependent on the cost of leased lines from the telcos as they ever were. If Metricom

were to achieve dense coverage of the Bay Area, the situation could change significantly to one where there would be a great deal of synergy between the two. For if BARRnet relied upon Metricom to supply much of its infrastructure, the price for wireless high speed internet connectivity in the speed range in which Metricom functions would almost certainly quickly decline below that of wireline connectivity. Of course how much of the infrastructure BARRnet could rely on is subject to debate. It is unlikely that large corporations would be willing to give up their T-1 leased lines - even for multiple wireless channels operating at a fraction of that rate.

Especially as bandwidth demands continue to increase, wireless is not now and will not soon be a *general solution* to internet transport. But it can now fill numbers of niches in affording local loop by pass opportunities. A Metricom mesh can provide individual service in any area where there is a cluster of users - urban or rural. Metricom radios don't daisy chain well. However the Tetherless radios do. Under these conditions they may provide cost effective solutions to getting from Telco pops to rural users. Furthermore the involvement of Tetherless with Vita and the low earth orbiting satellites needs to be closely watched and applauded. Finally it would be technically possible to bridge a Tetherless Radio daisy chain via a Metricom base station into a Metricom network, if Metricom which has not sold its base station technology yet were to make the bridge available at a reasonable cost.

It is very clear that the direction of the technology is already driving wireless to the point where it is fast becoming a cost effective competitor of wireline services. It is also clear that the increasingly archaic wireline giants can use their political and economic muscle to stop the wireless incursion. While the spectrum auctions may be good for the US treasury they are bad for ubiquitous and universally affordable wireless communications. Indeed they will help leverage the cash rich telephone companies into positions of control of many of the wireless services. The direction of all this is certainly away from an information future that offers a viable environment for millions of small business men and women.

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Russia is Successfully Building its Own Internet ISF Role Creates Controversy - Final Installment



Arcady Khotin at the New Jerusalem Monastery outside of Moscow

Still it was difficult. I was stationed 60 kilometers outside of Tallin in Estonia. I served with the anti-aircraft forces and got in big trouble for going back to St Petersburg on one of my first weekends without knowing the official leave procedures.

After the army I worked as an engineer for a scientific research organization for seven years. I was quite a good engineer and one of the devices I developed was implemented for some classified military purposes. To do this however they had to write documentation, so my boss took me upstairs and introduced me to his colleague in that department. Since I had now developed my own device, they who were fifty years old at the time began to treat me more like an equal using the singular form of you (thou) as their form of address. We had a social conversation before getting down to business in which they talked about their retirement with pension in ten years more time. They already knew the exact dates and were eagerly looking forward to them. So at that moment I thought: how am I going to work ten more years with these people who are really already "dead" inside? So I decided that I better quit.

I then went to a completely different organ-

ization which had to do with programming industrial process control machines. The work in 1978 involved the development and operation of real time feedback loops using our most advanced computers. I worked for this company for more than ten years and was very happy because, instead of putting on a show as they did in the research institute, you could actually see what you developed used because it was actually needed by industry. For example the production of rubber gaskets was able to achieve uniform standards of quality in its output after they applied our technology. Toward the end of my time with this company I started to work with IBM PC which arrived in Russia only at the end of the 1980s. I enjoyed this because unlike their Russian equivalents, they were reliable.

In February 1989 I went to work as a program development manager for the joint venture Dialog which was one of the very first developers of commercial software in Russia. We developed tailor made software for large commercial clients. I managed to meet many Americans including Bill Gates (we did the Russian version of DOS 4.01) and Esther Dyson.

Still it is getting easier all the time to do this work. I have a Master Card to which money can be sent from abroad. Also I have pretty well solved the mail problem because I use a service where someone can send a letter to an address in Finland that is just across the border - not far at all from St. Petersburg. A courier goes there once a day and picks up incoming mail bringing it back to the city itself. Right now my biggest challenge is to find out how to include in my contracts enough money to buy new computers for my people to do more work on. Why? Because I have plenty of jobs to do, but not enough hardware to do them all on. It's a vicious circle. I need more money to make more money.

Unfortunately by 1991 it turned out that no matter what we did, the profits went into the pockets of only our top two or three managers. Very quickly the amount of effort that I put into my work no longer bore any relationship to my pay. I thought it would be easy to get lots of American programming projects. This turned out not to be the case in part because Dialog was too large and therefore their overhead was too much. In short they were too expensive.

In the summer of 1992 I happened on some *Boardwatch* magazines which I understand that you brought to a Fidonet operator in St. Petersburg in April of that year. As a result I discovered the Internet and decided to investigate how this network could help me to establish my own business contacts and to figure out how much to charge. I met a guy with whom I am still working. One of our products - extensions to Microsoft Visual Basic - even won a reader's choice award. I think however that I can do more and manage more complex projects.

Later in the summer of 1992 I quit Dialog and started to work as an Assistant Professor of Computer Science at a new St. Petersburg school called the Northwest Personnel Center. This was actually a former school for high level Party members located in the Tauride Palace -- physically one of the most pleasant environments in Petersburg. Unfortunately the Institute was forced to move out of the palace and I found that most of my satisfaction with the institute ended with the move and on May 1, 1994 I quit and went entirely on my own.

Last year I started Arcadia as my own company. In January of this year I completed my first contract for 150 dollars, the second one was 250, the third was 500, the fourth was for 900 and now I am working on one for \$1100. I find that most of the developers I am working with do not want it to be known that their product is written in Russia. They seem to be concerned with people being angry that work is taken away from American programmers. One never came out and said so in so many words. He offered to take out a subscription to a magazine on visual basic for me and my guys, but said: please don't write any letters to the Editors.

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Larissa Tarkhova - a Network-Based Travel Advisor and Guide

When in March of this year we asked Arcady by email for assistance in finding a Russian family to stay with in Moscow, he told us to contact Larissa and gave us her Moscow email address. We did and she came up with a philologist friend who would offer us a room and two meals for \$18.50 a day. While for reasons of our own we decided to stay with a relative of a New Jersey neighbor, we also asked Larissa about a means of visiting the old and beautiful Russian town of Suzdal some 130 miles north east of Moscow. This proved to be very expensive compared to the rest of our stay - in part because in the country side the Russian infrastructure of roads and sleeping accommodations for tourists is close to where the United States was in the 1930's.

We spent the weekend of May 21 -22 with her as our guide going by train to Vladimir, private car to Suzdal and back to Vladimir and bus back to Moscow. It turns out that she has done a dissertation on American perceptions of Russia as depicted in American travel guides during the 20th century. She had worked for Intourist, the official Soviet and now Russian travel agency since the late 1970s. As the economy and old structures collapsed in 1990-91 she and a couple of friends in their section of Intourist were told they were expected to bring in 120,000 rubles during the next

year in exchange for salaries of 6,000 rubles. Sensing that these economics no longer made any sense, they decided to quit and become private travel consultants. Larissa is now using a Relcom account to advertise her services internationally.

We gave her as much advice as we could about the current direction of the commercial network. Part of this included a discussion of the development and operation of MecklerWeb. When she heard about this, she told us about Anatoli Ladygin, a friend in the Ministry of Science and Technology whom she thought might be interested in the development of a Russian Domain for MeklerWeb. We met with Ladygin and his associates at the Ministry on Friday May 27 and had a second meeting on Monday the 30th.

Ladygin is an upper middle level official in the Ministry who as is very common now has one foot in the public sector and one in the private. Apparently both his public job and the private one involve the export of technology and the seeking of investment funds for the commercialization of basic Russian technologies. He had a fair amount of information to give us about the Technology Center Impulse his private venture and almost nothing about his public position. He explained that within the Ministry he was to be a manager of a new Center for the Development and Exchange of Russian Technology an entity that would make a good host for a Russian domain on MecklerWeb. At a follow up meeting on Monday we presented an action plan for him to pursue in making a proposal to Chris Locke the MecklerWeb President. We arranged for him to get a press packet and have heard nothing further from him. We suspect that as a product of the staid old bureaucratic Ministry he is slow to catch on to the concepts involved. We also did the same thing for the much more entrepreneurial Sasha Galitski of ELVIS+ and anticipate receiving from him a full fledged proposal.

Victor Veselago - a Network-Based Physicist

Andrei Sebrant, who was our host for our 1992 visits, is a physicist at the Moscow Institute of Physics and Technology. In 1992 he was using a dial up account on Glasnet to find various activities to supplement his income which had been largely destroyed by inflation. Now his lab director has acquired research contract through the University of Arizona and direct internet access is a valuable tool in enabling the two labs to carry on work together. These arrangements have made it possible for Andrei to return to doing physics full time. On Thursday May 12 Andrei introduced us to a colleague Victor Veselago, a very tall and distinguished looking man who appears to be in his late 50s. Victor is trying to use the Internet as a distribution and ac-

cess tool for scientific information.

Victor tells us: I distribute a newsletter for the Moscow Institute of Physics and Technology on Relcom. I have about 100 subscribers in the US who also get the newsletter in the original Russian text directly from this computer thanks to our internet connection. We distribute directly from our listserv software to addressees in America. We also send it to the Friends and Partners Web server in Tennessee. Our audience is mainly the disturbingly large number of Russian physicists who have emigrated to the United States over the last decade. Many of these emigrants tend to collect around Russian language Internet file servers. Most of the foreign subscribers are actually graduates of this institute. But I can do this only because I have a grant from the Russian government that allows me to. At the same time I also use the Internet for picking up useful public domain material on science and them repost it to Glasnet conferences for redistribution within Russia.

I am thinking of developing a service that would distribute the table of contents and abstracts of articles from many of our physics journals over the internet - the problem is to develop a reliable means of allowing someone who wants to order the whole article to do so and to pay us for it.

Now I know very well CARL (the Colorado Association of Research Libraries) and find its Uncover service very useful. What would be even more useful is if CARL would give me permission to distribute its abstracts here on a commercial basis, I could gain for them a new and very large market. Of course there are two problems - no one here can afford to pay for this material what they charge in the West. We would also have to find some acceptable means of setting prices, collecting money and paying it to the American supplier.

To disseminate materials inside Russia, I must rely almost entirely on mailing lists because the interested sites tend to have only Relcom email accounts. When we get better internet connectivity inside Russia a service such as this will rapidly evolve into searchable databases. Full internet connectivity in Moscow is very nice indeed but it is really only helpful to a relatively small number of us who are situated here in the capital. Only after having it for nearly a year are we beginning to be able to extend its benefits to a few of the science towns surrounding Moscow. I have good access via Tennessee to a database from Pushchino 75 miles south of Moscow that has been transferred to the Friends and Partners web server in Tennessee. Connecting direct-

ly from Moscow to Pushchino simply isn't practical yet.

Andrei Sebrant's Views on the Evolution of Russian Society

We spent two evenings and parts of two days with Andrei Sebrant. While he is now on the governing board of the Glasnet Network, and we had some interesting conversations with him about the direction of the development of that network, we found him able to put what seems to be an intellectually sound foundation underneath our understanding of the stability and future direction of Russian society.

On the evening of May 24th, when we told him about some of the concerns expressed by Larissa Tarkhova who had been our guide for a weekend in Vladimir and Suzdal, he said: For the past 30 months the intelligentsia has been saying the economy cannot possibly go on for more than another 90 days without a total collapse. At yet it does go on without a collapse. Why? Survivability and adaptability of the Russian character. Take the street vendors for example. You don't see as many of them not because they are fewer in number but because more order has been brought into the system. There are certain areas where they are allowed to sell. If the sell in prohibited areas and get caught they will have to pay huge fines.

All these changes move very slowly towards something resembling a market economy. And speaking in terms of the full development of a market economy, you have to speak terms of generations. The question is no so much will there be major changes in five years or ten years as whether it will take two generations or three? Such developments will never happen before people who are born now will graduate from pedagogical universities and start teaching kids and the kids taught by these people will be seriously different.

Our very difficult situation continues and will do so for a number of years. But I really don't think that very many people think they are doomed. Yes the situations

Further more changes in Moscow do migrate to the provinces. There is just a time lag in their doing so. During our camping trip this May we went again on the route that we took a year ago between Moscow and Petersburg. Most all of the shops in one small town were privatized and one could buy there almost all the things that you could buy in Moscow at virtually the same prices. Items ranging all the way from pineapples to Dutch sausages.



Network Physicists - Andre Sebrant and Victor Veselago

is unstable. We have had another coup since you and I first met and we might well have another, or even five more in the next five years. On the other hand I don't think that any such events can seriously change anything. For example I just researched how many communist party members of the current parliament are working now in private banks -- some 20%. And these banks will consequently have more profitable connections with the Central Bank. What we see is really a fight between political factions whose names and superficially ideologies have little meaning.

Two years ago as you saw there were some empty shops in Moscow. But I am willing to bet that even then table in apartments in this city were not empty. Now you cannot find an empty shop -- not even outside of Moscow. Shortages are not an issue anymore. For this we must give credit to Gaidar's government. They did solve two important problems. Russians learn the hard way that money is what matters at the moment, not having "connections" and becoming a party functionary. And secondly that each person is responsible for his own future. That we can no longer rely on the state to do everything for us. It was necessary to learn all this very quickly in order to learn how to survive. And again, speaking of survivability and adaptability, we are very good at this.

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In Moscow, milk is five to six hundred rubles per liter. We were camped out near a small village and went there to buy milk and the lady who saw well dressed campers obviously from the city decided perhaps to announce a really high price. She looked at us and said: would you pay maybe 150 rubles? We said: Yes. But she finally got upset and said no I just can't charge that. If you pay 150 rubles, I will give you this bucket of potatoes for free. So you must realize that the basic cost of living is much more connected with milk and potatoes than with pineapples. These costs are two to three times lower in the countryside 100 kilometers outside of Moscow. If you read about the average salary of 60 to 80 dollars a month in large state owned industry, in Moscow this would be difficult to survive on. But in the country side it is possible.

I am much less worried about the possibility of civil war now than two years ago because the most difficult time of adaptation when everyone has positively no idea what to do about the new conditions and how to survive under them has now passed. Yel'tsin I think is lucky to have survived. Looks like he is a very good fighter but rather a poor builder.

Rutskoi being free is not a threat. Why? Because no one likes a looser. Five to seven per cent of the population still like Rutskoi - mostly retired army officers. In fact here is the danger. There is no single politician now who can seriously compete with Yel'tsin. If something happens to Yel'tsin the problem will not be that some bad person is waiting in the wings to take over, but that is no obvious leader and who knows what kind of fight between factions we would see? In this sense even if we are not happy with what Yel'tsin is doing, at the moment the alternative looks even more appalling.

The whole business of freedom is interesting. Several years ago the possibility of putting in a play one phrase that might offend the authorities was quite an achievement. But now who cares what you say in your play about Yel'tsin? Will there be any KGB there to immediately close you down? No. Now you have to write a really good play and this much more difficult to do than writing mere sensationalism. In my high school years twenty years ago the mere act of reading Solzhenitsyn was an act of defiance and the danger associated with this added a very special flavor.

But now we can buy these books at every

subway stop. I think now that life and knowledge have become too complex for a writer to tell the ruler of the state how he should do his job. Running the state should be left to professional politicians. That means we need a huge pool of professional politicians, which unfortunately we do not yet have. In forty years I think that we will have enough professional lawyers, politicians, and economists to form a government that understands what it is doing.

On Sunday June 19, the *New York Times* had a story about Yel'tsin's decree that to fight crime the police could detain anyone for 60 days without having to show cause. The *Times* reported that the decree was being met with general outrage in Moscow. We asked Andrei to comment. On June 20 he replied: Some journalists are mad, some happy (mostly those who have friends or relatives recently killed or raped). To say that there is any public reaction would be to heavily exaggerate. Parliament is still discussing whether they should veto the decree. Their own draft on the same subject (fighting organized crime) is even worse. There banks must report *any* "suspicious" transaction to authorities, and if they fail to do it, they may be immediately closed. A nice way to get rid of any private bank which the Central Bank does not like.

The Moscow mayor said that he is ready, if necessary, to arrange a referendum about new Yeltsin decree and is positive that it will pass with at least 70% voting for it. I guess he is right.

Of course, the decree is a violation of human rights. But here people are used to that. They are not used, however, to machine-gun duels between different gangs in the rush hour on the main streets of Moscow. As any other violation of human rights, this decree can be used for attaining several goals. We will have to see, what is the *real* goal of all these measures. I do not think that we can tell right now who will be the real victims - the criminals, or the opponents of the authorities. We'll have to wait and see.

Vasili Balog - Trade Union Leader

Vasili Balog, the Deputy Director of the International Section of the General Confederation of Trade Unions, had seen some of our writing on Glasnet and suggested a meeting. When we saw him at the Trade Union headquarters at 42 Leninskii Prospect on May 27, he turned out to be a very articulate spokesman for the use of the Russian Internet in helping to cement the trade union movement, which, as he described it, is under considerable attack.

Our earlier discussion however picked up from where the talk with Andrei Sebrant had left off. We asked whether he agreed with Andrei's statement about Russians be-

ing adaptable and being good survivors. Yes, he said but there was a third characteristic - Russian fatalism. It may be bad, but it could have been much worse. Thank God we are still alive. Yes, he says with a touch of bitterness in his voice, we can adapt to a lot including the fact that male life expectancy in Russia has dropped to less than 60 years at the end of the 20th century. We can adapt to the fact that I am 44 and I have already had quite a few friends my age who have already died; and to the fact that I am afraid when my daughter goes out at night; or to the fact than on a few occasions I have had to take special precautions for breathing because of pollution in Moscow. But this is normal?

We asked what should be the agenda for changing things here so that this will no be normal? Vasili replied that one should consider what the objective of society should be, then what are the intermediate objectives and what are means and the structures to achieve them? I think there are two dimensions for change necessary, interconnected and inseparable, one external, one internal. Economic opportunity must become more rational. You cannot pay a professor at Moscow State University \$30 a month and a taxi driver ten or twenty times that. The other is a moral sense of what we are doing. We cant skip stages of development. We must experience them for ourselves. But we must try to be as conscious as possible of what we are doing and of the mistakes others have made before us in order to try to avoid making them for ourselves.

Then in the foreign policy we must strive for predictability. There is also the matter of national pride. The Russian nation, like any other, is a proud nation. Also may we suppose that there are such things as national interests? And that French national interests are quite different than those of Great Britain? Russia has its own national interests that must to some extent be redefined. For the last seven decades it has been mobilized around a very strict, very rigid ideology which did not allow for the changes in the outer world to betaken into account.

As I grew up I tried to understand why, when very bad things happened in this country, were people quiet? Why were they quiet when their neighbors were taken away? Why were they quiet when arrests were made in broad daylight? But also why when World War Two started were the same people prepared to die with the name of Stalin on their lips? Why when Stalin died in 1953 was there genuine sorrow?

You may speculate about the Russian belief in the Good Tsar, but I think there were two other aspects that were used very shrewdly by Stalin and by the system. There were two images that further cemented the society. The internal enemy and the external enemy. And when you think

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about what Gorbachev did when he came to power? He destroyed both those images and the whole world knows what happened as a result. Part of the same environment were the two eternal questions: what must we do, and who is to blame? We were to prepared to accept the idea that someone else was to blame and that someone else should do something.

This is an enormously rich and powerful country both in natural and in human resources. The main thing to understand is that the country is like a huge barge, the direction of which is not easily changed and many of the parts of which need fixing. Moreover, in order to make a u-turn, it has to stop. Meanwhile Yel'tsin was most popular when he pitted himself against Gorbachev. Now that Yel'tsin is the regime his prestige has been declining. Too many promises have not been kept. Many people now begin to feel that the more it changes, the more it remains the same and some become apathetic. But apathetic or not we live in a completely different world than 20 years ago and there can be no return. The generation that was 15 years old when Gorbachev came to power is now mature and quite cynical and obsessed with physical possessions.

We then asked what Vasili considered to be the role that trade unions and computer networks would play in an environment like this. I believe that networks are changing the psychology of both individuals and organizations. Networks can be extremely empowering to those who know how to use them properly. They can help to end personal isolation

and to democratize society because networking like nothing else undermines all sorts of hierarchical approaches. The network essentially is able to ignore centralized authority.

Lets say you go to your trade union office in Omsk, or Vladivostok, or a small town in the Urals and one day you get yourself connected to the network by a modem and go through the terribly poor telephone lines and suddenly you find yourself out of this remote isolation - suddenly you are a "citizen of the world" who is in a position to change the course of reality; to say something that can get a reaction in seconds from the other side of the world. Suddenly you realize that to reach a collective decision, you don't have to be necessarily in the same geographical spot.

In our country now we have a strongly anti union environment. The unions have not figured out how to conduct their public relations in such an environment. Official news media are totally anti-union. Furthermore with the recent changes, unions cannot even begin to deliver what they could twenty years ago. The network becomes a platform from which the union point of view may be explained and disseminated. Those who would never read a trade union newspaper will read a trade union statement on-line.

Throughout the history of union movements, if a strong action is taken by the authorities against the union, you must have some resources put aside and adequate means ready to protect your interests. You must be in a position to communicate with and receive communications from those who share your interests. And that you are in a position to reach beyond the borders of your country.

In the write up by Jacques Leslie in *Wired* earlier this year, you may notice what happened last October when friends were detained at the time of the second coup. A note went to several network lists describing what had happened, giving the phone number of the police station and asking readers to call and to demand their release. Soon the phone at the police station was ringing off the hook with calls coming in from all over the world. The callers knew the names and circumstances of the detainees. (They were the press secretary to the president of the major trade union center in Russia. Two others were members of the Executive Committee of the Party of Labor.) It took several hours for such calls to wear down the jailers resistance, but in the end they let my friends go.

To extend trade union communications into the provinces, Vasili proposes to establish local hosts that can deliver email to the main Glasnet system on a store and forward basis using high speed modems.

I am quite happy to use Glasnet, because (in addition to its costing less than all the other networks in Moscow) it is a Russian network designed to be used for Russian purposes rather than an arm of a foreign network like Geonet. Networks like Relcom or Sovam Teleport are Russian alright, but they have been created for large structures like government or big corporate users with considerable resources. Right now we only have about two dozen organizations and individuals connected with organized labor online. They are in St Petersburg, Kazan, Alma Alta, Kalininograd, Ekaterinburg, and Moscow.

In October of last year we organized an international conference for trade unions under the title of Modern Telecommunications - New Vistas for International Workers Solidarity. We had people from all over Russia, Kazakhstan, Ukraine, Byelorussia, United Kingdom and the Netherlands. Three days before the beginning of the conference its site was occupied by OMON the anti-riot police. We had three or four days to change the location. We moved the location of the conference to a suburban area. We then used the network to make sure people would still be able to attend given the unusual circumstances. They did and it went off successfully. We will hold more such conferences to help people understand why they should go online. We find that if we can actually get people to watch online sessions on Glasnet in person, the message as to why it is worthwhile will get through to them. Our coal miners union is developing its own communications mechanisms. Because communication is quicker and much less expensive, we also use the network to keep involved with colleagues abroad.

Extel Becomes Compact Book Publishing Company

In April of 1992 we were introduced by Andrei Sebrant to friends who ran a small company named Extel. They were located in some dingy rooms of a telephone exchange building on the south side of Moscow. They had two products - a converter that allowed the operation of western built VCRs with Russian televisions and a digital scanner that could create and store high resolution digital images on the hard disks of Taiwanese 386 PC clones.

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When we returned on Saturday May 28, 1994 we saw an extraordinary transformation. They now occupy parts of two floors in a former school building near a subway stop at Kholomonoskoe on the West side of Moscow. Employing ten people, they had several large rooms full of the latest Macintosh and PC multimedia computers. With many gigabytes of disk space and all the necessary software and peripherals, they have become a publisher of CD ROMs. We had close looks at two that were with three weeks of being ready to ship to Sumeria, their California-based partner where the discs would actually be duplicated.

The first disc is a travel guide to Moscow. It contains an excellent selection of maps, diagrams, photographs, charts, tables and text passages all linked together in hypertext format. For example clicking on the Kremlin takes the view to a detailed diagram of the buildings inside. Clicking on a building will take the user down several further levels with text, and more diagrams and pictures. The second is a history of the Russian space program. Here one of the most remarkable things is a series of short movies showing many of the most memorable moments of the program including disasters never before shown on Russian television. They have been able to do this because the video archives of the space program have recently become available. They are also well into the production of a history of the Bolshoi Ballet and Opera. The production of each disc has occupied five people full time for less than four months.

When we asked their President, Alexander Kashcheev why they were producing their CDs in the US, he explained that the cost of borrowing capital in Russia because of the high inflation rate had pushed the cost of CD pressing, chip manufacture and similar high technology above that of the world market. Indeed that hi-tech products like chips with relatively lengthy production cycles were particularly vulnerable. Prices for the delivery of a product had to include enough profit to survive expected inflation rates *and* interest rates of 20% *per month* on borrowed capital. Nevertheless they had raised \$150,000 over the past 18 months. Roughly half came from Russian investors and half from their own economic activity. He believes that they have three major markets: (1) the American market; (2) the European market, and (3) the Russian market which in turn has two levels - Russian consumers who want Russian texts and foreign tourists who visit Russia. The division into European and American markets is because separate distribution channels exist for each and because products like the History of the Bolshoi Opera and Ballet are judged to be of more interest to the Euro-

pean market.

They feel the cost of capital for expansion at 20% a month is much worse than the regular inflation rate of closer to 7% a month. They don't much care what is going on in the Parliament. They don't expect to be hurt or helped by what it does. They are confident that nothing can bring back the old system. What they would like is greater stability and rationality in the economy and the possibility of the creation of a more normal consumer economy. We find that what they have accomplished in two years is extremely impressive. Their stories and the others related here seem to provide solid evidence that technical entrepreneur can not only adapt and survive but perhaps even flourish in post communist Russia.

Conclusion

Until we neared the end of the preparation of this study, we didn't realize that very likely the most important development in the current Moscow and future Russian internet situation is the George Soros - International Science Foundation effort. For something that started off as a welcome and much needed philanthropical effort, it has become highly controversial very quickly.

As a newcomer to these intrigues it is hard for us to know what to make out of the dismissals of Harly Balzer and Chet Brauch. Alexander Goldfarb and Ilya Mafter certainly seem to have a different

agenda - judging by the way presumed understandings about the ISF role in the completion of the Moscow backbone fell apart after the change in ISF leadership occurred.

One of our sources seemed to believe that the motivation was personal control over the way the Soros money was spent. At the present such an assumption is only a hypothesis without any proof. We believe however that the admonition from this person to judge ISF by its actions is a sound one. So far one of the clearest pieces of evidence about ISF intentions was the Goldfarb interview in *Nezavisimaya Gazeta*. We are responsible to Soros and no one else. Our agenda is his agenda.

But what is the agenda? Certainly a hint was contained in Mafter's May 28 remark to us about being opposed to Relcom's monopolistic intentions and ISF's desire to create an alternative to Relcom. Consider the fact that Relcom and its sister network DEMOS are the only Russian networks that do not already owe their existence to considerable foreign investment.

Given Russian sensibilities about foreign control of key technology assets during a period of stress and national weakness, the fact that Relcom as the nation's largest net is also the only purely Russian network as far as financial control is concerned is a source of considerable pride to many people. Even though the creation of an alternative network is offered as a means of deliverance from alleged monopolistic tendencies of Relcom, the fact is that the "liberator" is an American citizen who ap-

pears to be using Russian emigrees to this country to carry out his will. This will not be comforting to a rather large number of Russians motivated more by nationalism than by dollars.

Lets look at the Moscow backbone dispute again. ISF is refusing so far to share control of the backbone with Relcom - saying that it has to be purely non profit because ISF is using public monies and therefore its infrastructure cannot be commercial. While doing this it seems to ignore the example set in this country by the NSF where commercial use of government paid for infrastructure seems fine as long as it is properly "framed". Still we learn from Mafter that he hopes for an agreement with the Science Ministry and Russian Fund for Basic Research that would give these three entities control and that they would *then* negotiate commercial use with the commercial network community. Thus the issue of control seems to be far more important than commercial versus non commercial.

Certainly, if ISF does strike a deal to complete the backbone and it is one that pushes Relcom out, unless Relcom can very quickly create an alternative backbone via Macomnet connecting to key commercial sites, Relcom may be at a significant growth disadvantage in Moscow. Especially if ISF permits commercial use of its backbone under conditions *it* controls. And if the quality of the backbone is good enough to do ATM, ISF would in effect have a network that

Moscow City Telephone Company Threatens to Reinstate Modem Tax

While we were in Moscow we heard it said that proposals for taxes on the operations of modems are motivated much more by the authorities desire to stop this form of communication from becoming too widespread than from any real desire to raise money for new infrastructure. One evening towards the end of our stay the following appeared in our mail box.

"Modem Hunt Again?"

In Internet Society News, Vol. 1, No. 2, I published a translation of the article "Spring Modem Hunt in Moscow: Happy Fools' Day, Gentlemen!" from COMMERSANT Weekly, No. 13, March 23-30, 1992.

The article mentioned the plans of MGTS (Moscow City Telephone Network) to make the modem owners register them. MGTS wanted to charge organizations using modems for "commercial purposes" 50.000 rubles per year (\$312.5 at ruble/dollar exchange rate of 160, as it was on March 23-30). Other organizations were supposed to pay 1296 rubles per year (\$8.1). The author of the article was skeptical regarding the ability of MGTS to enforce that decision, and was right: in two years nothing happened.

But now, we probably must admit that MGTS were damn serious. Moscow bi-weekly EKSTRA-M, in its issue of May 16, 1994, in the article "There'll Be Phones, But Expensive, And Not For All" by Aliona Shevchenko, writes:

If you want to install, at home or in your office, a fax or a modem, don't forget to register it. Registration of a fax or a modem doesn't cost much: only 4,500 thousand rubles (\$2.36), and if it is not officially certified, add some thousand rubles for the expertise. But the monthly fee (26 thousand rubles, or \$13.7) will make you think twice whether you ought to have it registered at your own risk. If you are caught by chance, you'll be asked to proceed with registration. But MGTS will not stop with this. It will soon implement a system for hunting the offenders'.

Gentlemen, I consider this as the major threat to democracy and right of the free exchange of information, even more serious than the coup of August 1991.

According to the ordinance of Mr. Vasiliev, General Director of MGTS, effective May 1st, 1994, any fax owner must pay for the fact of having it, 56.000 rubles (\$29.4) per month! That is, in less than a year you must pay more than the fax machine value!

If this measure is enforced, the Internet will be dead in Russia. Nobody will be able to pay almost \$14 per month for only having a modem. Such amount is an average GlasNet user monthly bill. The state-owned monopoly, MGTS, will simply strangle electronic networking in Russia.

I urge all persons concerned with the future of computer networking to take immediate and firm action against the attempt of inefficient and obsolete monsters like MGTS to make money with no effort, and suppressing the natural right of the people to the free exchange of information.

Anatoly Voronov

would carry voice traffic as well as data - a general telecommunications infrastructure that could prove tempting to large commercial businesses.

What will happen if, as part of the next stage ISF, puts similar backbones in Russia's 10 or 15 largest cities and connects each city together by satellite or terrestrial links? If Soros under the rubric of telecommunications infrastructure for scientists creates such a network he will have effectively created an alternative to only to Relcom, but will operate and control what may be the best telecommunications infrastructure in the entire Russian nation. Is his goal then to create and control a Russian equivalent of AT&T? The "last mile" is a notorious problem in Russia. However, spread -spectrum license-free wireless technologies are coming on line that have the potential to obviate even this problem.

The needs of Russian scientists are very genuine. Soros's promise to fulfill them with modern telecommunications infrastructure could be creating quite a Faustian dilemma for Russian policy makers. We wonder whether in order to solve the scientists dilemma, the Russian government will feel compelled to make concessions that it would not otherwise make to foreign companies with money to invest?

We hope that these conclusions are absolutely wrong and that we shall soon see the ISF and Relcom on friendly terms. In our opinion, if ISF attempts to roughshod over Relcom it will be making a big mistake.

ISF Telecom Program: A Range of Possible Motives

Someone who heard Soros speak at INET told us: "Soros disclosed that, apart from his philanthropies, the investment funds which he "advises" may take positions in telecommunications ventures in Eastern Europe and the FSU. So, don't be surprised to see the Soros funds' investing in telecommunications companies that service that part of the world. However, I expect that Mr. Soros will be meticulous in avoiding even the appearance of conflicts-of-interest. He isn't stupid."

One of the most ubiquitous figures in Russian technology for the past decade has been Evgenii Velikhov. It appears that he may well have a behind the scenes role to play in these disputes as well. On June 23 Aleksei Platonov replied to our question about the outcome of the negotiations that Ilya Mafter alluded to on May 28:

"We've had several meetings of all sides in the office of Eugeny Velikhov (he is the Chairman of RELARN Coordinative Council). It was just before INET. Next week there will be one more (may be the

last) meeting. The things look now as follows. It seems that we'll be able to continue the work within some agreement. It includes some changes in RELARN structure, mainly concerning the control of the project, and the main thing is that money will flow directly to RELARN (not to RosNII-ROS as it was before) and then it gives it to executive organizations. I'm not sure that this is a good variant for our Ministries, because they don't like to work with 'public' organizations (associations, etc.), but both foundations (ISF and Russian) insist on this variant. Let's wait a little, I hope next week there'll be some result."

These details from Platonov raise more questions than they answer. Velikhov is Director of Russian Research Center, Kurchatov Institute. (Formerly called the Kurchatov Institute of Atomic Energy.) Aleksei Soldatov the Relcom CEO is Director of the Computing Center at Kurchatov. In effect a the major portion of Relcom is a business unit of Kurchatov and it is not in Velikhov's interest to see its economic well being threatened. Velikhov is also President of RELARN which means that he can exert influence over the way that the government's assistance to academic's use of the network is carried out. These two power bases would seem to align him with the RELARN Relcom camp. Yet he also appears to be playing a key role in the ISF, Ministry of Science, and Russian Fund negotiations that so far don't seem to be going in the direction that RELARN and Relcom would like. Where he will come down in this area seems impossible to predict.

Possible Impact of ISF on Russian Science Policy

Russian science policy is also in turmoil. Last fall the OECD issued a report saying that the number of scientists in Russian would have to drop from the current 900,000 to close to 300,000 if the Russian economy were to satisfactorily support a Russian science establishment. Many took this as a death sentence for the huge science bureaucracy subsidized by the Russian Academy of Sciences. The Russian Fund for Basic Research was established at the end of 1992 to act as a Russian equivalent of the National Science Foundation. It was to channel enough aid to the nations best scientists to ensure their survival. The Russian Fund and Ministry of Science under Saltykov are considered to be squarely in the Gaidar led school of reform. They are presumably ready to see much of the Academy of Sciences dismantled.

In this light Sergei Berezhnev's opinion that the Russian Fund would like to take over and control RELARN is significant. Why? Because according to what Ilya Mafter told us on May 28 the ISF, Russian Fund and Ministry of Science are about to cement an alliance that would allow the Moscow backbone to be finished at the exclusion of Relcom. RELARN represents a sizable chunk of users. Up to now they

seem to have been a drain on Relcom. However if Ministry of Science actually starts paying the promised RELARN subsidy, REALARN would then represent a customer that Relcom would not like to lose. We think of this in the very context of Mafter's statement to us also on May 28 that ISF would like to create an alternative to Relcom.

It seems that in the present fragmented situation that the ISF can choose sides in Russia's domestic science disputes and quite possibly exert enough power to make the chosen side a winner. That and the tremendous amounts of money involved could create a touchy situation for foreign involvement in the Russian situation. The June 22, 1994 *Chronicle of Higher Education* on page 34(a) printed a short story under the heading: Mismanagement Found in Russian Arm of Soros Fund. The article talks not about the ISF but instead about a second Soros Foundation charged with spending several hundred million dollars to reform Russian education. As the result of an audit by Deloitte and Touche, the four highest level Russian employees were either fired or resigned because of allegations that they had mismanaged funds.

According to an informed source: What you are reporting is correct. The Cultural Initiative is a totally separate operation from ISF (intentionally set up that way). The problem was decidedly not criminal, but also definitely a problem. It seems they were ignoring instructions and keeping too much of their funds in hard currency accounts in Moscow, where the money was loaned out for sometimes questionable purposes. Who did Soros send to Moscow to investigate and "clean up" the problem? Alex Goldfarb.

Perhaps ISF Telecom Program Has Not Developed a Coherent Policy?

Given the Russian situation none of this should be surprising. Remarks we received from Harly Balzer on June 27 shed further light on what could certainly be innocent confusion on Mr. Soros' part. Balzer wrote: "The early ISF management team did manage to get Soros himself to believe in the importance of telecom (or at least "e-mail"), and now he is willing to spend serious money on it--if only someone could tell him how to spend the money (or if someone could filter the noise of all the people trying to tell him how to spend the money, mostly by giving it to them). His latest focus appears to be "the user training interface," in some as-yet-to-be-determined form. Lots of people over there want a "fiber palace" training center which given Moscow real estate prices could consume vast sums."

Dr Balzer, who was the first Director of ISF, elaborated on these views in a tele-

phone interview on June 28: everyone has ideas about how Mr. Soros should spend his money - the huge problem is for him to decide to whom to listen. A secondary problem is that neither Mr. Soros nor Alexander Goldfarb have any real understanding of the Internet -- the kind that can only be acquired from first hand immersion and use.

This point was brought home to us in the following comments from a Russian scientist internet user: "Here is another funny situation. According to ISF agreement with the Academy, ISF "is supposed to provide every Russian scientist with full Internet connectivity", etc.. This statement of intent sounds just perfect until you read to the description of Internet connectivity. It's really amazing, because ISF suggests for all Russian scientists a 64 kb/s link to NORDUNET with the possible upgrade to 128 kb/s.

Considering the fact GlasNet with its less than 2000 active users uses 64 kb/s *now* and the fact that NASA provides even more bandwidth for *one* Institute (and DESY does the same for Radio MSU), this sounds strange. Either ISF has no idea what REAL Internet connectivity means, or they are not going to provide any to people outside the "Golden Brains" (a nickname for the Academy building - if you've seen it, you'll understand why) and

a very few selected institutes. This, in fact, is a strange combination. Optical backbone in the city, no links outside it, and a bottleneck to Internet. Maybe ISF wants to provide connectivity only to the top level Academy bureaucrats? Then why so much noise about the project? I really do not understand that."

We conclude that Soros may find that charting a wise course of action in Russian is far far more difficult than anything he has done before. We also conclude that although Soros's enterprise to the casual observers is merely philanthropic to those involved on the inside in Moscow and abroad it may also be a naked power struggle that could determine critical elements of Russia's future. In any case it seems to us that ISF must become more open about its intentions and that until there is clear evidence to the contrary that ISF should be assumed to have honorable intentions.

Certainly this explanation of the problems of sorting out conflicting advice is also as credible as the more Machievellian one of wanting to build a new Soros-controlled telecommunication empire. We suspect that Mr. Soros now has some important lessons to learn about what can happen when his high stakes high profile actions meet the open culture of the internet where all parties to the actions of the ISF can talk to each other and to a wide range of journalists.

Neither Simple Solutions Nor Easy Answers

Something known only to a few can become known to millions over night. One of the problems in dealing with the Internet that Dr. Balzer pointed out is that neither Soros or Goldfarb have any direct feel for it since neither of them are direct users. In such an environment it becomes very important for Mr. Soros to watch the ramifications of what his people do with as keen an eye as he is reputed to watch the financial markets. We hope that we will not see any onset of a circle-the-wagons mentality among Goldfarb and Mafer. Mr. Soros on the other hand, needs to think about opening his communications channels for the development of ISF policy to many more people. Given the power of the Internet, this very critical moment in Russian history, and the very large financial stakes involved - a lot of hands will reach in and want to stir the ISF pots.

We can only hope that George Soros will help to assure his significant place in history by widening the range of his advisors and resisting any temptation to let ISF run itself. We believe that too much is at stake for all concerned to permit policy to be made outside of public scrutiny. With this in mind we wish all sides good luck and much progress at the NATO meeting at the end of September.

MCI Internet Service Debuts

MCI announced its new Internet service on November 20th. The offering is a very ambitious one aimed primarily at the individual and small business consumer market complete with the promise of the best internet shopping mall yet. Pricing for the service does not seem to be completely clear. Dial up shell accounts would appear to be competitive only if a customer were in one of the 25 cities on MCI's backbone. Furthermore slip at \$50 a month is competitive only if no hourly or dial in access charges apply. MCI apparently is selling leased lines to other service providers dirt cheap.

While MCI has assembled an all star team at the top of its effort, its major weakness seems to be how it can get their efforts to scale. Where will MCI get adequate staff for customer support for 100,000 new slip users? How will they survive the expected dislocations of building their own massive TCP/IP infrastructure? Already on November 23 SURAnet reported that glitches in the backbone forced it to switch back to NSFnet service.

1995 COOK Report Publication Plans Announced For 1995 Prices and Services See p 24.

In January we will complete the interview with Tom Jennings on the history, development and future directions of the Little Garden Network. We will also publish an interview with the National Science Foundation's Steve Goldstein on the history development and future direction of the International Connections Program.

During the first half on 1995 we plan to publish a series of special studies on the impact of policies at the state level on the internet in particular and information super highway policy issues in general. At this point we have plans to cover Colorado, Washington state, and New York. Colorado will come first. We are flying there for 8 days on December 6. These studies will synthesize a series of interviews with policy makers at both the state and corporate level and with grass roots activists. We will try to identify, in each area, the leaders of cost effective appropriate technology solutions and show how their ideas or concerns are

playing out in the larger political arena. (New York appears to be implementing a top down high tech solution. There we will examine both the solution and its likely reception.) We believe these reports (each likely to be in the 20 to 25 thousand word range) will be useful to policy makers both at the state level and within large corporations as a source of insight into the ways in which these issues can be expected to play themselves out at the state level to which - given the national political situation - most action will now shift.

We may also revisit the key issues behind computer networks and health care and to publish a new special report on this subject. Finally our coverage of the CIX, and NAPs and issues developing at the Federal level will continue. As will occasional looks at k-12 education issues, wireless and cable tv as Internet on ramps, the Russian internet, and privacy issues.

Executive Summary

Erratic Actions Symptomatic of a Struggling CIX, pp. 1-7

Shortly after the September 14 members meeting John Rugo was elevated to the position of CIX Association President and Board Chairman. We reported this in the *COOK Report* on October 27 adding that Rugo had a mandate for reform and that, if he was unable to implement reform, he'd likely leave the CIX.

Unfortunately Rugo appears to have failed. BBN did not withdraw from the CIX but on November 1, when the CIX announced its intention to proceed with filtering on 11/15/94, Rugo resigned his seat on the Board. The Board, which had never informed the membership of his appointment as President and Chair, chose not to inform it of his resignation. Rugo himself informed the membership on November 18.

On November 19 the Board released to the membership the minutes of its November 10 meeting where it noted Rugo's resignation. The minutes also announced that filtering would not begin on the 15th after all. They observed that "Agreement was reached with Vixie Enterprises to assume software management of the CIX router [on December 1] where he will implement the filtering. The contract with Vixie Enterprises is month-by-month to provide the CIX optimal management flexibility when securing a contract via competitive procurement. Agreed 15 business days notice will be given to an affected party prior to activation of filtering (Suggestion that connected service providers provide AS numbers of all attached networks and note those who are customers)."

Thus Paul Vixie has apparently agreed to replace PSI as traffic cop for the router. It is still not clear whether filtering might actually be imposed on CIX members who might be aggregating class c addresses of non member resellers under their own class b addresses. If this is not done it would appear that the only non CIX members who will be filtered are those turned into Vixie by their own service providers. Thus the CIX would appear to be committed to a policy that it has no means of enforcing equitably.

Also on the 19th, Bob Collet the current Association President and Board Chair announced to the membership that the

CIX was now pledged to re-inventing its mission. Collet described a range of issues facing the industry and then said "Accordingly, our organization should be at the vanguard of these changes and position the membership to derive maximum economic benefit. Therefore, the Board is forming a Task Force to reinvent the CIX mission and develop a corresponding strategic plan.

The task force will consist of the Board and 10 volunteers from the membership. Volunteers are solicited and inquiries should be directed to Lou Scanlan (lscanlan@cix.org). Participants should expect to physically attend three meetings: at Internet World, Comnet and Interop Europe. The plan is to provide to the membership a draft plan in March. As a starting point for this endeavor, the Board has developed a draft mission statement and strawman strategic plan." [End Collet statement.] This plan would be presented to the task force to work with.

The meeting of November 10th had decided both on the further postpone of filtering via Vixie enterprises and the reform plan. Unfortunately CIX members found out about neither until after Collet announced on com-priv on November 16 that filtering would be delayed because it was important that the CIX do it correctly. Here was an organization in trouble with its membership for being non responsive to their needs *continuing* to inform the membership well after information became public knowledge.

Our article goes on to examine the relationship of CIX members to each other and to the rest of the market. It reaches the conclusion that what we are seeing is not the big players try to raise barriers to entry in the market place but rather the middle sized players, representing a majority on the CIX Board, trying to defend their interests against a market squeeze being placed on them from above and below. We believe that those in the middle suddenly saw the CIX as their only defense against the squeeze being engineered by the large IXCs from above and the small new providers being enabled by them from below. Perhaps the CIX could be made to play traffic cop? The middle could defend itself from this onslaught by insisting that everyone had to join the CIX. To put teeth its defensive argument the board announced a new policy that it - acting as the CIX - would now enforce routing and would hunt out violators of its decree. Among the violators would be many of those small providers that Sprint and ANS, and soon MCI were connecting to the net.

When the new policy was announced in mid July fear of its disruptive potential had perhaps some grounding in reality. By late November, however, it seemed completely out of touch. The critical question for smaller players was the ability to continue to resell and to be able to get their packets routed to the rest of the net at acceptable cost. The infrastructure for achieving both these ends is now available. Not only were the NAPs soon ready to come on line, but NET99 was formed and beginning to put together MAE-East like interchanges which would perform the same functions as the CIX router. A MAE-West was ready to be built and plans were afoot to resell NAP access to smaller networks at affordable rates. The CIX router as the central point for the exchange of commercial traffic in the Internet was dead. And even as the Board let the contract to Vixie for filtering it tacitly acknowledged this fact by announcing that the router would be taken out of service on Aug. 31, 1995.

There is a serious need for an Internet trade association that will function as a trade association and settlement free multi-lateral peering rather than a routing cop. What is in doubt is whether the current CIX will be able to perform that role.

Russian Internet Part 4 & Report from Golitsyno

The NATO sponsored conference in Golitsyno just outside Moscow brought all the players in the Russian Internet together for the first time. What is uncertain is the potential for serious cooperation between them and for uniting the two halves of a broken Moscow backbone. **Pages 8-11.**

On **pages 16-22** we present the 4th and final installment of our June report on the Russian internet. It surveys more users and concludes with an analysis of the policy issues raised by the International Science Foundation's involvement.

Wireless as Internet On Ramp - pp.12-15

We examine Teatherless Access's approach and present a conclusion that speculates on the further evolution of the market niches of TA and Metricom.

The Little Garden, p. 1, 11

Tom Jennings has for two years been at the focal point of a remarkable success story in building a major low cost service provider in California. Part 1 of a 2 part interview.

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Our basic subscription rates remain for the most part unchanged.

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