Research and Planning
Annual Report 1990-1991

Peter Day, July 1, 1991

Research and Planning
Annual Report 1990-1991

EVENTS OF THE YEAR

Network Planning

The Network Working Group met 14 times from October 31, 1990, through June 20, 1991. R&P sent notes summarizing the issues discussed to the members of the Review Group for the meetings through April 23, 1991. Notes from the last three meetings still need to be written and distributed.

During this effort, R&P has distributed to the Working and Review groups three network plans from other universities, and in addition distributed to the Working Group over 40 diagrams and articles on networking topics.

R&P investigated network security and obtained information on the DEC security server. R&P wrote a document giving advice on naming network entities, and a document describing what we currently recommend and support relative to networking. Neither of these documents has been published, due to lack of time to get them ready.

At least two things impeded progress in creating a Network Plan:

1. There is not a lot of networking expertise on campus, and much time was spent educating the Working Group. Whereas everyone on the E-Mail Working Group was a heavy user of E-Mail and had ideas about what was needed, very few on the Network group had experience with more than elementary networking issues.
2. Urgent matters from other R&P activities, especially the EUDA Task Force, diverted a lot of R&P's time and effort away from Network Planning. Although R&P and others continued to do network planning, and the Working Group continued to meet, R&P was unable to devote adequate resources to the organization and synthesis of the material and to the creation of documents.

The Network Working Group decided to postpone doing a networking survey; discussed without dissent the use of SynOptics equipment to implement Ethernet, bridging, and routing in campus buildings; reviewed Network Services' plan for migration to FDDI; discussed bridges versus routers and various ways to architect the network and segment it to control traffic flow; discussed the need for: better interoperability between existing network resources, a network upgrade plan, and a simpler networking environment; wrestled with the issue of what protocols to support and what supporting a protocol means; discussed the Universal ID plan and its implications for network access and NFS access; discussed FOCUS and its implication for the network and for implementation of client/server applications; discussed how to make a database available so that it is accessible from any supported environment; discussed the problem of decoding 802.2 packets that now appear on the backbone; and discussed how to improve the speed and reliability of our Internet connection.

R&P investigated what 802.2 activity was on the backbone and created a file of Ethernet addresses related to this activity. R&P later shared this file with others involved in networking in ITD.

The Working Group distributed to all members of the Review Group a document from ITD Network Services titled "General Building Specifications for Computer Data Communications and Telephone Wiring" dated October 25, 1990. Members of the Working and Review Groups said how much

they appreciated receiving it, and that they wished they had seen it sooner.

The Working group reviewed how the existing broadband backbone architecture allows problems in one area to affect other areas. Members obtained information from ITD Network Services showing how each member's department was affected by a broadband outage in other buildings. They also reviewed the capability of the Head End to survive power failures and other problems.

The Working group was influenced by the article "Slowing the Big Bang of Computer Networking" by Glenn Ricart. That article recommends minimizing the number of supported protocols. When there is more than one supported protocol, it recommends building gateways between them.

The group generally agreed with Ricart's recommended strategy. The group instituted an experiment to test this approach and gain experience by building a gateway between printers, with the goal that anyone on the network can print on any allowed printer. The experiment so far has demonstrated printing plain text directly from a Macintosh to plain-text printers on UNIX, the IBM mainframe and a Novell LAN; and from UNIX and the IBM mainframe directly to a plain-text printer on a Novell LAN.

The group discussed making PostScript a standard for network printers. The group then experimented with distributing draft copies of the minutes using PostScript and a file server. The group discovered that PostScript documents can contain fonts embedded in them which are in a format that some PostScript previewers are unable to decode.

Unresolved network planning issues are choice of a Distributed Computing Environment; determination of what constitutes support of a protocol; and determination of what protocols to support.

Committees

R&P participated in three ITD committees: The Rate Committee, the Education and Career Development Committee, and the Technical Planning and Review Committee. R&P also attended the CCC on May 28 to discuss Campus Wide Information Systems and Bulletin Boards.

R&P attended five (5) meetings of the Rate Committee. It participated very actively in the creation of the scheme for the new rate structure.

R&P attended five (5) meetings of the ECD.

R&P has held eight (8) meetings of the TPARC.

R&P is a member of the Research Subcommittee of the Academic Computing Advisory Committee.

End-User Data Access Task Force

R&P led the EUDA Task Force in its effort to select a tool to provide better access to data by end-users. The group met twenty (20) times from July 3, 1990 to May 30, 1991. In addition, R&P and various members of the task force attended eleven (11) presentations by various vendors and users of EUDA software, including six (6) by the vendor of FOCUS. R&P represented the task force at the MPC four (4) times and at the ISAC twice.

This project delivered a number of documents: A Recommendation on the Distribution of QMF; EUDA Task Force Statement of Direction; EUDA Task Force Preliminary Report recommending a trial of FOCUS and articulating a Database Direction for Emory Computing; and an EUDA Task Force Interim Report which describes the outcome of the trial and recommends purchase of FOCUS.

The EUDA task Force project required more time and effort than R&P had anticipated, because of the number of deadlines. R&P had write, distribute, and present reports by certain dates, and had to give immediate attention to problems and issues related to the trial.

Presentations, conferences, demonstrations, vendor meetings

R&P attended at least forty (40) presentations, conferences or demonstrations: Gartner Group 8/16 (DB2, repository, EUDA), MicroDecisionware 8/30, FOCUS 9/6, Novell 9/6, SyBase 9/12, JMAIL-INBOX 9/14, PhotoLink Demo 10/3, EDUCOM 10/14-17, Networking at Savannah River Plant 11/8, SynOptics Road Show 11/26, Software AG 12/13, Ultrix connection 1/18, Sterling SW 1/23, IBM AS 1/25, Digital Edu Day 1/29, AppleTalk 2/8, Digital on Tour 2/14, HP Laser printer 2/19, Showcase video projector 2/22, OSF/DCE (AUUG) 3/4, Performance of Protocols 3/8, OSIware 3/12, Anixter & DEC FDDI 3/14, IBM Academic LAN kit 3/21, Microsoft Mail & GatorMail/M at GaTech 3/22, Digital Network Architecture 4/3, Software for Distributed computing 4/9, Mac FOCUS demo 4/17, Athena 4/29 all day, Software AG 4/30, DEC consulting 5/1, FOCUS to ISAC 5/2, IDE Case tool 5/9, Leadership, Team building & Motivation 5/15, Comdex 5/20-21, FOCUS demo to JWJ 5/23, SURAnet 5/30, FOCUS on UNIX 6/5, FOCUS EIS 6/19, SynOptics FDDI 6/28.

Meetings with vendors included lunch with Apple 9/10; lunch with DEC 9/20, 1/23; IBI 2/12.

Leadership and Consulting

R&P actively helped others on various technical matters and tried to influence people to do the right thing:

1. Helped the Business School understand what software it needed to participate in Emory's networked environment, especially with regard to TCP/IP.
2. Attended the UNIX meetings twice a month to give advice and influence what happens in the area of UNIX at Emory Computing.
3. Attended weekly Technical Services meetings.
4. Argued for distributed user support at the 1990 planning meeting.
5. Wrote a review of the Service Committee Final Report.
6. Acted as the Network Architecture police.
7. Advised Network Services and Academic Computing on solving the problem of supporting isolated LocalTalk nodes by use of a SHARED zone.
8. Advised Departmental Computing on setup of the Provost volume on JUNGLE.
9. Advised Network Services on policy and rate structure for connecting LANs to the campus network, and wrote a report describing it.
10. Advised Academic Computing on solving the problem of providing dial-in access to the campus AppleTalk network; and advised Network Services on technical issues of setting up the hardware and software (the Webster Multiprotocol Gateway) to do it.
11. Helped Network Services and Departmental Computing explain various networking issues to Ron Johnson, including why he should use 10BaseT.
12. Met with Departmental Computing, Academic Computing, Microsupport, and Network Services to explain and advise them on our PC networking strategy.

Reaffirmed use of Novell for server on PC LANs.

13. Met with Network Services to advise them on network architecture, and again to help with Ethernet planning; and met with them and others to discuss Ethernet installation priorities.
14. Participated actively in the Technical Services all day planning session on May 24, 1991.
15. Met with Departmental Computing, Network Services, and representatives from the Emory Clinic to advise them on bridging the Clinic Ethernet to the campus Ethernet. Explained what services would be available, and what they would need to access the services.
16. Met with the Department of Epidemiology, Academic Computing, Departmental Computing and Network Services to advise Epidemiology on networking issues.
17. Actively participated in three meetings to plan removal of anonymous access to the Internet.
18. Pushed for the switch to AppleTalk Phase 2. This involved two meetings, reading documentation on Phase 2, monitoring the network, and advising Network Services on various aspects of the switch of the FastPaths to support phase 2. At the same time R&P got us switched to the new version of tn3270.
19. Also helped Laura with various Mac problems; participated in MVS capacity planing; advised on setup of the Psychology zone; and participated in meetings regarding SNA plans, the Yale Multiprotocol gateway, NFS client and server in MVS, and getting rid of VM; helped Louis Leon with issues of TCP/IP and subnetting.

E-Mail Planning

The E-Mail plan was mostly created last year. The last five (5) meetings of the E-Mail Planning Working Group were mainly about getting the report in final form. The report was officially released on December 17, 1990.

Since its official release, R&P has distributed the E-Mail planning Report through the Emory Computing Publication group. We know that they sent copies to these 18 people: Gene Kirschbaum, Nursing; gwinne@joiner; Alison Hartman and TACVAGH @VM.TCS.Tulane.EDU; Arnold Robbins; Susan Duncan, Erlanger Medical Center, Chattanooga, TN; Ken Williams, Computer Services, Georgia Southern University, Statesborough, GA; Cheryl G. Murray, Centers for Disease Control, Atlanta; Bob Tilton, Oracle Corp., Atlanta; Sandra Carnes, Digital Equipment Corp., Atlanta; Bill Goolsby, Anatomy/Cell Biology, Emory; David Smallen, Hamilton College, Clinton, NY, xxq@cornellc; Gene Kirschbaum, Nursing School, Emory; FNS6DFD@KCCC; Dave Molta <MOLTA@UNTVAX>; David Molta, Director of Academic Computing, University of North Texas, Denton, TX <MOLTA@cc1.acs.unt.edu>; Alan Steiner, B. C., Canada; Don Hanley <SYSDEH@CNS.CNS.SYR.EDU> for rodan.acs.syr.edu. In addition, R&P uploaded the report to the 'rodan' server so that anyone that wants to can ftp a copy.

R&P advised Howard Rollins on selection and implementation of a freeware e-mail system by means of one meeting and many e-mail notes. He is now using Pegasus E-Mail on his Novell LAN with the Charon SMTP gateway. This software was written by a consultant in the Computing Services Centre at Otago University in New Zeland. It is available for ftp from a computer at the

university of Hawaii. Although Pegasus mail only supports PCs right now, a Mac version is said to be almost ready.

R&P is participating in the E-Mail Implementation Task Force by examining and reviewing POP clients and servers. This group has met three times so far. Although R&P has examined a number of clients and servers, it has not had time to write a thorough review.

R&P continues to look at E-Mail products as well. It has met with the vendor of OSIware about its e-mail software, which turned out to be command-oriented; obtained from Oracle a description of its progress with Oracle*Office; and on two occasions has attended discussions and demonstrations of Microsoft Mail

SURAnet Administration

As part of writing the final report for the NSF grant for the equipment to connect to SURAnet, R&P analyzed usage and performance of the SURAnet link, and got information on how people at Emory were using the Internet. That report became the basis for an *InfoTalk* article. An updated version of that report accompanies this annual report.

R&P warned that anonymous access to the Internet was frowned upon, and did the research to find out how to put access controls in the SURAnet router.

R&P helped CDC with their initiative to get an Internet connection. It also instigated a deal which would allow us to use CDC as an alternate path to the Internet.

R&P is the Administrative contact for SURAnet. In that capacity R&P

1. Monitored problems with the link to GaTech by getting our UNIX group to run monitoring software developed by Math/CS. The software writes an entry to a log file whenever the link goes up or down.
2. Interacted with SURAnet operations management concerning problems of reliability of the equipment and the link.
3. Interacted with Math/CS over the problems they experienced when the link went down due to their having a class using it to do assignments.
4. Investigated the cost and what was involved to upgrade the speed of the link to T1.
5. Made SURAnet aware that we were unhappy that T1 was so expensive, and that the connection was so unreliable.

General Planning

R&P attended ERDA and GRA meetings. R&P wrote a paragraph on scientific visualization at Emory for the GRA Infrastructure Grant Request. R&P also reviewed drafts of that request, and rewrote the first paragraph of the request to make it more clear.

R&P participated in ITD planning activities including all day Apple and MPC retreats. For the MPC retreat it presented a summary of the planning documents from other areas.

R&P provided a diagram for the AT&T grant proposal and participated in a subsequent visit by AT&T.

R&P is the SACS coordinator for Emory Computing.

Other Activities

For *InfoTalk* R&P acted as a reviewer, attending six (6) meetings. R&P also provided material that led to the article “The Internet: window to a world of information” in the March, 1991, issue.

R&P worked on a plan to connect Grady and Emory. The work involved five (5)

meetings, and writing two handouts: one showing various diagrams that illustrated the connection plan and how it would deliver desired services, and the other a document describing security issues.

R&P arranged three technical presentations, and videotaped these plus three other technical presentations: ISDN 7/12, AppleTalk 2/8, OSF/DCE (AUUG) 3/4, Digital Network Architecture 4/3, Athena 4/29, FOCUS. The tapes are available for anyone inside or outside ITD to view in case they missed the presentation or want to see it again. The effort has been helpful: At least three of the tapes have been borrowed.

R&P represented Emory Computing for the C CHALLENGE. R&P attended a meeting, met with the director, reviewed materials, and wrote a letter which was sent to many staff areas.

HIGH-LIGHTS

1. Success of the EUDA Task Force in selecting a product which has the potential to radically change for the better the accessibility of information and the way we use it at Emory.
2. Publishing and distributing an E-Mail Planning Report which has received good reviews both from within Emory and from outside Emory.
3. Getting Network Services to switch the FastPaths to AppleTalk phase 2, and in particular, swapping the one in Math/CS for one that supports Phase 2.
4. Elimination of dial-in anonymous access to the Internet, and getting a plan in place to eliminate all anonymous access to the Internet.
5. Making progress in the Network Planning Group which included: agreement that we should have a distributed file system and provide gateways between supported protocols and formats; and a description by Network Services of its plan to migrate to FDDI.
6. Successful negotiation of the use of CDC's Internet connection as a backup Internet link.
7. Success in developing analytical techniques that can show usage of the Data Center Ethernet and usage of our Internet link.
8. Successful use of the Sniffer network analyzer to discover information. We discovered interesting things about the use of the network by FOCUS. In particular, we documented a bug they did not know they had. We also discovered that the IBM TCP/IP was not properly configured, and was bouncing all its traffic, even internal traffic, off the Proteon gateway.

LOW-LIGHTS

1. Lack of progress in actually writing a Network Plan.
2. Lack of progress in getting Operating System Support to fix a long-standing e-mail problem on VMS.
3. Lack of progress in getting Operating System Support to upgrade the VMS AppleTalk server to Phase 2.
4. Lack of progress in getting the SURAnet link upgraded to T1.
5. Small amount of progress in getting the e-mail plan implemented.
6. Lack of progress in identifying an e-mail product to recommend.

CONCERNS

Network Monitoring

I do not see any systems in place to allow us to monitor growth in use and reliability of

various network facilities, such as the Data Center Ethernet or the SURAnet link. Operations creates a monthly report which tracks how things are going on the IBM mainframe and other host systems, but there is nothing that month-by-month shows how usage of the networks changes or tracks the reliability of the Internet link.

There is cause for concern. Both Internet usage and usage of the Data Center Ethernet appear to have grown dramatically. Note that much of the traffic on the backbone flows to hosts at the Data Center and appears on the Data Center Ethernet. Internet traffic also appears on this Ethernet. Traffic to the Data Center Ethernet will only increase as we connect Ethernets to the backbone and as we switch from 7171's to the Yale Multiprotocol Gateway.

While this situation needs further analysis, I feel I need to sound the alarm that the responsiveness of the Data Center Ethernet will probably degrade noticeably over the next year. That degradation will also affect responsiveness of the Internet link, even if that link is upgraded to T1. We need to plan now to do something about it.

Class Use of Internet

Math/CS has scheduled at least one course every semester for the next two years that requires a fast and reliable Internet link for assignments in the course. Yet they have not written to us or met with us to make us aware of their support needs in this area. I do not think we have any real awareness of their intent, nor do we have procedures in place to support use by a class.

Information Access and Ease of Use

I do not see us doing as good a job as I would like to see of making access to electronic information resources easy, and of educating the Emory community on the existence of these resources and how to get to them. People in the FITC and especially the Woodruff Library seem much more interested in doing this, and much more successful at it than Emory Computing. We should consider increasing the Library's involvement in creating documentation and instruction on access to information resources that are located both inside and outside Emory.

GOALS

The long term goals of Research and Planning are to lead selected planning and research efforts related to campus-wide issues as required, act as a technical consultant to other areas, publish reports describing its efforts, and provide leadership.

The following are more immediate goals and how progress will be assessed.

1990-1991

1. Create a Network Plan. Assess by milestones met and unmet, and issues resolved and unresolved.
2. Find a way to provide End User Data Access. Assess by milestones met and unmet, and existence of report and a recommendation.
3. Lead the Technical Planning and Review Committee in promulgation of plans and reviews of technical issues. Assess by availability of plans, existence of reviews, and milestones met and unmet toward creation of a way to promulgate plans.
4. Get the Internet link upgraded to T1. Assess by milestones met and unmet, and whether or not it is in production running at T1.
5. Get more reliable connectivity to the Internet. Assess by milestones met and unmet, number of situations that could cause connectivity failure, the number of single points of failure, and existence of a

written plan on what to do in case of failure.

6. Get us switched completely to AppleTalk phase 2. Assess by number of nodes switched and remaining to switch.

1991-1992

1. Publish a Network Plan. Progress will be assessed as in 1990 above.
2. Lead the Technical Planning and Review Committee in promulgation of plans and reviews of technical issues. In particular, review the RFP for a new library system, the plan for data element descriptors, and the design of the security database. Progress will be assessed as in 1990 above.
3. Get the Internet link upgraded to T1. Progress will be assessed as in 1990 above.
4. Get more reliable connectivity to the Internet. Progress will be assessed as in 1990 above.
5. Implement an EIS showing the state of the network. Assess by milestones met and unmet, and whether or not it is in production.
6. Get us switched completely to AppleTalk phase 2. Progress will be assessed as in 1990 above.

PROGRESS

1. Network Planning progress is detailed in the section on Network Planning.
2. The EUDA Task Force wrote a report recommending FOCUS. Negotiation of the contract is underway.
3. The TPARC wrote a review of the recommendation to get FOCUS. It has obtained copies of existing planning documents for all areas of ITD. It has written an initial draft of a design for a database of planning document so as to make the documents available internally.
4. The effort to get T1 has met these milestones: Report showing nature of current and projected usage and need for the upgrade; research results from Math/CS showing that upgrade will suffice; determination of total cost and needed equipment. Rates have changed, so the plan will have to be redone.
5. The effort to get a more reliable Internet connection has met these milestones: agreement by CDC to connect to the Internet; agreement by CDC and Emory to connect their Ethernets and provide an alternate path to each other; receipt by Emory of purchase order from CDC to connect the Ethernets; submission by CDC of purchase orders to vendors for equipment to connect to the Internet; determination of the redundancy provided by this approach; establishment of a way to monitor reliability of the connection.
6. The switch to AppleTalk Phase 2 has met these milestones: Emory Computing staff have been educated on the benefits and need to switch to Phase 2; all FastPaths and GatorBoxes now support Phase 2 in transition mode; the Sociology Novell server is configured for Phase 2 only; the Math/CS FastPath has been upgraded to support Phase 2. Nodes remaining to to convert are VMS VAX; Novell servers in Psychology and Departmental Computing; Ethernet-connected Macs. Then we can turn off Phase 1 support in FastPaths and GatorBoxes.

STRENGTHS

1. Analytical, organizational, and writing ability
2. Willingness to fearlessly tackle novel technical problems and situations

3. Ability to work without much supervision; self-motivated
4. Strong background in most areas of computing
5. Ability to deal with very abstract concepts
6. Unburdened by necessity to manage a staff
7. Ability to work well with others at a technical level
8. Ability to explain technical concepts clearly

WEAKNESSES

1. Desire to work in areas where progress can be made incrementally and mistakes can be easily corrected
2. Lack of staff
3. Lack of direct experience with more than one GUI, and with the elements of a distributed computing environment, such as X-windows.