

release. However, Jim rejected Jay's request for implementation of the mail forwarding function, since it represents too much work and too little payoff for SDD.

Jim helped Bruce Malasky and Jerry Morrison bring up Brownie under FTP 4.1.

Internetwork Router

Hal Murray has been in contact with Art Axelrod (WRC), who is bringing up a few new Internetwork Routers, and with John Beeley (ASD), who is about to ship some more to ASD probe sites.

Pup and OIS Communication Packages

Jim White and Yogen Dalal met with Ben Wegbreit, Doug Brotz, and Steve Butterfield on 4 January to discuss ASD's market probe Pup communication requirements. Yogen's 29 December "Pups in Pilot" memo and his 19 December "Absolute vs. Relative Host Numbers" memo address some of the issues discussed at the meeting. Initiated by CS, the meeting yielded information about the applications ASD expects to run on the D0. The question of Pup/OISCP compatibility appears to be only the first of many compatibility problems ASD will face in trying to integrate OIS products with PARC research systems.

Jim, Yogen, and Hal Murray began development of an SDD strategy for satisfying ASD's now long-term needs for D0 Pup communication. Our tentative approach is to remove the Pup Package from Pilot, rather than restructure it to conform to Pilot design principles, as initially planned. A subsequent memo by Jim will motivate this course of action.

Peter Bishop, Charles Irby, Ted Linden, and Richard Moore set forth DataTalk's requirement for multicasting in their 2 January memo entitled "The Datatalk Requirement for Multicast". Yogen responded with a 19 January memo entitled "Multicast in OISCP", which outlines one possible technical approach but which also points out a number of architectural and administrative problems that must be solved first.

Yogen continued work on his "Pup Protocols and OISCP" memo, which will discuss the differences between the existing Pup protocol family and the new OIS Communication Protocol. The memo will describe the advantages of the latter over the former in an attempt to demonstrate that the benefits of the new protocol outweigh the compatibility problem it creates.

Yogen began redesign of the OIS Communication Package's buffer allocation mechanism while Hal implemented a first-cut IOCB-format D0 Ethernet driver, by means of which CS' D0 EM is already forwarding packets from one Ethernet to another. With Dave Boggs (PARC), Hal is also working on an automatic boot file distribution mechanism.

OIS Hardware

Jim White and Yogen Dalal attended Network Analysis Corporation's 16 January El Segundo presentation to XBS Planning. NAC just completed a several-month analysis of various local networking technologies, including the Xerox Wire. Jim, Yogen, and Ron Crane also discussed with Phil Arst on 17 January the feasibility and implications of marketing the Xerox Wire as a product.

Hal Murray worked with Roy Ogus and Ron Crane on the Ethernet and Xerox Wire boards, microcode, and test program. The Ethernet board is largely working, although a few too many packets are missed and an occasional bad packet arrives looking good. The Xerox Wire board, on the other hand, suffers from more basic problems, missing far too many packets. Hal's test program drives up to three Ethernet or Xerox Wire boards, sending and receiving on any combination of them.

The frequency with which CS' D0 EM is broken by static electricity has been significantly reduced by replacement of the keyboard. However, the machine is still susceptible to an occasional crash,

especially when the umbilical is connected.

The six Ethernet transceivers and cables ordered through SD Support on 29 November arrived.

Gateway Functions

Gateway Facility

Larry Garlick described the Gateway Facility to Palo Alto and El Segundo SDD personnel in January 9 and 17 Crosstalks, respectively.

While in El Segundo, Larry and Victor Schwartz met with Steven Abraham, Dan DeSantis, and Jim Reiley (PS) to discuss the Gateway Facility and its usage in Star. The results of the meeting are summarized in Steven's 18 January memo entitled "Minutes From Meeting on Gateway Software and Star" and in Larry's 24 January memo entitled "Addendum to Minutes From Meeting on Gateway Software and Star". Larry points out some possible problems in the Star user model in his 19 January memo entitled "Comments on Star User Interface to Communicating Foreign Devices".

The El Segundo meeting revealed that the Gateway Facility will be without clients for at least six more months. The full burden of testing and exercising that software, therefore, will necessarily fall upon Communication Software, while Product Software forfeits important early experience with gateway functions and foreign devices. This is a potential problem area. Consistent with this fact, however, formal release of Version 2.0 of the *Gateway Software Functional Specification*, originally slated for this month, will be deferred until later in the Teak development cycle. Both the *Gateway Software Functional Specification* and the *Gateway Design Specification* are currently being circulated for review within Gateway Functions. The latter will include as an appendix Sarah-Ann's description of the otherwise undocumented Xerox 800 idiosyncrasies discovered during the debugging process.

Victor responded to Linda Bergsteinsson's December progress report with a reminder that Communication Software is eager to learn of specific Star EDP requirements. At present, we have no direction from planning in this area.

Larry critiqued the ISO/TC97/SC16 report on Open Systems Interconnection, which attempts to define a comprehensive model for distributed systems. CS will look further at this and related documents as part of its ongoing international communication standards activities.

RS232C Channel

Victor Schwartz and Bill Danielson approached convergence on a set of changes that will make the channel interface sufficiently flexible to handle all planned microcode variants, as well as reasonable hardware changes. Sarah-Ann Bishop modified the X800 Driver to reflect the changes, enabling Victor and Bill to begin testing the new microcode on the D0. The RS232CTest program developed by Larry Garlick and for which Victor has now assumed responsibility is also being modified to track the changes. In addition, the Xerox 800 checksum machinery is now working properly and the X800 Driver's receive function has been designed and partially coded.

Victor has had a number of useful interactions this month with Bob Bell (ASD), who is attempting to implement the RS232C Channel interface on CommProc hardware to support full BSC, including transparent data. Not surprisingly, Bob has found our current implementation, which provides Xerox 800 support only, deficient in a number of respects. Victor and Bob are therefore negotiating changes to the interface so as to both accommodate ASD's needs and maintain (as far as possible) a single standard interface.

Victor succeeded in transferring files between the IBM System 6 and the IBM CMC II in both directions, mastering the art of printing and reading the CE communications log on the System 6 disk in the process. The log revealed that the machine had been improperly installed and a fix by

IBM enabled data transfers to proceed. Bill set up the CMC II's send and receive magnetic card decks in preparation for the experiment. Meanwhile, Larry and Sarah-Ann worked to resolve problems encountered while sending to the Xerox 800. As a result, monitoring and logging code was added to the Framer and the Gateway Transducer.

RS-232-C Microcode

Bill Danielson began looking into methods by which the various RS-232-C microcode variants might be loaded as needed at run-time. The whole area of dynamic microcode loading remains ill-defined; Bill and Victor Schwartz plan to meet with Carol Hankins on this subject before she departs.

Bill coded a bit synchronous microcode variant and tested it in simple loopback mode with a microcode driver. The synchronous microcode variants require external clocking, but a timer bug makes using such clocking difficult. Although Chuck Thacker has fixed the bug on one D0, that machine will not run the currently available microcode versions for other reasons. Chuck indicates that a new PROM must be blown and Bill has formally requested, through Robert Kierr, that this be done. Synchronous microcode variants cannot be tested through a modem until this work is performed.

Gateway Hardware

Victor Schwartz and Bill Danielson helped supply Bob Belleville with the information required to develop the D0 MIOC board, contributing a requirements specification for the board's gateway (that is, RS-232-C and RS-366) hardware. The entire MIOC specification, which includes Communication Software's input, is filed on [Iris]<Schwartz>RSpecMIOC.Bravo.

We still await installation, in Sarah-Ann Bishop's office, of the RJ-11 jack requested on 15 December. We are informed through Lee Anderson that its installation is imminent. Meanwhile, our Xerox 800 testing efforts are hampered.

A Xerox 850 was ordered on 5 January.

Next Month

Sarah-Ann Bishop

1. Complete coding and start debugging the X800 Driver receive function.
2. Complete the Protocol Driver Documentation (with X800 specifics).
3. Begin designing and coding gateway stream test programs for the Xerox 800.
4. Complete debugging the X800 Protocol Driver.

Yogen Dalal

1. Complete memos currently in progress.
2. Obtain a set of baseline Pilot 2.0 performance measurements.
3. Attempt to resolve the network numbers issue.
4. With Hal, work out a first cut reorganization of the Pilot communication code.
5. Work on the *OIS Distributed System Architecture Specification*.
6. Make a first cut at the papers for SIGOPS.

Bill Danielson

1. Convert RS-232-C microcode to microcode version 2.1b.
2. Try to put together an interim, *ad hoc* microcode loader.
3. Meet with Carol Hankins before she departs.

Larry Garlick

1. Test file transfer to and from the Xerox 800 mag tape via an Alto.
2. Start integrating the RS232C Manager and OIS Transporter into Pilot.
3. Submit *Star Functional Specification* CRs re CFD property sheet parameters.
4. Reevaluate error handling and logging in Gateway Software.

Hal Murray

1. Continue beating on the D0 and the Xerox Wire.
2. Produce a Nova/Alto Gateway package with automatic boot file distribution.
3. Begin converting the Pup Package to Mesa 5.0.
4. Complete planning for the next 4-6 months.

Victor Schwartz

1. Resolve (modem?) problems relating to Alto/D0-to-Xerox 800 test program.
2. Add missing features (e.g., break) to asynchronous channel implementation.
3. Complete design and implementation of RS232C Channel interface changes.
4. Add bit-synchronous support to RS232C Channel.
5. Expand RS232CTest to include bit-synchronous testing.
6. Continue involvement in Pilot/Teak planning activities.

Jim White

1. Further refine task list and work schedules for Teak.
2. Prepare group work plans.
3. Chair princops I/O interface working group.
4. Help prepare the annual SDD technical review for XBS management.
5. Prepare a memo motivating our decision to depilotize the Pup Package.
6. Convert FIP 4.1 to Mesa 5.0 as an alpha tester.
7. Beat the bushes for Arpanet aces.
8. If possible, resume work on the *RPCP Functional Specification*.

c: SDD/SS/CS