

Jim White consulted with Jay Israel (PARC) regarding his FTP-based Juniper mail server, with Mike Schroeder and Roy Levin (PARC) regarding proposed minor changes to FTP for the next Laurel release, with Steven Abraham regarding use of FTP for dumping and loading the Star file system to and from an IFS, and with Jerry Morrison and Bruce Malasky regarding what proved to be an FTP-related Brownie bug. Hal consulted with Tony Frederico (WRC) regarding the use of mini-Ethernets in copiers.

D0 Software

Hal Murray and Yogen Dalal began reorganization for Pilot 3.0 of the Pup and OIS Communication Packages. Yogen also measured the performance of the existing Pilot 2.0 Pup and OISCP software. This data will serve as a baseline for comparison with subsequent versions of the software, beginning with Pilot 3.0. Using the officially released microcode, with the display on, and sending to an Alto, the following net throughputs in kilobits per second were measured:

	<i>Checksums On</i>		<i>Checksums Off</i>	
	Socket	Stream	Socket	Stream
Pup	102	74	409	144
OISCP	81	45	210	87

With Roy Ogus, Hal continued to exercise the D0 Xerox Wire board. With the display task completely disabled, most packets are transmitted and received successfully. In the absence of scatter/gather and buffer dispatch index capabilities, however, things work much better. This fact raises the important question of whether these features should be mandatory for all OIS processors, made optional, or abandoned entirely. Yogen, Hal, Roy, and Dave Boggs are exploring this question.

Hal has written a D0 Ethernet driver that uses Roy Ogus's IOCB microcode, and has installed it in a D0 version of the Pup Internetwork Router.

Remote Procedure Call Package

Product Software successfully integrated RPCP with Star on 1 February. RPCP's Mesa data structure serialization and deserialization primitives are now in use by Star filing and printing software. Jim White worked only briefly on the *RPCP Functional Specification*. This effort is suffering because of the demands placed on Jim's time by planning and, more recently, IOCS.

Gateway Functions

RS232C Hardware

A new PROM has been installed in CIOS' D0 EM, enabling the testing of synchronous microcode on the D0 to proceed.

Hans Scharmann released an updated version of the *MIOC Requirements Specification*, which fairly accurately reflects the input of Victor Schwartz and Bill Danielson.

RS232C Microcode

Bill Danielson completed initial (loop-back) testing of both asynchronous and byte-synchronous RS232C microcode variants, which he integrated with the 2.1b microcode release. Bill also wrote Mesa code that simulates those variants, enabling testing of Gateway software to proceed on the Alto. The testing of bit-synchronous microcode has been deferred as a result of the Teak Hearings.

Bill Danielson replied to Bill Lynch's request for a summary of resources required by the RS232C microcode, which consumes 1.5 pages, 2 tasks, 32 registers, and 5 timers. Bill and Victor Schwartz met with Carol Hankins before her departure, and Carol promised to include these resource requirements in her farewell memo. Victor also ran an experiment for Bill Lynch to compare

processor bandwidth utilization for CRC computation in Mesa and microcode.

RS232C Channel

On 16 February, Victor Schwartz submitted to Project Coordination for approval a draft of the RS232C chapter of the *Pilot 3.0 Functional Specification*. It reflects a great deal of interchange with Leo Nikora, Bob Bell, and Bob Beeley (ASD).

Both the Alto and D0 (Alto-emulation) versions of the RS232C Channel have been upgraded to conform to this interface, and have successfully run the appropriately-upgraded loop-back test in both asynchronous and byte-synchronous modes. The Channel software required to support the bit-synchronous mode of operation is coded but untested.

Note that, consistent with the outcome of the Teak Hearings, byte-synchronous support (for example, for the System 6) is receiving priority over bit-synchronous support (for example, for OIS communication via phone lines).

BSC Driver and Framer

Sarah-Ann Bishop completed the receive function of the Framer and Driver on 12 February, and Larry Garlick and Sarah-Ann began debugging it via the Xerox 800 on 16 February. Documentation of the BSC driver has been deferred to accelerate testing.

Gateway Streams

Larry Garlick and Sarah-Ann Bishop successfully transmitted files, in both directions, between an Alto and the Xerox 800 tape system. Gateway client software outputs the incoming file via the Mesa typescript, with no attempt at format conversion.

Text was successfully transferred from an Alto to the IBM System 6 diskette via a Gateway stream. New versions of the RS232C byte-synchronous microcode simulator and RS232C Channel software were provided by Bill Danielson and Victor. Sarah-Ann's BSC driver, used primarily with the Xerox 800, was slightly modified to handle the EBCDIC code set. Other Gateway software was altered to include the session and protocol descriptors that define communication with the System 6. The demonstration program, a Gateway client, was augmented to include the conversion software required to transform a Bravo file into an EBCDIC System 6 file. Implementation of other filters of this sort has been identified as a reasonable assignment for a summer student.

Larry implemented an experimental TTY-simulation Gateway stream, which is able to dial MAXCI and support an interactive session. Besides validating the soundness of the current Gateway architecture, the experiment reidentified certain performance-related changes that will eventually be required for non-frame-oriented protocols.

Miscellaneous

Tom Horsley agreed to include Gateway software among the code he coordinates for Teak.

Larry produced a new version of the *Gateway Functional Specification*, which is filed on [IRIS]<Garlick>Gateway>func2.0>GateFunc.bravo.

Integration of the RS232C Manager and OIS Transporter into Pilot has been rescheduled for March and April to better match the OISCP schedule.

A modular phone plug was installed in Sarah-Ann's office on 31 January.

Input/Output Control System

The Architecture Board created an IO Working Group consisting of Pitts Jarvis, Dave Redell, Ed Taft, and Jim White (chairman) to make recommendations regarding the nature of the *PrincOps* I/O specification. At its 22 February meeting, the Board accepted in principle the group's

recommendation that the specification be at the Mesa procedural, rather than the microcode, level. One implication of that decision is that the OIS virtual machine is implemented not only from hardware and microcode, but also from Mesa software. Jim White's 20 February memo entitled "Status Report of IO Working Group" overviews the group's position.

Pitts Jarvis continued work on the RDC software and helped install an RDC on a Palo Alto D0 EM. The RDC attached to Bags now works, and we have a spare RDC and another SA4000 on order.

With help from Pitts, John Ng worked on the interim floppy disk controller design while coming up to speed on Mesa, the D0, and the FDC hardware design specification. This work included a trip to El Segundo to meet with Jack Cameron, Ruben Loshak, and Jim Katsiroumbas.

Problems

The IOCS project is desperately short of manpower. It is unlikely that CIOS can implement the device microcode and drivers required by Teak without additional assistance from elsewhere within SDD.

The Dover that serves Building 34, along with the Alto that supports it, are scheduled for removal soon. Only prompt action by SD Support will avoid leaving the approximately ten SDDers in that building without printing services.

The severe shortage of D0 control store continues to threaten to change the architecture of the RS232C channel/microcode interface. Bill Danielson and Victor Schwartz will meet with Bill Lynch to make certain he is fully aware of all the tradeoffs involved and the extent of our studies to date. Also, no progress has been made on implementing microcode overlays.

The arc welder in the basement of Building 34 continues to render many of our Altos and our only D0 EM useless whenever it is in use.

CIOS is unhappy with Star's current model of communication with foreign devices. Gateway Functions discussed this subject with Dave Smith on 30 January, but further discussion is necessary. Both groups seem hard-pressed to find time to pursue this issue.

The *MIOC Requirements Specification* contains a disclaimer about what will be built in hardware and what will be implemented in microcode. It is unclear, therefore, how SDD can track and/or control what hardware is actually produced.

The sketchiness of the protocol documentation for both the Xerox 800 and the IBM System 6 have resulted in a number of surprises during testing.

c: SDD/SS/CIOS