<< NONAME SPECIAL >>
Network SIG Newsletter

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Membership Coordinator
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Marlboro, Massachusetts 01752

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User Requests

User Requests

This section is intended to establish communications between individual Network SIG members with common interests:

Alice Brown would like to contact people using high speed data channels and/or linking VAX, PE832, Univac and PDP 11/70. She has a requirement for handling data over a fiber-optic channel at 5 megabit/second for 2 minutes.

Alice Brown
New Technologies, Incorporated
4811 Bradford Dune, NW
Huntsville, Al 35805

Newsletter Publication Date

by Larry Kilgallen

It may just look like our semi-annual publication date is slipping again, but this time we actually felt it would be better off to send out the Network SIG newsletter just AFTER the DECUS symposium rather than just before. Information we include from the symposium is thus fresh, and we become less of a hype sheet trying to convince you to attend (in a certain sense either you are going or not, and receiving a newsletter one week before is not going to convince you). From my own point of view, we still need more newsletter material that is not directly tied to Symposia sessions. That is where YOU come in.

Symposium Summary

by Bill Brindley

The Network SIG sponsored diverse sessions in Atlanta at the Spring 1982 DECUS Symposium. Highlights from Digital included a number of sessions summarizing the functionality of Digital's Ethernet products. User contributions included: local networks, ring networks, network security, the Los Alamos National Laboratory Network, the NASA Ames Research Center Network, Network Standards, Current Network Concepts at DARPA, Distributed Data Base lock problems, and the Food and Drug Administration's Field Information System. More information follows in this newsletter.

DECnet Phase IV

by Larry Kilgallen

During the Spring DECUS Symposium in Atlanta there was not much in the way of new DEC products in the Network area. The gap was filled the following week, with the announcement of plans for Phase IV of DECnet.

Major features planned for Phase IV are:

+ Network virtual terminals (heterogeneous)

+ Network management facilities for local area networks

+ Independent support for communications servers

  1. Terminal servers (for EIA devices)

  2. Routers (DECnet networks to DECnet networks)

  3. Gateways (DECnet networks to other networks)

  The one solid item described in this sense is an "SNA gateway".

+ Ethernet link support

+ Expansion of maximum network size to 1000

But don't get your checkbook out yet; delivery dates planned for INITIAL Phase IV products are:

- VMS - Mid-1983

- RSX - Early 1984

DEC says that support for TOPS-20 and the new personal computers will be added "over the next three years". There was no word of any Phase IV software planned for RT-11, IAS, RSTS/E or TOPS-10.

In an earlier time frame than all of that, DEC says it will have its Ethernet hardware available. That might be of some help if you are the sort who likes to "roll your own" and you like DEC's hardware better than that available from independent vendors.

HARDWARE

The initial hardware offering will be for the Unibus, taking care of VAX users and the high-end PDP-11 community. If you don't bother to count cable offerings as being a product, the initial hardware will consist of:

o H4000 Tranceiver

  This is the basic physical connection to the cable, which DEC says will have a "unique non-intrusive tapping mechanism which allows adding or deleting the tranceiver to an operational Ethernet".

o DEUNA Communications Controller

  This is the Unibus device, of the DMA persuasion, which handles the address recognition, retransmission on collision and similar hardware link functions outlined in the Ethernet specification.

SNA Gateway

The DEC press release on this one says "within a year". The product (not actually a part of DECnet Phase IV) is a small PDP-11 with gateway software configurable by the user. Initial options will include:

o network management

  for control and monitoring of the gateway from "any node" in a DECnet network.

o RJE

  Submission of a job to an IBM machine as if from an SNA remote workstation. Will support IBM's JES-2 and JES-3.

o Interactive 3270 facility

  To allow a user to interact with an existing IBM application from a VT100 terminal. Will interact with applications running under IBM's IMS and CICS.

o Applications program interface

  Here the official press release says the DECnet/SNA gateway wil be able to "link the SNA application environment to the complementary environment of DECnet applications". It is described as similar to DECnet

task-to-task capability. This time, however, you get to program half of it on an IBM machine.

The initial DECnet/SNA Gateway is scheduled to provide access only from VMS, with several other DEC operating systems supported in the future.

FUTURES

In the long run, DEC says they plan to provide Ethernet repeaters, Q-bus and PC-300 Ethernet controllers, a DECnet Router, a terminal server, an X.25 Gateway and an Ethernet SNA gateway.

DEC-IBM Channel Interface Status

by Bill Brindley

SCICON of London, England has entered into a contractual agreement with DIGITAL CSS Europe to produce a DX-11 replacement device called the KDX11. As of April 16, 1982, Vic Robson of SCICON has reported to me the following status:

* Five pre-production KDX11's were produced in December 1981. 3 KDX11's were installed in a Belgium bank, 2 in December and one later. They haave worked reliably on PDP11/70's connected to IBM 303X's and a 4341 since that time. the 4th KDX11 was delivered to Digital Field Service in Belgium. The 5th KDX11 was retained by the Digital development and production laboratory for testing modifications to the firmware.

* The first batch of 10 production KDX11's have been produced and accepted in the production facility.

* The first of 6 production units are being installed in the week commencing April 19th, 1982 in the Belgium bank, initially replacing the preproduction units.

* For KDX11's connected to a PDP11 in Europe, Digital Field Service will install and maintain the KDX11 for quoted prices with spares held locally.

* 12 KDX11's are scheduled to be installed in the Belgium Bank in 1982.

* XT11 and XN11 tape and SNA emulators are driving the KDX11's under RSX-11M.

* The second customer for the KDX11 is an electrical instrument manufacturer in the UK. The Digital computer is a VAX11/780 and the IBM is a 4341. The KDX11 is scheduled for delivery in May 1982. Scicon is working on diagnostic software for the KDX11 on the VAX and it is scheduled for completion in July 1982. Digital Field Service will then be in a position to quote for installation and maintenance at the discretion of the local Field Service manager.

* Scicon is planning to submit the KDX11 for FCC approval in May 1982. If the KDX11 passes the tests then Scicon plans that the KDX11 used for testing will be shipped to the USA for sale and installation.

* Scicon's intent is that the arrangements for Field Service in the USA will be the same as those in Europe on the PDP11 and the VAX11.

* The delivery of KDX11's is currently September 1982 and thereafter of the order of 3 months.

The KDX11 IBM Channel to DEC minicomputer UNIBUS interface is a data and status transfer controller, providing communication between an I/O channel of an IBM computer and the UNIBUS of the DEC minicomputer.

The transfer rate of the KDX11 is approximately 200,000 characters per second. The KDX11 is expected to be more reliable than the DX11 and maintenance costs much lower. More than one KDX11 may be connected to a single UNIBUS.

Network SIG Sponsored Pre-Symposium Seminars

by Bill Brindley

In response to user requests for in-depth technical information we are arranging for Network SIG sponsored pre-symposium seminars. These will be one-day seminars presented on Sunday December 5, 1982. Although plans have not been completed, our current intentions are to offer the following:

- Local Area Networks
- RSX and VAX DECnet Internals
- Network Protocols

See you at the 1982 Fall DECUS.

Session Summaries

by Bill Brindley

The following is a brief description of what was presented during several sessions in Atlanta.

- At each Symposium, the Network SIG sponsors a Network Application session, consisting of a panel of users who have experience with various aspects of Networking.

  * SNA on VAX

    Tim Wise, Paramin

    An overview of the implementation of SNA/SDLC on a VAX 11/750 system. Problems/solutions encountered in the building of this prototype system; emphasis on VAX related communications issues.

  * Pronet

    Howard Salwen, Proteon Associates, Incorporated

    A local area data communication network using ring network architecture. This architecture can handle up to 255 nodes per ring. Rings may be interconnected via gateways. A special control character (token) is circulated around the ring, eliminating transmission contention while providing ordered queueing.

  * Computer Science Center Network

    J. Gregory Harris, Tektronix, Incorporated

    This network uses a layered protocol that is similar to the International Standards Organization (ISO) reference model of open systems interconnect. The computers in the network are connected via a hyperchannel processor. The transmission medium is a standard CATV coaxial cable. A portion of the network is linked over a microwave system.

  * Network Standards

    J. Allison Smart, LLNL

    This session will present a general overview of the current standards for interfacing data terminal equipment (DTE) to data communications equipment (DCE). Topics will include RS232, RS449, and the V

series (modems, leased lines) standards.

- Dr Vint Cerf of the Defense Advanced Research Projects Agency presented a session titled "Current Networking Concepts at DARPA". Packet switching concepts have been applied to a wide variety of transmission media and applications. DARPA has developed and is now deploying facilities with widely varying characteristics of operation, speed, delay and reliability. Dr Cerf reviewed the various packet switched networks that make up the DARPA internal system, along with protocols used and experiences with DEC computers and operating systems in an internet environment.

- Dale Sparks of the Los Alamos National Laboratory presented a session titled "Integration of Microcomputers Into a Network". This session discussed the evolution of the large, extremely complex Integrated Computing Network at the Los Alamos National Laboratory and the integration of minicomputers as computer-based work stations into that network. Of key concern is the specification of a work station that is not directed toward a particular manufacturer, but rather, toward software tools that are portable and that can be implemented readily on equipment from various manufacturers.

- Randy Rick presented a session titled "The Food and Drug Administration Field Information System. This session consisted of an overview of the FAA FIS followed by a technical discussion of its implementation, problems, and solutions. The FIS evolved from a punched card oriented system to a sophisticated minicomputer based distributed processing system.

- Two sessions were presented addressing issues of Network Security. The first session described an implementation of COS/NPE, a multi-level secure Network Fron End by Digital Technology Incorporated (DTI). This project is being developed for the Defense Communications Agency. This COS/NFE software runs on a special purpose operating system developed by DTI. The operating system is a formally verified security kernel.

  The second network security session discussed Network Security and DECnet. Steve Lipner of Digital discussed general network security issues. Larry Kilgallen addressed VAX DECnet specific security issues. Although invited, the official Digital RSX and VAX representatives declined to participate in this

session. They have been invited to take part in a similar security session at Fall 1982 DECUS.

Another Relevant Security Session

Although not presented by the Network SIG, there was another session at the Spring 1982 Symposium of particular interest to those concerned with Network Security. Under an umbrella category of DEC Corporate Research activities, Steve Lipner included a talk prepared by Paul Karger of his organization. The material deals with authentication between nodes of a network and how various servers can accept each other's word that requests are on behalf of a valid user.

This is theoretical talk, not something about to be bundled into a DECnet maintenance release, but it is a positive indication that some people inside DEC are considering such concerns. Other indications in Atlanta is that at least some of the DEC developers whose work touches on networks are attuned to the work of Steve's group and are experimenting with some steps in that direction.

- Jim Hart presented a session describing Digital and DECnet at the NASA Ames Research Center. NASA Ames has a comprehensive operational network consisting of more than 40 nodes. The Ames network includes a Cyber 7600 system. Ames' long-term plans include using DECnet over a satellite link to connect their various facilities.

- M. Wayne Shiveley presented a session addressing two key problems common in the use of distributed data bases: the synchronization of update transactions and the availability of the data base. Some inventory control applications were used to demonstrate the problem and potential improvement alternatives.

- The Network SIG and Digital again sponsored a suite session. This session was well attended by users and a variety of Network issues were discussed. Many of the session presenters were on hand also. This session provides an opportunity for users to discuss Network issues in depth with each other and Digital.

Network SIG Structure

by Bill Brindley

The Network SIG is experiencing SIGnificant growth both in terms of membership and technology. Currently our SIG leadership consists of:

- Chair/Symposia Coordinator: Bill Brindley
- Newsletter Editor: Larry Kilgallen
- Standards Coordinator: J. Allison Smart
- VAX/VMS Coordinator: J. Gregory Harris
- RSTS Coordinator: Randy Rick
- Digital Counterpart: Marion Dancy

We are currently looking for people to fill the following slots:

+ Local Area Networks (Broadband/Baseband) Coordinator
+ Office Automation Coordinator
+ RSX Coordinator
+ LSI-11 Coordinator
+ Public Packet Network Coordinator
+ Protocols Coordinator ????? Vs Standards, bill?
+ Communication Technology Coordinator

If you are interested in participating in the Network SIG in any of the above capacities, contact the SIG chair. Those selected for these positions will act as a focal point for their respective areas of interest and for presenting reports on current happening at the Symposia and in the Newsletter.

At the Atlanta Symposium, the Network SIG had a new designated counterpart - Marion Dancy. She was previously the VAX SIG counterpart and thus is quite familiar with the workings of DECUS. Marion provided excellent support at the Atlanta Symposium. Our thanks to previous counterpart, Mike Thurk, who did likewise during his term.

Planned SIG Activities at the Fall 1982 Symposium

by Bill Brindley

We are well into the planning stage for the Fall 1982 Symposium. The deadline for formal submissions is July 2, 1982. The basic layout of the sessions will be similar to the Spring 1982 offering. Due to the large user interested we are planning to request repeat presentations of the following user-submitted sessions:

- Integration of Microcomputers into a Network

  Dale Sparks of Los Alamos National Laboratory

- Current Networking Concepts at DARPA

  Vint Cerf of DARPA

- Digital and DECnet at NASA Ames Research Center

  Jim Hart of NASA

A Digital Network Architecture (DNA) session will be presented by Digital to detail DNA Phase IV. That Phase is scheduled to include built-in Local Area Network (Ethernet) support. Other planned sessions include:

- Hardware Communications Panel
- Introduction to Networking (not DECnet)
- Using Broadband Networks with Digital products
- Performance of Ethernet (CSMA/CD) under heavy load
- SNA Gateway
- Extended Network Error Diagnosis
- Network Security

A Network Suite session will again be offered. We are also trying to get a Network DEMO including Ethernet links.

Since the Network campground has had low usage at recent Symposia, we are discontinuing it. Users may arrange to contact Digital or Network SIG staff through the Distributed Systems/Network booth in the Exhibit Hall at the Fall 1982 Symposium.

Portable Distributed Electronic Mail

by Joseph S. Sventek

The following material was presented at the Fall 1981 DECUS symposium in Los Angeles. At the time it was anticipated that the code for this software would be available with the next release of the Software Tools Virtual Operating System software in late February or early March 1982. This tape can be obtained through your LUG (Local User Group) for your particular operating system (RSX/IAS or VMS).

Virtual Machine Concepts Applied

to

Distributed Environments:

A Portable, Distributed Electronic Mail System

Joseph S. Sventek
Computer Science & Mathematics Department
Lawrence Berkeley Laboratory
Berkeley, CA 94720

Mail System

Existing Electronic Mail Systems

- ◇ ARPANET -- one of the first
- ◇ XEROX - part of their office automation system
- ◇ UUCP - Unix to Unix copy based
- ◇ Other office automation systems ("DECMAIL")
- ◇ Other dial-up network systems

Standards

Message Format (RFC733, NIC 41952)

* Messages are lines of text (no encoded drawings, facsimile, speech or structured text)
* Menu framework - rigidly formatted message header, followed by free format message text

Example

```
Date:     Monday, 02-Nov-81 14:12:13 - PST
From:     tools at lblh
Subject:  test message
To:       wayne, j at j
cc:       j at lbl-unix

Another test message.
```


Message Transfer Protocol (SMTP - RFC788)

* based upon the establishment of full-duplex virtual circuits between cooperating SMTP modules
* establishes reliable transmission of mail over the virtual circuit
* supports multiple recipients of a single message

A mail-system consists of two independent entities:

* Mail delivery modules
  - o transfer messages to other hosts, if necessary
  - o perform local delivery
  - o return of undeliverable mail
* User interface modules
  - o compose mail
  - o read, file and manipulate received mail

One should be able to change either of these independently!

Addressing Issues

address: user at host - tells where the user is, but not how to get there

route: user at host via host1 ... via hostn - send to hostn first, then hostn-1 ... then host

Addressing schemes on other systems:

UUCP: host2!host1!host!user - left to right

New internet (proposed): user.host@domain - domains will be unique in the world.

Problems

* `host' may not be unique, whereas `host' via host1 ... is (context sensitive addresses)
* a single host may be connected to several networks, all of which address user's differently (how to gateway mail effectively)
* different interpretations of the standards dependent upon local manpower and anarchistic tradition
* hosts are not always up when mail is sent

Additional Desirable Features

* route multiplicity [if cannot use X-net to get to host, use Z-net]
* mail aliasing (mailing lists) [send to all@host]
* provisions for a simple news service [send one copy of a message which can be accessed by all interested parties]
* make inclusion of additional network support simple, as well as addition of hosts to existing networks
* provide for a high degree of host autonomy

Software Tools Mail System

Goals

* portable implementation => eliminate different level of service on different hosts
* network independence => can add new networks and hosts easily
* tailorable through file system => local autonomy
* higher level functions using mail system as a substrate (news service, remote job execution, ...)

Additional Primitives Needed

* minit - initialize IPC capabilities for this process
* sndmsg - send message to process
* rcvmsg - synchronously receive next message
* isaliv - determine if process is active
* cre8mf - same syntax as create, with additional semantics that created files have protection appropriate for mail files
* hostnm - determine the host's hostname for the given network

Assumptions made of the host

* multi-processing
* permanent file system
* some form of inter-process communication between un-related processes
* support for the Software Tools Virtual Machine

Forms of address:

```
address: addr_token
       : address via host
       : address @ host

addr_token: token
          : token at host
          : token @ host

token: username
     : >filename
     : alias
     : myself
     : tc[_topic]
     : rmtxeq
```

Form of alias in alias file:

```
alias: address [,address]* ;
```

Three levels of aliasing:

1. malias - current working directory
2. ~/malias - home directory
3. ~mail/malias - system alias file

Special features of system alias file:

* if alias? (rather than alias:), then the alias will NOT appear in the output of the users utility.
* valid address is |"command to spawn"

Delivery responsibility

If the delivery system receives the following address to deliver to

name @ host1 @ ... @ hostn

it is responsible for delivery of the message to hostn.

Implicit routing

The system manager can maintain a file ~mail/hosts, which permits implicit routing of messages to hosts. The form of the entries in this file are

dest-host routing-host network-type

Delivery System

MAILER - synchronous with requests

◇ receives mail from formatting programs (SNDMSG, NSM, UUCPTOMSG, MFLUSH, RMTXEQ, etc.)
◇ resolves system-wide aliases
◇ queues processed message to DELIVR
◇ responds to sender with status

DELIVR - asynchronous, FIFO on work queue

□ receives mail from MAILER
□ performs local delivery
□ spawns any subprocesses required by aliases
□ performs any network deliveries
□ spawns NOTIFY (if found) for on-line notification

MFLUSH - timed execution

Δ locks ~mail from access by MAILER and DELIVR
Δ reads all file names in ~mail of the form ?return.xxx and retry.xxx
Δ unlocks the directory
Δ all files of the form retry.xxx are re-submitted to DELIVR for delivery
Δ all files of the form ?return.xxx are re-formatted and submitted to MAILER for return to sender

NOTIFY - synchronous, optional, system-specific

* receives list of user names on standard input
* message sender's name is passed as the first argument to notify
* notifies logged-in users of receipt of mail as

Software Tools mail has arrived from 'name'

NSM - server process for DECnet delivery

o DECnet object number 255
o copies mail received over network link into a scratch file
o submits it to MAILER for processing

TCADD - add entry to teleconference

◇ receives message to enter on standard input
◇ argument to tcadd is tc[_topic]
◇ validates sender's write access to teleconference file
◇ encrypts message and adds it to teleconference file

RMTXEQ - remote job execution

- invoked if the following appears in ~mail/malias:

  rmtxeq: |"rmtxeq ??~mail/rmtxeq.log";

- first line of message text is command to execute. The rest of the message is fed to the command as its standard input.
- validates the verb of the command with those found in ~mail/rmtxeq.cmd
- if valid, spawns the command, capturing the standard output of the command in a file
- output is mailed to sender

Known Files

Per User

1. ~/mymail - mail from other people deposited here by DELIVR
2. ~/mbox - default place to save messages from mymail
3. ~/author.cpy - repository for mail sent to 'myself'
4. ~/malias - user-specific aliases
5. ~/dead.ltr - messages queued by SNDMSG go here

Per System

1. ~mail/address - local host user data base
2. ~mail/malias - local host system alias file
3. ~mail/hosts - host table
4. ~mail/NAME.log - log file for program NAME (MAILER, DELIVR, MFLUSH, TCADD, RMTXEQ)
5. ~mail/mflush.syn - lock file for ~mail directory
6. ~mail/?return.xxx - mail rejected by MAILER (? = m) or DELIVR (? = d) awaiting re-formatting by MFLUSH
7. ~mail/retry.xxx - network delivery to be retried
8. ~mail/rmtxeq.cmd - list of valid commands for rmtxeq
9. for each teleconference topic:
   ~mail/topic.tc - teleconference file itself
   ~mail/topic.bnd - first and last entries of teleconference
   ~mail/topic.nfo - read and/or write access lists, with help text

User-interface Modules

sndmsg - compose mail to send to other users

msg - read, file, answer and forward your mail

postmn - determine if user has mail

users - list valid users on system

tc - teleconference reading tools

resolve - query user database for information

DECUS

DECUS U.S. SPECIAL INTEREST GROUP

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1. SIG Newsletter
2. SIG Symposia Sessions
3. SIG Symposia Planning Sessions
4. DECUS Program Library Submissions Review
5. DIGITAL and ANSI X3 Standards Review

To become a member of the SIG(s) that you wish to participate in, please complete the form below and return it to:

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