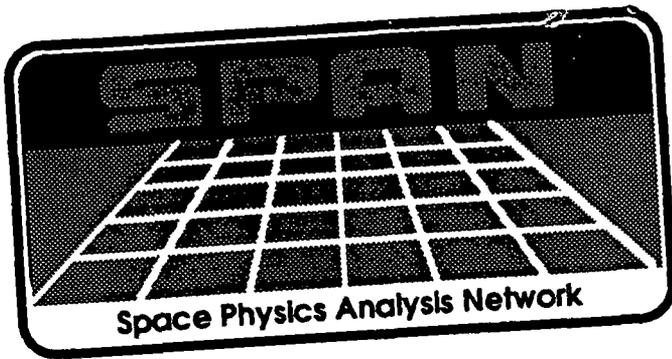


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THE SPAN COOKBOOK

A PRACTICAL GUIDE TO ACCESSING SPAN

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This document is available by sending E-Mail to
NSSDCA::REQUEST.

Please include your name and ***POSTAL*** mailing address.

An online version is available via DECnet COPY from
NSSDCA::[DOC]ACCESS.DOC or via anonymous FTP as filename
ACCESS.DOC on **NSSDCA.GSFC.NASA.GOV.**

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INTRODUCTION

This document was created to help remote users send electronic mail messages from SPAN to scientific colleagues on other computer networks and vice versa. In several instances, more than one gateway has been included for the same network. Please be sure to try all the optional gateways before calling the SPAN information office for help. Before the mail syntax examples in each section there is an introduction to the respective network. These introductions provide information about the details relating to the specific network. Also included in this document is information on file transfers and remote logins. Inquiries concerning any information contained in this document or requests for information on SPAN can be directed to:

SPAN User Support
SPAN Network Information Center
National Space Science Data Center
Code 930.2
NASA/Goddard Space Flight Center
Greenbelt, Maryland 20771

Telephone: (301) 286-7251
 FTS 888-7251

Electronic Mail:

SPAN: NCF::NETMGR or NSSDCA::NETMGR or NSSDC::NETMGR
TCP/IP INTERNET: NETMGR@NSSDCA.GSFC.NASA.GOV

NOTE: This list is current as of July 1, 1990. The information contained in the Space Physics Analysis Network On-Line Data Base System (SPAN_NIC) will always be more up-to-date (see Appendix A for information on accessing this data base system).

**DEFINITIONS EVERYONE ASSUMES YOU KNOW BUT
FORGOT TO DEFINE FOR YOU**

Listed below are the definitions of the topics covered in this document.

- SPAN:** SPAN is the Space Physics Analysis Network. This network allows scientists and researchers to obtain information from NASA and NASA related projects. SPAN is distributed throughout the United States and has a European counterpart referred to as E-SPAN (European SPAN). SPAN headquarters is located at the Goddard Space Flight Center in Greenbelt, Maryland.
- Electronic Mail:** Electronic mail is a way to communicate with other users on the same or different network. When your message reaches its destination, the remote system puts the message in the appropriate mailbox.
- File Transfers:** File transfers allow you to send a copy of one or more of your files to another person on either the same or a different network.
- Remote Login:** Remote logins allow you to establish an interactive session on a remote computer system. A valid username and password are required in order to login on the remote system.
- Node (Host):** A computer system. Most hosts support user accounts. Some hosts have the special hardware and software configurations which allow them to be gateways and act as "relays" between networks.
- Domain:** Part of a nodename. Examples are ACME.COM or GUN.PENT.MIL or NSSDCA.GSFC.NASA.GOV. In these examples ".COM" is a commercial domain, ".MIL" is a military domain within "PENT," the Pentagon and NSSDCA is a host named within the GSFC (Goddard Space Flight Center) domain, a subset of NASA which falls within the GOV (federal government) domain.
- DECnet Internet:** Collection of world-wide nodes using the DECnet protocol.
- (The, TCP/IP) Internet:** Collection of world-wide nodes using the TCP/IP series of protocols.

GATEWAYS AND THE STRUCTURE OF MAIL SYNTAXES

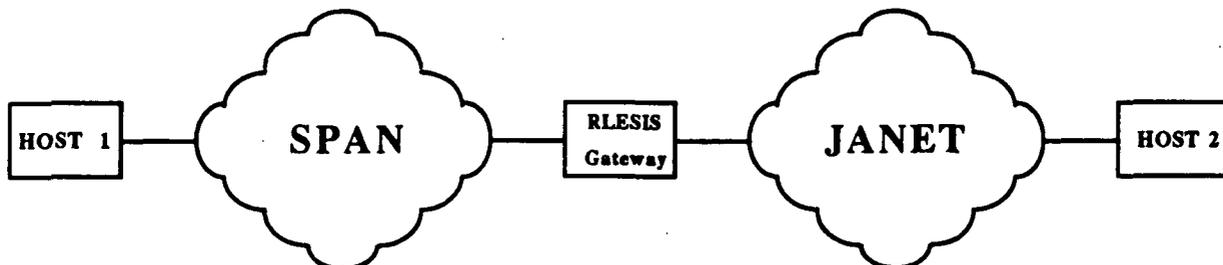
This section covers some basic ideas and information about electronic mail concerning all networks. This section addresses gateways, how gateways interconnect different networks, and how mail syntaxes are processed by the different networks. In this manual, specifics about each network will be discussed before the example syntaxes.

Sending mail to another node (host) on the DECnet Internet from SPAN is simple (see the DECnet section for specific information). The message is sent from your host machine through the SPAN network and into the recipient's host machine.



The syntax becomes more complicated when mailing to other networks because it is often necessary for the message to be "routed" through other nodes and/or networks.

If your computer is not physically connected to the computer you are sending a message to then you must "route" through other computers that are physically connected to each other. Some computer systems have hardware and software configurations which enable them to be gateways and act as "relays" between the networks to which they are connected. To be able to mail to another network you must know a gateway that is linked to more than one computer network. For example, you may want to reach JANET (Joint Academic NETWORK) from SPAN. The RLESIS gateway interconnects SPAN and JANET. There is connectivity between SPAN and the RLESIS gateway, and between the RLESIS gateway and JANET. The message is sent from your host machine via SPAN (the RLESIS Gateway) to a SPAN/JANET gateway. The RLESIS gateway routes the message via JANET to the addressee's mailbox.



GATEWAYS AND THE STRUCTURE OF MAIL SYNTAXES

Sometimes a mail message must be routed through more than one gateway if certain networks are only accessible by others. If your host does not have access to the RLEIS gateway (which it does if you are on SPAN) there needs to be another route to JANET. Both SPAN and JANET are connected to the TCP/IP Internet. To send a message from SPAN to JANET, it must first be sent from your machine via SPAN to a SPAN/TCP/IP Internet gateway (this is any SPAN system that is also known to interconnect with the TCP/IP Internet). From this gateway, the message must be routed via TCP/IP Internet to a TCP/IP Internet/JANET gateway. Finally, over JANET the message is delivered to the remote system where it is then delivered to the desired mailbox.



A message can be sent through as many gateways, nodes, and networks as necessary. In order to accomplish this task successfully you need to be aware of the different syntaxes used in each network. This includes the symbols used in the syntaxes and the direction the syntaxes are read. Some symbols are used only in certain networks while others are used for different reasons on different networks. For example, the percent sign (%) on the Internet is used to indicate another Internet node for the message to be sent to. In X.25 mail addresses the % sign is placed after the name of the mailing software used on the system. Many of the addresses are read in different orders, and when you start to combine these different networks you need to be aware of which network is read which way. Listed below are a few networks and their symbols. There are numerous networks and each has its own characteristics.

GATEWAYS AND THE STRUCTURE OF MAIL SYNTAXES

<u>NETWORK</u>	<u>DIRECTION ADDRESS IS READ</u>	<u>SYMBOL(S) USED</u>
DECNET	LEFT TO RIGHT	::
INTERNET	RIGHT TO LEFT	%@
UUCP	LEFT TO RIGHT	!

DECnet addresses are parsed from left to right and two colons are used between nodes (::). TCP/IP Internet addresses are read from the right to the left. TCP/IP Internet addresses use "%" signs and "@" signs between nodes. This is not unique to the TCP/IP Internet and seeing these symbols does not necessarily guarantee that the address is a TCP/IP Internet address. Many other networks, such as BITNET, have also adopted this syntax. UUCP (UNIX to UNIX CoPy) addresses have bangs (!) and are read from left to right.

A good example of how an address can be built is an address from SPAN to the University of Tasmania. Below is a step-by-step explanation of how the address is read by the gateways and "taken apart". Seeing how the gateways read the syntax should help you in building your own syntaxes.

To: FEDEX::"munnari!physvax.utas.oz.au!SMITH@uunet.uu.net"

The message is first sent to the machine FEDEX from your machine via SPAN. FEDEX takes its name and the quotation marks out of the address. The address is now:

To: munnari!physvax.utas.oz.au!SMITH@uunet.uu.net

The address is now sent over TCP/IP to the gateway uunet.uu.net. This gateway takes its name and the "@" out of the syntax. It then replaces the right-most % sign (if there is one) with an "@" in this case there is not a % sign. There is a bang (!) so the address is now read from left to right. The address is now:

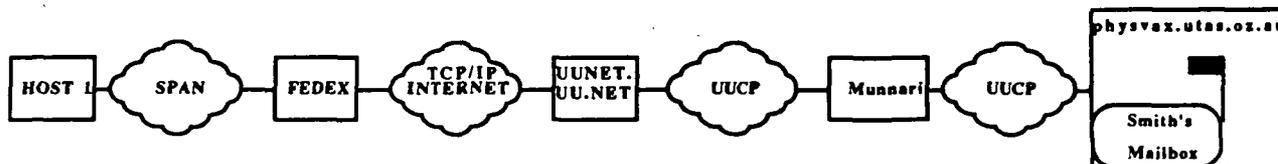
To: munnari!physvax.utas.oz.au!SMITH

The message is sent via UUNET to Munnari. Munnari receives the message, looks at what is to the right of the bang, and sends the message to this gateway or node (after deleting its own name and the bang out of the address). In this case, the remote site physvax.utas.oz.au is to the right of the bang. The message is mailed to the remote site physvax.utas.oz.au via UUCP. The address is now:

To: physvax.utas.oz.au!SMITH

GATEWAYS AND THE STRUCTURE OF MAIL SYNTAXES

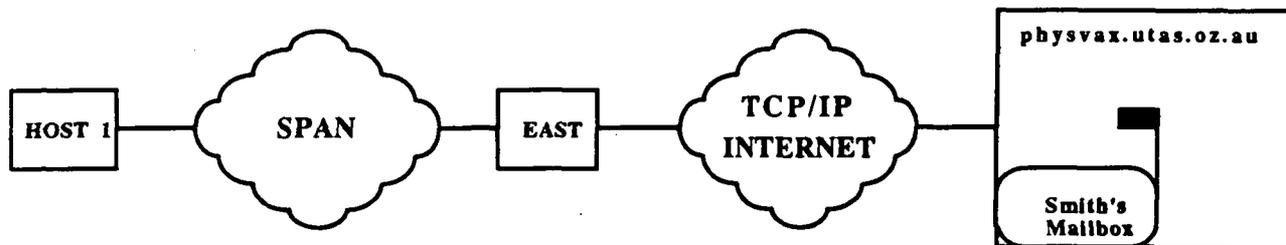
The local computer (physvax.utas.oz.au) deletes its name and bang from the address and delivers the message to the mailbox SMITH.



This is a complex syntax but it is necessary to reach the node physvax.utas.oz.au. The TCP/IP Internet is beginning to reach many of the far corners of the world. Often complicated syntaxes such as the above can be replaced with a short TCP/IP Internet address providing that you have a connection to TCP/IP Internet and the remote site has a connection to the TCP/IP Internet. For example, from SPAN, physvax.utas.oz.au can be reached via the TCP/IP Internet using the syntax:

To: EAST::"SMITH@physvax.utas.oz.au"

The message is sent to the gateway EAST via SPAN. EAST deletes its name and the quotation marks from the address and sends the message to SMITH@physvax.utas.oz.au via the TCP/IP Internet. Physvax.utas.oz.au then delivers the message to the mailbox SMITH. This syntax is much simpler and reaches the same destination as the first syntax.



For most mailings the syntaxes in this booklet will be sufficient, but you may need to contact someone who is not at one of the nodes listed in this manual. If you know which gateways connect which networks, and which direction addresses are read on the different networks you should be able to construct a valid address.

UNDELIVERABLE MAIL AND COMMON ERROR MESSAGES

Each computer system that handles a message attaches its identity to the front of the message-text. This information forms a "header block" or "mail header" and can be used to identify the path a message took to reach its final destination. In most cases the information in the mail header can be ignored. The header block is used when a message is undeliverable.

If problems are encountered the message must be returned to its sender. Since the computer system currently handling the message may not know who sent it, the header block provides the information necessary for the intermediate system to construct the proper return address. It is possible for an addressee not to receive a message from the sender and the sender not to receive an error message. This means that one of the intermediate computer systems was unable to construct a proper return address and the message has been lost in the system.

A computer system encountering a delivery error will insert into the header block a few lines of text stating the reason for return. To see what the error was you need to look at the Subject, comment, Reason for Return, or other similar heading. The next few lines of text after this heading are very important because they inform the sender of what event occurred that caused the message to be undeliverable. Before any corrective action can be taken or help given on a mail problem, it is imperative to know WHY the mail was not deliverable as originally addressed. There are a variety of reasons why a mail message may not reach its final destination. Some of these errors are under your control, such as typographical errors. Other errors may not be in your control, such as the DTE number for a node not being defined in your computer's data base.

There are two times when you can receive errors. The first is immediately after you enter in the address at the "To:" prompt. After typing the address and hitting return you may receive an error message instead of the Subj: prompt. The second type of error message is received after the mail message has been sent. Listed on the following pages are some common errors, possible reasons for these errors and ways to remedy them.

**EXAMPLES OF ERRORS RECEIVED IMMEDIATELY AFTER
TYPING THE ADDRESS AT THE TO: PROMPT**

**%MAIL-E-LOGLINK, error creating link to node _____
-SYSTEM-F-IVDEVNAM, invalid device name**

OR

**%MAIL-E-LOGLINK, error creating link to node _____
-SYSTEM-F-NOSUCHNODE, remote node is unknown**

Possible Reasons:

- Typographical error
- The node name is not defined in your computer's data base, the node name needs to be replaced by the integer address (if it is a DECnet node) or the DTE# (if it is a node on the X.25 network). See the respective sections in this manual for information on obtaining these numbers.
- This node may not exist, the name of the node may have been changed, etc. -----

**%MAIL-E-LOGLINK, error creating network link to node _____
-SYSTEM-F-UNREACHABLE, remote node is not currently reachable**

Possible Reasons:

- The node may currently be down, try to send the message later.
- If you continue to receive this message, contact your system manager or network information office to see if the node will be down for a prolonged amount of time.
- There is a possibility that the node no longer exists -----

%MAIL-E-NOSUCHUSR, no such user _____ at node _____

Possible Reasons:

- Typographical error
- Double check the user name, often first initials must be added to the last name to account for multiple users with the same last name, etc.
- The user you are trying to contact does not have an account on this node.

EXAMPLES OF ERRORS RECEIVED AFTER THE MAIL MESSAGE HAS BEEN SENT

The second type of error occurs after the mail message has been sent. If you receive a message back from a gateway (Postmaster, Mailer-Daemon) saying that your message was undeliverable, you need to look at the header block of the message from the gateway. Listed below are some common errors, reasons for these errors, and possible actions to take. Depending on which computer system sends you the error message, the message will resemble the following examples. All the headers have basically the same information: the system that encountered the error, the date, the original sender's address, and what the error was.

The most common error is an unknown host. Below is a header stating that the sent message was undeliverable because of an unknown host.

```
From: EAST::"MAILER-DAEMON" "Mail Delivery Subsystem" 29-JUN-1990 09:15:04.17
To: <nssdca::mason>
CC:
SUBJ: RETURNED MAIL: UNKNOWN HOST
```

```
----- Transcript of session follows -----
550 <Hain@ccc.nmfecc.gov.mfenet>...Host Unknown

----- Unsent message follows -----
```

The host, or computer that the user Hain has an account on, "ccc", was unknown in this mail message. When the gateway East received this message it was not able to send the message onto the remote computer ccc.nmfecc.gov.mfenet, therefore it returned an error message to the original sender, Mason.

Possible Reasons:

- Typographical error
- Part of the domain (nmfecc.gov.mfenet) is possibly incorrect. CCC may exist but the domain has been mistyped or is incorrect, etc.
- The host does not exist, has been renamed, or replaced
- If you are mailing to JANET you must have the host and domain names in the correct order for the GATEWAYS you are sending the message through. See the JANET section in this manual for the correct domain orders to use when mailing.

Mail messages can be returned within minutes, hours, or days depending on which gateway the message is sent through and how this gateway is setup to handle error messages. Some gateways will try to send your message for days. When the message becomes "too old" or the message stays at the gateway for a certain number of days it will send an error message. The fol

lowing message was sent to the same person as the above example, but through a different gateway. This gateway attempted to send the message for 5 days before mailing an "unknown host" error message back to the original sender.

From: SMTP%"Postmaster" 17-JUN-1990 15:48:27.60
To: <MASON>
CC:
SUBJ: UNDELIVERABLE MAIL

Date: Sun, 17 Jun 1990 15:48:22 EDT
From: Postmaster@NSSDCA.GSFC.NASA.GOV
Subj: Undeliverable Mail
To: <MASON>
Comment: Bad address--<Hain%ccc.MFENET@nmfecc.arpa>

Comment: Message too old: %MULTINET-F-EHOSTUNREACH, No route to host

Start of returned message

Date: Wed, 13 Jun 1990 15:19:29 EDT

Unknown host is the most common error encountered by gateways. You may also receive a "mailbox is incorrect" error meaning that the username is incorrect. You may also receive strange errors such as infinite loops. If your mail message is returned, try the above suggestions. If you continue to have problems contact your network information office.

INTRODUCTION TO THE DECNET INTERNET

The DECnet Internet is based on a protocol developed by The Digital Equipment Corporation (DEC). This widely used network is composed of other networks that use the DECnet protocol.

NETWORKS USING THE DECNET PROTOCOL

US-SPAN (United States Space Physics Analysis Network)
E-SPAN (European SPAN)
E-HEPnet (European High Energy Physics network)
THEnet (Texas Higher Educational network)
UARS (Upper Atmosphere Research Satellite network)
ESnet/DECnet (Formerly the U.S. High Energy Physics network)
GEOnet (United States Geological Survey Network)

It is very simple to mail to another person who is on a computer that is physically connected to your computer.

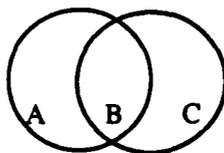
MAIL> SEND
TO: NODE::USER

If you want to send a message to the user NETMGR on node NSSDCA (on SPAN) you first need to be in the mail utility. At the mail prompt (MAIL>) type send. Next it is necessary to know what node (computer) the person has an account on. At the "To:" prompt type node::user.

TO: NSSDCA::NETMGR

This is a direct address because you are sending a message to a computer that is transparently linked to your machine. This is not always the case. You may want to send a message to a person whose machine is not actually joined to yours.

POOR MAN'S ROUTING:



If you are on machine A and want to reach machine C, which is not actually linked to A, there must be a machine B in the middle which is physically connected to A and C. This is called "Poor Man's Routing" (Or P.M.R.), you are "routing" through B to reach C. You can route through as many nodes as necessary to reach your destination. Each time you route through a different machine you type two colons (::). To mail a message to user PETERS on node C from node A you would type:

To: B::C::PETERS

So far names have been used for the nodes. This is for the convenience of the users. The routing computers need a number for the node. When the node name is entered, the computer searches a database. If the name is present the computer takes the corresponding number and replaces the node name with this number. The mail message is then sent. If the node name has not been defined in the data base you will receive an error message. This does not necessarily mean that the node does not exist; the computer just does not recognize the name.

To cure this problem, the numerical equivalent for the node can be calculated. The nodes on the DECnet Internet are arranged in 63 areas. Each area can have up to 1023 nodes. Areas 1 through 46 are DECnet Internet unique areas. In areas 1 through 46 only one machine is allowed per node number. For example, 6.1001, 32.45, and 21.695 are all uniquely assigned; one node number for one computer.

Areas 47 through 63 are referred to as hidden areas. There may be duplicate areas. For example, there can be an area 53 in California and a separate area 53 at a university in Iowa. With duplicate areas, consequently you will have duplicate node numbers. For example, if there is an area 53 in California and a separate area 53 at a university in Iowa there may be two machines with the address 53.808. Duplicate node numbers can occur with any of the hidden areas. Which of the machines, if any, you can connect to is determined by your initial position within the DECnet Internet.

Despite what area the host is in, the same process is used to compute the numerical equivalent for the node. Let's say that you receive an unknown host error for node B. You know that node B is in area 15 and its node number is 180. This is the node's address and is written as 15.180. To compute the numerical equivalent, first take the area and multiply it by 1024 and then add the node number.

USER PETERS ON NODE "B":	B::PETERS
NODE B IS IN:	AREA 15 AND IS HAS THE NODE NUMBER 180
NODE Bs ADDRESS:	15.180
NUMERICAL EQUIVALENT:	(15*1024)+180=15540
USE THIS ADDRESS NOW:	15540::PETERS

Now instead of typing B::Peters you would type the numerical equivalent to B, 15540. If the message needed to be routed through node C to reach Peters, its numerical equivalent would have to be calculated also. This process requires a knowledge of the area and node number. If you do not know this information you should contact your network information office for assistance.

TRANSPARENT DECNET INTERNET SYNTAXES

SPAN-to-HEPNET

HEPNET is reachable in DECnet areas 41, 42, 43, and others

SPAN-to-DAN

DAN is reachable in DECnet area 18

SPAN-to-THENET

To: UTSPAN::UTADNX::hostname::username

THENET-to-SPAN

To: UTADNX::UTSPAN::hostname::username

EXAMPLE

To send a mail message to the user Tracy at the host "thenic" on THENET, the following syntax would be used:

To: UTSPAN::thenic::tracy

SPAN-to-UARS

PRIMARY:

To: NSSDCA::hostname::username

SECONDARY:

To: VIRGO::hostname::username

To: SPRLJ::hostname::username

UARS-to-SPAN

PRIMARY:

To: NSSDCA::hostname::username

SECONDARY:

To: VIRGO::hostname::username

To: SPRLJ::hostname::username

EXAMPLE

To send a message to user Germain on UARS, using the Primary gateway (CDHF1), the following address would be used:

To: NSSDCA::cdhf1::Germain

TRANSPARENT DECNET INTERNET SYNTAXES

SPAN-to-SDSC (San Diego Supercomputer Center)

To: SDSC::"username@hostname"

SDSC-to-SPAN

To: username@hostname.SPAN

INTRODUCTION TO THE TCP/IP INTERNET

Internet has become one of the most widely used networks and continues to grow daily. There are many internetworks (with a lower case i) but only one Internet (with a capital I).

An internetwork can refer to any number of linked nodes that use the same protocol. Internet is a specific network based on the TCP/IP protocol (Transmission Control Protocol/Internet Protocol) and is often referred to as the TCP/IP Internet.

Some of the Networks Comprising the Internet

NSFnet	(National Science Foundation network)
ESnet	(Formerly the High Energy Physics network)
MIL	(Defense Data Network)
NSN	(NASA Science Network)
CICNet	(Committee on Institutional Cooperation Network)
MIDnet	(Regional Network in the MidWestern United States)
SURAnet	(Southeastern Universities Research Association network)
NSI	(NASA Science Internet-TCP/IP)

The basic mail syntax to reach Internet from SPAN is:

To: NODE::"USER@HOST.DOMAIN"

The node must be a gateway that interconnects DECnet and the Internet. There are many nodes that can be used to reach the Internet from SPAN (see the INTERNET MAIL SYNTAX SECTION).

If the message needs to be sent through more than one host on the TCP/IP Internet a syntax similar to the one below would be used:

To: NODE::"USER%HOST.DOMAIN%HOSTC@HOSTB"

When a message is sent to a host directly, the "@" sign is placed between the users name and the name of the host the user has an account on. The "@" sign tells the TCP/IP Internet gateway to send the message to the host that is to the right of the "@" sign. If the message needs to be sent through more than one TCP/IP host, the "@" sign should be placed to the left of the FIRST host the message is sent to. This is always the host on the far right of the syntax because TCP/IP Internet addresses are read from right to left. NOTE: IF THE ADDRESS INCLUDES GATEWAYS OTHER THAN THE TCP/IP INTERNET, THE "@" SIGN IS PLACED TO THE LEFT OF THE RIGHT-MOST TCP/IP INTERNET HOST. All the hosts after the first should have a "%" sign placed to the left of their host names, as shown in the example above.

With the previous example, the message is first sent to the node "NODE." This node takes its name and the quotation marks out of the address. TCP/IP Internet addresses are read from right to left therefore the node sends the message to the host at the far right of the syntax. In this case the mail would be sent to HostB. HostB now takes its name out of the address and replaces the right-most "%" sign with an "@" sign. The "@" sign tells the node to send the message on to the next node. The mail is now sent to HostC. HostC also removes its name from the address and replaces the right-most "%" sign with an "@" sign. The mail message is then sent to host.domain which puts the message in the user's mailbox.

The TCP/IP Internet uses a domain naming system. The domain names are added after the host name. On the TCP/IP Internet, the name of the node is the host and domain names combined. With the following example, NSSDCA.GSFC.NASA.GOV is the entire name of the node. Domains use a hierarchical naming scheme. In the United States the domains start with the more specific and important information on the left to the higher order domain (or more general) on the right. For instance in the address:

"JONES@NSSDCA.GSFC.NASA.GOV"

NSSDCA is the host (or computer) that the user JONES has an account on. The next part is the domain. GSFC (Goddard Space Flight Center) is in NASA which is in the U.S. Federal Government. Domain names are used for the convenience of the user. The numerical equivalent of the host and domain name is referred to as the IP address. If you receive unknown host error messages you need to replace the domain name with the ip address. Contact your network information office if you need help in finding the ip address.

Many hosts on the DECnet Internet are also hosts on the TCP/IP Internet. Users on those hosts can send mail directly to TCP/IP Internet hosts using a local TCP/IP mailer. The exact syntax will vary depending on the type of TCP/IP mailer software used on your system. See your local system manager for details. Some examples, using user JONES as above are:

To: SMTP % "Jones@nssdca.gsfc.nasa.gov"
To: EXOS % "Jones@nssdca.gsfc.nasa.gov"
To: WINS % "Jones@nssdca.gsfc.nasa.gov"

FILE TRANSFERS

It is possible to transfer files from a TCP/IP Internet machine to your local VMS/SPAN machine, transfer files from your VMS/SPAN machine to a TCP/IP Internet machine, and to transfer files from a TCP/IP Internet machine to a remote VMS/SPAN machine using the EAST gateway. For more information on these transfers and binary file transfers see Appendix B in this manual (page B-4).

REMOTE LOGINS

You can establish an interactive session on a remote VMS/SPAN machine from a TCP/IP Internet machine and you can also login into a TCP/IP Internet machine from a VMS/SPAN machine. For more information on remote logins see Appendix B in this manual (page B-7).

INTERNET MAIL SYNTAXES

SPAN-TO-INTERNET

PRIMARY:

To: EAST::"user@host.domain"

SECONDARY:

To: NSSDCA::SMTP%"user@host.domain"

To: DFTNIC::SMTP%"user@host.domain"

To: AMES::"user@host.domain"

To: WITCH::"user@host.domain"

To: NSFGW::"user@host.domain"

Example:

To send to user Posinski at host UVAX and domain University.edu, using the primary gateway, you would type the following:

To: EAST::"Posinski@uvax.university.edu"

INTERNET-TO-SPAN

PRIMARY:

To: user@host.DNET.NASA.GOV

SECONDARY:

To: user%host.DNET@EAST.GSFC.NASA.GOV

To: user@host.SPAN.NASA.GOV

To: user%host.SPAN@AMES.ARC.NASA.GOV

To: user%host.SPAN@WITCH.JPL.NASA.GOV

To: user%host.SPAN@LONGS.UCAR.EDU

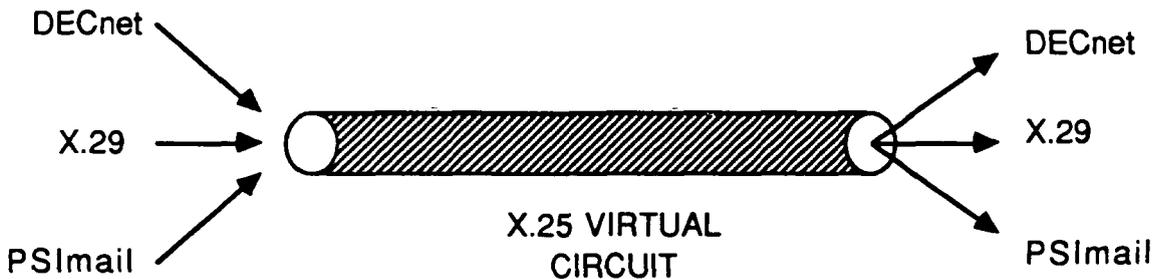
Example:

To send to user NETMGR at host NSSDCA on SPAN, using the primary gateway, the following syntax would be used:

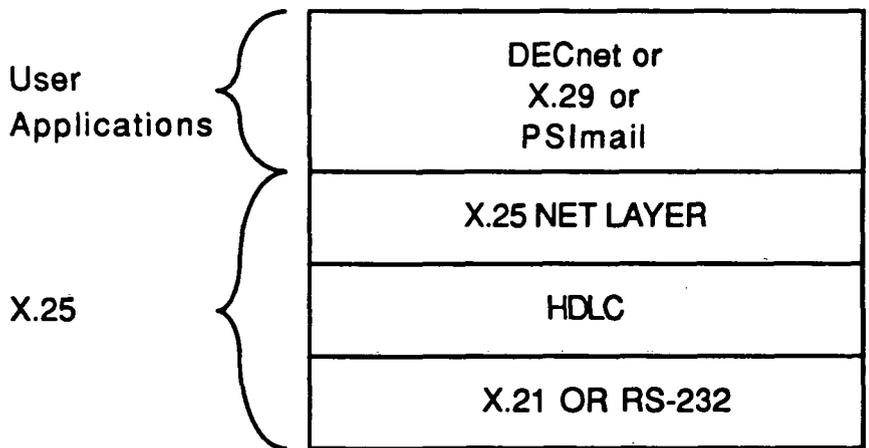
To: netmgr@nssdca.dnet.nasa.gov

INTRODUCTION TO THE X.25 NETWORK

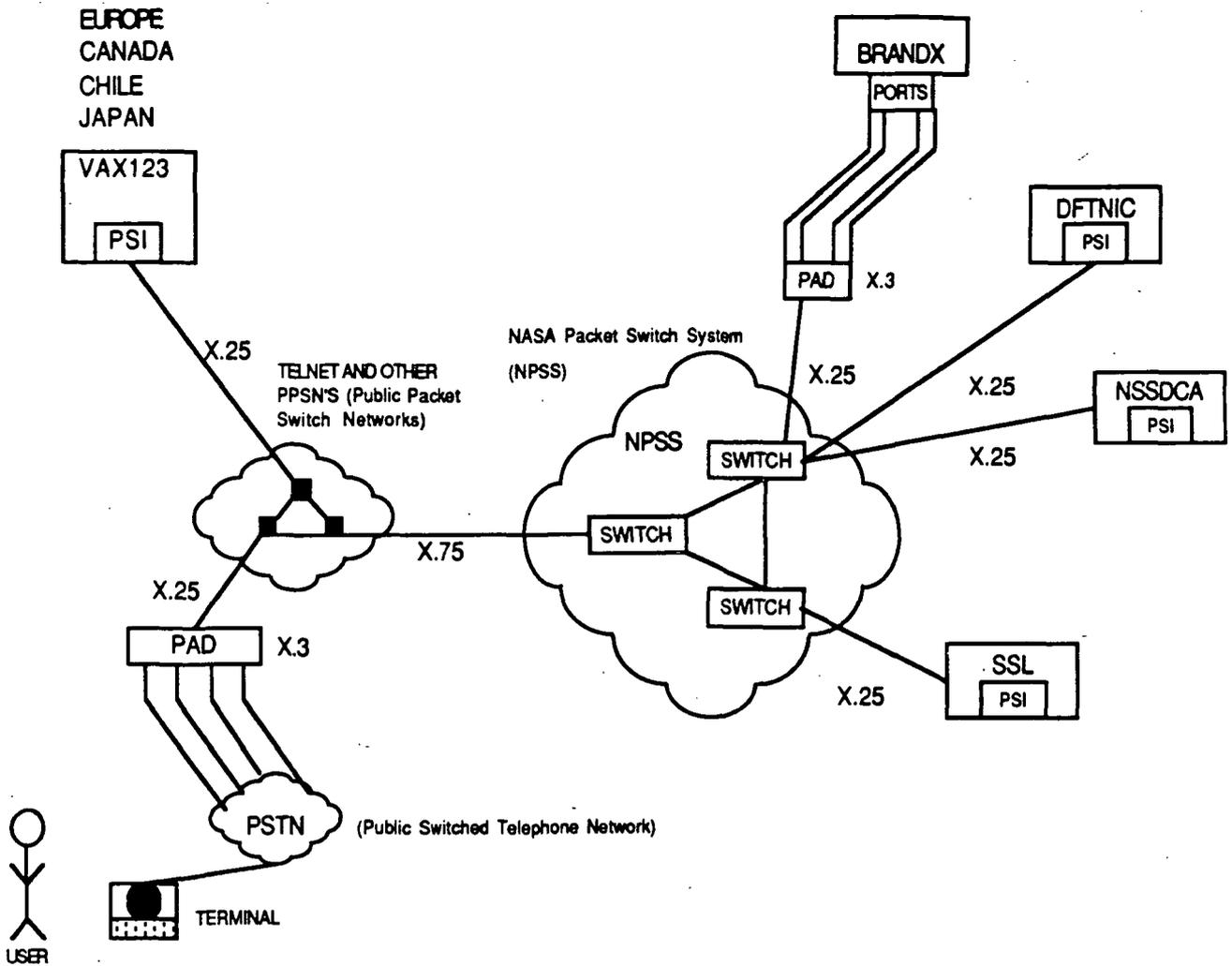
X.25 was created in an effort to universalize networking protocols. Networks are organized into layers. Each layer performs a different task in the sending and retrieving of data when a user sends electronic mail. The network reference model is composed of seven layers: the physical, data link, network, transport, session, presentation, and application layers. The only layer the user sees when sending electronic mail is the application layer (the highest layer). X.25 is a set of standardized protocols for the physical layer (also referred to as X.21), which handles the physical and electrical transmission of the data; the data link layer, which divides the data into packets and does error checking; and the network layer, which determines the path that the packets should take through the network. An X.25 "circuit" can be compared to telephone lines. X.25 is a means by which electronic mail and files are transferred. A piece of software must be used to run over X.25. Some of these are PSI Mail, PSI Copy, X.29/PAD, and DECnet ("DLM circuits").



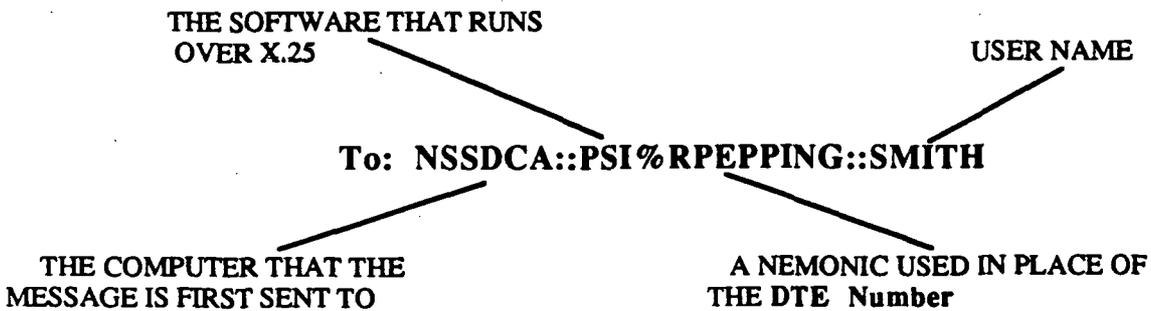
X.25 can be thought of as telephone lines that allow DECnet, X.29, PSImail, and other pieces of software to be run over it.



Network configurations are often shown as layers. The user interface is always the top layer. Here you can see that X.25 is concerned with the lower levels that the user does not see.



If you are on NSSDCA, using PSImail, you can mail to DFTNIC, CANOTT, and SSL because they all have PSImail. It is possible to tell what piece of mailing software your system has by looking at the mail syntax.



The software generally has a % sign after it (this is only for X.25, Internet also uses % signs but for a different reason). With the address To: NSSDCA::PSI%RPEPPING::SMITH, the mail message is first delivered to the computer NSSDCA. The computer then deletes NSSDCA from the address. The software PSI sends the message to the computer RPEPPING, which inserts the message in SMITH's mailbox.

DTE Numbers:

As with DECnet, X.25 also has mail names (known as node names in DECnet). In the above example, RPEPPING is a PSImail name. Once again, mail names are for the convenience of the users. (DTE numbers are typically 12-14 digits. For example, a DTE number 12345678987654 may be defined as "EASY" on your system for convenience.) When the message arrives at NSSDCA, the computer must go into a data base of mail names and look up RPEPPING. If RPEPPING is found, the computer replaces the mail name with its DTE number (DATA TERMINAL EQUIPMENT number). The message can then be mailed to its destination. If the computer does not have the mail name's DTE number in its data base, you will receive an error message. There is no method to calculate a DTE number as you do for node names in DECnet. If a mail name is not defined in your data base and you do not know its DTE # you must contact someone who has this number or talk to your network information office.

X.25 reaches many parts of the world, including those nodes that have connections to many networks and those nodes that only see X.25. As Internet continues to grow many of these isolated X.25 nodes can now be directly contacted through the Internet. As you will see from the list of syntaxes in this section almost every node has both an X.25 and an Internet address.

REMOTE LOGINS

Remote logins can also be established over X.25. Not all hosts support X.25 protocols. To enable these machines to also use X.25, a PAD (Packet Assembler Disassembler) is needed. When a virtual terminal session (remote login) is established to a remote machine, a PAD disassembles the information that is being sent into packets to be sent across X.25. When the packets reach their destination they are reassembled in the remote host's PAD and then sent to the host machine. The two host machines have no knowledge of X.25. The PADs understand the X.25 protocol and actually send the information. When the information arrives at the PAD it reconstructs the message back into the node's protocol. The PAD can be a separate "machine" which the node has direct lines to or the PAD can be a part of the node.

With the figure on the previous page, if you are on the BRANDX computer you can log onto the PAD which allows you to get onto X.25. From X.25 you can link into NPSS (NASA Packet Switched System). From this point you can talk to anyone as long as you can connect to them.

It is possible to dial the NSSDC (National Space Science Data Center) cluster from Telenet or any public packet Network. There is also a SPAN Passthrough Account which allows a user to use SPAN as a passthrough device to reach an X.29 host, connect to the Internet from a Telnet Pad, etc. See Appendix A in this document for more information.

SELECTED INTERNET AND X.25 SYNTAXES

In Australia

Anglo-Australian Observatory (Epping, NSW, Australia) from SPAN
SPAN-to-AAOIPP

USING X.25:

PRIMARY:

To: NSSDCA::PSI%AAOIPP::user

SECONDARY:

To: SSL::PSI%AAOIPP::user

SPAN-to-RPEPPING (USED TO BE EPP75A)

USING X.25:

PRIMARY:

To: NSSDCA::PSI%RPEPPING::user

SECONDARY:

To: SSL::PSI%RPEPPING::user

Example:

To send a message to Eason at RPEPPING, using the primary gateway, the following syntax would be used:

To: NSSDCA::PSI%RPEPPING::HEASON

Mount Stromlo & Siding Spring Observatory (Canberra, ACT, Australia)
(This address will reach the observatory staff.)

SPAN-to-MSSSO

USING INTERNET:

To: EAST::"user@MSO.ANU.OZ.AU"

USING X.25:

To: NSSDCA::PSI%MSSSO::user

Example:

To send a message to Young using X.25 the following syntax would be used:

To: NSSDCA::PSI%MSSSO::PJY

SELECTED INTERNET AND X.25 SYNTAXES

University of Tasmania in Australia (at node DIEMEN)
SPAN-to-UNIVERSITY OF TASMANIA

USING INTERNET:

To: EAST::"user@physvax.utas.oz.au"

USING X.25:

To: NSSDCA::PSI%RPEPPING::acsnet%"user@physvax.utas.oz"

Example:

To send a message to Smith at the University of Tasmania any of the above syntaxes can be used. One example is:

To: NSSDCA::PSI%RPEPPING::acsnet%"Smith@physvax.utas.oz"

University of Newcastle (Newcastle, NSW, Australia)
SPAN-to-NEWCASTLE

USING INTERNET:

To: EAST::"user@cc.nu.oz.au"

USING X.25:

To: NSSDCA::PSI%NEWCASTLE::user

Example:

To send a message to Morrison at Newcastle using X.25 the following would be typed:

To: NSSDCA::PSI%NEWCASTLE::Morrison

In Canada

Dominion Astrophysical Observatory (Victoria, Canada)
SPAN-to-DAO

USING X.25:

To: NSSDCA::PSI%DAO::user

Example:

To send a message to Woodsworth at the Dominion Astrophysical Observatory you would type the following:

To: NSSDCA::PSI%DAO::Woodsworth

SELECTED INTERNET AND X.25 SYNTAXES

In Chile

Cerro Tololo Inter-American Observatory (La Serena, Chile) from SPAN
SPAN-to-CTIOV1

USING X.25:

PRIMARY:

To: NSSDCA::PSI%CTIOV1::user

SECONDARY:

To: SSL::PSI%CTIOV1::user

CTIOV1-to-SPAN

USING X.25:

PRIMARY:

To: CTIOV1::PSI%NSSDCA::user

SECONDARY:

To: CTIOV1::PSI%SSL::user

Example:

To send mail to Smith at the Cerro Tololo Inter-American Observatory using the primary gateway you would type the following:

To: NSSDCA::PSI%CTIOV1::Smith

In Japan

Hiraiso Solar Terrestrial Research Center, Communications Research Laboratory (Ibaraki, JAPAN)
SPAN-to-CRLHI

USING X.25:

PRIMARY:

To: NSSDCA::PSI%CRLHI::user

SECONDARY:

To: SSL::PSI%CRLHI::user

Example:

To mail a message to Tokumaru at the Hiraiso Solar Terrestrial Research Center using the primary gateway you would enter the following:

To: NSSDCA::PSI%CRLHI::Tokumaru

In New Zealand

University of Otago (Dunedin, New Zealand) from SPAN
SPAN-to-OTAGO

USING X.25:

PRIMARY:

To: NSSDCA::PSI%OTAGO::user

SECONDARY:

To: SSL::PSI%OTAGO::user

SELECTED INTERNET AND X.25 SYNTAXES

Example:

To mail a message to Brendan at the University of Otago using the Primary gateway, the following would be typed:

To: NSSDCA::PSI%OTAGO::Brendan

University of Canterbury (Christchurch, New Zealand) from SPAN
SPAN-to-UNICANT

USING INTERNET:

To: EAST::"user@canterbury.ac.nz"

USING X.25:

To: NSSDCA::PSI%UNICANT::user

Example:

To mail a message to Charles Brown at the University of Canterbury using X.25 you would type the following:

To: NSSDCA::PSI%UNICANT::CCTR065

DSIR/PEL (Department of Scientific and Industrial Research/ Physics and Engineering Laboratory)
(Lauder, New Zealand) from SPAN
SPAN-to-DSIR/PEL

USING INTERNET:

To: EAST::"user@grv.dsir.govt.nz"

USING X.25:

To: NSSDCA::PSI%PEL::user

Example:

To send a message to John Doe using Internet you would type the following:

To: EAST::"Doe@grv.dsir.govt.nz"

In West Germany

SPAN-to-DFN (Deutsche Forschungnetz, West Germany)

USING INTERNET:

To: FEDEX::"user@ZPL.DFN.DBP.DE"

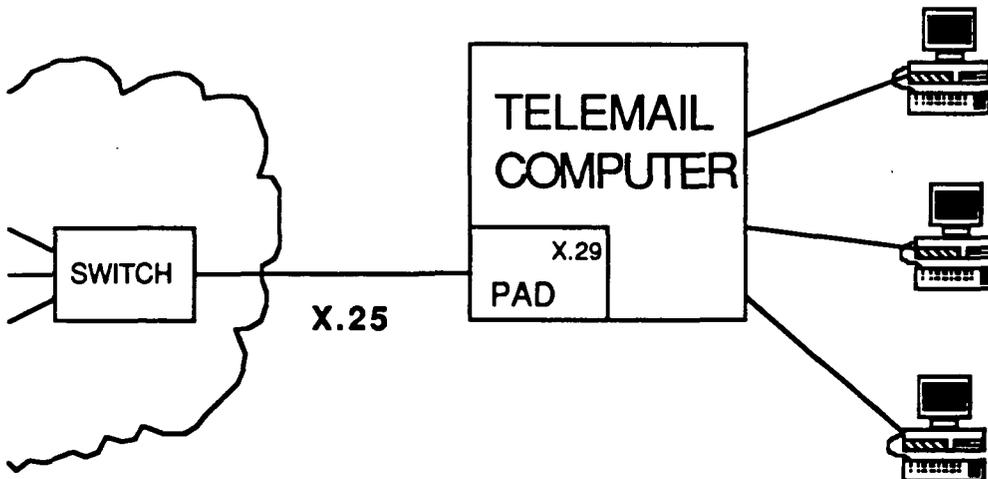
INTRODUCTION TO PUBLIC PACKET MAIL

Public packet mail is different from the previously discussed networks (and networks to be explained later). With DECnet, Internet, and X.25, when you send a mail message the message is actually split into packets and sent through electrical wires to another machine, country, and/or continent. The mail message is sent directly to the addressee's machine. Public packet mail does not work this way. If you are on the computer NSSDCA and you send a message to someone with an account on TELEMAL, the message is sent to a TELEMAL computer. When the person with the TELEMAL account wants to read their mail, they must log on to the telemail computer. The mail message does not come directly to their machine but is stored in the TELEMAL computer. If person A has an account on TELEMAL and he sends a message to person B with an account on TELEMAL the mail message never goes anywhere. It stays in one computer. If person B wishes to read the mail from person A he must log on to the TELEMAL computer. Below is a list of some services that use public packet mail.

SERVICES USING PUBLIC PACKET MAIL

NASAMAIL (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MAIL)
GSFCMAIL (GODDARD SPACE FLIGHT CENTER MAIL)
TELEMAL
OMNET

Mailing from one of these services to SPAN is very different (according to the particular service). Generally you go over X.25 or the Internet to reach any of the public packet mailboxes.



PUBLIC PACKET MAIL SYNTAXES

***NOTE: The underlined text in the following examples, IN THIS SECTION ONLY, are the prompts that the computer gives you. You need to type everything that is NOT underlined.

SPAN-to-NASAMAIL

PRIMARY:

To: AMES::"user@NASAMAIL"

SECONDARY:

To: EAST::"user@NASAMAIL.NASA.GOV"

Example:

To send a message to the SPAN_MGR from SPAN to NASAMAIL, using the primary gateway, you would type the following:

To: AMES::"span_mgr@NASAMAIL"

NASAMAIL-to-SPAN

Command? compose

To: POSTMAN

CC:

Subject:

Text:

To: user%host@AMES.ARPA

Type the rest of your message here

!--POSTMAN account will
AUTOMATICALLY send your message...

!--Start your message text.

!--MUST BE FIRST LINE
IN YOUR MAIL MESSAGE.

!--Finish your message.

Example:

To send a mail message from NASAMAIL to the user NETMGR on SPAN, you would enter the following:

Command? compose

To: POSTMAN

CC:

Subject:

Text:

To: NETMGR%NSSDCA@AMES.ARPA

Type the rest of your message here.

PUBLIC PACKET MAIL SYNTAXES

INTERNET-to-NASAm ail

To: user@NASAMAIL.ARC.NASA.GOV

Example:

To send a message to the user SPAN_MGR from INTERNET to NASAMAIL, you would type the following:

To: span_mgr@NASAMAIL.ARC.NASA.GOV

SPAN-to-GSFCMAIL

PRIMARY:

To: AMES::"user@GSFCMAIL"

SECONDARY:

To: EAST::"user@GSFCMAIL.NASA.GOV"

To: NSSDCA::SMTP%"user@GSFCMAIL.NASA.GOV"

Example:

To send a mail message to the user SPANTEAM at GSFCMAIL from any SPAN host, using the primary interface, you would type the following:

To: AMES::"SPANTEAM@GSFCMAIL"

GSFCMAIL-to-SPAN

Command? compose SPAN

To: (UN:POSTMAN,O:NASA,PRMD:NASAMAIL,ADMD:TELEMAIL,C:USA)

CC

Subject:

Text:

To: user@host.SPAN.NASA.GOV

!--MUST be the 1ST line of your message

SEND?

!--Enter YES or NO

***Example on the next page...

PUBLIC PACKET MAIL SYNTAXES

Example:

To send a mail message from GSFCMAIL to the user NETMGR on the SPAN node NSSDCA, you would do the following:

Command? Compose SPAN

To: (UN:POSTMAN,O:NASA,PRMD:NASAMAIL,ADMD:TELEMAIL,C:USA)

CC

Subject:

Text:

To: NETMGR@NSSDCA.SPAN.NASA.GOV

SEND? yes

INTERNET-to-GSFCMAIL

To: user@GSFCMAIL.NASA.GOV

Example:

To send a message the user SPANTEAM at GSFCMAIL using internet you would type the following:

To: SPANTEAM@GSFCMAIL.NASA.GOV

GSFCMAIL-to-NASAMAIL

Command? compose

To: (C:usa, ADMD:telemail, PRMD:nasamail, UN:user)

CC

Subject:

Text:

Type in your message.

Example:

To send a message to Phil Jones at NASAMAIL from GSFCMAIL you would type the following:

Command?..compose

To: (C:usa, ADMD:telemail, PRMD:nasamail, UN:JPJONES)

CC

Subject:

Text:

TYPE IN YOUR MESSAGE

PUBLIC PACKET MAIL SYNTAXES

NASAMAIL-to-GSFCMAIL

Command? compose

To: (C:usa, ADMD:telemail, PRMD:gsfc, UN:user)

CC:

Subject:

Text:

Type your message here.

!--Start your message text.

Example:

To send a message to the user SPANTEAM at GSFCMAIL from NASAMAIL you would enter the following:

Command? compose

To: (C:usa, ADMD:telemail, PRMD:gsfc, UN:SPANTEAM)

CC:

Subject:

Text:

SPAN-to-TELEMAIL

To: EAST::"user@TELEMAIL.NASA.GOV"

To: JPLLSI::"user%TELEMAIL@ORION.ARPA"

TELEMAIL-to-SPAN

Command? compose

To: [POSTMAN/NASA] NASAMAIL

CC:

Subject:

Text:

To: user%host@VLSI.JPL.NASA.GOV

Type your message here.

!--POSTMAN account will
AUTOMATICALLY send your message

!--Start your message text.

!--MUST BE FIRST LINE OF YOUR
TEXT MESSAGE

or

command? compose

To: user@host.SPAN

PUBLIC PACKET MAIL SYNTAXES

*****NOTE:** OMNET is an electronic mail management company that provides communications consulting services. OMNET's SCIENCEnet is a communications network for International R & D companies.

SPAN-to-OMNET

To: AMES::"username@OMNET"

Example:

To send a message to Mark Mueller at OMNET from SPAN you would type the following:

To: AMES::"Mueller@OMNET"

OMNET-to-SPAN

Command? compose

To: (C:USA, A:TELEMAIL, P:NASAMAIL, O:NASA, SN:MAIL, FN:INTERNET)

CC:

Subject:

Text:

To: <user@host.span.nasa.gov>

Type your message here.

!--Start your message text.

!--MUST BE 1ST LINE IN MAIL MESSAGE

!--Finish your message.

Example:

To send a mail message from OMNET to the user NETMGR on the SPAN host NSSDCA, you would enter the following:

Command? compose

To: (C:USA, A:TELEMAIL, P:NASAMAIL, O:NASA, SN:MAIL, FN:INTERNET)

CC:

Subject:

Text:

To: <netmgr@nssdca.span.nasa.gov>

Type the rest of your message here.

INTRODUCTION TO BITNET

BITNET (Because it's Time Network) is a network for the academic and research community in the United States. BITNET's equivalent in Europe is the network EARN (European Academic Research Network). To the user, BITNET and EARN appear to be the same network and both networks can be reached with the same syntaxes. To mail to BITNET or EARN from SPAN the basic syntax is:

Basic Syntax: To: NODE::SOFTWARE%"USER@HOST"

Example: To: DFTNIC::JNET%"WHEELERL@ECSVAX"

OR

Basic Syntax: To: EAST::"USER@HOST.BITNET"

Example: To: EAST::"WHEELERL@ECSVAX.BITNET"

From the preceding examples you can see that BITNET uses the Internet style syntaxes. BITNET has given its users the option to use domain names but they are not mandatory in order for your message to reach its destination.

BITNET MAIL SYNTAXES

SPAN-TO-BITNET & EARN

PRIMARY:

To: DFTNIC::JNET%"user@host"

SECONDARY:

To: EAST::"user@host.BITNET"

Example:

To send to user INS_AJPI at host JHUVMS.HCF.JHU.EDU (domain EDU), using the primary gateway, you would type the following:

To: DFTNIC::JNET%"ins_ajpi@jhuvms.hcf.jhu.edu"

BITNET & EARN-TO-SPAN

To: user%host.SPAN@LSUVAX.LSU.EDU

Example:

To send a message to the NETMGR at SPAN, you would type the following:

To: NETMGR%nssdca.SPAN@LSUVAX.LSU.EDU

INTRODUCTION TO JANET

JANET (Joint Academic Network) is a network throughout the United Kingdom used primarily by the academic community to communicate both within the United Kingdom and around the globe. From SPAN, JANET can be reached by two basic methods. The EAST gateway can be used to reach JANET with an Internet style syntax. JANET can also be contacted over the X.25 network. With both of these methods a domain naming system is used. The order of the domain name depends on which gateways you are trying to send mail through to reach JANET. The two different orders are generally referred to as the US order and the UK order.

US ORDER: HOST.DOMAIN
EXAMPLE: GSFC.SPAN.NASA.GOV

UK ORDER: DOMAIN.HOST
EXAMPLE: GOV.NASA.SPAN.GSFC

The host is the computer on which the person you are mailing to has an account. The domain name specifies which type of networks (Research, Military, etc.) and local areas the host you are sending to is under. With the US order, as you read from left to right the names become more general. Reading from left to right, the most significant information is listed first. With the UK order, the domain becomes more specific as you read to the right. Reading from left to right, you read the least significant information first. Depending on which gateways you use to mail to SPAN from JANET, you may have to use the US order or the UK order (you do not always use the UK order if you are mailing to the UK). When sending to JANET with the EAST gateway, the US order domain is used. With the Coloured Book Software, the UK order domain is used. Some gateways will take the host and domain name only in the US or the UK order, while other gateways will recognize both orders (or will compensate for the wrong order and switch it).

INTERNET STYLE:

BASIC SYNTAX: EAST::"USER@HOST.DOMAIN"
EXAMPLE: EAST::"TERRET@STARLINK.RUTHERFORD.AC.UK"

OR

USING COLORED BOOK SOFTWARE (CBS):

BASIC SYNTAX: RLEIS::CBS%DOMAIN.HOST::USER
EXAMPLE RLEIS::CBS%UK.AC.RUTHERFORD.STARLINK::TERRET

The CBS software runs over the X.25 network just as PSI mail and X.29 do. In the preceding example, the computer RLEIS is on DECnet and runs CBS. The mail protocol on JANET is referred to as the Grey book. File transfers and other protocols are referred to as different color books (for example file transfers are the blue book).

JANET MAIL SYNTAXES

SPAN-TO-JANET

Gateway at Rutherford Appleton Laboratory (RAL)

If you are on a VAX/VMS Version 5.0 environment:

USING INTERNET:

PRIMARY:

To: EAST::"user@host.domain"

SECONDARY:

To: EAST::"user%host.domain@
NSFNET-RELAY.AC.UK"

USING X.25:

To: RLEIS::CBS%domain.host::user

or To: 19527::CBS%domain.host::user

Example:

To send to the user CYM at host IB and domain RL.AC.UK, using Internet, you would enter the following:

To: EAST::"CYM@IB.RL.AC.UK"

Using X.25 you would type:

To: RLEIS::CBS%UK.AC.RL.IB::CYM

JANET-TO-SPAN

Gateway at Rutherford Appleton Laboratory (RAL)

USING INTERNET:

To: user%domain.host@UK.AC.NSFNET-RELAY

USING X.25:

To: CBS%UK.AC.SPAN-RELAY::"host::user"

Example:

To send to user NETMGR at host NSSDCA and domain GSFC.NASA.GOV, using Internet, you would type the following:

To: NETMGR%GOV.NASA.GSFC.NSSDCA@UK.AC.NSFNET-RELAY

Using X.25 you would enter:

To: CBS%UK.AC.SPAN-RELAY::"NSSDCA::NETMGR"

INTRODUCTION TO X.400 NETWORKS

An X.400 address is referred to as an originator/recipient address, or O/R address. X.400 addresses are based on a hierarchical naming system, known as "attribute lists". There are approximately 14 categories that may be used in O/R addresses and these vary depending on the system the person you are trying to contact is on. The field may be abbreviated to "uniqueness". For example, the administrative domain can be abbreviated to "a" but you will also see it written as "admd" on many systems. Either abbreviation is acceptable, but "admd" is more readable.

SOME KEYWORDS USED BY X.400 MAIL SYSTEMS

- Country
- Administrative domain
- Private Domain
- Organization
- Organizational Unit
- Unit Name
- Usercode
- Username
- Surname
- First Name
- Given Name
- Initials
- Generation
- Name

The country, administrative domain, and private domain fields are used by most X.400 systems. Which other categories are necessary, is dependent on the gateways and systems you are mailing to. For this information you need to contact the person you are mailing to or your network information office. Below are some important facts you may find useful:

- **The order that the keywords are placed in does not matter**
For example, the country category can be first, last, or anywhere in between.
- **The country category refers to which country the system is in, not the country the user is in.**
If you are mailing to Pierre Smith in France, who has an account on NASAMAIL, the country would be the United States and not France. The reason for this is that NASAMAIL is located in the United States.

- Upper case letters, lower case letters, numerals, and the following special characters may be used in X.400 addresses:

~ ` ! @ # % ^ & * () _ - + = { } [] : ; " ' | \ < > , . ? /

The above information is very general. What the exact syntax should include depends on the specific X.400 gateway you are using. You really need to obtain the information about the address from the addressee or your network information office. The next section includes syntaxes for ONE X.400 gateway.

X.400 MAIL SYNTAXES

SPAN-to-GSFCMAIL

To: EAST:="/pn=personal name/o=gsfcmail/prmd=gsfc/admd=telemail/c=us/@sprint.com"

Example:

To send a message to Bob McGuire at GSFCMAIL, from SPAN you would enter the following:

To: EAST:="/pn=robert.mcguire/o=gsfcmail/prmd=gsfc/admd=telemail/c=us/@sprint.com"

TELEMAIL-to-SPAN

To: (c:usa, a:telemail, p:internet, "rfc-822":<username(p)host.dnet(a)east.gsfc.nasa.gov>)

Example:

To send a message to Tim James (on host NSSDCA) on SPAN from TELEMAIL, you would enter the following:

To: (c:usa, a:telemail, p:internet, "rfc-822":<JamesT(p)NSSDCA.dnet(a)east.gsfc.nasa.gov>)

TELEMAIL-to-INTERNET

To: (c:usa, a:telemail, p:internet, "rfc-822":<username(a)host.domain>)

Example:

To send a message to Lenore Jackson on the Internet from TELEMAIL you would type the following:

To: (c:usa, a:telemail, p:internet, "rfc-822":<Jackson(a)nssdca.gsfc.nasa.gov>)

JUNET MAIL SYNTAXES

*****NOTE:** The purpose of JUNET is to promote information exchange among Japanese researchers and with researchers outside Japan. It is organized by a group of students at Tokyo Institute of Technology.

SPAN-to-JUNET

USING INTERNET:

To: NSSDCA::SMTP%"user@host"

If the Internet syntax does not work, there are alternate syntaxes that may be used. Which syntax you use depends on whether you are using JUNET for academic or non-academic purposes. Alternate syntaxes to be used only if the internet syntax does not work:

USING NON-ACADEMIC JUNET:

NSSDCA::SMTP%"user%host@JP-GATE.WIDE.AD.JP"

USING ACADEMIC JUNET:

NSSDCA::SMTP%"user%host@MTFUJI.GW.U-TOKYO.AC.JP"

Example:

To send a message to Toyo Kamei at JUNET from SPAN you would type the following:

To: NSSDCA::SMTP%"Toyo@Kyoto"

JUNET-to-SPAN

Use the normal Internet MAIL syntax

GODDARD MAIL SYNTAXES

***NOTE: All the networks in this section are based at Goddard Space Flight Center.

SPAN-to-SCFMVS (IBM 3081 at the Goddard Space Flight Center)

To:DFTNIC::JNET%"user@SCFMVS"

SPAN-to-GSFCMAIL

See the Goddard Space Flight Center Mail Section under Public Packet Mail Syntaxes.

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MFENET MAIL SYNTAXES

***Note: MFENet is the Magnetic Fusion Energy network. It links energy researchers at educational and research institutes around the country. The network is connected to the National Energy Research Supercomputer Center, Lawrence Livermore, National Laboratory. These computers are available for use by those connected to MFENet. The National Magnetic Fusion Energy Computer Center (NMFEECC) at Livermore is responsible for the development and maintenance of the network.

SPAN-to-MFENET

To: SDSC::"user@host.MFENET"

MFENET-to-SPAN

PRIMARY:

To: user%host.SPAN@VLSI.JPL.NASA.GOV

SECONDARY:

To: user%host.SPAN@SDS

Example: To send a message to the user Hain on MFENet from SPAN you would type the following:

To: SDSC::"Hain@CCC.NMFECC.GOV.MFENET"

ACSNET MAIL SYNTAXES

*****NOTE:** ACSNET (Australian Computer Science Network) is the main network in Australia. It is based on the University of Sydney UNIX Network (SUN) software.

SPAN-TO-ACSNET

PRIMARY:

To: NSSDCA::SMTP%"user%MUNNARI.OZ.AU@UUNET.UU.NET"

SECONDARY:

To: NSSDCA::PSI%505228621001::ACSNET%"user@host"

To: NSSDCA::PSI%505228621001::IN%"user@host"

ACSNET-TO-SPAN

To: user%host.SPAN@VLSI.JPL.NASA.GOV

Example:

To send a message to Tom Jones on ACSNET, using the primary interface, you would type the following:

To: NSSDCA::SMTP%"Jones%MUNNARI.OZ.AU@UUNET.UU.NET"

REFERENCES AND FURTHER READING

Below is a list of references used in the introductory sections of this manual. These references are also an excellent source for further reading.

Dorman, Gary. "SPAN X.400 Mail User Guide: Preliminary Version, June 1990"

LaQuey, Tracy L. The User's Directory of Computer Networks. United States: Digital Press, 1990.

Quarterman, John S. The Matrix: Computer Networks and Conferencing Systems Worldwide. United States: Digital Press, 1990.

Quarterman, John S. and Hoskins, Josiah C. "Notable Computer Networks." Communications of the acm, October 1986, pp. 932-971.

Tanenbaum, Andrew S. Computer Networks. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1981.

APPENDIX A

**ACCESSING THE SPACE PHYSICS ANALYSIS NETWORK
ONLINE DATA BASE SYSTEM (SPAN_NIC)**

**ACCESSING THE SPACE PHYSICS ANALYSIS NETWORK
ONLINE DATA BASE SYSTEM (SPAN_NIC)**

SPAN_NIC is a menu-driven Network Information Center data base system designed to help SPAN users with questions about the nodes connected to SPAN. This system gives the latest up-to-date MAIL syntaxes for INTERNET mail, NEWS about the network, information on how to access other NICs (Network Information Centers), and information about what links are down..

<u>DECnet</u> <u>NODENAME</u>	<u>DECnet</u> <u>NODE_num</u>	<u>Internet</u> <u>NODENAME</u>	<u>Internet</u> <u>NODENUM</u>	<u>System</u> <u>Type</u>
NSSDC	6.132 (6276)	NSSDC.GSFC.NASA.GOV	128.183.10.59	VAX 11/780
NSSDCA	6.133 (6277)	NSSDCA.GSFC.NASA.GOV	128.183.10.4	VAX 8650

In the examples provided, remember you can either enter NSSDC or NSSDCA, depending on which machine you want to access.

To access the NSSDC Computer Facility:

- From DECnet Nodes: System Prompt You Type
 (e.g., SPAN)
 \$ *SET HOST NSSDCA <CR>*
 Username: *SPAN_NIC <CR>*

- From TCP/IP Nodes: System Prompt You Type
 (i.e., Internet)
 [command is the same \$ or % *TELNET NSSDCA.GSFC.NASA.GOV <CR>*
 for all TCP/IP nodes]
 Username: *SPAN_NIC <CR>*

- For Dial-In:
First, dial the phone number for the Rolm modem pool (baud rate is automatically self-adjusting):
 - For odd/no parity (8 bits, 1 stop bit) ==> (301)286-9000
 - For even parity (7 bits, 1 stop bit) ==> (301)286-9500

```

System Prompt   You Type
ENTER NUMBER?    nssdca <CR>
DIALING nnnnn
CALL COMPLETE    <CR>
Username:        SPAN_NIC <CR>

```

• From Telenet or any Public Packet Network:

All public pad access to the NSSDC computer facility has to go through the new DACS II login session. DACS II was implemented by MSFC to protect the NASA Packet Switched System (NPSS) network. Before using this procedure, you will need to call the SPAN Network Information Center to obtain a valid NPSS Userid and Password.

To obtain a USERID and PASSWORD for the NPSS Gateway system, please submit the following information to the SPAN Network Information office by:

Phone: (301) 286-7251 or FTS 888-7251
 FAX: (301) 286-4952 or FTS 888-4952
 Electronic Mail: NCF::NETMGR or NSSDCA::NETMGR or NSSDC::NETMGR
 or NETMGR@NSSDCA.GSFC.NASA.GOV

We will need the following information from you:

Full Name: _____
 Phone #: _____
 Mailing Address: _____

 Employer: _____

Once you obtain your valid USERID and PASSWORD, the steps are as follows:

To find the phone number of a Telenet PAD local to the area from which you are calling, call the Telenet customer office, toll free, at 1-800-TELENET. Make sure your terminal is set to 7 bits, even parity, and then dial into the local Telenet PAD. When the PAD answers, hit several carriage returns until you get a prompt:

	<u>System Prompt</u>	<u>You Type</u>
	Terminal=	dl <CR>
or	@	c NASA <CR>
	@	32107035 <CR>
	USER ID	ENTER your <i>userid</i> IN ALL CAPS <CR>
	PASSWORD	ENTER your <i>password</i> IN ALL CAPS <CR>
	DESTINATION	NSSDC <CR>
	Username:	SPAN_NIC <CR>

*****NOTES:**

- A) If you make a mistake while typing, please use the "CTRL H" keys to make a correction.
- B) You can call 1-(800) 255-NASA for toll free access to NPSS.
- C) If you are coming in from overseas, the access method from your public packet provider is slightly different. At the @ prompt, you will have to enter the following: id ;311032100104. A leading zero may be required.
- D) If you have any problems with your USERID or PASSWORD (after you receive the form from MSFC), please call MSFC NCC HELP:

(205) 544-1771 or FTS 824-1771

They are the only individuals who will be able to, for instance, reset your account password.

SPAN PASSTHROUGH ACCOUNT:

We also have a SPAN passthrough account on the NSSDC Computer Facility. This account allows a user to use our system as a passthrough device to do the following:

Connect from SPAN to INTERNET and vice versa
Connect from SPAN to an X.29 host and vice versa
Connect from a TELENET pad to SPAN or INTERNET

The access methods are the same as listed above for the SPAN_NIC account. The only difference is as follows:

Username: SPAN
Password: Please call SPAN Network Information Center
for the password.

APPENDIX B

NASA Science Internet Interoperability Gateway

**This document is available on-line in
NSSDCA::[DOC]USING_EAST_GATEWAY.DAT**

OR

**via ANONYMOUS/GUEST FTP on NSSDCA.GSFC.NASA.GOV;
filename=USING_EAST_GATEWAY.DAT**

NASA Science Internet Interoperability Gateway

The NASA Science Internet Project Office (NSIPO) has funded an Interoperability Gateway to facilitate the exchange of electronic mail, file transfer, and remote login capability between the Internet networks (TCP/IP protocol based, such as NASA Science Network (NSN), NSFnet, NSFnet regionals, MILnet, ARPAnet, etc.), and DECnet networks (DDCMP protocol based, such as Space Physics Analysis Network (SPAN), High Energy Physics Network (HEPnet), and ESnet/DECnet).

The Interoperability Gateway at Goddard Space Flight Center (GSFC) is based on a Digital Equipment Corporation (DEC) MicroVAX 3300 currently running Ultrix 3.1. This system runs a DEC layered product, DECnet-Ultrix Gateway, that provides for native mode DECnet and TCP/IP protocol interperatation. This system is attached to both the TCP/IP Internet and SPAN.

This article will detail how to make use of this gateway. No account or special access is needed on the gateway machine to make use of these capabilities. Interoperability functions, e-MAIL, and file transfer are translated from one protocol to the other "on-the-fly" in a one-step operation and are not "staged" onto the gateway, translated, and then sent off to their end destination.

The Interoperability Gateway at GSFC is known as

<u>SPAN</u> <u>name</u>	<u>SPAN</u> <u>address</u>	<u>INTERNET</u> <u>name</u>	<u>INTERNET</u> <u>address</u>
EAST	6.769	east.gsfc.nasa.gov	128.183.104.4

Listed below are instructions on how to use the interoperability gateway to send electronic mail, transfer files, and login to remote computer systems. IN ALL OF THE SYNTAXES GIVEN THE QUOTES SHOULD BE TYPED EXACTLY AS THEY ARE SHOWN.

SENDING ELECTRONIC MAIL BETWEEN THE INTERNET AND SPAN

1. *From the Internet to SPAN*

From an Internet machine mail can be sent to a user on a VMS/SPAN machine by mailing to:

`user@host.dnet.nasa.gov`

NOTE: If the TCP/IP mail software does not use the name server to get information about hosts, you may have to use the following syntax. Most implementations support MX records in their mail software, so this should be unnecessary.

`user%host.dnet@east.gsfc.nasa.gov`

host: the name of the VMS/SPAN host to which you wish to send mail
user: the login name of the person to whom you wish to send mail to.

2. *From SPAN to the Internet*

To send mail to an Internet site from a VMS/SPAN host, mail to the address:

`EAST::"user@host.domain"`

host.domain: the full name of the Internet host to which you wish to send mail
user: the login name of the person to whom you wish to send mail to.

NOTE: If node EAST is not defined on your system (you receive an unknown host error message), substitute 6913 for EAST. You should see your system manager about adding EAST to your computer's data base to avoid having to replace EAST with its numerical equivalent each time you mail a message. See the DECnet introduction in this manual for information on how the numerical equivalent (6913) was calculated for the node name (EAST).

FILE TRANSFERS

1. *Copying a file from an Internet machine to your local VMS/SPAN machine*

To copy a file from an Internet machine with FTP capability to your local VMS/SPAN machine, you would type the command:

```
$ COPY EAST"host.domain!user password"::"remote-file" VMS file
```

host.domain: the full name of the Internet host from whom you want to get the file
user: the login name on the Internet machine
password: the login password for the designated user account on the Internet machine
remote-file: the name of the file to fetch from the Internet machine (the syntax of the remote-file is dependent on the operating system on the remote Internet machine)
VMS-file: the name of the local file to create on your VMS/SPAN machine (and is in normal VMS syntax).

NOTE: If you receive an error message indicating that node EAST is not defined on your system substitute 6913 for EAST. See your local network manager about adding EAST to your computer's data base to avoid having to substitute the numerical equivalent (6913) for the node name (EAST) each time you transfer a file. For information on how the numerical equivalent is calculated for the node name see the DECnet introduction in this manual.

If the Internet machine happens to be setup for anonymous FTP and the file you want has been placed in the anonymous FTP directories there, you can use a user name of "anonymous" and put anything in as the password (although a password must still be present; by convention the last name of the invoking user is often used as the password).

2. *Transferring a file from your VMS/SPAN machine to an Internet machine*

To transfer a file from your VMS/SPAN machine to an Internet machine, simply reverse the order of the arguments to the VMS COPY command. You should use the command:

```
$ COPY VMS-file EAST"host.domain!user password"::"remote-file"
```

VMS-file: the file you are transferring to the Internet machine
host.domain: the full name of the Internet host that you are sending the file to
user: the login name of the account on the Internet machine
password: the password of the account you are sending the file to
remote-file: What the VMS-file will be named when it is put in the Internet account

3. *Transferring a file from an Internet machine to a remote VMS/SPAN machine*

To transfer a file from an FTP-capable Internet machine to a remote SPAN machine, type the command:

FTP EAST.GSFC.NASA.GOV

NOTE: If you receive an "unknown host" error, you can use the IP address 128.183.104.4 to make the FTP connection.

Once you have connected and received the login prompt, respond with:

HOST::USER

host: the name of the VMS/SPAN host (computer) to which you wish to send a file
user: the login name of the account you wish to place the file in.

When prompted for the password, give the password for this account. You may then use normal FTP commands, such as "get" and "put" to transfer files. It is not possible to invoke a gatewayed transfer from the Internet side without a password for a VMS/SPAN account because VMS/DECnet networking does not provide any sort of password-less access such as anonymous FTP.

4. *BINARY FILE TRANSFERS*

A word of warning: UNIX systems do not have the same record structure format that VMS files have. **IF A BINARY FILE IS SENT FROM A VMS/SPAN NODE THROUGH A UNIX GATEWAY TO AN INTERNET MACHINE, USING THE TECHNIQUES ABOVE, THE RECORD STRUCTURE WILL BE LOST. THIS IS TRUE EVEN IF THE DESTINATION INTERNET MACHINE IS ALSO RUNNING VMS.** Files sent through a UNIX gateway from the Internet side to a VMS/SPAN machine in binary mode will create files on the destination VMS machine that have fixed length 512-byte records. It is also likely that if the Internet machine is not a DEC machine or other machine that uses DEC byte ordering, you may run into byte ordering problems when the data in the destination file is interpreted.

TO AVOID THIS PROBLEM:

One way around this problem is to use FDL (File Definition Language) files. The sender can create a description of the file structure by typing the following at the dollar sign prompt:

ANALYZE/RMS/FDL FILENAME

This will create a file called **FILENAME.FDL**. The sender should then send this file along with the original file. The person who receives the message should then enter the following command at the dollar sign prompt:

CONVERT/FDL=FILENAME.FDL INPUT-FILENAME OUTPUT-FILENAME

This should restore the file to its proper format using the information in the FDL file.

Example:

If user A wishes to send the file solar.txt to user B through a UNIX gateway he should type **ANALYZE/RMS.FDL SOLAR.TXT** at the dollar sign prompt. This command creates the file solar.fdl. User A then sends solar.txt and solar.fdl to user B. When user B receives the files he should type **CONVERT/FDL=solar.fdl solar.txt newsolar.txt**. The input filename is the original name of the file. The output filename is what User B wishes to call the file (the input and output filenames can be the same).

REMOTE LOGINS

*****NOTE:** The underlined text in the examples, IN THIS REMOTE LOGIN SECTION ONLY, refer to the prompts that the computer gives you. You need to type everything that is NOT underlined.

1. *Logging into Internet hosts from VMS/SPAN hosts*

To login to an Internet host with telnet capability from a VMS/SPAN host, execute the command:

SET HOST EAST

NOTE: If you receive an error message stating that node EAST is not defined on your system, substitute 6913 for EAST. See your local network manager about adding EAST to your computer's data base to avoid having to substitute the numerical equivalent (6913) for the node name (EAST). For more information on how the numerical equivalent for the node name is calculated see the DECnet introduction in this manual.

When you receive the Ultrix login prompt as shown below, type in the host and domain of the Internet host you are trying to login to.

Ultrix-32 V3.1 (Rev. 9) (east.gsfc.nasa.gov)

login: host.domain!

host.domain: the full name of the Internet host to which you wish to login to.

!!!! Do not forget the exclamation point (!) or you will be asked to supply a password for the EAST gateway itself, rather than the TCP/IP Internet host you are trying to connect to.

You should receive a login prompt from the designated Internet machine.

2. *Logging into VMS/SPAN hosts from Internet hosts*

To login to a VMS/SPAN host from an Internet host, issue the command:

TELNET EAST.GSFC.NASA.GOV

NOTE: If the gateway machine is not known to your local machine, you may telnet to the IP address 128.183.104.4.

When you receive the login prompt from the gateway machine as shown, type in the host name followed by two colons (::).

EAST.GSFC.NASA.GOV: HOST::

host: the name of the VMS/SPAN host to which you wish to log on (followed by the double colon as shown). If the VMS/SPAN host is not known to the gateway, you may use its DECnet numerical equivalent if you happen to know it (followed by the double colon) and the gateway will connect you. (See the DECnet introduction in this manual for more information about calculating the numerical equivalent of a DECnet node name). After entering this line, you should see the usual Username: prompt from the VMS/SPAN machine.

If you experience any problems, please contact:

Jeffrey Burgan, NASA/Ames Research Center (NSIPO)
Internet: jeff@nsipo.arc.nasa.gov
DECnet: EAST::"jeff@nsipo.arc.nasa.gov"
(415)604-5705
FTS 464

Todd Butler, NASA/Goddard Space Flight Center(SPAN)
Internet: tbutler@nssdca.gsfc.nasa.gov
DECnet: NSSDCA::TBUTLER (6277::TBUTLER)
(301)286-7251
FTS 888-7251