A Guide to External Networking at the IBM T.J. Watson Research Center

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Abstract

This document is provided as a user's guide to the external networking services available to users of the IBM T.J. Watson Research Center computing systems. In this paper information is presented on how to obtain authorization to use these services, as well as providing information on resources available on the networks outside of IBM.

This version has additions in the area of user services, namely additional information resources accessible by Internet users.

If you have any comments or suggestions for improvement, please contact the author at NRT at WATSON (on VNET) or via tieline 862-1850. This document may be redistributed in its original form only.

This document was produced using LaTeX with the Helvetica family of PostScript fonts, and run through "dvips" to get the final PostScript output.

Contents

1 Introduction **1**

2 An Overview of External Networking **1**

3 Getting Authorization for External Mail **3**

4 Using Mail **3**

4.1 Mail addressing - Other Networks 4

4.2 Finding People on the Internet 5

4.3 Using NAMES files on VM 6

5 Getting Authorization for Telnet/FTP **6**

6 Using Telnet **6**

7 Using File Transfer Protocol (FTP) **8**

8 Kermit over the Internet **10**

9 Secure Inbound Telnet System **10**

10 Other Services on the External Networks **13**

10.1 A Few words about X Windows 14

10.2 XMosaic 14

10.3 traceroute 15

10.4 dig 16

10.5 whois 17

10.6 Hytelnet 17

10.7 Gopher 17

10.8 “Services” at Washington U. 18

10.9 Archie 18

10.10Internet Relay Chat (IRC) 21

10.11 Wide Area Information System (WAIS) 22
10.12 Library of Congress 22

11 IBM Mail Exchange **23**

12 USENET **23**

13 Questions and Answers **24**

14 Other Resources **24**

15 About the Author **26**

1 Introduction

Since January 1991, all external networking functions at the IBM T.J. Watson Research Center have been gathered together under one department (currently managed by Joe Wells, WELLSJW at WATSON) to provide facilities for using the Internet and BITNET.

The old users guide for the Internet (GWUGUIDE SCRIPT on the TCPMAINT 355 disk) is now outdated for the Watson environment. This document will serve a similar purpose but is specific for Watson and Zurich users.

This new document is necessary due to the number of changes and additional services now available at Watson (including handling our own mail under the domain “watson.ibm.com”, having our own supported Telnet/FTP gateway, and having our own “Anonymous FTP” server on the Internet). Additional services are continually being offered and this document will be updated as needed.

Version 3.3 of this document now offers documentation on XMosaic, the best information tool on the Internet, as well as more information on other External Networking Services offerings.

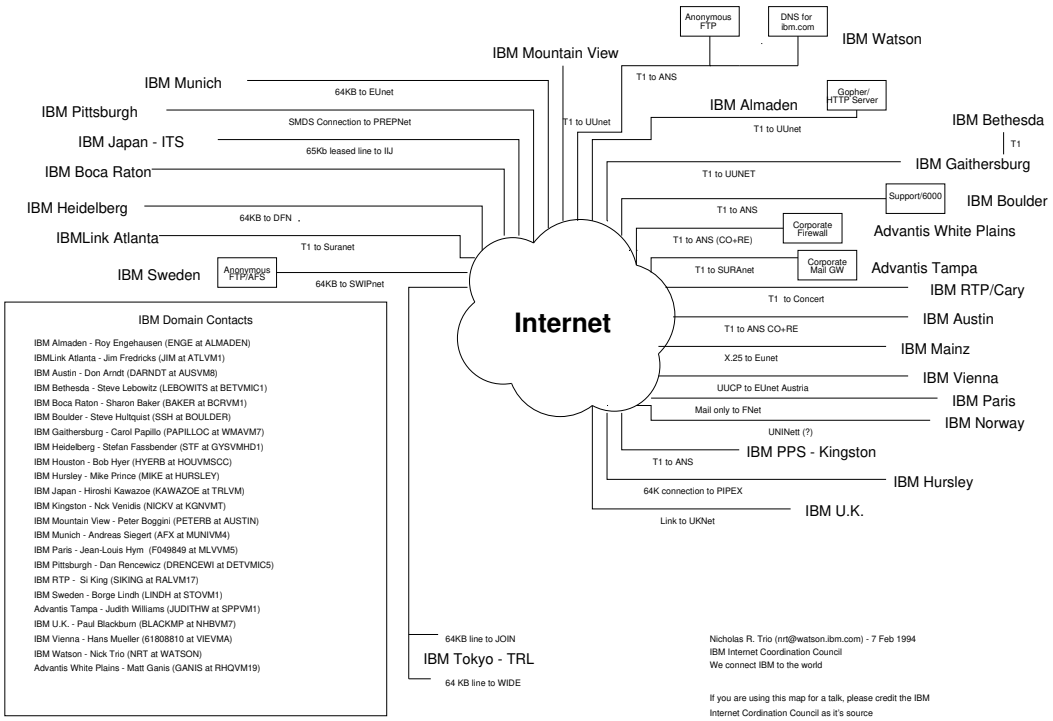
2 An Overview of External Networking

While many people within IBM are familiar with our internal networks (such as VNET or the internal IP network), they sometimes lack familiarity with the external networks. This section is a brief overview of what is outside the borders of the IBM internal networks.

The Internet is the world’s largest computer network. As of early 1994, it is estimated that there are 2.2 million computers and 22 million users of the Internet. The Internet started as an outgrowth of work done by the Defense Department with the old ARPANet.

IBM has a long history of being active in the Internet...with MCI and Merit, IBM helped form the Internet T1 (now T3) backbone. In addition, IBM has grown from having one Internet gateway to many. Here’s the current IBM Internet connection map:

IBM Internet Connections



The responsibility for helping guide all these connections is the IBM Internet Coordination Council. It's made up of all the IBM folks who actually provide Internet connections. It was created in a rather ad hoc fashion in 1992 (with zero funding), but has served well in coordinating IBM's Internet activities and exchanging information among IBM sites.

The Watson Research Center has direct connections to the Internet via a T1 line from the Yorktown computer room to New York City. Our Internet provider is Advanced Networks & Services (ANS), and once our T1 gets to the ANS Point-of-presence in NYC, it goes directly to the Internet T3 backbone. The Internet uses the TCP/IP protocols and connects a massive number of universities, commercial organizations, and government agencies in a large meta-network. We have a mail gateway running on YKTVMV, as well as a Telnet/FTP gateway (Telnet is the protocol for logging into remote systems, and FTP is the File Transfer Protocol) known as "internet-gw" on IBM's internal IP network.

In addition, we have a BITNET connection that goes to City University of New York (CUNY). It is generally used from our VM systems, allowing the user to send mail and TELL messages to other BITNET hosts. BITNET is made up of mostly academic systems around the world and is used often for communications with colleagues at universities or other research centers. BITNET uses the IBM RSCS protocol for exchanging information and is currently run by the Corporation for Research and Educational Networking.

One can also use BITNET or Internet to send mail to other networks such as UUCPNet or JANET (see below) as well as CompuServe and MCIMail (which have mail gateways to the Internet), making external networking an extremely versatile way to maintain technical vitality and contacts with colleagues outside of IBM.

3 Getting Authorization for External Mail

Anyone on the VM systems at the Watson Research Center can simply run the EXTNET EXEC, which will produce a form for requesting access to BITNET and/or CSNET (Internet). A first line manager's signature is required on this form. Once this is done, simply send the form to the address on the form. You will receive a confirmation note by electronic mail as soon as authorization is completed.

When you receive authorization, then your BITNET address (presuming you requested BITNET access) will be USERID at YKTVMH (or whatever you use for your VNET address, including WATSON). For instance, I use NRT at WATSON for just about all my mail, so BITNET folks can send mail to me also using NRT at WATSON.

For Internet mail, your address will be userid@watson.ibm.com (example: my Internet mail address is "nrt@watson.ibm.com"). Incoming mail will then be sent to USERID at WATSON by default. To get this mail to your favorite VM system or workstation, use the XFORWARD EXEC to tell the system where you want your mail to go.

4 Using Mail

On VM, the NOTE EXEC will automatically recognize whether the note is meant to go outside of IBM or not. For example, if you want to send a note to the BITNET address NRT at PITTVMS, you simply issue the following command on VM:

```
NOTE NRT AT PITTVMS
```

When you finish composing your note and send it off, you will be reminded of the guidelines for sending external mail and asked if you're really sure you want to send it. If everything seems OK, then type "YES".

You can also send Internet mail from VM with the NOTE EXEC. For example, if you want to send mail to nrt@speedy.cs.pitt.edu, you can use the following on VM:

```
NOTE nrt AT speedy.cs.pitt.edu
```

Note that in some cases, the address is case sensitive, especially those things going to the Internet or USENET (see below). When you are done, you'll again be reminded of the guidelines and asked if you're sure. If you are, then type "YES".

You can also send external mail from your AIX (or other UNIX) or OS/2 workstationj. Using the "mail" command, you can send mail to a BITNET user using the command:

```
mail nrt@pittvms.bitnet
```

To send Internet mail from your workstation, use:

```
mail nrt@speedy.cs.pitt.edu
```

The "X-External-Networks" line in the mail header was once required but is no longer necessary. This will also work for "alternative" interfaces if configured correctly such as GnuEmacs' "rmail" mode (my favorite), xmh, or LaMail on OS/2. Generally, if you're on Agora or CORE, you're already configured correctly to do this.

When you're receiving mail, you can simply read it just as if it were internal mail. Incoming mail from BITNET will go to the system the sender has specified (i.e. NRT at WATSON or NRT at YKTVMH). However, mail coming in from the Internet will always go to USERID at WATSON. To get it to your favorite place for reading mail, use the FORWARD EXEC to forward your mail properly.

4.1 Mail addressing - Other Networks

Addressing mail to other people outside of IBM can either be a simple job or a complex venture. Mail to BITNET and Internet addresses described above are the easiest to handle.

However, consider someone who gives you an address such as "nrtpc!nrt" or "nrt@nrtpc.uucp". This is mail going to the UUCP Network (a network of mostly UNIX computers connected usually by dial-up links). In the above case, you could use the following NOTE command:

```
NOTE nrtpc!nrt at uunet.uu.net
```

If it's a longer address, such as "bywater!scifi!nrtpc!nrt", then you can use:

```
NOTE ''bywater!scifi!nrtpc!nrt'' at uunet.uu.net
```

In the above cases, "uunet.uu.net" (which is a host on the Internet) is acting as a gateway to UUCPNet. Likewise, someone sending mail to "nrt" within the Watson Research Center can send mail back to this address from UUCP:

```
uunet!watson.ibm.com!nrt
```

Another network that causes some confusion in addressing is JANET, which is a United Kingdom-based address. When you get electronic mail from one of these systems, it will look like "user@uk.ac.xx.yy". In this case, you need to take the part of the address after the "@" and reverse it. Thus, you would then send mail using this NOTE command:

```
NOTE user at yy.xx.ac.uk
```

Sending mail to CompuServe is also very easy if you remember the change in syntax. If someone gives the address [111,2222] on CompuServe, you can send mail to this person by addressing it as "111.2222@compuserve.com" or "111.2222 at compuserve.com" from VM.

4.2 Finding People on the Internet

Most of the time, you will have a userid and node on the Internet for someone you want to reach (it's in the mail you received from someone, it's on a business card, it's in a journal article or the other person told you what it is).

But suppose you just have a name and organization but no e-mail address. There are a number of ways of finding someone on the net (if the person is there at all). The WHOIS service, mentioned later in this document is one way. However, not everyone is in WHOIS, so you may need to resort to other "tactics".

Since this usually relates to sending e-mail on the Internet, it'll be covered here...remember that to use these tools you'll need to log onto internet-gw (see below).

If you know a user is at an organization and you know the name of the remote host, you can try to use finger. For example, if you want to find someone with the name of "Trio" and the system you think he is on is "cs.pitt.edu", here is what happens when you use the finger command to find out:

```
internet-gw % finger trio@cs.pitt.edu
[cs.pitt.edu]
Login name: nrt                         In real life: Nick Trio
Phone: IBM Research, Guest of Hoffman
Directory: /home/speedy1/nrt            Shell: /bin/csh
Last login Tue Sep 29 10:19 on ttyp9 from ibm.com
No Plan.
internet-gw %
```

Thus, this user's actual userid is "nrt".[1]

If this doesn't work, and WHOIS hasn't helped, here are some other services available. Netfind is a fairly user friendly service that will search the Internet for users. From internet-gw, telnet to bruno.cs.colorado.edu and log in as netfind. You should probably look at the help message to get started.

Another possibility is to try the Usenet address service. Send a note to "mail-server@pit-manager.mit.edu". They save the addresses of the poster of every Usenet article that passes through their Usenet site. To get help for this system, send the server a note with the word "help" in the body of the message. The command to find a name in the Usenet list is `usenet-address/word` where "word" is a list of one or more words (like lastname, firstname, userid, etc.).

One other note on the Usenet address service...apparently, it is also accessable via WAIS (see below for more information on WAIS).

As a final resort, you can try sending mail to the userid "postmaster" at the organization the person is at, asking for your party's e-mail address. This is one of the jobs of Postmaster, but since they're usually very busy people (I know...I handle postmaster for ibm.com, watson.ibm.com, and zurich.ibm.com), there might be a slight delay in getting a reply back.

[1] I'm sure Bob Hoffman out at the U. of Pitt. won't mind if you try "finger trio@cs.pitt.edu" once...in return, I buy him lunch when I'm in Pittsburgh

4.3 Using NAMES files on VM

It's obviously easier remembering a short nickname rather than an extended external network address (especially Internet). If you wish, you can add entries to your NAMES file and use them for external Internet mail (BITNET is handled just like VNET names so additional info on it isn't really necessary).

Here is an example entry from a NAMES file:

```
:nick.NRT1  :userid.nrt   :node.speedy.cs.pitt.edu
            :csaddr.nrt@speedy.cs.pitt.edu
```

With this entry in your NAMES file, you can use the command:

```
NOTE NRT1
```

rather than the harder to memorize

```
NOTE nrt@speedy.cs.pitt.edu
```

Using NAMES, you can then construct larger distribution lists, etc., that you use frequently.

5 Getting Authorization for Telnet/FTP

Once you have authorization for external Internet mail, you can get authorization to use the Telnet/FTP gateway for the Internet. This allows one to log in remotely to computers outside of IBM and exchange files with hosts on the Internet.

After getting your mail authorization, run the INTERREQ EXEC on VM and answer the questions. In a few days at most, you will receive confirmation that you may now use the "internet-gw" Internet gateway. Remember that you must have completed the EXTNET process first, since INTERREQ depends on your having EXTNET authorization.

6 Using Telnet

For security reasons, outbound telnet is a two-step process. You first must telnet to the "internet-gw" system, and then telnet out to your destination.

Here's an example of a telnet session from an AIX/RT within IBM to a UNIX system at a university (my userid on both systems is "nrt"):

```
$ telnet -e vt100 internet-gw
Now emulating a vt100 terminal
Trying...
Connected to internet-gw.watson.ibm.com.
Escape character is '^T'.


4.3 BSD UNIX (internet-gw)

login: nrt
Password:
Last login: Wed May 29 16:55:43 from 129.34.220.72
4.3 BSD UNIX (INGW) #2: Mon Aug  6 15:41:44 EDT 1990
          Welcome to the Internet Gateway Machine
- In case of problems contact Nick Trio (NRT at WATSON)  -
- T/L 862-1850 ((914) 945-1850)                          -
---------------------------------------------------------
- NOTE: idle daemon will be running...if you leave your  -
- terminal logged on but idle for 20 minutes you will be -
- automatically logged off...this is due to a shortage   -
- of network ports.  Thanks for your cooperation!  NRT   -
---------------------------------------------------------

% telnet speedy.cs.pitt.edu
Trying...
Connected to speedy.cs.pitt.edu.
Escape character is '^]'.


Ultrix V3.1 (Rev. 14) (speedy.cs.pitt.edu)

login: nrt
Password:
Last login: Wed May 29 13:43:35 from internet-gw.wats
Ultrix V3.1 (Rev. 14) System #2: Fri Sep 29 13:42:53 EDT 1989
=====
Slang is language that takes off its coat, spits on its hands, and goes
to work.
speedy:1 % stty erase ^H
speedy:2 % ^D
Connection closed by foreign host.
% ^D
Connection closed by foreign host.
$
```

Since the remote system in the example above is a UNIX system, I use the VT100 emulation of Telnet so that I can use programs that require terminal emulation (e.g. EMACS or vi screen editors). From VM, you can't emulate a VT100 terminal (but you can telnet out to other IBM mainframes from VM and use their full-screen programs).

In any case, one can always telnet to another machine using line mode (such that the Unix "ed" editor will work, even from a 3270 terminal).

Notice that above I used the command:

```
stty erase ^H
```

This means I typed “stty erase” followed by my delete key. This is useful to remember if you log into a UNIX system and your delete key doesn’t work right.

Additionally, if you are working from a UNIX system with X-Windows, you can use XANT to get Telnet-3270 support (thanks to Barry Leiba for help with this info).

On your own workstation, you should either create an /etc/X0.hosts file with the following line:

```
internet-gw
```

or simply say `xhost internet-gw`.

Then, you can log into the internet-gw machine just as described above, then issue the following command:

```
xant xx.yy.zz
```

In this case, “xx.yy.zz” is the host you’re trying to connect to. You can also specify any xant options you want (they can be found in the Xant documentation). In addition, you can log off the internet-gw after starting your xant session, and the xant session will remain (this eliminates an idle process).

By default, internet-gw will use the hostname of your workstation (the one you’re logging in from) as your X-window. For example, if you’re logging in from workstation “slapshot”, it will set your DISPLAY variable to `slapshot:0`.

7 Using File Transfer Protocol (FTP)

File Transfer Protocol (FTP) is a way of exchanging remote files with a remote system. Simply put, you first FTP to “internet-gw” and give your userid and password, then use the “site (remotesite)” command (from VM) or “quote site (remotesite)” (from other systems) to connect to the remote host. Then you can get and put files to the remote system.

Here’s an example FTP session to get a file from a remote server:

```
$ ftp internet-gw
Connected to internet-gw.watson.ibm.com.
220-4.3 BSD UNIX (INGW) #2: Mon Aug  6 15:41:44 EDT 1990
220-          Welcome to the Internet Gateway Machine
220-- In case of problems contact Nick Trio (NRT at WATSON)  -
220-- T/L 862-1850 ((914) 945-1850)                          -
220------------------------------------------------------------
220-- NOTE: idle daemon will be running...if you leave your  -
220-- terminal logged on but idle for 20 minutes you will be -
220-- automatically logged off...this is due to a shortage   -
220-- of network ports.  Thanks for your cooperation!  NRT   -
```

```
220----------------------------------------------------------
220-
220 internet-gw FTP GATEWAY (Version 4.24 Mon Dec 18
17:59:45 EST 1989) ready.
Name (internet-gw:nrt): nrt
331 Password required for nrt.
Password:
200 Specify Remote Destination with SITE command
ftp> quote site speedy.cs.pitt.edu
220 speedy.cs.pitt.edu FTP server (Ultrix Version 4.36 Thu
Dec 29 22:53:11 EST 1988) ready.
ftp> user anonymous
331 Guest login ok, send ident as password.
Password:
230 Guest login ok, access restrictions apply.
ftp> ls
200 PORT command successful.
150 Opening data connection for /bin/ls (129.34.139.1,4345) (0 bytes).
bin
pub
226 Transfer complete.
10 bytes received in 0.1333 seconds (0.07325 Kbytes/s)
ftp> cd pub
250 CWD command successful.
ftp> ls
200 PORT command successful.
150 Opening data connection for /bin/ls (129.34.139.1,4346) (0 bytes).
README
gwalborn
226 Transfer complete.
18 bytes received in 0.01667 seconds (1.055 Kbytes/s)
ftp> get README
200 PORT command successful.
150 Opening data connection for README (129.34.139.1,4347) (69 bytes).
226 Transfer complete.
local: README remote: README
70 bytes received in 0 seconds (0.06836 Kbytes/s)
ftp> quit
221 Goodbye.
$
```

Useful FTP commands to remember (used after you type the “quote site” command as in the above example) are:

- cd - change directory
- binary - set file type to binary
- ASCII - set file type to ascii
- get (filename) - get a file sent to you
- put (filename) - send a file to the remote system
- mget (filename) - get all files matching the filename
- prompt - do not ask “yes” or “no” for each file (if prompt is set OFF)

- quit - to end the session

In most cases, you will use an assigned userid/password on the remote system in FTP, however many systems support "Anonymous FTP", most notably file repositories (such as wuarchive.wustl.edu for MSDOS software and uunet.uu.net for Unix software). When using these repositories use "anonymous" for the userid, and give your electronic mail address (user@watson.ibm.com) as the password. If possible, do most of your big FTP's outside of normal business hours.

Occasionally, you may see an error message like "can't map assigned port address"...this is because of an incompatibility between internet-gw and the remote FTP server. To get around this problem, use a "-" in front of your password when FTPing to that system.

Remember that the user is responsible for abiding by IBM Research Division's "Computing and Information Security Guidelines" and IBM's "Business Conduct Guidelines" when obtaining software from outside of IBM, including "public domain" software. If you have any questions on these policies, speak with your manager or the Legal department.

8 Kermit over the Internet

There may be times when you are telnetting into a remote bulletin board system on the Internet and can only get files using Kermit. If you are on a Unix or OS/2 workstation and have a very recent version of Kermit, this should be no problem.

To use it, you run Kermit on your local workstation, then use the command `set host internet-gw`, followed by the `connect` commands in Kermit. You will see a logon screen for internet-gw; at this point you can log on and go to wherever you want on the Internet.

Then, when you're ready to transfer a file to your workstation, start the transfer on the remote end, then escape back to your host session (e.g. under C-Kermit for Unix, the escape is Ctrl-\, followed by a c). Once escaped back to your local system, simply receive the file.

Also, if you're dialing in from home, you can telnet to internet-gw directly from the Annex Terminal Server (presuming you're using that service) and Kermit files directly to your home workstation (providing you're running a communications package that provides the Kermit protocol).

Complete documentation on Kermit is outside the scope of this document, but you should have received documentation when you got your communications package. If not, drop the author a note and I'll try to get you a decent reference.

9 Secure Inbound Telnet System

If a regular IBM employee spends a significant amount of time away from IBM but needs to access IBM systems, a possible solution is the Secure Inbound Telnet System. This provides a secure inbound gateway

from the Internet to IBM. This system is NOT open to contractors or joint-study faculty, and you may not access IBM Confidential or higher classified material over this gateway (since the Internet is a public, non-secure network).

To register for the service, print a copy of the file INTELNET SCRIPT U on VM using the command:

```
SCRIPT INTELNET SCRIPT (ON XXX
```

where XXX is your favorite printer. Fill out the form, get your manager's approval, and send it to the External Networking Administrator (currently, the author of this document). When the form is processed, you'll get a note to make arrangements with External Networking Systems to come by in person and pick up your SecureNet Key and access codes. For security reasons, we do not send these keys through internal mail nor will we give them to someone else for you...you must come by in person for the key and codes.

To use the gateway from the Internet (once authorized), you would turn on the SecureNet Key and enter your Personal Identification Number (PIN). Then you would telnet to "telnet.watson.ibm.com" (ip address 129.34.139.7), log in with your userid and password. The system will prompt you with a challenge, which you must enter into your SNK and get back the response. This response must be entered exactly to allow access to the system.

If you're planning to try xant from a workstation running X-Windows, please make sure to execute the following command at your local workstation before attempting to telnet into IBM:

```
xhost 129.34.139.7
```

Here is an example session using the Secure Inbound Telnet System (the command may be different at the host you're using...here I'm using the vt100 emulation mode):

```
% tn -e vt100 telnet.watson.ibm.com
Trying...
Connected to 129.34.139.7.
Escape character is '^]'.


4.3 BSD UNIX (telnet)

login: nrt
Password:
Last login: Thu Oct  3 16:20:10 from slapshot.watson.
4.3 BSD UNIX (INGW) #2: Mon Aug  6 15:41:44 EDT 1990
*********************************************************
For IBM Authorized Use Only...intruders will be prosecuted.
In case of emergency, contact Nicholas R. Trio
(nrt@watson.ibm.com) at (914) 945-1850 (tieline 862).
*********************************************************

Challenge is 78157506
Enter Response:
```

At this point, I turn on my SecureNet key, enter my PIN number, and type into the SNK the challenge above

(78157506). When I type the “ent” key, I will get a string back, which I type back to the host system. If I’ve done this correctly, here’s what I’ll see:

```
Currently logged in from 129.34.139.1
imported TERM=vt100
Please enter what you would like set as TERM [vt100]
```

At this point, either enter the terminal type you are emulating or if you’re happy with what you see, simply hit enter. Then you’ll see...

```
Your TERM variable has been set to ibm6154
Your DISPLAY variable has been set to 129.34.139.1:0
IBM-YKT:
```

“IBM-YKT:” is the system prompt on the gateway. Once you are on the gateway, you can “telnet” to your workstation, or use “tn3270” to get to VM. If the system you are sitting at is running X-Windows, you can also use xant as described above (though you will need to use the command “display xxxx:Y” where xxxx is your IP address and Y is your window before running xant). Sometimes the display variable isn’t set right, so you can always use “distest” to show your display variable.

For instance, to run XANT you would use the following commands (presume the IP address for the workstation outside of IBM is 130.199.128.212):

```
IBM-YKT: display 130.199.128.212:0
IBM-YKT: distest
130.199.128.212:0
IBM-YKT: xant yktvmz
```

Since some Unix workstations (e.g. Sun) do not have PF10-PF12 keys that work under xant, you can also use Ctrl-q for PF10, Ctrl-w for PF11 and Ctrl-e for PF12.

If you’re using tn3270 with a VT100 terminal (or emulating VT100 via Telnet), here are the key bindings you’ll need to effectively use VM (\E is the Escape key):

```
enter = '^m';
clear = '^z' | '\EOM';

nl = '^?';
tab = 'î';
btab = '^b';
left = '^h' | '\E[D';
right = '^l' | '\E[C';
up = '^k' | '\E[A';
down = '^j' | '\E[B';
home = '\EOn';

delete = '^d';
eeof = 'ê';
einp = '^w';
insrt = '^ ';
```

```
pfk1 = '\EOq' | '\E1'; pfk2 = '\EOr' | '\E2'; pfk3 = '\EOs' | '\E3';
pfk4 = '\EOt' | '\E4'; pfk5 = '\EOu' | '\E5'; pfk6 = '\EOv' | '\E6';
pfk7 = '\EOw' | '\E7'; pfk8 = '\EOx' | '\E8'; pfk9 = '\EOy' | '\E9';
pfk10 = '\EOP\EOp' | '\E0'; pfk11 = '\EOP\EOq' | '\E-';
pfk12 = '\EOP\EOr' | '\E='; pfk13 = '\EOP\EOs' | '^f13';
pfk14 = '\EOP\EOt' | '^f14'; pfk15 = '\EOP\EOu' | '^f15';
pfk16 = '\EOP\EOv' | '^f16'; pfk17 = '\EOP\EOw' | '^f17';
pfk18 = '\EOP\EOx' | '^f18'; pfk19 = '\EOP\EOy' | '^f19';
pfk20 = '\EOQ\EOp' | '^f20'; pfk21 = '\EOQ\EOq' | '^f21';

pa1 = '\E\EOP' | '^p1';
pa2 = '\E\EOQ' | '^p2';

reset = '^t';
flinp = '^x';
reshow = '^v';
escape = '^c';
master_reset = '^g';

settab = '\E;';
deltab = '\E\'';
clrtab = '\E:';
setmrg = '\E,';
sethom = '\E.';
coltab = '\E\E[B';
colbak = '\E\E[A';
indent = '\E\E[C';
undent = '\E\E[D';
```

10 Other Services on the External Networks

A number of services other than Telnet, FTP and electronic mail are available via the Internet. These range from electronic databases of information, to real-time conferencing systems. The best way to learn about them is by using this guide and simply “playing” with them to get a feel for what is there and how to use them.

It would be near impossible to present every service available on the Internet in this users’ guide, so here are the major services. Additional services can be found using Gopher, WAIS or the Hytelnet package (described below).

For the most part, you really want to use a workstation to get to internet-gw, then to the service (using vt100 emulation mode for Telnet to internet-gw) to use these services. Telnetting from VM limits the interactiveness of the services (and indeed, some services simply can’t deal with the VM type terminal).

If you find any additional services that would be worthwhile to add here, let the author know, and I’ll get them in.

10.1 A Few words about X Windows

The current gateway configuration doesn't allow any X Windows transparency for security reasons (once you do an "xhost", you basically open up your system to anyone on the remote side where you're client is running). However, we do provide a number of X Windows clients on internet-gw, namely xarchie, xgopher and xmosaic. They actually run on internet-gw, but will display on your local Unix or OS/2 workstation.

If you're running OS/2, make sure to run PMX (the X Windows Server for Presentation Manager). You'll need to have this running before you telnet to internet-gw to start the client there.

Under Unix (AIX, etc.), you need to use the command "xhost internet-gw.watson.ibm.com" before you connnect to internet-gw to allow X clients to display on your workstation.

Also, if you're using an X Station, the DISPLAY variable will wind up wrong (it'll be set to your boot server and not your actual X Station). To fix this, use this command on internet-gw:

```
display xxx.xxx.xxx.xxx:y
```

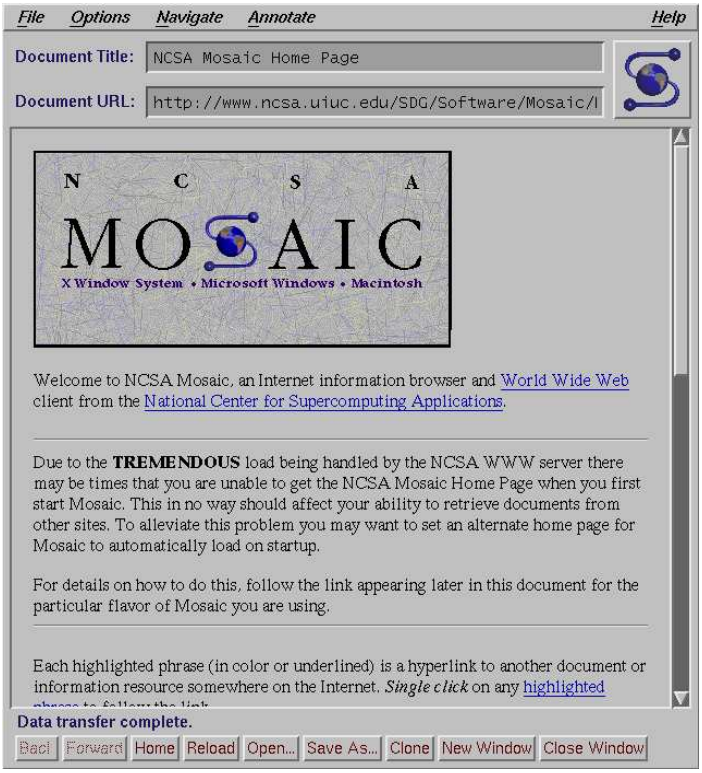
where "xxx.xxx.xxx.xxx" is the IP address of your X Station, and "y" is the display number (usually 0).

10.2 XMosaic

Okay, let's get right to it...XMosaic is the single best application for accessing information on the Internet. It's an X application so you need to do this from a workstation supporting X Windows.

XMosaic will get you to World Wide Web (WWW), Gopher, Wide Area Information Services (WAIS), Hytelnet (mentioned below) and much, much more. It's hypertext based, and you can get to places by simply clicking on the words in blue.

Here's the opening screen (note that the globe in the upper right hand corner turns as it's working on something):



It'll tell you exactly where you are in Internet information space at all times. The best way to learn about XMosaic is to simply try it. The best things to try are the XMosaic Demo Page to get a flavor of what's available, the What's New section to find out the latest, greatest information sources available on the net, the Suggested Starting points for Internet Exploration, and the Meta-Index which will try to show you everything available at a high level (go here if you want to get to services like Gopher, WAIS and Hytelnet).

The File menu will allow you to specifically open new windows, mail data back to yourself, and exit the program. Do not try to save data, as there is no way to get it back to yourself. You can mail it to your Internet address (i.e. userid@watson.ibm.com)...this will work for text, but you won't be able to get graphics this way.

The Options menu will allow you to change the display fonts and some other things for XMosaic. Navigate's menu provides a quick path to the Internet Resources Meta-Index and the "Suggested Starting Points for Internet Exploration".

Besides, it's fun to learn XMosaic this way...you'll be amazed at what you'll find. Also, if you want to do things efficiently, go into the Meta-Index and look at the various search engines available to search for information.

10.3 traceroute

Traceroute is a facility for finding out why you can't get to a remote site (specifically, where the link is broken). You can access it from internet-gw.

The syntax is simply "traceroute hostname"...you will then see an output that documents all the links between you and the remote host.

Here's an example of one where I say "traceroute ai.mit.edu"

```
traceroute ai.mit.edu
traceroute to ai.mit.edu (128.52.32.80), 30 hops max, 40 byte packets
 1  129.34.139.253 (129.34.139.253)  7 ms  6 ms  21 ms
 2  t1-5.New-York-cnss35.t3.ans.net (140.222.35.7)  93 ms  30 ms  13 ms
 3  t3-3.New-York-cnss33.t3.ans.net (140.222.33.4)  94 ms  29 ms  12 ms
 4  t3-3.New-York-cnss32.t3.ans.net (140.222.32.4)  94 ms  35 ms  12 ms
 5  t3-0.Hartford-cnss48.t3.ans.net (140.222.48.1)  94 ms  26 ms  13 ms
 6  t3-0.Hartford-cnss49.t3.ans.net (140.222.49.1)  93 ms  33 ms  14 ms
 7  t3-0.enss134.t3.ans.net (140.222.134.1)  94 ms  29 ms  17 ms
 8  w91-cisco-external-ether.mit.edu (192.54.222.1)  94 ms  24 ms  19 ms
 9  B24-CISCO-FDDI.MIT.EDU (18.168.0.6)  98 ms  33 ms  23 ms
10  * * *
11  GROSS.AI.MIT.EDU (18.10.0.9)  99 ms  30 ms  29 ms
12  life.ai.mit.edu (128.52.32.80)  100 ms  26 ms  37 ms
$
```

If the link is down between (1) and (2) above, or you don't even get to (1) above, that's when you need to contact the External Networking Administrator at Watson. Also, if a link is down for awhile, the External Networking Administrator may be able to help find out why it's taking so long to come back up.

10.4 dig

Dig is a tool for finding out what the IP address name is of a host on the Internet. The syntax is "dig server hostname type" where "type" is the type of nameservice record (e.g. an A record for the IP address).

Here's a sample I ran:

```
dig @watson.ibm.com wuarchive.wustl.edu a

; <<>> DiG 2.0 <<>> @watson.ibm.com wuarchive.wustl.edu a
;; ->>HEADER<<- opcode: QUERY , status: NOERROR, id: 10
;; flags: qr ; Ques: 1, Ans: 1, Auth: 3, Addit: 3
;; QUESTIONS:
;; wuarchive.wustl.edu, type = A, class = IN

;; ANSWERS:
wuarchive.wustl.edu. 172800 A 128.252.135.4

;; AUTHORITY RECORDS:
WUSTL.EDU. 172800 NS WUGATE.WUSTL.EDU.
WUSTL.EDU. 172800 NS WUARCHIVE.WUSTL.EDU.
WUSTL.EDU. 172800 NS ROUGE-GW.USL.EDU.

;; ADDITIONAL RECORDS:
WUGATE.WUSTL.EDU. 172800 A 128.252.120.1
WUARCHIVE.WUSTL.EDU. 172800 A 128.252.135.4
```

```
ROUGE-GW.USL.EDU. 172800 A 130.70.40.21

;; Sent 1 pkts, answer found in time: 197 msec
;; FROM: internet-gw.watson.ibm.com to SERVER: watson.ibm.com  129.34.139.4
;; WHEN: Mon Feb  8 13:41:50 1993
;; MSG SIZE  sent: 37  rcvd: 182
```

dig tends to be much better behaved than the older “nslookup” command.

10.5 whois

To look up people on other systems, you can telnet into “nic.ddn.mil” and use the “whois” service.

From the internet-gw gateway, telnet to “nic.ddn.mil”, and at the prompt, type “whois”. The service is pretty self-explanatory, but be warned some of the information on the service is out of date, and many, many people are not listed. If you know where someone is and the user isn’t in “whois”, then you probably will want to send a note to “postmaster@site” to find out the person’s current e-mail address (just as users send mail to postmaster@ibm.com to find out the e-mail addresses of IBM employees).

As a shortcut, from internet-gw, you can simply type `whois <name>` and the whois program there will automatically look up the data at nic.ddn.mil.

10.6 Hytelnet

A large number of library catalog systems are available on the Internet. The best reference to these systems the ‘Hytelnet” system. You can get to Hytelnet system from XMosaic or gopher. This system provides a quick mechanism for finding resources on the Internet (in catalog form).

10.7 Gopher

Gopher is a very user-friendly information service on the Internet. To get to it, you can telnet to internet-gw (using vt100 emulation is best), then telnet to gopher.uiuc.edu (login as gopher).

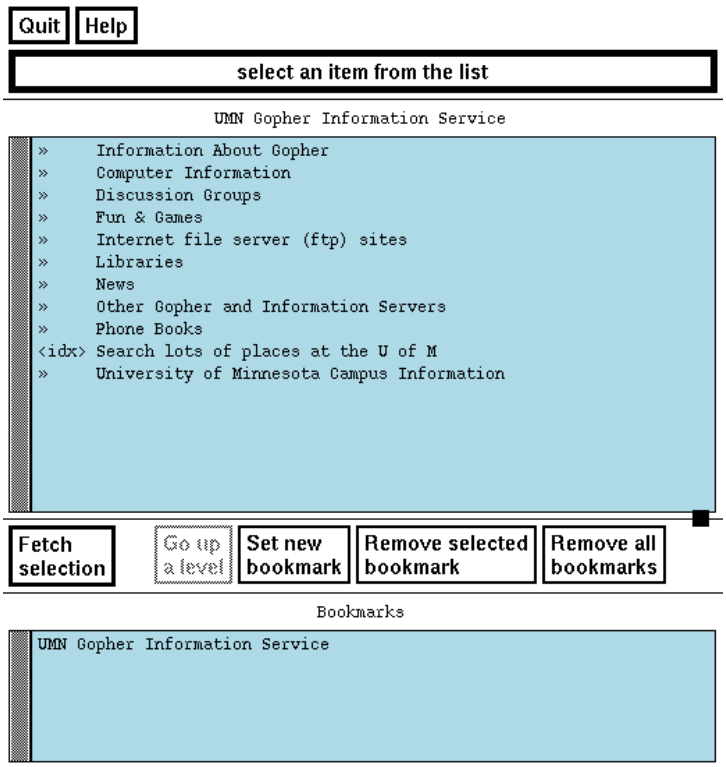
The system is tree structured. You can use the arrow keys to move up and down in the selections, < to page up, and > to page down. You can also get help anytime with the “?” command.

To go down the next level, simply put your cursor on the entry of your choice and hit the return key. To go back up to the previous menu, use the “u” command. To quit, use the “q” command.

Gopher is useful for tracking down documents all over the Internet, including standards documents (such as Internet RFC’s), Electronic Books, and “Frequently Asked Questions” guides. It also allows you to connect to other Gopher servers around the world, so you can search various servers via one Telnet session.

Note that there is also an “xgopher” server available on internet-gw. If you’re using X-Windows on your workstation, you can use the command “xgopher” and it will display the X client on your workstation (be sure to use the command “xhost internet-gw.watson.ibm.com” before telnetting to internet-gw).

Using xgopher, you get a client display that looks like this:



From here, simply move the mouse to the service you want to access, click it on, then click the “fetch” box...to move back up, you can use the “go up” button...for help, just click on the “help” button.

10.8 “Services” at Washington U.

Services is a server like Gopher. It provides a one-stop connection to many, many Internet services. It’s not quite as user friendly as Gopher, but does carry quite a bit of information. To use it, telnet to wugate.wustl.edu, and log in as services.

10.9 Archie

Archie is a service available on the Internet for locating various software packages. To use it, you first telnet to “archie.ans.net” and log in as “archie”. At that point, you can set various options and do searches for keywords, etc.

Here’s a sample session:

```
$ telnet archie.ans.net
Trying...
Connected to nis.ans.net.
```

```
Escape character is '^]'.


AIX telnet (nis.ans.net)

IBM AIX Version 3 for RISC System/6000
(C) Copyrights by IBM and by others 1982, 1990.
login: archie
*===============================================================*
|                 Welcome the ANS Archie Server !               |
|                                                               |
| *** As of 02/19/92, the default search method is set to "exact".  |
| *** Type "help set search" for more details.                  |
|                                                               |
| Australian users:   archie.au (139.130.4.6)                   |
| Canadian users:     archie.mcgill.ca     (132.206.2.3)        |
| European users:     archie.funet.fi      (128.214.6.100)      |
|                     archie.doc.ic.ac.uk  (146.169.11.3)       |
| Other U.S. servers:                                           |
| archie.sura.net (128.167.254.179)    archie.unl.edu  (129.93.1.14) |
| archie.rutgers.edu (128.6.18.15)                              |
|                                                               |
| ** 'help' for help                                            |
| ** Problems reports and questions to archie-admin@ans.net     |
| ** Please report problems !                                   |
|                                                               |
| Client software is available on ftp.ans.net:/pub/archie/clients,  |
| and documentation can be found in /pub/archie/doc on the same     |
| machine.                                                      |
*===============================================================*
# term set to ibm6155 24 80
```

At this point, I usually set the options for regular expression searches (so I can use wildcard searches) and the pager option so it only displays a screen at a time.

```
archie> set search regex
archie> set pager
```

Now, to do the search, I simply use the keyword “prog” followed by the string to search on...the locations of all the “hits” show up from the search:

```
archie> prog vt100

Host wuarchive.wustl.edu   (128.252.135.4)
Last updated 17:22 13 Jul 1992

    Location: /usenet/comp.binaries.amiga/volume2/comm
      FILE      rw-rw-r--     57363  Dec 15  1988   vt100r28a.uu1.Z
    Location: /usenet/comp.binaries.amiga/volume89/comm
      FILE      rw-rw-r--     57923  Oct 20  1989   vt100r29.uu1.Z
```

```
Host simpson.germany.eu.net   (192.76.144.75)
Last updated 15:10 13 Jul 1992

    Location: /pub/newsarchive/comp.binaries.amiga/volume89/comm
      FILE      rw-r--r--     57671  Jan 24  1990   vt100r29.uu1.Z

Host wuarchive.wustl.edu   (128.252.135.4)
Last updated 17:22 13 Jul 1992

    Location: /usenet/comp.binaries.amiga/volume89/comm
      FILE      rw-rw-r--     57323  Oct 20  1989   vt100r29.uu2.Z

Host simpson.germany.eu.net   (192.76.144.75)
Last updated 15:10 13 Jul 1992

    Location: /pub/newsarchive/comp.binaries.amiga/volume89/comm
      FILE      rw-r--r--     57125  Jan 24  1990   vt100r29.uu2.Z
```

By using the “help” command at the archie prompt, you can get help on various archie functions:

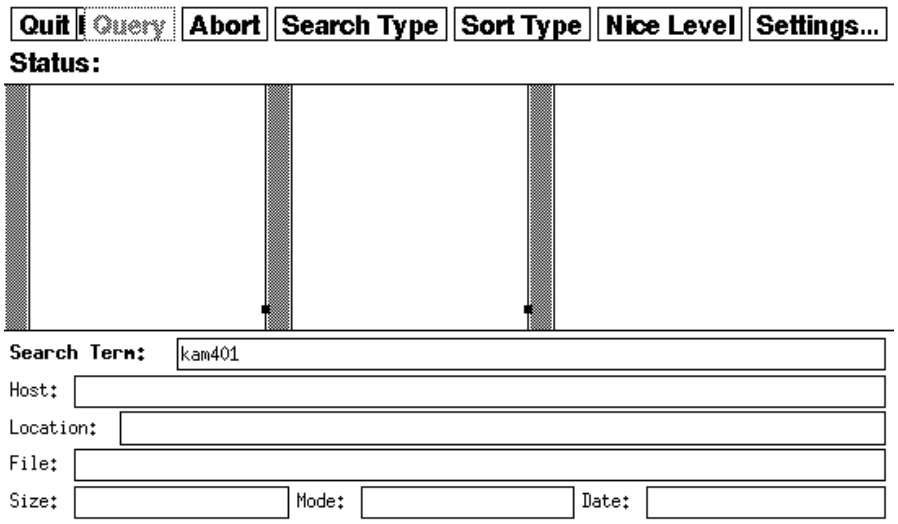
```
archie> help

 Help gives you information about various topics, including all the
 commands that are available and how to use them.  Telling archie about
 your terminal type and size (via the "term" variable) and to use the
 pager (via the "pager" variable) is not necessary to use help, but
 provides a somewhat nicer interface.

 Currently, the available help topics are:

    about   - a blurb about archie
    bugs    - known bugs and undesirable features
    bye     - same as "quit"
    email   - how to contact the archie email interface
    exit    - same as "quit"
    help    - this message
    list    - list the sites in the archie database
    mail    - mail output to a user
    nopager - *** use 'unset pager' instead
    pager   - *** use 'set pager' instead
    prog    - search the database for a file
    quit    - exit archie
    set     - set a variable
    show    - display the value of a variable
    site    - list the files at an archive site
    term    - *** use 'set term ...' instead
    unset   - unset a variable
    whatis  - search for keyword in the software description database

 For information on one of these topics type:
```

```
   help <topic>


 A '?' at the help prompt will list the available sub-topics.


Help topics available:
        about   bugs    bye     email
        list    mail    nopager pager
        prog    regex   set     show
        site    term    unset   whatis

Help topic?
```

To quit, simply type “quit”.

“xarchie”, an X-windows based archie client is also available on internet-gw, which allows one to use the “xarchie” command and have it display the X client on your workstation (if you’re running X windows). Make sure to use the command “xhost internet-gw.watson.ibm.com” on your local workstation before you access internet-gw.

The xarchie display looks like this:



To search, simply type the string in the “Search Term” box, then click on “Query”.

Note that due to the way Archie was designed, it’s almost always faster to telnet into an Archie server and run a search rather than using the X interface.

10.10 Internet Relay Chat (IRC)

Internet Relay Chat (IRC) is a real-time conferencing system (imagine a VM Tell session with multiple people). It runs 24 hours a day and always has people on it from all over the world. You can create public

or private electronic conferences with others on the internet, basically anytime you want to.

To use it, you can telnet to internet-gw in vt100 mode, then type “irc”. It will split the screen into two sections, the top section for messages to you, and the bottom input line, with a status line separating them). You will automatically be connected to the IRC system, and your userid there will be the same as your login userid.

If you are on VM and telnet to internet-gw, use the command “irc -d”...you won’t have the same screen format, but everything will work the same way.

All the commands are proceeded with a “/”, and help is available with the command “/help”...for newusers, “/help newuser” will give information on starting out with IRC.

The IRC system is split up into a number of “channels”, each starting with a “#”. To see which channels are active, type “/list”. To see who is on a certain channel (say #talk), then use “/who #talk”.

To join a channel, simply type “/join (channel)”. Then, anything you type not beginning with a “/” will be sent to everyone on the channel. To quit the channel, use the “/part” command. To quit, use the “/bye command”.

You can also send private messages to someone by using the command “/msg nickname message”. If you receive a private message, it will be headed by the user’s nickname surrounded by asterisks.

10.11 Wide Area Information System (WAIS)

WAIS is a distributed database that is useful for locating documents on the Internet. To start using it, telnet to internet-gw, using vt100 mode (this won’t work from VM), then telnet to quake.think.com, and login as wais.

It will bring up a menu of databases you can search. You can choose the database by using the spacebar to toggle on or off the database. Then, you can select the keywords to search on. When you hit the Return key, WAIS will connect to the remote database(s) and find any matching documents.

When items are found, it will give you a list of “hits”...you can select a particular item using the spacebar, and WAIS will display that entry on your screen.

To move around, you can use the arrow keys to move up and down, Control-v to page down, and escape-v to page up (just like EMACS). You can get help anytime by using the “?” command. If the screen looks messed up, you can use Control-l to redraw the screen.

You can also get to WAIS using the xgopher service (see the section on Gopher). Select “other gopher and information services”, then at the bottom of the next screen select “WAIS Information Servers”. This allows you to access WAIS through the Gopher-WAIS gateway (it’s very nice, in my humble opinion).

10.12 Library of Congress

An electronic version of the Library of Congress card catalog is available via the Internet. To access it, telnet to dra.com (using vt100 terminal emulation). The system is self explanatory, and allows searches by title and author[2].

[2] According to this card catalog, Richard Cavendish, in 1978, wrote the book *King Arthur & the Grail: the Arthurian legends and their meaning*...and I thought it was just something made up by the Monty Python folks.

11 IBM Mail Exchange

IBM Mail Exchange is a service provided by IBM Information Network to exchange mail with other IBM Mail Exchange subscribers and X.400 mail services such as:

- AT&T Easylink
- AT&T Mail
- GEIS Quick Comm
- US Sprint SprintMail
- MCI Mail
- BT Tymnet Dialcom 400
- Netherlands National PT&T MEMOCOM 400-NET

To get a userid for IBM Mail Exchange, send a note to REGISTER at IBMMAIL. You will get a userid assigned that looks like USIBMxxx, where xxx is a three-digit alphanumeric id. Then your address will be IBMMAIL(USIBMxxx). There is also a way to designate for yourself an X.400 mail address. By the way, you have no choice as to your IBM Mail Exchange userid.

For more information, you can obtain the full IBM Mail Exchange Handbook by using the following command on VM:

```
TOOLS SENDTO KGNVMZ TOOLS IBMVM GET IMX4IBM SCRIPT
```

For questions and additional assistance, you can subscribe to the MAILEXCH FORUM on IBMVM.

12 USENET

USENET is a news system (similar to our forums, but with less control over content), that runs across many different networks ranging from the Internet and other TCP/IP networks to dial-up Unix connections and much inbetween. It is a common meeting ground for folks of all ilk to discuss anything and everything.

In a joint venture between the Agora Project and External Networking Systems, USENET is available within IBM in a very transparent fashion. The first thing you need is software to access the newsservers (yktnews and hawnews). If you are part of Agora, the software will be there already (most likely “rn”, “trn”, “xrn”, or “gnus”). For OS/2 users, an NNTP (Network News Transfer Protocol) client called NR/2 comes with the standard TCP/IP implementation.

The other thing you’ll need is documentation to get used to the world of USENET (which can be very different from internal forums). The best book currently is probably by Grace Todino and Dale Dougherty called *Using*

UUCP and Usenet (published by O'Reilly & Associates). The Krol book mentioned in the "Other Resources" section also covers Usenet, but not much on the actual news software commonly in use at Watson.

An additional benefit of using the news software and USENET is that the internal forums are also carried as USENET news groups, such that you only need to use the news software to have access to both USENET and internal forums.

For those on VM, you can read the technical USENET newsgroups by subscribing to them on the NETFORUM conference disk (they all have the filetype USENET).

13 Questions and Answers

(I'm looking for more input here...send additional questions and answers if you have them to NRT at WATSON or nrt@watson.ibm.com)

Q. When I telnet out via internet-gw from my Unix workstation and run Emacs on a remote system, I get hung when I type control-S and/or my screen doesn't look right. What can I do about this?

A. Mark Kennedy, here at Watson, makes the following recommendations (he's one of my best customers...NRT). He says you should run the real xterm on your Unix system (/local/bin/X11R5/xterm), and before telnetting out to internet-gw, using the command `stty -ixon -ixoff -ixany`. Once on internet-gw, use the commands `stty start u` and `stty stop u`.

Q. Why can't I save stuff out of xmosaic (or xgopher or xarchie)?

A. Because we use a secure gateway (internet-gw), we don't allow users their own home directories nor a way to get files back to their workstations. However, all is not lost. If you use xmosaic, you can click on the File menu, and mail the file back to your Internet address (e.g. yourid@watson.ibm.com).

14 Other Resources

There are a number of resources available to find out more about the external networks and how to use them.

The Internet Request For Comments (RFC) documents are available on the RFC disk (use `GIME RFC` to link the disk). These documents represent technical information (e.g. specifications for the TCP/IP protocols used on the Internet) and user information. For new Internet users, the following are probably most helpful:

- RFC1118 - Hitchhikers guide to the Internet
- RFC1206 - FYI on Questions and Answers: Answers to commonly asked "new Internet user" questions
- RFC1207 - FYI on Questions and Answers: Answers to commonly asked "experienced Internet user" questions

Of course, you can also get to these documents via XMosaic on the Internet.

On the IBMUNIX disk, a list of sites supporting Anonymous FTP on the Internet and what they provide is available (called ANONFTP SITES). Simply type (on VM)

```
GIME IBMUNIX
```

to link the IBMUNIX disk. You can XEDIT or brows the file at your convenience.

Two very good books on various networks and how to get mail "from here to there" are available. The more detailed one is John Quarterman's *The Matrix* (Bedford, MA: Digital Press, 1990), which provides an excellent in-depth view of many, many networks. A briefer, yet still useful document is *!%@:: A Directory of Electronic Mail Addressing and Networks* (Sebastopol, CA: O'Reilly & Associates, 1989). Either of these two books is useful if you're trying to send or receive electronic mail to other networks.

A new book is available by Ed Korl called *The Whole Internet User's Guide & Catalog* (Sebastopol, CA: O'Reilly & Associates, 1992). Ed wrote the original Hitchhiker's Guide to the Internet mentioned above, and has done a great job providing a single answer book for consumers of the Internet.

The External Networking group also functions as a resource for finding things on the Internet/BITNET (such as what Internet mailing lists are available in a certain topic). If you need this type of assistance, you can call or e-mail the author of this document for help. If you're interested in library resources, the Watson Library staff can help you (they have been working hard to become Internet literate and have done quite well...they are pushing quickly into the Internet age).

15 About the Author

Nick Trio (NRT) is in charge of external networking (Internet) for the IBM T.J. Watson Research Center, is the UNIX “expert” on the IBM Computer Emergency Response Team (CERT), and chairs the IBM Internet Coordination Council. He serves as IBM’s representative on the Internet Society Advisory Council. He also runs the IBMUNIX conference disk. Nick holds a BA and MA in Sociology, and an MS in Information Science, all from the U. of Pittsburgh. Nick joined IBM in August 1987, and is currently a staff programmer.