

A
Northern Illinois University
Academic Computing Services
Workshop

UNIX Internet Utilities

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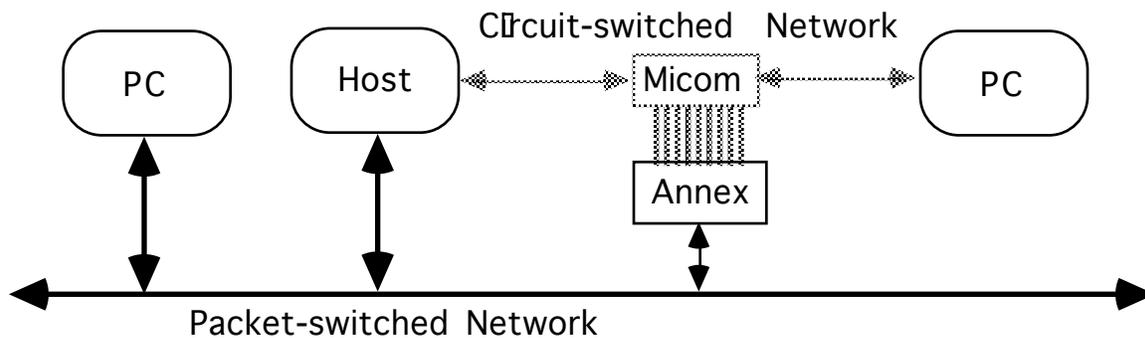
This workshop is a series of examples of the utilities that you can use to navigate the Internet. The following utilities are examined.

Telnet for access to a UNIX system in ACS
Tn3270 for access to MVS/SuperWylbur at NIU
Ftp for file transfer from McGill University in Montreal
Archie for ftp information from
Gopher for information about University of Minnesota
Ping for testing a connection to a system
Nslookup for information on Internet addresses

Telnet for Access to UNIX System at ACS

Telnet provides terminal access to multiple remote systems on a packet-switched network for entering arbitrary commands that are interpreted by the remote system.

Multiuser systems on campus are generally on the NIU packet-switched network "NIUnet". They can be reached by other workstations on this network or by other workstations which are directly connected (or dialing-in to the Micom RS232C circuit switch).



A UNIX System on the NIU packet-switched network can be accessed as a remote system from any personal computer that is also on the network and that uses the TCP/IP suite of communications software. The PCs in SP10A use the Novell LAN Workplace variant of the TCP/IP *telnet* command which provides remote access as a DEC vt220 terminal on the network.

`tnvt220 nirvana` Accesses the ACS Sun SPARCStation.

The hostname *nirvana* is translated through a table on the PCs to the network of the ACS host system.

Most UNIX systems present a *login:* prompt to check account access. Enter your account username and press Enter to identify yourself. A *password:* prompt is displayed. Enter the account password and press Enter to verify your identity. The password is not displayed as a security measure, but if you know that you typed it wrong, you can use `BACKSPACE` to erase erroneous characters, and then retype the correct characters. Successfully accessing a system through the *login:* and *password:* prompts is often called *logging in*.

If the login/password combination does not match with the system values, UNIX will respond with *login incorrect*, and redisplay the *login:* prompt. Some systems may redisplay the *login:* prompt a limited number of times.

When the login/password combination is recognized by the system, it displays several messages and finally a command line prompt.

If the system prompts for a terminal type, enter `vt220` and press `ENTER`.

`ENTER` Scrolls the screen
and displays another prompt.

The typical prompt for new accounts is the percent sign (%).
This prompt is characteristic of the *C shell* command interpreter.
The *C shell* (the command interpreter) uses any non-zero number of spaces or tabs to separate the parts of a command line.

The UNIX systems on the packet-switched network can also be reached by first going through the Micom circuit switch to get to the Annex terminal switch (*umax*) which is on the packet-switched network.
The Annex allows terminals and PCs acting as terminals on the circuit-switched network access to the packet-switched network.

The following steps describe how to reach the ACS Sun SPARCstation through the Micom from the Stevens Lab.

`BREAK BREAK BREAK ENTER` Requests the Micom menu
over a Data-Over-Voice (DOV) line.
Another procedure is required for dial-in.

`umax` Requests an Annex network connection.

`ENTER ENTER` Requests the *annex:* prompt.

`telnet nirvana.acs` Accesses the ACS Sun SPARCStation.

Because ACS is on a different subnet than the Annex,
you must use the hostname and subnet of the ACS host system.

`ALT T` Switches to *telnet* command mode.

`?` Displays a list of *telnet* commands.

`ALT T` Switches to *telnet* command mode.

status	Displays the current connection and the mode then returns to <i>telnet</i> connect mode.
resume	Returns to the remote session.
ALT S	Switches to <i>telnet</i> Setup Menu.
ALT T	Switches to <i>telnet</i> command mode.
open mp.cs.niu.edu	Begins a session with another system.
ALT N	Switches to the next session (nirvana).
ALT D	Switches to DOS.
exit	Returns to <i>telnet</i> .
ALT T	Switches to <i>telnet</i> command mode.
session	Displays the opened sessions.
close 2	Ends the session with the Encore.
quit	Terminates all sessions and returns to DOS.

Tnvt220 can be configured to convert various ends of lines and to handle line or character and ASCII or binary modes.

TN3270 for Access to MVS/SuperWylbur at NIU

TN3270 provides telnet access to IBM mainframe systems that use the IBM 3270 terminal/controller protocol. The IBM telnet server will only handle IBM 3270 emulation so tn3270 converts the character stream for the local system.

tnvt220 mvs.cso.niu.edu	Displays garbage when the NIU MVS system is accessed.
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<code>ALT T</code>	Escapes to <i>telnet</i> command mode.
<code>quit</code>	Terminates <i>telnet</i> .
<code>tn3270 mvs.cso.niu.edu</code>	Displays the NIU VTAM access screen.
<code>ALT T</code>	Escapes to <i>tn3270</i> command mode.
<code>?</code>	Displays a list of <i>tn3270</i> commands.
<code>ESCAPE 3</code>	Closes the VTAM session.

TN3270 Keys for Novell LAN Workplace

<code>ENTER</code>	<code>RETURN</code>	<code>CLEAR</code>	<code>CTRL Z</code>
<code>NEWLINE</code>	<code>CTRL N</code>		
<code>TAB</code>	<code>CTRL I</code>	<code>BACK TAB</code>	<code>CTRL B</code>
<code>CURSOR UP</code>	<code>CTRL K</code>	<code>CURSOR RIGHT</code>	<code>CTRL L</code>
<code>CURSOR LEFT</code>	<code>CTRL H</code>	<code>CURSOR DOWN</code>	<code>CTRL J</code>
<code>DELETE CHAR</code>	<code>CTRL D</code>	<code>ERASE EOF</code>	<code>CTRL E</code>
<code>INSERT TOGGLE</code>	<code>ESCAPE SPACE</code>	<code>ERASE INPUT</code>	<code>CTRL W</code>
		<code>ERASE FIELD</code>	<code>CTRL U</code>
<code>ERROR RESET</code>	<code>CTRL R</code>	<code>PA1</code>	<code>CTRL P 1</code>
<code>PURGE INPUT</code>	<code>CTRL X</code>	<code>PA2</code>	<code>CTRL P 2</code>
<code>KEYBOARD UNLOCK</code>	<code>CTRL T</code>	<code>PA3</code>	<code>CTRL P 3</code>
<code>REDISPLAY SCREEN</code>	<code>CTRL V</code>		
<code>PF1</code>	<code>ESCAPE 1</code>	<code>PF11</code>	<code>ESCAPE -</code>
<code>PF2</code>	<code>ESCAPE 2</code>	<code>PF12</code>	<code>ESCAPE =</code>
<code>PF3</code>	<code>ESCAPE 3</code>	<code>PF13</code>	<code>ESCAPE !</code>
<code>...</code>	<code>...</code>	<code>...</code>	<code>...</code>

Rlogin, Rsh, and Rcp

Remote UNIX systems can be accessed from trusted systems without logging in.

rlogin nirvana	Establishes a TCP/IP network connection with a predefined system <i>localhost</i> sending the TERM variable.
exit	Terminates the session on the remote system.
rlogin -l acs### nirvana	Establishes a TCP/IP network connection with a predefined system <i>localhost</i> using the login <i>username</i> and sending the TERM variable.
exit	Terminates the session on the remote system.
rsh -l acs### localhost "ls"	Executes a command on a remote UNIX system using the command interpreter (shell) from /etc/passwd on the remote system.
rcp -r nirvana:myfile myfile2	Copies a directory and its subdirectories from a remote UNIX system to the local system.

The local username must exist on the remote system because *rcp* does not prompt for it as *rlogin* and *rsh* do.

```
rcp -r acs###@nirvana:remote_pathname local_pathname
```

Copies a directory and its subdirectories
from a remote UNIX system
to the local system
after prompting for a password for username.

Rpr and *rpd* can be used to send files to a remote printer.

X Windows for Graphical Remote Access

The X Windows system provides remote access to remote systems through a windowed, menued, graphical user interface that uses a mouse or other pointing device.

Multiple connections can be simultaneously displayed on one screen.

The window server consists of a local display server, a user interface, and a window manager.

A remote program communicates with the display server across the network sending output to be displayed and expecting input from the keyboard and pointer.

Ftp for Network File Transfer

FTP provides reliable file transfer between systems on a TCP/IP network.

It allows more interaction with the remote system than does *rcp*.

Some of the commands that give information about local files may not be available.

<code>ftp nisc.jvnc.net</code>	Establishes a file transfer session on the system <i>nisc.jvnc.net</i> over a TCP/IP network.
<code>anonymous</code>	Allows access at the login: prompt.
<code>name@acs.niu.edu</code>	Identifies a user in response to the password: prompt.

status Describe the current configuration.

FTP allows you to configure the file transfer with character type (ascii, ebcdic, or binary) and file structure (stream or record).

ascii Sets *ftp* to exchange data ignoring the eighth bit that is not used in text definitions.

binary Sets *ftp* to exchange data in full eight-bit bytes.

? Displays a list of *ftp* commands.

pwd Displays the current remote directory.

ls Displays the filenames in the current remote directory.

dir Displays complete information on files in the current remote directory.

lpwd Displays the current local directory.

lls Displays the filenames in the current local directory.

ldir Displays complete information on files in the current local directory.

cd pubs Changes directory to *pubs*.

ls Displays the filenames in the current remote directory.

cd msdos Changes directory to *msdos*.

ls	Displays the filenames in the current remote directory.
cd archie	Changes directory to <i>archie</i> .
!mkdir mydir	Escapes to DOS and creates a directory.
lcd mydir	Changes the current local directory.
get archie.zip	Receives a copy of a file from the remote system. A second filename is needed only when you want to change the file name.

Multiple files can be transferred with *mput*, *mget*, and the wildcard ***.

open cs.niu.edu	Begins a session with another system.
close	Ends the session with the other system.
quit	Signals the end of input and terminates <i>ftp</i> .

FTP can also create and remove remote directories and rename and remove remote files.

Archie for Ftp Information From

To use *ftp* you must know where to find the file that you are after. Archie servers can save you time searching across the Internet because they periodically search across the Internet sorting and saving the information about the filenames that they find. Archie servers are accessed using Archie clients because they know how to exchange information. You could use the Archie client that we just downloaded, you could access a multiuser system that gives you access to a client, or you can mail an Archie query to the server.

telnet archie.unl.edu	Accesses the Archie server at Nebraska.
archie	Responds to the <i>login:</i> prompt requesting access to (as) <i>archie</i> .
servers	Displays the known Archie servers.
help	Displays a list of commands.
show	Displays the variable settings.
show search	Displays the type of match used in a search.
set search sub	Requests matching substrings in filenames.
set search regex	Requests interpreting wildcards in searches.
set search exact	Requests exact matches with filenames.
set maxhits 10	Requests a limit on the filenames displayed.
set pager	Requests that the display of information be halted after every screenful.
prog pcgopher	Searches for the "program" <i>pcgopher</i> .
whatis pcgopher	Displays the existing description for <i>pcgopher</i> .
mail <i>your_address</i>	Send a copy of the last search.
help set sort	Displays the sorting options.
quit	Exits Archie.
Requests can be mailed to Archie servers.	
mail archie@archie.unl.edu	Sends a message of requests to the server.

An Archie client can be used to send requests as single commands.

```
archie -h archie.unl.edu -m5 -l -s pcgopher
```

Requests the same search,
but with one line per filename.

Gopher for Information about University of Minnesota

The Internet Gopher is a tool for browsing information published as text on the Internet using a menu system. The text information is published on a Gopher server. A Gopher client is executed locally to access the server. It is not necessary to use telnet to get terminal access to a remote system, although some systems (consultant.micro.umn.edu and gopher.uiuc.edu under username gopher) allow you to telnet and execute the client there. One benefit of Gopher is that it is easy to publish information on a Gopher server: Copy a text file into the Gopher directory structure and the filename becomes its title in the menu.

The server administrator can also arrange full-text indices for searching information on the Gopher server, telnet connections through the gopher server to other systems, access to Archie servers, access to ftp servers, examine on-line library holdings, get weather information Gopher knows which programs to use to get information for you without you having to know how to access the information. The client displays a menu, the server send directions to get your selected information, and the client connects the system described in the directions (recording where you were) to get the information.

```
gopher gopher.umn.edu      Connects to the gopher server  
                           at the University of Minnesota.
```

```
?                           Displays Gopher help.
```

Press the item number or use the direction keys to select a menu item and press ENTER to go to the item.

Items that end with a slash are submenus.

u Returns to the previous menu.

> Displays the next page of a menu.(.)

The page number is displayed in the lower right corner of the screen.

< Displays the previous page of a menu. (,)

Items that end with a period are text files.

SPACE Displays the next page of text.

q Returns to the menu without finishing.

At the end of the text, you can obtain the text or return to the menu.

s Uses ftp to transfer the text to a file on your system.
Gopher prompts for its name.

m Mails you a copy of the text.
Gopher prompts for your preferred address.

Items that end with <CSO> are phonebooks.

Phonebooks provide a search menu.

Select a menu item for Name, Phone, E-Mail, or Address, and type words for which to search.

The wildcard * can be used in a word to match any characters and the list [*list*] can be used to limit a match to characters in the list.

1 Selects the Name search.

[Pp]rais Searches for *Prais* and *prais*.

Items that end with <?> are indices.

These items prompt for word(s) to search for and display menu choices based on what it finds.

Searches are case-insensitive and can be tuned with *and*, *or*, and *not*.

Place words that are found together in double quotes.

= Displays the directions that the server sends the client.

q Exits Gopher.

Testing an Internet connection with Ping

Ping is used to check that another node on the Internet is capable of responding.

Ping is a term used distance sensing in SONAR.

ping vm.cso.niu.edu Checks whether NIUVM is alive.

Nslookup for Information on Internet Addresses

The NIU packet-switched network is a combination of Ethernet network segments and Token Ring network segments.

The nodes on these networks are identified by *Internet or IP addresses* which are quartets of eight-bit numbers,

that is, numbers between 0 and 255.

For instance, 131.156.7.2 is the address of the ACS Sun and

131.156.1.18 is the address of MVS on the NIU Amdahl.

The most significant number is the leftmost.

The first three numbers indicate the net-subnet corresponding to an organization and the rightmost number indicates the system (node).

The subnet number identifies a portion of the organization.

There are four types (classes) of network addresses.

Type	net	subnet	system	systems/net
A	X. 0+(7-bit network)	X.X. (24-bit host)	X	256 ³ 0.0.0.0 - 127.255.255.255
B	X.X. 10+(14-bit network)	X. (16-bit host)	X	256 ² 128.0.0.0 - 191.255.255.255
C	X.X.X. 110+(21-bit network)		X (8-bit host)	256 192.0.0.0 - 223.255.255.255
D	X.X.X.X 111+(29-bit special)			1 224.0.0.0 - 255.255.255.255

While an Internet or IP address is the surest way to reach a system, it is often difficult to remember.

Nodes are also given a word address.

For instance, *nirvana.acs.niu.edu* is the address of the ACS Sun and *mvs.cso.niu.edu* is the address of MVS on the NIU Amdahl.

The significance of this address is opposite that of the IP address.

The leftmost word is the hostname; the next word is the department; and the last two words is the organization.

These system names are associated with the IP addresses in a file (host table) on the local system.

tnvt220 nirvana Accesses the ACS Sun SPARCStation.

The hostname *nirvana* is translated through a table on the PCs to the network of the ACS host system.

Most UNIX systems present a *login:* prompt to check account access.

Enter your account username and press Enter to identify yourself.

A *password:* prompt is displayed.

Enter the account password and press **ENTER** to verify your identity.

more /etc/hosts Displays system names and IP addresses known to the local system.

Some systems are configured to interrogate other systems called *nameservers* for the address corresponding to a system name.

hostname	Displays the name of local system.
/usr/etc/ping mvs.cso.niu.edu	Checks the connection to the Amdahl.
/usr/etc/nslookup mvs.cso.niu.edu	Displays the Internet address of MVS.
/usr/etc/nslookup	Starts the interactive nameserver query tool.
help	Displays commands for <i>nslookup</i> .
set all	Displays configuration for <i>nslookup</i> including default nameserver and recent host.
server niu.edu	Changes the default server to <i>niu.edu</i> .
ls niu.edu	Displays hosts known to the <i>niu.edu</i> nameserver.
nirvana.acs	Displays the address of host <i>nirvana</i> in the domain <i>acs.niu.edu</i> .
finger <i>your_username</i>	Displays information about your account on the most recently named host.
ls niu.edu > niu_domain	Puts into the file <i>niu_domain</i> information about hosts known to <i>niu.edu</i> nameserver.
view niu_domain	Displays information in <i>niu_domain</i> .
ls -h niu.edu	Displays the types of systems known to the default server.
exit	Exits <i>nslookup</i> .

`finger your_username` Displays a description of your account.

`finger another_username` Displays a description of another account.

`finger` Displays a description of the active accounts.

`finger another_username@another_system`
Displays a description of another account on another system without using *nslookup*.

`logoutEnter` Terminates your UNIX session.

Places to go -- Things to see

`ftp seq1.loc.gov` `pub/vatican`
Vatican exhibit at Lib of Congress

`telnet spacelink.msfc.nasa.gov` login: newuser password: newuser
NASA and space flight

`ftp ux1.cso.uicu.edu` `doc/pcnet`
PC conversion software

`gopher gopher.ora.com`
`telnet gopher.ora.com` login: gopher O'Reilly and Associates Books

`telnet rusmv1.rus.unistuttgart.de` login: infoserv
University of Stuttgart cookbook

`telnet freenet-in-a.cwru.edu`
Cleveland Free-Net

`finger quake@geophys.washington.edu`
Earthquake Info

`gopher gopher.nsf.gov?`

telnet stis.nsf.gov login:public	NSF Science and Technology Info
telnet pac.carl.org	Colorado Association of Research Libraries catalog
telnet info.rutgers.edu library reference	Oxford Dictionary of Familiar Quotes
ftp coe.montana.edu	pub/TV TV series archives
telnet tycho.usno.navy.mil login: ads	US Naval Obsevatory time
telnet sol.bucknell.edu 185	
telnet nri.weston.va.us 185	Knowbot Information Server for Internet info
gopher	
telnet madlab.spri.umich.edu 3000	Weather Underground
ftp ox.ac.uk	pub/ota Oxford Text Archives
ftp mrcnext.cso.uiuc.edu	pub/etext Project Gutenberg texts
telnet well.sf.ca.us	The Well Whole Earth Catalog