



Version 1.02

Thursday 20th May 1993

Abstract

Trawl is an intuitive network management utility that allows its user to gather information from an AppleTalk Internet. It facilitates the manipulation and presentation of the gathered data by various means including exporting to other programs.

Introduction

Since its inception in 1984, the Macintosh has included both the hardware and software for low cost networking. The foresight shown by the Macintosh design team ensured that developers would write software to take advantage of its inherent abilities. Today the Macintosh is possibly the most widely networked computer and out of these simple beginnings, Macintosh networking has matured to provide faster transport mechanisms as well as advanced services such as file serving, electronic mail, program linking, distributed computing, shared printers, network modems and remote access. The growth and increasing complexity of AppleTalk internets has meant that management of these networks has become correspondingly more difficult. A new type of commercial network software has been developed to facilitate easier management. *Trawl* seeks to eventually provide many of the capabilities and services of these commercial products in an affordable and simple to use shareware package.

Trawl allows a network manager to selectively scan an AppleTalk internet and produce a pictorial view of the network with the devices and services found represented as icons. From this display, which is similar to the Finder's display of files, further information may be obtained about specific devices by selecting the desired icons and choosing the required action through the available menus. Furthermore, the data obtained through the network scan may be exported to other programs for further use either as a pictorial view of the network or as textual data.

Program Development

After completing an insipid first year Pascal and Software Engineering course at University, I wanted to apply the knowledge gained to something more practical than the rather useless tasks we were given. This, together with a desire to learn how to use the Macintosh toolbox and an interest in computer networking has led to my first Macintosh programming effort. Despite the vast range of shareware currently available *Trawl* is as far as I know a unique network utility.

Early in my design I made a decision not to support System software prior to System 7—I expected the majority of potential users to be network managers of some capacity, and by virtue most (if not all) should be using current software. *Trawl* is therefore fully System 7 compatible, 32 bit clean, and compatible with virtual memory and 040 caching. I have performed fairly extensive testing on a variety of Macintosh models and found it to be stable on the Mac Plus, Mac LC, Mac LCII, Mac IIcx, Mac SE/30, and Quadra 700.

Trawl was totally built in Symantecs' excellent Think Pascal development environment. However, I plan to port my code over to C, pending the availability of the next version of Symantecs' Compiler.

About The Author

I am a second year Electrical Engineering undergraduate at the University of Technology, Sydney. I have particular interests in computer internetworking and Macintosh software development.

I welcome any questions, suggestions or comments you may have about this initial release of *Trawl* or, in the unlikely event, about any bugs you may encounter ;-).

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Registering Your Copy

Trawl is distributed as shareware. It is not a free product! You may use the program on a trial basis for up to 7 days, but if after this period you decide to continue using it you are obligated to pay the current registration fee of US\$10 (or equivalent) preferably in cash. Upon registration, I can send you (electronically only) a registered version. I will also send to you future versions as they are released.

I encourage you to give the *Trawl* package to your friends, however be sure to give them the whole package and remind them that the copy they receive should be registered!

How To Use Trawl

This document assumes that you know how to operate the Macintosh and are familiar with basic Macintosh terminology. Otherwise, you should first refer to your Macintosh User's Guide.

Initiating a network search

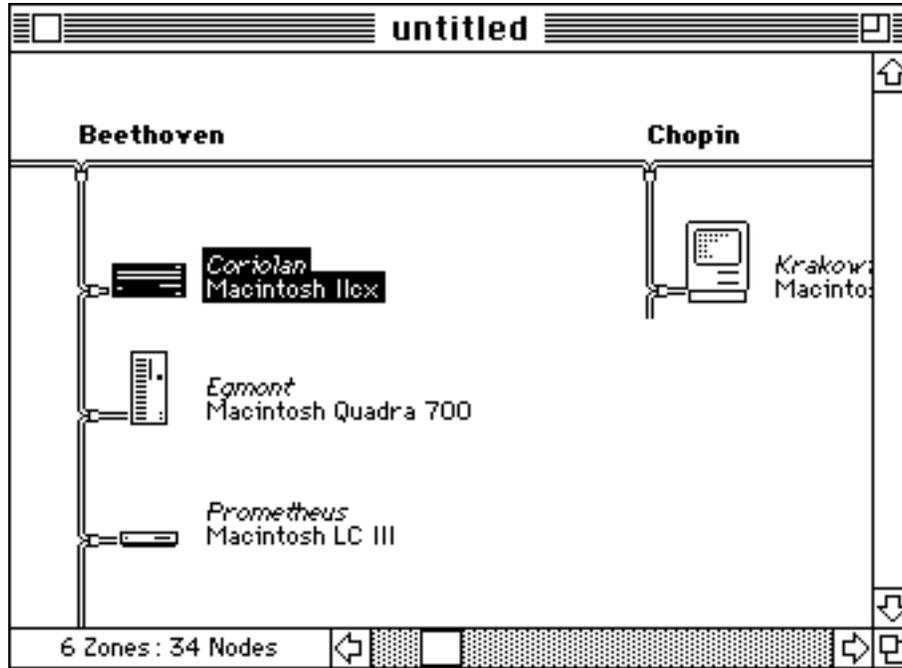
After launching *Trawl* from the Finder, you will be prompted by a dialog (as shown below) giving you a list of the zones available to search on your AppleTalk internet. Initially every zone is selected and will therefore be searched, however you may deselect the zones you don't need to search (thereby decreasing the time taken to perform the network search) by clicking on individual zones to select/deselect them. You may also, as a shortcut, click on the "None" button to deselect all zones and then reselect the zones you wish to search. When you have completed your selections, click the "Scan" button or hit return. The time taken for the search to complete will vary wildly, depending upon the number of zones you are searching, the amount of memory available to *Trawl*, and the setting of *Trawl*'s preferences, however you can generally expect that it will take less than 1 second per zone. The network search executes as a background process, so it is possible to switch to, and work with, other applications while you are waiting.



The network window

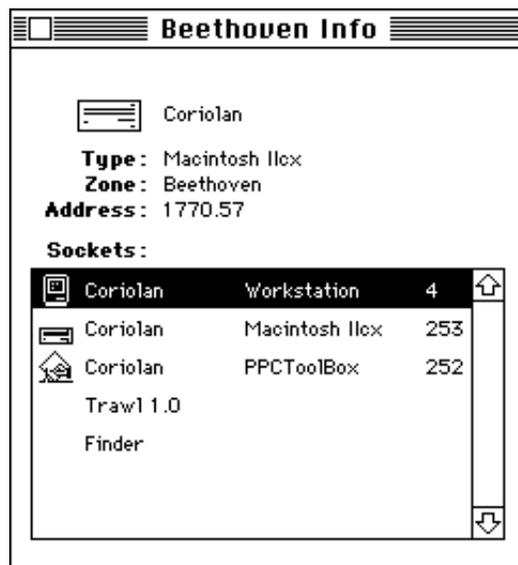
When the network search has completed *Trawl* will display the results in an untitled window. This window may either be displayed as an 'Icon' or 'Zone' view. In this 'Icon View' (shown below) the network topology is represented graphically as a 'backbone' of AppleTalk zones. Zone names are displayed in alphabetical

order across the top of the window and the nodes belonging to each zone are chained underneath. In the 'zone' view, zones and the nodes belonging to each zone are presented in a list going down the window. In either view, individual nodes can now be selected/deselected with the mouse using methods that are similar to manipulating icons in the Finder.



Info Dialog

To obtain more detailed information about individual nodes, you must either first select the appropriate nodes and then choose "Get Info" from the "Node" menu (or press Command-I), or alternatively, double click on the required nodes. You will be presented a window similar to the one below for each node you have selected. This 'Info' window provides you with the node information already available from the network window as well as its address, registered sockets and program ports.



Echoing

By sending an AppleTalk 'echo' packet to a remote node and timing the delay before it returns, network performance monitoring is made possible. You can echo a node with either a network window or node info dialog at the forefront by choosing "Echo" from the "Node" menu (or press Command-E). You will be presented with a dialog showing a column graph of the echo delay vs. time for the node you have selected. This graph presents the delays as vertical bars, while the minimum, maximum and average delays are shown as horizontal lines (in colour, the minimum and maximum values are shown in red, while the average is blue). At the bottom left of this dialog the minimum, maximum, average and current delay and hop values are shown numerically for the node (hops represents the number of routers the echo packet has passed through when sent to the node).

Please note: some AppleTalk nodes (particularly old LaserWriters) do not support the AppleTalk Echo protocol, and will therefore show a loss rate of 100%.

Exporting

You may export the information obtained through a network search as either the pictorial view of the network (as displayed in the network window's "Icon" view), or as a tab-separated list of every node and their sockets. First you must bring a network window to the front and then choose "Export..." from the "File" menu. You will be presented with a standard file dialog in which you must specify the position, name, and type of the new file, and then click the "Export" button.

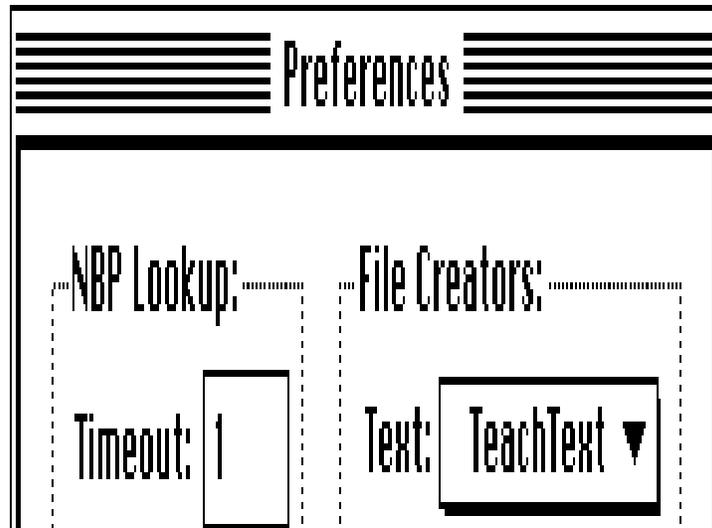
Preferences Dialog

Trawl allows you to control some of its internal settings through a preferences dialog. To access it, choose "Preferences" from the "Edit" menu—you will be presented with the dialog shown below.

The "NBP Lookup" panel controls aspects of the network search (or Name Binding Protocol Lookup as it is technically known). The "retries" field controls how many times *Trawl* will search each zone, while the "Timeout" field controls how long *Trawl* will wait for nodes to reply during each zone search. The default setting for both fields are general settings which will work well for most networks, however the optimum settings are specific to the internet in which you will be using *Trawl*. They depend upon the number of routers/gateways you have, the physical size of the network and the amount of network traffic present. Unless you understand how each parameter is affected by the characteristics of your network, you probably shouldn't change the default settings.

The "When Lookup Finishes" panel allows you to control what level of notification *Trawl* will provide if it is not the foreground application when the network search completes. You have the choice of no notification, a diamond next to *Trawl*'s name in the Application menu, or a diamond as well as *Trawl*'s icon being flashed in the menubar.

The "File Creators" panel allows you to specify what creator *Trawl* will assign to files it creates when exporting a network window.



Technical Notes

Trawl performs the network search using the services of the AppleTalk Name Binding Protocol. It will initiate concurrent NBP lookups of as many zones as possible in order to reduce the time taken to complete the search. However, two factors govern how many lookups can be performed in parallel and therefore how quickly the search will be completed.

- The number of concurrent NBP lookups your AppleTalk version allows.
- The amount of free memory available to *Trawl* to allocate a buffer for each lookup.

You may find how many concurrent lookups your computer allows by checking *Trawl*'s "About box" (on most computers I have seen, AppleTalk has a limit of 10), however it is obviously beyond your control, apart from installing a later version of AppleTalk from Apple's Network Software installer.

The second factor can be changed by adjusting *Trawl*'s memory setting in the Finder. *Trawl* must be able to maintain a 10 kilobyte buffer for each lookup during the network search—therefore for a search to complete in the minimum of time, it would typically need to maintain 100 kilobytes of buffers. If *Trawl*'s free memory becomes critically low during a search, it will stop some lookups and recover the memory used by their buffers—you should therefore allow *Trawl* enough memory for both the lookup buffers as well as any data that will be created as a result of the search.

During the network search, *Trawl* attempts to assign an icon to each node's sockets—to do this it uses a resource 'sMap'. For every socket, it will descend through the 'sMap' list until it finds a match with the socket's Type—it will then use the corresponding icon ID specified by the resource. The node's primary socket (the socket that is drawn in the 'Icon' view) will be the socket that has a match highest in the 'sMap' list. By using ResEdit, you may add your own icons to *Trawl* (however, they should be marked as purgeable) as well as fields to the 'sMap' resource. You may also wish to send me your icons and I will include them in future releases.

Future Development

I have long term goals and strategies for the development of *Trawl*, however, at present two factors are hampering my development efforts:

- an acute lack of time, and
- a lack of information resources on Macintosh programming—I don't have ready access to the old Inside Macintosh series, and most of the new Inside Macintosh books are so far unavailable.

Features that are likely to be added to future versions include:

Remote control of Macintoshes (by the sending of AppleEvents across a network)

This will facilitate such actions as Shutting Down/Restarting a remote computer.

Increased number of View options

View by net, node, socket type etc.

Rescanning a network

This will show how a network has changed since the previous scan.

Network monitoring/node failure notification

Trawl will monitor specified nodes and provide notification if they disappear from the network.

SNMP management station support

Something of a holy grail for network management, however this will require a large amount of work for complete implementation.

Distribution Rights and Legal Information

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Version History

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|------|---------------|---|
| 1.0 | 14 April 1993 | Initial release |
| 1.01 | 3 May 1993 | Fixed a build problem that caused certain Macs to crash either with 'Illegal Instruction' or 'Address Error'
Added printing of both the icon and zone views
Windows now remember their positions across 'quits'
Expanded the list of available PICT and Text creator types |
| 1.02 | 20 May 1993 | Added AppleTalk Echo facilities (aka Pinging)
Improved the network search's memory management |