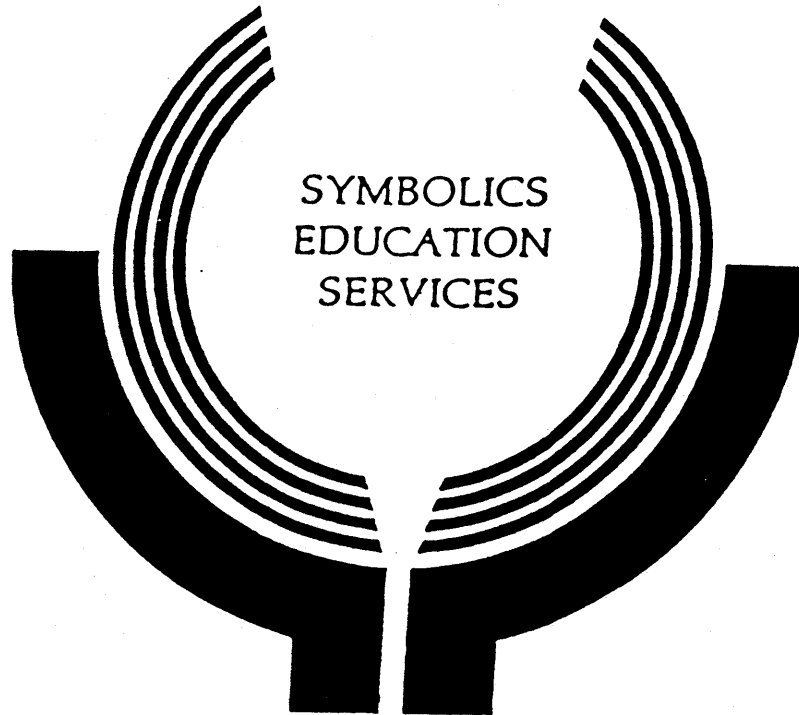


Site Maintenance



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December 17, 1986

Errata for Site Administration Notes

1. p. 2, under "Mouse Documentation lines". Change "thirds" to "third"
2. p. 47, in the righthand column. "Add" should be removed
3. p. 51, in the small.boot example. The second line should read:
Declare Paging fep0:>page
4. p. 51, third to last line. "it's" should be capitalized.
5. p. 60, step 6 isn't really a separate step.
6. p. 64, line 2. Change "buy" to "by".
7. p. 77, third paragraph from the bottom. "eg." should be "e.g."
8. p. 78, in the example at the bottom. The lines which begin:
0 100 200 300 400.....
should end:
35100 35200 35337
9. p. 79, step 3. Typing FUNCTION m-C will not have any effect on the saved world, as Genera 7.0 resets the mouse documentation line before saving the world. Instead, go to FSEdit and edit the root directory on the file server.
10. p. 82, top line in section 9.2. Insert "has" after "Each object."
11. p. 86, last paragraph. "5 thru 8" should be "5 thru 7."
12. p. 87, second to last paragraph. Again, "eg." should be "e.g."
13. p. 102, two-thirds of the way down the page. Change "Insert the following lines" to "Insert the following line"

Site Maintenance

November 1986

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1. System Overview

Lisp Machine Anatomy
Who's Who On The Network
Controlling The Processor
Getting Out Of Stuck States

1.1 Lisp Machine Anatomy

The Symbolics 3600-series computer is a single user computer, just like your favorite microcomputer. We use the term "3600-series" because there are several different models that Symbolics sells (and has sold) that are very similar.

Symbolics 3600-series computers have two major physical parts, the console and the processor box.

In the processor box you will find:

- Front End Processor (FEP) board
- Lisp Processor board(s)
- Memory board(s)
- Disk drive(s)
- Paddle Card(s)
- Cooling Fans, etc.

On the outside of the processor box are RESET and POWER switches. On most machines these are two buttons. On the 3650 they are part of a key operated switch. On the 3600 they are toggle switches. You will also find (on most models) serial and parallel ports and a network connection. At least one machine at each site will have a tape drive. There is nothing user-serviceable inside the processor box.

The console has three parts: the screen, the keyboard and the mouse.

When the Lisp software is running, the *screen* has three particularly interesting areas.

Status line The very bottom line contains some generally useful information.

Mouse Documentation lines
The second and thirds lines from the bottom (typically in reverse video) tell you what each of the three mouse buttons would do if you pressed it now.

Main Screen Everything above the status and mouse documentation lines is available for use by any program or system utility.

The keyboard is an extended keyboard. It has all of the normal computer keyboard keys as well as some that are unique to Symbolics.

The *mouse* has three buttons. These are called "Left", "Middle" and "Right".

Symbolics Genera™ 7.0

This machine is *Symbolics S4CC Kenai Fjords*, a Symbolics 3640™.

Symbolics Genera 7.0 (S4CC)
Loaded from FEPO:>s4cc-genera-7-0.load.1
2048K words Physical memory, 37312K words Swapping space.

Genera 7.0

You are typing to *Dynamic Lisp Listener 1*.
Control characters are interpreted as commands to edit input.
Type Control-**Q** for a list of input editor commands.

Use the "Help" command to display a list of all the Command Processor commands.
Type **CTRL-D** to select Document Examiner™ to read online documentation.
Type **CTRL-HELP** for a list of programs.
Type **CTRL-WINDOWS-HELP** for a list of asynchronous and window operations.
Hold down Shift and click the rightmost mouse button to select the System Menu of programs and window operations.
Type Symbol-**HELP** for a list of special function keys and special character keys.

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see important legal notices. Symbolics, Genera, Symbolics
3600, Symbolics 3640, and Document Examiner are trademarks
of Symbolics, Inc.

Command:

Dynamic Lisp Listener 1

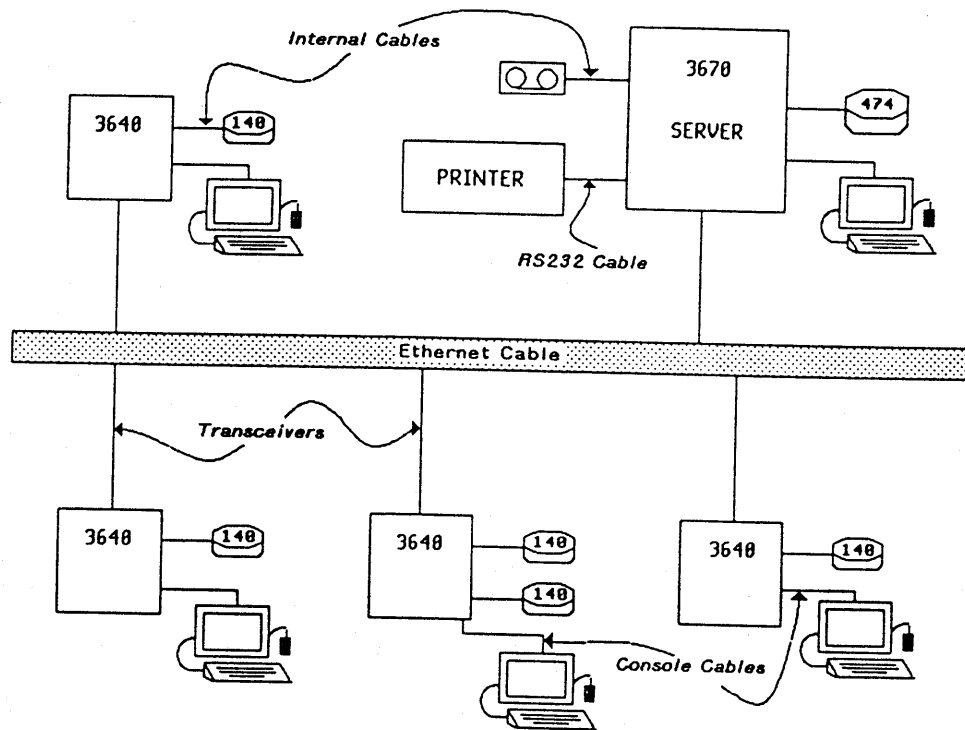
Mouse-L: Select Activity Document Examiner; Mouse-R: Menu.
To see other commands, press Shift, Control, Control-Shift, Meta-Shift, or Super.

[Fri 21 Nov 11:00:35]

CL-USER: User Input

Kenai Fjords

Diagram Of A Typical Network



1.2 Controlling The Processor

1.2.1 Stopping the processor

You can do either of the following to stop execution of the Lisp processor. Each has a time and place where it is most useful:

- Command: Halt Machine
- Press the keys: Hyper Control Function together

After either of the above actions you will see the following prompt at the top of your screen:

```
Lisp stopped itself  
FEP Command:
```

On very rare occasions you might have to stop the processor using the RESET switch on the processor box.

1.2.2 Booting the processor

The subject of booting will be covered in detail later in the course, but for now, when you are ready to restart Lisp you can enter the following command:

```
Fep Command: Boot
```

1.2.3 Controlling the console

LOCAL B	Screen gets <i>brighter</i>
LOCAL D	Screen gets <i>dimmer</i>
LOCAL L	Makes the audio <i>louder</i>
LOCAL Q	Makes the audio <i>quieter</i>
LOCAL n C	Changes the contrast of the screen. "n" is a number from one to four. Four is the highest contrast.

Note: On the beige keyboard even though the LOCAL key has white lettering, you must press it simultaneously with the key it modifies.

1.3 Getting Out Of "Stuck States"

Things that can get you into stuck states

- Killing windows
- Overlapping windows
- Aborting out of menus

Things that can get you out of stuck states

- Function Escape causes the window that wants to display something new to be exposed. This command is useful for the conditions *Output Hold* and *Sheet Lock*.
- Function O-S brings up any window that wants to display an error.
- Function c-T clears temporary window system locks. This command is useful for *Sheet Lock*.
- Function c-Clear Input clears all window system locks. This command is useful for *Sheet Lock*.
- Function - A (Function minus A) Unarrests a window which has become arrested. This is useful for the *Arrested* condition.
- The condition (*no window*) occurs when the window system is confused as to which is your current window. Selecting another window should clear this up.
- If you find your self in the *cold load stream* the window system is in trouble. Read the information displayed by the debugger carefully and take appropriate action. Usually, ABORT is the right thing to do.
- If you were thrown into the cold load stream because the window system is locked up usually "unlock all window system locks?" is one of your options. You should respond "Yes".

2. Lisp Machine File System

The Root
Directories
Files
Fsedit

2.1 The File System

The Lisp Machine file system is a tree (hierachy) of *files* and *directories*. The directory that is at the root of the tree is called the *root directory*. The following are some of the features of the Symbolics file system:

- A file has a *name*, an *extension* (or *type*), and a *version*
- The name can be a string of any length
- The extension can be a string of up to fourteen characters
- The version is a positive integer from one to 16,777,215
- The name and extension strings are case insensitive
- You cannot have the characters "<.:\" or \"Return\" in the name or extension
- Soft deletion is supported (Delete / Undelete / Expunge)
- Files and directories maintain information about their author, creation date, etc. called *properties*

Listed below are some of the file extensions and files that are important to most people who use the Lisp machine:

File extensions

text	Character files that contains text of some sort
lisp	Character files that contain Lisp source code
bin	Binary files that contain compiled programs

2.2 Pathnames

A Symbolics computer generally has access to many file systems. All the files in these file systems can be accessed by their pathname. Pathnames are composed of the following parts:

2.2.1 Pathname components

- Host
- Directory
- File

2.2.2 Pathname examples

;;; Lisp machine pathnames

host:>directory>file

cd:>sys>site>sys.translations

anni:>dog-house>bed>bone-to-pick.lisp.22

;;; Unix pathnames

host:/directory/file

vixen:/ufs/fred/notes.txt

;;; VMS pathnames

host::dsk:[directory]file

drkstr::aiko:[roy]concerts.txt

There are other forms of pathnames that we will discuss in the chapters on Backups, the FEP file structure and Installing Software

2.3 The File System Editor (FSEdit)

FSEdit is a menu-oriented program for dealing with the file system. It can be used by anyone to access their own files and directories, and by the system administrator to perform backups and do other more basic operations to the file system. To use *FSEdit* enter `SELECT F`.

FSEdit has a four level menu structure. The operations available become more dangerous and less useful for the average user as you proceed to higher level menus. Level 1 is useful to all users. Level 2 contains basic operations for the System Administrator. Level 3 contains more powerful/dangerous operations for the System Administrator. Level 4 contains operations useful only to wizards who understand the internals of the File System.

In this chapter we will concentrate on level one. The three most important menu items at this level are:

- Tree Edit Root
- Tree Edit Any
- Tree Edit Home Dir

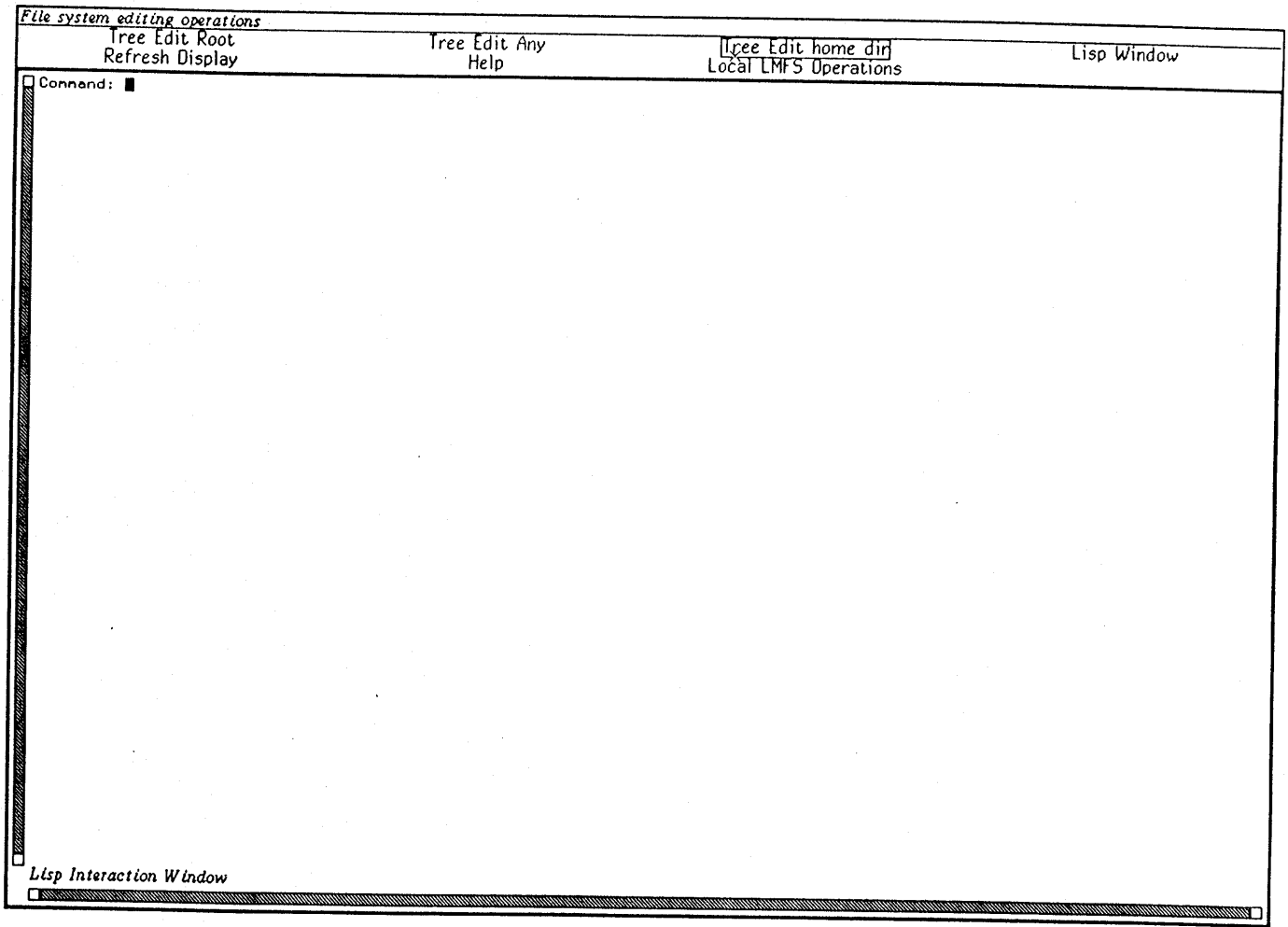
FSEdit Level One Menu

When you edit a directory the inferior directories are listed first followed by the files contained in that directory. Every directory and file is mouse sensitive. The meanings of the mouse clicks are as follows:

Left	Open the directory (Display its contents)
Middle	Close the directory containing this file.
Right	Menu of operations

The rest of this chapter will be screen snapshots demonstrating the following uses of *FSEdit*.

- Tree Edit Any
- Opening/Closing directories
- Deleting and Undeleting files
- Expunging directories
- Automatic expunging of old deleted files
- Controlling the number of versions of a file



File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
H:>eric-wolf>x.x.x			
>eric-wolf>c11-course			
>eric-wolf>c12-course			
>eric-wolf>course-evaluation			
>eric-wolf>genera-7-8-course			
>eric-wolf>hacks			
>eric-wolf>nail			
>eric-wolf>nenos			
>eric-wolf>micro-courses			
>eric-wolf>personal			
>eric-wolf>projects			
>eric-wolf>sales-course			
>eric-wolf>site-course			
>eric-wolf>ta-job			
>eric-wolf>w&f-course			
>eric-wolf>workbooks			
babyl.text.2912 52 235112(8) 11/21/86 11:53:12 (11/21/86)			
babyl.text.2913 53 238343(8) 11/21/86 12:09:11 (11/21/86)			
lispn-init.bin.25 1 1152(16) 11/14/86 18:35:17 (11/21/86)			
lispn-init.lisp.59 1 3221(8) 09/25/86 10:40:11 (11/14/86)			
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)			
things-to-do.text.3 1 460(8) 08/14/86 16:55:10 (08/14/86)			
znail-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)			
znail-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)			

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
-----------------------------------	-----------------------	---	-------------

```

M:>eric-wolf>x.s.s
>eric-wolf>c11-course
>eric-wolf>c12-course
>eric-wolf>course-evaluation
>eric-wolf>genera-7-8-course
>eric-wolf>hacks
>eric-wolf>nail
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>w&f-course
>eric-wolf>workbooks
baby1.text.2912 52 235112(8) | 11/21/86 11:53:12 (11/21/86)
baby1.text.2913 53 238343(8) | 11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25 1 1152(16) 11/14/86 18:35:17 (11/21/86)
lispn-init.lisp.59 1 3221(8) 09/25/86 18:40:11 (11/14/86)
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)
things-to-do.text.3 1 460(8) 08/14/86 16:55:18 (08/14/86)
zmail-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)
zmail-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)

```

File operations: M:>eric-wolf>things-to-do.text.3

- Delete
- View
- Rename
- View Properties
- Edit Properties
- New Property
- Edit File
- Hardcopy
- Load

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
-----------------------------------	-----------------------	---	-------------

```

H:>eric-wolf>*.z.*
>eric-wolf>c11-course
>eric-wolf>c12-course
>eric-wolf>course-evaluation
>eric-wolf>genera-7-0-course
>eric-wolf>hacks
>eric-wolf>mail
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>u&f-course
>eric-wolf>workbooks
baby1.text.2912 52 295112(8) | 11/21/86 11:53:12 (11/21/86)
baby1.text.2913 53 298343(8) | 11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25 1 1152(16) 11/14/86 18:05:17 (11/21/86)
lispn-init.lisp.59 1 3221(8) 09/25/86 10:40:11 (11/14/86)
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)
things-to-do.text.3 1 460(8) 08/14/86 16:55:18 (08/14/86)
zmail-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)
zmail-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)

```

File operations: H:>eric-wolf>things-to-do.text.3

- Undelete
- View
- Rename
- View Properties
- Edit Properties
- New Property
- Edit File
- Hardcopy
- Load

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<pre> H:>eric-wolf>*.x.* >eric-wolf>c11-course >eric-wolf>c12-course >eric-wolf>course-evaluation >eric-wolf>genera-7-0-course >eric-wolf>hacks >eric-wolf>nail >eric-wolf>nenos >eric-wolf>micro-courses >eric-wolf>personal >eric-wolf>projects >eric-wolf>sales-course >eric-wolf>site-course >eric-wolf>ta-job >eric-wolf>u&f-course >eric-wolf>workbooks baby1.text.2912 52 23E baby1.text.2913 53 23E lispn-init.bin.25 1 lispn-init.lisp.59 1 lispn-init.lisp.60 1 things-to-do.text.3 1 zmail-init.bin.22 1 zmail-init.lisp.63 1 </pre>			
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>File operations: H:>eric-wolf>things-to-do.text.3</p> <ul style="list-style-type: none"> Delete View Rename View Properties <u>Edit Properties</u> New Property Edit File Hardcopy Load </div>			

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
-----------------------------------	-----------------------	---	-------------

```

W:>eric-wolf>*.*.
>eric-wolf>c11-course
>eric-wolf>c12-course
>eric-wolf>course-evaluation
>eric-wolf>genera-7-0-course
>eric-wolf>hacks
>eric-wolf>mail
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>w&f-course
  
```

Change properties for W:>eric-wolf>things-to-do.text.3

Generation Retention Count: 3
 Modification Date: 8/14/86 16:55:18
 Reference Date: 8/14/86 16:55:18
 Creation Date: 8/14/86 16:55:18
 Author: "eric-wolf"
 Deleted: Yes No
 Don't Reap: Yes No
 Don't Delete: Yes No
 Don't Delete Reason: None

Abort Done

File system editing operations

Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	
H:>eric-wolf>*.*.*			
>eric-wolf>c11-course			
>eric-wolf>c12-course			
>eric-wolf>course-evaluation			
>eric-wolf>genera-7-8-course			
>eric-wolf>hacks			
>eric-wolf>mail			
>eric-wolf>nenos			
>eric-wolf>micro-courses			
>eric-wolf>personal			
>eric-wolf>projects			
>eric-wolf>sales-course			
>eric-wolf>site-course			
>eric-wolf>ta-job			
>eric-wolf>w&f-course			
>eric-wolf>workbooks			
babyl.text.2912	52	235112(8)	11/21/86 11:53:12 (11/21/86)
babyl.text.2913	53	238343(8)	11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25	1	1152(16)	11/14/86 18:35:17 (11/21/86)
lispn-init.lisp.59	1	3221(8)	09/25/86 10:40:11 (11/14/86)
lispn-init.lisp.60	1	3153(8)	11/14/86 18:34:48 (11/17/86)
things-to-do.text.3	1	460(8)	• 08/14/86 16:55:18 (08/14/86)
zmail-init.bin.22	1	1460(16)	09/25/86 15:47:59 (11/21/86)
zmail-init.lisp.63	1	3205(8)	09/25/86 15:47:55 (10/08/86)

File system editing operations

	Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
W:\>eric-wolf>*.z.*				
>eric-wolf>c11-course				
>eric-wolf>c12-course				
>eric-wolf>course-evaluation				
>eric-wolf>genera-7-0-course				
W:\>eric-wolf>hacks>*.z.*				
D	check-nail.bin.4	1 1184(16)	08/08/86 13:47:55 (09/18/86)	eric-wolf
	check-nail.bin.5	1 1187(16)	09/23/86 16:17:26 (11/21/86)	eric-wolf
D	check-nail.lisp.4	1 3195(8)	08/08/86 13:42:09 (09/23/86)	eric-wolf
	check-nail.lisp.5	1 3212(8)	09/23/86 16:17:01 (11/17/86)	eric-wolf
	connands.lisp.3	1 411(8)	05/21/85 15:52:44 (08/03/86)	JLB
	copy-tree.lisp.1	1 892(8)	05/16/85 11:05:07 (08/03/86)	BIGBOB
	delete-tree.lisp.1	1 892(8)	05/16/85 11:04:58 (08/03/86)	BIGBOB
	nelt.lisp.1	2 4670(8)	09/09/86 14:53:37 (09/09/86)	eric-wolf
	nelt.lisp.2	2 3827(8)	09/17/86 10:59:12 (09/19/86)	eric-wolf
	overnight.bin.2	1 569(16)	07/08/85 13:25:19 (08/03/86)	eric-wolf
	overnight.lisp.2	1 853(8)	07/08/85 13:21:53 (08/03/86)	eric-wolf
>eric-wolf>nail				
>eric-wolf>nenos				
>eric-wolf>micro-courses				
>eric-wolf>personal				
>eric-wolf>projects				
>eric-wolf>sales-course				
>eric-wolf>site-course				
>eric-wolf>ta-job				
>eric-wolf>waf-course				
>eric-wolf>workbooks				
	babyl.text.2912	52 235112(8)	11/21/86 11:53:12 (11/21/86)	
	babyl.text.2913	53 238343(8)	11/21/86 12:09:11 (11/21/86)	
	lispn-init.bin.25	1 1152(16)	11/14/86 18:35:17 (11/21/86)	
	lispn-init.lisp.59	1 3221(8)	09/25/86 10:40:11 (11/14/86)	
	lispn-init.lisp.60	1 3153(8)	11/14/86 18:34:48 (11/17/86)	
	things-to-do.text.3	1 460(8)	08/14/86 16:55:18 (08/14/86)	
	zmail-init.bin.22	1 1460(16)	09/25/86 15:47:59 (11/21/86)	
	zmail-init.lisp.63	1 3205(8)	09/25/86 15:47:55 (10/08/86)	

File system editing operations

Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	

```

M:>eric-wolf>x.lisp
>eric-wolf:
>eric-wolf:
>eric-wolf:
>eric-wolf:
M:>eric-wolf:
D check-naif Create Inferior Directory 17:55 (09/18/86) eric-wolf
D check-naif View Properties 17:26 (11/21/86) eric-wolf
D check-naif Edit Properties 12:09 (09/23/86) eric-wolf
check-naif New Property 17:01 (11/17/86) eric-wolf
connands. Create link 12:44 (08/03/86) JLB
copy-tree. Rename 15:07 (08/03/86) BIGBOB
delete-tr Wildcard Delete 10:45 (08/03/86) BIGBOB
nelt.lisp Link Transparencies 13:37 (09/09/86) eric-wolf
nelt.lisp 15:12 (09/19/86) eric-wolf
overnight. 15:19 (08/03/86) eric-wolf
overnight.lisp.2 1 853(8) 07/08/85 13:21:53 (08/03/86) eric-wolf
>eric-wolf>naif
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>w&f-course
>eric-wolf>workbooks
babyl.text.2912 52 235112(8) | 11/21/86 11:53:12 (11/21/86)
babyl.text.2913 53 238343(8) | 11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25 1 1152(16) 11/14/86 18:35:17 (11/21/86)
lispn-init.lisp.59 1 3221(8) 09/25/86 18:40:11 (11/14/86)
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)
things-to-do.text.3 1 460(8) 08/14/86 16:55:18 (08/14/86)
znaif-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)
znaif-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)
  
```

Directory operations: >eric-wolf>naifs

- Delete
- Close
- Decache
- Exchange

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
-----------------------------------	-----------------------	---	-------------

```

M:>eric-wolf>*.x.*
>eric-wolf>c11-course
>eric-wolf>c12-course
>eric-wolf>course-evaluation
>eric-wolf>genera-7-0-course
M:>eric-wolf>hacks>*.x.*
check-nail.bin.5 1 1187(16) 09/23/86 16:17:26 (11/2
check-nail.lisp.5 1 3212(8) 09/23/86 16:17:01 (11/1
connands.lisp.3 1 411(8) 05/21/85 15:52:44 (08/8
copy-tree.lisp.1 1 892(8) 05/16/85 11:05:07 (08/8
delete-tree.lisp.1 1 892(8) 05/16/85 11:04:58 (08/8
nelt.lisp.1 2 4670(8) 09/09/86 14:53:37 (09/8
nelt.lisp.2 2 3827(8) 09/17/86 10:59:12 (09/1
overnight.bin.2 1 569(16) 07/08/85 13:25:19 (08/8
overnight.lisp.2 1 853(8) 07/08/85 13:21:53 (08/8
>eric-wolf>nail
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>w&f-course
>eric-wolf>workbooks
babyl.text.2912 52 235112(8) | 11/21/86 11:53:12 (11/21/86)
babyl.text.2913 53 238343(8) | 11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25 1 1152(16) 11/14/86 18:35:17 (11/21/86)
lispn-init.lisp.59 1 3221(8) 09/25/86 10:40:11 (11/14/86)
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)
things-to-do.text.3 1 460(8) 08/14/86 16:55:18 (08/14/86)
zmail-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)
zmail-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)

```

Directory operations: >eric-wolf>hacks

- Delete
- Close
- Decache
- Expunge
- Create Inferior Directory**
- View Properties
- Edit Properties
- New Property
- Create link
- Rename
- Wildcard Delete
- Link Transparencies

File system editing operations

Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	

```

M:>eric-wolf>*.x.*
>eric-wolf>c11-course
>eric-wolf>c12-course
>eric-wolf>course-evaluation
>eric-wolf>genera-7-8-course
M:>eric-wolf>hacks>*.x.*
check-mail.bin.5 1 1187(16) 09/23/86 16:17:00
check-mail.lisp.5 1 3212(8) 09/23/86 16:17:00
comnands.lisp.3 1 411(8) 05/21/85 15:52:44
copy-tree.lisp.1 1 892(8) 05/16/85 11:05:07 (08/03/86)
delete-tree.lisp.1 1 892(8) 05/16/85 11:04:58 (08/03/86)
nelt.lisp.1 2 4678(8) 09/09/86 14:53:37 (09/09/86)
nelt.lisp.2 2 3827(8) 09/17/86 10:59:12 (09/19/86)
overnight.bin.2 1 569(16) 07/08/85 13:25:19 (08/03/86)
overnight.lisp.2 1 853(8) 07/08/85 13:21:53 (08/03/86)
>eric-wolf>mail
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>u&f-course
>eric-wolf>workbooks
babyl.text.2912 52 235112(8) | 11/21/86 11:53:12 (11/21/86)
babyl.text.2913 53 238343(8) | 11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25 1 1152(16) 11/14/86 18:35:17 (11/21/86)
lispn-init.lisp.59 1 3221(8) 09/25/86 10:40:11 (11/14/86)
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)
things-to-do.text.3 1 460(8) 08/14/86 16:55:18 (08/14/86)
zmail-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)
zmail-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)

```

File name for directory, under >eric-wolf>hacks:
special-hacks

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
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```

M:>eric-wolf>*.*.
>eric-wolf>c11-course
>eric-wolf>c12-course
>eric-wolf>course-evaluation
>eric-wolf>genera-7-8-course
M:>eric-wolf>hacks>*.*.
>eric-wolf>hacks>special-hacks
check-nail.bin.5 1 1187(16) 09/23/86 16:17:2
check-nail.lisp.5 1 3212(8) 09/23/86 16:17:0
connands.lisp.3 1 411(8) 05/21/85 15:52:4
copy-tree.lisp.1 1 892(8) 05/16/85 11:05:0
delete-tree.lisp.1 1 892(8) 05/16/85 11:04:1
nelt.lisp.1 2 4670(8) 09/09/86 14:53:3
nelt.lisp.2 2 3827(8) 09/17/86 10:59:1
overnight.bin.2 1 569(16) 07/08/85 13:25:1
overnight.lisp.2 1 853(8) 07/08/85 13:21:5
>eric-wolf>nail
>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>w&f-course
>eric-wolf>workbooks
baby1.text.2912 52 235112(8) | 11/21/86 11:53:12 (11/21/86)
baby1.text.2913 53 238343(8) | 11/21/86 12:09:11 (11/21/86)
lispn-init.bin.25 1 1152(16) 11/14/86 18:35:17 (11/21/86)
lispn-init.lisp.59 1 3221(8) 09/25/86 10:40:11 (11/14/86)
lispn-init.lisp.60 1 3153(8) 11/14/86 18:34:48 (11/17/86)
things-to-do.text.3 1 460(8) ● 08/14/86 16:55:18 (08/14/86)
znail-init.bin.22 1 1460(16) 09/25/86 15:47:59 (11/21/86)
znail-init.lisp.63 1 3205(8) 09/25/86 15:47:55 (10/08/86)
  
```

Directory operations: >eric-wolf>hacks>special-hacks

- Delete
- Open
- Selective open
- Expunge
- Create Inferior Directory
- View Properties
- Edit Properties
- New Property
- Create link
- Rename
- Wildcard Delete
- Link Transparencies

File system editing operations

Tree Edit Root
Refresh Display

Tree Edit Any
Help

Tree Edit home dir
Local LMFS Operations

Lisp Window

W:>eric-wolf>x.s.s
>eric-wolf>c11-course
>eric-wolf>c12-course

Change properties for W:>eric-wolf>hacks>special-hacks.directory.1

Auto Expunge Interval: 1 week 3 hours 6 minutes
 Default Generation Retention Count: 3
 Default Link Transparencies: WRITE, READ
Creation Date: 11/21/86 12:18:20
Author: "eric-wolf"
Deleted: Yes No
Don't Reap: Yes No
Don't Delete: Yes No
 Don't Delete Reason: None

Abort Done

>eric-wolf>nenos
>eric-wolf>micro-courses
>eric-wolf>personal
>eric-wolf>projects
>eric-wolf>sales-course
>eric-wolf>site-course
>eric-wolf>ta-job
>eric-wolf>u&f-course
>eric-wolf>workbooks

babyl.text.2912	52	235112(8)		11/21/86 11:53:12	(11/21/86)
babyl.text.2913	53	238343(8)		11/21/86 12:09:11	(11/21/86)
lispn-init.bin.25	1	1152(16)		11/14/86 18:35:17	(11/21/86)
lispn-init.lisp.59	1	3221(8)		09/25/86 18:40:11	(11/14/86)
lispn-init.lisp.60	1	3153(8)		11/14/86 18:34:48	(11/17/86)
things-to-do.text.3	1	460(8)	■	08/14/86 16:55:18	(08/14/86)
zmail-init.bin.22	1	1460(16)		09/25/86 15:47:59	(11/21/86)
zmail-init.lisp.63	1	3285(8)		09/25/86 15:47:55	(10/08/86)

File system editing operations

Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	

KENAI-FJORDS:>: : :
>site
>sources

File system editing operations

Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
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Connend:
 Error: FEP file FEP:>lnfs.file.newest, required for the file system as a partition, is not accessible:
 FEP File not found.
 For FEP0:>lnfs.file
 For JEWEL:>*.z.*

(FLAVOR:METHOD :DIRECTORY-LIST LMFS:LOCAL-LMFS-ACCESS-MIXIM):
 Arg 0 (SELF): #<LOCAL-LMFS-ACCESS-PATH JEWEL using LOCAL-FILE 36714127>
 Arg 1 (SYS:SELF-MAPPING-TABLE): #<Map to flavor LMFS:LOCAL-LMFS-ACCESS-MIXIM 250531423>
 Arg 2 (FLAVOR::.GENERIC.): :DIRECTORY-LIST
 Arg 3 (LMFS:PATHNAME): #P"JEWEL:>*.z.*"
 Arg 4 (LMFS:OPTIONS): (:NO-EXTRA-INFO :DELETED)

s-A, **RETRY**: Retry DIRECTORY-LIST of JEWEL:>*.z.*
 s-B, **GOBY**: Return to FS Maintenance Lisp Listener in Fsmaint Interaction Pane 1
 s-C: FS Maintenance Top Level
 s-D: Restart process Fsmaint Frame 1
 *

Lisp Interaction Window

3. FEP File Structure

FEP File Types
Pathnames To FEP Files
Sizes Of Blocks And Records

3.1 The FEP Types

The following file types are used by the FEP file system for files used by the system.

BOOT	Contains FEP commands that can be read by the FEP's Boot command. BOOT files are manipulated by the editor.
LOAD	Contains a world load image that is used to boot the system.
MIC	Contains a microcode image.
FILE	Contains a LMFS partition. For example, >LMFS.FILE.1 is the default LMFS file partition. DO NOT DELETE THIS FILE.
FSPT	Contains a File System Partition Table.
FEP	<p>The file contains binary information used by the FEP file system. These files should not be written to by user programs. DO NOT DELETE THESE EITHER! Some examples are:</p> <p>>FREE-PAGES.FEP Describes which blocks on the disk are allocated to existing files.</p> <p>>BAD-BLOCKS.FEP Owns all the blocks that contain a media defect and should not be used.</p> <p>>DISK-LABEL.FEP Contains the disk's physical disk label. The label is used to identify the disk and describe its characteristics.</p>
PAGE	Contains disk space that can be used by the virtual memory system.
FLOD	Contains FEP software.
DIR	Contains a FEP directory.

3.2 Pathnames To FEP Files

The following are the various forms of pathnames to FEP files:

fep:>boot.boot

fep0:>Genera-7-0.load

fep1:>Genera-7-0.load

arches|fep0:>Genera-7-0.load

chaos|31542|fep1:>Genera-7-0.load

3.3 Sizes of things

One memory word is four eight bit bytes plus four tag bits (36 bits total).

One FEP block contains 256 36-bit words of data.

One LMFS record is created from four FEP blocks.

One page of virtual memory corresponds to 1 FEP block.

3.4 Typical FEP Directory

Command: Show FEP Directory (on host [default KENAI-FJORDS]) KENAI-FJORDS
 Host KENAI-FJORDS:
 Unit 0: 11603 free, 280477/292080 used (96%)
 Lines highlighted in **bold** represent files currently in use.

World Load Files:

FEP0:>**in-house-genera-7-0b.load.1** 38726 [In House Genera 7.0; IP-TCP 51.4]
 FEP0:>**s4cc-from-in-house-genera-7-0b.load.1** 3000 [S4CC, Genera 7.0; IP-TCP 51.4; Exp S4CC 3.1]
 FEP0:>release-6-g.load.1 27539 [Rel6.G, Distribution]
 FEP0:>s4cc-from-release-6-g.load.1 8450 [Rel 6.G, Release-6-7, S4CC 1.0]

Microcode files:

FEP0:>**3640-mic.mic.394** 111 [3640-MIC 394]
 FEP0:>tmc5-io4-col-mic.mic.388 112

Paging files:

FEP0:>**PAGE.PAGE.1** 60000 [Paging]
 FEP0:>**page1.page.1** 30000 [More Paging]
 FEP0:>**page2.page.1** 30000 [Even More Paging]
 FEP0:>**page3.page.1** 30000 [Get The Drift?]

Boot files:

FEP0:>boot.boot.15 1
 FEP0:>boot.boot.16 1
 FEP0:>boot.boot.17 1
 FEP0:>hello.boot.1 1
 FEP0:>rel6.boot.1 1
 FEP0:>rel6.boot.2 1

Lisp Machine File System Partitions:

FEP0:>fspt.fspt.1 1 [LMFS Partition Table]
 FEP0:>lmfs.file.1 49000 [File partition w/ Rel. 6.1 Sources]

Fep-specific files:

FEP0:>BAD-BLOCKS.FEP.1 77 [File of bad blocks]
 FEP0:>DISK-LABEL.FEP.1 24 [Disk label]
 FEP0:>FREE-PAGES.FEP.1 32 [Free pages map]
 FEP0:>Reserve.FEP.1 500 [Reserved for future use]
 FEP0:>ROOT-DIRECTORY.DIR.1 2 [The Root]
 FEP0:>SEQUENCE-NUMBER.FEP.1 1 [FEP FS sequence nos]

FEP0:>v127-bo1.flod.33	47
FEP0:>v127-debug.flod.31	50
FEP0:>v127-disk.flod.31	29
FEP0:>v127-info.flod.43	14
FEP0:>v127-llsp.flod.43	47
FEP0:>v127-loaders.flod.43	41
FEP0:>v127-re17.flod.43	5
FEP0:>v127-tests.flod.43	11

4. LMFS Maintenance

Creating A LMFS
Growing A LMFS
Removing A LMFS Partition
Salvaging

Dedication:

**The Most Common
Catastrophic Mistake That
System Administrators Make Is
Deleting All Or Part Of A LMFS.**

**This Chapter Is Dedicated To
Those Poor (currently unemployed) People.**

4.1 LMFS Basics

As you know the LMFS is composed of one or more files in the FEP file structure. A LMFS cannot be spread across Lisp machines. It can be spread across multiple disks on a Lisp machine.

On the next several pages we will demonstrate the creation, modification and removal of a LMFS.

Please keep in mind:

- Never delete part of your LMFS with Delete File
- Do not delete the FSPT.FSPT file
- You must have a FSPT.FSPT file on the drive from which you boot
- Do not delete any FEP file, especially BAD-BLOCKS.FEP

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operations	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage Remove Partition	Initialize Exit Level 3	Check Records LMFS Internal Tools	Grow Partition
<p>These tools are potentially dangerous! If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3].</p> <p>If you have any questions, please call Symbolics Software Support. Command: █</p>			
<p><i>Lisp Interaction Window</i></p> <p>Enter Level 3 FSMaint menu, containing Local File System maintenance tools for expert use</p>			
<p>[Fri 21 Nov 2:56:10] Eric-Wolf CL-USER: <u>User</u> Input Kenal Fjords</p>			

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operations	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage Remove Partition	Initialize Exit Level 3	Check Records LMFS Internal Tools	Grow Partition
<input type="checkbox"/> These tools are potentially dangerous! If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3]. If you have any questions, please call Symbolics Software Support. Command: Initial partition location [default FEP0:>lnfs.file]: FEP0:>lnfs.file Partition FEP0:>lnfs.file does not now exist. It will be created. Number of blocks to allocate? 1000 Created FEP0:>lnfs.file.1. Proceeding with initialization of partition in FEP0:>lnfs.file.1. Zeroing FEP0:>lnfs.file.1, 1000 blocks. Partition initialization complete. Command: █			
<i>Lisp Interaction Window</i>			
L: Create an empty file system R: Menu of file sys part initialization options			

[Fri 21 Nov 2:57:00] Eric-Wolf

CL-USER: User Input

Kenai Fjords

<i>File system editing operations</i>			
Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	
<i>Level 2: Local file system control operations</i>			
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape
Find Backup Copies	Display Tape Map	List Backup Tape	Compare Backup Tape
List FEP FS Root	Free Records	Flush Free Buffer	Close All Files
Expunge local LMFS	Server Shutdown	Server Errors	Exit Level 2
LMFS Maintenance Operations			
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage	Initialize	Check Records	Grow Partition
Remove Partition	Exit Level 3	LMFS Internal Tools	
<input type="checkbox"/> Command: Initial partition location [default FEP0:>\nfs.file]: FEP0:>\nfs.file The file system on this machine is now in use. You may not create an empty file system while the file system is in use. Warm boot, or cold boot, and try again. Command:			
<input type="checkbox"/> <i>Lisp Interaction Window</i>			
<input type="checkbox"/> L: Create an empty file system R: Menu of file sys part initialization options			

[Fri 21 Nov 2:57:49] Eric-Wolf

CL-USER: User Input

Kenel Fjords

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operations	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage Remove Partition	Initialize Exit Level 3	Check Records LMFS Internal Tools	Grow Partition
<p>These tools are potentially dangerous! If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3].</p> <p>If you have any questions, please call Symbolics Software Support. Command: Initial partition location [default FEP0:>lnfs.file]: FEP0:>lnfs.file FEP0:>lnfs.file appears to contain a valid file partition last used 11/21/86 14:56:49. It is the root of a valid file system. Do you really want to create a new file system in FEP0:>lnfs.file? (Yes or No) Yes Partition FEP0:>lnfs.file already exists, and is 1000. blocks long. Overwrite, or Delete and expunge? (O or D) Overwrite</p> <p>Proceeding with initialization of partition in FEP0:>lnfs.file. Zeroing FEP0:>lnfs.file.1, 1000 blocks. Partition initialization complete. Command:</p>			
<i>Lisp Interaction Window</i>			
L: Create an empty file system R: Menu of file sys part initialization options			

[Fri 21 Nov 2:59:15]* Eric-Wolf

CL-USER: User Input

Kenal Fjords

<i>File system editing operations</i>			
Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	
<i>Level 2: Local file system control operations</i>			
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape
Find Backup Copies	Display Tape Map	List Backup Tape	Compare Backup Tape
List FEP FS Root	Free Records	Flush Free Buffer	Close All Files
Expunge local LMFS	Server Shutdown	Server Errors	Exit Level 2
<i>LMFS Maintenance Operations</i>			
<i>Level 3: Potentially dangerous</i>	<i>File System Partition Initialization</i>		
Salvage	Partition FEP File: FEP0:xyzzy.File		
Remove Partition	Operation: New File System Auxiliary Partition	Check Records	Grow Partition
	Do It <input type="checkbox"/>	LMFS Internal Tools	Abort <input type="checkbox"/>
<p>These tools are potentially dangerous. If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3].</p> <p>If you have any questions, please call Symbolics Software Support. Command:</p>			
<p><i>Lisp Interaction Window</i></p> <p>Mouse-L: Select window; Mouse-R: System menu.</p>			

[Fri 21 Nov 3:00:19]* Eric-Wolf

CL-USER: Choose

Kenel Fjords

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operation	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous operations</i>			
Salvage Remove Partition	<div style="border: 1px solid black; padding: 2px;"> File System Partition Initialization Partition: FEP File: FEP0:>lnfs1.file Operation: New File System Auxiliary Partition Do It <input type="checkbox"/> Abort <input type="checkbox"/> </div>	Check Records IFS Internal Tools	Grow Partition
<p><input type="checkbox"/> These tools are potentially dangerous! If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3].</p> <p>If you have any questions, please call Symbolics Software Support. Command: Back to FS Maintenance Lisp Listener in Fsmaint Interaction Pane 1.</p> <p>Command: Initial partition location [default FEP0:>lnfs.file]: FEP0:>lnfs2.file The file system on this machine is now in use. You may not create an empty file system while the file system is in use. Warm boot, or cold boot, and try again. Command:</p>			
<i>Lisp Interaction Window</i>			
Any button to select choice.			

[Mon 24 Nov 2:42:01] Eric-Wolf

CL-USER: Choose

Kenel Fjords

<i>File system editing operations</i>			
Tree Edit Root	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
Refresh Display			
<i>Level 2: Local file system control operations</i>			
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape
Find Backup Copies	Display Tape Map	List Backup Tape	Compare Backup Tape
List FEP FS Root	Free Records	Flush Free Buffer	Close All Files
Expunge local LMFS	Server Shutdown	Server Errors	Exit Level 2
LMFS Maintenance Operations			
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage	Initialize	Check Records	Grow Partition
Remove Partition	Exit Level 3	LMFS Internal Tools	
<p>These tools are potentially dangerous! If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3].</p> <p>If you have any questions, please call Symbolics Software Support.</p> <p>Command: Partition FEP0:>LMFS1.FILE does not now exist. It will be created. Number of blocks to allocate? 500 Created FEP0:>lnfs1.file.1. Zeroing FEP0:>lnfs1.file.1, 500 blocks. Added File partition in FEP0:>lnfs1.file.1 to file system of KENAI-FJORDS. Partition initialization complete. Command:</p>			
<i>Lisp Interaction Window</i>			
Vacate and remove one or more partitions from the local file system			

[Fri 21 Nov 3:01:30]* Eric-Wolf

CL-USER:

User Input

Kenai Fjords

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operations	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Partitions to remove File partition in FEP0:>lnfs1.file.1 Do It <input checked="" type="checkbox"/> Abort <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> Initialize Exit Level 3	Check Records LMFS Internal Tools	Grow Partition
<p>walking over all directories and files of the local file system, and moving files and directories on the partitions to be evacuated to other partitions. For medium and large file systems, this operation takes a long time.</p> <p>In order for this operation to succeed, there must be enough room in other partitions to contain the files and directories currently in the partitions that are going to be evacuated. This tool determines whether or not sufficient room exists for the operation to complete successfully, and queries if it suspects that sufficient room is not available. Salvaging might be necessary to properly identify all free records. You can select [Free Records (R)] for a partition-by-partition report.</p> <p>[Remove Partition] provides the option of deleting the FEP file when all LMFS files have been removed from it.</p> <p>DO NOT ATTEMPT TO USE THIS TOOL TO MANIPULATE FEP FILES FOR ANY OTHER PURPOSE, OR TO MANIPULATE FEP FILES IN USE BY LMFS ("lnfs.file", "lnfs1.file", "fspt.fspt", etc.) IN ANY OTHER WAY. TOTAL IRRETRIEVABLE DESTRUCTION OF DATA ENTRUSTED TO YOUR FILE SYSTEM WILL RESULT.</p> <p>Do you still want to attempt to remove some partitions from this file system? (Yes or No) Yes</p>			
<p>Lisp Interaction Window</p> <p>Any button to select choice.</p>			
<p>[Fri 21 Nov 3:02:44]* Eric-Wolf CL-USER: Choose Kenal Fjords</p>			

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operations	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage Remove Partition	Initialize Exit Level 3	Check Records LMFS Internal Tools	Grow Partition
<p>Command: Partition FEP0:>lnfs.file.1: Size is currently 1000. blocks. Grow it to what new size, in FEP FS blocks? 1500 Now 365. LMFS records available in File partition in FEP0:>lnfs.file.1. Command: █</p>			
<i>Lisp Interaction Window</i>			
Add records to a file partition already in use.			
[Mon 24 Nov 2:43:49] Eric-Wolf CL-USER: User Input Kenel Fjords			

<i>File system editing operations</i>			
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window
<i>Level 2: Local file system control operations</i>			
Incremental Dump Find Backup Copies List FEP FS Root Expunge local LMFS LMFS Maintenance Operations	Complete Dump Display Tape Map Free Records Server Shutdown	Consolidated Dump List Backup Tape Flush Free Buffer Server Errors	Read Backup Tape Compare Backup Tape Close All Files Exit Level 2
<i>Level 3: Potentially dangerous server and maintenance operations</i>			
Salvage Remove Partition	Initialize Exit Level 3	Check Records LMFS Internal Tools	Grow Partition
<p>These tools are potentially dangerous! If used improperly, you can damage the local Lisp Machine File System (LMFS), and data might be lost irretrievably. Do NOT use these tools unless you are knowledgeable about file system issues, and fully understand the purpose of these tools and the problems they are trying to solve. To exit the Level 3 Menu, click on [Exit Level 3].</p> <p>If you have any questions, please call Symbolics Software Support. Command: Top-down treewalk record check: Yes No Check for and repatriate orphans: Yes No Output recording: Tape File Console Only File for output: FEP0:>salvager-output>Salvout-11/21/86-15:04.text [Ctrl] aborts, [Esc] uses these values</p>			
<p><i>Lisp Interaction Window</i></p>			
<p>Mouse-L, -R: Accept Values Abort. To see other commands, press Shift, Meta-Shift, or Super.</p>			
[Fri 21 Nov 3:04:25]* Eric-Wolf		CL-USER: User Input	Kenel Fjords

<i>File system editing operations</i>			
Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	
<i>Level 2: Local file system control operations</i>			
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape
Find Backup Copies	Display Tape Map	List Backup Tape	Compare Backup Tape
List FEP FS Root	Free Records	Flush Free Buffer	Close All Files
Expunge local LMFS	Server Shutdown	Server Errors	Exit Level 2
LMFS Maintenance Operations			
<input type="checkbox"/> Command: Hierarchy DEFAULT, volume table version 4, root #<FILE-DESC 224244412 Root>, 1 volume. 1 partition: 1: File partition in FEP0:>Infs.file.1, index 1, @ block 0. for 1000. blocks. Status :OPEN, not removed, root #<FILE-DESC 224244412 Root>. File partition in FEP0:>Infs.file.1 on Kenai Fjords: 237 (decimal) free, 3/240 used (12). Volume array for hierarchy DEFAULT: 1: Volume DEFAULT, not demountable, not removed, volume index 1, 2 partitions. Contained partitions: File partition in REMOVED File partition in FEP0:>Infs.file.1 <input type="checkbox"/> Command: █			
<i>Lisp Interaction Window</i>			
<input type="checkbox"/> Local LMFS free record info L: Summarize local usage M: Directory-by-directory report R: Partition by partition			

[Fri 21 Nov 3:03:44]* Eric-Wolf

CL-USER: User Input

Kenai Fjords

5. Fep Commands

Boot
Show
Add
Clear
Load
Reset
Set
Start
Continue
Compute
Halt

5.1 FEP Command Summary

These are the FEP commands you are likely to use. General features of the FEP command processor are:

- Command completion
- The HELP key shows what commands are possible, given what you've already typed in
- Anything in ()'s is a comment

5.2 Boot Files

Boot files are FEP files which contain commands you would like the FEP to perform. There are two kinds of boot files:

- Hello.boot - Contains commands which initializes the FEP after the machine has been reset
- Boot.boot - Contains commands which boot the machine

Both types of boot files are simple text files which can be easily created in Zmacs. Additionally, the Save World command can update a boot.boot file for you.

Although "hello" and "boot" are the standard names for these files, you can give them other names if you wish. It is important, however, that you keep the .boot extension.

5.2.1 Hello.boot File

If your machine has NFEP, whenever you reset the FEP (by entering the Reset FEP command or by physically turning the machine off and then on again), the following message will appear on the screen:

```
Type "Hello" to initialize the Fep's command databases, etc.
```

When you type "hello", the commands in the hello.boot file are executed sequentially. The hello.boot file typically looks like this:

```
Scan FEP0:>V127-info.flod
Scan FEP0:>V127-loaders.flod
Scan FEP0:>V127-lisp.flod
Scan FEP0:>V127-debug.flod
Initialize Hardware Tables
```

Note: Unlike boot.boot files, hello.boot files are used only when the FEP is reset or the machine is powered-up. We usually have only one, and it is called **fep0:>hello.boot**. By convention, when we talk about "boot files", we usually mean "boot.boot" files.

5.2.2 Boot.boot Files

Up to now we have described "booting your machine" as the act of bringing a new world into the machine. It actually involves a few more steps.

Issue the `Boot` command to the FEP in order to reload the Lisp world. If you just enter `Boot`, it will read the commands in the file that you last booted from.

A boot file should contain at least the first six commands.

- Clear Machine** Clears memory and resets various internal hardware caches. You must also issue this command when you change the microcode.
- Declare Paging** Tells the FEP and Lisp processor which files you will use for paging. See the chapter *Paging and Your Disk Space* for more information.
- Load Microcode** Loads microcode plus various other machine memories. If you clear the machine using *Clear Machine*, you must reload the microcode. Symbolics computers will not run without microcode.
- Load World** Loads the Lisp environment into the machine. If you have not issued a *Declare Paging* command, it assumes you have a `page.page` file on the same disk as the world you are booting.
- Set Chaos-Address** Sets the Chaos address for this machine. The machine **must** have a Chaos address set before it can be *Started*.
- Start** Starts the Lisp world. This takes a while to figure out how big the screen is and so forth, and then clears the screen and begins to initialize the rest of the environment. This is always the last line in the boot file, since this command tells the Lisp processor to take over.
- Enable IDS** Allows you to create incremental copies of the Lisp world. IDS is discussed in the chapter *Manipulating Worlds*.

5.2.3 Sample Boot Files

boot.boot - for everyday use

```
(Acme Lisp machine LISPM-17)
Clear Machine
Declare Paging fep0:>page aux
Load Microcode fep0:>3640-mic.mic.394
Load World fep0:>Genera-7-0-Acme.load
Enable IDS
Set Chaos 417 (LISPM-17)
Start
```

small.boot - for use when reconfiguring machines

```
(Acme Lisp machine LISPM-17 Small boot file)
Clear Machine
(Declare Paging fep0:>page aux)
Load Microcode fep0:>3640-mic.mic.394
Load World fep0:>Genera-7-0-Acme.load
Enable IDS
Set Chaos 417 (LISPM-17)
Start
```

Note: it's a good idea to put comments in the boot file, so the reader can figure out what's required and what's optional. Remember, anything in parentheses in a boot file is a comment.

5.2.4 Video Control commands

Set Monitor-Type

Informs the FEP and the Lisp processor as to what type of monitor you have attached to the system. This command will not normally be required, since each machine has only one console, and knows what type of console it is. Unfortunately, if the command is necessary, you won't be able to read the screen; it will look like a television with "horizontal hold" problems. Should you have this problem, use the *Set Monitor-Type* command and be sure to let your customer service engineer know that the machine needs adjustment.

The two types of monitors Symbolics currently offers are known by the name of the manufacturers of their innards. They are **Philips** and **Moniterm** monitors.

FEP Command: **set monitor-type philips**

FEP Command: **set monitor-type moniterm**

Remember that, like Genera, the FEP has command completion. For instance, **set monitor-type** can be abbreviated **se m**.

Clear Screen

Clears the screen. Pressing Refresh has the same effect.

Reset Video

Reset the video to the original monitor type. If that was wrong, then this will mess the screen up again.

5.2.5 Commands useful in a crash

Continue	Continues running Lisp after a Halt
Start	Warm starts Lisp
Reset FEP	Resets the FEP processor
Hello	Reads the boot file for the FEP processor. Defaults to: >hello.boot
Show Status	Displays machine state. Often, this will show the problem which caused a hardware failure.

5.2.6 Other FEP commands

Show Directory This command displays the contents of the FEP file system.
For example:

Fep Command: **Show Directory** (default is >*) **RETURN**

```

FEP0:>BAD-BLOCKS.FEP.1 578      0(8)  @ 06/26/85 19:23:34 [File of bad blocks] AKT
FEP0:>boot.boot.4      1      259(8)  09/05/85 18:28:40 [] Gaia
FEP0:>DISK-LABEL.FEP.1 24      0(8)  @ 06/26/85 19:23:33 [The disk label] AKT
FEP0:>FREE-PAGES.FEP.1 41      0(8)  @ 06/26/85 19:23:34 [Free pages map] AKT
FEP0:>fspt.fspt.1      1      37(8)  10/15/85 09:33:35 [] rsl
FEP0:>hello.boot.1    1      135(8)  10/07/85 18:38:39 [] rsl
FEP0:>lmfs.file.1     20000  0(8)  @ 10/15/85 09:31:33 [] rsl
FEP0:>lmfs2.file.1    10000  0(8)  @ 10/15/85 09:33:33 [] rsl
FEP0:>PAGE.PAGE.1     35000  0(8)  06/26/85 19:23:34 [Main paging area] AKT
FEP0:>release-6-1-dist.load.1 28277 32563584(8) 10/04/85 17:23:27 [Rel 6.1] LISPM
FEP0:>Reserve.FEP.1   1000    0(8)  06/26/85 19:23:36 [Reserved] AKT
FEP0:>ROOT-DIRECTORY.DIR.1 2  DIRECTORY @ 06/26/85 19:23:33 [His highness] AKT
FEP0:>sequence-number.fep.1 1 0(8) @ 06/26/85 19:43:18 [] AKT
FEP0:>tmc5-io4-mic.mic.336 110 125727(8) 09/09/85 10:59:03 [TMC5-I04-MIC 336] rsl
FEP0:>v127-debug.flod.1 48 54613(8) 10/05/85 16:07:47 [] SWM
FEP0:>v127-disk.flod.1 27 30348(8) 10/07/85 09:28:08 [] SWM
FEP0:>v127-info.flod.2 12 13074(8) 10/07/85 13:33:25 [] SWM
FEP0:>v127-lisp.flod.2 42 47434(8) 10/07/85 13:32:12 [] SWM
FEP0:>v127-loaders.flod.2 34 38112(8) 10/07/85 13:30:00 [] SWM
FEP0:>v127-tests.flod.2 10 10843(8) 10/07/85 13:34:02 [] SWM

```

Note: the @ in the display indicates that the *Don't Delete bit* is set.

Shutdown Powers down the machine.

Show Configuration

Tells you the machine serial number. ECO levels, date of manufacture, etc.

Compute Microcode Default

Looks at the hardware and tells you the right microcode for this configuration.

Show Paging Lists the files currently declared as paging files.

Mount Makes available a disk not otherwise referenced in a boot file.
Place it before the Start command. For example:

```
(Acme Lisp machine LISPM-17)
Clear Machine
Declare Paging fep0:>page page1
Load Microcode fep0:>3640-mic.mic.394
Load World fep0:>Genera-7-0-Acme.load
Enable IDS
Set Chaos 417 (LISPM-17)
Mount FEP1:
Start
```

6. Paging And Your Disk Space

Creating More Paging Space
Removing Paging Space
Capacities Of The Various Drives
Rules Of Thumb For Allocating Space
LMFS and Paging Lab

6.1 Creating More Paging Space

By enlarging your paging area you increase your consing space. This greatly decreases the frequency with which you must garbage collect. For every ten thousand blocks of paging file you get 2.5 million words of paging space.

To get more room for paging, delete and expunge unused files from the fep file system. Old world loads, boot files, old microcode files. Consult your boot.boot file for the names of your present world load, paging and microcode files. Do not delete the world you are running or the paging files you are currently using. EVER!

Find out how much free space is left in your fep file structure. You can use the Show Fep Directory command and round down to the next lowest thousand.

Please note:

- Show Fep Directory does not display deleted files.
- Don't forget about FEP1.

Use the command Create FEP File to create an empty file of that size. Below is an example. Notice the .PAGE extention.

```
Command: Create FEP File fep0:>page1.page 35000
```

Edit your boot file and add the following line before the "Load Microcode" command. If there is already a declare paging command there, simply add page1 to the command. If the Declare Paging command is not there, you will have to add the entire command.

```
Declare Paging fep0:>page page1
```

At this point you have two options:

1. Halt and boot your machine. Look at the herald to see how much you've gained.
2. Use the Add Paging File command to add the paging file without booting. The herald will not show the updated swap space, but it is there.

6.2 Reducing Paging Space

When the machine is up and running it is using all the paging files added by the boot file. In order to reduce the size of your paging you cannot simply delete one of your paging files. You should follow these steps:

Getting rid of an extra paging file:

- Edit your boot file to remove the extra file from the Declare Paging command
- Boot the machine
- Delete the extra paging file and expunge the FEP directory

Reducing the size of your only paging file

- Create a new paging space of the correct size
- Edit your boot file to use the new paging file
- Reboot using your new paging file.
- Delete the old paging file and expunge the FEP directory

6.3 Capacities Of The Available Disk Drives

Drive Cap.	Approximate Useful Space
140Mb	110,000 blocks
190Mb	150,000 blocks
300Mb	250,000 blocks
368Mb	290,000 blocks
474Mb	370,000 blocks

6.4 Rules Of Thumb For Allocating Space

- You must **always** have on disk the world you are running and the paging file(s) you are using.
- When changing to a new world, it is good to keep an old world around until you are **sure** you like the new one.
- For every four blocks of disk you allocate to paging you get one kiloword of paging.
- Paging files should be 35 to 40 thousand blocks so they can be swapped for world loads easily. If your site has larger world loads (because of layered software you install) adjust the numbers accordingly.
- It is a good idea to have two smaller paging files instead of one big one. It makes it easier to bring in new world loads.
- Convert any unused disk space to paging space.

6.5 LMFS and FEP Lab

Booting your machine by hand

Read your boot.boot file by selecting a Lisp Listener and using the Show File command or by reading the file into an editor buffer. Write down each step in the boot.boot file. Logout, do a Halt Machine, and boot the machine by hand.

Making an auxiliary paging file

1. Use the command Show FEP Directory to determine the number of free blocks you have.
2. Go to FSEdit and click on [Tree Edit Any] and specify Fep0:>*.*** to edit the FEP directory.
3. Expunge Directory FEP0:>*.*** . Now, go back to a Lisp Listener and use Show FEP Directory to see how many blocks you have available .
4. Use the Create FEP File command to create an auxiliary paging file. Make sure to leave 1000 blocks free in your FEP directory. Create an auxiliary paging file by entering the following command processor command:

Create Fep File page1.page *number-of-blocks*

where *number-of-blocks* = (number of free blocks - 1000).

Please note:

- a. We're leaving 1000 blocks still free in order to have room to update files and create new files.
- b. If you already have a file called "page1.page", name the file something else....be creative.
- c. Before continuing, check the size of your swap space by doing a Show Herald. Write it down here.

5. Edit your boot file to add the new paging file.
Declare Paging FEPn:>page FEPn:>page1
6. Where n is the disk that file is on.
7. After saving your boot file, logout and cold boot. How much extra swap space did you get?

Practice with LMFS partitions

1. Click left on [Initialize] in the level 3 FSEdit menu to create a LMFS partition of 500 blocks.
2. Click right on [Initialize] to create an auxiliary LMFS partition (100 blocks). Give the new partition a meaningful name, eg. lmfs1.file, instead of the default, xyzy.file.
3. Look at the FEP directory to see if the new partitions have been created.
4. Look at the file fspt.fspt.
5. Click left on [Tree Edit Root] to open the (new, empty) LMFS. Click right on the machine name and choose *Create Inferior Directory* from the pop-up menu. Supply your login name as the name of the new directory.
6. Go to the editor and read in or create a file, then save it in your new local directory.
7. Go back to FSEdit and click on [Grow Partition]. Make the auxiliary partition 100 blocks bigger.
8. Use [Tree Edit Any] to edit the FEP directory.
9. Use the [Edit Properties] menu item to add a comment to your auxiliary lmfs partition's directory entry.
10. Remove your auxiliary partition. Look at fspt.fspt once again.

7. Tapes

Kinds of Tapes
Carry Tapes
General Backup Theory
Full Backup
Incremental Backup
Consolidated Backup

7.1 Kinds of Tapes

The Lisp machine supports four kinds of tapes. It is important that you understand their differences so that you can use the correct kind for a given application.

1. Carry Tape - Used to transport files
2. Backup Tape - Used to save the contents of your file server's directory in order to be able to recover accidentally lost files at a later date
3. FEP Tape - Used to transport FEP files and world loads
4. Distribution Tape - Used to transport software systems and layered products

Distribution tapes will be discussed later in the course.

7.2 Pathnames and Wildcards

A pathname using wildcards might look something like this: **host:>**>*****

host	Is the machine you are sitting at
*	Match any component of a pathname
***	Match any name, any extension and all versions
**	Match all subdirectories (at any level).

What do you think the following pathnames would refer to?

HOST:>*>***

HOST:>***

HOST:>SYS>*>***

HOST:>SYS>**>***

7.3 Using Carry Tapes

The carry tape system is very simple way of transporting files from one Lisp Machine to another (or one site to another). You should not use backup tape for this purpose. There are two useful functions: **tape:carry-dump** puts files onto a tape, **tape:carry-load** restores them to the Lisp Machine.

7.3.1 How to make a carry tape

The function **tape:carry-dump** copies files from the LMFS (Lisp Machine File System) to a tape in the tape drive of the local machine. **Tape:carry-dump** takes one argument: a list. The list consists of the pathnames of the files to be dumped.

Next it will list the directories to be dumped, tell you the total number of files, and ask if this is OK. If you want to make the tape, answer *Yes*.

Then it will prompt you with a long bunch of information about the "tape spec", just press RETURN.

Tape one file:

```
(tape:carry-dump '("c:>eric-wolf>lispm-init.lisp"))
```

Tape all files at top level in eric-wolf's directory:

```
(tape:carry-dump '("c:>eric-wolf>*. *.*"))
```

Tape the newest version of the lisp programs in eric-wolf's directory:

```
(tape:carry-dump '("c:>eric-wolf>*.lisp.newest"))
```

Tape everything in eric-wolf and cgay's directories:

```
(tape:carry-dump '("c:>eric-wolf>*. *.*" "c:>cgay>*. *.*"))
```

Tape everything in eric-wolf's directory and all it's subdirectories:

```
(tape:carry-dump '("c:>eric-wolf>***. *.*"))
```

Dump everything on the host "c" (not recommended, it will be BIG):

```
(tape:carry-dump '("c:>***. *.*"))
```

7.3.2 How to reload a carry tape

Go to a machine with a tape drive. Put the tape in the tape drive. Go to the machine's console and run the function **tape:carry-load**, by typing **(tape:carry-load)** in a Lisp Listener window.

First it will print a long "tape spec" and allow you to change it. As when you were dumping the files, just press RETURN.

The program will print a summary of what is on the tape and then ask you what you want to do with the first file. You have four options:

- Y Reload the file to the default place.
- N Don't reload the file.
- O Reload the file to some other place (you are prompted to enter the new pathname).
- A Reload the file (and the rest of the tape) to the default place without further prompting.

The system will take the appropriate action and then go on to the next file on the tape.

7.4 General Backup Theory

As the site administrator one of your major ongoing responsibilities is to backup the Lisp machine file system on a regular basis. This is THE task you cannot let slide.

When backing up the file system you will be working with the level two menu of FSEdit. To bring it up press SELECT F and click on the level one menu item *Local LMFS Operations*.

There are three kinds of backup dumps available to you:

- | | |
|--------------|--|
| Complete | Copies to tape all files and directories specified |
| Incremental | Copies to tape all files and directories that have been created or modified since the last backup |
| Consolidated | Copies to tape all files and directories that have been created or modified since a date you specify |

File system editing operations

Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window
Refresh Display	Help	Local LMFS Operations	

Level 2: Local file system control operations

Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape	Find Backup Copies
Display Tape Map	List Backup Tape	Compare Backup Tape	List FEP FS Root	Free Records
Flush Free Buffer	Close All Files	Expunge local LMFS	Server Shutdown	Server Errors
Exit Level 2	LMFS Maintenance Operations			

Waikato> █

Lisp Interaction Window

Start an incremental backup dump

[Mon 24 Nov 1:15:22] File-Server CL-USER: User Input * Waikato:rolling-stone>00076755.rdata 1000 4616

<i>File system editing operations</i>				
Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window	
Refresh Display	Help	Local LMFS Operations		
<i>Level 2: Local file system control operations</i>				
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape	Find Backup Copies
Display Tape Map	List Backup Tape	Compare Backup Tape	List FEP FS Root	Free Records
Flush Free Buffer	Close All Files	Expunge local LMFS	Server Shutdown	Server Errors
Exit Level 2	LMFS Maintenance Operations			

Waikato>
 A tape name must be specified.
 Dump Type: Incremental Consolidated Complete
 Pathnames: W:>*>*.x.*
 Tape Reel ID: []
 Tape Drive Spec: Local: cart, den=3200
 Dump deleted files: Yes No
 Tape when done: Offline Rewind Leave Query
 Person operating: "File-Server"
 Set date dumped: Yes No
 Restart pathname: a null or type
 Comment: ""
 <ESC> aborts, <END> uses these values

Lisp Interaction Window

Mouse-L: Replace this field; Mouse-M: Edit this field; Mouse-R: Menu.
 To see other commands, press Shift, Meta-Shift, Super, or Super-Shift.

[Mon 24 Nov 1:15:40] File-Server CL-USER: User Input Hardcopy: sending page buffers

<i>File system editing operations</i>				
Tree Edit Root	Tree Edit Any	Tree Edit home dir	Lisp Window	
Refresh Display	Help	Local LMFS Operations		
<i>Level 2: Local file system control operations</i>				
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape	Find Backup Copies
Display Tape Map	List Backup Tape	Compare Backup Tape	List FEP FS Root	Free Records
Flush Free Buffer	Close All Files	Expunge local LMFS	Server Shutdown	Server Errors
Exit Level 2	LMFS Maintenance Operations			

Waikato>
 A tape name must be specified.
 Dump Type: Incremental Consolidated Complete
 Pathnames: W:>*>*.s.*
 Tape Reel ID: WINC001
 Tape Drive Spec: Local: cart, den=3200
 Dump deleted files: Yes No
 Tape when done: Offline Rewind Leave Query
 Person operating: "File-Server"
 Set date dumped: Yes No
 Restart pathname: a null or type
 Comment: For SITE class
 <CR> aborts, <END> uses these values

Lisp Interaction Window

Mouse-L, -R: Accept Values Exit.
 To see other commands, press Shift, Meta-Shift, or Super.

[Mon 24 Nov 1:16:05] File-Server CL-USER: User Input * W:\roll\inc-stone>00076755.rdata 1002 4616

File system editing operations				
Tree Edit Root	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window	
Refresh Display				
Level 2: Local file system control operations				
Incremental Dump	Complete Dump	Consolidated Dump	Read Backup Tape	Find Backup Copies
Display Tape Map	List Backup Tape	Compare Backup Tape	List FEP FS Root	Free Records
Flush Free Buffer	Close All Files	Expunge local LMFS	Server Shutdown	Server Errors
Exit Level 2	LMFS Maintenance Operations			

Haikato>
 A tape name must be specified.
 Dump Type: Incremental Consolidated Complete
 Pathnames: W:>*>*.t.*
 Tape Reel ID: WINC001
 Tape Drive Spec: Local: cart, den=3200
 Dump deleted files: Yes No
 Tape when done: Offline Rewind Leave Query
 Person operating: "File-Server"
 Set date dumped: Yes No
 Restart pathname: a null or type
 Comment: For SITE class
ABORT aborts, **END** uses these values
 Tape CCOM001, containing a Backup dump of 11/21/86 16:25:48
 taken by CGay at 11/21/86 16:25:48 appears to be on drive CART.
 Did you really mean to specify reel CCOM001, instead of WINC001? (Yes or No) No
 In that case, do you want to OVERWRITE reel CCOM001, destroying all the files
 dumped on it, and make this reel BE reel WINC001, writing it from the beginning?
 Answering "yes" will write on this tape from the beginning, and relabel it
 as being tape WINC001. Shall I go ahead and overwrite it? (Yes or No) Yes
 Beginning Incremental dump.
 The dump map is being written to W:>dump-naps>INCREMENTAL-11/24/86-13:15.nap.1.
 Beginning incremental dump of Haikato: >*>*.t.*
 Not dumping deleted files.
 First tape, reel ID is WINC001.
 The name of the dump is "Backup dump of 11/24/86 13:15:27".
 Tape host, device, and parameters:
 Local: cart, reel=WINC001, buffers=10

Lisp Interaction Window

[Mon 24 Nov 1:18:38] File-Server CL-USER: Cart tape * W:>dump-naps>INCREMENTAL-11/24/86-13:15.nap 328

<i>File system editing operations</i>				
Tree Edit Root Refresh Display	Tree Edit Any Help	Tree Edit home dir Local LMFS Operations	Lisp Window	
<i>Level 2: Local file system control operations</i>				
Incremental Dump Display Tape Map Flush Free Buffer Exit Level 2	Complete Dump List Backup Tape Close All Files LMFS Maintenance Operations	Consolidated Dump Compare Backup Tape Expunge local LMFS	Read Backup Tape List FEP FS Root Server Shutdown	Find Backup Copies Free Records Server Errors

Tape Reel ID: WINC001
 Tape Drive Spec: Local: cart, den=3200
 Dump deleted files: Yes No
 Tape when done: Offline Rewind Leave Query
 Person operating: "File-Server"
 Set date dumped: Yes No
 Restart pathname: a *name* or type
 Comment: For SITE class
~~CCOM~~ aborts, ~~NO~~ uses these values
 Tape CCOM001, containing a Backup dump of 11/21/86 16:25:48
 taken by CGay at 11/21/86 16:25:48 appears to be on drive CART.
 Did you really mean to specify reel CCOM001, instead of WINC001? (Yes or No) No
 In that case, do you want to OVERWRITE reel CCOM001, destroying all the files
 dumped on it, and make this reel BE reel WINC001, writing it from the beginning?
 Answering "yes" will write on this tape from the beginning, and relabel it
 as being tape WINC001. Shall I go ahead and overwrite it? (Yes or No) Yes
 Beginning Incremental dump.
 The dump map is being written to W:\dump-naps\INCREMENTAL-11/24/86-13:15.nap.1.
 Beginning incremental dump of Waikato: >*>*.t.*
 Not dumping deleted files.
 First tape, reel ID is WINC001.
 The name of the dump is "Backup dump of 11/24/86 13:15:27".
 Tape host, device, and parameters:
 Local: cart, reel=WINC001, buffers=10
 Beginning pass over W:>*>*.t.*

 Ended pass over W:>*>*.t.*

 47 files dumped.
 Incremental dump completed at 11/24/86 13:59:35.
 Setting backup dates for files just dumped.
 Can't set backup dates for W:>eric-wolf>nail.text.1: The file was not found.
 For W:>eric-wolf>nail.text.1
 Creating W:\dump-naps>winc001.directory.8
 Backup dump of 11/24/86 13:15:27 completed.
 Waikato> █

Lisp Interaction Window

To see other commands, press Shift, Meta-Shift, or Super.

[Mon 24 Nov 2:05:50] File-Server CL-USER: User Input 9 active servers

7.6 Finding and Restoring Files

There are a variety of tools which help make restoring files from backup tapes relatively painless.

7.6.1 Displaying a Dump Map

When the backup program runs, it creates a file, called a *dump map*. A dump map lists all the files which have been placed on a particular tape. The [Display Tape Map] command lists all of the files which were dumped on a particular tape.

7.6.2 Finding Files on a Backup Tape

As you might imagine, searching through many dump maps (to find out which tape contains a particular file) could be a long and tedious process. The [Find Backup Copies] command, on the level 2 FSEdit menu, does the work for you. It prompts you for a pathname and then searches all of the dump maps for files matching that pathname. It then prints a list of all matching files and the tape(s) on which they appear.

7.6.3 Restoring Files from a Backup Tape

Once you have found out which tape contains the file(s) you wish to restore, you can use the [Read Backup Tape] command to restore them. [Read Backup Tape] allows you to specify a pathname and then restores all files on the tape which match the pathname.

7.7 FEP Tapes

FEP Tapes are used to transport worlds and microcodes. Symbolics is the heaviest user of FEP tapes, we distribute new releases of Genera that way. In general, a FEP Tape consists of one or more microcode files followed by one or more world loads.

7.7.1 Reading FEP Tapes

FEP Tapes can be read in two ways.

1. From the FEP, using the `Disk Restore` command.
2. From Lisp using the `FEP-Tape` activity.

Being able to read FEP tapes from the FEP is important. If you accidentally delete the last world load on your disk and then halt your machine, you would return your system to a working configuration by restoring a world from tape using the FEP's `Disk Restore` command.

On the other hand, reading FEP tapes from the FEP is somewhat cumbersome, so most often we use the `FEP-Tape` activity to read them.

7.7.2 Writing FEP Tapes

FEP Tapes cannot be written from the FEP, they can only be written from Lisp (usually, using the `FEP-Tape` activity). You should write a FEP tape to keep a backup of the world which comes on your system (normal backup procedures only backup files in the LMFS). You might also write a FEP tape in order to transfer a world between two, unconnected machines at your site.

7.7.3 The FEP-Tape Activity

Start the `FEP-Tape` activity by typing the command `Select Activity FEP-Tape` to a Lisp Listener (it is not selectable from the `SELECT` key or the system menu).

To read a `FEP-Tape`, just type the command `Read Tape`. The system will read through the tape and ask you whether you want to restore each file. Be sure to have enough space on your FEP file-system for all the files you want to restore.

To write a `FEP-Tape`, you first use the `Add File` command to create a list of all the files you wish to dump. Put the microcode file(s) first, followed by the world load(s). Next, use the `Write Tape` command to actually write the tape. Since each tape hold approximately 20 megabytes, it takes 2 tapes to hold one microcode and one world. The program will stop after it has finished the first tape and wait for you to put the second tape in the tape drive.

7.8 Periodic Tasks

7.8.1 Cleaning Up The Dump-Map Directory

The backup program places its dump maps in the **dump-maps** directory on the file server. For example:

```
server:>DUMP-MAPS>complete-9/15/86-9:02.MAP.1
```

```
server:>DUMP-MAPS>com0001.DIRECTORY.1
```

The MAP files are character files. One is created per dump and it records the dump in a human readable form. The DIRECTORY files are binary files. One is created per reel of tape (a single dump may consist of many reels of tape).

These files take up space. Every few months you may want to go into this directory and delete and expunge the files for which you have already recycled the tapes.

7.8.2 Checking Your Tape Hardware

It is possible that hardware problems can cause bad backup tapes to be written, without any error being detected. Therefore, it is important that you compare your backup tape with the LMFS. You can do this with the FSEdit menu option *Compare Backup Tape*.

8. Manipulating Worlds

Creating A New World
Incremental Disk Save
Copying Worlds
New World Lab

8.1 Creating A New World

Your Lisp World is initially defined by the contents of the world load file which you choose to boot. If you wish some piece of software to always be available you can make it part of a world load. To do this you follow these basic steps:

- Make sure you have room in the FEP file system for a new world
- Boot the world you wish to start with
- Start the ephemeral garbage collector
- Log in as the generic user.
- While doing as little else as possible, load the software you wish to be part of the world
- Possibly run the dynamic or immediate garbage collector¹
- Enter the Save World command

For example:

```
Command: Show FEP directory
Host KENAI-FJORDS:
Unit 0: 44698 free, 65462/110160 used (59%)
.
```

```
Command: Logout
Command: Halt Machine
```

```
Fep Command: Boot
```

```
Command: Start GC :Ephemeral Yes
Command: (si:login-to-sys-host)
Command: Load File kenai-fjords:>fred>my-expert-system.bin
Command: Start GC :Immediately Yes
Command: Save World Complete fep0:>fred-expert-7-0.load
```

¹See the chapter on Garbage Collection

8.2 Incremental Disk Save

Incremental disk save (IDS) lets you save only the changed part of the world.

To create an IDS world, follow these steps:

- Boot a clean world making sure your boot file contains the command `Enable IDS`. This permits the Lisp Machine to record those pages which have changed since cold boot, so that only those pages have to be dumped to disk.

- Turn on the Ephemeral garbage collector: `Start GC :Ephemeral`

- Make the changes to your world

- Save your world:

Command: `Save World Incremental fep0:>new-world-name.load`

- Save World will offer to update your boot file

Even Incrementals take more disk room than the files which comprise them, but *much* less than complete world loads. They are also much quicker to boot than the time it would take to load the files (unless the files take only a few seconds to load).

Note: Do not do an immediate, dynamic or full garbage collection before saving an incremental world. This vastly increases the size of the world. The garbage collector is discussed in chapter 11.

8.2.1 Parents and their Children

An IDS world is called the *child* and the main world associated with it is its *parent*. One parent can have several children (eg. Pascal world and Macsyma world). Children can have children as well.

To boot a IDS world all the ancestors must be present on that machine. If you accidentally delete a world that has children you can never boot those children.

When you load an IDS world, it automatically finds its parent. If you boot a world which has children, you don't get the children.

8.3 Copying Worlds

Once you've created your world, you may want to copy it to another machine. You copy a full world or an IDS world with the same command:

Command: `Copy World source-world destination-world`

You can be on sending or receiving end. You must specify the complete pathname for the world at the other end. Here are some examples:

```
Copy World fep1:>genera-7-0.load fep0:>genera-7-0.load
Copy World fep1:>genera-7-0.load arches|fep0:>genera-7-0.load
Copy World redwood|fep1:>genera-7-0.load fep0:>genera-7-0.load
```

A complete example:

```
Copy World arches|fep1:>genera-7-0.load fep0:>genera-7-0.load
```

Copying from Arches to local host;

Using the fast blast protocol.

Remote band is

```
FEP1:>genera-7-0.load.1 35337 40708224(8) 8/27/86 07:45:04 [Genera 7.0] LISPM
```

Do you really want to receive 35337 remote file blocks starting at block
0 to local file? (Yes or No) **Yes**

```
0 100 200 300 400 .... 38500 38600 38726
```

Checksumming the entire file.

```
0 100 200 300 400 .... 38500 38600 38726
```

No bad blocks were found.

Do you want to update the boot file to load fep0:>genera-7-0.load (Yes or No) **Yes**

Boot file to update (Default FEP0:>boot.boot) **RETURN**

8.4 New World Lab

1. Your machine should have a configured world on it. A configured world load file will have a name something like this: "FEP0:>Genera-7-0.load". Don't use the world named something like: "FEP0:>Genera-7-0-dist.load".
2. Be sure you have 35000 free blocks in the FEP directory. If you don't, delete the files you think can be deleted to make the room. **Do NOT expunge them until you have the instructor or TA's go ahead.**
3. Take a configured world and boot it. Change the mouse documentation line to be inverse video by using Function m-C. This is the place where you are changing the Lisp World. You could be loading an expert system or compiling some code, this is just a short, simple change. Now, Save World Complete. Boot the new world to see that it works and that the change to the mouse doc line was permanent.
4. Delete the disk-saved world (You'll have to boot the original world first). Change the mouse documentation line to be inverse video. Do a Save World Incremental, and boot that new world. Don't delete this new world.
5. Use Select E to select the editor, Zmacs. Type in a few lines of text. Select the Lisp Listener. Save World Incremental again. Boot the new incremental world. Look at the editor. Do you see why you cannot use the editor when you are creating worlds? Don't delete this new world either.
6. Pick a partner in the class. Use the Copy World command to move the last incremental world you made to your partner's machine. Boot the copied world. Does it work without its ancestors?
7. Delete all the world loads that you made.

9. Site Configuration

What Is A Namespace?
 FEP Tape
 Distribution Worlds
 Configured Worlds
What Happens When You Boot A World
 Configuring a Site
 Adding Users
 Adding Hosts
Site Configuration Lab

9.1 What Is A Namespace?

There are many things about a site that are important for any host to know, such as where to deliver a user's mail, what host the user's home directory is on, and what host(s) provide hardcopy service.

The Symbolics system maintains a database of such information called the *namespace database*. This database is maintained by a single host on the network, called the *namespace server*.

Each Lisp Machine has a copy of the namespace database in memory. However, only the copy on the namespace server is guaranteed to be completely up-to-date.

Whenever you do something that requires using the namespace database, the system will use the local copy unless it thinks that the namespace server has more up-to-date information.

9.2 Namespace objects

The namespace database is a collection of *objects*. Each object a *name*, some *attributes*, and is a member of a *class*. The classes are:

host	A host object represents any computer, usually connected to a network.
user	A user object represents a person who uses any of the hosts.
network	A network object represents a computer network, to which some hosts are attached.
printer	A printer object represents a device for producing hardcopy.
site	A site object represents a collection of hosts, printers, networks and users that are grouped together in one physical location.
namespace	A namespace object represents a mapping from <i>names</i> of objects to the objects themselves.

You can add objects to the database and modify them by using the *namespace editor*, which can be selected by using the command **Edit Namespace Object** or through the System Menu.

For example, you might connect a printer whose name is jenny-lake to the host whose name is cascades. You must then alter the printer attribute of the host cascades to be the printer jenny-lake.

9.3 Servers and Using Services

It would seem at first glance that each Lisp Machine would need its own printer. This is quite impractical. Typically, there are several Lisp Machines at a site, but the site only needs one printer.

One host will have a printer attached to it, and it will provide *hardcopy service* for the other hosts on the network.

Using Services

To use a service that a particular host provides, your host will send a request over the network to the server host. The server will perform the requested operation and, if required, respond to the sender.

Most Lisp machines will provide the following services:

File	Access to files
Lispm-finger	Who is on this machine
Show-users	Who is on this machine
Send	Converse
Login	Remote login
Uptime	How long has this machine been up
Time	What time is it
Chaos-status	Are you there?

In addition at least one machine at your site should provide these services:

Namespace	Namespace queries answered
Mail-to-user	Mail handling
Hardcopy	Printing things

9.4 Worlds

A world load file contains a complete Lisp environment. At boot time the world load is brought into memory and begins to run. What is in your world load determines what will happen when you boot. There are two kinds of world loads:

Distribution worlds

- A distribution world is the plainest kind of world load file.
- Distribution worlds are sent to you on FEP tape. New microcode might also be on the FEP tape.
- Distribution worlds are at a site called *Distribution*.
- Distribution worlds don't try to do any operations that would require site-specific information while booting.
- Distribution worlds must be *Configured* to make them useful.

Configured worlds

In addition to the normal Lisp environment, a configured world contains all the information that the namespace had when it was configured.

This information includes:

- What site the machine is at
- Information about all the hosts it knew about
- Identity of the namespace server

9.5 Booting a world

When you boot a configured world:

1. A request for the time is broadcast
2. If this is a namespace server, it reads in the namespace database.
3. If not a namespace server, the namespace server is asked about the identity of the machine and then for any updates to the namespace.

When you boot a distribution world:

1. A request for the time is broadcast
2. Machine doesn't ask any namespace questions
3. You use the "Set Site" command to establish the machine's identity.

9.6 Configuring A Site

In this section we will go through a complete site configuration. Our site will consist of two 3640's and one 3670. We will assume you are starting from scratch. The general outline that we are going to follow is:

1. Plan the site
2. Restore the distribution world from tape to disk
3. Create the site on the 3670
4. Add the other machines to the site
5. Configure the namespace server world on the 3670
6. Configure a non-namespace world on the first 3640
7. Copy that world to the other 3640

Normally, you plan and create a site only once, when you first get your machine(s). However, you configure machines for you site (steps 2 and 5 thru 8) each time you get a new a new distribution world (usually when Symbolics creates a new major release of the software).

9.7 Step 1 -- Plan the site.

We have decided to call our site Acme. Our site has three Lisp Machines which we'll call Lispm-1, Lispm-2, and Lispm-3.

Lispm-1 (the 3670) will be the file server, the namespace server and the SYS host because it has the most disk space and the only tape drive at the site.

We must assign Chaos addresses, nicknames, and pretty names:

Name	Chaos address	Nickname	Pretty Name
Lispm-1	401	LM-1	Lisp Machine 1
Lispm-2	402	LM-2	Lisp Machine 2
Lispm-3	403	LM-3	Lisp Machine 3

Whenever you want to refer to a machine (eg. in a pathname), you can type the machine's *nickname* instead of its full name.

The machine's *pretty name* appears in the herald when you cold boot.

9.7.1 Chaos Addresses

A Chaos address is a 16-bit quantity, in which the high-order 8 bits represent the subnet number, and the low-order 8 bits represent the host number on that subnet. Chaos addresses are expressed in octal.

We must choose a Chaos subnet number which will apply to all of the machines at our site, plus a different host number for each machine at our site.

We choose subnet number 1 for our site and host numbers 1, 2, and 3 for Lisp-1, 2, and 3, respectively. These give us Chaos addresses 401, 402, and 403.

Example: Chaos Address 403

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+															
	0		0		0		0		0		0		1		1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+															
<-----Subnet Number----->								<-----Host Number----->							

9.8 Step 2 -- Restore the distribution world from tape to disk

If you are installing a new machine, you should skip this step. New machines arrive with a distribution world already on the disk. This step is necessary only if you are installing new software on an existing machine.

If you are running Genera 7.0 already, you can restore the world from tape using the FEP-Tape activity (described in Chapter 7). If you are still running Release 6.0 or 6.1, follow these instructions to restore the world from tape. The tape should be accompanied by a specific list of its contents and what you need to restore. In general:

- Put the first FEP tape into the drive.

- Create a FEP file to hold the new world:

```
Command: Create FEP File (FEP File) fep0:>Genera-7-0-dist.load  
          (Size in Blocks) 35000
```

```
Command: Logout
```

```
Command: Halt Machine
```

- Clear the machine and load the microcode.
- Scan the disk flod file, then disk restore the contents of the tape:

```
Fep Command: Clear Machine
```

```
Fep Command: Load Microcode tmc5-io4-st506-mic.mic.336
```

```
Fep Command: Scan fep0:>v127-disk.flod
```

```
Fep Command: Disk Restore
```

- When you are asked about restoring microcode, you usually enter S(kip), since most of the microcodes on the tape are for machines configured differently from yours. When you see the correct microcode for your configuration, you answer **Yes**. You can determine the correct microcode from the instructions accompanying your tapes.
- After the first tape has finished you will see the message, "End of restoration tape encountered." Simply put in the second tape and do another disk restore; the system will continue at the proper place.

9.9 Step 3 -- Create the site

Cold boot the 3670 by hand -- it will become the namespace server.

FEP Command: **Clear Machine**

FEP Command: **Load Microcode** (default: >3670-MIC.MIC)

FEP Command: **Load World** (default: >Released-World.load) >**genera-7-0-dist.load**

FEP Command: **Set Chaos 401**

FEP Command: **Start**

Create the LMFS on LISPM-1 (if one does not yet exist).

Login using (**si:login-to-sys-host**)

click on [Initialize] in FSEdit level 3 menu

Partition FEP0:>lmfs.file.newest does not now exist. It will be created

Number of blocks to allocate? **10000**

Created FEP0:>lmfs.file.1.

Proceeding with the initialization of partition in FEP0:>lmfs.file.1.

Zeroing FEP0:>lmfs.file.1, 10000 blocks.

Partition initialization complete.

Create the site:

Command: **Set Site** (site name) **acme**

Define a new site named ACME (as opposed to looking for an existing definition of ACME on disk?) (Yes or No)? **Yes**

What host is to be a namespace server for ACME (default: LOCAL) **RETURN**

What host is to be the SYS host for ACME (default: LOCAL) **RETURN**

What Symbolics computer will store the namespace data files for ACME (default: LOCAL):
RETURN

What host is to be used for bug reports for ACME (default: LOCAL) **RETURN**

What is the real name of the local host: **lisp-1**

What directory on LISP-1 will hold the namespace data files (default >sys>site):
RETURN

What directory on LISP-1 corresponds to SYS: SITE; (default >sys>site): **RETURN**

What account should be used for the system to login to LISP-1
(default: lisp): **RETURN**

What is the local timezone (default: EST): **RETURN**

Is ACME a stand-alone site (there are no servers to respond to a Who-am-i request)? (Y or N) **N**

Created CHAOS|401:>sys.

Created CHAOS|401:>sys>site.

[13:24:33 Namespace Lock CHAOS|401: reloading namespace ACME.

Recent servers contacted are CHAOS|401]

[13:24:41 Namespace ACME has become unloaded:

No longer server for this namespace.

Recent servers contacted are DIS-LOCAL-HOST]

The local host is now LISP-1.

9.10 Step 4 -- Modify the site as needed

Since we know there are two other machines at this site, we can add them to the namespace database now.

Add Lispm-1's short name:

Command: **Edit Namespace Object** (a namespace class or a token)

Host (name) **lisp-1**

click on [name after Short Name]

Attribute: Short Name

Description: Shorter names, used for input or output

LM-1

click on [Save]

Create Lispm-2 (we're still in the namespace editor):

click on [Copy]

Enter a name for the host to be created: **lisp-2**

click on [401] in the CHAOS address

Attribute: Address

Description: A network address for this host.

402<return>

click on [LM-1 after Short Name]

Attribute: Short Name

Description: Shorter names, used for input or output

LM-2

click on [Save]

Do the same for Lispm-3 (not shown here), using its chaos address.

The new site has now been created.

9.11 Step 5 -- Configure the namespace server.

In the process of creating the site, you also created a lot of garbage. It is necessary to cold boot the machine prior to configuring a world on the namespace server. Now is a good time to update the boot.boot file.

Command: **Edit File** (file [Default: ...]) **fep0:>boot.boot**

Delete the Chaos address (probably 52525) and insert the correct address (401, in this case).

You may also have to change the world which is loaded:

Load World fep0:>Genera-7-0-dist.load

Once you have saved this file, log out and cold boot the machine.

After a while, the machine will display the initial window and ask for your command. You must now do another set site, in order to configure the distribution world for the namespace server.

```
Command: Set Site (site name) acme
Define a new site named ACME (as opposed to looking for an existing
definition of ACME on disk)? (Yes or No) No
What host is a namespace server for ACME (default: Local): RETURN
Where is the descriptor file for ACME
(default: local:>sys>site>acme-namespace.text): RETURN
Assuming that LISPM-1 is the real pathname host name of the local host.
[Warning: the local host, DIS-LOCAL-HOST, was not known to have that
name]
[13:28:18 Namespace lock LISPM-1: Reloading namespace ACME.
Recent servers contacted are LISPM-1]
[13:28:24 Namespace ACME has become unloaded:
No longer server for this namespace.
Recent servers contacted are DIS-LOCAL-HOST]
```

The local host is now LISPM-1.

Save The Configured Server World

Command: **Save World** (Complete or Incremental) **Complete**
(on FEP file [default FEP0:>Genera-7-0.load]) **Genera-7-0-Server**

Symbolics Genera, FEP0:>Genera-7-0-Server.load.1
3670 Processor, 1024k words Physical memory, 15000K words Swapping space.
Genera 7.0
Acme LISPM-1

Are you satisfied with this herald? (Y or N) **Y**

The title for this world on the disk is "Genera 7.0", ok? **Y**

Do you want to update the boot file to load FEP0:>Genera-7-0-Server.load.1? (Yes or No)

Yes

Boot file to update (default FEP0:>Boot.boot): **RETURN**

9.12 Step 6 -- Configure a non-server world on LISPM-2

First, cold boot the machine by hand.

FEP Command: **Clear Machine**

FEP Command: **Load Microcode** (default:>tmc5-io4-st506-mic.mic.336)**3640-mic.mic**

FEP Command: **Load World** (default: >World1.load) >**Genera-7-0-dist.load**

FEP Command: **Set Chaos 402**

FEP Command: **Start**

Fix up the boot file and make room for the new world load.

Command: **(si:login-to-sys-host)**

Command: **Edit File** (file [Default: ...]) **fep0:>boot.boot**

Delete the Chaos address (probably 52525) and insert the correct address (402, in this case). If you plan to use Incremental Disk Save, you can also insert *Enable IDS* after the *Load World* command and before *Start*. Also make sure the boot file doesn't add *aux.page*.

Save the file with **c-X c-S**, and return to the Lisp Listener with **SELECT L**.

Now, make room for the new world:

Command: **Delete File FEP0:>aux.page**

Command: **Expunge Directory FEP0:>**

FEP0:>*.*.*: 35000 blocks freed.

Now, shut down the machine and boot it again. Since you used the text editor, you must cold boot again before building a world you intend to save. This is a good time to test the boot file you just wrote.

Command: **Logout**

Command: **Halt Machine**

Do you really want to halt the machine? (Yes or No)**Yes**

Lisp stopped itself.

FEP Command: **boot**

After a while, the machine will display the initial window and the Command: prompt.

Command: **Set Site** (site name) **acme**

Define a new site named ACME (as opposed to looking for an existing definition for ACME on disk)? (Yes or No) **No**

What host is a namespace server for ACME (default: Local): **lisp-1**

Chaosnet address for lisp-1: **401**

Host responds as LISPM-1, ok? (Y or N) **Y**

After a short pause:

The local host is now LISPM-2.

Save The Configured Non-Server World

Note: If there were site-specific software you wanted in the world, this would be the time to load it. Such software might be the color software or other Symbolics "Layered Products", software you purchased from a third party, or software you have written which you want to be a basic part of your world.

Command: **Save World** (Complete or Incremental[default Complete]) **Complete**
(on FEP file [default FEP0:>Genera-7-0.load])
Genera-7-0-Acme

Symbolics System, saved into FEP0:>Genera-7-0-Acme.load
3640 Processor, 1024K words Physical Memory, 17360K words Swapping Space.
Genera 7.0
Acme LISPM-2

Are you satisfied with this herald? (Y or N) **Y**

The title for this world on the disk is "Genera 7.0", ok? **Y**

New estimated size is 35887 blocks.
Logging out ...
Running BEFORE-COLD initializations ...
System Shutdown ...

The screen is cleared.

Note: Servers are currently disabled.

Saved to FEP0:>Genera-7-0-Acme.load.1, size is 35789. blocks

Update boot file to load FEP0:>Genera-7-0-Acme.load.1? (Yes or No) **Yes**
Boot file to update (default FEP0:>Boot.boot): **RETURN**

Now, you should test the world you just built. Since you are about to throw away the distribution world by making it be the replacement extra paging file, you should make sure the world you are trusting to be all right really is. To do this, cold boot the machine again.

Command: **Logout**

Command: **Halt Machine**

Lisp stopped itself.

FEP Command: **Load World** (default: FEP0:>Genera-7-0-dist.load)
>Genera-7-0-Acme.load

FEP Command: **Start**

Note that you don't have to clear the machine, reload the microcode, or set the chaos address again. Try out a couple of things in the world. The Lisp Listener should come up clean, the editor should not have anything in it, and so forth.

Final Details Of Step 6

Finally, you should now update `Boot.boot` to use the auxiliary paging file, having first made sure that there is one. We use the old distribution world as the new paging file. If your machine arrived with the distribution world already on the disk, you should write the distribution world to tape prior to deleting it from the disk.

```
Command: Rename File (existing name [default ...]) Genera-7-0-dist.load  
          (new name) FEP0:>page1.page
```

```
Command: Edit File (file [Default: ...]) fep0:>boot.boot
```

Insert the following line just before the *Load Microcode* command:

```
Declare Paging fep0:>page page1
```

Now, halt the machine and reboot to make sure it works:

```
Command: Logout
```

```
Command: Halt Machine
```

```
Lisp stopped itself.
```

```
FEP Command: Boot
```

9.13 Step 7 -- Copy the non-server world to the other non-server machines.

In order to copy a world load file from one machine to another, both machines must be running and configured for the local site. Thus, you must boot the third machine by hand and configure it for the local site.

```
FEP Command: Clear Machine
FEP Command: Load Microcode(default:>tmc5-io4-st506-mic.mic.336)3640-mic.mic
FEP Command: Load World (default: >World1.load) >Genera-7-0-dist.load
FEP Command: Set Chaos-address 403
FEP Command: Start
```

```
.
.
.
Command: Set Site (site name) acme
Define a new site named ACME (as opposed to looking for an existing
definition of ACME on disk)? (Yes or No) No
What host is a namespace server for ACME (default: Local): lispm-1
Chaosnet address for lispm-1: 401
Host responds as LISPM-1, ok? (Y or N) Y
The local host is now LISPM-3.
```

Now, copy the world to the local machine, first making room by deleting aux.page.

```
Command: Delete File FEP0:>aux.page
Command: Expunge Directory FEP0:>
FEP0:>*. *.*: 35000 blocks freed.
```

```
Command: Copy World (from FEP file [default FEP0:>foo.load])
lispm-1|fep0:>Genera-7-0-Acme.load (to [default
FEP0:>Genera-7-0-Acme.load]) RETURN
```

Copying from LISPM-1 to local host;

Remote band is

```
FEP0:>Genera-7-0-Acme.load.1 35887 41341824 (8) 11/09/86 08:15:32 [Genera 7.0] LISPM
```

Using the fast blast protocol.

```
Do you really want to receive 35887 remote file blocks to local? (Yes or No) Yes
0 100 . . .
```

Do you want to update the boot file to load FEP0:>Genera-7-0-Acme.load.1? (Yes or No)

Yes

Boot file to update (default FEP0:>Boot.boot): **RETURN**

Now, you should test the world you just copied. Since you are about to throw away the distribution world by making it be the replacement `page1.page` file, you should make sure the new world is trustworthy. To do this, cold boot the machine again.

Command: **Logout**
Command: **Halt Machine**

Lisp stopped itself.
FEP Command: **Load World** (default: `FEP0:>Genera-7-0-dist.load`)
 >Genera-7-0-Acme.load
FEP Command: **Start**

Again, you don't have to clear the machine, load the microcode, etc. Poke around, make sure the world seems intact.

Finally, it's time to rename the old distribution world and bring the boot file into its final form.

Command: **Rename File** (existing name [default ...]) **Genera-7-0-dist.load**
 (new name) **FEP0:>page1.page**
Command: **Edit File** (file [Default: ...]) **fep0:>boot.boot**

Insert the following lines after the *Load World* command and before the *Start* command:

Declare Paging `fep0:>page page1`

Don't forget to update the Chaos address if you haven't already done so.

Now, shut down the machine and reboot to make sure it works:

Command: **Logout**
Command: **Halt Machine**

Lisp stopped itself.
FEP Command: **Boot**

That's it!

9.14 Site Configuration Lab

In this lab you will work with a partner. Your goal is to follow the outline presented below and together create a site of two lisp machines.

Things to remember:

1. You are on a network with other students.
2. Specify your chaos addresses, site name and machine names carefully.
3. Work together. Make sure you are both involved and tuned in.
4. If there is already a LMFS on your namespace server use it.
5. You will need a FSPT.FSPT file on the drive you are booting from if it is not the drive your LMFS is on.
6. If you are stuck...ask for help
7. If you suspect a problem....stop...and ask for help

Lab Partner: _____

Site Name: _____

Name of Lisp machine 1: _____ Chaos Address _____

Name of Lisp machine 2: _____ Chaos Address _____

Follow these steps:

1. Boot the distribution world by hand on machine 1.
2. Login as the sys host
3. Build a LMFS (1000 blocks)
4. Set the site
5. Add other host to namespace
6. Add a user to the namespace
7. Boot the machine again to clear all the garbage
8. Set site, answering no to "Define new site?"
9. Save the world to disk
10. Edit the boot file FEP0:>boot.boot to boot your new world
11. Reboot using your new boot file
12. Now, on machine 2 boot the distribution world
13. Set the site
14. Save the world to disk
15. Edit the boot file FEP0:>boot.boot to boot your new world
16. Reboot using your new boot file
17. Done

10. Installing Layered Software

Distribution Tapes
Systems
Logical Pathnames
Patches

10.1 Introduction

This chapter discusses the concepts and procedures involved with installing *layered* software. Layered software is software which is not part of the Genera environment (which comes with each machine). Layered software can come from Symbolics (like Pascal, Fortran, IP/TCP, Color, etc), from outside developers (like ART, KEE, and ICAD), or from your own site.

The software installation process consists of two required steps and an optional step:

1. Restoring software from a tape to a file system.
2. Loading the software from the file system into the Lisp World.
3. Saving a world with the software loaded. (Optional)

There are two software facilities which make this process easier for both the programmer and the system administrator: *Logical Pathnames* and *Systems*. This chapter will help you understand the concepts behind and use of these software tools.

10.2 Concepts

10.2.1 Systems

A **system** organizes a group of related files into a single unit. We can perform operations, such as loading into memory, storing on tape, or reloading from tape, on all of the files at once by referring to them by their system name.

10.2.2 Logical Pathnames

Logical Pathnames allow programmers to create site independent software.

Logical pathnames have the same components as physical pathnames, but different syntax:

Host	Directory	Name	Extension	Version
logical-host:	log-dir;	test	. lisp	. 3

Programmers use logical pathnames wherever they would use physical pathnames. The system translates any reference to a logical pathname into a physical pathname appropriate for the current site. As site administrator, you define the translations for your site.

Without logical pathnames, each piece of software would have to be specially written for a given site, or each site would have to have exactly the same hosts and directory structures. Neither of these requirements would be at all desirable.

10.3 Distributing Systems

How do *systems* get created and what do you do when you receive a tape containing one?

10.3.1 Programmer's Steps

Here is a simplified explanation of what the programmer does to create a system and ship a *system*.

1. The programmer creates a program consisting of a group of files. For example:

```
c:>roy>admin-project>inventory.lisp
c:>roy>admin-project>parts.lisp
c:>roy>admin-project>diagnostics.lisp
```

2. The programmer defines these files to be a *system*, here, a system called **ADMIN**:

```
(defsystem admin
  a bunch of stuff we aren't interested in)
```

3. The programmer places this definition in a file, for instance:

```
c:>roy>admin-project>admin-defsystem.lisp
```

This file must be loaded every time the machine is cold booted, in order to define the components of the **ADMIN** system.

4. Once the system is defined by evaluating this **defsystem** form, I can load the entire program by typing:

```
Command: LOAD SYSTEM ADMIN
```

5. Next, the programmer creates logical pathnames which correspond to the physical files.

```
admin-host:admin-dir;inventory.lisp
admin-host:admin-dir;parts.lisp
admin-host:admin-dir;diagnostics.lisp
```

6. The programmer puts these files onto a *Distribution Tape* and ships the tape to you.

10.3.2 System Administrator's Steps for Installing Systems

When you receive a distribution tape:

1. Place the tape in a tape drive on one of your Symbolics Computers (probably your file server).
2. Read the installation instructions, which should list all of the logical pathnames which the program uses. Choose the physical directories which you want to correspond to the program's logical pathnames. Create the translations between the logical and physical pathnames.
3. Enter the form (dis:load-distribution-tape) to a Lisp Listener. This pops up a menu which allows you to choose which systems are to be restored from the tape.

10.3.3 Specific Steps

1. Place the tape in the tape drive.
2. Now we will define the logical pathname and system information necessary to restore the system from tape and load it into our Lisp World.

- a. First we use Zmacs to create a new file called

```
sys:site;admin.system
```

Notice that this is a logical pathname. The directory `sys:site;` is defined at **every** site (in fact, if you look back to where we created the ACME site, you will see that the system asked us about `sys:site;` at the very beginning). This directory contains some site specific information, including the definitions for each system known at that site. In this case, we are defining the system called "Admin", so we create the file

```
admin.system
```

The file will have the following Lisp code in it:

```
(fs:make-logical-pathname-host "admin-host")

(si:set-system-source-file "admin"
 "admin-host: admin-dir; admin-defsystem.lisp")
```

The first *Lisp form* declares that there is a logical host named

ADMIN-HOST. This second form declares that the DEFSYSTEM form, which defines all the ADMIN system's components, can be found in the file LM1:>tools>admin-defsystem.lisp.

- b. Next we create a translations file

```
sys:site;admin-host.translations
```

This file will contain the translations between the logical pathnames used by the ADMIN system and the physical pathnames we are going to use at our site. The logical pathnames for which we must provide translations were listed in the installation guide which came with the software. The physical pathnames they translate to are our choosing. The translations file will look like this:

```
(fs:set-logical-pathname-host "admin-host"
  :physical-host "LM1"
  :translations '(("admin-host:admin-dir;" "LM1:>tools>")))
```

This tells the system that all references to admin-host should be translated into references to LM1 and that all references to the directory admin-host:admin-dir; should be translated to LM1:>tools>.

- c. Once we have created and saved these two files, we need to have the system "read" them. Go to a Lisp Listener and type

```
Command: Load File sys:site;admin.system
```

This loads the system file (which loads the translations file, when the fs:make-logical-pathname-host form is evaluated.

- d. Now that we've defined all the appropriate translations, we can load the software from the tape.

```
Command: (dis:load-distribution-tape)
```

The system will ask you about the tape drive you are using. If you are using the cartridge tape on the same machine, simply press RETURN.

A menu will pop up. Clicking on [DO IT] will load all of the software on the tape. Alternatively, if there is more than one system on the tape, you can choose which systems to load and which not to load.

- e. After restoring the files from the tape, type:

Command: Load System ADMIN

This will load the ADMIN system into the Lisp World and make it available for use.

These steps make the ADMIN system available to all users at the site. They simply issue the command Load System admin and then start the program.

3. Finally, if you wish to save the version of the world with the system loaded:
 - a. Cold boot a machine
 - b. Use Load System to load the software
 - c. Use Save World to save the modified world.

10.4 Installation Lab

11. Garbage collection

What is Garbage
Collection of Garbage
Ephemeral
Dynamic
Immediate
Full
Gc And Making World Loads

11.1 Garbage Collection

As you program in Lisp, you use up large amounts of virtual memory. This "consing", which is a byproduct of everything you do on the machine, will eventually cause your machine to run out of memory, at which time you'll be forced to cold boot.

The GC is a facility that reclaims space which no longer contains useful information, and allows you to reuse it.

11.1.1 Types of Garbage Collection

For some modes of GC, you can work independently while the GC is going on, others require the entire machine. These two categories of garbage collection are:

Incremental Allows you to do other things while GC is in progress.

Non-incremental Freezes your machine until GC has completed.

11.2 The Garbage Collectors

11.2.1 Ephemeral

Command: Start GC :Ephemeral

Command: Halt GC

Incremental: You can work on other things while GC is going on.

Happens in small increments from time to time. Assisted by hardware and firmware. EGC tends to increase *locality* of objects and their references, meaning that related data tends to be concentrated on fewer pages. Greatly decreases paging. In fact, compute-bound jobs run faster with EGC on due to the decreased paging demand.

11.2.2 Dynamic

Command: Start GC :Dynamic

Command: Halt GC

Incremental: You can work on other things while GC is going on.

You would turn on Dynamic to load in a program which is SO huge that the program won't fit into memory unless you do so.

11.2.3 Immediate

Command: Start GC :Immediately

Command: Halt GC

Non-incremental: starts GC at once; you can't do anything else while it's happening.

Succeeds where dynamic might fail due to lack of space. You might want to gc-immediately when you leave for the day.

11.2.4 Full

(si:full-gc)

No command to stop it.

Non-incremental: starts GC at once; you can't do anything else while it's happening.

Only do Full GC when you are creating a new world. Boot the vanilla world. Load the huge system (Full GC is overkill for loading a small system) and then save the world. In most cases it will reduce the size of the world.

11.3 GC And Making World Loads

Turn on the Ephemeral Garbage Collector (EGC) right after booting a world you are planning to modify and then save to disk.

Do not use the dynamic, immediate or full garbage collectors if you are going to create an *incremental* world. These garbage collectors modify many pages of memory and will make your incremental world huge.

After you have loaded your software, running the immediate or full garbage collector may further reduce the size of the complete world load you are about to create.

11.4 GC And Normal Operations

On an everyday basis the recommended use of garbage collectors is:

- Ephemeral GC On
- Dynamic GC Off
- Run an Immediate GC at the end of the day.

The Ephemeral GC is on by default when you cold boot your machine (starting in Genera 7.0).

12. Useful Odds And Ends

Lisp Machine Etiquette
Classic Mistakes in Site Administration
Useful Tricks

12.1 Lisp Machine Etiquette

Save your work

If you've been editing any files, save out any changes to disk. Same for any mail you've been reading. Same for any program you've been using. Make sure everything you want to keep is saved in a *file*, not just a buffer.

Logout

Logging out does two things: (1) it sniffs around to see if there's anything that it knows about which is changed but not saved in a file (and questions you about it), and (2) removes your name from the bottom of the screen so others will know that the machine is free.

Logging out does not get rid of any editor buffers.

Boot

Use the command `Halt Machine` to stop the Lisp processor and return control to the FEP. Then at the "Fep Command:" prompt, type `Boot`. This will cold boot your machine. The next person then knows that the machine is free to use, because it will say "cold-booted" at the bottom. If anything is done to the machine after being cold booted, that message goes away.

Booting gets rid of all editor buffers.

12.2 Classic Mistakes in Site Administration

Deleting the world you are running

Undelete it if you haven't expunged the directory. You are now OK.

If you have another world on disk that you can boot from you are OK. Halt the machine and boot that world.

If you have not created any new files in the FEP directory since the expunge you can try running the function (**si:copy-world-out-of-load-map**). This will move the all the pages of your world into your paging area. Go on to next paragraph for more instructions.

If you don't have a world to boot from you should attempt to create a FEP file big enough (35000 blocks) to hold a world. If that works, you can either try restoring a world from tape using the FEP command `Disk Restore` or doing a `COPY WORLD` command to bring a world from another machine. You may want to call your software support person or HOSS before you try this.

Deleting all paging files.

Less severe, because you could use another FEP file (eg. a world load) as paging space. If there is nothing on disk that is suitable to page on try the command `Create FEP File`.

Deleting your >BAD-BLOCKS.FEP file.

All of a sudden, all the bad blocks will be available for use by the FEP file system. Don't delete any of the other ".FEP" files, either.

Deleting a non-empty LMFS partition.

If you want to reduce the size of LMFS use the FSEdit menu option *Remove Partition*. If you do delete and expunge a non-empty LMFS, you have destroyed your file system. Go get the backup tapes.

Deleting your FSPT.FSPT file.

If you have a multi partition LMFS and you delete this file, the next time you boot the machine will not be able to find half of the file structure. To fix this, just create the file in ZMACS.

12.3 Useful Tricks

When the machine is "stuck": Cold-booting is a last resort. Warm-booting is better than cold-booting because you don't lose the state of the Lisp World. The start command in the FEP warm boots.

c-h-Function will get you to the FEP so you can warm or cold boot.

The function (zwei:save-all-files) will save all your editor buffers.

Function c-Clear-Input clears out many window system problems. ["It's stuck."]

Use Select P (for Peek) to examine various things about the running system. Useful for bashing things with a large hammer. Requires that you be creative - there isn't a particular single right thing to do with this program. Resetting processes is a common but severe thing to do.

When there's a software bug that you want to report, use the c-M command in the debugger to show the context of the error.

Use the document examiner. It can help you find things quickly when you have no idea where in the documentation set to look.

If you run out of swap space, you can do Add Paging in the FEP, and then Start in order to keep going. However, this requires that there be a file already available to add for paging. In an emergency you can use >Reserve.FEP.

You can distribute the source files of the Lisp Machine system and any layered software across as many hosts as seems prudent, by making the logical host translate to the right places. This gives you the capacity to spread files across the various hosts, if you've got lots of one drive 3640's.

If you have a dedicated Lisp Machine as a file server, look at the file SYS:EXAMPLES;FILE-SERVER-INIT-FILE.TEXT for some ideas as to what software customizations the dedicated Lisp Machine file servers at Symbolics have.

You can login at any site by using the form (si:login-to-sys-host). This logs you in as an innocuous user. The name of the user varies from site to site, but the function always works. "LISPM" is a common name.

If you click on *Local* in the namespace object menu, updates will affect only that machine. If you modify the namespace locally on the namespace server, then all machines at the site will see the change. However, the local change is not written into the namespace database on disk, and will go away when you boot the server.

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