# 4. USING MEDLEY ON THE SUN WORKSTATION

Once the system administrator has installed Medley software on the Sun, Lisp users can customize their Medley Lisp environments. This chapter provides basic information to get you started in the Medley environment on a Sun Workstation.

## Setting Up a Site Init File

The users at a given site generally print to the same printers, load library files from the same directory, and so on. Medley uses variables to supply defaults for such things. The obvious place to set these variables is in one common initialization file. That is the Site Init File's role.

The Site Init File is a file of Lisp expressions that is loaded when you start Medley with a fresh `LISP.SYSOUT`.

The following Lisp symbols should be set in your site init file:

**IL:USERGREETFILES** **[Variable]**

A list of templates to search for the place where individuals should find their personal init files. If this is not set in the site init file, no personal init file is used. The list should be similar to the following:

```
(({file-server}< USER >LISP>INIT.LCOM)
 ({file-server}< USER >LISP>INIT)
 ({file-server}< USER >INIT.LISP))
```

**IL:DISPLAYFONTDIRECTORIES** **[Variable]**

A list of directories to search when the system is looking for display fonts. The site initialization file should set it to a list of strings, each containing a complete pathname for font files, e.g., (`"{UNIX}/usr/local/lde/fonts/display/presentation/"`).

**IL:INTERPRESSFONTDIRECTORIES** **[Variable]**

A list of directories to search when the system is looking for Interpress font widths.

**IL:DIRECTORIES** **[Variable]**

The list of paths to search for files that are not found in the current (Lisp) connected directory.

**IL:LISPUSERSDIRECTORIES** **[Variable]**

The list of paths to search for library and LispUsers' files. Remember that every path in this list should also be in `DIRECTORIES`.

**IL:DEFAULTPRINTINGHOST** **[Variable]**

A list of names of default printers.

**IL:DEFAULTPRINTERTYPE** **[Variable]**

The default printer type, e.g., POSTSCRIPT.

**XCL:*LONG-SITE-NAME*** **[Variable]**

The value of the function XCL:LONG-SITE-NAME, e.g., "Frobnitz, Baz and Lispers, Incorporated."

**XCL:*SHORT-SITE-NAME*** **[Variable]**

The value of the Common Lisp function XCL:SHORT-SITE-NAME, e.g., "Frobco".

**IL:\BeginDST** **[Variable]**

The day of the year on or before which Daylight Savings Time takes effect (i.e., the Sunday on or immediately preceding this day). Must be set to 98 in the USA if Lisp is to perform time computations correctly (subject, of course, to future legislation). If you are in a region where Daylight Savings Time is not observed, set the value to 367.

**IL:\EndDST** **[Variable]**

The day of the year on or before which Daylight Savings Time ends. Must be set to 305 in the USA.

## Setting Up a Personal Init File

Your personal init file keeps track of the location of your home directory and windows layout; it also remembers which library files you always load.

Your personal init file is a file of Lisp expressions that is loaded and run after the site init file. You can create it either as a text file, or have Medley's File Manager help you.

Your initialization file is normally ~/INIT.LCOM

## Saving Your State

On the Sun, lde is an ordinary UNIX program that allocates a 45 MB data area, reads into that area several megabytes of data (the sysout), and modifies it there. Under UNIX, that program's data requirements (which include the sysout) are handled by UNIX; all Medley does is modify in "memory" a copy of your original sysout file. UNIX, transparently to Medley, handles all real memory swapping. This has several consequences related to starting, saving, and restarting sysouts.

On Xerox workstations, the virtual memory partition is updated periodically and used to store new pages as they are allocated or flushed from the real memory of the machine. For example, LOGOUT and SAVEVM write out only those pages of data which are different from what might already be in the virtual memory file.

On the Sun Workstation, however, the contents of virtual memory are only written to a file by an explicit call to SAVEVM, LOGOUT, SYSOUT, or MAKESYS. This file is an ordinary SunOS file (normally ~/lisp.virtualmem). The entire virtual memory, which may be many megabytes of data, is written out there.

On the Sun Workstation, starting anew from a saved virtual memory file requires reading it into memory. On the Xerox workstation, it is necessary to first copy the

saved sysout to the virtual memory file and then read it in. Thus, restarting a saved sysout or virtual memory file is significantly faster on a Sun Workstation.

The file that LOGOUT and SAVEVM writes is normally ~/lisp.virtualmem (i.e., the file lisp.virtualmem on the user's home directory). However, the environment variable LDEDESTSYSOUT can be used to override this default. For example, you might want to keep virtual memory images on /user/local. During a demonstration where you do not want the memory image saved, you can reset LDEDESTSYSOUT to /dev/null. You can use the C-Shell command setenv to do this, e.g.:

```
prompt% setenv LDEDESTSYSOUT "/dev/null"
```

Cursor tracking interferes with writing out the screen bitmap as part of the Medley memory image. For this reason, Medley takes the cursor down before saving a virtual memory image as part of LOGOUT, SAVEVM, SYSOUT, or MAKESYS. When this happens, the message

```
Saving VMem, taking mouse down
```

appears in the prompt window, and cursor tracking is disabled.

Because the virtual memory file need not already exist to run Medley, the functions LOGOUT and SAVEVM can signal the following file errors:

```
File-System-Resources-Exceeded
Protection-Violation
File-Wont-Open
```

Even if some errors occur while saving a virtual memory, the old destination file is safe. Saving does not overwrite the old virtual memory file. The saving virtual memory file is named with "–temp", such as lisp.virtualmem–temp. The file is renamed to a specified name, such as lisp.virtualmem, at the last sequence of the save.

When the user does not have enough space to save the virtual memory, the old virtual memory file can be overwritten by setting IL:\LDEDESTOVERWRITE to T. The initial value of IL:\LDEDESTOVERWRITE is NIL. In some cases, even if the user tries to overwrite, there may still not be enough space.

In Medley, a "page" is 512 bytes. Under SunOS, the page size is variable; some Sun Workstations use 8 Kbyte pages. In general, Medley functions deal only in units of Medley pages, e.g., the SIZE attribute of files is in terms of 512–byte pages, (VMEMSIZE) returns the number of 512–byte pages in use.

**(IL:LOGOUT** *FAST***)** **[Function]**

Lets you exit Medley cleanly. The parameter *FAST* indicates whether resumption of the same environment is desirable and in what fashion. Before exiting, disk buffers are written, and network connections subject to timeout are closed.

If *FAST* is NIL, LOGOUT first saves your virtual memory in a file. Change the file name by setting the UNIX environment variable LDEDESTSYSOUT. If this variable is not set, the file saved is ~/lisp.virtualmem (i.e., lisp.virtualmem on the user's home directory).

If *FAST* is T, Medley stops without writing the virtual memory file. It is not possible to resume execution in the same image.

**(IL:SAVEVM )** **[Function]**

Saves your state, but does not exit. It causes the current virtual memory image to be written to the location specified by the environment variable LDEDESTSYSOUT, if this variable is set; otherwise it is written to ~/lisp.virtualmem. This allows Lisp to continue. Execution in Medley continues after memory is saved; thus, SAVEVM operates as a sort of checkpoint of the current working state. SAVEVM can cause the following error:

File-System-Resources-Exceeded.

**(IL:SYSOUT** *FILE***)** **[Function]**

Performs the equivalent of SAVEVM and then copies the saved image to *FILE* for devices other than {DSK} and {UNIX} (e.g., XNS file servers). (See Chapter 5, Medley File Systems, for further information on {DSK} and {UNIX}.) SYSOUT can cause the following error:

File-System-Resources-Exceeded.

# Sun-Specific Environment Functions

## System Environment Functions and Variables

These functions, which interrogate the system environment, operate as described below when they are invoked on the Sun Workstation:

**(IL:REALMEMORYSIZE)** **[Function]**

On some machines, returns the total amount of real memory available; does not work on a Sun Workstation (i.e., returns a meaningless value).

**(CL:MACHINE-TYPE)** **[Function]**

Returns a string identifying the type of computer hardware the system is running under. On the Sun–3 workstation MACHINE-TYPE returns "mc68020". On a Sun–4 workstation, MACHINE-TYPE returns the string "sparc".

**(IL:MACHINETYPE)** **[Function]**

Identifies the generic type of Lisp machine in use. On the Sun Workstation, it returns the symbol IL:MAIKO.

**(CL:MACHINE-VERSION)** **[Function]**

Returns a string identifying the version of the emulator running; e.g., "Microcode version: 279, memory size: 16384".

**(CL:MACHINE-INSTANCE)** **[Function]**

Returns a string containing the workstation host ID (in hexadecimal) and the host name.

**IL:LISP-RELEASE-VERSION** **[Variable]**

Identifies the release number within a single major release name. In Medley 2.0, IL:LISP-RELEASE-VERSION is 2.0 While IL:MAKESYSNAME does not change, IL:LISP-RELEASE-VERSION always changes with each new sysout release. This variable did not exist in the Medley 1.0-S sysout.

**IL:\MY.NSADDRESS** **[Variable]**

Fills in the fields of the network address with the host ID if Medley is run without the Ethernet enabled. Programs that use the network address as a unique identifier should be aware that the value could vary from session to session depending on whether or not the Ethernet is enabled. (Refer to Chapter 14 of the *Interlisp-D Reference Manual* for further information.)

## VM Functions

The biggest difference is a change in terminology. On Xerox 1100 series workstations, Lisp itself handles all virtual memory operations directly, so the terms "sysout" and "virtual memory image" can be used interchangeably. The running sysout resides in a reserved area on the workstation local disk (the virtual memory partition) that Lisp reads from and writes to as it needs to move pages into and out of physical memory.

**(IL:VMEMSIZE)** **[Function]**

Returns the number of 512–byte pages of the Medley virtual memory that are in use. This number is a good estimate of the size of a SYSOUT, MAKESYS, or SAVEVM virtual memory file.

**(IL:VMEM.PURE.STATE** *ON/OFF***)** **[Variable]**

Has no effect on the Sun Workstation. The virtual memory file is not modified except by an explicit (LOGOUT) or (SAVEVM).

**IL:BACKGROUNDPAGEFREQ** **[Variable]**

Has no effect on the Sun Workstation. The virtual memory file is not modified except by an explicit (LOGOUT) or (SAVEVM).

You can control how much virtual memory Medley uses by using the -m switch, as described below.

**ldeether [<***SYSOUT-name***>] [**-m<*memory-size*>**] [***other options***]** **[Command]**

Allows you to specify an arbitrary virtual memorey size for Medley.

-m Specifies the memory size

*memory-size* 8 through 32 Mbytes

When you use -m, the value of IL:\STORAGEFULLSTATE in the sysout you start should not be 3 or 4. Those values mean it already used more than the 8-Mbyte space in the sysout. Because of the Medley storage management architecture, the virtual memory size cannot be changed after IL:\STORAGEFULLSTATE has been set to 3 or 4. This value can be examined just before (IL:LOGOUT) if you want to specify the virtual memory size during the next start-up.

Example: `ldeether /usr/LISP.SYSOUT -m 16`

This example means 16 Mbytes of virtual space will be assigned for Lisp.

## Stopping Lisp Temporarily

**(IL:SUSPEND-LISP)** **[Function]**

Suspends, temporarily, the UNIX process running Medley. Using the `fg` C-Shell command, the Medley process can be continued from the C-Shell where it was started. `SUSPEND-LISP` has no effect on Xerox Lisp workstations. This function should not be used during I/O operations (file or network).

## Login Functions

This section describes the interaction between the usernames and passwords in Medley and the SunOS usernames and passwords. The functions IL:USERNAME, IL:SETUSERNAME, IL:SETPASSWORD, and IL:LOGIN access the username/password database used by Medley in network operations. (For further information, see Chapter 24 of the *Interlisp-D Reference Manual*.) When Medley is started, this database contains only the SunOS username, with no password. Except for this, there is no interrelation between these Medley functions and SunOS usernames and passwords.

IL:USERNAME returns the SunOS login name under which the emulator was started. A subsequent IL:SETUSERNAME or IL:LOGIN changes IL:USERNAME, and the default login name for network access to XNS and PUP hosts. However, it does not change the SunOS login name or access capabilities for files on {DSK} or {UNIX}. (See Chapter 5, Medley File Systems, for detailed information on {DSK} and {UNIX}.) Because it doesn't change the SunOS login name, it won't change the author name on SunOS files created from Lisp.

The following functions apply to login activities.

**(IL:UNIX-USERNAME)** **[Function]**

Returns a string consisting of the username of the SunOS process running Medley. Returns NIL if one of the following conditions apply:

- You are not running under UNIX
- You do not have a full name entered in /etc/passwd or the NIS password map
- An error occurs.

**(IL:UNIX-FULLNAME)** **[Function]**

Returns a string containing the full name of the owner of the SunOS process running Medley. Returns NIL if the user is not running under UNIX or an error occurs.

**(IL:LOGIN** *HOST FLG DIRECTORY MSG***)** **[Function]**

Attempts to maintain user IDs and passwords for network as well as local access. If *HOST* is NIL, this function attempts to perform the SunOS setuid operation.

Unless you are running as root, this will not change your SunOS login.

## Environment Inquiry

The following functions return the values of UNIX environment variables or machine parameters. They return NIL if run in Medley on Xerox 1100 series workstations.

**(IL:UNIX-GETENV** *STRING***)** **[Function]**

Returns the value of the environment variable with the given name. The argument *STRING* should be the name of a UNIX environment variable. For example, (UNIX-GETENV "HOME") might return the user's home directory.

**(IL:UNIX-GETPARM** *STRING***)** **[Function]**

Returns the value of one of a few built-in parameters. The argument *STRING* should be the name of one of the following UNIX environment variables:

| Variable | If running on this hardware | Returns |
|---|---|---|
| "MACH" | Sun-4 | "sparc" |
| | Sun-3 | "mc68000" |
| | RS/6000 | "rs/6000" |
| | HP9000 | "hp9000" |
| | DEC3100 | "mips" |
| | PS/2 | "i386" |
| "ARCH" | Sun-4 | "sun4" |
| | Sun-3 | "sun3" |
| | RS/6000 | "rs/6000" |
| | HP9000 | "hp9000" |
| | DEC3100 | "dec3100" |
| | PS/2 | "ps/2" |
| "HOSTNAME" | All | Returns the local host name |
| "HOSTID" | All | Returns the local host identification number as a hexadecimal string |

## Display and Keyboard Functions and Variables

Some Medley display and keyboard functions and variables operate differently on the Sun Workstation.

The following functions have no effect on a Sun Workstation, and always return NIL:

IL:CHANGEBACKGROUNDBORDER

IL:VIDEORATE

IL:SETMAINTPANEL

IL:VIDEOCOLOR

The functions IL:BEEPON, IL:BEEPOFF, IL:PLAYTUNE, IL:RINGBELLS generate monotones.

**(IL:BEEPON** *FREQ***)** **[Function]**

Turns on the keyboard tone generator on the Sun Workstation. The *FREQ* argument is ignored.

**(IL:BEEPOFF)** **[Function]**

Turns off the keyboard tone generator.

**(IL:PLAYTUNE** *TUNEPAIRS***)** **[Function]**

Sounds tones, but ignores the frequencies of the values in *TUNEPPAIRS*.

**(IL:RINGBELLS)** **[Function]**

Causes the machine to beep several times.

## Timers and Clocks

UNIX is a timesharing operating system. When Medley is running, other programs can be running at the same time on the same workstation.

On a Xerox workstation running Lisp, CPU time could be computed exactly from elapsed time after subtracting known system overhead. To allow older Interlisp-D programs to work unchanged, the timer functions were modified to allow programs that accounted for time on Xerox workstations to continue to run. Time is categorized as follows:

| | |
|---|---|
| CPU time: | The total amount of time spent executing Medley's process in user mode. |
| SWAP time: | The total time spent running other processes (Elapsed time – (CPU time + Disk time). |
| Disk I/O time: | The total amount of time spent in the system executing on the behalf of Medley's process. |

The Medley functions `CLOCK`, `TIME`, and the like get the time of day directly from SunOS. The function `SETTIME` has no effect on the Sun Workstation.

**`IL:\RCLKMILLISECOND`** **[Variable]**

The number of clock "ticks" in a millisecond. On the Sun Workstation, this value is always 1000. All of the timer functions that deal in clock ticks will do their computation in microseconds. Note, however, that the Sun Workstation does not have that accurate a clock resolution. While clock resolution varies from one operating system version to another, it often has a resolution no better than 1/60th of a second.

## Miscellaneous Operational Differences

The stack and virtual memory handling functions on the Sun Workstation are implemented differently from the way they are on the Xerox workstations. For this reason, the "cursor bars" used on the Xerox workstations are not used on the Sun Workstation.

When working in Medley on a Sun workstation, you should periodically load a fresh sysout. Older Medley sysouts don't run as well as "fresh" sysouts due to a number of factors such as fragmentation of memory, increased working set, more objects taking up various spaces (e.g., gc tables), reduced symbol space.

On Xerox workstations, users are reminded to reload fresh sysouts, because they eventually fill up their sysout partition. With Sun workstations, there is no such limit reminder, so users' sysouts tend to grow to the maximum size (32 MB), and thus run slower and slower.

## Console Messages

Under SunOS, various system processes and operations attempt to log information on the console. Since Medley takes over the screen, console messages are redirected (except when running under X); a background process in Medley causes them to appear in the prompt window.

However, when Medley is run remotely (i.e., not from the console), most console, or operating system, messages are printed in the prompt window. However, some messages may also appear in the middle of the Medley display screen or on the remote tty. This occurs because UNIX is often confused about where to send messages. Note that Medley is normally run remotely only for debugging purposes.

**CAUTION**

Critical UNIX system processes can hang if the buffer holding console messages fills. Medley uses a temporary file, `/tmp/XXXX-lisp.log`, where `XXXX` is the user's login name, to buffer console messages before printing them. Do not delete this log file while Medley is running. If the log file is deleted, console messages can no longer be printed in the Medley prompt window.

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