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Volume II

Khoros Programmer's Manual

Chapter 10

INSTALLATION GUIDE

Installation Guide for the Khoros System

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INSTALLATION GUIDE

A. INTRODUCTION

Welcome to Khoros 1.0 (Patch 5)! This document contains the information that you need to load and install the Khoros software onto your system. Both source and binaries are available via anonymous ftp or by ordering a tape and printed documentation.

The installation procedure outline follows:

Step 1) ftp from pprg.eece.unm.edu or order and receive a tape

Step 2) untar the source and/or binary files in KHOROS_HOME

Step 3) set up your user environment

Step 4) if you did NOT install binaries and want to compile, run **installit**

Step 5) read Volume 1, Chapter 1 of the Khoros manual and try Khoros out!

A.1 PREREQUISITES

If you are going to use the binaries provided (sun4, sgi, or dec mips), then the prerequisite is to have some version of the the X windows system and about 40 Megabytes of disk space plus the amount of space needed for binaries (see table below).

The following list of prerequisites is for those that plan on compiling the system.

- X11R4 or X11R5 from MIT with current patches. You need X11R4 or X11R5 libraries (client libraries, *X11, Xaw, Xt, Xmu* and *Xext*) to compile Khoros; however once Khoros is compiled, it will run with an X11R3 server. Both X11R4 and X11R5 are available via Anonymous FTP from "export.lcs.mit.edu".
- A C compiler
- A Fortran compiler is recommended (not all of Khoros will be available without a Fortran compiler)
- The compress program (available via Anonymous FTP from "pprg.eece.unm.edu").
- About 65 Megabytes of disk space plus room for objects, libraries and binaries (see table below)

Khoros 1.0 Binaries Are Available for These Architectures				
Vendor	Name	OS	.o's and lib	Binaries (Meg)
DEC	5000/3100	Ultrix 4.1	37	66
SUN	sparc	SUN OS 4.1.1	21	63
SGI	Indigo	OS 4.0	36	70

A.2 OTHER DOCUMENTATION

If you are unsure about the installation of Khoros and need additional information, the following documents may be of help:

khoros This is a four page overview of Khoros. If you are not sure what Khoros is and what it can do, read this document to get a better overview than the one provided in the announcement. This file is located in $KHOROS_HOME/release.

chapter1 Volume I, Chapter 1 of the Khoros User's manual provides general information for the Khoros user. This should be considered required reading.

chapter9 Volume II, Chapter 9 of the Khoros Programmer's Manual provides a detailed description of the source configuration and **imake** system used by Khoros. This will be helpful to those who are porting the software to other architectures or are having trouble with compiling.

appendixB Volume II, Appendix C of the Khoros Programmer's Manual provides a detailed description of the **imake** system symbols and rules. This document is helpful when modifying the Khoros **imake** system.

announce This is the announcement of the Khoros 1.0 release. It provides a brief overview of Khoros and ordering information. This file is located in $KHOROS_HOME/release.

This document, install, and the documents listed above are available in both postscript and plain text form on pprg.eece.unm.edu in the directory `pub/khoros/release` or in your copy of Khoros in $KHOROS_HOME/release. A *.ftp indicates that it is a plain text file, a *.ps indicates postscript (ready to print), and a *.ms indicates that it is the source "roff" file. Instructions on how to obtain these files is provided below.

A.3 SUPPORT AND MAINTENANCE

Even though many users of Khoros have said that it is quality software, Khoros 1.0 is not a commercial product. Support is provided via an e-mail users group (khoros@chama.eece.unm.edu), a USENET news group comp.soft-sys.khoros, and periodic updates. To join the Khoros mailing list, mail to khoros-request@chama.eece.unm.edu. To report bugs, mail to khoros-bugs@chama.eece.unm.edu. Please use the bug report form found in `$KHOROS_HOME/repos/BugReport` as a template for reporting bugs.

There are several companies that are likely to be selling Khoros support in the near future. Please inquire if you are interested.

A.4 COMMON PROBLEMS

Khoros 1.0 is a large system, and often an end user only wants part of its functionality. This often leads to complaints about the system requirements. The only solution to this problem now is to obtain Khoros as it is, install it, and then delete the components of the system that you do not want. The minimum set of directories that you need to run Khoros are:

bin contains executables

repos User Interface Specification files, architecture-specific configuration files
You may also want to keep:

doc Online help

man man pages used by **vman**

manual contents of printed manual

release starter documentation

data example data
You do not need the following for only a "runable" Khoros system:

src needed for compiling

lib needed for compiling

include needed for compiling

B. KHOROS VIA FTP DISTRIBUTION

First you must determine where on your system that you want to install Khoros and then create a directory (any name is fine). This can be done by creating a user named "khoros", or simply by creating a home directory such as `/usr/local/khoros` or `/usr/khoros`.

B.1 ACQUIRE TAR FILES

Move to the directory that you just created and then execute the following commands to acquire the Khoros compressed TAR files.

a. Use ftp to connect to pprg.eece.unm.edu.
```
% ftp pprg.eece.unm.edu
```
-or-
```
% ftp 129.24.24.10
```

b. Use "anonymous" or "ftp" as the user name.
```
Name (pprg.eece.unm.edu:login):  anonymous
```
-or-
```
Name (pprg.eece.unm.edu:login):  ftp
```

c. Use your e-mail address as the password; please use a valid e-mail address, as this ftp site logs all anonymous ftp's.
`Password (pprg.eece.unm.edu:user):` {your valid e-mail address}
```
331 Anonymous login ok, use your E-MAIL address as the
password.
230 Guest login ok, access restrictions apply.
```

d. Get the installation guide (this file, called install.ftp) for acquiring Khoros via anonymous ftp. (note that "install.ftp" is the plain text file - both ".ms" and ".ps" files are available for those who would like them).
```
ftp> cd /pub/khoros/release
ftp> get install.ftp
```

e. Set the ftp program to binary mode.
```
ftp> bin
```

f. The next step is to actually get the Khoros TAR files. The compressed TAR files are located in four separate directories: bins (sun4, sgi, decmips), system, source and data. Within each of these directories, you will find both the compressed TAR file and a set of "split" files created from that TAR file. You can have a functional Khoros system without the data and system directories, in other words, a minimal system can be installed with only system and bins.

To get the system directory:
```
ftp> cd system
ftp> get system.tar.Z
```

The system.tar.Z has been split into many different files; if you have trouble getting the system.tar.Z file, you may try getting each of the split files individually. To use this method, substitute the previous commands with:

```
ftp> prompt
ftp> mget system.[0-9]*
```

g. In the above steps, you acquired the "foundation" (doc, dotfiles, repos, man, manual, release) of the Khoros system. In order to get bins, source (src and include) and data, go to that directory on pprg.eece.unm.edu and follow the same basic steps as above. A minimal system can be created by only obtaining the system and bins directories.

B.2 COMMON PROBLEMS IN ACQUIRING THE SYSTEM

It is not uncommon for the files to be corrupted during ftp transfer. To verify that you have good files, use the *.listing file found in each directory of pprg along with the TAR files. Check to see that the calculated checksums match. For example, if you got the system.tar.Z file, this procedure will be simple. First, get the "system.listing" file from pprg.eece.unm.edu, in /pub/khoros/system, if you have not already done so. Then, run:

```
% sum system.tar.Z
```

The output of the *sum* program should match the statistic given for system.tar.Z, at the top of the system.listing file. If it does not match, this indicates that the TAR file has been corrupted. If the TAR file has been corrupted, you may want to re-acquire the system as detailed in the previous section. Or, you can find out which files are bad by executing:

```
% zcat system.tar.z | tar tvf - > my_system.listing
```

Now, execute:

```
% diff system.listing my_system.listing
```

This will list the differences between the two files. Of course, the first ˜30 lines will differ, as our system.listing file has additional checksum information at the beginning; however, if any other lines in the listing differ, look at the filenames listed on the lines that differ. This will indicate which files were corrupted.

If you got the split files, it is best to write a small "foreach" script to perform the checking procedure for you.

B.3 UNTAR THE FILES

You have already created a "home" directory for the TAR files, now you must set the environment variable KHOROS_HOME. It should be set to the home directory that you created above. For instance, if you created a home directory /usr/khoros,

```
% setenv KHOROS_HOME /usr/khoros
```

or

```
% setenv KHOROS_HOME ˜khoros
```

if you set up a user name for Khoros.

All of the TAR files should be untarred in the KHOROS_HOME directory. (In the case of untarring binaries for more than one architecture, you may want to create a binmach directory and untar the bins into different subdirectories.) To untar the system.tar.Z file, use the following commands:

```
% cd $KHOROS_HOME
% zcat system.tar.Z | tar -xfoB -
```

-OR-

```
% uncompress -c  system.tar.Z | tar -xfoB -
```

If you transferred the split files instead of the system.tar.Z file, you will need to do:

```
% cd $KHOROS_HOME
% cat system.[0-9]* | uncompress > system.tar
% tar -xf system.tar
```

Alternatively, you may use (WARNING: this is not as reliable and doesn't seem to work on bindecmips):

```
% zcat system.[0-9]* | tar -xfoB -
```

-OR-

```
% uncompress -c system.[0-9]* | tar -xfoB -
```

You should follow the same basic procedure for the data, source and bins TAR files. After you untar the compressed TAR file, you may want to remove the TAR file to save space.

B.4 COMMON PROBLEMS IN UNTARRING FILES

Be sure that you have not run out of disk space by using the `%df .` command. If you run out of disk space during the untarring procedure, the untarred Khoros system will be corrupted. Delete the untarred Khoros system, and free up some extra space before starting the untarring procedure again. Often, an uncompressed TAR file gets left around after it is successfully untarred; delete it to free up additional space.

C. KHOROS VIA TAPE DISTRIBUTION

First you must determine where on your system that you want to install Khoros and then create a directory (any name is fine). This can be done by creating a user named "khoros", or simply by creating a home directory such as `/usr/local/khoros` or `/usr/khoros`.

The tape distribution includes tape(s) with Khoros source and binaries (if ordered), Volume one and two of the Khoros manual and installation instructions for extracting Khoros from the tape(s).

C.1 EXTRACTING KHOROS FROM TAPE

Your tape distribution should include instructions on how to extract Khoros from the tape(s). If you have problems with extracting Khoros off the tape(s), please contact us. Note, make sure you move to the directory that you just created before extracting Khoros from tape.

If you did not receive binaries or want to compile Khoros on another architecture, follow the instructions below for compiling Khoros.

D. CONFIGURING YOUR ENVIRONMENT

You will need to set up your user environment so that Khoros applications will run properly. The files of concern are: .cshrc or .login, .khoros_env and .Xdefaults. If you need more details than what is provided below, please read Chapter 1, Volume 1 on "Getting Started" with

Khoros.

Provided with the release is a directory called "dotfiles" that provides templates or examples for the files mentioned below.

.cshrc Modify your ".cshrc" or ".login" file to include a path to $KHOROS_HOME/bin. The ".cshrc" or ".login" file should `source .khoros_env`.

.khoros_env The environment variables used by Khoros are set in the .khoros_env file. Use the file `$KHOROS_HOME/dotfiles/khoros_env` as a template.

```
% cp dotfiles/khoros_env .khoros_env
```

.Xdefaults Use the one provided to start with; it is in `$KHOROS_HOME/dotfiles/Xdefaults`.

```
% cp dotfiles/Xdefaults .Xdefaults
```

As a note, Khoros was developed using primarily the **twm** window manager which is distributed with X11R4. To test out your new environment, execute the following commands:

```
% source .cshrc
% xrdb .Xdefaults
```

If you have obtained and untarred binaries, you can skip the following section on compiling Khoros. However, it is very important that you execute the following program to configure the man pages for your site:

```
% $KHOROS_HOME/man/utils/tmac/customize
```

If you forget to run the *customize* program, the **vman** command will not work, and you will not have access to the Khoros man pages.

E. COMPILING KHOROS

If you have all of the prerequisites as stated above, and you are compiling for one of the platforms listed above, the configuration should be quite simple. However, if you are compiling for a new (unsupported) architecture or want to support multiple architectures, you should read $KHOROS_HOME/release/chapter9 and use $KHOROS_HOME/release/appendixB as a reference for **imake** changes. You should be most concerned with configuring the Khoros **imake** system correctly. If you received a printed manual consult Volume II, Chapter 9 and Appendix B.

E.1 CONFIGURING THE IMAKE SYSTEM

Before starting the compile, the **imake** configuration files in $KHOROS_HOME/repos/config/imake_conf must be modified. The files that need special attention are: *platform.cf*, where *platform* is the name of the architecture (i.e. for a Sun use sun.cf, for a DecMips use ultrix.cf, etc) and Site.def. The symbol defines in these files need to be set according to how you want to compile Khoros. For example, if your system does not have a Fortran compiler, the symbol "HasFortran" in the *platform.cf* file must be set to "NO".

We have tried to tailor the **imake** configuration files so that very little effort is needed to compile Khoros, however, it is important that you check these files for correctness. While the **imake** configuration files such as *platform.cf* and *Site.def* are fairly well commented, more information can be found in Chapter 9 and Appendix B. Once the **imake** configuration files have been modified, you are ready to compile Khoros.

E.1.1 Commonly Asked Questions About Configuring Imake

Below are a few commonly asked questions about the **imake** configuration files. If you need to use any of the following symbols or any other imake symbol, we suggest that the symbol defines are put in the *platform.cf* file.

Q: X11 directories are not in the "standard" place on my machine, how do I specify where the X11 directories exist?

A: define the symbol "XLibDir" to the directory where the X11 libraries exist

```
#define XLibDir /usr/local/lib/X11
```

define the symbol "XIncludes" to the directory where the X11 include directory exists.

```
#define XIncludes -I/usr/local/include
```

Q: Fortran libraries are in /usr/lang rather than in /usr/lib, how do I change where to look for Fortran libraries?

A: define the symbol "FortranLibDir" to the directory where the Fortran libraries exist

```
#define FortranLibDir /usr/lang
```

Q: I need to add some other libraries to compile against, how do I add these extra libraries?

A: define the symbol "ExtraLibs" to the directory where the libraries exist

```
#define ExtraLibs /myhome/foobar
```

Q: How do I make the libraries load with a different option than the C programs load with?

A: define the symbol "LibraryLdCmd" to the command that you want the libraries to load with and the "LdCmd" to the command that you want the C programs to load with.

```
#define LibraryLdCmd ld
#define LdCmd cc
```

Q: How do I specify different compile options for libraries and C programs.

A: define the symbol "LibraryCCOptions" to the options that you want the libraries to compile with and the "DefaultCCOptions" to the options that you want the C programs to compile with.

```
#define LibraryCCOptions -q -P
#define DefaultCCOptions -float
```

Q: How do I specify different compile options for Fortran libraries and Fortran object files.

A: define the symbol "LibraryFCOptions" to the options that you want the libraries or other Fortran object files to compile with.

```
#define LibraryFCOptions -O
```

Q: I can not regenerate the Khoros manual on a Sun Workstation because soelim for .so lines in the roff files, limits the file length to 64 characters.

A: This is a bug and has been reported to Sun, but not expected to be fixed until the release after 4.1.2 (maybe). We are distributing a public domain version of the soelim program. If you think or know that your OS has this problem, then make sure you have the following symbol set to YES.

```
#define SoeLim YES
```

Q: Can I compile Khoros and utilize shared libraries.

A: As of Patch 5 we are only supporting Sun shared libraries. We have the mechanisms in place for other architectures, but have not verified the shared rules. If you want to compile the Sun with Shared Libraries then set the symbol "HasSharedLibraries" to YES.

```
#define HasSharedLibraries YES
```

If you want to port Khoros to use shared libraries on your architecture, you should model it after the the Sun version. You will have to either modify or create a library rules file in the $KHOROS_HOME/repos/config/imake_conf/Lib.

Although many more questions about configuring the **imake** system have been asked, this set of questions and answers should give one the feel of how to make changes to the **imake** configuration files. It is strongly suggested that the document Volume 2, Appendix B, "Imake Symbols and Variables" be consulted when making changes to the **imake** symbols.

E.2 STARTING THE COMPILE

The installit program in $KHOROS_HOME/src will prompt you for some default directories and startup flags. The installit program will modify the imake *Site.def* file to include the correct location for Khoros binary, library and include directories. To compile Khoros, execute the following commands:

```
% cd $KHOROS_HOME/src
% ./installit
```

If you would like to watch the compile, you can execute:

```
% tail -f make.World
```

Note that if you use the "tail" command to watch the Khoros system compile, you will have to "^C" out of it when the compile has been completed.

The compile will take several hours. Some typical times are listed below.

SparcStation 1	5 hours (src mounted on NFS partition)
Sun3/260	4.6 hours (using gcc on NFS partition)
Vax 3500	4.4 hours (using cc on NFS partition)
DecStation 5000	3.33 hours (local disk)
SGI Indigo	2.00 hours (local disk)

E.3 COMMON PROBLEMS WITH COMPILING

Again, the most common problems is that you run out of disk space or NFS will time out during the compile. If this happens, you should:

```
% cd $KHOROS_HOME/src
% make allclean; installit
```

The reason that you need to "clean" the system is because of the possibility of corrupted .o's and libs.

It is not unusual to have a system failure (NFS dies, machine crashes, etc) during the compile. Follow the same instructions as above.

If the "installit" fails due to compile errors, please verify that you have configured the **imake** system files located in $KHOROS_HOME/repos/config/imake_conf correctly. Consult Volume II, Chapter 9 for assistance.

F. INSTALLING TOOLBOXES

This section discusses how to install a toolbox that was created by another person or was developed on another machine, and is being set up on a new machine. Note, It is assumed that Khoros is already installed at this point. The following steps must be followed in order to update the configuration files for the new directory and machine.

1. Set the environment variable KHOROS_TOOLBOX to your toolbox file. To do this type the following command.

   ```
   % setenv KHOROS_TOOLBOX {Pathname to Toolbox file}
   ```

2. Find a location for your toolbox, and create the directory. If you received Khoros via tape distribution, then follow the installation instructions you received with your order. Otherwise, If you aquired the toolbox via ftp, the file will be in tar format. To untar the toolbox, use the following command:

   ```
   % tar -xf {toolbox tar filename}
   ```

   Make sure you cd to the directory you want to unpack it to, **before** typing the untar command.

3. For the rest of this discussion, `{top dir}` will refer to the directory that contains the top level of your toolbox. Modify the `{top dir}/repos/config/src_conf/{toolbox}_mf` file. Look for the KHOROS_USER tag inside the file, and substitute your user name for one that is already there. Use `\pwd` in the `toolbox/src` directory to get the absolute path, and replace the path assigned to the LOCAL_SRC_TOP tag with this new path.

4. Run **kraftsman** to add the toolbox entry to your toolbox file. (See the help page on "ADD TOOLBOX" option on the "Creation" pane in **kraftsman**, or check in Volume 2, Chapter 11 for information on how to add a toolbox to your toolbox file.)

5. After adding the toolbox entry to your toolbox file, go to the "Configuration" pane, and make sure that both the Binary Path and Library Path are correct. (See the configure toolbox documentation in Volume 2, Chapter 11.) Once you have set these paths correctly, you may exit **kraftsman**.

The rest of the instructions explain how to build and install all the routines in the newly installed toolbox.

6. execute:
   ```
   % cd {top dir}/src
   ```
7. execute:
   ```
   % make Makefile Makefiles
   ```
8. execute:
   ```
   % make install
   ```

Finally, you will need to add `{top dir}/bin` to your path so that you will be able to execute the routines. You may want to do this in your ".cshrc" file, so that you will not have to remember to set the path every time you log in.

G. GETTING STARTED

Now that you have Khoros installed, you will want to use the manual printing utility, **prnmanual**, to print out Volume 1, Chapter 1, "Getting Started", and other documents. If you received a printed copy of the manual, there is no need to reprint any of the manual.

Questions, comments, constructive criticism can be mailed to the Khoros E-Mail Users Group, `khoros@chama.eece.unm.edu`, or the Khoros USENET news group, `comp.soft-sys.khoros`. To join the e-mail group, mail to `khoros-request@chama.eece.unm.edu`. *PLEASE:* only requests to get on or off the Khoros mailing list should go to this address. Other mail is very likely to get lost or be deleted.

Once you are a member of the Khoros Users Group, you may mail any questions that are not addressed in the Khoros Manuals to `khoros@chama.eece.unm.edu`. If a member of the Khoros group itself cannot answer your question immediately, it is likely that another Khoros user may be able to.

As with any system approaching the size of the Khoros system, you can expect to find some bugs. We already are aware of several bugs; these can be found in $KHOROS_HOME/repos/BugList. If you find a bug in the Khoros system, please look through this file first to see if it is one of the bugs that we already have on our list. We *strongly* encourage you to report any bugs that you may find that are not listed in the BugList. All bugs are to be reported via *email*, to `khoros-bugs@chama.eece.unm.edu`. When reporting bugs, please include the version of Khoros (located in the file $KHOROS_HOME/src/Patchlevel), the machine type (execute: uname -a), and how the bug can be duplicated. You can send us Cantata Workspaces and/or Journal Playback files.

We hope that you like the Khoros system!

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