EMA3D

version 3.1

Software Installation Guide

for UNIX

and Linux (32-bit)

EMA3D version 3.1.3 15-January-2008

EMA3D version 3.1 Software Installation Guide for UNIX and Linux (32-bit)

C O N T E N T S

Introduction

This Installation Guide is for the Solaris, SGI IRIX, and 32-bit Linux versions of EMA3D.

For other platforms, including Windows and 64-bit Linux, see the appropriate Installation Guide for that platform.

EMA3D Installation Documentation

A copy of this document is also on the EMA3D CD, in the subfolder "unix/installdocs".

Installing CADfix - Use the "CAE Modeller" Setup Type

EMA3D uses the software product CADfix as a graphical front-end. The installations of EMA3D and CADfix are separate. The two products may be installed in either order.

When installing CADfix, the user is usually presented with a choice of "Setup Type" to install. The choices are usually:

    1: CADfix Data Exchange (or sometimes called "DX")
    2: CADfix CAE Modeller
    3: CADfix license manager only

    Use "CADfix CAE Modeller" when installing CADfix for use with EMA3D.

The "Data Exchange" or "DX" setup type is for automated CAD database translation and repair and does not contain certain features necessary for preparing a model for use with EMA3D.

The "CADfix license manager only" option can be used if you want to install just the CADfix license manager on a machine without installing the full set of CADfix application files.

Installing EMA3D - Overall Procedure

The overall procedure for installing EMA3D is:

1) install the software   - see section "Installing EMA3D"
2) install a license key   - see section "Installing a License Key File"
3) source the setup scripts   - see section "Running EMA3D"
4) locate the documentation   - see section "EMA3D Documentation"
5) Additional Information:

    - see section "gnuplot" for more information about
    gnuplot, a free third-party plotting program included with EMA software.

    - see section "Adobe Acrobat Reader" for
    instructions on obtaining and installing Adobe Acrobat Reader
    if you do not already have Acrobat Reader on your system.

Perform the following steps to install EMA3D on a UNIX or Linux system:

1) Load the EMA3D CD into the CD-ROM drive. You may have to "mount" the CD-ROM (see your system documentation).

2) In a shell command prompt or terminal window, go to the "unix" subdirectory of the CDROM.

    example:

    % cd /cdrom/cdrom0/unix

3) Run the setup script "install.sh".

    example:

    % ./install.sh

The setup program will prompt you for some choices, including choice of platform (depending on what is on the CDROM), installation directory, and installation type.

    - The installation type "EMA3D" includes all of the EMA3D installation
    plus the license server software and licensing utilities.

    - The installation type "EMA3D License Manager Only" can be use if you
    want to install just the license server software without installing all of
    the EMA3D application files.

Install a License Key

Before running EMA3D you must either install a standalone license, or set-up the license server with a floating network license. See the sections "License Server Installation and Startup" and/or "Installing a License Key File" for more information.

Source the Setup Script

Before attempting to run EMA3D, you should source the set-up script "ema3d_setups_csh" (for C-shell (csh)) or "ema3d_setups_sh" (for Korn or Bourne shells (ksh or sh)).

    example:

    # (sh or ksh)
    % . ema3d_setups_sh

    # (csh)
    % source ema3d_setups_csh

You should also source the setup script before running CADfix. You can run CADfix without sourcing the EMA3D setup script, but the additional EMA-

provided toolboxes and tools for setting-up an EMA3D problem from within CADfix, will not be present.

These scripts do the following:

1) add the full pathname of the EMA3D "bin" subdirectory to the PATH environment variable so that EMA3D may be run from the command-line.

2) add the full pathname of some EMA3D "man" subdirectories to the MANPATH environment variable so that certain man pages are available (see "documentation" section of this Installation Guide).

3) define certain environment variables that convey to CADfix the location of certain EMA files and tools that are incorporated into the CADfix GUI for use when CADfix is used as the front-end to EMA3D.

These scripts are placed in the top-level installation directory by the installation program. The setup script can be sourced from a system login script or from individual users' login scripts. See your system documentation for instructions on how to do this.

See "Appendix A: EMA3D Environment Variables" near the end of this document for more information on the use of environment variables by EMA3D/CADfix.

Running EMA3D

Once the script has been sourced to include the EMA3D "bin" path in the PATH environment variable, EMA3D can be executed at the command line:

% ema3d

EMA3D will prompt you for the name of an input file. The input file name can also be given as a command-line argument:

% ema3d testmodel.emin

After checking the information in the input file for consistency and errors, EMA3D will begin the computation.

See the User Manual Set for EMA3D for extensive, detailed information about using EMA3D and CADfix.

EMA3D version

The exact version of EMA3D that is installed can be determined with the following command:

% e3dver

It is a simple shell script that echoes the EMA3D version and date release.

Running the EMA3D/CADfix interfaces

Traditionally, EMA3D has been accompanied by two interface programs that enable it to interoperate with CADfix: the program "famtoema3d", which translates geometrical information and EMA3D problem information from the CADfix

model database file to the EMA3D input file format; and the program "famfromema3d", which translates simulation result data from the EMA3D output file format to a CADfix result database file.

In the current release of EMA3D, the function of "famtoema3d" is performed by a GUI tool within the CADfix GUI. To find this tool, select the toolbox named "EMA3D_ReviewTool" from the drop-down list of toolboxes in the CADfix GUI, and click the button "EMA3DREV". The "Model Review Tool" will open, displaying summary information about the EMA3D simulation data in the CADfix database. The button at the bottom labeled "FTE" performs the "famtoema3d" conversion.

The function of "famfromema3d" is still a separate, command-line program. If the EMA3D setups script has been sourced as described earlier, you can run famfromema3d at the UNIX command prompt:

    % famfromema3d

famfromema3d will prompt you for the name of an EMA3D output file. You can also supply the output file name as a command-line argument:

    % famfromema3d testmodel.emout

The EMA3D output file (*.emout file), and the corresponding CADfix database from which the model was build (*.fbm file), must both be in the current working directory to run famfromema3d.

    NOTE: CADfix was called "FAM", for "Field Analaysis Modeller", in
    earlier releases. The name "FAM" or "fam" still persists in some
    places. The naming convention "famfromanalysis" or "famtoanalysis"
    is still the standard convention for programs that translate
    information between CADfix and any analysis program.

famfromema3d for Different Versions of CADfix

famfromema3d is built using some CADfix executable code, and is therefore somewhat dependent on the version of CADfix being used for correct operation. The version of famfromema3d that is executed when you run "famfromema3d" as shown above, is built for CADfix 7.0. The EMA3D installation also includes versions of famfromema3d for CADfix 5.1 and 6.0. These versions have names that indicate which version of CADfix they are built for, and can be executed as follows:

For CADfix 5.1, use the following:

    % famfromema3d510

For CADfix 6.0:

    % famfromema3d600

For CADfix 7.0, you can use the following:

    % famfromema3d700

Or, for CADfix 7.0 you can just use "famfromema3d" as indicated before. "famfromema3d" and "famfromema3d700" are two copies of the same executable file with different names.

```
EMA3D Documentation
```

The following user manuals and documentation are part of the EMA3D
software installation:

<u>Installation Documentation</u>

 docs/install_ema3d.pdf
   - EMA3D Installation Guide for UNIX and Linux (this document)
 docs/install_ema3d.txt
   -text file version of install_ema3d.pdf

<u>EMA3D User Manual Set</u>

 docs/EMA3DGettingStartedManual.pdf
 docs/EMA3DOverviewManual.pdf
 docs/EMA3DTrainingManual.pdf
 docs/EMA3DProjectObjectivesManual.pdf
 docs/EMA3DPreparationManual.pdf
 docs/EMA3DReviewToolManual.pdf
 docs/EMA3DExecutionManual.pdf
 docs/EMA3DPostProcessingManual.pdf

  - EMA3D User Manual Set

EMA3D tools/utilities documentation

      docs/ema3d_utilities_ref.pdf

           - reference manual for the command-line utilities
             included with EMA3D (PDF format)

      docs/ema3d_utilities.README

           - list and overview of the command-line utilities

      docs/addfiles.README
      docs/derivfile.README
      docs/fft.README
      docs/filter.README
      docs/makesource.README
      docs/multisource.README
      docs/shiftsource.README
      docs/source.README
      docs/source2.README
      docs/sumfile.README
      docs/tfunc.README
      docs/writenode.README
      docs/writeprobe.README
      docs/xferNewSource.README

      docs/compute_Pavail.README
      docs/compute_Pin.README
      docs/compute_Pout.README
      docs/compute_Prefl.README
      docs/compute_Skn.README
      docs/compute_Snn.README
      docs/compute_TrFn.README
      docs/compute_Vin.README
      docs/compute_Znn.README
      docs/RCS.README
      docs/RXS.README

           - individual read-me files for each utility (same information
           as in the utilities reference manual

      docs/man/man1

           - this directory contains man page versions of all the
           utility read-me files above

gnuplot documentation

      docs/man/man1/gnuplot.1
           - man page for gnuplot, a third-party plotting program
           frequently used with EMA3D

      gnuplot3.7.3/man/man1/gnuplot.1
           - duplicate copy of the above man page

        lic/docs/SLM71sys.pdf
              - Rainbow Sentinel License Manager System Administrator's Guide
              (for use by system administrators)

        lic/man/man1/lsdecode.1
        lic/man/man1/lsmon.1
              - man pages for lsdecode and lsmon, Rainbow SLM utilities
              (for system administrators)

        lic/README - quick-start instructions for setting-up a license server

Viewing Documentation

        Files with a name like "README", "*.readme", "*.README" or "*.txt" are
text files that may be viewed with any text file viewer.
        Files with extension .pdf are Adobe Portable Document Format (PDF) files.
They require Adobe Acrobat Reader to view them. To view these files, first
launch Adobe Acrobat Reader:

% acroread

        Then click the "File" menu, choose "Open...", and navigate to the location
of the desired document listed above. Check the installation location or
consult your system administrator if you are not sure where to find the
documents listed above.
        If you do not have Adobe Acrobat Reader on your system, see the section
"Adobe Acrobat Reader", below, or consult your system administrator.

EMA3D Utilities

EMA3D Utilities

        Several command-line utilities, useful in working with column-formatted
ASCII data files produced by and used with EMA3D, are part of the EMA3D
distribution. They are located in the "bin" subdirectory of the EMA3D
installation. If the setups script has been sourced (see the section "Running
EMA3D"), you can run them from a command prompt the same way you run ema3d. For
example,

% writeprobe

EMA3D Utilities Documentation:

        Documentation on the meaning and usage of the EMA3D command-line utilities are installed in the "docs" subdirectory of the EMA3D installation:

        <install_dir>/ema3d313/docs

        The file "ema3d_utilities.README" contains a list and overview of all of the utilities.
        The file "ema3d_utilities_ref.pdf" is a complete reference guide to the EMA3D utilities.
        See the section "EMA3D Documentation" for a list of the utilities README files.

EMA3D Utilities Documentation - man pages:

        man page versions of the utilities reference pages are available. If the setups script has been sourced, which sets the MANPATH (see the section "Running EMA3D"), you can access the man pages from the command-line, for example:

% man writeprobe

        Invoking the following man page:

% man ema3d_utilities

        gives a list and overview of all utilities. The command "man utility_name" gives the man page for a specific utility.

```
gnuplot
```

gnuplot installed automatically

EMA3D result waveforms may be viewed with any available third-party plotting package. The freely-available "gnuplot" is fit for this purpose, and is included with the EMA3D software distribution. gnuplot is installed automatically by the installation script along with the EMA3D software.

If you wish to not have gnuplot installed on your system, you may remove the gnuplot directory and all its contents from the hard drive without disturbing the rest of the EMA software installation. The gnuplot directory will be something like

```
<install_location>/ema3d313/gnuplot4.0.0
```

(The version designation in the directory name may vary).

The EMA3D setup scripts "ema3d_setups_sh" and "ema3d_setups_csh" (see the section "Running EMA3D") add the directory path containing the gnuplot executables to the PATH environment variable. They also add the path containing a gnuplot man page to the MANPATH environment variable. If the setup script has been sourced, you should be able to run gnuplot from the UNIX command prompt:

```
% gnuplot
```

NOTE: some systems (particulary Linux) may already have a version of gnuplot installed. In this case, you might get the pre-existing installation when you enter "gnuplot" at a command prompt, because the EMA3D setup scripts put the EMA-installed gnuplot directory at the end of PATH.

If you wish to use the EMA-installed version instead (for example, if the EMA-installed version is a more recent version), you can edit the setup scripts to put the EMA-installed gnuplot location at the beginning of PATH. The setup scripts already contain a line to do this, which is commented-out by default. Just comment-out the line that puts the directory at the end of PATH, and un-comment the line that puts the directory at the beginning of PATH. There are comments in the setup scripts that tell you how and where to do this.

You should also be able to read the gnuplot man page:

```
% man gnuplot
```

If the man page does not come up, you may need to run "catman" to create the "windex" databases in the MANPATH directories. See your system administrator or UNIX or Linux documentation for details.

gnuplot source code distribution included

The installation script installs a copy of gnuplot that has been pre-compiled by EMA, from the gnuplot source code distribution, for the appropriate platform and using the default set of terminal drivers.

A copy of the raw gnuplot source code distribution is included on the EMA3D CD but is not installed by the installation script. This may be used, if desired, to compile a version of gnuplot for some other platform, or to add or remove terminal drivers for particular terminal types. The source code is set-

up to compile more or less automatically on a variety of systems. For more information, look on the EMA3D CD in the following directory:

    unix/gnuplot-4.0.0

and read the file "gnuplot-4.0.0.readme". You will find directions for both compilation and installation on a wide variety of platforms.

    For more information on gnuplot, visit the main gnuplot web site at:

    http://www.gnuplot.info

DISCLAIMER

    Gnuplot is free, third-party software provided as a convenience to EMA software end-users in accordance with the Gnuplot Copyright. EMA does not support gnuplot; it is included "as-is" on the CD and in the EMA software installation.
    See "Appendix D: Gnuplot Copyright" for the Gnuplot Copyright statement.

Adobe Acrobat Reader

    Most of the manuals included with the EMA3D distribution are in Adobe Portable Document Format (PDF). Viewing them requires Adobe Acrobat Reader, which is available for free.

Acrobat Reader from Adobe

    Acrobat Reader can be obtained from the Adobe web site at:

http://www.adobe.com

Acrobat Reader from the EMA3D CD

    Acrobat Reader is included on the EMA3D CD for convenience. It is not installed by the installation script, but it can be installed separately if you do not have Adobe Acrobat Reader on your system. Look in the subdirectory "unix/acrobat" of the the CD-ROM. Look for a directory corresponding to your platform, for example "unix/acrobat/solaris8" or "unix/acrobat/irix6.5", then look for a directory called "install", then look for a file called "README" in the "install" directory for further instructions.

License Server Installation and Startup – Sentinel LM

The following platform versions of EMA3D use the Sentinel License Manager (SLM) from SafeNet Technologies:

    Windows (32-bit)
    Solaris SPARC (32-bit)
    SGI IRIX 6.4 (32-bit)
    Linux 32-bit

    For Linux 64-bit, see the Installation Guide for 64-bit Linux for licensing instructions for that platform.
    To use a floating/network license key, you will need to install and start the license server.
    Use the following instructions to install the SLM license server on a Linux machine.
    If you are using a standalone license key, setting up the license server is not necessary, and is not recommended, as it may confuse things.

License Server Installation

1) Select a machine to be the license server

2) Run the EMA3D installation script to install the license server software on this machine.

- Selecting the "EMA3D" installation option will install all the EMA3D application files plus the license server software.

- The "EMA3D License Manager Only" installation option will install just the license server software and utilites without installing the entire set of EMA3D application files.

License Server Startup

    Once the licensing software has been installed on a machine, the license server can be started by changing dir to the "lic" subdirectory of the EMA3D installation and using the following command:

    % ./lserv -s ./lservrc

where, lservrc is the license file which has been installed in the "lic" subdirectory.
    A command like the above can be put in a system startup script so that the license server is started every time the machine boots. In this case use full path names for everything:

    <license_dir_path>/lserv -s <license_dir_path>/lservrc

    See your system documentation for more information on system startup scripts.

License Server Control Script

     A system startup script is provided which can be used to control the license server. This script is located at

`<installation_dir>/ema3d313/lic/slm_ema_daemon`

     This script will probably not work on your system as-is; it should be edited before use to customize it for your site (by setting certain directory pathnames in the script) and to customize it for your system (by adjusting organization, semantics, syntax or system commands) before using it.

> DISCLAMER: Since daemon startup scripts vary between different systems, EMA does not guarantee that this script will not cause some undesirable effect on your system, or that it will work properly as-is without being edited to fit your installation. You should read the script before using it to understand what it is doing, and customize it to fit your installation.

> NOTE: The script launches the license server daemon process as user "slm". Running application daemons as user "root" is not recommended as a general precaution. You should either create a user "slm" on your system for running the daemon, or edit the appropriate line(s) in the startup script to run the daemon as some other user.

     The script was developed on a Solaris 8 machine, so it conforms to Solaris-style startup script semantics and organization.

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```
Installing a License Key File
```

<u>Licensing Overview</u>

The following platform versions of EMA3D use the Sentinel License Manager (SLM) from SafeNet Technologies:

Windows (32-bit)
Solaris SPARC (32-bit)
SGI IRIX 6.4 (32-bit)
Linux 32-bit

For other platforms such as 64-bit Linux, see the Installation Guide for that platform.
EMA3D using SLM supports either a standalone license or a floating/network license.

<u>Overall Procedure for Obtaining and Installing a License Key</u>

1) Generate locking information for the license server machine (for a floating/network license) or for the individual machine(s) (for a standalone license).

2) Transmit the locking information to EMA. You will receive one or more license key files (usually by e-mail).

3) install the key file(s) in the correct location(s)

4) For a floating license, start or re-start the license server to pick up the new key file.

For instructions for installing and starting the license server, see the section "License Server Installation and Startup".

Follow the instructions below for steps 1-4 above:

Step 1) Obtain machine locking codes and transmit them to EMA

Machine Locking Codes

      To generate the machine locking code(s) on UNIX or Linux:

1) Start a command-line prompt or terminal window and change directory to the folder containing the licensing utilities. This should normally be the "lic" directory of the EMA software or license server installation.

      example:

      % cd /opt/ema/ema3d313/linux/ema3d313/lic

2) Run the utility "echoid":

      example:

      % ./echoid

   SentinelLM 7.20 Host Lock Code Information Utility
    Copyright (C) 1998 Rainbow Technologies, Inc.

           Lock Code 1   1-2524D
           Lock Code 2   0-0

  NOTE: Do not confuse "echoid" with any native UNIX or Linux command.
  "echoid" is a utility supplied by SafeNet Technologies for use with
  SentinelLM; it will not give the same information as some other native
  UNIX or Linux "hostid" command.

  NOTE: You must change directory to the "lic" subdirectory of the software
  installation before running "echoid". This is because the file
  "echoid.dat" MUST be in the current working directory when running
  "echoid", in order to generate the correct locking codes!
      Running "echoid" without first making the "lic" subdirectory your
  current working directory will result in incorrect locking codes. Always
  change dir to this directory first. (As an alternative, the file
  "echoid.dat" could be copied to your current working directory before the
  command "echoid" is run.)

3) Transmit the resulting information to EMA.

      Return the resulting locking code(s) to EMA and EMA will send the appropriate license key file(s).

Step 3) Install license key file(s)

License Key File Installation – standalone license

      The license key file will be named "lservrc".

      To install a standalone license key file:

1) Place the license key file "lservrc" in the "bin" directory of the EMA3D software installation. This is the same directory containing the EMA3D executable, "ema3d".

2) For a standalone license on a UNIX or Linux system, you should set the environment variable "LSERVRC" to the full path name of the license key file.

      example:

      (Korn or Bourne or Bourne-again shell):

      $ export LSERVRC=<install_dir>/ema3d313/bin/lservrc

      (C shell)

      $ setenv LSERVRC <install_dir>/ema3d313/bin/lservrc

      NOTE: The environment variable must be exported (Korn/Bourne shell) or set as an environment variable, not just a shell variable (C shell).

      NOTE: The full pathname of the license key file, including the filename, must be used; not just the directory containing it.

      You can put a command to set LSERVRC in a system login script, or in users' login or shell startup scripts, so that LSERVRC is correctly defined when users log on.
      You can test whether LSERVRC is set correctly, by logging on as an ordinary user (not root) and attempting to read the license key file by using the environment variable.

      example:

      % cat $LSERVRC

      and you should be able to see the contents of the license key file.

License Key File Installation – floating license

      A floating license key file will be named "lservrc". Before installing a floating license key file, set up the license server as described in "License Server Installation and Startup".

      To install a floating EMA3D license key:

1) Place the key file "lservrc" in the license server directory. This is the same directory containing the license server executable "lserv", and other

licensing tools. It will normally be the "lic" directory of the EMA software or license server installation directory.

2) If the license server is already running, you should stop and re-start it to pick up the new key file (use the tool "lsrvdown" in the "lic" directory to shut down the license server). Otherwise, start the license server.

> NOTE: If you already have a floating license key file named "lservrc" containing licenses for other EMA products, or for products from other vendors using the Sentinel License Manager license server, you can append the contents of the EMA software key file to the existing file and use the single key file for license keys from various products using SLM.

License Key File Format:

The format of the license key file is important in order for the EMA software or license server to successfully read it. License keys issued by EMA will be in the correct format when they are sent. However, if the format becomes altered or if you experience trouble, the following are the important points to observe:

- Every line in a license file consists of a license code string, optionally followed by a comment. A '#' denotes the beginning of a comment.
- There should be exactly one license code string in each line of the file.
- Every line in the file must begin with a license code string and not some other text, not even a comment.
- The permissions of the file must be set so that the users (in the case of standalone licensing) or the license server (in the case of network licensing) have permission to read it.

License System Documentation and Further Information

For more detailed or advanced information about the Sentinel License Manager, refer to the "Sentinel License Manager System Administrator's Guide", located in the EMA software installation at:

<install_dir>/lic/doc/SLM71sys.pdf

EMA3D is tied together with CADfix through several environment variables. These environment variables convey to CADfix, the locations of certain files provided by EMA, which are incorporated by CADfix into the operation of the CADfix GUI.

Shell scripts to set these variables are created by the installation program and placed in the top-level installation directory, so setting these variables is automatically done if these scripts are sourced.

If you experience trouble with environment variables, or wish to do something unusual with your installation, the following is a list and description of the required EMA3D environment variables, and their required values.

Symptoms of trouble with EMA3D environment variables may include:

- EMA3D CADfix GUI toolboxes or tools not appearing under the drop-down list of toolboxes in the CADfix GUI

- EMA3D macros not being found when you try to invoke them from CADfix (either from a tool button or by name from the CADfix command-prompt)

- a TCL error to the effect of "unknown command" or "command not found" when you try to launch an EMA3D CADfix GUI tool.

EMA3D Environment Variables for CADfix

Variable	Meaning and required value
CADFIXSITECONFIG	Conveys to CADfix the location of the custom site-level CADfix configuration file, named "CADfix", which contains the definitions of the EMA-provided CADfix toolboxes and tool buttons which should appear in the CADfix GUI. Typical value: <install_dir>/ema3d313/fammacros
FAMMACROPATH	Conveys to CADfix the location of the custom EMA macros invokable from within CADfix either by name, or (for some macros) from a tool button inside an EMA toolbox. Typical value: <install_dir>/ema3d313/fammacros
EMATCL	Conveys to CADfix the location of the EMA TCL source files, which implement some of the EMA CADfix GUI tools that appear in some of the EMA toolboxes. Typical value: <install_dir>/ema3d313/tclsrc

EMABITMAPS

        Conveys to some of the EMA CADfix GUI tools, the location of bitmaps which are displayed for illustrative purposes in some of the EMA CADfix GUI tool dialog boxes.

        Typical value:

        <install_dir>/ema3d313/tclsrc

Additional environment variables not related to CADfix

Variable	Meaning and required value
PATH	Conveys to the system, the locations of directories in which to look for executable programs invoked from the command line.
	Typical value:
	<install_dir>/ema3d313/bin
MANPATH	Conveys to the system, the locations of directories in which to look for man pages.
	Typical value:
	<install_dir>/ema3d313/docs/man

Additional environment variables used by the EMA installation of gnuplot:

Variable	Meaning and required value
GNUHELP	Conveys to the gnuplot, the location of the gnuplot help file, so that interactive help is available from within gnuplot.
	Typical value:
	<install_dir>/ema3d313/ gnuplot4.0.0/share/gnuplot/4.0/gnuplot.gih
GNUPLOT_DRIVER_DIR	Conveys to gnuplot, the location of the directory containing the gnuplot X11 driver file necessary for the proper operation of gnuplot.
	Typical value:
	<install_dir>/ema3d313/gnuplot4.0.0/libexec/gnuplot/4.0

Environment variables used by the Sentinel License Manager licensing system:

Variable	Meaning and required value
LSERVRC	Specifies the location of the license key file "lservrc".
	This environment variable should only be necessary for a standalone license key on UNIX/Linux.
	The setup scripts contain a line to set this variable to the appropriate location for a standalone key file, but it is commented-out. It can be un-commented in the setup script if it is necessary for a standalone key file. For a floating network key file, it should remain commented-out.
	typical value:
	<install_dir>/ema3d313/bin/lservrc
LSHOST	For network/floating licensing only; Specifies the name of the license server machine for network licensing.
	If you are using a floating network license, this environment variable can be set to the name of the machine running the license server.
	Normally this is not necessary as the application uses a subnet broadcast to locate any available license server. However, if the license server is on a different subnet than the machine running the application, you will need to set this environment variable in order for the application to locate the license server.
	You can also set this, if you wish, to disable the broadcast mechanism and direct the application to directly contact the specified machine for a license.
	The license server machine can be specified either by name or by IP address.

For more information or assistance with environment variables, consult your UNIX/Linux documentation or system documentation or contact EMA, Inc.

The following are the system requirements for EMA3D version 3.1 for UNIX. Please note that these are the system requirements for EMA3D only. CADfix (a separate software package that serves as a graphical front- and back-end to EMA3D) has its own system requirements that are separate from those listed below for EMA3D. Consult the CADfix Installation Guide for system requirements for CADfix.

Some system requirements are platform-specific, others are common to all variants of UNIX.

SUN Solaris

The SUN Solaris version of EMA3D in this distribution was prepared on a SUN Ultra60 running Solaris 8. Here are the SUN Solaris-specific system requirements:

Hardware Platform:
processor: SUN SPARC family processor.

Software Platform:
operating system: Solaris 8 or compatible.

SGI IRIX

The SGI IRIX version of EMA3D in this distribution was prepared on an SGI Octane running IRIX 6.5.20. Here are the SGI IRIX-specific system requirements:

Hardware Platform:
processor: SGI MIPS processor or compatible.

Software Platform:
operating system: SGI IRIX 6.5.x.

Linux (32-bit)

The Linux version of EMA3D in this distribution was prepared on a 32-bit Intel platform running Red Hat Enterprise Linux 3.0. Here are the Linux-specific system requirements:

Hardware Platform:
processor: Intel x86-family 32-bit processor.

Software Platform:
operating system: RedHat Enterprise Linux 3.0 or compatible.

<u>Linux - 64-bit</u>

The 64-bit Linux version of EMA3D in this distribution was prepared on a 64-bit x86_64 Intel platform running Red Hat Enterprise Linux 3.0. Here are the Linux-specific system requirements:

<u>Hardware Platform:</u>
processor: Intel x86-family 64-bit processor (x86_64).

<u>Software Platform:</u>
operating system: RedHat Enterprise Linux 3.0 64-bit x86_64
                                or compatible.

<u>UNIX/Linux (all)</u>

Here are the system requirements common to all versions of UNIX:

<u>Hardware Platform:</u>
hard disk space (installation):   180 MB
hard disk space (user)*:   1 GB minimum,
                                   5 GB or more recommended
system memory**:   256MB minimum,
                                   500MB - 2 GB recommended
swap file size: appropriately proportional to system
                                   memory (for example, 100% to 150% of
                                   system memory size is one commonly
                                   used rule of thumb)
graphics card/display: no graphics card
                                   or display requirement

<u>Software Platform:</u>
graphics system: no graphics requirement

*User disk space requirements vary significantly depending on the amount of input and output data required for a particular EMA3D problem (input/output data file size), and the amount of space required for associated data files that may be produced in the course of pre- or post-simulation analysis. In fact, input and output data file size can vary for the same problem depending on length of simulation, number of output probes and time-spacing of output data points, and many other factors. Since disk space is rather cheap, a good rule of thumb is "the more, the better".

**System memory requirements vary significantly depending on what types of problems you want to solve with EMA3D. The memory image size of a particular EMA3D problem is affected by many factors related to the nature of the problem and how you are solving it. EMA3D itself imposes no upper limit on the possible memory image size of an EMA3D computation; on the other hand, some usefule EMA3D problems can be solved with only a few kilobytes of memory. The requirements mentioned are rough guidelines only, and should allow you to solve a variety of useful EMA3D problems.
        For more specific advice regarding memory requirements for your problems of interest, contact EMA, Inc.
        Note that these are memory requirement suggestions for the EMA3D problem memory image size by itself, and does not include memory required by the operating system. For best performance, additional memory should be allowed for the operating system and/or other applications or system software.

Appendix C: CADfix Compatibility

EMA3D version 3.1 is designed for use with CADfix versions 5.1, 6.0, and 7.0. CADfix is a product of Transcendata Europe Ltd.

Appendix D: Gnuplot Copyright

Gnuplot is distributed with EMA software in accordance with the Gnuplot Copyright, quoted here:

GNUPLOT v4.0.0 COPYRIGHT

```
/*[
 * Copyright 1986 - 1993, 1998, 2004   Thomas Williams, Colin Kelley
 *
 * Permission to use, copy, and distribute this software and its
 * documentation for any purpose with or without fee is hereby granted,
 * provided that the above copyright notice appear in all copies and
 * that both that copyright notice and this permission notice appear
 * in supporting documentation.
 *
 * Permission to modify the software is granted, but not the right to
 * distribute the complete modified source code.  Modifications are to
 * be distributed as patches to the released version.  Permission to
 * distribute binaries produced by compiling modified sources is granted,
 * provided you
 *   1. distribute the corresponding source modifications from the
 *    released version in the form of a patch file along with the binaries,
 *   2. add special version identification to distinguish your version
 *    in addition to the base release version number,
 *   3. provide your name and address as the primary contact for the
 *    support of your modified version, and
 *   4. retain our contact information in regard to use of the base
 *    software.
 * Permission to distribute the released version of the source code along
 * with corresponding source modifications in the form of a patch file is
 * granted with same provisions 2 through 4 for binary distributions.
 *
 * This software is provided "as is" without express or implied warranty
 * to the extent permitted by applicable law.
]*/
```