MSC.Marc® and MSC.Marc® Mentat® 2005 r3

Installation and Operations Guide

MSC SOFTWARE®
SIMULATING REALITY

Corporate

MSC.Software Corporation
2 MacArthur Place
Santa Ana, CA 92707
Telephone: (800) 345-2078
FAX: (714) 784-4056

Europe

MSC.Software GmbH
Am Moosfeld 13
81829 Munich
GERMANY
Telephone: (49) (89) 43 19 87 0
Fax: (49) (89) 43 61 71 6

Asia Pacific

MSC.Software Japan Ltd.
Shinjuku First West 8F
23-7 Nishi Shinjuku
1-Chome, Shinjuku-Ku
Tokyo 160-0023, JAPAN
Telephone: (81) (3)-6911-1200
Fax: (81) (3)-6911-1201

Worldwide Web

www.mscsoftware.com

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Table 1 Versions of MSC.Marc Running under Unix

Computer	Operating System Revision	CDROM mount command (assumes /cdrom exists)	CDROM umount command
HP-Compaq (Digital Equip.)	OSF1 5.0 or later	mount -t cdfs -r -o rrip /dev/rz**uA** /cdrom where: **u** = CDROM unit number **A** = a or c	cd <other_dir> umount /cdrom
HP 9000-700, 800, Itanium 2	HP-UX 11.0 or later	mount /dev/dsk/c0tnd0 /cdrom where: **n** = SCSI controller number for CDROM	cd <other_dir> umount /cdrom
IBM RS6000	AIX 5.2 or later	mount -rv cdrfs /dev/cd0 /cdrom	cd <other_dir> umount /cdrom
Silicon Graphics	IRIX64 6.5 or later	CD will be automounted by system or mount -rt iso9660 /dev/scsi/sc**n**d**u**l0 /cdrom where: **n** = SCSI controller number **u** = CD-ROM unit # **Note:** The CDROM will usually automount to /cdrom or /CDROM	cd <other_dir> eject CDROM or cd <other_dir> umount /cdrom
Sun	Solaris 2.8 or later	CD will be automounted by system	cd <other_dir> eject cdrom
Intel Pentium	Linux 2.4.20 or later	mount /mnt/cdrom RedHat mount /dev/cdrom /cdrom MSC.Linux	cd <other_dir> umount /mnt/cdrom

Chapter 1: Read me first: Installation Prerequisites

Before installing the software	Decide where you want the product to be installed before reading in the MSC.Marc and/or MSC.Marc Mentat software from the CD-ROM. You will be prompted for a parent directory to install the software, which will be referred to as `<parent>`. During the installation, a directory called `marc2005r3`, and/or `mentat2005r3`, `install`, and `flexlm` will be created in theu directory you specify. MSC.Marc requires approximately 130 Mbytes of permanent disk storage capacity. Mentat requires approximately 400 to 450 Mbytes of permanent disk storage capacity. The `mentat2005r3/examples` directory contains approximately 230 Mbytes of data. If you are installing both MSC.Marc and MSC.Marc Mentat, install MSC.Marc first, and then install MSC.Marc Mentat.
Personal data	During installation, you will be prompted to supply your name, address, telephone number, etc. You will also be asked to enter the MSC license agreement number which is listed on the accompanying packing slip. This information will be sent to the MSC.Software Corporation office supplying you the installation passwords and is intended to keep your data as known to the MSC.Software Corporation up to date.
Password protection	The MSC.Marc and MSC.Marc Mentat version you have received is protected against illegal usage by means of Macrovision's FLEXlm licensing software. You *cannot* run the program directly after you have installed the product from the CD-ROM until you obtain passwords from MSC.Software Corporation. Passwords will be supplied to you from the nearest MSC.Software Corporation office after you have performed the first two steps of the installation procedure. These steps are as follows: 1. Run the installation script, install the software from the CD-ROM, and generate a machine specific identifier for the purpose of creating passwords. 2. Send the machine specific identifier to the nearest MSC.Software Corporation office. 3. Upon return of the passwords, enter these by editing the `license.dat` file. Passwords normally only need to be entered once.
Multiple machines/NFS Fileserver	If you are installing MSC.Marc and/or MSC.Marc Mentat on an NFS Fileserver, the install script needs to create directories in which to install MSC.Marc and/or MSC.Marc Mentat; the default NFS export options do not allow this level of access by root. Two approaches are possible – do not install as root, or if *you must install as root, modify your NFS export options to include ~root=list (where list* can include hostnames and netgroups).

Should I be "root"?	Normally, there is no need to be logged in as `root`. However, you will be queried as to whether you want to create an optional `link` by which MSC.Marc and/or MSC.Marc Mentat will be known system-wide under the name `marc2005` or `mentat2005`. This link will, by default, be placed in the directory `/usr/local/bin` to which you must have write permission. Logging in as `root` is one way of ensuring that you can create this link. Make sure that you have write permission to the installation directory before you start the installation script. Note that on most systems you will have to be `root` to mount the CD-ROM. For NFS fileserver networks, read the above paragraph.
FORTRAN compiler	A FORTRAN compiler is necessary if user subroutines are to be used. For other cases, no compiler is needed. The compiler needs to be compatible with the one used in the MSC.Marc build, see the *MSC.Marc and MSC.Marc Mentat Release Guide* for a list of supported compilers.

Chapter 2: Quick Installation Procedure

Step 1: Start the install script	<cdrom_dir>./install.exe	Run the MSC.Marc installation script `install.exe` from the CD-ROM. Substitute your CD-ROM device name for `<cdrom_dir>`. For example, on a Sun this may be `/cdrom/cdrom0`.
	Welcome to the MSC.Marc installation script for Unix systems Enter a valid pathname to the directory to install the software `(<current directory>)`	Enter the path for the directory in which you want to install the MSC.Marc product(s). The default selection will be your current directory. You must have write permission to this directory.
Step 2: **Extract the files from the CD-ROM**	**Main Menu** 1) Install/Test MSC.Marc 2) Install MSC.Marc Mentat d) Install Documentations o) Options ?) Help information q) Exit from the installation script Selection: **1**	Select option **1** to install MSC.Marc. This will take you to the MSC.Marc submenu. Select option 2 to install MSC.Marc Mentat. Option **d** will only appear in the documentation CD. **Note:** Remember to install MSC.Marc before you install MSC.Marc Mentat. Documentation should be installed **after** MSC.Marc and MSC.Marc Mentat are installed.
Select the platform	**MSC.Marc 2005 Menu** D1) Install for HP/Compaq/Dec Tru64 5.1x (~90 MB) H1) Install for HP-UX 11.00 (PA 2.0 64bit) (~250 MB) H2) Install for HP-UX 11.22 (Itanium 2) (~400 MB) I1) Install for IBM AIX 4.3.2/3 (~100 MB) I2) Install for IBM AIX 5.2 (64bit) (~100 MB) I3) Install for IBM AIX 4.3.2 (SP) (~100 MB)	Select the platform that you will be running MSC.Marc on. The script will determine a default value, and it will be shown in brackets after the *Selection* prompt. Just press Return/Enter to use the default value. You will also be prompted whether you want to create a system wide link to the *marc2005r3* script. **Note:** Other platforms may appear on your menu list that are not shown here. Do not attempt to install the 64bit version on a 32bit operating system.

	L1) Install for LINUX 2.4.x (32bit - RedHat 7.1) (~96 MB) L2) Install for LINUX 2.4.x (32bit - RedHat 9) (~96 MB) L3) Install for LINUX 2.4.x ((64bit Itanium 2) (~96 MB) G1) Install for SGI IRIX R12K 6.5 (~140 MB) G2) Install for SGI IRIX64 R12K 6.5 (~300 MB) S1) Install for Sun Solaris 2.8 (32bit Ultra II) (~250 MB) S2) Install for Sun Solaris 2.8 (64bit Ultra III) (~300 MB) t) Test and maintain the installation ?) Help information r) Return to previous menu Selection [S1] :	
	r) Return to the previous menu OR	Choose the Return to previous menu option to return to the main menu.
	MSC.Marc Mentat 2005 Installation **MSC.Marc Mentat Menu** d1) Install for HP/Compaq/Dec Tru64 5.1x (~400 MB) h1) Install for HP-UX 11.0 (64bit PA 2.0) (~390 MB) h2) Install for HP-UX 11.22 (Itanium 2) (~390 MB) i1) Install for IBM AIX 4.3.2/3 (~400 MB) i2) Install for IBM AIX 5.2 (64bit) (~400 MB) l1) Install for LINUX 2.4.x (32bit - RedHat 7.1) (~350 MB) l2) Install for LINUX 2.4.x (32bit - RedHat 9) (~350 MB) l3) Install for LINUX 2.4.x ((64bit Itanium 2) (~350 MB)	Select the platform that you will be running MSC.Marc Mentat on. The script will determine a default value, and it is shown in brackets after the *Selection* prompt. Press Return/Enter to use the default value.

	g1) Install for SGI IRIX R12K 6.5 (~460 MB) g2) Install for SGI IRIX64 R12K 6.5 (~460 MB) s1) Install for Sun Solaris 2.8 (32bit Ultra II) (~400 MB) s2) Install for Sun Solaris 2.8 (64bit Ultra III) (~400 MB) ?) Help information r) Return to previous menu Selection [ ] :	You will be prompted to supply the pathname to the directory where MSC.Marc is installed. If the script determines that MSC.Marc is already installed to the default location of `<parent>/marc2005r3`, then a default value for the path is displayed. Press Return/Enter to use the default value. If you do not have MSC.Marc at this site, you can ignore the prompt. You will also be prompted whether you want to create a system wide link in `/usr/local/bin` to the *mentat* script. You must be `root` to perform this. **Note:** Other platforms may appear on your menu list that are not shown here.
	r) Return to the previous menu	Choose the Return to previous menu option to return to the main menu.
Step 3: Options	o) Go to options menu in main menu	
Step 4: Security	s) Install Security sd) Install Security documentation u) Update Product scripts d) Delete (un-install) a product ci) Change the installation directory cd) Change the CDROM path l) Change the product listing file sc) Determining system configuration	
Step 5: Generate system identifier	s) Security submenu 1) Generate system identifier file	Generate system identifier. From the options menu, select option **s**, and then option **1**. You will be prompted for your name, address, etc. You will also be prompted to supply your MSC license agreement number and your amendment number which is in the accompanying letter.

Step 6: Send the system identifier to MSC.Software	2) Show system identifier 3) Print the system identifier 4) Send the system identifier r) Return to previous menu q) Exit from the installation script	The system identifier is stored in the subdirectory `install` under the `<parent>` directory, in a file called `sid001.dat`. Send the contents of this file to the nearest MSC.Software Corporation office to receive passwords. You may exit the script now by choosing the option **q**.
Step 7: Enter the password	`cd <parent>/flexlm` *`mkdir licenses`* *`cd licenses`* *`vi license.dat`* *`chmod 644 license.dat`*	When you receive the passwords from the MSC.Software salesperson, they should be entered by means of creating the file `license.dat` file in the `flexlm/licenses` subdirectory using an editor. If the file was E-mailed to you, then save the contents in `license.dat`. See Macrovision's *FLEXlm End User Manual* for more information on the license file format.
	For MSC.Marc Network run see Step 9.	
Step 8: Checking MSC.Marc	1) Install/Test the MSC.Marc program t) Test and maintain the installation **MSC.Marc Tools Menu** 1) Test MSC.Marc installation **Test the MSC.Marc installation** 1.1) Run a MSC.Marc job without user subroutine	**If you installed both MSC.Marc and MSC.Marc Mentat**, you can check the MSC.Marc installation by following the instructions under (Checking MSC.Marc from MSC.Marc Mentat). Start the `install.exe` script again, and select option **1**, "Install the MSC.Marc program", and then select **t**) "Test and maintain the installation". This brings up a new menu. Select option **1**, "Test MSC.Marc installation". A new "Test" menu appears. You must choose either Serial or Parallel depending on the license you have. Run one of the standard MSC.Marc demonstration examples as proof of a successful installation by choosing option **1.1**. If all goes well, one of the final messages on screen should read: **MSC.Marc Exit number 3004**

	1.2) Trial MSC.Marc job with user subroutine	**If you have a FORTRAN compiler on your system**, choose a second demonstration example, option **1.2**. Here again, MSC.Marc should give a **MSC.Marc Exit number 3004**.
		Troubleshooting: 1. If you get an error message of `f77 not found` when running a job with a user subroutine and there is a Fortran compiler, its path needs to be appended to your path in the `.cshrc` file. A typical example would be the Sun platform where the f77 compiler may live in the `/opt/SUNWspro/bin` directory. This path must be added if you get the `f77` error message.

		2. For the IBM-SP machines, if you get
		`ERROR: Hostfile or pool must be used to request nodes`,
		create a `hostfile` in the `marc2005r3/tools` directory with the available nodes in it as:
		`node 1`
		`node 2`
		⋮
		`etc.`
		and set the path to point to this file in *MP_HOSTFILE* variable in the `include` file in the `tools` directory.

	r) Return to previous menu q) Exit from the installation script	Repeatedly choose the Return/Exit option to leave the installation script. Choose option **q** to leave the installation script.

Step: 9
Checking Mentat
(Checking MSC.Marc from MSC.Marc Mentat)
	`cd <parent>/mentat2005`
	`./bin/mentat`
	
	Run a Demo problem by selecting the menu buttons:
	HELP
	RUN A DEMO PROBLEM
	COUPLED CONTACT
		Next, change your current directory to be the `<parent>` directory in which you installed MSC.Mentat, and then `cd` to *mentat2005r3*.
		Enter the command `./bin/mentat` to start MSC.Mentat. From the HELP menu, select RUN A DEMO PROBLEM, and then select the COUPLED CONTACT demo. It will run for 50 increments.

Step 10: For MSC.Marc Parallel Network version only		Please follow the *MSC.Marc 2005 Parallel Network Version for UNIX Installation Instructions* (Part 1 General Information: and Part 2 Installation Notes:) on installing and running jobs with the network version.
Step 11: **Installing the documentation**		Use option **d** on the documentation CD to install the documentations.

Chapter 3: Installation Procedure Information

Multiple machines/NFS Servers	If you are installing MSC.Marc and/or MSC.Marc Mentat on an NFS Fileserver, the install script needs to create directories in which to install MSC.Marc and/or MSC.Marc Mentat; the default NFS export options do not allow this level of access by root. Two approaches are possible – do not install as root, or if you must install as root, modify your NFS export options to include ~*root=list* (where *list* can include hostnames and netgroups).
Step 1: Start the install script from the CD-ROM	Start the installation by running the *install.exe* script located on the CD-ROM from a "C" or Bourne shell. You should not have your current directory be the CD-ROM device, since temporary files will need to be created. If you are installing MSC.Marc and MSC.Marc Mentat, install MSC.Marc first (using Main Menu option 1). Decide where the MSC.Marc and/or MSC.Marc Mentat program is to be located in the system. This location is called the `<parent>` directory. For example, if you specify the installation path as `/usr/software/marc`, the `<parent>` directory is `/usr/software/marc`. It is recommended that you create this directory before you start the installation script. The directories `marc2005r3`, and/or `mentat2005r3`, `install`, and `flexlm` will be created when the program is installed. The *install.exe* script will accept the following options: `-a` Turns on automatic installation – installs both MSC.Marc and MSC.Marc Mentat from the CD-ROM. The **-i** option (described below) is required. `-c <path>` Specifies the path to the CD-ROM device. This may also be the path to a NFS mounted CD-ROM. Normally the script will determine the path to the CD-ROM device from the path specified to invoke *install.exe* on the command line. `-i <path>` Specifies the installation path (`<parent>` directory). This option is required when specifying the automatic installation option `-a`. `-l <file>` Specifies a file for product listing `-v` Turns on verbose mode. The "automatic" installation will install both MSC.Marc and MSC.Marc Mentat. To perform an "automatic" installation, run the installation script as follows: `/cdrom/install.exe -a -i <path>` Note that when the "automatic" installation is complete, you will have to run the installation script interactively to generate the system identifier using option **1** (see Step 3: Generate system identifier).

	Check the contents against the list supplied in Appendix C: MSC.Marc/MSC.Marc Mentat Files and Subdirectories of this document. If any subdirectory is missing, please contact MSC.Software Corporation customer support for further details. **Note:** See Table 1 at the beginning of this document for the name of the CD-ROM device for your machine if you can't determine what it is named, or see your systems administration guide.
Step 2: Extract the files and set paths	Extract the files from the CD-ROM and set the path names in the MSC.Marc and/or MSC.Marc Mentat background files to correspond to the location where you have installed the version. From the main menu list of the `install.exe` script, choose option **1** to install MSC.Marc or option **2** to install MSC.Marc Mentat, and then select the platform from the Marc2005 submenu. Note that a default platform selection is displayed if the script determines that MSC.Marc or MSC.Marc Mentat has not yet been installed. In MSC.Marc, the installation script extracts the files and proceeds to set the path names in the *run_marc* scripts to correspond to the current location of the MSC.Marc version. In MSC.Marc Mentat, the installation script extracts the files and proceeds to set the path names in the MSC.Marc Mentat background files to correspond to the current location of the MSC.Marc Mentat version. You will be asked a question concerning the MSC.Marc program which can be started from within MSC.Marc Mentat. You are required to give the pathname to the directory where MSC.Marc is installed on your system. If you do not have MSC.Marc installed at your site, ignore the prompt. **Note:** Do not attempt to install a 64bit version of the product on a 32bit operating system.
ranlib	Some MSC.Marc Unix versions will ask if you want to *ranlib* the MSC.Marc binary libraries supplied with the version. This will create a fresh table of contents for the libraries. It is advisable to do this. **Note:** Not all Unix versions need the *ranlib*; the question will not appear on them.
link	You will also be asked whether MSC.Marc and/or MSC.Marc Mentat should be made accessible system wide under the link-name `marc2005r3` and/or `mentat2005r3`. If so, a symbolic link (`marc2005r3` and/or `mentat2005r3`) will, by default, be created in the directory `/usr/local/bin`. **Note:** If you decide to create the link, you • must be allowed to create the link at the chosen location (for example, be logged in as `root`). • must ensure your users who want to use MSC.Marc and/or MSC.Marc Mentat have that location (`/usr/local/bin`) in their search path.

Step 3: Generate system identifier	Using the installation script `install.exe`, choose option **s**) Install security from the main menu list. A submenu will appear. Choose option **1** from this submenu to generate the system identifier. **Note:** When you generate the system identifier, you will be asked to enter your name, address, etc. See Appendix A: Sample Installation of MSC.Marc and MSC.Marc Mentat for a sample session.
Step 4: Send to MSC.Software Corporation	The system identifier is stored in the subdirectory `install` under the `<parent>` directory, in a file called `sid001.dat`. The file can be printed using option **3** in `install.exe`. Send the printout by means of telefax to the nearest MSC.Software Corporation office. If you have access to the E-mail facility, you can E-mail the system identifiers directly using option **4** in `install.exe`.
Step 5: Password	Change your current directory to the subdirectory `flexlm/licenses` under the `<parent>` directory. If you receive your passwords via E-mail, then save the license data in a file named `license.dat` in this directory. The permissions for `license.dat` should be 644, since all users will need read access. If you receive your passwords via telefax, then enter them by means of creating the `license.dat` file using an editor and typing in the information. The password will consist of at least three lines: "SERVER" line which specifies the system hostname "DAEMON" line which specifies the vendor specific daemon name and path "FEATURE" line(s) which specifies the product and options. This line contains the password and the expiration dates. The *run_marc* and *mentat* script uses the environment variable `MSC_LICENSE_FILE` to locate the `license.dat` file. It should be either the full pathname to the license file or using the specification port@host, such as `1500@mars.earth.com`. See *Chapter 8: Managing FLEXlm with MSC.Marc and MSC.Marc Mentat* or *Macrovision's FLEXlm End User Manual* for more information on entering your license password. **Note:** The FLEXlm license manager needs to be started on the license server before running the program. The *run_marc* and *mentat* scripts no longer attempt to start the license manager.

Step 6: Checking MSC.Marc	**If you installed both MSC.Marc and MSC.Marc Mentat,** you can check the MSC.Marc installation by following the instructions under "Checking MSC.Marc from MSC.Marc Mentat". Run one of the standard MSC.Marc demonstration examples as proof of a successful installation. Using the installation script `install.exe`, choose **1**) Install MSC.Marc from the Main Menu, and then, choose **t**) Test and maintain the installation, and the MSC.Marc Tools menu appears. Choose option **1** from this menu, a new menu appears, and you must choose, depending on the license you have, either Serial or Parallel. A list of problems appears and you can choose which problem you want run. If all goes well, one of the final messages on screen should read **MSC.Marc Exit number 3004**. If you have a FORTRAN compiler on your system, choose a demonstration example with a user subroutine. Again, MSC.Marc should give a **MSC.Marc Exit number 3004**. **Note:** Should any of these examples not run, please use the checklist in Appendix B: Troubleshooting to verify whether the installation was executed correctly. Refer to Chapter 4: Running MSC.Marc of this document for the syntax of *run_marc*. Contact MSC.Software Corporation customer support if you are still unable to run the examples.
Checking MSC.Marc Mentat	Run MSC.Marc Mentat. Repeatedly choose the exit option to leave the installation script: *0)Return to the previous menu* *0)Exit from the installation script* *type mentat if a soft link was created* **Note:** Should MSC.Marc Mentat fail to start, please use the checklist in Appendix B: Troubleshooting to verify whether the installation was executed correctly. Contact MSC.Software Corporation customer support if you are still unable to run the program.
Checking MSC.Marc from MSC.Marc Mentat	If you have both MSC.Marc and MSC.Marc Mentat installed, you can check the MSC.Marc installation from within MSC.Marc Mentat. To do this, click the HELP button on the bottom-right corner of the MSC.Marc Mentat window. Use the RUN A DEMO PROBLEM button to run an installation check on MSC.Marc.
Step 7: **Exit**	Choose the *exit* option to leave the installation script: *r) Exit from the trial submenu* *q) Exit from the installation script*
Step 8: **Installing the documentation**	Use option **d** of the documentation CD to install the documentations.

Chapter 4: Running MSC.Marc

This section describes the MSC.Marc usage on Unix based machines applicable to either BSD4 or System V machines except where noted. The MSC.Marc programs are mainly controlled by a shell script program called *run_marc* which is stored in the `marc2005r3` subdirectory `tools`. If you have used the option to creating a link during the installation, this link is also known system wide as `marc2005r3`. It is designed to handle practically all possible options.

The shell script will submit a job and must be executed in the directory where all relevant input and output files concerning the job are available. To use the shell script, each MSC.Marc job should have a unique name qualifier and all MSC.Marc output files connected to that job will use this same qualifier.

MSC.Marc input files should always be named *job_name.dat*, whereby the prefix *job_name* is the name qualifier which you are free to choose. The suffix *.dat* is obligatory.

To actually submit a MSC.Marc job, the following command should be used. The single input line is split over multiple lines for clarity:

run_marc	**`-jid`**	**job_name (required as minimum)**
	`-rid`	*restart_name*
	`-pid`	*post_name*
	`-sid`	*substructure_name*
	`-prog`	*program_name*
	`-user`	*user_subroutine_name*
	`-save`	*save_user_executable*
	`-queue`	*queue_name*
	`-back`	*run_in_background*
	`-ver`	*verification_flag*
	`-vf`	*viewfactor_name*
	`-def`	*defaults_name*
	`-nprocd`	*number_of_processors*
	`-nprods`	*number_of_domains*
	`-nthread`	*number_of_threads*
	`-dir`	*directory where job I/O takes place*
	`-sdir`	*directory where the scratch files are located*
	`-host`	*hostfile (for running over the network)*
	`-comp`	*compatible machines on a network*
	`-ci`	*copy input files to remote machines in a network*
	`-cr`	*copy post files back from remote machines in a network*
	`-pq`	*Batch queue only: queue priority*
	`-at`	*Batch queue only: delay time for start of job*
	`-cpu`	*Batch queue only: cpu time limit*
	`-autorst`	*autorestart_value.*
	`-sdir`	*scratch file directory.*

Table 2 describes the meaning of these input options and Table 3 gives examples.

Table 2 run_marc Input Options

Keyword	Options	Description
-jid (-j)	job_name	Job and input file name identification.
-prog (-pr)	progname	Run saved executable *progname.marc* from a previous job (usually *user_name*; see below).
-user (-u)	user_name	User subroutine *user_name.f* will be used to generate a new executable program called *user_name.marc*.
-save (-sa)	**no** yes	Do *not* save the new executable program *user_name.marc*. Save the executable program *user_name.marc* for a next time.
-rid -(r)	restart_name	Identification of previous job that created RESTART file.
-pid (-pi)	post_name	Identification of previous job that created postfile containing temperature data.
-sid (-si)	substructure	Substructure jobs only: name of the substructuring file *substructure.t31*.
-queue (-q)	**background** foreground queue name	Run the program in the background. Run the program in the foreground. Submit to batch queue the queue name. Only available for machines with batch queue. Queue names and submit command syntax may differ from site to site, adjust *run_marc* if necessary.
-back (-b)	yes no	Alternative for -queue: run the program in the background. Run the program in the foreground.
-ver (-v)	yes no	Ask for confirmation before starting the job. Will start the job immediately.
-nprocd (-np)	2,3,4,etc	Number of processors (generally same as the number of domains).
-nprods (-nps)	2,3,4,etc	Number of domains for parallel processing using a Single Input file.
-nthread	2,4,etc	Number of threads for parallel matrix solver.
-dir	directory_name	Directory where the job i/o should take place. Defaults to current directory.
-sdir	directory_name	Directory where the scratch files are placed. Default is to `-dir`.
-host (-ho)	hostfile	Specify the name of the host file for running over a network (default is execution on one machine only in which case this option is not needed).
-comp (-co)	**yes** no	When machines are compatible in a run over the network. When machines are not compatible in a run over the network. This option is only needed when user subroutines are used.
*Default options are shown in **bold**.		

Table 2 run_marc Input Options (continued)

Keyword	Options	Description
-ci	**yes** no	Automatically copy input files to remote machines in a network run.
-cr	**yes** no	Automatically copy post files back from remote machines in a network run.
-pq	0,1,2,etc	Batch queue only: queue priority
-at	date/time	Batch queue only: delay time for start of job Syntax: January,1,1998,12:30 or: today,5pm
-cpu	sec	Batch queue only: CPU time limit
-vf	vf_filename	Refers to the viewfactor file for a heat transfer radiation analysis. (Monte Carlo method)
-def	defaults_file	Used to define an auxiliary input file containing default values.
-autorst	**0** or 1	If 0 when remeshing is required, the analysis program goes into a wait state until meshing is complete. If 1 when remeshing is required, the analysis program stops, the mesher begins, and the analysis program automatically restarts. Using the default procedure (0) uses more memory, but less I/O. Using the restart procedure (1), invokes the RESTART LAST option.
-sdir	directory_name	Directory where the scratch files are created during the run. Defaults to the current directory.
*Default options are shown in **bold**.		

Table 3 Examples of Running MSC.Marc Jobs

Examples of running MSC.Marc jobs	Description:
run_marc -jid e2x1	Runs the job e2x1 in the background, the input file *e2x1.dat* resides in the current working directory.
run_marc -jid e2x14 -user u2x14 -save yes	Runs the job *e2x14* in the background, using the user subroutine *u2x14.f* and the input file *e2x14.dat*. An executable program named *u2x14.marc* will be saved after completion of the job.
run_marc -jid e2x14a -prog u2x14	Runs the job *e2x14a* using the executable produced by job *e2x14*.
run_marc -jid e3x2a -ver no -back no	Runs the job *e3x2a* in the foreground. The job will run immediately without verifying interactively.

Table 3 Examples of Running MSC.Marc Jobs (continued)

run_marc -jid e3x2b -rid e3x2a	Performs a restart job using the results of the previous job *e3x2a*.
run_marc -jid e2x1 -nprocd 2	Runs a two processor job on a single parallel machine.
run_marc -jid e2x1 -nprocd 2 -host hostfile	Runs a two-processor job over a network. The hosts are specified in the file `hostfile` (refer to the MSC.Marc Parallel Network for Unix Installation and Operations Guide for runs on a network of machines.

Chapter 5: Running MSC.Marc Mentat

This section describes the MSC.Marc Mentat usage on Unix based machines applicable to either BSD4 or System V machines except where noted. MSC.Marc Mentat is started by a shell script program called *mentat* which is stored in the `mentat2005r3/bin` directory. If you used the option to create a link during the installation, this link is known system wide as *mentat2005r3*.

You do not need to start the shell script from a specific directory.

MSC.Marc Mentat creates the default files in your current working directory; that is, where you are located at the time of starting MSC.Marc Mentat.

The shell-script *mentat* contains a number of arguments which are passed on to MSC.Marc Mentat. Table 4 gives the meaning of these input options. You are free to alter these commands to suit your preference.

Table 4 MSC.Marc Mentat Input Options

Keyword	Option	Description
`-ar`	area_ratio	This is similar to `-sz`, except it is a percentage of the default window size.
`-bp`	`$(DIR)/bin/`	Directory path name where the external MSC.Marc Mentat programs and shell scripts are located.
`-compile`	binary_menu_filename	This is used to compile ASCII menu files into a Binary menu file.
`-db`	True/False	Double buffering: a screen refresh is first assembled in a separate memory section and then displayed. This option results in a smooth appearance. The default is *True* or *On*.
`-fn`	8x15	Default font type.
`-gr`		This uses the gray scale color map.
`-ha`	True/False	This option enables the middle mouse button help windows to run the Adobe Acrobat reader using the PDF help files. True turns on using the PDF help, false turns it off. The default is *True* or *On*.
`-help`		Print a list of all of the options.
`-hp`	`$(DIR)/help/`	Directory path name where the help files are located.
`-ic`	bitplane_threshold [3 - 8]	This install color map switch is only relevant if you are running MSC.Marc Mentat on an X Window screen that does not support many colors. This number allows you to set a lower bound on the number of colors MSC.Marc Mentat will use. On cheaper screens, setting this number too high may produce distracting side effects.
`-lf`	*filename*	Specify the MSC.Marc Mentat logfile name.
`-mb`	24/16/8	Maximum graphic depth allowed. The default is *24*.
`-mf`	`main.ms`	The name of the startup menu file.

Table 4 MSC.Marc Mentat Input Options (continued)

Keyword	Option	Description
-ml	`$(DIR)/material/`	Directory path name where the material files are located.
-mp	`$(DIR)/menus/`	Directory path name where the menu files are located.
-nh		Not provided by default. For OpenGL and X Window versions of MSC.Marc Mentat. The use of this switch reduces run time memory requirements at the expense of graphic speed.
-ogl		Use the OpenGL graphics interface, if available.
-path	directory_name	Provides a directory in which MSC.Marc Mentat searches when opening an existing input file. Multiple directories can be specified as follows: *-path directory_1 -path directory_2* etc.
-pr	*filename*	Any additional set-up commands you wish to add. Store these in a procedure file containing the MSC.Marc Mentat commands.
-ra		This reads all of the ASCII Menu files.
-rf	*filename*	Record the MSC.Marc Mentat commands in the procedure file *filename*.
-ss	True/False	Graphic refresh to use snapshots. The default is *True*.
-sz	width height	Change the size (width and height in pixels) of the window.
-ti	title	Append *title* to the name of the window.
-xfdb	True/False	Fast X server double buffering. The default is *True*.
-xr	horizontal_ratio	This is similar to `-sz`, except it is a percentage of the default window size in the horizontal direction.
-yr	vertical_ratio	This is similar to `-sz`, except it is a percentage of the default window size in the vertical direction.

Chapter 6: Making Changes to the MSC.Marc Programs

The MSC.Marc program sizing

MSC.Marc uses dynamic memory. The initial amount of memory that MSC.Marc will allocate is the amount given by the SIZING parameter in the input file (set in MSC.Marc Mentat in the JOB menu as MEMORY ALLOCATION). MSC.Marc will then automatically allocate more memory as needed. There is a possibility to limit the amount of memory being allocated. This can for instance be used to avoid that a machine with limited memory is using paging space for a run. The *include* file in the tools directory of the MSC.Marc installation directory contains a variable MAXSIZE. MSC.Marc will not allocate more memory than specified by MAXSIZE (which is defined in number of million 4 byte words). The default is set to 500 (corresponding to 2 GB) for 32 bit machines and 2000 (corresponding to 8 GB) for 64 bit machines. These are also the practical memory limits in this release. If the analysis requires more memory than specified by MAXSIZE, MSC.Marc will select at least one of the out-of-core options, either ELSTO or out-of-core solver. For a parallel job these memory limits are for each domain of the job.

You may choose to modify the MAXSIZE variable permanently. This can be done by editing the *include* file. It can also be modified by means of the *install.exe* shell script.

Modifying the MPI Setting: mpich or hardware

For most platforms, the executable of MSC.Marc for the release has been built based on mpich MPI, which is characterized by its general applicability to both single multiprocessor machines and a network of heterogeneous machines. However, the option to modify the above default setting to other hardware specific MPI is given. Refer to the *MSC.Marc 2005 and MSC.Marc Mentat 2005 Release Guide* for the exception.

If you choose to modify the MPI setting, you may do so by means of the *install.exe* script:

```
cd <parent>/install
install.exe
```

Choose option **1** from the main menu to get to the MSC.Marc menu, and then choose **t**) Test and maintain the installation to get to the MSC.Marc tools menu. Here, choose option **2** to get into the maintenance submenu. Choose the option **2.1** to modify the MPI setting.

The options of modifying the MPI setting are given.

Switching the Default for AIX 5.1 64-bit Version

The default for the MSC.Marc AIX 5.1 64-bit version is serial. For users with the IBM POE (hardware MPI) installed in their systems, the default can be switched by performing the following steps:

1. Copy `marc_hrdwr` to `marc` under the `marc2005r3/bin` directory.
2. Copy `mdsrc.a_hrdwr` to `mdsrc.a` under the `marc2005r3/lib` directory.

3. Change the *include* under the `marc2005r3/tools` directory from

```
MPITYPE=none
#MPITYPE=mpich
#MPITYPE=hardware
```

to

```
#MPITYPE=none
#MPITYPE=mpich
MPITYPE=hardware
```

Chapter 7: MSC.Marc Mentat Interfaces

MSC.Marc Mentat External Programs

MSC.Marc Mentat supports a number of CAD interfaces: IGES, MSC.Patran, Ideas, VDA, etc. These interfaces are programmed in external programs called from within MSC.Marc Mentat. The interface programs are stored in the *mentat2005r3* subdirectory *bin*. These programs read the data files in their native format and translate the contents into a MSC.Marc Mentat model file. This file is subsequently read by MSC.Marc Mentat. The external programs are called from within MSC.Marc Mentat by means of the *file* submenu.

Jobs

The subdirectory *bin* contains shell script files to start a MSC.Marc FEM job using the following shell scripts:

submit1, submit2, submit3,

These shell scripts are called by means of the buttons in the *job* menu.

You can alter these files to suit your environment; for example, set up one of the *submit* scripts so that it starts a MSC.Marc job on a different machine on your network.

Plotter Interface

Because of the many variations in plotting environments, we have created plotting interfaces in the form of shell scripts that operate from within MSC.Marc Mentat. Currently, MSC.Marc Mentat recognizes the following plotting formats:

- PostScript
- Xdump (translated in either PostScript or HPGL format)

This section describes a template shell script for each of the formats mentioned above. They are located in the `./bin` directory and are named as follows:

psgray1, psgray2, psgray3
pscolor1, pscolor2, pscolor3
xdump1, xdump2, xdump3

PostScript

The PostScript function is activated by pressing either the Gray or Color Print button from the UTILS menu on the POSTSCRIPT panel. The program captures the graphics portion of the screen into a file and sends this file to a PostScript printer using the *`psgray`* or *`pscolor`* shell scripts located in the `./bin` directory. In the example listed below, the file is sent to a computer called ‘mars’ on the network. The `lpr` command with the `supt` argument sends the file to a PostScript printer known to the spooler as supt. After the file is sent, it is removed from disk automatically.

```
#!/bin/csh
 rsh mars lpr -Psupt < $1
rm -f $1
```

The `argument $1` is the filename handed to the shell by MSC.Marc Mentat. If there is more than one printer on-line, the *psgray* and *pscolor* shell scripts can be used to address these other printers.

Xdump

The `xwd` command, widely available on many platforms, dumps an image of an X window into a specially formatted dump file. This file can then be read by various other X utilities for redisplay, printing, editing, formatting, and archiving. Its complementary `xpr` command takes the window dump file as input and formats its output for a particular device, such as a PostScript printer or a HP PaintJet (color mode). Below is an example of a shell script that uses `xwd`, and, in conjunction with `xpr`, sends the information to PaintJetxl. See the `man` pages on your system for more details.

```
#!/bin/csh
xwd | xpr -device pjetxl -scale 2 | /etc/aprint -Abatphone2 -L25
```

Edit

The *edit_window* shell script is used to control the editor associated with the `EDIT` commands. It is possible to change the type of editor, for example, from *vi* to *emacs* or change the type of windowing environment.

System Shell

The *system_window* shell script is used to control the type of window opened with the `system_shell` command. It is possible to change the type of window.

Parallel Render

The *marc_render* shell script can be modified such that the photorealistic rendering is performed across multiple CPUs. The parameter *nbands* is used to specify the number of CPUs.

Chapter 8: Managing FLEXlm with MSC.Marc and MSC.Marc Mentat

FLEXlm License File

FLEXlm is the network based licensing product from Macrovision Software used in MSC products.

The license file, `license.dat`, should be placed in the `<parent>/flexlm/licenses` directory once you receive your licenses from your nearest MSC.Software Corporation office. Everyone should have read permission to the file. The license file has the following format:

Line	Description
SERVER	This line specifies the license server. It has the format: SERVER hostname hostid port
DAEMON	This line specifies the name of the vendor daemon (MSC), and the path. It has the format: DAEMON MSC <parent>/flexlm/<platform>/msc
FEATURE	This line lists the feature or license names. This line cannot be modified from what is sent to you. For your MSC.Marc license, it has the format: FEATURE MARC MSC 2010.1231 (for single processor version) FEATURE MARC_Parallel MSC 2010.1231 (for parallel version) For your MSC.Marc Mentat license, it has the format: FEATURE MENTAT MSC 2010.1231 Each single-processor job is required to have a license name MARC for execution to proceed. To run a multiprocessor job, a corresponding number of multiple licenses with the feature name MARC_Parallel plus a license name MARC is required. For example, to run a job using four processors in parallel, one MARC license and four MARC_Parallel licenses are needed.
USE_SERVER	When used together with the SERVER line, this line is used on the licensed “client system” (as opposed to the license server), to specify that it should obtain a license from the specified license server. It has no options.
CAMPUS	This line specifies that a pool of license tokens are used. When the MasterKey licensing system is used, the FEATURE line will have a specification for `VENDOR_STRING` containing `GROUP:CAMPUS` and `BLV:nn`, where `nn` is the number of tokens that is required in order to obtain a license. All MSC.Software products may obtain a license from a MasterKey license provided that a corresponding FEATURE line exists.

FLEXlm License Manager

The `run_marc` and `mentat` script will start the FLEXlm license manager daemon `lmgrd` using the `rc.lmgrd` script located in the `flexlm/<platform>` directory. Once `lmgrd` is running, it reads the license file `license.dat` which is located in the `flexlm/licenses` directory. The license file contains the MSC.Software license (and other MSC.Software product licenses, if necessary). In addition, `lmgrd` also starts the MSC.Software vendor daemon `msc`. The path to `msc` is specified in the license file on the DAEMON line. These processes must be running on the license server for the MSC.Software security system to obtain a license.

MSC.Marc and MSC.Marc Mentat contact these daemons at regular intervals. If no contact is made after a specified time period, MSC.Marc or MSC.Marc Mentat terminates execution.

For the 2005r3 version, the FLEXlm License Manager must be at version 10.8 or higher.

When the security programs are installed, they will be upgraded to version 10.8. You should stop the FLEXlm License Manager before installing the product so that the programs can be updated. If your license server is a remote machine, then you need to update the FLEXlm programs on the server before attempting to run the product. If you do not have a CD-ROM for that platform, the programs may be downloaded from:

```
ftp://ftp.mscsoftware.com/pub/msc-products/system_util/flexlm/v10.8.0
```

There is a *readme* file which will tell you which zip file to download, and an *install* file which will provide instructions for installing the programs.

Environment Variables

The environment variable ***MSC_LICENSE_FILE*** is used to specify the full path to the `license.dat` file, and is a colon separated list of file pathnames. An example setting of `MSC_LICENSE_FILE` is:

```
MSC_LICENSE_FILE=$DIR/../flexlm/licenses/license.dat:/usr/local/flexlm/licen
ses/license.dat:1515@mars.earth.com
```

The variable must be set in your environment, or optionally could be inserted in the `run_marc` or `mentat` script. The default setting is `$DIR/../flexlm/licenses/license.dat`, where `$DIR` is the path to the MSC.Marc or MSC.Marc Mentat directory. Note that the FLEXlm license manager must be running before MSC.Marc or MSC.Marc Mentat executes. This has changed from previous versions where it would startup the license manager automatically if it wasn't already running.

Note: You may want to combine all of your FLEXlm licenses into one file and change the FLEXDIR setting appropriately. For instance, if you have already installed other MSC products and the MSC daemon has been activated.

Security Directory

The security directory defaults to `<parent>/flexlm`. It must be writable by all MSC.Marc and MSC.Marc Mentat users if they will be allowed to start the license manager when needed, since `lmgrd` writes the logfile (`flexlm/flexlm.log`) to that directory. If you do not wish to have the security directory writable by others, then you must have the license manager started at boot time.

You may also want to monitor the size of the logfile, since all FLEXlm activity is recorded to that file.

Note: The `flexlm.log` file contains important status information regarding the license manager daemon. Always check this file when you get a security error.

Combining the MSC.Marc License with Other MSC Products

You can combine the MSC.Marc license with other MSC product licenses. To do this, add the MSC.Marc license to the license file for MSC.Nastran, MSC.Patran, or other MSC.Software products. You will need to restart the license server before using MSC.Marc.

Client/Server Licensing

The default installation assumes that the system in which MSC.Marc is installed, functions as the license server. The term license server only refers to the fact that `lmgrd` and `msc` are running on that system, and maintains the state of available licenses. Even if you have purchased a nodelocked license, the nodelocked system functions as the license server for that license. A nodelocked license can be distinguished from a floating license since it will have a `HOSTID=xxx` in the feature line.

If you have purchased a floating license, the system that is to be the license server must be determined before generating the system identification file (`sid001.dat`). You must generate the system identification file from the license server, since the *lmhostid* value of the server is needed to generate your passwords. The license file that is returned to you should be placed in the `flexlm` directory. The client systems can use the same license file, or they can use a brief license file with just the SERVER and USE_SERVER lines.

If you are using a license server and `lmgrd` will always be running, then you may wish to remove or rename the `rc.lmgrd` script started by the `run_marc` and `mentat` script so that it does not attempt to start the license manager on the client.

MasterKey Licensing

The MasterKey licensing option allows you to use a pool of licenses for all of the MSC.Software products. A MasterKey license is issued with a pool of “tokens”. Each MSC.Software product will attempt to retrieve a specified number of these tokens in order to be granted a license. If not enough tokens are available, then it will be queued. Programs that are queued will be granted a license in the order in which they request a license. For example, if there are 100 tokens and a request is made for 60 tokens, that program will be granted a license. If another program makes a request for 60 tokens, it will be placed in the license queue. If yet another program makes a request for 40 tokens, it will be queued

behind the request for 60 tokens. When the program that was using the 60 tokens exits and releases its tokens, the queued request for 60 tokens will then be granted a license. Then the queued request for 40 tokens will be granted a license.

The amount of minutes a program will wait for a license after it has been queued may be specified with the environment variable `MSC_AUTHQUE`. The default value is 5 minutes. It may be set as follows in a Bourne shell:

```
MSC_AUTHQUE=20
export MSC_AUTHQUE
```

In a C shell, it may be set as:

```
setenv MSC_AUTHQUE 20
```

Product Layout

When you install MSC.Marc and/or MSC.Marc Mentat, you will get the following installation hierarchy:

`<Parent>`

- **install** contains the `install.exe` script and other installation scripts
- **flexlm** contains the FLEXlm programs
- **marc2005r3** contains the MSC.Marc program files (if installed)
- **mentat2005r3** contains the MSC.MSC Mentat program files (if installed)

In the `run_marc` script, the environment variables involved with the FLEXlm security are set as follows:

```
DIR=<parent>/marc2005r3
DIR=<parent>/marc2005r3
```

In the `mentat` script, the environment variables involved with the FLEXlm security are set as follows:

```
DIR=<parent>/mentat2005r3
FLEXDIR=$DIR/../flexlm/licenses
```

Appendix A:Sample Installation of MSC.Marc and MSC.Marc Mentat

In this appendix, a sample installation, assuming a single license installation for SGI R8000, is demonstrated.

Step 1: Start the installation script on the CD-ROM

```
<cdrom_dir>/
install.exe
```

In most cases, the name of `<cdrom_dir>` will be `/cdrom` or `/CDROM`. The device name for your CD-ROM may be different, so check your system administration guide. For example, on a Sun the name may be `/cdrom/cdrom0`.

Step 2: Extract the files from the CD-ROM

Welcome to the MSC.Marc installation script for Unix systems

Enter a valid pathname to the directory to install the software (`<current directory>`).

Enter the path **/opt/marc**

MSC.Marc Installation script for Unix systems
MSC.Software Corporation
Main menu

1) Install/Test MSC.Marc
2) Install MSC.Marc Mentat
o) Options
?) Help information
q) Exit from the installation script

Select option 1 *Selection:* ***1***

MSC.Marc Installation

MSC.Software Corporation
MSC.Marc 2005 Menu

D1)	Install for HP/Compaq/Dec Tru64 5.1x	(~90 MB)
H1)	Install for HP-UX 11.00 (PA 2.0 64bit)	(~150 MB)
H2)	Install for HP-UX 11.22 (Itanium 2)	(~150 MB)
I1)	Install for IBM AIX 4.3.2/3	(~100 MB)
I2)	Install for IBM AIX 5.2 (64bit)	(~100 MB)
I3)	Install for IBM AIX 4.3.2 (SP)	(~100 MB)
L1)	Install for Linux 2.4.x (32bit - RedHat 7.1)	(~96 MB)
L2	Install for Linux 2.4.x (64bit - RedHat 9)	(~96 MB)

L3) Install for Linux 2.4.x (64bit Itanium 2) (~96 MB)
G1) Install for SGI IRIX R12K 6.5 (~140 MB)
G2) Install for SGI IRIX 64 R12K 6.5 (~140 MB)
S1) Install for Sun Solaris 2.8 (32bit Ultra II) (~100 MB)
S2) Install for Sun Solaris 2.8 (64bit Ultra III) (~100 MB)
t) Test and maintain the installation
?) Help information
r) Return to previous menu

Select option G2

Selection [G2]: ***G2***

You have selected SGI IRIX64 R12K 6.5.

Is this correct? [Y/n] **y**

Make your choice.

Installing MSC.Marc Marc 2005 for SGI IRIX64 R12K 6.5
Installing the script files to /opt/marc/install
Installing the security files in /opt/marc/flexlm/irix
Installing from /cdrom/products/ag65w12n.k05

include script adjusted
run_marc script adjusted

You must be `root` to create the link

Do you want to create links to the marc's startup scripts [y/N] ? **n**

Hit return to continue

Mentat Installation

MSC.Software Corporation
Mentat 2005 Menu

d1) Install for HP/Compaq/Dec Tru64 5.1x (~400 MB)
h1) Install for HP-UX 11.0 (64bit PA2.0) (~390 MB)
h2) Install for HP-UX 11.22 (Itanium 2) (~390 MB)
i1) Install for IBM AIX 4.3.2/3 (~400 MB)
i2) Install for IBM AIX 5.2 (64bit) (~400 MB)
l1) Install for Linux 2.4.x (32bit - RedHat 7.1) (~350 MB)
l2) Install for Linux 2.4.x (64bit - RedHat 9) (~350 MB)
g1) Install for SGI IRIX R12K 6.5 (~460 MB)
g2) Install for SGI IRIX64 R12K 6.5 (~460 MB)

		s1) Install for Sun Solaris 2.8 (32bit Ultra II) (~400 MB) s2) Install for Sun Solaris 2.8 (64bit Ultra III) (~400 MB) ?) Help information r) Return to previous menu
	Select option g1	*Selection [g2]:* ***g2***
		You have selected SGI IRIX R12K 6.5
		Is this correct? [Y/n]: **y**
		Installing MSC.Marc Mentat 2005 for SGI IRIX64 R12K 6.5 Installing the script files to /opt/marc/install
		Do you want to replace /opt/marc/flexlm/irix ? [y/N] **n**
		/opt/marc/flexlm/irix is not empty No new flexlm files are installed
		Installing from /cdrom/products/gg65w120.k05
	Enter the path to the `marc2005` directory.	*Enter the pathname to the directory containing the solver:*
		[/opt/marc/marc2005]
	You can use the default selection by just pressing the enter key.	Hit return to continue
		mentat script adjusted mrun script adjusted submit1 script adjusted submit2 script adjusted submit3 script adjusted kill1 script adjusted kill2 script adjusted kill3 script adjusted
	Make your choice	Do you want to create links to the mentat's startup scripts [y/N] ? **n**
		Hit return to continue
Step 3:	Return to main menu	r) Return to previous menu
Step 4:	Go to options menu	o) Options
Options		

Step 5: **Security**		*s) Install Security* *sd) Install Security documentation* *u) Update Product scripts* *r) Remove (un-install) a product* *ci) Change the installation directory* *cd) Change the CDROM path* *l) Change the product listing file* *sc) Determining system configuration* *Selection:* ***S***
Step 6: **Generate a system identifier**	Select option 1	**Security submenu** *1) Generate system identifier file* *2) Show the system identifier* *3) Print the system identifier* *4) Send the system identifier* *5) Reset the license manager (lmreread)* *6) Start the license manager daemon* *7) Stop the license manager daemon* *?) Help* *r) Return to previous menu* *Selection:* ***1***
Enter your data		*Please enter the following information:* *Your company name () :* **PieMontVue Inc.** *Your department () :* *Your company address () :* **101 Grant St.** *City and postal code () :* **Woodsland, Ca 97001** *Country () :* **USA** *Your name () :* **Pat Smith** *Your email address () :* **psmith@pie.com**

	If you are installing both MSC.Marc and MSC.Marc Mentat, enter both of your license codes.	*Your telephone number () :* **498 8779221** *Your telefax number () :* **498 8770101** *Current system data :* *Computer type (SGI) :* **SGI** *Computer model (IP27) :* **O2** *MSC license agreement number (optional) () :* *Amendment number (optional) () :* *Any changes (y/n) [n] ?* **n** ***** Data written in file "/opt/marc/install/sid001.dat"* *Send this file to MSC.Marc*
Step 7: Send the system identifier to the nearest MSC.Software Corporation office	**Select option 3 to print, or 4 for E-mail**	*Selection:* ***4***
Step 8: Enter passwords	*vi license.dat* *chmod 644 license.dat*	When you receive your passwords from MSC.Software, edit or create the `<parent>/flexlm/licenses/license.dat` file and add the license data sent to you. It will consist of at least three lines: a SERVER line, a DAEMON line, and a FEATURE line. See Macrovision's *FLEXlm End User Manual* for more information.
	Select option `q` to exit the installation script	*Selection:* ***q***
Step 9: umount and mount the CDs	Follow the directions in Table 1.	
Step 10: Install documentations		**Welcome to the MSC.Marc installation script for Unix systems** Enter a valid pathname to the directory to install the software (`<current directory>`).
	Enter the path	**/opt/marc**

Select option d	***MSC.Marc Installation script for Unix systems*** *MSC.Software Corporation* *Main menu* *d) Install Documentations* *o) Options* *?) Help information* *q) Exit from the installation script* *Selection:* **d** *Installing documetation at* */opt/marc/mentat2005/doc* *Hit return to continue.*

Appendix B:Troubleshooting

Cannot read CD-ROM

- The device name listed in Table 1 may be incorrect for your system. Please consult your system manager.
- The CD-ROM device may not be mounted. Please consult your system manager.

Cannot create

- You have no write permission in the parent directory. Change with *chmod.*

Security failed

MSC.Marc or MSC.Marc Mentat was unable to obtain a license from the FLEXlm licensing software. In this case, MSC.Marc or MSC.Marc Mentat will exit. The possible causes for this are:

- The FLEXlm license manager is missing or cannot be executed due to permission problems. Check the log file `flexlm.log` in the `flexlm` directory. Try testing the FLEXlm license server with the command `flexlm/lmstat`. If this fails, consult the *FLEXlm End User Manual*.
- You are attempting to run on a machine that according to the MSC.Marc password(s) you are not allowed to use.
- Your license period has expired. Check the date on your machine.
- For counted licenses, currently running too many MSC.Marc jobs. Try later. If the limit has not been exceeded, try restarting the license manager, `lmgrd` and the vendor daemon `MSC`. Make sure no other MSC.Marc jobs are running.
- If you have just modified the `license.dat` file, the `lmgrd` and `MSC` daemons may not have been restarted. Run the *lmreread* utility as follows:

  lmreread `-c` “parent”/flexlm/licenses/license.dat

- If you get the FLEXlm error:

  Invalid (inconsistent) license key (-8,130:2) No such file or directory

  it may be implying that the hostid value specified on the SERVER line are inconsistent with the passwords. Check the values and restart the license manager.

- If you get the FLEXlm error:

  Cannot connect to license server (-15,12:146)

  and you are using a floating license, the license manager (`lmgrd`) may not be running on the license server, or the USE_SERVER line in your client side `license.dat` file is incorrect. Also make sure that the TCP/IP port numbers used on the SERVER line are the same on both the client and the server.

- If you get the FLEXlm error:

  No such feature exists (-5,147)

  and your license is limited to certain systems, you may be trying to run on a system that is not licensed for use. Check that the *lmhostid* of the system you are trying to use and that on your `marc2005` (*FEATURE MARC*) license is the same.

Link failed in MSC.Marc

- Your user subroutine causes compiler errors.
- You have no FORTRAN compiler.
- Fortran libraries not available.
- Check the variable **syslibs** in the file *include* in the `marc2005` subdirectory `tools`. It references special system libraries in `/usr/lib` which may not exist on your system.

Testing MSC.Marc Installation fail

- If you are using `install.exe` to test MSC.Marc installation and the Test and maintain installation does not respond, remove `exec tcsh` from your `.cshrc` and restart installation testing.

MSC.Marc Mentat cannot open the display

- Make sure MSC.Marc Mentat has X server access to your display device. The command: `xhost +` allows MSC.Marc Mentat to run on a remote screen. This command must be issued while logged onto the computer that owns the remote screen.
- If you are using a terminal other than the default screen belonging to the machine, you may have to set the X-window output device:

  C-shell: `setenv DISPLAY your_terminal_name:0.0`

  Bourne shell: `DISPLAY=your_terminal_name:0.0 export DISPLAY`

MSC.Marc Mentat runs OK, then aborts

- This may happen when the model you are working on becomes very large. MSC.Marc Mentat requires a considerable amount of memory to store the model. We advise that a minimum of 128 MB core memory is available in your machine.
- You can save memory by switching off the double buffering mode.

Appendix C:MSC.Marc/MSC.Marc Mentat Files and Subdirectories

The MSC.Marc version you have received contains a full set of subdirectories listed below. You can save disk space by removing the subsets that you do not need.

Table 5 Contents of the MSC.Marc Distribution CD-ROM

Basic set:	Contents: required as minimum
`bin`	executable MSC.Marc programs
`tools`	shell scripts to run and maintain the MSC.Marc programs
`../flexlm`	FLEXlm security files
`AF_flowmat`	material data for database
`doc`	Installation Guide, Release Guide and Volumes A-E installed from the documentation CD-ROM installed in this directory MSC.Marc Mentat is not installed
Extended set:	**Contents: only for use with user subroutines**
`common`	insert files containing MSC.Marc common blocks
`lib`	binary libraries with the compiled MSC.Marc routines
`user`	templates for all available MSC.Marc user subroutines
Examples:	**Contents: example files**
`demo`	input files and user subroutines for the *MSC.Marc Volume E: Demonstration Problems*
`demo_ddm`	input files and user subroutines for the single parallel machine as well as the network parallel version of MSC.Marc
`demo_table`	input files and user subroutines for the MSC.Marc Volume E: Demonstration Problems based upon Table driven input format.
`benchmark`	small set of demonstration examples for performance measurement
`test_ddm`	one, two, and four processor test examples for installation testing of the single parallel machine as well as the network parallel version
Utilities:	**Contents:**
`pldump2000`	source routines for the post-file conversion program pldump
`mpich`	MPI libraries for network parallel version
Source code:	**Contents: for source code licenses only**
`source`	source routines for the standard MSC.Marc program
`csource`	source routines for the standard MSC.Marc program written in C
`bcssolver`	source routines for the multifrontal solver
`mshell`	sources for auxiliary programs for running MSC.Marc
*__Note__ that the last set is available on SOURCE code license tapes only.	

Table 5 Contents of the MSC.Marc Distribution CD-ROM (continued)

stubs	source routines for solvers and MSC.Marc reader
mdsrc	machine dependent routines for the MSC.Marc programs
*__Note__ that the last set is available on SOURCE code license tapes only.	

The MSC.Marc Mentat version you have received contains a full set of subdirectories listed below. You can save disk space by removing the subsets that you do not need.

Table 6 Contents of the MSC.Marc Mentat directory unloaded from CD-ROM

Basic set:	Contents: required as minimum
bin	shell scripts and programs for MSC.Marc Mentat
help	MSC.Marc Mentat online help files
materials	MSC.Marc Mentat material files
menus	MSC.Marc Mentat menu files
doc	Installation Guide, Release Guide and MSC.Marc Volumes A-E installed from the documentation CD-ROM
Extended set:	**Contents: example MSC.Marc Mentat procedure files**
examples	sample MSC.Marc Mentat procedure files the `examples\training\ctour` directory contains movie files showing the use of MSC.Marc products and training courses

Table 7 Contents of the Flexlm/<platform> directory unloaded from CD-ROM

Program	Description
lmcksum	performs a checksum of the license file
lmdiag	diagnose a problem with checking out a license
lmdown	shutdowns the license daemons
lmgrd	the main license manager daemon for Flexlm
lmhostid	prints the hostid of a system
lmremove	allows you to remove a single user’s license
lmreread	causes the license manager to reread the license file
lmstat	helps you monitor the status of all network licensing activities
lmswitchr	switches the FLEXadmin log file for the specified feature
lmutil	The executable to which the FLEXlm utilities are linked
lmver	Lists the FLEXlm version of a library or executable
msc	The vendor daemon used to pass MSC.Marc specific licensing information to lmgrd
rc.lmgrd	The script that starts lmgrd
See the *FLEXlm End User Manual* for more information.	

MSC.Marc Parallel Network for Unix Installation and Operations Guide

Table of Contents

Introduction

The current document is divided into three parts:

Part I	Provides the general description about the hardware and software requirements and definitions.
Part II	Provides a step-by-step approach to installation of the network version.
Part III	Provides miscellaneous information about executing a parallel job over a network and use of user subroutines.

The list of supported capabilities in parallel can be found in Section 7 of the Release Guide.

Part 1 General Information

Hardware and Software Requirements:

The MSC.Marc 2005 network version for Unix uses MPICH Version 1.2.5 from Argonne National Laboratory for MPI. The latter is included on the MSC.Marc CD.

Although no specific hardware requirements exist for MSC.Marc to run in network mode, it is preferable to have fast network connections between the machines. It is recommended that the network should have a speed of at least 100 MBit per second. If only two machines are to be used, a hub or a cross-over cable can be used to connect them. If more than two machines are to be used, a switch is preferable. TCP/IP is used for communications.

For a list of supported Unix platforms, see the *Release Guide, Section 7.*

Compatibility:

Although it is possible to connect different Unix machines, it is recommended to only use compatible machines in an analysis. Two machines are compatible if they can both use the same MSC.Marc executable.

Some examples of compatible machines are:

1. Several machines with exactly the same processor type and O/S.
2. One SGI R8000/Irix 6.5 and one SGI R10000/Irix 6.5 machine.
3. One HP J-Class/HPUX-11.0 and one HP C-Class/HPUX-11.0.

Note: The DEC machines cannot be connected to other Unix machines in this release.

Definitions

1. Root machine:
   The machine on which the MSC.Marc job is started.
2. Remote machine:
   Any machine other than the root machine which is part of a distributed MSC.Marc run on the network.
3. Shared installation:
   MSC.Marc is installed in an NFS shared directory on one machine only. Other machines can access the MSC.Marc executable since the directory is shared.
4. Distributed installation:
   MSC.Marc is installed on all machines. Each machine accesses its own MSC.Marc executable.
5. Distributed execution:
   MSC.Marc is run on multiple machines which are connected with a network. Each machine loads the MSC.Marc executable either from a shared or a local directory and then executes the executable.

6. Shared I/O:
   MSC.Marc reads and writes data in an NFS shared directory. Each MSC.Marc executable running on the network reads/writes to the same directory.
7. Distributed I/O:
   MSC.Marc reads and writes data in a directory located on each machine. The user must make the input available in each directory and collect the results files after the analysis.
8. NFS – Network File System.

Network Configuration

MSC.Marc only needs to be installed on the root machine where the installation directory is shared via NFS (shared installation). MSC.Marc can also be installed on the remote machines which then use their own executable (distributed installation). A distributed installation must be done if incompatible machines are used. The root machine is the one on which the MSC.Marc job is started, typically from within MSC.Marc Mentat. The remote machines can be located anywhere as long as they are connected to the network. The working directory on each machine can be a shared directory on any machine on the network (shared I/O) or it can be a local directory on the hard disk of each machine in the analysis (distributed I/O). The User Notes describes how to specify what working directory to use.

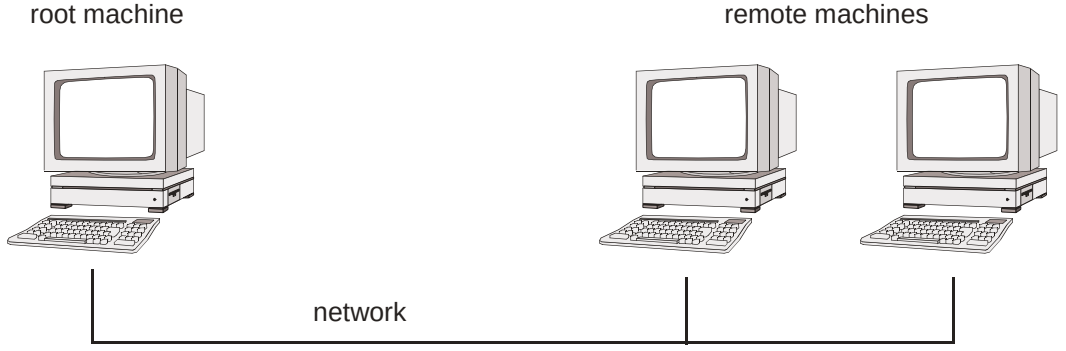


Figure 1 Network Configuration

Part 2 Installation Notes

This part describes the specific steps needed to install and set up a network version of MSC.Marc. For general information on MSC.Marc installation, see MSC.Marc and MSC.Marc Mentat for Unix Installation and Operations Guide.

Install MSC.Marc on the root machine and, if needed, on the remote machines. MSC.Marc only needs to be installed on the root machine. However, if MSC.Marc is to be used on the remote machines as well, it can also be installed there. There is nothing special that needs to be done related to the installation itself for the network version.

In order to run parallel jobs on machines connected over the network, it has to be set up properly. If any of the remote hosts does not have MSC.Marc installed, the installation directory on the root machine needs to be shared using NFS or some other mechanism so that the MSC.Marc executable is available from the remote machines. Users need to be able to connect between the machines using `rlogin` without having to provide a password.

Assume the following, there are two machines with hostnames host1 and host2 that are to be used in a parallel job over the network. MSC.Marc has been installed on host1 and the job is to be started from this machine. A hypothetical naming convention is used for shared directories where a directory name on any machine starts with */nfs/hostname*, where *hostname* is the name of the machine on which the directory is located.

First, test the installation for single processor execution. Change directory to the `test_ddm` subdirectory of the MSC.Marc installation directory on host1. Then do

```
cd exmpl2/exmpl2_1
marc2005r3 -j cyl2 -b no -v no
```

and MSC.Marc should exit in about three minutes if it is a successful run.

Then test the MSC.Marc installation for multi-processor execution. Do

```
cd ../exmpl2_2
```

and edit the file `hostfile` in this directory by replacing `workdir` with

```
/nfs/host1/marcinstall/test_ddm/examp2/exmpl2_2
```

and `installdir` with

```
/nfs/host1/marcinstall.
```

The host names and directory names should, of course, be replaced with the names on the current system. Finally, type:

```
marc2005r3 -j cyl2 -b no -v no -nproc 2 -host hostfile
```

and MSC.Marc should exit in about two minutes if it is a successful, parallel run on host1 and host2 using one processor on each.

Part 3 User Notes

This section assumes that the network version of MSC.Marc has been successfully installed on at least one of two machines that are to be used in a distributed analysis and that the appropriate MSC.Marc licenses are in order. Assume that host1 is the host name of the machine on which MSC.Marc Mentat is running and from which the job is to be started (the root machine). The host name of the other machine (the remote machine) is host2.

How to run a network job

First, make sure that the two machines are properly connected. From host1, access host2 with

```
rlogin host2
```

If a password needs to be provided to do the remote login, this has to be taken care of. If the `rlogin` is not possible without providing a password, a network run will not be possible. See Troubleshooting in this case.

In order to perform an analysis over a network, a specific file called *host file* needs to be created by the user. This file defines which machines are to be used, how many processes are to run on each, what working directory should be used, and where the MSC.Marc executable can be found on each machine. The host file can be selected and edited in MSC.Marc Mentat and the MSC.Marc job started as usual from within MSC.Marc Mentat (see the example below). If MSC.Marc is run from the command line, it is done as for a serial run using an additional command line option. For example:

```
marc2005r3 -v no -b no -jid test -nproc 2 -host hostfile1
```

will run the two-processor job `test.dat` using the specification in the file `hostfile1`. No specific name or extension is used for the host file except that the name *jobid.host* (in this example `test.host`) must be avoided since it is used internally by MSC.Marc.

Specification of the host file

The host file has the following general format:

```
host1 n1
host2 n2 workdir2 installdir2
host3 n3 workdir3 installdir3
```

Each line must start at column 1 (no initial blanks). Blank lines and lines beginning with a # (number symbol) are ignored.

The first entry is the host name of a machine to be used in the analysis. The root machine must be listed first and each machine must only occur once.

The second entry specifies the number of processes to run on the machine specified in the first entry. The sum of the number of processes given in the host file must equal the number of domains used. In a five-domain job, it is required that `n1+n2+n3=5`.

The third entry specifies the working directory to use on this host. This is where the I/O for this host takes place. The MSC.Marc input files for this machine must be in this directory and the results files for this machine are created in this directory.

The fourth entry specifies where the MSC.Marc installation directory that this host should use is located. This entry can be omitted if the name of the MSC.Marc installation directory is the same on all machines (which could be a shared directory on host1 with the same name from host2 and host3).

The directories in the third and fourth entries will be used from the respective host. To check the correctness of the host file specification, log in to the respective machine and list the directories as specified in the host file. For the host file given above, do:

```
rlogin host2
ls workdir2
ls installdir2
```

The second line should show the working directory to use on host2 and the third line the installation directory which will be used by host2.

The different domains of the MSC.Marc job are associated with the different machines as follows. Suppose a five-domain job `test` is run using a host file defined as

```
host1 2
host2 1 workdir2 installdir2
host3 2 workdir3 installdir3
```

with appropriate definitions of the third and fourth entries, see below. There will be six MSC.Marc input files associated with this job: `test.dat, 1test.dat, ..., 5test.dat`. Domains 1 and 2 will be associated with host1, domain3 with host2 and domains 4 and 5 with host3.

Shared I/O

Suppose a job is to be run on host1 and host2. A shared directory on host1 is to be used for I/O and from host2 its name is /nfs/host1/marc/workdir (assuming a hypothetical naming convention for shared directories which starts with /nfs/hostname). The installation directory is assumed to have the same name on both machines. The host file for a two-processor job would simply be

```
host1 1
host2 1 /nfs/host1/marc/workdir
```

To verify the workdir given, do `rlogin host2 ; ls /nfs/host1/marc/workdir`. The directory seen should be the same one as the working directory on host1.

Distributed I/O

If the user wants to have the I/O to be local on host2, specify the host file as

```
host1 1
host2 1 /usr/people/marcuser
```

The I/O on host2 will now take place in the directory /usr/people/marcuser on the hard disk of host2. For this case, the MSC.Marc input files are transferred to /usr/people/marcuser on host2 before the job is started, and the results files are transferred back after the analysis for postprocessing. This transfer of files is done by MSC.Marc automatically.

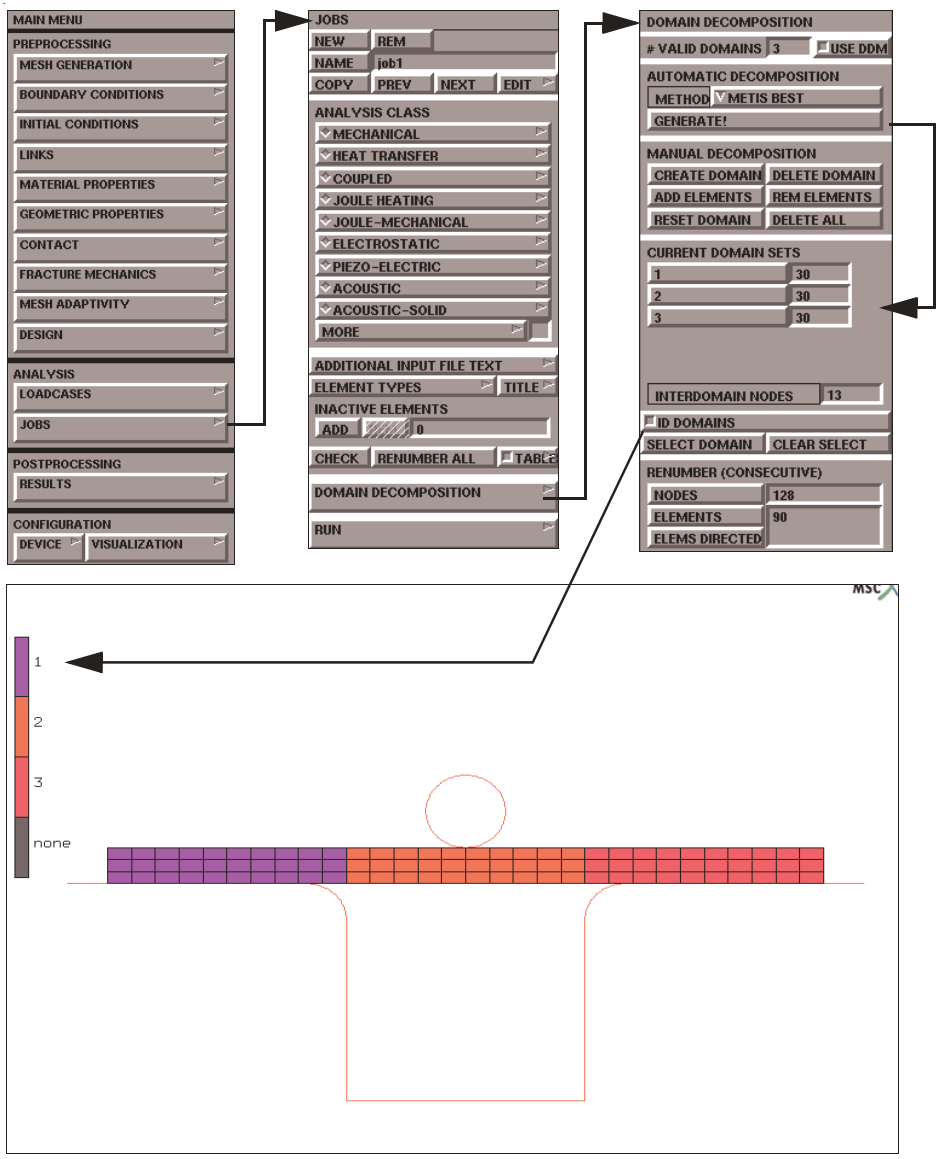
It is also possible to use only two entries in the host file. This requires that both the working directory and the installation directory have the same names on all machines.

Example

The definitions for a network run with MSC.Marc Mentat is demonstrated with a simple example. We assume the simplest case where both the working directory and installation directories are shared.

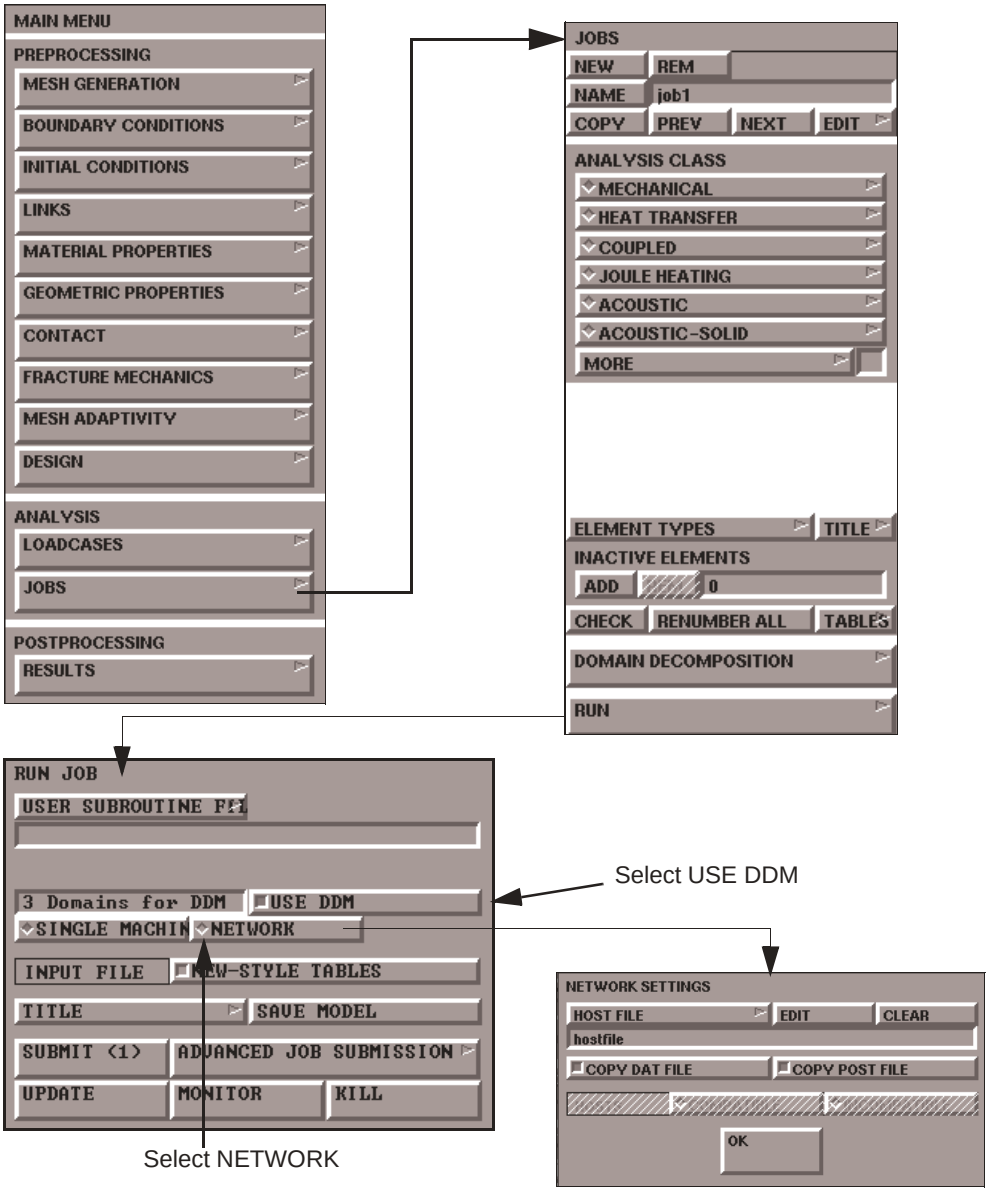
Enter the menu HELP-> RUN A DEMO PROBLEM and select the example CONTACT WITH DDM. Select and confirm your three domains as shown below.

Step 1



Activate the DDM and enter the NETWORK SETTINGS menu.

Step 2


MAIN MENU
PREPROCESSING
MESH GENERATION
BOUNDARY CONDITIONS
INITIAL CONDITIONS
LINKS
MATERIAL PROPERTIES
GEOMETRIC PROPERTIES
CONTACT
FRACTURE MECHANICS
MESH ADAPTIVITY
DESIGN
ANALYSIS
LOADCASES
JOBS
POSTPROCESSING
RESULTS
JOBS
NEW
REM
NAME
job1
COPY
PREV
NEXT
EDIT
ANALYSIS CLASS
MECHANICAL
HEAT TRANSFER
COUPLED
JOULE HEATING
ACOUSTIC
ACOUSTIC-SOLID
MORE
ELEMENT TYPES
TITLE
INACTIVE ELEMENTS
ADD
0
CHECK
RENUMBER ALL
TABLES
DOMAIN DECOMPOSITION
RUN
RUN JOB
USER SUBROUTINE FI
3 Domains for DDM
USE DDM
SINGLE MACHIN
NETWORK
INPUT FILE
NEW-STYLE TABLES
TITLE
SAVE MODEL
SUBMIT (1)
ADVANCED JOB SUBMISSION
UPDATE
MONITOR
KILL
Select USE DDM
Select NETWORK
NETWORK SETTINGS
HOST FILE
EDIT
CLEAR
hostfile
COPY DAT FILE
COPY POST FILE
OK

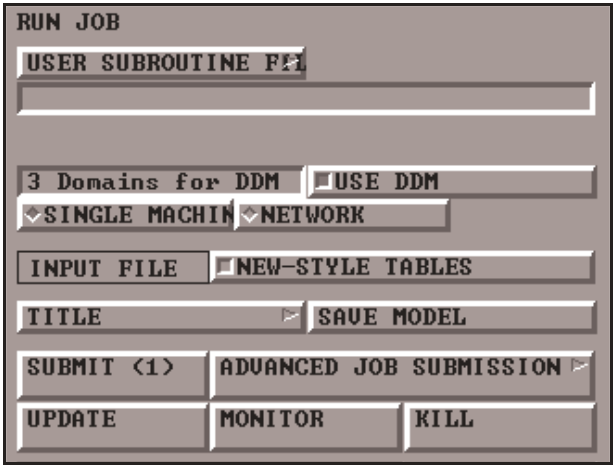
Select the file hostfile with the HOST FILE button. Edit it by clicking the EDIT button. The `hostfile` places two domains on host1 and one domain on host2 with the contents:

```
host1 2
host2 1      workdir      installdir
```

Replace workdir and installdir with the full paths to the working and MSC.Marc installation directories, respectively.

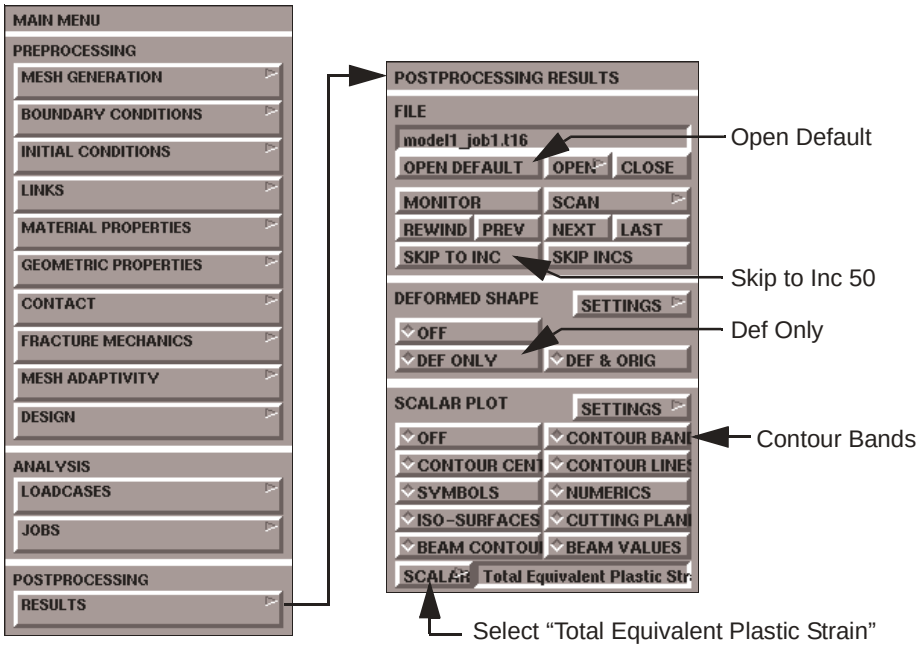
Run MSC.Marc from within MSC.Marc Mentat using the SUBMIT button.
The following should appear on your screen.

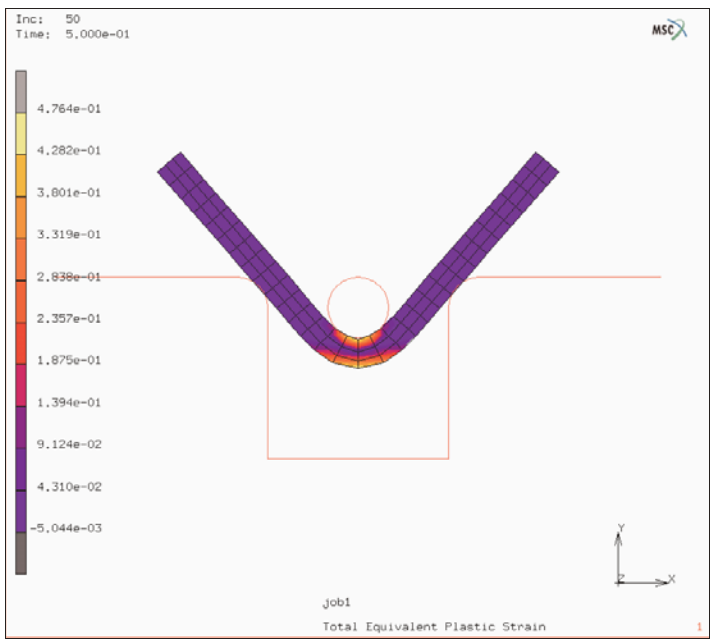
Step 3



Check your results.

Step 4


MAIN MENU
PREPROCESSING
MESH GENERATION
BOUNDARY CONDITIONS
INITIAL CONDITIONS
LINKS
MATERIAL PROPERTIES
GEOMETRIC PROPERTIES
CONTACT
FRACTURE MECHANICS
MESH ADAPTIVITY
DESIGN
ANALYSIS
LOADCASES
JOBS
POSTPROCESSING
RESULTS
POSTPROCESSING RESULTS
FILE
model1_job1.t16
OPEN DEFAULT
OPEN
CLOSE
MONITOR
SCAN
REWIND
PREV
NEXT
LAST
SKIP TO INC
SKIP INCS
DEFORMED SHAPE
SETTINGS
OFF
DEF ONLY
DEF & ORIG
SCALAR PLOT
SETTINGS
OFF
CONTOUR BANI
CONTOUR CENT
CONTOUR LINES
SYMBOLS
NUMERICS
ISO-SURFACES
CUTTING PLANI
BEAM CONTOUI
BEAM VALUES
SCALAR
Total Equivalent Plastic Str
Open Default
Skip to Inc 50
Def Only
Contour Bands
Select “Total Equivalent Plastic Strain”


Inc: 50
Time: 5.000e-01
MSC
4.764e-01
4.282e-01
3.801e-01
3.319e-01
2.838e-01
2.357e-01
1.875e-01
1.394e-01
9.124e-02
4.310e-02
-5.044e-03
Y
Z
X
job1
Total Equivalent Plastic Strain
1

MSC.Marc created a post file associated with each domain as well as a root post file associated with the job id. For the previous model, `1model1_job1.t19`, `2model1_job1.t19`, and `3model1_job1.t19` are the processor files, while `model1_job1.t19` is the root file.

If the model is very large, it can be convenient to view only a portion of the model by selecting any one of the processor post files, such as `3model1_job1.t19`. This file contains only data associated with domain 3 as selected in the domain decomposition menu under Step 4. As described in Step 3, this file was created by host2.

Shared vs. Distributed I/O

For jobs with very large post or restart files, it is usually more efficient to use distributed I/O. With distributed I/O, the input files and the post files are located on the host's local disks. MSC.Marc by default automatically transfers the input files and the post files to and from the remote host if needed. It is possible to suppress this transferring with two buttons in the Network settings in the JOBS menu in MSC.Marc Mentat.

To run a job using distributed I/O, specify a local directory in the host file:

```
host1 2
host2 1 /usr/people/marcuser
```

Jobs with User Subroutine

User subroutines are fully supported in the network version.

The Fortran file with the subroutine is located in the working directory on the root machine. MSC.Marc automatically creates the executable and makes it available on all remote hosts. There is no need to modify the host file if it is correct for a job without a user subroutine.

If the working directory is shared for all remote hosts and only compatible machines are used in the analysis, the user subroutine is compiled on the root machine and the executable is available in the shared working directory.

If a remote host is using a local working directory, the executable will be automatically copied over to the remote machine using remote copy (`rcp`). MSC.Marc automatically knows if a directory is shared or local.

If incompatible machines are used, the compilation is done on each machine separately. If a shared working directory is used, the host name is appended to the name of the executable. For local directories, the new executable is placed in the local working directory. This is all done automatically by MSC.Marc. To make sure that incompatible machines are treated as such, use the INCOMPATIBLE button in the MSC.Marc Mentat NETWORK SETTINGS menu, or if started from the command line, use the command line option "`-comp no`".

Notes for Incompatible Machines

This version only supports connection of homogeneous networks; that is, machines of the same type. The communication software we use, MPICH, allows heterogeneous networks to be used. You could connect for instance two HPs, three IBMs, two SGIs, and a Sun to run a job. Obviously, the install directories must be local to the different machines in this case.

Restrictions:

1. Hardware vendor provided solver must NOT be used when using different machines on the network.
2. Please note that DEC machines cannot be connected to other Unix machines at this time.

Solver

Solver type 6 (hardware provided sparse) is available on HP, SGI, and Sun. No specific input is needed for its use in a parallel analysis. MSC.Marc makes use of the parallel features of these solvers. However, the use of a hardware solver is, in general, not recommended in a network run. The equation solution is performed on the root machine by starting multiple processes. This is done in order to utilize the parallel performance of the solver (which is using multithreading). This is efficient on a single parallel machine, but if the root machine of a network run does not have the number of processors available, it will not be efficient.

Solver types 0 (direct profile), 2 (sparse iterative), 4 (sparse direct), and 8 (multifrontal sparse) are supported in parallel.

Out-of-core solution is only supported in parallel for Solver 8.

Troubleshooting

Check that:

1. The network connection between the hosts is working by using the command `ping host`.
2. A remote login using the command `rlogin` can be done between the hosts without providing a password. If not, contact your system administrator or check the man pages for `rlogin` and look for `.rhosts`.
3. The host names used in the hostfile are correct. It should be the same as the output from the command `hostname` on the respective host.
4. The working and installation directories on the host file are correct. Log onto the remote host, change directory to these directories to verify the host file content. The installation directory given should, among others, contain the executable in the bin directory.
5. The input files for each host are available in the respective working directory. An error message is printed out from MSC.Marc if they are not.

Error messages:

6. The error message "`semget failed...`" at job start-up means that the communication environment is not clean. This can be checked with the Unix command `ipcs`. If entries belonging to specific users except `root` show up, they may need to be removed. Run the script `tools/mpiclean` located in the MSC.Marc installation directory.

Note: This will kill all parallel jobs currently running under the current user. Only entries belonging to the current user are deleted.

Other:

1. On some machines, sometimes there are files called `p4_shared_arena_xxxx`, with `xxxx` being some number, left in `/var/tmp`. These can eventually fill up that disk and should be removed.

MSC.Marc and MSC.Marc Mentat for Microsoft Windows Installation and Operations Guide

Preface

This document describes the installation and usage of the MSC.Marc and MSC.Marc Mentat programs on Microsoft Windows platforms configured as shown in Table 8. The instructions given here require a basic knowledge of the machine on which you are loading the MSC.Marc products, no attempt is made to teach the use of Microsoft Windows commands.

This document contains a quick installation section intended for experienced MSC.Marc users, a section containing details about the installation procedure, a section concerning the usage of the MSC.Marc and MSC.Marc Mentat programs and a section about making permanent changes to MSC.Marc.

Appendices include hints about troubleshooting.

If you encounter a problem during the installation, please contact the customer support staff at the nearest MSC.Software office.

Table 8 Requirements of MSC.Marc & MSC.Marc Mentat Running on Windows 2000

Operating System	Microsoft Windows 2000 Service Pack 1 or higher, which includes Windows XP
CPU	Intel Pentium II or higher CPU
Graphics Card	SVGA or better running in at least 16 bit (64k) color mode
Hard Drive	Minimum: 120 MB MSC.Marc 480 MB MSC.Marc Mentat
CD-ROM Drive	Required
Ethernet Card	An ethernet card is required. Also, Microsoft TCP/IP Service must be installed.
Mouse	Three button mouse is recommended
Memory	Minimum 256 MB Recommended 512 MB
FORTRAN Compiler	Compaq Fortran Version 6.6B or Intel Fortran Version 8.0

Chapter 1: Read me first: Installation Prerequisites

Before running setup	Decide where you want the version to be installed before running the *Setup* program on the CD-ROM. When running *Setup*, you will be prompted to supply a directory pathname to install the MSC.Software products. In the remainder of this document, the directory that you specify will be referred to as *parent*. The directories `marc2005r3`, and `mentat2005r3`, will be created in the directory that you specify. You must have the TCP/IP networking facility installed on Microsoft Windows. To check the TCP/IP network installation: 1. Open the Control Panel. 2. Select the Network icon. 3. Right click on the local area connection that is active and select properties. 4. Check to see that the TCP/IP protocol is installed. MSC.Marc also requires an ethernet card, even if the workstation is not connected to a network. MSC.Marc uses the ethernet card to create a system ID for FLEXlm licensing.
Password protection	The MSC.Marc version you have received is protected against illegal usage by means of Macrovision's FLEXlm licensing software. You *cannot* run the program directly after you have installed from the CD-ROM until you obtain these passwords. Passwords will be supplied to you from the nearest MSC.Software Corporation office after you have performed the first two steps of the installation procedure. These steps are as follows: – Run the setup program, and generate a machine specific identifier for the purpose of creating passwords. – Send the machine specific identifier to the nearest MSC.Software office. – Upon return of the password file, place this file in the `MSC.Software\MSC.Licensing\9.2` directory. – Passwords normally need to be entered only once.
Should I be "administrator"?	Normally, there is no need to be logged in as *administrator*. However, you will need administrator privileges since the system registry will be updated. Also, check that you have read and write permissions to the installation directory.

FORTRAN compiler	We strongly advise you to have a FORTRAN compiler on your system if you are installing the MSC.Marc product. During installation you will be asked which compiler version you currently have installed. **Note:** After you install the FORTRAN compiler, make sure that all users have their "path" and "lib" environment variable include the path to the FORTRAN compiler. Otherwise, using user subroutines will not work properly. See Appendix C: Troubleshooting for important information regarding requirements for the Intel Fortran compiler.
Computer Name	Your machine *must* have a computername (hostname). If no computer-name is known, supply one by using the **Control Panel\Network** applet to set the "Computer Name". You should also make sure the "Host Name" specified in the DNS tab of **Network\Protocols\TCP/IP Protocol** is the same as the "Computer Name".
Previous Versions	If you have previous versions of MSC.Marc and/or MSC.Marc Mentat installed, you may want to adjust your PATH environment variable to remove the reference to the previous version.

Chapter 2: Quick Installation Procedure

Step 1: **obtain your FLEXlm hostid**	From the MS-DOS command prompt type d:\setup, or from the Start->Run... menu open **d:\setup**. Select the MSC.Licensing server software option: ☐ **MSC.Marc 2005r3** ☒ **MSC.Licensing**	Start the Setup program. Substitute the drive letter for your CD-ROM drive. Obtain your FLEXlm hostid by selecting the *MSC.Licensing* product. During installation, it will display your FLEXlm hostid and ask if you want to install the server. You should elect to install the server only after you receive your license file since it will request the location of the license file when installing.

Step 2:
send to MSC.Software Corporation and enter the passwords
	`cd \msc.software`
	`mkdir msc.licensing\9.2`
	`cd msc.licensing\9.2`
	`notepad license.dat`
		Send the hostid information to your nearest MSC.Software office to obtain your passwords.
		The passwords you receive from the MSC.Software salesperson should be entered by means of creating a file named `license.dat` in the `C:\MSC.Software\MSC.Licensing\9.2` directory.
		You may, however, save it anywhere you like.

Step 3: **install the licensing product**	Install the MSC.Licensing product: ☐ **MSC.Marc 2005r3** ☒ **MSC.Licensing**	Install the *MSC.Licensing* system next. The MSC.Marc 2005r3 release requires the use of FLEXlm version 9.2. The licensing server software will by default be installed in `C:\MSC.Software\MSC.Licensing\9.2` Upon completion of installing the server it will ask you to select your license file.
Step 4: **install the MSC.Marc product**	Select the MSC.Marc 2005r3 product from the initial installation screen: ☒ **MSC.Marc 2005r3** ☐ **MSC.Licensing**	Select the *MSC.Marc 2005r3* product to install. After the ***Welcome*** banner, the ***Software License Agreement*** screen appears. Please read it carefully. Press the **Next** button to proceed.

set location	Choose Destination Location: *Destination Folder*: **C:\MSC.Software\MSC.Marc\2005r3** *rrr*	The next screen will prompt you to set the location where you want the products installed. This path is the "parent" directory. It defaults to **C:\MSC.Software\MSC.Marc\2005r3**. The directories `marc2005r3` and `mentat2005r3` will be created in the directory that you specify.
setup type	You will then be presented with which product options to install. ☐ **Complete** ☐ **Solver** ☐ **Modeler**	Select the Complete option to install both MSC.Marc and MSC.Marc Mentat. Select the Solver option to only install MSC.Marc, or select the Modeler option to only install MSC.Marc Mentat.
program folder	Select Program Folder: *Program Folder*: **MSC.Software**	Select the folder that you wish to place the shortcut to the MSC.Marc Mentat startup script. The default program folder name is **MSC.Software**.
specify compiler version	☐ **MSC.Marc Solver Intel Fortran 8.0** ☐ **MSC.Marc Solver Digital Fortran 6.6B** ☐ **MSC.Marc Solver 64-bit Intel Fortran 8.1**	Select the compiler version that you wish to use. If you are a first time user, select the Intel Fortran version. The 64-bit option will only be displayed on the Microsoft Windows Server 2003 64-bit and Microsoft Windows XP 64-bit operating systems.
specify license file	License: C:\MSC.Software\MSC.Licensing\9.2\license.dat	When you perform the *MSC.Marc* installation, it will ask for the location of a valid MSC.Marc license file. Specify the location of your license file.
	☐ **I would like to view the README file.**	The last screen is the ***Setup Complete*** screen. It will present you with an option to view the readme.txt file. Click on the **Finish** button to leave Setup. Then click on the X button in the lower left hand corner of the main installation menu window or press the escape button.

Step 5: **start the License Manager**	Start the FLEXlm license manager. You may also want to enable the license manager to run as a service and to start the server at power-up by enabling these options in the Config Services section.	Select Start-> Programs-> MSC.Software-> MSC.License 9.2-> FLEXlm Configuration Utility to configure FLEXlm. Select the *Config Services* tab and verify that the settings are correct; i.e. the "License File" is set correctly. Then start the license manager from the *Start/Stop/Reread* tab by pressing the *Start Server* button.
	For Network Version, skip Step 6.	

Step 6:
checking
	Run MSC.Marc Mentat by either selecting the MSC.Marc Mentat item in the program folder that you chose, or run it from the MS-DOS Command Prompt.
	First check that the variable MSC_LICENSE_FILE is set properly. Use an MS-DOS Command Pompt window and type:
	`set msc_license_file`
	If it is not correct, change it using the System applet in the Control Panel.
	Then run the program using:
	`cd \msc.software\msc.marc`
	`cd 2005r3\mentat2005`
	`bin\mentat`
	
	Run a Demo problem by selecting the menu buttons:
	HELP
	RUN A DEMO PROBLEM
	COUPLED CONTACT
		Check the installation by running MSC.Marc Mentat. You have three methods you can use to run MSC.Marc Mentat. You may use either the MSC.Marc Mentat icon which is created on the desktop, the link in the MSC.Software\MSC.Marc program group, or run it from an MS-DOS Command Prompt window.
		You must first check that the environment variable MSC_LICENSE_FILE is set properly to the full pathname of your valid license file. If it is not, the product will fail due to licensing.
		To run from the command prompt, `cd` to the \parent*mentat2005r3* directory, and enter the command *bin\mentat* to start MSC.Marc Mentat.
		Check the MSC.Marc Mentat program by running one of the standard MSC.Marc demonstration examples as proof of a successful installation. From the HELP menu, select RUN A DEMO PROBLEM, and then select the COUPLED CONTACT demo. It will run for 50 increments.

	To check that user subroutines are working by running one of the standard user subroutine demo problems:
	`cd \msc.software\msc.marc`
	`cd 2005r3\marc2005r3\demo`
	`run_marc -j e2x4 -u u2x4`
		If you have a FORTRAN compiler, run a user subroutine example using:
		`run_marc -j e2x4 -user u2x4`
		MSC.Marc should give a **MSC.Marc Exit number 3004.**

Step 7: **for Network Version only**		If you will be using the MSC.Marc Parallel Network feature, you will need to setup NT-MPICH. This service is optionally installed on the system when you installed *MSC.Marc*, however you will need to install it on the remote machines. Follow the MSC.Marc Parallel Network for Microsoft Windows Installation and Operations Guide (Parts 1 and 2) for important information on installing and running jobs with the network version.

Chapter 3: Installation Procedure Information

Step 1: **obtain your FLEXlm hostid**	From the CD-ROM, run the *Setup* program and select the *MSC.Licensing* product to obtain your FLEXlm hostid. When you are asked if you want to proceed with Server Installation you should select **No** at this time. The system identifier may also be found after installing the Server Installation by using the Start menu and selecting Programs-> MSC.Software-> MSC.Licensing 9.2-> FLEXlm Configuration Utility. It is listed in the *Ethernet Address* item under the *System Settings* tab. The system identifier may also be found by running: *lmutil -lmhostid* in the directory `c:\msc.software\msc.licensing\9.2 .`
Step 2: **send to MSC.Software Corporation and enter your passwords**	Send the FLEXlm identifier to your nearest MSC.Software office. After receiving the passwords, enter them by means of creating the file *license.dat* in the subdirectory `c:\msc.software\msc.licensing\9.2.` The password will consist of at least 3 lines: “SERVER” line which specifies the system hostname “DAEMON” line which specifies the vendor specific daemon name and path. The path for the MSC daemon must be changed to the location of where you installed the licensing software. “FEATURE” line(s) which specifies the product and options. This line contains the password and the expiration dates. The **mentat** and the **run_marc** batch scripts use the global environment variable MSC_LICENSE_FILE to locate the `license.dat` file. It typically points to the `msc.software\msc.licensing\9.2\license.dat` file. If the file does not exist, then they will use the environment variable LM_LICENSE_FILE to obtain the full pathname for the license file. You may set the LM_LICENSE_FILE variable to point to another license file if you wish. See Macrovision’s *FLEXlm End Users Guide* for more information on entering your license password.

Step 3: **install licensing software**	Select the MSC.Licensing product from the CD-ROM. Note that installing the licensing software requires administrator privileges. The licensing product will by default be installed in **C:\MSC.Software\MSC.Licensing\9.2**. You should have your password information saved to a license file on your system. When you install the server software, the installation will request that you specify a license file. If you do not already have one, you may create a blank `license.dat` in `C:\MSC.Software\MSC.Licensing\9.2`. The installation will tell you that no valid server line was found. It will then ask if you still want to use it, so select Yes to use the file temporarily. When you receive your passwords from your MSC.Software office, save the password data to this file. See Macrovision's *FLEXlm End Users Guide* for more information on entering your license password. Select the Finish button in Setup. Press the escape key or the **X** in the lower left corner of the Demoshield window to exit. Logoff from your Windows session and log back in again so that the environment settings will take effect. **Note:** The drive letter that is used will be that of your System Drive letter.
Step 4: **install the MSC.Marc products**	You should decide where you want the products to be installed before running the *Setup* program on the CD-ROM. The directory that you specify will be created during the installation process. The MSC.Marc product will by default be installed in **C:\MSC.Software\MSC.Marc\2005r3**. You may rename it if you like. This location is the installation path, and in the remainder of this document, the directory that you specify will be referred to as parent. The directories `marc2005r3` and `mentat2005r3` will be created in the location that you specify.
setup type	Select the product options that you wish to install. The Complete installation will be selected by default, which includes both MSC.Marc and MSC.Marc Mentat.
compiler version	You will be asked which FORTRAN compiler version of MSC.Marc you wish to use. The choice will be one of the following: **MSC.Marc Solver Intel Fortran version 8.0** **MSC.Marc Solver Digital Fortran version 6.6B.** **MSC.Marc Solver 64-bit Intel Fortran 8.1.** This is important for use with user subroutines, since only these FORTRAN compiler versions are supported. New users should select the Intel Fortran version. The 64-bit option will only be displayed on Microsoft Windows Server 2003 64-bit and Microsoft Windows XP 64-bit.

specify license file	You will be prompted to specify the path to your license file. It will default to the current setting of MSC_LICENSE_FILE. If it is not set, then it will attempt to use the license file specified for *FLEXlm License Manager version 9.2*. If you do not already have your license file, you may leave it blank, however you must set the MSC_LICENSE_FILE variable before attempting to run any of the *MSC.Marc* products. **Note:** This is an important step. The installation will set the variable MSC_LICENSE_FILE to the setting that you enter. Failing to set it to a valid license file will result in a licensing failure and you will have to edit the environment variable setting by using the System applet in the Control Panel.
file types	The installation will associate the file types *.mfd*, *.mud*, *t16*, *.t19* and *.proc* to MSC.Marc Mentat if they are not already associated. If they are, as it would be in the case that you have a previous MSC.Marc Mentat installation, you will be asked if you wish to overwrite them. If you answer YES, then they are set to the current version and the PATH environment variable is updated with the current version specified first. If you answer NO, then they are not modified and the PATH environment variable is updated with the current version specified last.
install NT-MPICH	If you do not already have the *Cluster Manager Service* installed, you will be asked if you want to install NT-MPICH. The 64-bit version will require either the *MPICH2 Process Manager* or the *Microsoft Compute Cluster Pack*. You will only need to install this option if you will be running parallel jobs using the MSC.Marc Parallel Network feature. Note that this is a licensed feature. For more information on using this feature, see the section MSC.Marc Parallel Network for Microsoft Windows Installation and Operations Guide.
install Python	If you have selected the Complete or Modeler option, you will be asked if you want to install Python 2.2. Although it is not required, it is recommended that you install Python 2.2 since this will provide you with access to additional MSC.Marc Python modules and documentation.
complete the installation	Select the **F**inish button in Setup. You may want to check the contents against the list supplied in Appendix A of this document. Should any subdirectory be missing, please contact MSC.Software customer support for further details.

Step 5: starting the License Manager	You must start the *FLEXlm License Manager* before attempting to run MSC.Marc or MSC.Marc Mentat. To start the license manager, use the Start menu and select Programs->MSC.Software->MSC.Licensing 9.2->FLEXlm Configuration Utility. Select the *Config Services* tab and verify that the settings are correct; i.e. the "License File" is set to the proper license file. Then start the license manager from the *Start/Stop/Reread* tab by pressing the *Start Server* button. **Note:** If you already had the FLEXlm License Manager 9.2 installed, you should not need to perform these steps. You should specify the options "Use NT Services" and "Start Server at Power-Up" under the *Config Services* tab. This will enable the license manager to start automatically at boot time.

Step 6: checking	Verify that the setting for MSC_LICENSE_FILE is set properly by opening an MS-DOS Command Prompt window and typing:
	`set msc_license_file`
	The value will be displayed and it should be set to a valid license file.
	Correct the setting using the *System* applet in the *Control Panel* and selecting the *Advanced* tab and then the *Environment variables* button. It should be listed under the *System variables* section.
	Run MSC.Marc Mentat by selecting the MSC.Marc Mentat 2005r3 icon on the desktop or by going to the Start menu on the taskbar and selecting the Programs->MSC.Software->MSC.Marc 2005r3->MSC.Marc Mentat 2005r3 menu item. You may also start MSC.Marc Mentat by typing *mentat* in a MS-DOS Command Prompt window.
	To check that MSC.Marc is working properly, run one of the standard MSC.Marc demonstration examples as proof of a successful installation. Open an MS-DOS Command Prompt window and `cd` to the *\parent\marc2005* subdirectory *demo*. Run the e2x1 demo using the command:
	`run_marc -j e2x1`
	If all goes well, one of the final messages on the screen should read **MSC.Marc Exit number 3004**. If you have a FORTRAN compiler, choose a second demonstration example by running a user subroutine example using:
	`run_marc -j e2x4 -user u2x4`
	Again, MSC.Marc should give a **MSC.Marc Exit number 3004**.
	Note: Should any of these examples not run, please use the checklist in Appendix A to verify whether the installation was executed correctly. Refer to Chapter 4 of this document for the syntax of **run_marc**. Contact MSC.Software customer support if you are still unable to run the examples.

Chapter 4: Running MSC.Marc

This section describes the MSC.Marc usage on Microsoft Windows based machines. The MSC.Marc programs are mainly controlled by a batch script program called **run_marc.bat** which is stored in the *parent* subdirectory `marc2005r3\tools`.

The batch script will submit a job and must be executed in the directory where all relevant input and output files concerning the job are available. To use the batch script, each MSC.Marc job should have a unique name qualifier and all MSC.Marc output files connected to that job will use this same qualifier.

MSC.Marc input files should always be named *`job_name.dat`*, whereby the prefix *job_name* is the name qualifier which you are free to choose. The suffix *.dat* is obligatory.

To actually submit a MSC.Marc job from an MS-DOS Command Prompt window, the following command should be used. The single input line is split over multiple lines for clarity:

run_marc	**`-jid`**	***job_name (required as minimum)***
	`-rid`	*restart_name*
	`-pid`	*post_name*
	`-sid`	*substructure_name*
	`-prog`	*program_name*
	`-user`	*user_subroutine_name*
	`-save`	*save_user_executable*
	`-back`	*alternative for -queue*
	`-vf`	*viewfactor_name*
	`-def`	*defaults_name*
	`-nprocd`	*number_of_processors*
	`-nprods`	*number_of_domains*
	`-dir`	*directory where job i/o takes place*
	`-host`	*host_file*
	`-ci`	*copy input files to remote machines in a network*
	`-cr`	*copy post files back from remote machines in a network*
	`-autorst`	*(see detailed description in Table 9).*
	`-pc`	*computer_name*
	`-sdir`	*scratch file directory.*

Table 9 describes the meaning of these input options and Table 10 gives examples.

Table 9 run_marc Input Options

Keyword	Options	Description
-jid (-j)	job_name	Job and input file name identification. Requires `job_name.dat` for all programs.
-prog (-pr)	progname	Run saved executable `progname.exe` from a previous job.
-user (-u)	user_name	User subroutine `user_name.f` will be used to generate a new executable program called `user_name.exe`.
-save (-sa)	**no** **yes**	Do *not* save the new executable program *`user_name.exe`*. Save the executable program *`user_name.exe`* for a next time.
-rid -(r)	restart_name	For marc or progname: identification of previous job that created RESTART file.
-pid (-p)	post_name	For marc or progname: identification of previous job that created postfile containing temperature data. For plot: identification of job that created post file.
-sid (-si)	substructure	Substructure jobs only: name of the substructuring file *substructure.t31*.
-back (-b)	**yes** **no**	Alternative for -queue: run the program in the background. Run the program in the foreground.
-nprocd (-np)	3,4,etc.	Number of processors to be used for Domain Decomposition.
-nprods (-nps)	2,3,4,etc.	Number of domains for parallel processing using a Single Input file.
-host (-ho)	hostfile	Specify the name of the host file for running over a network (default is execution on one machine only).
-ci	**yes** no	Automatically copy input files to remote machines in a network run.
-cr	**yes** no	Automatically copy post files back from remote machines in a network run.
-vf	vf_filename	Refers to the viewfactor file for a heat transfer radiation analysis.
-def	defaults_file	Used to define an auxiliary input file containing default values.
-autorst	**0** or 1	If 0 when remeshing is required, the analysis program goes into a wait state until meshing is complete. If 1 when remeshing is required, the analysis program stops, the mesher begins, and the analysis program automatically restarts. Using the default procedure (0) uses more memory, but less I/O. Using the restart procedure (1), invokes the RESTART LAST option.
*Default options are shown in **bold**.		

Table 9 run_marc Input Options (continued)

-dir	directory	Directory where the job i/o should take place. Defaults to current directory.
-pc	computer_ name	Remote computer name: defaults to local. Used for DCOM server support.
-sdir	directory_ name	Directory where the scratch files are placed. Defaults to `-dir` job.
*Default options are shown in **bold**.		

Table 10 Examples of Running MSC.Marc Jobs

Examples of running MSC.Marc jobs	Description:
run_marc -jid e2x1	Runs the job *e2x1*, the input file *e2x1.dat* resides in the current working directory.
run_marc -jid e2x14 -user u2x14 -save yes	Runs the job *e2x14*, using the user subroutine *u2x14.f* and the input file *e2x14.dat*. An executable program named *u2x14.dat* will be saved after completion of the job.
run_marc -jid e2x14a -prog u2x14	Runs the job *e2x14a* using the executable produced by job *e2x14*.
run_marc -jid e3x2a	Runs the job *e3x2a*.
run_marc -jid e3x2b -rid e3x2a	Performs a restart job using the results of the previous job *e3x2a*.
run_marc -jid e2x1 -nprocd 2	Runs a two processor job on a single parallel machine.
run_marc -jid e2x1 -nprocd 2 -host hostfile	Runs a two-processor job over a network. The hosts are specified in the file `hostfile` (refer to the MSC.Marc Parallel Network for Microsoft Windows Installation and Operations Guide for runs on a network of machines.

Chapter 5: Running MSC.Marc Mentat

This section describes the MSC.Marc Mentat usage on Microsoft Windows machines. The MSC.Marc Mentat program is started by a batch script called **mentat.bat** which is stored in the *parent*`\mentat2005r3\bin` directory. It may also be started by using the MSC.Marc Mentat 2005r3 menu item in the START menu in the MSC.Software folder or by selecting the MSC.Marc Mentat 2005r3 icon that the *Setup* program created on your desktop.

You do not need to start the batch script from a specific directory.

The MSC.Marc Mentat program creates the default files in your current working directory; i.e. where you are located at the time of starting the MSC.Marc Mentat program (if run from the command line), or the "Start in" directory specified for the shortcut if started from the MSC.Marc Mentat 2005r3 icon.

The batch script **mentat.bat** contains a number of arguments which are passed on to the MSC.Marc Mentat program. Table 11 gives the meaning of these input options. You are free to alter these commands to suit your preference.

Table 11 MSC.Marc Mentat Input Options

Keyword	Option	Description
-ar	area_ratio	This is similar to `-sz`, except it is a percentage of the default window size.
-bp	`$(DIR)/bin/`	Directory path name where the external MSC.Marc Mentat programs and shell scripts are located.
-compile	binary_menu_filename	This is used to compile ASCII menu files into a Binary menu file.
-db	True/False	Double buffering: a screen refresh is first assembled in a separate memory section and then displayed. This option results in a smooth appearance. The default is *True* or *On*.
-fn	8x15	Default font type.
-gr		This uses the gray scale color map.
-ha	True/False	This option enables the middle mouse button help windows to run the Adobe Acrobat reader using the PDF help files. *True* turns on using the PDF help, *false* turns it off. The default is *True* or *On*.
-help		All of the options.
-hp	`$(DIR)/help/`	Directory path name where the help files are located.
-lf	*filename*	Specify the MSC.Marc Mentat logfile name.
-mf	`main.ms`	The name of the startup menu file.
-ml	`$(DIR)/material/`	Directory path name where the material files are ocated.
-mp	`$(DIR)/menus/`	Directory path name where the menu files are located.

Table 11 MSC.Marc Mentat Input Options (continued)

Keyword	Option	Description
-nh		Not provided by default. For OpenGL and X Window versions of MSC.Marc Mentat. The use of this switch reduces run time memory requirements at the expense of graphic speed.
-ogl		Use the OpenGL graphics interface, if available.
-path	directory_name	Provides a directory in which MSC.Marc Mentat searches when opening an existing input file. Multiple directories can be specified as follows: *-path directory_1 -path directory_2* etc.
-pr	*filename*	Any additional set-up commands you wish to add. Store these in a procedure file containing the MSC.Marc Mentat commands.
-ra		This reads all of the ASCII Menu files.
-rf	*filename*	Record the MSC.Marc Mentat commands in the procedure file *filename*.
-ss	True/False	Graphic refresh to use snapshots. The default is *True*.
-sz	width height	Change the size (width and height in pixels) of the window.
-ti	title	Append *title* to the name of the window.
-xr	horizontal_ratio	This is similar to `-sz`, except it is a percentage of the default window size in the horizontal direction.
-yr	vertical_ratio	This is similar to `-sz`, except it is a percentage of the default window size in the vertical direction.

Chapter 6: Making Changes to the MSC.Marc Programs

The MSC.Marc Program Sizing

MSC.Marc uses dynamic memory. The initial amount of memory that MSC.Marc will allocate is the amount given by the SIZING parameter in the input file (set in MSC.Marc Mentat in the JOB menu as MEMORY ALLOCATION). MSC.Marc will then automatically allocate more memory as needed. There is a possibility to limit the amount of memory being allocated. This can, for instance, be used to avoid that a machine with limited memory is using paging space for a run. The *include* file in the tools directory of the MSC.Marc installation directory contains a variable MAXSIZE. MSC.Marc will not allocate more memory than specified by MAXSIZE (which is defined in number of million 4 byte words). The default is set to 500 (corresponding to 2 GB) for 32 bit machines. These are also the practical memory limits in this release. If the analysis requires more memory than specified by MAXSIZE, MSC.Marc will select at least one of the out-of-core options, either ELSTO or out-of-core solver. For a parallel job, these memory limits are for each domain of the job.

You may choose to modify the MAXSIZE variable permanently. This can be done by editing the *include.bat* file.

Chapter 7: MSC.Marc Mentat Interfaces

MSC.Marc Mentat External Programs

MSC.Marc Mentat supports a number of CAD interfaces: IGES, MSC.Patran, Ideas, VDA. These interfaces are programmed in external programs which are called from within MSC.Marc Mentat. The interface programs are stored in the *parent* subdirectory `mentat2005r3\bin`. These programs read the data files in their native format and translate the contents into a MSC.Marc Mentat model file. This file is subsequently read by MSC.Marc Mentat. The external programs are called from within MSC.Marc Mentat by means of the FILE submenu.

Jobs

The subdirectory `bin` contains batch script files to start a MSC.Marc job using the following batch scripts:

submit1.bat, submit2.bat, submit3.bat

These batch scripts are called by means of the buttons in the *job* menu. You may alter these files to suit your environment.

Plotter Interface

Because of the many variations in plotting environments, we have created plotting interfaces in the form of batch scripts that operate from within MSC.Marc Mentat. Currently, MSC.Marc Mentat recognizes the following plotting formats:

- PostScript
- WinDump (translated into Windows bitmap (.BMP) format)

This section describes a template batch script for each of the formats mentioned above. They are located in the mentat2005\bin directory and are named as follows:

pscolor1.bat, pscolor2.bat, pscolor3.bat
psgray1.bat, psgray2.bat, psgray3.bat
xdump1.bat, xdump2.bat, xdump3.bat

PostScript

The PostScript function is activated by pressing the Gray or Color Print button from the UTILS menu on the POSTSCRIPT panel. The program captures the graphics portion of the screen into a file and sends this file to a PostScript printer using the psgray or pscolor batch scripts located in the mentat2005\bin directory. In the example listed below, the file is sent to the printer LPT1. This can be a printer attached locally, or located somewhere on the network. After the file is sent, it is removed from disk automatically.

```
print /D:LPT1: %1
del %1
```

The argument `%1` is the filename handed to the batch script by MSC.Marc Mentat. If there is more than one printer on-line, the **pscolor2.bat** and **pcolor3.bat** batch scripts may be used to address these other printers.

You can use the `setup_printer` program to configure a network printer. Run `setup_printer` for more details.

Edit

The **edit_window.bat** batch script is used to control the editor associated with the EDIT commands. It is possible to change the type of editor, for example, from notepad to emacs.

System Shell

The **system_window.bat** batch script is used to control the type of window opened with the `system_shell` command.

Chapter 8: Managing FLEXlm

FLEXlm License File

FLEXlm is the network based licensing product from Macrovision used in MSC products.

The license file, license.dat, should be placed in the c:\msc.software\msc.licensing\9.2 directory once you receive your licenses from your nearest MSC.Software office. Everyone should have read permission to the file. The license file has the following format:

Line	Description
SERVER	This line specifies the license server. It has the format: SERVER hostname hostid port
DAEMON	This line specifies the name of the vendor daemon (marcd), and the path. It has the format: DAEMON MSC c:\msc.software.msc.licensing\9.2*MSC*
FEATURE	This line lists the feature, or license names. This line cannot be modified from what is sent to you. For your MSC.Marc license, it has the format: FEATURE MARC MSC 2010.1231 (for single processor version) FEATURE MARC_Parallel MSC 2010.1231 (for parallel version) For your MSC.Marc Mentat license, it has the format: FEATURE MENTAT MSC 2010.1231 Each single-processor job is required to have a license name MARC for execution to proceed. To run a multiprocessor job, a corresponding number of multiple licenses with the feature name MARC_Parallel plus a license name MARC is required. For example, to run a job using four processors in parallel, one MARC license and four MARC_Parallel licenses are needed.
USE_SERVER	When used together with the SERVER line, this line is used on the licensed "client system" (as opposed to the license server), to specify that it should obtain a license from the specified license server. It has no options.
CAMPUS	This line specifies that a pool of license tokens are used. When the MasterKey licensing system is used, the FEATURE line will have a specification for VENDOR_STRING containing GROUP:CAMPUS and BLV:nn, where nn is the number of tokens that is required in order to obtain a license. All MSC.Software products may obtain a license from a MasterKey license provided that a corresponding FEATURE line exists.

FLEXlm License Manager

When you install MSC.Marc or MSC.Marc Mentat, the FLEXlm License Manager is installed in the *msc.licensing\9.2* directory. Once **lmgrd.exe** is running, it will read the license file license.dat which is located in the *msc.licensing\9.2* directory. The license file contains the MSC.Marc and MSC.Marc

Mentat license (and other MSC.Software product licenses, if necessary). In addition, **lmgrd.exe** will also start the MSC.Software vendor daemon **MSC.exe**. The path to **MSC.exe** is specified in the license file on the DAEMON line. These processes must be running on the license server for the MSC.Software security system to obtain a license. The only exception to this is for a "zero count" license. If the number of licenses for a feature (the number following the expiration date) is 0, then neither **lmgrd.exe** or **MSC.exe** are used. The license manager is only used to keep track of licenses that are checked in/out.

MSC.Marc contacts these daemons at regular intervals. If no contact is made after a specified time period, MSC.Marc terminates execution.

For the 2005 version, the FLEXlm License Manager must be at version 9.2 or higher.

When you select the MSC.Licensing product, they will be upgraded to version 9.2. You should stop the FLEXlm License Manager before installing the product so that the programs can be updated (this is done automatically on Microsoft Windows). If your license server is a remote machine, then you need to update the FLEXlm programs on the server before attempting to run the product. If you do not have a CD-ROM for that platform, the programs may be downloaded from:

```
ftp://ftp.mscsoftware.com/pub/msc-products/system_util/flexlm/v9.2
```

There is a *readme* file which will tell you which zip file to download, and an *install* file which will provide instructions for installing the programs.

Environment Variables

The environment variable **MSC_LICENSE_FILE** is used to specify the *license.dat* file. This environment variable can be set using the System applet in the Control Panel, and is a semicolon separated list of file pathnames or hosts. The default setting will be `c:\msc.software\msc.licensing\9.2\`*license.dat*. When MSC.Marc executes, it checks the list of license files specified by this environment variable. You may have it point to a license server using the syntax port@host, as follows:

Variable: MSC_LICENSE_FILE
Value: 10620@myserver

If you have other products that use FLEXlm and they are required to be available when MSC.Marc is running (such as a FORTRAN compiler license), then you should modify the `MSC_LICENSE_FILE` setting to point to the proper license file for that product.
You may instead want to combine the licenses into one file.

Security Directory

The security directory must be writable by all MSC.Marc users since **lmgrd.exe** will write the logfile (*flexlm.log)* to that directory. If you do not wish to have the security directory writable by others, then you must update this location by starting the FLEXlm applet located in the Start menu. You may also want to monitor the size of the logfile, since all FLEXlm activity is recorded.

Note: The *flexlm.log* file contains important status information regarding the license manager daemon. Always check this file when you get a security error.

If you move the security directory to a different location, or more specifically if you move your `license.dat` file, then you ***must*** modify the `MSC_LICENSE_FILE` environment variable to specify the new path.

Combining the MSC.Marc License with Other MSC Products

You can combine the MSC.Marc license with other MSC product licenses. To do this, add the MSC.Marc license to the license file for MSC.Nastran, MSC.Patran, or other MSC products. Then make sure that the `MSC_LICENSE_FILE` environment variable is set to the new location.

Client/Server Licensing

The default installation assumes that the system in which MSC.Marc is installed will function as the *license server.* The term *license server* only refers to the fact that *lmgrd* and *MSC* will be running on that system, and will maintain the state of available licenses. Even if you have purchased a nodelocked license, the nodelocked system will function as the license server for that license. A nodelocked license can be distinguished from a floating license by the string HOSTID=xxx specified in the feature line.

If you have purchased a floating license, the system that is to be the license server must be determined before generating the system identification file (*sid001.dat*). You ***must*** generate the system identification file from the license server, since the lmhostid value of the server is needed to generate your passwords.The license file that is returned to you should be placed in the security directory. The client systems can use the same license file, or they can use a brief license file with just the SERVER and USE_SERVER lines.

MasterKey Licensing

The MasterKey licensing option allows you to use a pool of licenses for all of the MSC.Software products. A MasterKey license is issued with a pool of “tokens”. Each MSC.Software product will attempt to retrieve a specified number of these tokens in order to be granted a license. If not enough tokens are available, then it will be queued. Programs that are queued will be granted a license in the order which they request a license. For example, if there are 100 tokens and a request is made for 60 tokens, that program will be granted a license. If another program makes a request for 60 tokens, it will be placed in the license queue. If yet another program makes a request for 40 tokens, it will be queued behind the requested 60 tokens. When the program that was using the 60 tokens exits and releases its tokens, the queued request for 60 tokens will then be granted a license. Then the queued request for 40 tokens will be granted a license.

The amount of minutes a program will wait for a license after it has been queued may be specified with the environment variable `MSC_AUTHQUE`. The default value is 5 minutes. It may be set as follows in a command prompt:

```
set MSC_AUTHQUE=20
```

Chapter 9: Configuring the MSC.Marc DCOM Server

Specifying the Logon User

The MSC.Marc DCOM Server allows you to run jobs on a remote Microsoft Windows machine without actually being logged into it. Unlike MSC.Marc Parallel, it will only run a single CPU job.

When you install MSC.Marc, the installation will initially setup the MSC.Marc DCOM Server. The server must be setup on both the client and the server machine. The user must specify a login user for the MSC.Marc DCOM Server using `Dcomcnfg` before attempting to run a job remotely.

To run `Dcomcnfg`, open up a console window and type `dcomcnfg` at the prompt, or select the Start->Run... menu and enter `dcomcnfg` and press OK. It will appear as shown in Figure 2.

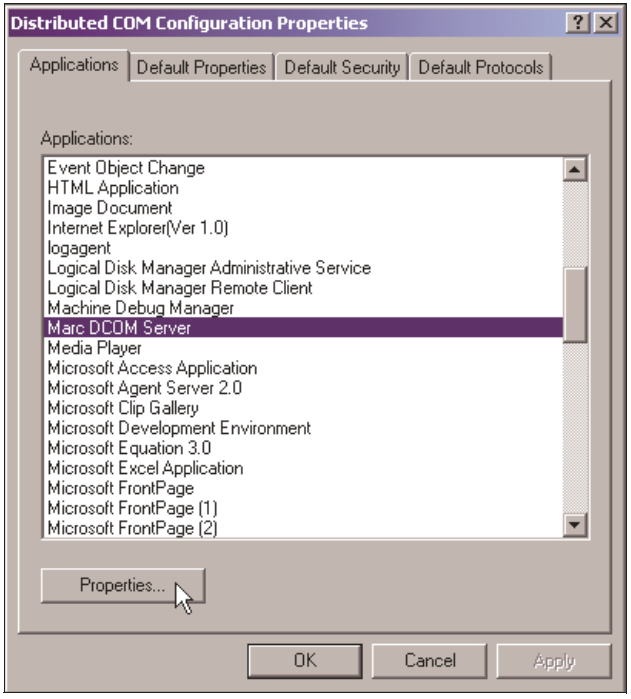


Figure 2 Dcomcnfg Displaying MSC.Marc DCOM Server

On Windows XP, a different interface appears. Select the *Component Services/Computers/My Computer/DCOM Config* option, and scroll down to the Marc DCOM Server item. Right click it and select *Properties*.

Select the *Properties* button for the MSC.Marc DCOM Server. A new window will appear showing the various properties. This is shown in Figure 3.

The only property that needs adjusting is the *Identity* property. Select the Identity tab. `Dcomcnfg` will then display the identity view as shown in Figure 4.

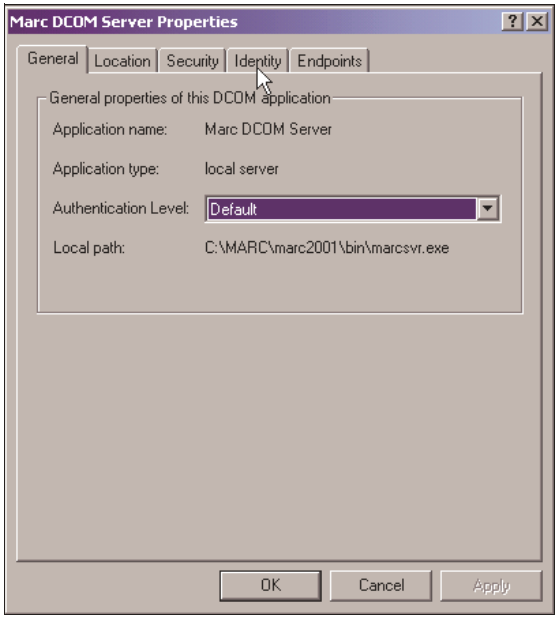


Figure 3 Dcomcnfg Displaying the Properties of the MSC.Marc DCOM Server

In the Identity view, select *This user*, and specify a user that has access rights to this machine. Select *Apply*, and then *OK* to close the window. Then select *OK* in the main view.

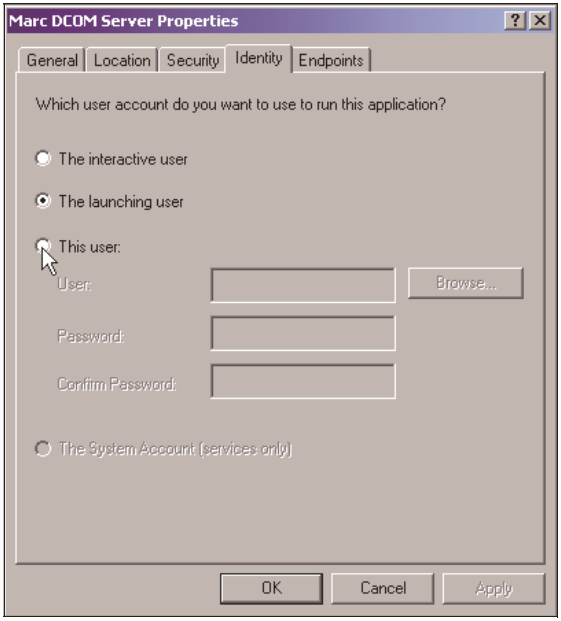


Figure 4 Dcomcnfg Displaying the Identity Properties of the MSC.Marc DCOM Server

The data files must be located in a shared directory. This is required so that the two machines can access the files. If the file is not located in a shared directory, MSC.Marc will issue an error message specifying that the file is not located in a shared directory. To share a disk or a directory, select *My Computer* from the desktop and select the disk or browse to the directory. Then select the disk or the directory by using the right mouse button, and select *Sharing*. In the Sharing view, select the Share this folder button and enter a name for the share.

Testing the installation

You should first test the MSC.Marc DCOM Server on the server machine, and then test it on a client machine. First, copy a MSC.Marc data file to a shared directory. The file must be in a shared directory even if the job is to be run locally using the MSC.Marc DCOM Server. The data file parent\marc2005r3\demo\e2x1.dat will suffice. Run the job from any command prompt window using the *-pc* option:

```
<parent>\marc2005r3\tools\run_marc -pc <servername> -j e2x1
```

If it succeeds, then perform the same test on a client machine. If a failure occurs, see the section on the following page on *Troubleshooting*. Again, make sure the data file resides in a shared directory. When running the job, you may also use the UNC name in the path. If it is not specified, MSC.Marc will determine the UNC path and send it to the server.

MSC.Marc Mentat Support

Running the job remotely may also be done within MSC.Marc Mentat. In the JOBS->RUN->ADVANCED JOB SUBMISSION menu, there is a button named DCOM as show in Figure 5. Select the DCOM button and in the adjacent text area specify the name of the remote machine. Note that when you submit the job, you will NOT be able to do a `monitor_job` (MONITOR in the JOBS->RUN menu) because the standard output from MSC.Marc is not redirected to the log file. However, you will be able to do a `post_monitor` (MONITOR in the RESULTS menu).

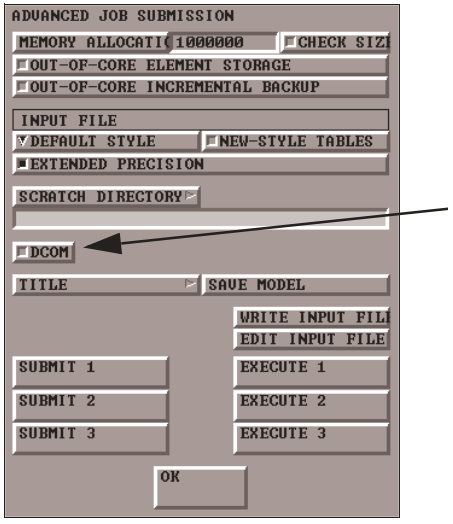


Figure 5 JOB RUN Menu Displaying the DCOM Button

Troubleshooting

In the case of an error, try some of the following suggestions:

- Check that your user ID is valid on both the server and the client machines.
- Check that the user ID has read and write access to the directory where the job is to be run.
- Check that the directory that the data file resides in is a shared directory. Note that for Windows 2003 Server, you must also specify the user permissions using the /GRANT option for the *net share* command or by clicking the Permissions button under the Sharing tab in Explorer.
- Run the *run_marc* script using the *-it* option to print out debugging information. This will print out exactly what is being sent to the server:

  ```
  <parent>\marc2005r3\tools\run_marc -pc <servername> -j e2x1 -it 0
  ```

  The pathnames displayed from the debug output should be displayed as a proper UNC name. If not, verify that the directory is shared.
- Start the MSC.Marc DCOM Server manually and connect to it. To do this, cd to the `marc2005r3\bin` directory and run the program `marcsvr.exe`. You may also supply the *-it* option to obtain what the server has received. Then open up another command prompt window and run the job. In the `marcsvr.exe` window, you should see the log file output from the job.

Appendix A: MSC.Marc Subdirectories

The MSC.Marc version you have received contains a full set of subdirectories listed below. You can save disk space by removing the subsets that you do not need.

Table 12 Contents of the MSC.Marc Distribution CD-ROM

Basic set:	Contents: required as minimum
bin	executable MSC.Marc programs
tools	batch scripts to run and maintain the MSC.Marc programs
..\flexlm	FLEXlm security files
AF_flowmat	material data for database
doc	Installation Guide, Release Guide, and MSC.Marc Volumes A-E installed in this directory if MSC.Marc Mentat is not installed
Extended set:	**Contents: only for use with user subroutines**
lib	binary libraries with the compiled MSC.Marc routines
common	insert files containing MSC.Marc common blocks
user	templates for all available MSC.Marc user subroutines
Examples:	**Contents: example files**
demo	input files and user subroutines for the MSC.Marc Volume E: Demonstration Problems
demo_ddm	input files and user subroutines for the single parallel machine as well as the network parallel version of MSC.Marc
demo_table	input files and user subroutines for MSC.Marc Volume E: Demonstration Problems based upon Table driven input format
benchmark	small set of demonstration examples for performance measurement
test_ddm	one, two, and four processor test examples for installation testing of the single parallel machine as well as the network parallel version
Utilities:	**Contents:**
pldump	source routines for the post-file conversion program pldump
pldump2000	source routines for the post-file conversion program pldump2000

Appendix B: MSC.Marc Mentat Files and Subdirectories

The MSC.Marc Mentat version you have received contains a full set of subdirectories listed below. You can save disk space by removing the subsets that you do not need.

Table 13 Contents of the MSC.Marc Mentat Directory Unloaded from CD-ROM

Basic set:	Contents: required as minimum
bin	batch scripts and programs for MSC.Marc Mentat
help	MSC.Marc Mentat online help files
materials	MSC.Marc Mentat material files
menus	MSC.Marc Mentat menu files
doc	Installation Guide, Release Guide, and MSC.Marc Volumes A-E
Extended set:	**Contents: example MSC.Marc Mentat procedure files**
examples	sample MSC.Marc Mentat procedure files the `examples\training\ctour` directory contains movie files showing the use of MSC.Marc products and training courses

Table 14 Contents of the Security directory unloaded from CD-ROM

Program	Description
lmutil.exe	the Flexlm utility program
lmgrd.exe	FLEXlm license manager
MSC.exe	the vendor daemon used to pass MSC.Marc specific licensing information to lmgrd
See the *FLEXlm End User Manual* for more information	

Appendix C: Troubleshooting

Access is denied

This type of problem is caused by not having write permissions to the file or directories to which you are installing.

To correct this problem, open up an MS-DOS Command Prompt window, `cd` to the directory in which you are installing MSC.Marc, and run the **attrib** program to remove the read-only attributes (with the -R option).

You may also use the File Manager's **Security** menu to change *Ownership* of files and directories, and to change *Permissions* on them.

Error during move process

This problem is caused by having an application or a file open during the installation process that the installation is trying to overwrite. Exit all applications and documents during installation and restart the installation.

Security failed or MSC.Marc exit 67

- The environment settings are not set properly. If you have not already logged out and logged back in again, do so now and try again. Check that the environment variable `MSC_LICENSE_FILE` is set to a valid license file. If you have not installed your passwords yet, then you must do so before security will succeed.
- Check that the FLEXlm license manager has been started from the FLEXlm Configuration Utility applet in the Start menu under MSC.Software-> MSC.Licensing 9.2. This must be done AFTER you have saved your **license.dat** file in the *`msc.software\msc.licensing\9.2`* directory. Test that it is working by pressing the Status button in the Control menu.
- You are attempting to run on a machine that according to the MSC.Marc password(s) you are not allowed to use.
- Your license period has expired. Check the date on your machine.
- Cannot access or read the file **license.dat** in the *`msc.software\msc.licensing\9.2`* subdirectory.
- Every MSC.Marc user should have read and write rights for the *parent* subdirectory *`9.2`*.

License Manager will not start

- If the license manager won't start, check that the hostname on the SERVER line is correct. Also check that the DAEMON line contains the correct path to the license daemon **MSC.exe**.
- If you had an older version of the FLEXlm license manager installed, the new installation may replace it. If the Use NT Services button was previously checked, you should uncheck this button, start the license manager, and then select the Use NT Services button.

Link failed

- Your user subroutine causes compiler errors.
- You have no Fortran compiler or Fortran libraries not available.
- Your PATH or LIB environment variables settings do not point to the proper location for your Fortran compiler.

FORTRAN files are not being compiled

- The FORTRAN compiler is not in your search path, or the INCLUDE and LIB environment variables are not set. You can verify that your settings are correct with the **set** command. If you selected the default installation path, you should run the \Program Files\Microsoft Visual Studio\DF98\bin**dfvars.bat** script (or substitute your installation directory). These items can be set from the System applet located in the Control Panel.
- The Intel Fortran compiler requires that the Microsoft .NET 2003 framework is installed and the LIB environment variable setting includes the required dependency libraries. The setting must include the following:

  C:\Program Files\Microsoft Visual Studio .NET 2003\VC7\LIB
  C:\Program Files\Microsoft Visual Studio .NET 2003\VC7\PlatformSDK\Lib
  C:\Program Files\Intel\Fortran\Compiler80\Ia32\Lib

  The following paths must also be included in the PATH environment variable to locate the required runtime libraries:

  C:\Program Files\Microsoft Visual Studio .NET 2003\VC7\Bin
  C:\Program Files\Microsoft Visual Studio .NET 2003\VC7\Common7\IDE

User subroutines are not being called

- With FORTRAN, the argument list for subroutines must match exactly. If the argument does not match exactly, your subroutine will not replace the existing subroutine in the MSC.Marc Library. The linker will continue to use the subroutine that is defined in the MSC.Marc Library, and since your routine will not be linked in, it will never be called.

MSC.Marc Parallel Network for Microsoft Windows Installation and Operations Guide

Table of Contents

Introduction

The current document is divided into three parts:

Part I	provides the general description about the hardware and software requirements and definitions.
Part II	provides a step-by-step approach to installation of the network version.
Part III	provides miscellaneous information about executing a parallel job over a network and use of user subroutines.

The list of supported capabilities in parallel can be found in Section 7 of the Release Guide.

Part 1 General Information

Hardware and Software Requirements:

The MSC.Marc 2005 network version for Microsoft Windows uses MP-MPICH from University of Aachen, Lehrstuhl für Betriebssysteme.

Although no specific hardware requirements exist for MSC.Marc to run in network mode, it is preferable to have fast network connections between the machines. It is recommended that the network should have a speed of at least 100 MBit per second. If only two machines are to be used, a hub or a cross-over cable can be used to connect them. If more than two machines are to be used, a switch is preferable. TCP/IP is used for communications.

The O/S must be Microsoft Windows 2000, Service Pack 1 or later. It is recommended to have a FORTRAN compiler installed. This version supports Compaq Fortran with Microsoft Visual Studio 6.6B and Intel Fortran 8.0. If installing on Microsoft Windows XP Service Pack 2, check the TroubleShooting section regarding requirements for this O/S version.

Definitions

1. Root machine:

   The machine on which the MSC.Marc job is started.

2. Remote machine:

   Any machine other than the root machine which is part of a distributed MSC.Marc run on the network.

3. Shared installation:

   MSC.Marc is installed in a UNC shared directory on one machine only. Other machines can access the MSC.Marc executable since the directory is shared.

4. Distributed installation:

   MSC.Marc is installed on all machines. Each machine accesses its own MSC.Marc executable.

5. Distributed execution:

   MSC.Marc is run on multiple machines which are connected with a network. Each machine loads the MSC.Marc executable either from a shared or a local directory and then executes the executable.

6. Shared I/O:

   MSC.Marc reads and writes data in a UNC shared directory. Each MSC.Marc executable running on the network reads/writes to the same directory.

7. Distributed I/O:

   MSC.Marc reads and writes data in a directory located on each machine. Transfer of data files and post files between the root machine and remote machines is done automatically by MSC.Marc.

8. UNC – Uniform Naming Convention.

Network Configuration

MSC.Marc only needs to be installed on the root machine where the installation directory is UNC shared (shared installation). MSC.Marc can also be installed on the remote machines which then use their own executable (distributed installation). The root machine is the one on which the MSC.Marc job is started, typically from within MSC.Marc Mentat. The remote machines can be located anywhere as long as they are connected to the network. The working directory on each machine can be a shared directory on any machine on the network (shared I/O) or it can be a local directory on the hard disk of each machine in the analysis (distributed I/O). The User Notes describes how to specify what working directory to use.

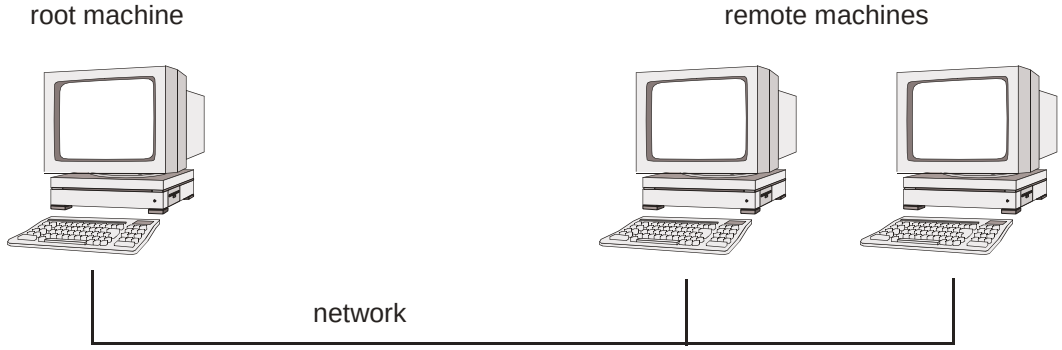


Figure 6 Network Configuration

Part 2 Installation Notes

This part describes the specific steps needed to install and set up a network version of MSC.Marc. For general information on MSC.Marc installation, see MSC.Marc and MSC.Marc Mentat for Microsoft Windows Installation and Operations Guide.

Steps 1–6: Must be performed as Administrator.

Step 1: Install MSC.Marc on the root machine. The installation directory must be shared such that it is available on the remote machines.

Step 2: Install MP-MPICH, which is also on the CD, on both the root machine and the remote machine(s). Note that MSC.Marc only needs to be installed on the root machine but MP-MPICH must be installed on all machines used in an analysis. If both MSC.Marc and MP-MPICH are to be installed, just follow the instructions in Setup.

If only MP-MPICH is installed on a machine, do the following:

- Insert the CD and exit Setup which starts automatically.
- Use My Computer and select the CD icon with the right mouse button and select Open.
- Start the installation of MP-MPICH by double-clicking the file `rcluma-install.bat`.
- Enter a valid login username and password when prompted. Also enter the domain name if that is how you login to the system, or use "local" if you do not login through a domain. Note that the installation program does NOT verify that the password you entered is valid, so make sure that you enter exactly as the login password (either the local machine login or the domain login).

  See Item 1 in the Troubleshooting section if you change your system login password after you perform these steps.

Step 3: Make sure that the installation directory on the remote host is properly shared. Assume that MSC.Marc is installed under `c:\MSC`. Make this directory shared by associating a UNC sharename with it as follows. Use My Computer and locate the directory to be shared. Right click on the directory and choose Sharing, Choose Share As and give it a Share Name (this is the UNC name) and click OK.

Please note that MSC.Marc restricts the UNC name to have a maximum of 10 characters and the name of the shared directory to have a maximum of 30 characters.

If necessary, a directory higher up in the path can be shared (for instance, `c:\` instead of `c:\MSC`). It is sufficient that either `c:\` or `c:\MSC` is shared.

Step 4: Create a MSC.Marc file with the shared naming information. From the Command Prompt, change directory to the `tools` directory in the MSC.Marc installation directory (here assumed to be `C:\MSC`).

```
c:
cd \MSC\marc2005r3\tools
net share > marc.net
```

This file has to be recreated each time the shared name of the installation directory is changed. The file `marc.net` contains the connection between the path names on the root machine and the UNC names, and can be created only by the Administrator. If this file does not exist or contains outdated information, the remote machines will not be able to find the executable on the root machine.

Step 5: Test the MSC.Marc installation for single processor execution by typing from the root machine:

```
c:
cd \MSC\marc2005r3\test_ddm\exmpl2\exmpl2_1
run_marc -j cyl2
```

and MSC.Marc should exit in about three minutes if it is a successful run.

Step 6: Test the MSC.Marc installation for multi-processor, distributed execution. Assume the host name of the root machine is host1 and one of the remote machine is host2. Type from host1:

```
c:
cd \MSC\marc2005r3\test_ddm\exmpl2\exmpl2_2
```

and edit the file `hostfile` in this directory by replacing workdir with

```
c:\MSC\marc2005r3\test_ddm\exmpl2\exmpl2_2
```

The host names and directory names should be replaced with the names on the current system. Finally, type:

```
run_marc -j cyl2 -nproc 2 -host hostfile
```

and MSC.Marc should exit in about two minutes if it is a successful parallel run on host1 and host2 using one processor on each. If the job stalls or hangs at start-up time, exit it by typing `control-C` in the window in which is was started. See Part 3 User Notes in this section.

Part 3 User Notes

This section assumes that the network version of MSC.Marc, including MP-MPICH, has been successfully installed on two machines that are to be used in a distributed analysis and that the appropriate MSC.Marc licenses are in order. Assume that host1 is the host name of the machine on which MSC.Marc Mentat is running and from which the job is to be started (the root machine). The host name of the other machine (the remote machine) is host2.

How to run a network job

First make sure that the two machines are properly connected. From host1, access host2 with Network Neighborhood. If this is not possible, a network run will not be possible.
See Part 3 User Notes in this case.

In order to perform an analysis over a network, a special file called a *host file* needs to be created by the user. This file defines which machines are to be used, how many processes are to run on each, what working directory should be used, and where the MSC.Marc executable can be found on each machine. The host file can be selected and edited in MSC.Marc Mentat and the MSC.Marc job started as usual from within MSC.Marc Mentat (see the example below). If MSC.Marc is run from the command line, it is done as for a normal run using an additional command line option. For example:

```
run_marc -b no -jid test -nproc 2 -host hostfile1
```

will run the two-processor job `test.dat` using the specification in the file `hostfile1`. No specific name or extension is used for the host file except that the name *jobid.host* (in this example `test.host`) must be avoided since it is used internally by MSC.Marc.

Specification of the host file

The host file has the following general format:

```
host1 n1
host2 n2 workdir2
host3 n3 workdir3
```

Each line must start at column 1 (no initial blanks). Blank lines and lines beginning with a # (number symbol) are ignored.

The first entry is the host name of a machine to be used in the analysis. The root machine must be listed first and each machine must only occur once.

The second entry specifies the number of processes to run on the machine specified in the first entry. The sum of the number of processes given in the host file must equal the number of domains used. In a five-domain job, it is required that `n1+n2+n3=5`.

The third entry specifies the working directory to use on this host. This is where the I/O for this host takes place. The MSC.Marc input files for this machine must be in this directory and the results files for this machine are created in this directory.

The different domains of the MSC.Marc job are associated with the different machines as follows. Suppose a five-domain job `test` is run using a host file defined as

```
host1 2
host2 1 workdir2
host3 2 workdir3
```

with appropriate definitions of the third entry, see below. There will be six MSC.Marc input files associated with this job: `test.dat, 1test.dat, …, 5test.dat`. Domains 1 and 2 will be associated with host1, domain3 with host2 and domains 4 and 5 with host3.

Shared I/O

Suppose a job is to be run on host1 and host2. A shared directory on host1 is to be used for I/O. The UNC sharename for this directory is assumed to be `dir7`. The host file for a two-processor job would simply be

```
host1 1
host2 1 \\host1\dir7
```

To verify the work directory given, enter Network Neighborhood from `host2` and click through `host1->dir7`. The directory seen should be the same one as the working directory on host1.

It is also possible to use only two entries for each host in the host file (host name and number of processes). This requires that the working directory is shared and that the sharing information is up to date in the file `tools\marc.net` in the MSC.Marc installation directory.

Distributed I/O

If the user wants to have the I/O to be local on host2, specify the host file as

```
host1 1
host2 1 D:\users\dir5
```

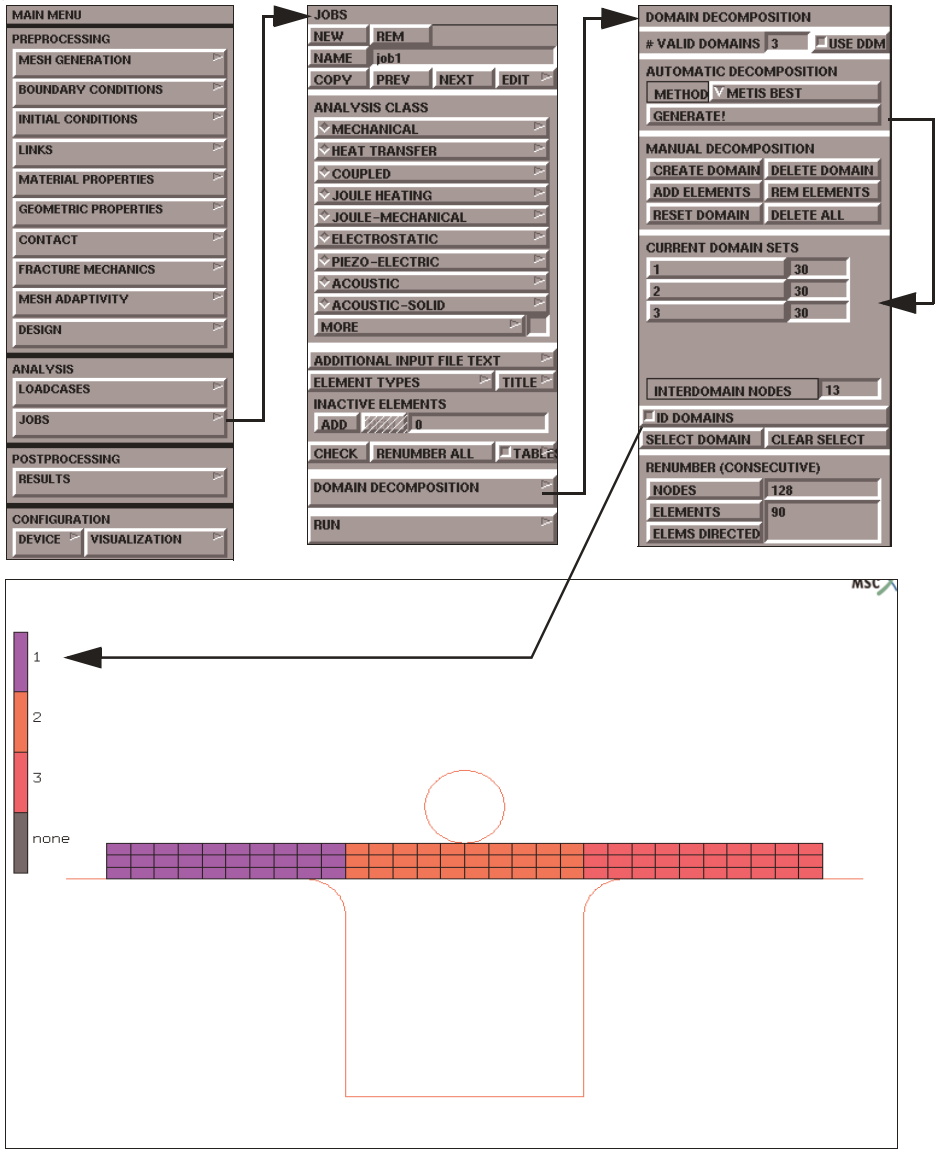
The I/O on host2 will now take place in the directory `D:\users\dir5` on the hard disk of host2. For this case, the MSC.Marc input files are transferred to `D:\users\dir5 on host2` before the job is started, and the results files are transferred back after the analysis for postprocessing. This transfer of files is done by MSC.Marc automatically.

Example

The definitions for a network run with MSC.Marc Mentat is demonstrated with a simple example. We assume the simplest case where both the working directory and installation directories are shared.

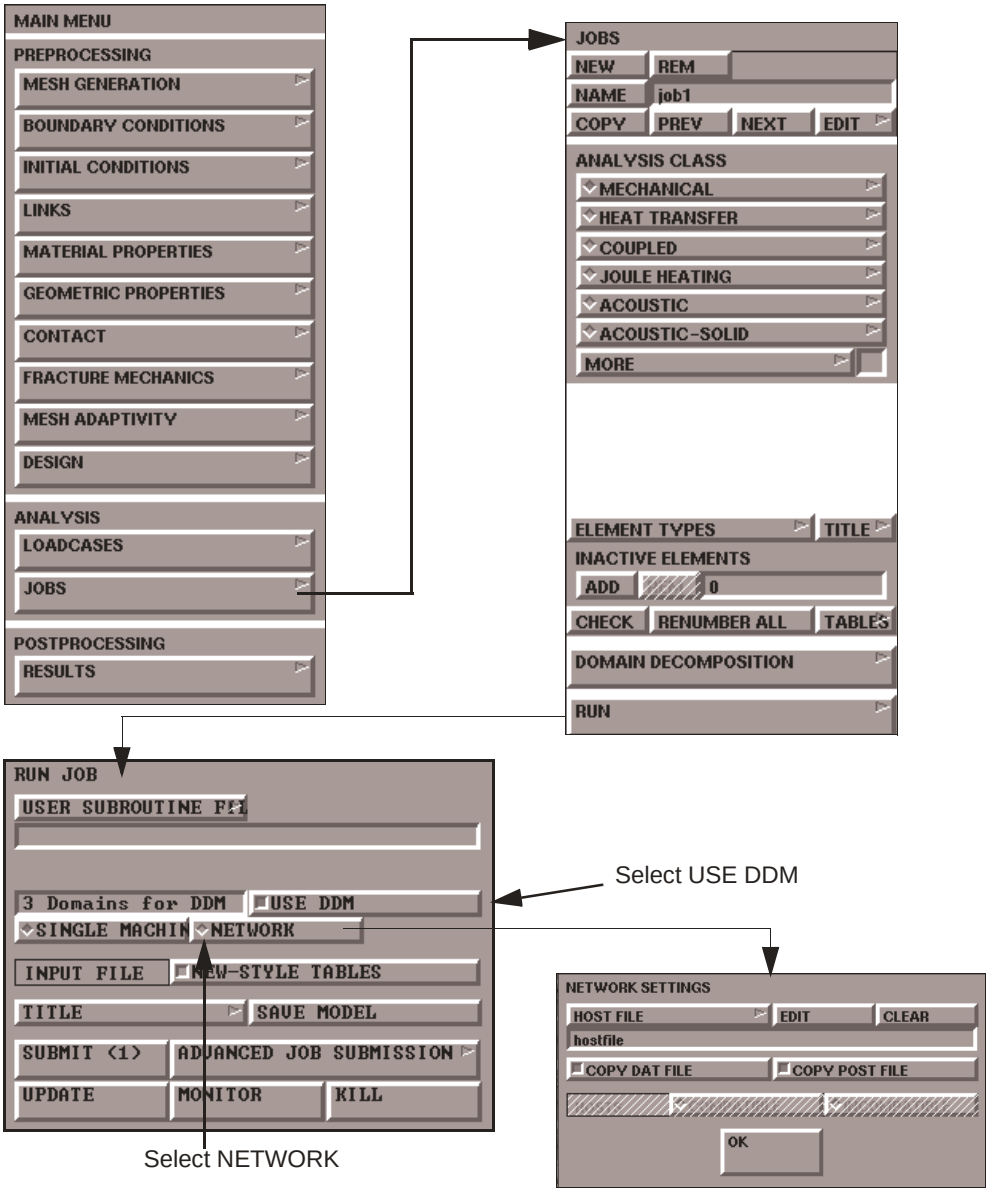
Enter the menu HELP->RUN A DEMO PROBLEM and select the example CONTACT WITH DDM. Select and confirm your three domains as shown below.

Step 1



Activate DDM and enter the NETWORK SETTINGS menu.

Step 2



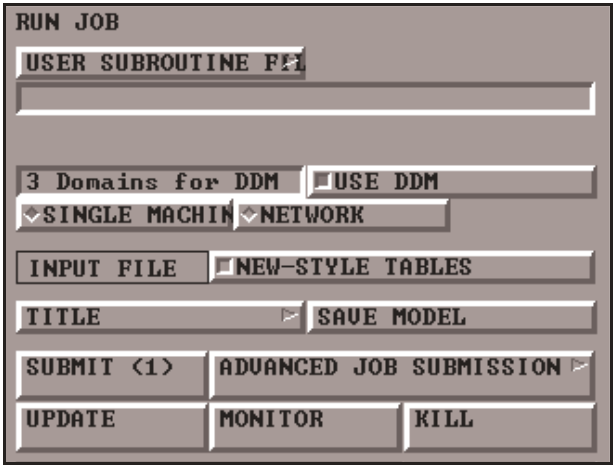
Click on the HOST FILE button and select the file called hostfile and modify it to contain:

```
host1 2
host2 1    \\host1\...
```

Set the working directory according to the share names on the current system. The host file places two domains on host1 and one domain on host2.

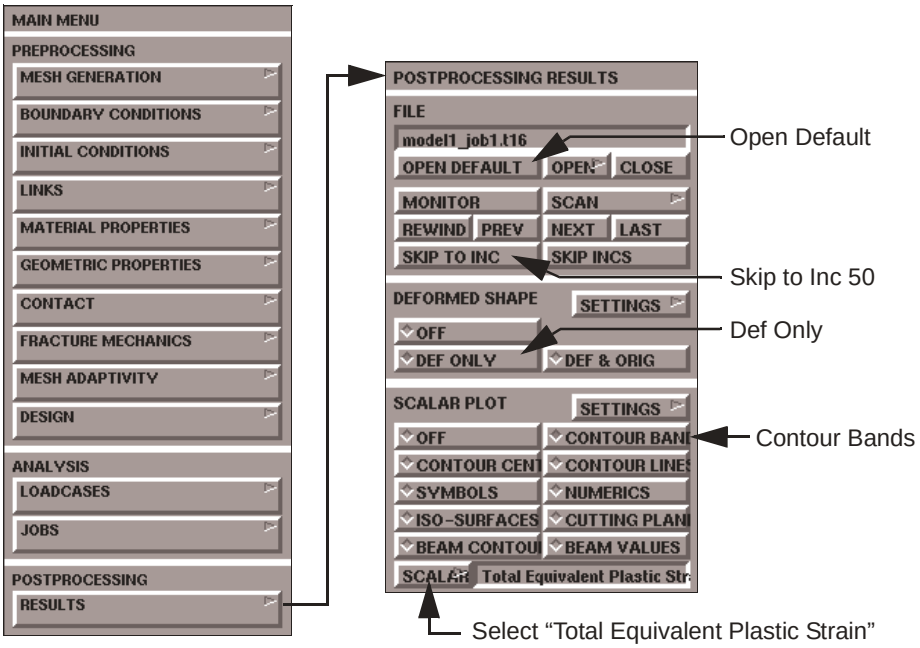
Run MSC.Marc from within MSC.Marc Mentat using the SUBMIT 1 button.

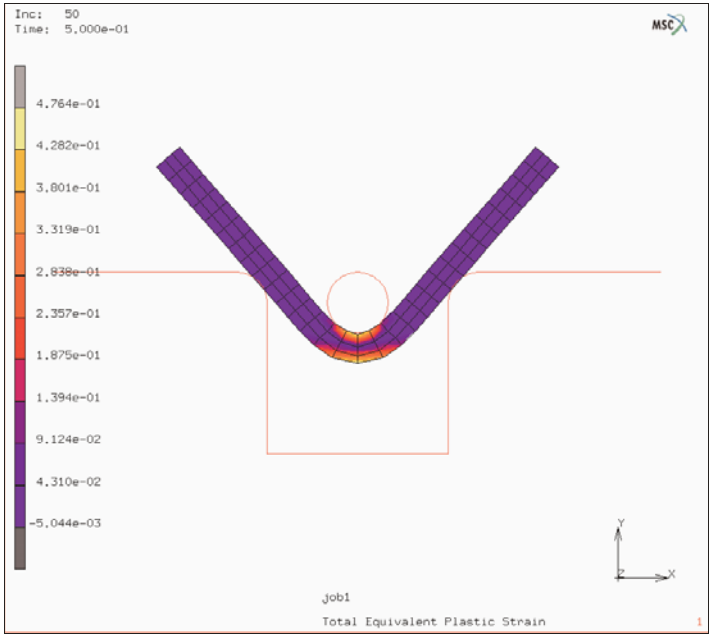
Step 3



Check your results.

Step 4


MAIN MENU
PREPROCESSING
MESH GENERATION
BOUNDARY CONDITIONS
INITIAL CONDITIONS
LINKS
MATERIAL PROPERTIES
GEOMETRIC PROPERTIES
CONTACT
FRACTURE MECHANICS
MESH ADAPTIVITY
DESIGN
ANALYSIS
LOADCASES
JOBS
POSTPROCESSING
RESULTS
POSTPROCESSING RESULTS
FILE
model1_job1.t16
OPEN DEFAULT
OPEN
CLOSE
MONITOR
SCAN
REWIND
PREV
NEXT
LAST
SKIP TO INC
SKIP INCS
DEFORMED SHAPE
SETTINGS
OFF
DEF ONLY
DEF & ORIG
SCALAR PLOT
SETTINGS
OFF
CONTOUR BAND
CONTOUR CENT
CONTOUR LINES
SYMBOLS
NUMERICS
ISO-SURFACES
CUTTING PLANE
BEAM CONTOU
BEAM VALUES
SCALAR
Total Equivalent Plastic Str
Open Default
Skip to Inc 50
Def Only
Contour Bands
Select “Total Equivalent Plastic Strain”


Inc: 50
Time: 5.000e-01
4.764e-01
4.282e-01
3.801e-01
3.319e-01
2.838e-01
2.357e-01
1.875e-01
1.394e-01
9.124e-02
4.310e-02
-5.044e-03
job1
Total Equivalent Plastic Strain

MSC.Marc creates a post file associated with each domain as well as a root post file associated with the job id. For the previous model, `1model1_job1.t19`, `2model1_job1.t19`, and `3model1_job1.t19` are the processor files, while `model1_job1.t19` is the root file.

To postprocess the entire model, select `model1_job1.t19` as the postprocess file. If the model is very large, it may be convenient to view only a portion of the model by selecting any one of the processor post files, such as `3model1_job1.t19`. This file contains only data associated with domain 3 as selected in the Domain Decomposition menu. As specified in the host file, this file was created by host2.

Shared vs. Distributed I/O

For jobs with very large post or restart files, it is usually more efficient to use distributed I/O. With distributed I/O, the input files, and the post files are located on the host's local disks. MSC.Marc, by default, automatically transfers the input files and the post files to and from the remote host if needed. It is possible to suppress this transferring with two buttons in the Network settings in the JOBS menu in MSC.Marc Mentat.

To run a job using distributed I/O, specify a local directory in the host file:

```
host1 2
host2 1    d:\workdir
```

Jobs with User Subroutine

User subroutines can be used as usual. If local directories are used on remote hosts (distributed I/O), the new executable will be transferred automatically to the remote host if necessary.

Solver

Solver type 6 (hardware provided sparse) is not available on the Microsoft Windows platform.

Solver types 0 (direct profile), 2 (sparse iterative), 4 (sparse direct), and 8 (multifrontal sparse) are supported in parallel.

Out-of-core solution is only supported in parallel for Solver 8.

Troubleshooting

Use the Event Viewer on the root host by selecting Start/Programs/Administrative Tools/Event Viewer to read the System, Security, and Application log files under the Log button. To read these files on a remote host, select Log/Select Computer and pick the remote host from the list. Look for log entries related to Cluster Manager Service V2.

Check that:

1. Your user ID is recognized by the local or remote hosts. Also check that the password you entered during the MP-MPICH installation process is the same as that for the local system or the domain. The installation process does NOT verify that the password you entered is the same as the machine or domain login password.

   Also note that your password must not have any spaces in it or the MP-MPICH installation process will not handle your password correctly.

   Either of these types of errors will give you the error message:

   Access is denied. (5)

   Also note that if you change your login password you must reset your MP-MPICH password by doing the following:

   ```
   cd marc2005r3\nt_mpich\bin
   mpiexec  -store -save ..\..\tools\setdomain.bat
   ```

   Enter the username, domain, and password when prompted.

   The file `marc2005r3\tools\setdomain.bat` is used to set the domain for the login. If you wish to change the domain you use for the MP-MPICH login, then this file should be updated accordingly. It has the format of:

   ```
   set domain=mydomainname
   ```

2. The remote hosts have permission to read from and write to the root host. In particular, check that the sharing is giving full access; that is, not being restricted to read only.
3. Your MSC.Marc and MSC.Marc Parallel licenses are valid.
4. The host names are valid.
5. Check that the Cluster Manager Service is running. The service is not running if you get a message similar to:

   `"C:\MSC\marc2005r3\demo_ddm\e2x1.host"` does not contain any valid hosts

   ```
   Scanning network....
   ```

   Select My Computer/Control Panel/Services and look for Cluster Manager Service V2 in the list. Check that it has Status: Started. This must be done on all hosts. Also check that the user name used for this service is the same on all hosts.

Running a Parallel Job when not connected to the Network

If you disconnect your system from the network and want to run a parallel job on that system, you will have to install the Microsoft Loopback Adapter. Follow these steps:

Go to Control Panel, Add/Remove Hardware.

Select the hardware task you want to perform:

```
Add/Troubleshoot a device
```

Choose a Hardware Device:

```
Add a new device
```

Do you want Microsoft Windows to search for your new hardware?

```
No, I want to select the hardware from a list
```

Select the type of hardware you want to install:

```
Network adapters
```

Select Network Adapter:

```
Manufacturers:  Microsoft
Network Adapter:Microsoft Loopback Adapter
```

It will now install the loopback adapter. You will have to enable/disable the loopback adapter as you remove/connect your machine to the network.

Running a Parallel job on Windows XP System when not a member of a Domain

If you will be running a parallel job on a Windows XP system that is not a member of a domain, you will have to modify a registry entry.

Using *regedt32*, look for the following key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Lsa
                        "forceguest" : REG_DWORD : 00000001
```

If you find this key, change the `REG_DWORD` value to 0. The name may also appear as ForceGuest.

If you do not have this registry entry, your system will function properly.

Running a Parallel Job on Windows XP SP2

After you install or upgrade to Windows XP SP2, the RPC protocol does not permit anonymous requests to the RPC Endpoint Mapper but requires client requests be authenticated. This will cause an "Access is Denied" error when you attempt to run a MSC.Marc Parallel job.

Note: These settings are important to enable Microsoft Windows to run a parallel job. If they are not set properly, the error message "Host is unreachable (5)" or "Access is Denied (5)" will be issued.

To workaround this problem, do the following:

From a command prompt, run **gpedit.msc**.

Select **Computer Configuration**,

expand **Administrative Templates**,
expand **System**,
click **Remote Procedure Call**,
double click **RPC Endpoint Mapper Client Authentication**.

Change the value to **Enabled**.

You will also need to check the Data Execution Prevention settings.

Right click **My Computer**
Go to **Properties**
Select the **Advanced** tab
Select the Performance **Settings** button
Select the **Data Execution Prevention** tab
Select the button for *Turn on DEP for essential Windows programs and services only*

Required Privileges

Running a parallel job either locally or over a network requires certain user privileges. If the privileges are not sufficient, MPICH will print an error code of 1314.

You will need to check the following settings from the **Control Panel**:

Select **Administrative Tools**
Select **Local Security Policy**

Check the following items under **Local Policies->User Rights Assignment**.

Windows 2000
"Increase quotas".
"Replace a process level token"

Windows XP
"Adjust memory quotas for a process"
"Replace a process level token"

You can add usernames to these if needed by right clicking them and going to Properties.

Note that if they log in through a domain controller, the setting on the domain controller will also need to provide access to these settings for each username.