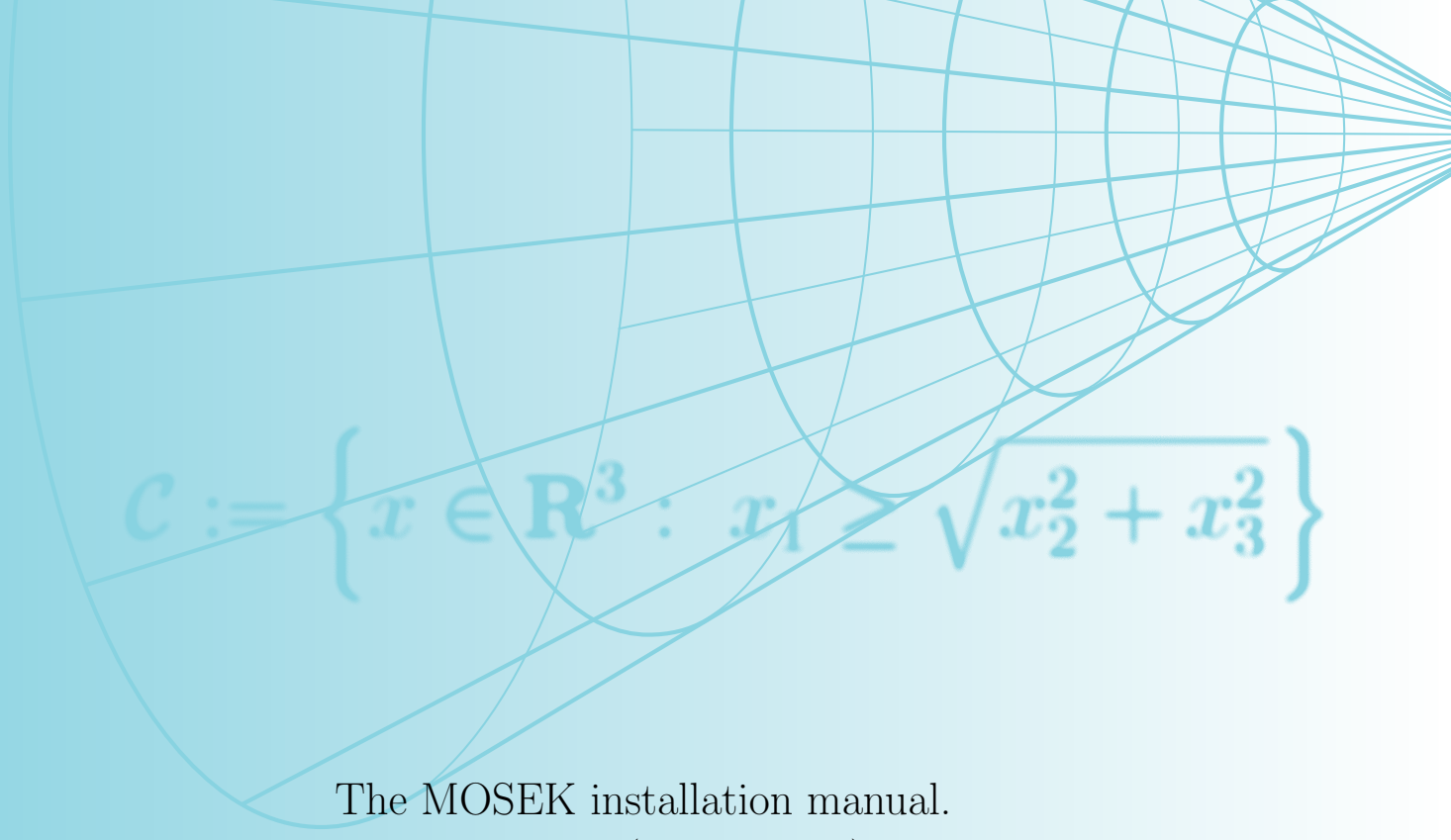

The MOSEK installation manual.
Version 4.0 (Revision 16).

mosek

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Contents

Chapter 1

Before installation

1.1 License conditions

Before installing MOSEK then it is recommended that the license conditions is review. The current license conditions can be seen

www.mosek.com/license.html

1.2 Supported operating systems

The Table 1.1 shows which operating system that are supported in each platform specific download.

1.3 Supported intefaces

The Table 1.2 shows which interfaces that are supported in each platform specific download.

Platform		
Discription	Type	OS Version
Linux 32bit x86	linux32x86	RedHat 9+
Linux 64bit X86	linux64x86	RedHat Enterprise 4+
Linux 64bit Itanium2	linuxia64	RedHat Enterprise 4+
MAC OSX 32bit Power PC	osx32ppc	10.2+
Solaris 32bit Sparc	solarissparc	8+
Solaris 64bit Sparc	solarissparc64	8+
Windows 32bit x86	win	2000/XP/2003
Windows 64bit X86	win64x86	XP/2003
Windows 64bit Itanium2	winia64	2003

Table 1.1: Supported operating systems

Platform	APIs			MATLAB	AMPL	
Description	C/C++	Java	.NET	Toolbox	Interface	Translator
Linux 32bit x86	Yes	Yes	No	Yes(7.0/7.1)	Yes	Yes
Linux 64bit X86	Yes	Yes	No	Yes(7.0.1/7.1)	Yes	Yes
Linux 64bit Itanium2	Yes	No	No	N/A	No	No
MAC OSX 32bit Power PC	Yes	Yes	No	Yes(7.0/7.1)	Yes	Yes
Solaris 32bit Sparc	Yes	Yes	No	Yes(7.0/7.1)	Yes	Yes
Solaris 64bit Sparc	Yes	Yes	No	N/A	Yes	No
Windows 32bit x86	Yes	Yes	Yes	Yes(7.0/7.1)	Yes	Yes
Windows 64bit X86	Yes	Yes	Yes	Yes(7.1.beta)	Yes	Yes
Windows 64bit Itanium2	Yes	No	Yes	N/A	Yes	No

Table 1.2: Supported interfaces.

Chapter 2

Installation

In this Section we discuss how to install the MOSEK optimization tools.

2.1 MOSEK optimization tools

2.1.1 Windows installation instructions

MOSEK provides two methods for installing the optimization tools i.e. an automatic and a manual method. Users without much computer knowledge are recommended to use the automatic method.

Note one advantage of the automatic installation method is that it also facilitates automatic uninstallation using the Add/Remove programs feature of the Windows operating system.

2.1.1.1 Virus software

Before trying to install MOSEK it sometimes necessary to shut off all virus protection software. The reason is the virus protection software may not allow installation of all the required files. The virus software can of course be turned on after the installation has completed.

2.1.1.2 The automatic method

First step is to download the appropriate installation file from the MOSEK website. The required file is one of the following

- `moseksetupwin.msi` (Windows 32bit).
- `moseksetupwin64x86.msi` (Windows x64).
- `moseksetupwinia64.msi` (Windows Itanium).

Which one depends on the Windows version MOSEK is installed on.

Next step is to make sure you have **administrative privileges** because otherwise there is great chance that the installation will fail.

Finally, run the downloaded file and MOSEK will automatically be installed. During the installation the program will ask where to install MOSEK. It will offer the default choice

```
\mosek\4
```

which in most cases should be left unchanged. However, if you want MOSEK to be installed on the `d:` drive for instance, then add the drive letter to the beginning of default choice i.e. specify

```
d:\mosek\4
```

After installation you may need to log out of your current Windows session in order to have changes made to environment variables take effect.

2.1.1.3 The manual method

It is also possible to install MOSEK manually. The process of doing this is described in Section A.1

2.1.2 MAC OSX installation instructions

Section A.2 describes how to install the MOSEK optimization tools under MAC OSX.

If you are planning to use MOSEK with MATLAB, then it is important that you setup an appropriate

```
$HOME/.MacOSX/environment.plist
```

file which specifies the appropropriate operating system variables. Please see Appendix B for how to do that.

2.1.3 LINUX/UNIX installation instructions

Section A.2 describes how to install the MOSEK optimization tools under LINUX and UNIX.

2.2 AMPL modelling language

You install the AMPL modelling language by first installing the MOSEK optimization tools because it will automatically install the AMPL modelling language processor at

```
\mosek\4\tools\platform\<platform>\bin\mampl
```

If the MOSEK optimization tools are installed correctly, then you can run AMPL by typing

```
mampl
```

at the operating system command prompt.

If you wish, then you can rename `mampl` program to `ampl`.

Chapter 3

The license system

3.1 What to do when things does not work

If something goes wrong during license installation or the license system do not work, then please contact support@mosek.com. Please include as much information about the problems as possible. In particular error messages are very useful.

3.2 How to activate a purchased MOSEK license

In order to activate a purchased MOSEK license you should perform the steps:

- Step 0: If you have purchased and received a dongle, then install it. **Most customers do NOT buy a dongle.** Detailed dongle installation instructions are in Section 3.6.
- Step 1: Email the hostname and hostid of the license server to license@mosek.com. See Section 3.7 for how to locate the hostname and hostid.
- Step 2: Receive your permanent license file via email from MOSEK. (The license file you receive after downloading MOSEK is NOT a permanent license file.)
- Step 3: Install the license file mentioned in step 2. Detailed installation instructions are in Section 3.10.

If you are unfamiliar with the MOSEK license system it might be a good idea to read Section 3.3.

3.3 How the license system works

MOSEK is licensed software which means you must have a valid license in order to use MOSEK. In practice a license is a file which specifies:

- How many copies of MOSEK you are allowed to use simultaneously.
- Which features in MOSEK you are allowed to use. An example of a feature is the mixed integer optimizer.
- On which operating systems you can use MOSEK.

The licenses is managed by the FLEXlm [1] license manager which is a program supplied with MOSEK. The FLEXlm license manager handles two types of licenses:

- A demo license:

  A *demo license* is not tied to any particular computer but is time limited. A demo license is typically only used for evaluation purposes.

- A floating license:

  A *floating license* is tied to a particular license server computer. However, MOSEK can be used on any computer connected to the license server (usually trough the local area network). In particular MOSEK can of course be used on the license server.

  Hence, you may think of the license server computer as a computer with a bag of license tokens and whenever a client computer starts using MOSEK then MOSEK requests a license token from the server. Moreover, when MOSEK completes it sends back the license token to the server. This implies that you can not use more license tokens than you actually have at any given point in time.

  The advantage of a floating license is:

  1. An unlimited number of MOSEK users can share a limited number of MOSEK licenses.
  2. A license can be used on any operating system you purchased access to. For instance if you have purchased a license that includes Windows 32 bit and Linux 32 bit, then you can use the license from both Windows 32 bit and Linux 32 bit as you wish. Although not simultaneously of course.
  3. The license server can be installed on any operating system MOSEK supports.

3.3.1 How to use MOSEK on multiple non networked computers

If you want to use a license on multiple non networked computers, then the license file should be tied to a dongle. Please see Section 3.5.2 for further details.

[1] FLEXlm is a widely used license manager manufactured by MacroVision(www.macrovision.com).

3.3.2 Further information about FLEXlm

Further information about the FLEXlm license system is available in the "FLEXlm End user manual" which gives a detailed description about the FLEXlm license system. The guide can can be obtained from

http://www.macrovision.com/services/support/enduser.pdf

3.4 License system requirements

The MOSEK license system does not require access to the internet. However, in particular on computers running Linux and Windows it requires that your computer is equipped with network card unless you use a dongle. On Linux this is normally not a problem.

However, on Windows based computers that are not connected to a local area network this sometimes cause problems because when the internet connection is disabled the network card is also disabled. Therefore, MOSEK cannot see the network card and will not work. Section 3.5 explains why MOSEK needs the network card.

The solution to the problem about the disabled network card is one of the following:

- Create a network connection using Windows. You do that by choosing *Network and internet connections* in the *Control panel*.
- Purchase and use a dongle to provide the hostid. This is likely to be a better solution if you are not a computer expert.

3.5 The hostid

3.5.1 The default hostid

A floating license is tied to some unique ID know as the hostid. Usually the hostid is identical to the MAC address of a network card. Therefore, the computer normally needs to be equipped with a functioning network card. However, you do not have to be connected to any network because MOSEK only needs an number coded in the network card[2].

3.5.2 A dongle hostid

Alternatively a license can be tied to an id in a dongle which is a small piece of hardware that is attached to a USB port. The advantage of using a dongle is that the dongle can be moved from computer and to another computer. Hence, this implies that a license can be used at the main office and at home for instance.

[2] All network cards have a unique address known as the MAC address.

3.6 Installing a dongle

If you purchased a dongle and want to use it, then you must first install it. Currently, a dongle can only be employed on the Windows operating system.

Please follow the steps below to install a dongle.

1. Make sure you have administrative rights on your computer.
2. Attach the dongle to the computer.
3. Study the dongle installation readme file at:

   ftp://ftp.mosek.com/download/stable/4/flexlm/FLEXid_README.pdf
4. Download and install the driver:

   ftp://ftp.mosek.com/download/stable/4/flexlm/FLEXidInstaller.exe

   If any error messages occur under the installation, then please contact support@mosek.com. Please include the error message in your email.
5. If you want to test whether, the dongle works either read Section 3.7 or open a DOS box and execute the command

   ```
   cd \mosek\4\tools\platform\<platform>\flexlm
   lmutil lmhostid -flexid
   ```

   where `<platform>` is your platform i.e. for instance `win` or `win64x86`. Afterwards you should see something like

   ```
   lmutil - Copyright (c) 1989-2003 by Macrovision Corporation. All rights reserved.
   The FLEXlm host ID of this machine is "FLEXID=8-5E7001934307"
   ```

   The important part is `FLEXID=8-5E7001934307` which indicate that the hostid for this dongle is `8-5E7001934307`. If there is no `FLEXID=` part, and you are using Windows then please try to remove the dongle driver again using

   ftp://ftp.mosek.com/download/stable/4/flexlm/FLEXidCleanUtility.exe

   and then reinstall the dongle using the instructions above.

3.7 Obtaining the hostname and hostid

In order to create license file, then a *hostname* and a *hostid* of the computer acting as license a server is required. The hostname of a computer is name of the computer and the hostid of a computer is a number or a string that uniquely defines the computer.

3.7.1 On a Windows system

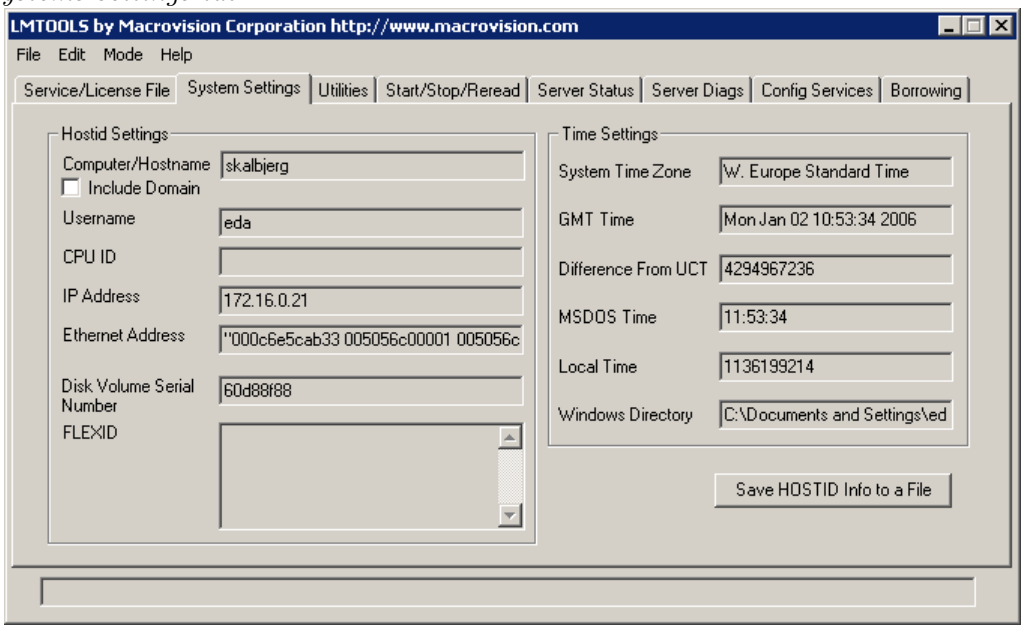
On Windows based system the hostname and hostid can be obtained using the program

```
\mosek\4\tools\platform\<platform>\flexlm\lmtools
```

where `<platform>` is your platform i.e. for instance `win` or `win64x86`.

If the computer wants to go online when obtaining the hostid then please read Section 3.4.

After starting up `lmtools` then choose the *Systems settings tab*. Below is an example of a *Systems settings tab*.



On the *Systems settings tab* the hostname is reported as the *Computer/Hostname* and the hostid is reported under `FLEXID` if you have a dongle attached. Otherwise the field *Ethernet Address* is identical to the hostid.

OBSERVE it is a good idea to choose *Save HOSTID info to a file* from the *Systems settings tab*. If you do that, then you will be asked for a file name where all the relevant host information is saved to. Sending this file whenever you are asked for the hostname and hostid is a very good idea because it reduces the possibility for errors.

3.7.2 On a LINUX/UNIX system

On all UNIX system the hostname can be determined by running the

```
hostname
```

program. The hostid reported by the command

```
mosek/4/platform/<platform>/flexlm/lmutil lmhostid
```

`<platform>` should be replaced by the actual platform name i.e. for instance `linux32x86` or `solarissparc`.

3.8 Locating the license

Whenever MOSEK is running then it must have access to a valid license. Therefore, somehow MOSEK needs to know where to locate the license. This is done by defining an appropriate operating system variable named

```
MOSEKLM_LICENSE_FILE.
```

If you do not know how to manipulate operating system variables then please read Appendix B.

If you did NOT use the automatic installation version of MOSEK, then almost always the operating system variable

```
MOSEKLM_LICENSE_FILE
```

should be setup manually.

Normally `MOSEKLM_LICENSE_FILE` has the value

```
c:\mosek\4\licenses\mosek.lic
```

i.e. it points to the license file which is fine. Alternatively if you are using a floating license then the variable can alternatively have the value

```
@hostname_of_the_license_server
```

i.e. for instance

```
@skalbjerg
```

This implies whenever MOSEK needs a license it will contact the computer named `skalbjerg`.

3.9 Installation of a demo license

If a license file does not contain a line starting with the word `SERVER` i.e. something like

```
SERVER ahostname ahostid
```

then the license file is a demo license. In this example `ahostname` and `ahostid` are not important. In case of a demo license you should follow the instructions in Section 3.8.

3.10 Installation of a floating license

For a floating license it is necessary to install a license manager and the so-called vendor daemon.

3.10.1 The license manager and vendor daemon

The file

```
mosek\4\tools\platform\<platform>\flexlm\lmrgd
```

is the so-called license manager daemon. The purpose of `lmgrd` is to:

- Keep track of the available licenses.
- Start the vendor daemon.

`lmgrd` must be installed on the license server. The file

```
mosek\4\tools\platform\<platform>\flexlm\MOSEKLM.exe
```

is the vendor daemon and is used by `lmgrd`. `MOSEKLM` must be installed on the license server. However, it is not necessary to install `MOSEKLM` on client computers.

3.10.2 Step-by-step license installation instructions for Windows

Important note! If you are installing on the Windows x64 platform, then please follow the installation instructions in Section 3.10.3. Due to a known bug in Flexlm then procedure described below does not work on Windows x64.

Subsequently it is assumed MOSEK is installed at

```
c:\mosek\4
```

If that is not the case, then replace this directory by the directory where MOSEK is installed.

1. If you do not know what a floating license is, then it might be very useful to read about a floating license in Section 3.3.
2. If you are not connected to a local area network, then please read 3.4.
3. Only users having **administrative** privileges can install a license server. Therefore, please make sure you have administrative privileges.

4. **This is ONLY relevant for customers who have purchased a dongle.** If you do not know whether you have purchased a dongle then consult your invoice.

   If you are using a dongle to provide the hostid, then make sure you have attached the dongle to the computer and installed the dongle as described in Section 3.6. Moreover, it is very important that you make sure the license file specifies the correct hostname i.e. the name of the computer you are installing the license file on. You can modify the license file using your favorite ASCII file editor. A good choice for editor is `notepad`. The license file contains a line looking like

   ```
   SERVER ahostname ahostid
   ```

   `ahostname` and `ahostid` is the actual hostname and hostid. Before installing the license file on a new computer the hostname should be changed to the actual hostname of the computer you are installing the license on.

5. Copy the license file you have obtained from your MOSEK vendor to the file

   ```
   mosek\4\licenses\mosek.lic
   ```

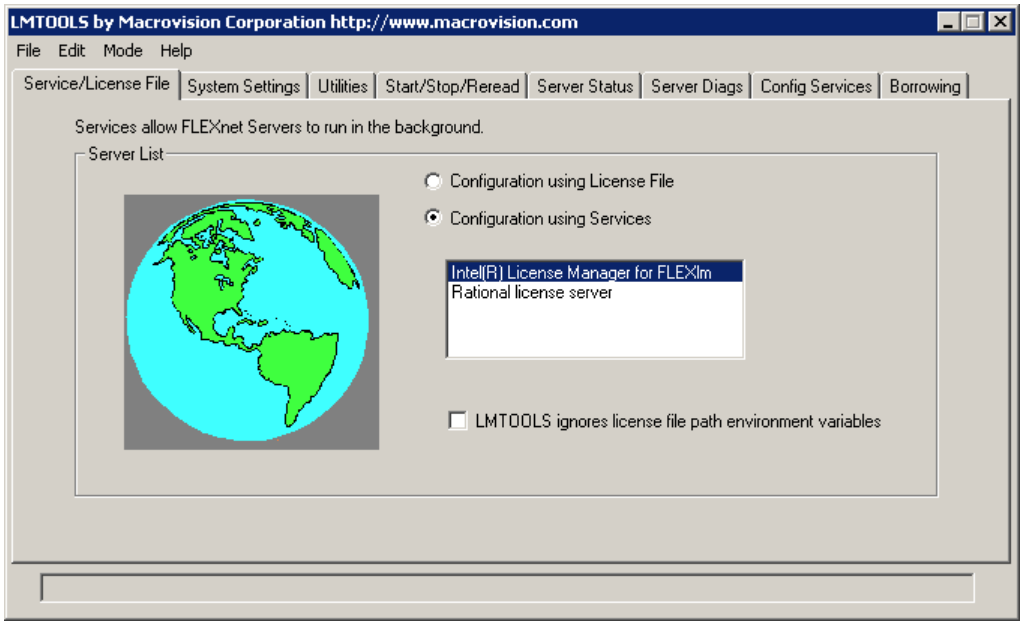
   Normally, the license file is named `mosek.lic`. However, if you have multiple MOSEK license then just keep the original name.

6. Next start up the program `lmtools` located at

   ```
   mosek\4\tools\platform\<platform>\flexlm\lmtools
   ```

   where `<platform>` should be replaced by the appropriate platform name i.e. for instance `win` or `win64x86`.

7. After startup then choose the *Configuration using Services* option. See the screen shot below.



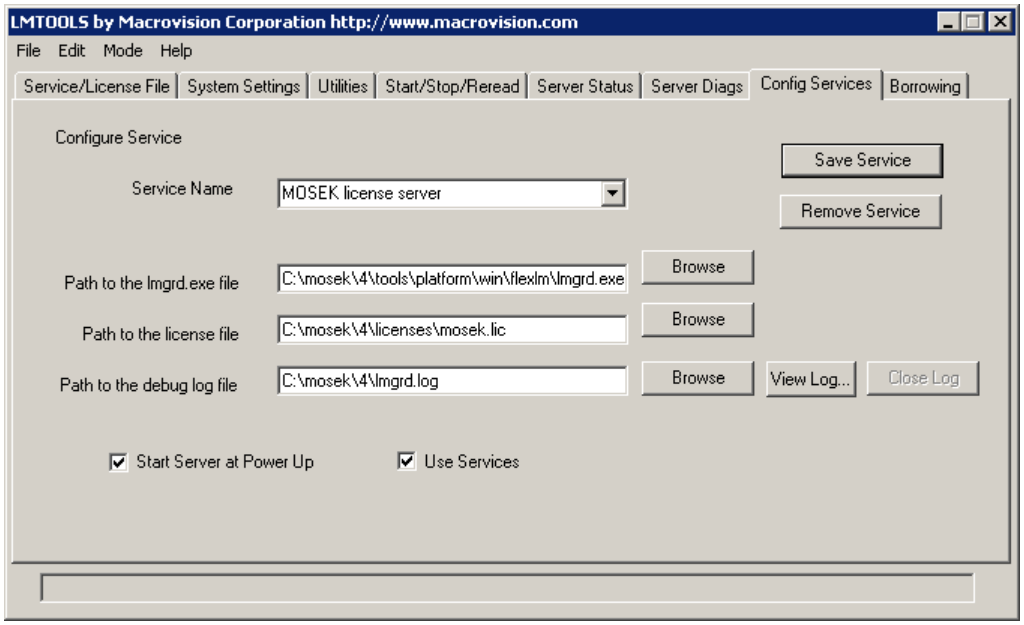
If other FLEXlm license servers are already installed, then you just leave them unchanged. If the MOSEK license server is **not** already installed, then continue to next step.

If the MOSEK license is already installed, then choose the *Config Services* tab. In the license file path box, then add the new license file, so it looks like

```
mosek\4\licenses\mosek.lic;
```

`mosek.lic` represents the name of the license file. Next click on *Save Service* button. Finally, choose the *Start/Stop/Reread* tab and click on the *ReRead License File* and exit `lmtools`. You are done and MOSEK is ready to be used.

8. Choose the *Config Services* tab in the top right hand side corner. Next fill out the fields on the screen as shown below.

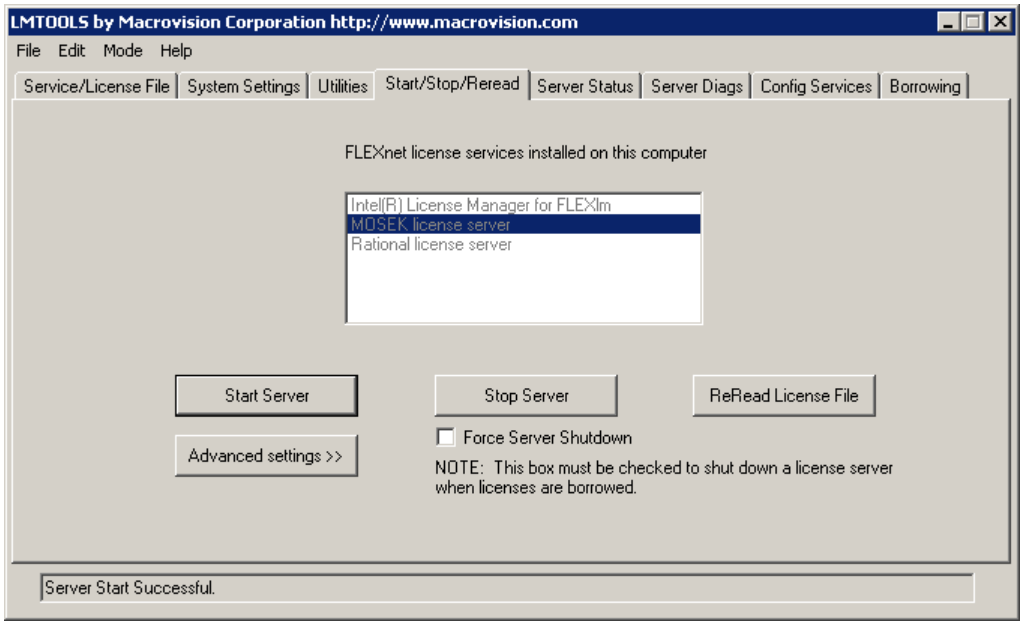


Observe you should fill in the fields *Service Name*, *Path to lmgrd.exe file*, *Path to license file*, and *Path to debug log file*.

The debug log file specified in the last field is very useful because using that file it is possible to see what goes wrong in case of problems.

9. Click on the *Save Service* button.

10. Click on the *Start/Stop/Reread* tab and the following screen will appear.



11. Continue with clicking on the *Start Server* button. After starting the license server you may want to have look at the MOSEK license manager log file

    `\mosek\4\lmgrd.log`

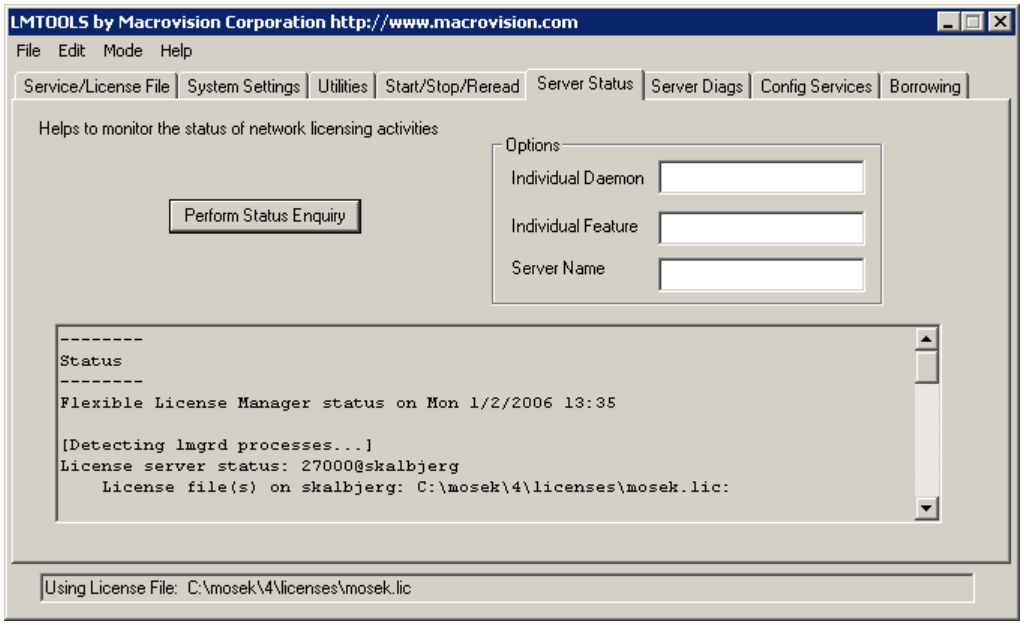
    which in this case looks like

```
13:21:45 (lmgrd) ----------------------------------------------
13:21:45 (lmgrd)   Please Note:
13:21:45 (lmgrd)
13:21:45 (lmgrd)   This log is intended for debug purposes only.
13:21:45 (lmgrd)   In order to capture accurate license
13:21:45 (lmgrd)   usage data into an organized repository,
13:21:45 (lmgrd)   please enable report logging. Use Macrovision's
13:21:45 (lmgrd)   software license administration  solution,
13:21:45 (lmgrd)   FLEXnet Manager, to  readily gain visibility
13:21:45 (lmgrd)   into license usage data and to create
13:21:45 (lmgrd)   insightful reports on critical information like
13:21:45 (lmgrd)   license availability and usage. FLEXnet Manager
13:21:45 (lmgrd)   can be fully automated to run these reports on
13:21:45 (lmgrd)   schedule and can be used to track license
13:21:45 (lmgrd)   servers and usage across a heterogeneous
13:21:45 (lmgrd)   network of servers including Windows NT, Linux
13:21:45 (lmgrd)   and UNIX. Contact Macrovision at
13:21:45 (lmgrd)   www.macrovision.com for more details on how to
13:21:45 (lmgrd)   obtain an evaluation copy of FLEXnet Manager
```

```
13:21:45 (lmgrd)   for your enterprise.
13:21:45 (lmgrd)
13:21:45 (lmgrd) ----------------------------------------------
13:21:45 (lmgrd)
13:21:45 (lmgrd)
13:21:45 (lmgrd) pid 5632
13:21:45 (lmgrd) Detecting other license server manager (lmgrd) processes...
13:21:45 (lmgrd) Done rereading
13:21:45 (lmgrd) FLEXnet Licensing (v10.8.0.1 build 19446) started on
                 skalbjerg (IBM PC) (1/2/2006)
13:21:45 (lmgrd) Copyright (c) 1988-2005 Macrovision Europe Ltd. and/or
                 Macrovision Corporation. All Rights Reserved.
13:21:45 (lmgrd) US Patents 5,390,297 and 5,671,412.
13:21:45 (lmgrd) World Wide Web:  http://www.macrovision.com
13:21:45 (lmgrd) License file(s): C:\mosek\4\licenses\mosek.lic
13:21:45 (lmgrd) lmgrd tcp-port 27000
13:21:45 (lmgrd) Starting vendor daemons ...
13:21:45 (lmgrd) Started MOSEKLM (pid 5688)
13:21:45 (MOSEKLM) FLEXnet Licensing version v10.8.0.1 build 19446
13:21:45 (MOSEKLM) Server started on skalbjerg for: MOSEKENV
13:21:45 (MOSEKLM) TBXMOSEKENV  PTS     INTPNT
13:21:45 (MOSEKLM) SIMPLEX      INTPNTNL    PTON
13:21:45 (MOSEKLM) INTPNTCO PTOC        MIXEDINT
13:21:45 (MOSEKLM) PTOM
13:21:45 (lmgrd) MOSEKLM using TCP-port 1819
```

Your log file may be slightly different. However, it is important that the file does not contain any error messages.

12. Finally you might want to check server status by clicking on *Server Status* tab. After clicking on the *Perform Status Inquiry* the screen should look like.



In particular investigate the scrollable Window for error messages. If it contains no error messages, then the license server works. If there are error messages, then fix the problem causing them. If you do not know what is causing the problem, then contact support@mosek.com. Please include the error messages in your email.

13. Exit `lmtools`.

14. Please read about the operating system variable `MOSEKLM_LICENSE_FILE` in Section 3.8 if you have not already done so.

15. You may want to test license using the instructions in Section 3.14.

3.10.3 Installing the license server with `installs`

It is possible to install the license server without using the graphical tool `lmtools` mentioned above. Instead the command line tool `installs` can be used.

The syntax of installs is as follows:

```
installs -c license_file -e lmgrd_location -l log_file -n service_name
```

where

`license_file`: Shuld be the path to the MOSEK license file e.g `c:\mosek\4\licenses\1205.lic`

`lmgrd_location`: Location of `lmgrd.exe` e.g `c:\mosek\4\platform\win64x86\flexlm\lmgrd.exe`

`log_file`; re to write license manger log file e.g `c:\mosek\4\lmgrd.log`

`service_name:` User defined name of the license service. e.g `MosekLicense`.

The command line could look like this:

```
installs -c c:\mosek\4\licenses\1205.lic \
         -e c:\mosek\4\platform\win64x86\flexlm\lmgrd.exe \
          -l c:\mosek\4\lmgrd.log -n MosekLicense
```

After executing the command you will need to restart Windows to start the license manager.

3.10.4 Installation instructions for Linux and UNIX

This section discusses how to install the license server `lmgrd` on an UNIX system.

First it is possible to try out the license manager easily. The following commands demonstrate this.

```
# Testing whether MOSEKLM is on the path.
MOSEKLM
# Ignore the output printed by MOSEKLM. It is only important
# that it prints something.

# Startup lmgrd with the license file. Replace solaris/sparc
# with appropriate platform directory.
#

mosek/4/tools/solarissparc/flexlm/lmgrd -l lmgrd.log -c path_to_license_file

# <version> is the major MOSEK version number.

#
# IMPORTANT:  Check if the file moseklm.log has any error messages by
#

cat moseklm.log

#
# Set the environment variable
#
#   MOSEKLM_LICENSE_FILE=path_to_license_files
#
# or
#
```

```
#   MOSEKLM_LICENSE_FILE=@actual_hostname_where_lmgrd_is_running
#
#
# Startup up your MOSEK product which should work.
#
#
# For instance users having the MOSEK optimization tools may do
#
#   mosek
#
# In this case
#
#   mosek -l path_to_license_file
#
# should also work if MOSEKLM_LICENSE_FILE is not defined.
```

Please observe any normal, non-privileged user (non-root user) can start `lmgrd`. Security experts recommend that users and administrators avoid running daemons as root - when such daemons do not require root privileges. Since `lmgrd` does not require root privileges, we recommend you do not start `lmgrd` as root.

In general it it might be advantageous to start `lmgrd` from a system startup script (/etc/rc files), we recommend that you use the following command:

```
su username -c "umask 022; lmgrd -c path_to_license_file -l lmgrd.log"

#   Where:
#     username:  is a normal, non-root, non-privileged user
#
#     lmgrd: is the complete path and file name to the lmgrd binary
#
#     path_to_license_file:   is the complete path and file name to
#                             the license file
#
#    log:       is the complete path and file name to the debug log file
```

3.11 Using a dongle

3.11.1 Using a dongle on multiple computers

If you have license that is tied to dongle, then you can use the license on any computer that has dongle attached (and on any computer that is on the same network as the computer

dongle). However, before you can MOSEK on the computer with the dongle attached you should

- Install the dongle as described in Section Section 3.6.
- Install the license file as described in Section 3.10.

3.11.2 Reattaching a dongle

If you are using a dongle to provide a hostid, then the dongle should normally be attached to the computer when it starts up i.e. reboots. If that is not the case, then you should open a DOS box and do

```
cd \mosek\4\tools\platform\win\flexlm
lmutil lmreread
```

after inserting the dongle so FLEXlm recognize that the dongle has been attached. You can also use *lmtools* i.e.

```
\mosek\4\tools\platform\win\flexlm\lmtools
```

to perform this operation (choose reread the license file) if you prefer graphical interface.

3.12 Updating a license file on the license server

If you purchase additional MOSEK products you will obtain a new license file which should replace your existing license file. However, the license server will not use the new license file before license server computer is rebooted or it is told to use the new license file. You can force the license server to reread the license file using `lmtools` (on Windows only) utility or by using the `lmutil` utility as described in Section 3.17.

3.13 Network usage

In a network installation, then install the license on the computer chosen as license server using the instructions in previous two sections.

On each client running MOSEK, then define the operating system environment variable

```
MOSEKLM_LICENSE_FILE=@hostname
```

where `hostname` is the host name of the license server computer.

Also make sure the server's `hostname` found in the SERVER line of license file is available in the `DNS`[3]. Normally this should be the case.

If it is not the case, then we suggest you discuss the issue with your local system administrator(expert). The system administrator will also be able to tell whether the server name is listed in the `DNS`.

[3] `DNS` means domain name server. This service converts computer names to IP addresses.

3.14 How to check the license system works

In this section we discuss how you can check the license manager works. The discussion assumes you are using a Windows based system but if you are using a LINUX/UNIX based system then it should be easy to adapt the commands.

Open a DOS Window and execute the commands

```
cd mosek\4\tools\platform\win\bin
mosek -L @skalbjerg ..\..\..\examp\25fv47.mps
```

where `@skalbjerg` represents the hostname of the license server. If everything works, MOSEK should produce the (edited) output

```
MOSEK Version 2.5.1.9(RC) (Build date: Aug  7 2002 13:07:16)
Copyright (c) 1998-2002 MOSEK ApS, Denmark. WWW: http://www.mosek.com

Reading mps file - ..\..\..\examp\25fv47.mps

[Parts of file removed.]

Return code - 0 (MSK_RES_OK)
```

If the return code is 0, then the license manager works fine.

In the case the license manager is not working then MOSEK will produce an output similar to

```
MOSEK Error 1014   - The FLEXlm license manager reported '
                         major: -15 minor: 10 sys: 10061 '.

*** A FLEXlm error occured. FLEXlm reported:

Cannot connect to license server
 The server (lmgrd) has not been started yet, or
 the wrong port@host or license file is being used, or the
 port or hostname in the license file has been changed.
Feature:       MOSEKENV
Server name:   ruge
License path:  @ruge
FLEXlm error:  -15,10.  System Error: 10061 "WinSock: Connection refused"
For further information, refer to the FLEXlm End User Manual,
available at "www.globetrotter.com".

*** end of FLEXlm report.
```

```
Return code - 1014 (zero means no error)

        MOSEK has license problems.
        Consult the user's guide for how to solve this problem.
        Or use the -L command line option as follows. Assuming the
        license file is stored in the directory

                c:\mosek\2\licenses\

        then invoke MOSEK as follows:

                mosek -L c:\mosek\2\licenses\tools.lic
```

The important part of this output is the error message FLEXlm provides. In this case FLEXLm reports that it cannot connect to the license server which most likely is due to the license server is not running. Moreover, it reports an error code which in this case is -15. This error code can be looked up in the FLEXlm End User Manual.

If you cannot diagnose and fix the license problems from the above message then please email the above message to the MOSEK support and they can help.

3.15 Speeding up license checkout

If you want the fastest possible license checkout then you should follow the three subsequent steps.

1. Get hold of the log file that was created when you started up the license server. It will have some lines looking like

   ```
   13:13:44 (lmgrd) US Patents 5,390,297 and 5,671,412.
   13:13:44 (lmgrd) World Wide Web:  http://www.globetrotter.com
   13:13:44 (lmgrd) License file(s): C:\mosek\2\licenses\x.lic
   13:13:44 (lmgrd) lmgrd tcp-port 27000
   ```

   The important part is `lmgrd tcp-port 27000` that says the license manager is using `port` 27000. The port number may be different on your server but will be in the range 27000 to 27009.

2. On each client computer performing a license checkout you should set the environment variable `MOSEKLM_LICENSE_FILE` as follows

   ```
   MOSEKLM_LICENSE_FILE=port_number@ip_address_of_license_server
   ```

i.e. something like

```
MOSEKLM_LICENSE_FILE=27000@192.16.0.34
```

This will make MOSEK obtaining the license faster because it only has to search one port and not use the DNS to look up the license server name.

3. After a restart of the license server, then the port number may change which is inconvenient. However, the license server can be forced to use the same port number all the time if you modify the server line in the license file. The server line should look like

   ```
   SERVER hostname hostid portnumber
   ```

   `portnumber` should be portnumber you want to used.

3.16 How to use the license system trough a firewall

Many firewalls require that port numbers be specified to the firewall. In practice it means that both the lmgrd daemon and the MOSEK vendor daemon must have specified port numbers. The first two lines in a standard MOSEK license files looks like:

```
SERVER my_server 123456789ABC
VENDOR MOSEKLM
```

The lmgrd daemons port number is 27000 by default. You may change it to any free port number of your choice. Now also specify a port number for the MOSEKLM daemon by adding port=number to the VENDOR line. Again, choose any free port number (it must differ from the port number on the SERVER line):

```
SERVER my_server 123456789ABC 27000
VENDOR MOSEKLM port=3084
```

Configure your firewall to allow access to the chosen port numbers which in this case is number 27000 and 3084. If you are unsure which port numbers are free, or how to allow firewall access to them, please contact your system administrator.

Finally, it is a good idea to check if the port is open by using the telnet command as follows

```
telnet my_server 27000
```

on the client computer(s). In Windows you will get something like

```
Connecting To birkende...Could not open connection to the host,
   on port 27000: Connect failed
```

if the port is not open.

See also the Flexlm end user manual for more information.

3.17 License administration tools

The MOSEK installation includes several tools for license adminstration. They are all stored in the directory

```
mosek\4\tools\platform\<platform>\flexlm\
```

where `<platform>` is your platform type i.e. for instance `win`.

The license administration tools are used as follows:

- `lmutil lmcksum`: Prints license checksums.
- `lmutil lmdiag`: Diagnoses license checkout problems.
- `lmutil lmdown`: Gracefully shuts downs all license daemons (both `lmgrd` and all vendor daemons) on the license server node.
- `lmutil lmhostid`: Reports the hostid of the system.
- `lmutil lmreread`: Force the license server to reread the license file. The command is normally executed on the computer acting as license server as follows

  ```
  lmutil lmreread -c <path_to_license_file>
  ```

- `lmutil lmstat`: Display the status of the license server. In particular the command

  ```
  lmutil lmstat -a
  ```

  is frequently used to diagnose license server problems.
- `lmtools`: (Windows only) A comprehensive graphic tool for installing and debugging the license service.

Chapter 4

Getting support and help

4.1 The help desk

An on-line help desk is available in MOSEK. If you load the file

`mosek\4\tools\help\help.html`

into your favorite web browser then you can read the present manual on-line and other MOSEK related information.

Appendix A

Manual installation instructions

A.1 Windows

```
INSTALLATION OF THE MOSEK OPTIMIZATION
TOOLS FOR WINDOWS

CONTENTS:
  1. INSTALLATION.
     1.1 MANUAL METHOD
     1.2 AUTOMATIC METHOD
     1.3 CREATED DIRECTORIES
  2. TESTING THE INSTALLATION
  3. COMPILER.
  4. ONLINE DOCUMENTATION.
  5. SUPPORT.

1. INSTALLATION

    1.1 MANUAL METHOD

       The following table shows which file you need for each platform
       to install MOSEK manually.

       Platform description  : Platform  : Binary download
       ------------------------------------------------------------
       Windows               : win       : mosektoolswin.exe
       Windows x64           : win64x86  : mosektoolswin64x86.exe
       Windows 64 bit/Itanum : winia64   : mosektoolswinia64.exe
       ------------------------------------------------------------

       After obtaining the correct file then run it and it should extract
       itself.
```

```
   Assuming you install MOSEK in the directory

   c:\mosek\4\

   then you must add the path

   c:\mosek\4\tools\platform\<platform>\bin

   to operating system environment variable

   PATH.

   Observe <platform> should be replaced by the right value from
   the above table i.e for instance win or win64x86.

   Also you must set the operating system environment variable

   MOSEKLM_LICENSE_FILE

   to

   c:\mosek\4\licenses\mosek.lic

1.2 AUTOMATIC METHOD

   The following table shows which binary download you need.

   Platform description  : Platform  : Binary download
   ------------------------------------------------------------
   Windows               : win       : moseksetupwin.msi
   Windows x64           : win64x86  : moseksetupwin64x86.msi
   Windows 64 bit/Itanum : winia64   : moseksetupwinia64.msi
   ------------------------------------------------------------

   After downloading the appropriate file from the MOSEK website
   then run it i.e. for instance by double clicking on it.

1.3 CREATED DIRECTORIES

   Unpacking the distribution file will create a directory
   named

   mosek\4\tools

   which have the subdirectories
```

```
    tools\help\         : The MOSEK help desk.
    tools\doc\          : Manuals in HTML and PDF format.
    tools\doc\license\  : License conditions.
    tools\bin\platform\ : Platform specific binaries and
                          libraries.
    tools\examp\        : Various example files.
    tools\test\         : Test scripts for the MOSEK
                          installation.

2. TESTING THE INSTALLATION (For experts only.)

   This is an option for EXPERTS only. Note some operations may
   fail during test because you do not have all the appropriate
   tools installed.

   The installation can be tested as follows.  First
   open a DOS box and then execute the command.

       cd \mosek\4\tools

   next if you using Windows 32 bit then do

       test\testwin

   else if using Windows x64 then do

       test\testwin 64x86

   Finally, if you are using Windows 64 bit Itanium then do

       test\testwin ia64

3. COMPILER

   The lib, dll, and exe files in this distribution is known
   to be compatible with

   Microsoft C V6.
   Microsoft .NET
   Intel C v8 and v9.

4. ONLINE DOCUMENTATION

   Load the file
```

```
   mosek\4\tools\help\help.html

   into your browser for online help.

5. SUPPORT

   In case of problems then consult the
   frequently asked question chapter in the
   user's manual or contact the MOSEK support.

   MOSEK support / support@mosek.com
```

A.2 LINUX/MAC OSX/UNIX

```
INSTALLATION OF THE MOSEK OPTIMIZATION TOOLS FOR UNIX

CONTENTS:
  1. WHAT YOU SHOULD DO.
  2. UNPACKING.
  3. OPERATING SYSTEM ENVIRONMENT VARIABLES.
     3.1 LD_LIBRARY_PATH (HPUX/LINUX/SOLARIS)
         3.1.1 SH AND BASH SHELLS
         3.1.2 CSH SHELL
     3.2 LIBPATH (AIX)
     3.3 DYLD_LIBRARY_PATH (MAC OSX)
     3.4 PATH
     3.5 MOSEKLM_LICENSE_FILE
  4. ONLINE DOCUMENTATION.
  5. EVALUATION LICENSE INSTALLATION.
  6. SUPPORT.

1. WHAT YOU SHOULD DO

   Please complete the following steps to install MOSEK.

   a. Download and unpack the appropriate file, see Section 2 for
      details.

   b. Setup the appropriate operating system variables environment variable.
      The following table shows which variables that should be defined
      on each operating system.

      Variable name          : Operating system      : See Section
      ------------------------------------------------------------
```

```
   LD_LIBRRY_PATH         : HPUX/LINUX/SOLARIS    : 3.1
   LIBPATH                : AIX                   : 3.2
   DYLD_LIBRARY_PATH      : MAC OSX               : 3.3
   MOSEKLM_LICENSE_FILE   : All operating systems : 3.5
   ------------------------------------------------------------
```

c. Optionally setup the PATH variable. See Section 3.4 for details.

2. UNPACKING.

Obtain the appropriate distribution file from the MOSEK web site and unpack it. Names of the distribution file for each supported platform are listed below:

mosektoolsaixrs6k.tar.gz	IBM AIX RS6K.
mosektoolsaixrs6k64.tar.gz	IBM AIX RS6K. 64 bit version.
mosektoolshpuxpa32.tar.gz	HP UX v11 PA-RISC.
mosektoolshpuxpa64.tar.gz	HP UX v11 PA-RISC. 64 bit version,
mosektoolslinux32x86.tar.gz	Linux Intel X86 32bit version/glibc 2.3.
mosektoolslinux64x86.tar.gz	Linux x64 (AMD and Intel CPUs).
mosektoolslinuxia64.tar.gz	Linux on Itanium 64 bit.
mosektoolslinuxintel.tar.gz	Linux Intel X86 32bit version/glibc 2.2.
mosektoolsosx32ppc.tar.gz	MAC OSX 32 bit.
mosektoolssolarissparc.tar.gz	Solaris Sparc.
mosektoolssolarissparc64.tar.gz	Solaris Sparc. 64 bit version.
mosektoolssolarisintel.tar.gz	Solaris Intel.

Unpacking the distribution file will create a directory named

mosek/<version>/tools

which have the subdirectories

help/	: The MOSEK help desk.
doc/	: Manuals in HTML and PDF format.
doc/license	: License conditions.
platform/	: Binaries and libraries.
platform/<platform>/h/	: Include files.
examp/	: Example files.
scripts/	: Useful shell scripts.
test/	: Test scripts for MOSEK installation.

where <platform> is the platform key i.e. for instance linux32x86.

3. OPERATING SYSTEM ENVIRONMENT VARIABLES

```
MOSEK requires some shared libraries i.e.
all the shared libraries in

mosek/<version>/tools/platform/<platform>/bin

3.1 LD_LIBRARY_PATH (HPUX/LINUX/SOLARIS)

   In order to make them accesible, then the OS environment variable

   LD_LIBRARY_PATH

   should point to this directory. How to do that
   is dependent on the shell you are using.

   3.1.1 SH AND BASH SHELLS.

      If you are using the sh or bash shells you set LD_LIBRARY_PATH using the commands

      LD_LIBRARY_PATH=$HOME/mosek/<version>/tools/platform/<platform>/bin:$LD_LIBRARY_PATH
      export LD_LIBRARY_PATH

   3.1.2 CSH SHELL.

   If you are using a CSH shell you can set it as follows

   setenv LD_LIBRARY_PATH  $HOME/mosek/<version>/tools/platform/<platform>/bin:$LD_LIBRARY_PATH

3.2 LIBPATH (AIX)

    On the IBM AIX platform you need to set the LIBPATH variable i.e.

    LIBPATH=$HOME/mosek/<version>/tools/platform/aixrs6k/bin:$LIBPATH
    export LIBPATH

3.3 DYLD_LIBRARY_PATH (MAC OSX)

    On the MAC OSX platform you need to set the DYLD_LIBRARY_PATH variable i.e.

    DYLD_LIBRARY_PATH=$HOME/mosek/<version>/tools/platform/osx32ppc/bin:$DYLD_LIBRARY_PATH
    export DYLD_LIBRARY_PATH

    You may have to the DYLD_LIBRARY_PATH spefication to your

    $HOME/.MacOSX/environment.plist
```

```
    file.

3.4 PATH

    You may consider adding the path

    mosek/<version>/tools/platform/<platform>/bin

    to environment variable $PATH. <platform> represent the
    platform id e.g. solaris/sparc.


3.5. MOSEKLM_LICENSE_FILE

    You should set operating system environment variable

    MOSEKLM_LICENSE_FILE

    to

    $HOME/mosek/<version>/licenses

    where $HOME/ represent the directory where you installed MOSEK.

3.4. Startup file

   You may want to add the commands executed in the previous section
   to your startup file. The startup file for a bash shell is  ~/.bashrc

4. ONLINE DOCUMENTATION

   Load the file

   mosek/<version>/tools/help/help.html

   into your browser for online help.

5. EVALUATION LICENSE INSTALLATION

   If you using MOSEK with an evaulation license, then
   do NOT try to install the license server (lmgrd).

   Setting the MOSEKLM_LICENSE_FILE environment variable
   is all that is required. Normally setting it as

   MOSEKLM_LICENSE_FILE=$HOME/mosek/<version>/licenses/mosek.lic
```

```
   should work where <version> is the MOSEK version i.e. for instance 3.

6. SUPPORT

   In case of problems then consult the frequently asked question
   chapter in the user's manual. Or contact the MOSEK support
   at the email address

   support@mosek.com
```

Appendix B

Operating system environment variables

This appendix discusses how add and modify operating system environment variables for different operating systems.

B.1 Windows NT/2000

On Windows NT/2000 choose the system icon from

```
\start\Settings\Control Panel\
```

Next choose the environment tab. This tab allows you add new environment variables and to modify existing environment variables.

B.2 Windows XP

1. Right-click of the *My computer* icon in the start menu.
2. Choose *Properties*.
3. Choose *Advanced* tab.
4. Choose *Environment variables*.
5. You can now add new variables or modify an existing old variable.

B.3 MAC OSX

Usually you can setup operating system variables on MAC OSX as you would do under UNIX as explained in Section B.4.

Sometimes it necessary to create file named

```
$HOME/.MacOSX/environment.plist
```

or if the file exists you should add some lines to file. An example `enviroment.plist` file is shown below

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC
  "-//Apple Computer//DTD PLIST 1.0//EN"
  "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
    <key>MOSEKLM_LICENSE_FILE</key>
    <string>/home/user/mosek/4/licenses/mosek.lic</string>
    <key>DYLD_LIBRARY_PATH</key>
    <string>/home/user/mosek/4/tools/platform/osx32ppc/bin</string>
</dict>
</plist>
```

Note in the `dict` scope the value of the relevant MOSEK operating system variables are defined. For further explenation see http://developer.apple.com/qa/qa2001/qa1067.html.

B.4 UNIX

How to set and modify operating system environment variables in a UNIX environment is dependent on shell. For `csh` and `tcsh` environment variables are defined using the command

```
setenv MYVAR some_value
```

whereas in `bash` and `sh` shells environment variables are defined using the commands

```
MYVAR=some_value export MYVAR
```

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