



Questions and Answers

AutoCAD 2004 Network Licensing

1. Overview

In AutoCAD® 2002, Autodesk introduced a new network license manager, FLEX/*m*® from Macrovision Corporation. With the release of AutoCAD® 2004 software, Autodesk continues to enhance the capabilities of this license management software by supporting the new license borrowing capability in the latest FLEX/*m* version. AutoCAD 2004 also includes support for the timeout feature, another key FLEX/*m* license management tool.

This document provides an in-depth look at the new FLEX/*m* features in AutoCAD 2004 software and reviews the basic FLEX/*m* technology and how it works. At the end of this paper is a section for users who are making the transition from the older Élan network licensing software used with AutoCAD 2000i and earlier releases.

2. License Borrowing

2.1 What is license borrowing?

License borrowing is a new capability of FLEX/*m* and AutoCAD 2004 that allows licenses that normally reside on the license server to be bound to a user's workstation for a fixed period. During this time, maintaining a license does not require any communications with the license server. At the end of the license borrowing period, the license is automatically disabled on the user's workstation, and the license server increases its pool of available licenses by one. The user also may return the license to the server pool early if it's no longer needed. A common use of license borrowing is taking a laptop, with an AutoCAD license bound to it, on a trip where access to the license server is not possible.

With the new license borrowing utility in AutoCAD 2004, users can borrow any Autodesk product that has enabled license borrowing. This utility acts as a front end to the *lmttools* utility, which is how Macrovision controls the use of license borrowing. Autodesk created this license borrowing utility for two primary reasons:

1. The *lmttools* utility is a powerful general-purpose utility (among other things, it can be used to shut down the license server). In addition to the potential for abuse, it contains many features that are not relevant to license borrowing.
2. The *lmttools* user interface is designed for a systems administrator, not a CAD user. The AutoCAD license borrowing utility has been designed and tested with the usability requirements of a CAD user in mind.

2.2 How do I control my users' borrowing of licenses?

Since borrowing removes a license from your server's license pool, you may want to restrict how many licenses can be borrowed and who is allowed to borrow them. There are three key options file controls that you can use to control license borrowing.

BORROW_LOWWATER sets the maximum number of licenses that can be borrowed (by product) on a license server. INCLUDE_BORROW and EXCLUDE_BORROW enable you to specifically include or exclude individual users, groups of users, specific workstations, and so forth.

2.3 What is the maximum period my users can borrow licenses?

The Autodesk license file sets the maximum period at 30 days. You can then set a shorter period (if necessary) through the ADLM_BORROWMAX environmental variable (described in the Autodesk Network Licensing Guide). Based on this maximum, your user selects the actual borrowing period desired. This borrowing period is set in days so that the license is always deactivated on the individual's workstation at midnight on the last day of the borrowing period.

2.4 Can users return their licenses early?

Yes, using the license borrowing utility, a user can return a license early (if connected to the license server).

2.5 How does the license borrowing utility work?

The utility sets the same parameters on the license server and local workstation as those provided by the lmttools utility. This means that the utility sets the environment on the user's desktop to begin borrowing licenses. The actual license borrowing is accomplished by running the application. As each application is run, the utility indicates that the license has been borrowed. When the utility is closed, no more borrowing occurs. If a user leaves the utility open inadvertently, licenses borrowed unintentionally can be returned.

2.6 How does a user know that a license has been successfully borrowed?

When the user launches the AutoCAD product (or any other borrowed product), the license borrowing utility notifies the user that the license has been borrowed and indicates the number of days left until the license expires.

2.7 Can users borrow licenses if they are traveling and their previous licenses have expired?

They must be able to connect to your network and to acquire licenses from the appropriate license server. If you have configured your network to allow access (for example, through a VPN and dial-up connection, or a local office that is connected by a WAN back to your office), then your users should be able to borrow subsequent licenses in exactly the same way they did at your home office.

2.8 Does AutoCAD 2004 support the timeout feature in the options file?

AutoCAD 2004 now supports the timeout feature in the options file. Timeout defines the maximum time a license may sit idle before the license server reclaims it. AutoCAD 2002 did not support this feature, because there was no process for determining when an AutoCAD session was idle. With the AutoCAD 2004 program, the process is now included as a feature supported through the options file. Systems administrators can use timeout to enforce the return of licenses to the license pool when they are not being used. The behavior of a license reclaimed by the timeout setting is the same as that exhibited by a license that loses communication with the license server.

3. FLEX/m Basics

3.1 How does FLEX/m work?

FLEX/m is a client-server application toolkit. The software/client requests a license from the license server and is either granted or denied the license.

The main FLEX/m components are

- lmgrd
- License file
- Vendor daemon(s)
- License administration tools (lmutil, lmdiag, lmstat, and so forth)

The user installs lmgrd and the vendor daemon on the computer specified in the licenses. Once the license file(s) and the daemons are in place, the only requirement is to start lmgrd. The daemon is typically started when the machine boots (on Microsoft® Windows® as a system service) but can also be started manually by any user.

When the AutoCAD 2004 network version is started, a request for a license token is sent to the FLEX/m license server. If a license is available, it is granted, and the AutoCAD 2004 application starts on the workstation. Once a license has been granted, a "heartbeat" is established between the AutoCAD session and the license server. The frequency of this heartbeat is once per minute. When the AutoCAD session ends, the license token is returned to the server and the heartbeat is terminated. The FLEX/m license server is passive in that it does not advertise itself, thus it does not generate unnecessary network traffic.

3.2 What are the components of the FLEX/m license server?

The following terms are used to describe FLEX/m concepts and software components:

Feature—Any functionality requiring licensing. The meaning of a feature depends entirely on how it is used by each application. For example, a feature could represent any of the following:

- An application software system consisting of hundreds of programs
- A single program (regardless of version)
- A specific version of a program
- A part of a program
- A piece of data

Client—An application program requesting or receiving a license.

Daemon—A process that must continuously run in the background and is often designed to respond to requests from other processes across a network. On Microsoft® Windows NT®, daemons are called "services." When services respond to requests, they are known as the "server" half of a client/server architecture.

Vendor Daemon—The daemon or service that dispenses licenses for the requested features. This daemon is built by a software provider with FLEX/m libraries supplied by Macrovision Corporation. The Autodesk vendor daemon name is *adskflex*.

lmgrd—The daemon process, or license server, that directs client processes to the correct vendor daemon. The same lmgrd can be shared by all applications from all vendors, because this daemon neither authenticates nor dispenses licenses. lmgrd processes few user requests on its own but forwards these requests to the vendor daemons.

License File—A file distributed with software that enables and restricts the usage of specified features and behaviors.

The three principal components of the FLEX/*m* network licensing system are the master daemon, the vendor daemon, and the license file. These components can be configured and managed with a GUI interface tool, *lmtools.exe*, or a command-line interface, *lmutil.exe*. At the option of the administrator, FLEX/*m* is capable of writing a debug log file and report log file. The administrator can create a vendor-specific options file to control license access and specify report log placement.

A single instance of the master daemon is run on the license manager system, regardless of how many products or even software vendors are being served. When an application such as AutoCAD software sends a request for a license, it first contacts this master daemon, which directs the request to the proper vendor daemon.

Once the master daemon passes a license request to the vendor daemon, all license interactions occur between the application (AutoCAD) and the vendor daemon (adskflex). Adskflex authenticates requests against the license file that contains information about the number of licenses authorized for each product feature and is tied to the license server by the Ethernet MAC address.

If the administrator elects to create a vendor-specific options file, license access can be reserved or denied based on workstation host name, user login name, or IP address. The options file also enables an administrator to reserve licenses for a user. Administrators specify report log creation in the options file to be used by the SAMreport-Lite tool.

4. Host ID

4.1 How is the host ID used?

The host ID is used to communicate between the license manager and the AutoCAD 2004 software. The license manager uses the host ID to distinguish itself from other computers running license managers, and the AutoCAD application uses the host ID to identify which computer to request a license from.

4.2 How do I get the system host ID?

When you create deployments, the Network Setup wizard prompts you for the server host name and server host ID. The server host name is the name of the computer running FLEX/*m*, and the server host ID is the MAC address of the network card from the host server. To obtain the server host ID, run *lmtools.exe* from the computer where FLEX/*m* is installed. *lmtools.exe* can be installed from the AutoCAD 2004 CD browser. Installing the Network License Manager is step 2 on the Network Deployment tab. The host ID is the Ethernet address found on the System Settings tab in the *lmtools* window. The host ID is the identification key used to bind the license file to a particular license server machine. The Network Setup wizard also creates a license file from the information supplied, telling AutoCAD 2004 software where to find the license manager.

5. FLEX/*m* Versions

5.1 How can I tell which version I'm using?

Use the *lmutil lmver* command, or you can run *lmtools.exe*. When using *lmtools*, go to the Utilities tab, navigate to the FLEX/*m* file, and click the Find Version button.

5.2 I have products from several companies at various FLEX/m version levels. Do I have to worry about how these versions work together?

If you're not combining license files from different vendors, the simplest thing to do is to run them separately, making sure you use the tools (especially *lmgrd* and the vendor daemon) that are shipped by each vendor.

Newer versions of *lmgrd* always support older versions of vendor daemons and applications. If you have combined license files from two vendors, you must use the latest version of *lmgrd*.

If you've received two versions of a product from the same vendor, you must use the latest vendor daemon. An older vendor daemon with a newer client may cause communication errors.

5.3 I've received a new copy of a product from a vendor, and it uses a new version of FLEX/m. Is my old license file still valid?

Yes. Older FLEX/m license files are always valid with newer versions of FLEX/m.

6. License File Locations

6.1 My AutoCAD program cannot seem to find the license file. What can I do?

For Autodesk products using FLEX/m, the license files reside on the license server and are used by the master daemon and vendor daemon to distribute licenses.

Created with the deployment and installed with each application to the client workstation is a file named *licpath.lic*, which contains the path information to the license server.

Based on the error code displayed, you can reference the specific error in the FLEX/m documentation.

6.2 I have received FLEX/m license files from two different companies. Do I need to combine them?

You don't need to combine license files. You can have any number of separate license files, with different *lmgrd* server processes supporting each file. Moreover, because *lmgrd* is a lightweight process, running separate license files is often the simplest way to proceed for sites without systems administrators.

6.3 When is it recommended to combine license files?

Many systems administrators, especially for larger sites, prefer to combine license files to ease administration of FLEX/m licenses. It's purely a matter of preference. Autodesk recommends running separate license files.

7. License File Contents

7.1 What are the components of a license file?

The license file contains licensing information provided by Autodesk. You obtain license file data when you register.

The license file contains information about network server nodes and vendor daemons, and an encrypted digital signature created when Autodesk generates the license file. The following is an example of the contents of a license file:

```
SERVER ServerName HostID
USE_SERVER
VENDOR VendorDaemon port=portnumber
```

```

INCREMENT IncrementName VendorDaemon Version ExpirationDate
NumberofLicenses \
  VENDOR_STRING=UsageType:LicenseBehavior SUPERSEDE
DUP_GROUP=DupGroup \
  ISSUED=IssueDate ck=xxx SN=SerialNumber SIGN=nnnnnnnnnnnn

```

The following table defines each license file parameter.

Parameter	Definition
ServerName and HostID	Binds the license to a particular server.
VendorDaemon	The name of the server-side Autodesk license daemon.
Portnumber	Reserved and assigned for use only for Autodesk products running the Autodesk/FLEX/m vendor daemon.
IncrementName	Name of the product or feature.
Version	Internal version number.
ExpirationDate	The date when the license expires.
NumberofLicenses	Specifies the number of licenses to be managed by a particular server or redundant server pool.
VENDOR_STRING	Defines the license configuration settings, UsageType and LicenseBehavior.
SUPERSEDE	Replaces existing lines in a license file that have a date earlier than the defined IssueDate. The Autodesk policy for modifying an existing license is to reissue the entire license file. Because there can be multiple INCREMENT lines, the SUPERSEDE/ISSUED parameters are used to replace any previous product or feature of the same name.
DupGroup	Defines how the server handles the sharing of multiple license requests. The default for this behavior is Host, which allows for multiple sessions on the same computer to share the same license.
IssueDate	The date the license file was generated by Autodesk.
ck=	Can be used with the Imcksum utility to help verify that the license administrator has entered the license information correctly.
SerialNumber	The serial number of the Autodesk product.
SIGN=	The encrypted signature used to authenticate the attributes of the license file.

Following is an example of a completed license file for a single or distributed server model:

```

SERVER pc12345 123456789012
USE_SERVER
VENDOR adskflex port=2080
INCREMENT 41100ACD_2004_OF adskflex 1.000 permanent 3 \
  VENDOR_STRING=commercial:permanent SUPERSEDE DUP_GROUP=H \
  ISSUED=22-jun-2003 ck=231 SN=399-99999999 SIGN=6E88EFA8D44C

```

Following is an example of a completed license file for a redundant server model:

```
SERVER PC54321 210987654321 27005
SERVER PC12345 123456789012 27005
SERVER PC32154 321543210981 27005
USE_SERVER
VENDOR adskflex port=2080
INCREMENT 41100ACD_2004_OF adskflex 1.000 permanent 3 \
    VENDOR_STRING=commercial:permanent SUPERSEDE DUP_GROUP=H \
    ISSUED=22-jun-2003 ck=346 SN=399-99999999 SIGN=FE311B4A0B40
```

Note: The redundant server model requires the addition of a port number (the default is 27005) for each server.

The license file is located on a network share that you specify in the Network Setup wizard. The license file is required for using AutoCAD 2004 software on a network. As a result, the license file must be located on a network share that is accessible to every user who runs AutoCAD 2004 from a network installation.

8. Using FLEX/m

8.1 How do I obtain and set up the FLEX/m license file?

The license file identifies important licensing information, including license type and behavior, and the number of licenses available for use.

To obtain a license file:

1. Obtain the following information:
 - Product serial number(s)
 - Server name
 - Host ID number
 - An email address where Autodesk can send the license file
2. Contact the Autodesk Registration and Authorization office and provide all required information specified in the previous step. Refer to Chapter 3 of the *Network Licensing Guide* for the best way to contact your local Autodesk Registration and Authorization office.

The Autodesk Registration and Authorization office will email you the license file in text format.

To set up a license file:

1. Copy the contents of the license file (from the email) to a text editor.
2. Save the file to the `\Autodesk License Manager\license` folder. You can name the license file anything you want; however, the name must have a `.lic` or `.dat` extension.

8.2 How do I configure and start the FLEX/m license server?

You configure the license server with the `lmttools.exe` utility.

To configure the license server:

1. From the Windows Start button, go to Programs>Autodesk License Manager>Tools>`lmttools.exe`.

or

In Windows Explorer, go to the *Autodesk License Manager* folder (or the *netsetup\support\AdLM* folder on the CD) and double-click *Imtools.exe*.

2. On the Service/License File tab, select the Configure Using Services option.
3. Click the Configure Services tab.
4. In the Service Name drop-down list, verify that the service you want to use to manage AutoCAD 2004 licenses is selected.

If no service name exists, enter the service name you want to use to manage AutoCAD 2004 licenses.

Note: If you have more than one software vendor using FLEXlm for license management, this drop-down list will have more than one option.

5. Enter the path to the license manager daemon (*Imgrd.exe*). This daemon is installed in the *\Program Files\Autodesk License Manager* folder.

Note: If you are using distributed servers, the location of the license manager daemon and the license file can vary depending on your configuration.

6. Enter the path to the license file.
7. Enter the path where you want the debug log to be located.
A debug folder will be created in the *\Program Files\Autodesk License Manager* folder.
8. To automatically start *Imgrd.exe* when the system starts, select Start Server at Power Up.
9. To run *Imgrd.exe* as a Windows NT or Windows 2000 service, select Use Services.
10. Choose Save Service to save the new configuration under the service name created in Step 4.
11. Click the Start/Stop/Reread tab.
12. Choose Start Server to start the license server. The license server is running and ready to respond to client requests.

If there are multiple service names, you must click the Service/License File tab, select Configure Using Services, and then select the service name. For each service name, perform steps 11 and 12 to start the service.

8.3 If my client application exits abnormally, does the server free the license?

Yes, unless the client's entire system crashes. The license is freed immediately when the computer is still able to communicate with the license manager. If the entire system crashes, then the license is not freed, and you should use the *Imremove* option of *Imutil.exe* to free the license. You can also create an options file, setting a timeout value where a license is released if communication is lost between the client application and the license server.

If the entire system running the client application crashes or is disconnected before the license is checked in, the license will not be freed automatically. To free the license, use *Imutil Imremove*. Stopping and restarting the server also frees the license, but this is not recommended.

8.4 What happens when the server stops?

AutoCAD software continues running and checks for about 15 minutes to see if the license server has been restored. After that, if the license server is still down, users on each client workstation receive a warning that their license(s) has been lost and are prompted to save their work before exiting.

9. How FLEX/m Works

9.1 What prevents me from changing a license file?

Each feature line in the license file has a 12- or 20-character hexadecimal license key. If anything significant is changed, the key becomes invalid, and the license won't work.

9.2 How fast does a check-out occur?

Check-out speed depends on the operating system and the system or network load. Some tests show that a typical system performs check-outs in about 1/50 second (20 ms).

9.3 Does FLEX/m licensing impose a heavy load on the network?

No. A typical check-out request requires five messages and responses between client and server, and each message is less than 150 bytes.

When a server is not receiving requests, it requires virtually no CPU time.

9.4 Does FLEX/m work with ATM, ISDN, token ring, and so on?

These are not officially supported, but, in general, they have no impact on FLEX/m. Because FLEX/m requires TCP/IP, as long as TCP/IP works, FLEX/m will work.

9.5 Does FLEX/m work with subnets, fully qualified names, multiple domains, and so forth?

Yes.

9.6 We are using FLEX/m over a wide-area network. What can we do to improve performance?

Setting up your license configuration as a distributed server model improves performance over a wide-area network.

10. Redundant Servers

10.1 What are redundant servers?

With a redundant server model, you can use three servers to authenticate a single license file. One server acts as the master, while the other two provide backup if the primary server fails. Using this configuration, the system continues to monitor and issue licenses as long as at least two servers are functional.

If you use the redundant server model, all servers must reside on the same subnet and have consistent network communications. (Slow, erratic, or dial-up connections are not recommended.) This model does not support the User Datagram Protocol (UDP) packet type.

To create a redundant server pool, run the Network Setup wizard on the first server you want to configure, and then repeat the AdLM run tree installation for the other two servers. To get proper license authorization, you must obtain the host ID and server name for each server in the redundant server pool before contacting Autodesk.

Redundant servers require a quorum of two servers to be up, or no licenses are served.

10.2 How do I start redundant servers?

Once all client workstations are installed and are communicating with the license server, you must modify the *licpath.lic* file on each client workstation to include server information for each of the three servers. Following is an example of the contents of the *licpath.lic* file:

```
SERVER PC54321 210987654321
USE_SERVER
```

Following is an example of a *licpath.lic* file modified for a redundant server operation:

```
SERVER PC54321 210987654321 27005
SERVER PC12345 123456789012 27005
SERVER PC32154 321543210981 27005
USE_SERVER
```

The redundant server model requires a port number (the default is 27005) for each server.

Note: The port number at the end of each SERVER line must also be included in the license file for the redundant server model only.

The redundant server model requires Microsoft® Windows NT® Server 4.0 or Windows® 2000 Server. Windows NT/2000 Workstation editions are not supported.

The redundant server model also requires that separate copies of the same license file, the license manager daemon (lmgrd), and the vendor daemon reside on each server; all are necessary to authenticate and release licenses.

11. FLEX/m Versus Élan

11.1 Why has Autodesk changed its network license manager to FLEX/m?

FLEX/m is a more reliable and robust network licensing tool. In addition, it is already in wider use than the previous license manager.

11.2 Will the FLEX/m license server coexist with an existing Élan installation?

Yes, the two license managers can coexist; however, Élan can't be used to manage licenses for AutoCAD 2002 and 2004 and FLEX/m can't be used to manage licenses for AutoCAD 2000i and earlier.

11.3 Does FLEX/m support Novell networks?

You can still deploy and run the AutoCAD application in a Novell® network environment using the FLEX/m license manager. However, the license manager itself must reside on a Microsoft Windows NT Server or Windows 2000 Server installation, and the TCP/IP protocol must be configured and running on your network. If you have a "network deployment" or "thin" installation of AutoCAD, the application components can reside on and be served from a Novell Netware® server. This configuration does not support the IPX/SPX protocol or Novell Loadable Modules (NLM) of FLEX/m.

11.4 How do I generate usage reports with FLEX/m?

Autodesk includes SAMreport-Lite with FLEX/m. You can use SAMreport-Lite to generate summary reports on software usage. A copy of the SAMreport-Lite User's Guide is available for download from the Network Deployment tab of the AutoCAD 2004 CD browser. You need to obtain a license for SAMreport-Lite before you can start reviewing log files. The procedure to do this is explained in the guide.

11.5 Does Autodesk still provide a Network Setup wizard?

Yes, the Network Setup wizard is still included as part of the new network licensing technology and is used to install FLEX/m and create deployments for installing AutoCAD 2004 software on local workstations.

11.6 How do FLEX/m and the Autodesk License Manager from Élan compare?

AutoCAD 2002 and 2004 users see no difference using FLEX/m compared to earlier versions of AutoCAD software that use the Autodesk License Manager provided by Élan. AutoCAD requests a license from the license manager, and that request is either granted or denied. When the user is finished using the software, the license is returned to the license manager.

Both versions of the license manager use the Network Setup wizard to install the license manager. This is where the similarities end.

11.7 What are the FLEX/m equivalent tools when compared to Élan?

Élan uses five program files to control, distribute, and report on license activity. FLEX/m uses only three program files. Following is a comparison of the Élan tools with their FLEX/m counterparts.

Élan Tools	FLEX/m Tools
AdLM Admin	Imtools
Key Directory	Configure Services:Path to license file
Host Name	System Settings:Computer/Hostname
Key (Authorization Code)	License file obtained from Autodesk
Feature Code: Licenses	Server Status:Perform Status Enquiry

Élan Tools	FLEX/m Tools
AdLM Control	Imtools and Imutil.exe
Servers	Server Status:Server Name
Clients	Server Status:Perform Status Enquiry
Bury Client	Imutil Imremove
Zero Log	Switch Report Log
Find Log	Configure Services:Path to Debug Log
Dump Log	No equivalent
AdLM Query	Imtools
Servers	Server Status:Server Name:Perform Status Enquiry
Clients	Server Status:Perform Status Enquiry
Environment	System Settings Server Status:Perform Status Enquiry
Feature	Server Status:Individual Feature:Perform Status Enquiry
AdLM Report	SAMreport-Lite
AdLM Control Panel Applet	Imtools
Start/Stop	Start/Stop/Reread
Settings	Configure Services Options file

AdLM equivalent	Imtools
No equivalent	Utilities
No equivalent	Server Diagnostics

Besides the initial program files, both the FLEXlm and Élan license managers use support files. Following is a list of each file and its default installation location and equivalent.

Élan	FLEXlm
.\ <i>key</i> \<feature number>.lic One .lic file must exist for each application.	.\ <i>license</i> \<file_name>.lic or .dat Multiple Autodesk product license files can be combined into a single file for easier management.
.\ <i>log</i> \adlm.log	.\ <i>log</i> \<file_name>.log
Élan Resource file	FLEXlm Options file
Set in control panel applet and created by user	Created by user and specified in license file

11.8 Does FLEXlm use a server code and authorization code?

FLEXlm has an equivalent for both the server code and authorization code. In FLEXlm the server code is equal to the Ethernet address reported on the System Settings tab in Imtools. The FLEXlm equivalent of the authorization code is the license file that Autodesk emails when you authorize AutoCAD software.

11.9 Will FLEXlm work with AutoCAD 2000 and AutoCAD Release 14?

No. FLEXlm cannot distribute licenses for AutoCAD 2000/2000i or AutoCAD Release 14. FLEXlm can coexist with the AdLM from Élan. The Élan license manager administers AutoCAD 2000/2000i and AutoCAD Release 14 licenses.

11.10 Will Élan administer AutoCAD 2002 and 2004 licenses?

No. Élan cannot distribute licenses for AutoCAD 2002 and 2004. Élan can coexist on the same computer running the FLEXlm license manager. The FLEXlm license manager will administer the AutoCAD 2002 licenses.



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