

Network Licensing Questions and Answers

In the AutoCAD® 2002 software release, Autodesk introduced a new network license manager, FLEXlm® from Macrovision Corporation. The license manager has improved with each release, and continues to evolve with the release of AutoCAD® 2007 software. In addition, AutoCAD 2007 includes a Network License Activation Utility. This document provides an in-depth look at the FLEXlm features in AutoCAD 2007 software and reviews the basic FLEXlm technology and how it works.

1. General Information

1.1 Can I have a back-up license server?

Autodesk does not allow backup servers. However, Autodesk supports Distributed or Redundant server models that allow failover in case your active server stops working.

- **Distributed license server model:** Licenses are distributed across more than one server. A unique license file is required for each server. To create a distributed license server pool, you must run the Network License Manager on each server that is a member of the distributed server pool. The number of licenses available for a given product is the sum of licenses for that product across all distributed server pool members. If one server goes down, users can use the licenses on the remaining servers.

CONTENTS

General Information	1
License Borrowing	3
FLEXlm Basics	4
Host ID.....	6
FLEXlm Versions.....	6
License File Locations	7
License File Contents.....	7
Using FLEXlm.....	9
How FLEXlm Works	10
Redundant Servers .	10
Cascading for Network Licenses.....	11

Network Licensing Questions and Answers AutoCAD 2007

- **Redundant license server model:** Three servers authenticate a single license file. One server acts as the master, while the other two provide backup if the master server fails. With this configuration, licenses continue to be monitored and issued as long as at least two servers still work. You must install the Network License Manager on each server.

1.2 If my server goes down, can I get another license file for my new server?

Yes, Autodesk provides a temporary license to run until your primary server comes back up. If your primary server is permanently disabled, Autodesk reissues a new, permanent license for the new server.

1.3 Can I first deploy my Autodesk licenses on a test server, and then move them to another “production” server?

Yes. To do this, contact the Autodesk registration and activation team so they can issue you a license file that works for 30 days.

1.4 I have a network license system at work that allows me to run Autodesk products while on the network. Am I allowed to run a copy of the products on my home computer, and how do I do this?

The Autodesk Software License Agreement permits an additional installation only on a computer that is owned or controlled by the licensee. This provision is intended to allow employees to work while away from their usual work location. It is not intended to allow employees to install a product on their personal computer over which the licensee has no control.

You have two options:

- Use the License Borrowing utility to check out a license from the network license server on a computer owned by the licensee. Your license is automatically returned to the license server at the end of the day on the return date you set when you borrowed the license. You can also return a license early.
- If you have a VPN (Virtual Private Network) connection into your company, dial up and run the application remotely on a computer owned by the licensee. You do not have to borrow a license from the server.

1.5 I am a customer with a network license, but I want to move two licenses and deploy them as stand-alone. How is this done?

- If you are a current subscription customer, contact the Autodesk Business Center at customercare.abc@autodesk.com and ask to create a new group for that product family with a stand-alone deployment for two seats. The network license is decremented by the number of stand-alone licenses requested. There is no charge, and you can merge all licenses back into one group in the future when you are ready. In EMEA, you sign a software removal form for network license reduction. If it's for a certain period, Autodesk provides a temporary code.
- If it is a perpetual license that is not on subscription, you can get a new license created for two stand-alone seats. Place an order with the Autodesk Business Center at customercare.abc@autodesk.com. The network license is decremented by the number of stand-alone licenses requested. In EMEA, you sign a software removal agreement for this. New products with new deployment type settings and new serial numbers are issued. You can change back again, if necessary (there is a charge to do so). Ask the Autodesk Business Center at customercare.abc@autodesk.com for the specific cost in your region.
- Another option is to exchange two network licenses for two new stand-alone licenses for one seat each (there is a charge to do this). Ask your Autodesk Business Center at customercare.abc@autodesk.com for the cost in your region. As part of this transaction, Autodesk also ships you any necessary media or boxes

1.6 If I am on subscription, how do I run part of my network on the prior release of a product and another part of the network on the current release?

Firstly, you must have owned the prior release. Then, you must request a new network license through Autodesk Business Center customercare.abc@autodesk.com for the number of licenses you wish to run on each version. The license total will not exceed the total number of purchased licenses. If you are not on subscription, Autodesk allows you to do this for 120 days after you have installed the new Autodesk product.

2. License Borrowing

2.1 What is license borrowing?

License borrowing was first introduced in AutoCAD 2004 and allows licenses that normally reside on the license server to be bound to a user's workstation for a fixed period. License borrowing was enhanced in AutoCAD 2006, and is now part of the AutoCAD application. During a borrowing period, 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 is automatically added back into the server pool of available licenses. A user may also return a license to the server pool early.

A common use of license borrowing is for a user who is taking a laptop on a trip where access to the license server is not available. In this case a license is borrowed from the license pool on the server for a specified period, and then resides on the laptop until the borrowing period expires, or the license is returned by the user when they next connect to the server.

License borrowing is integrated in AutoCAD 2006 and AutoCAD 2007, and users can borrow a license from within AutoCAD. By integrating license borrowing into AutoCAD there is no longer a need for a separate utility or to use LMTOOLS utility from Macrovision.

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. These restrictions are controlled by editing the Options file on the license server. 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 (per product) on a license server. INCLUDE_BORROW and EXCLUDE_BORROW enable you to specifically include or exclude individual users, groups of users, and specific workstations.

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

The Autodesk license file sets a maximum borrowing period that is available for the software. You can then set the borrowing period to any value up to the maximum using the ADLM_BORROWMAX environmental variable (described in the Autodesk Network Licensing Guide). You, as a user, can then select your own desired borrow period up to the limit set by the administrator. 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.

Network Licensing Questions and Answers AutoCAD 2007

2.4 Can users return their licenses early?

Yes, a user must be connected to the license server to return the license.

2.5 How do users borrow a license?

In AutoCAD 2006 and AutoCAD 2007, licenses are borrowed directly from within the application using the Tools > License Borrowing menu option.

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

When you launch the application, you are notified through the Communication Center balloon notification that you are running under a borrowed license. The notification informs you that the license has been borrowed and indicates the number of days left until the license expires.

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

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

2.8 Does AutoCAD 2007 support the timeout feature?

Yes. The timeout feature is supported through the Options file. Timeout defines the maximum time a license may be idle before the license server reclaims it. Administrators can use the 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. FLEXlm Basics

3.1 How does FLEXlm work?

FLEXlm is a client-server application. The software client (the software application) requests a license from the license server and is either granted or denied a license by the license server.

The main FLEXlm components are

- Lmgrd.exe – referred to as the Master daemon – a small application that communicates with all Vendor daemons
- Adeskflexe.exe – referred to as the Vendor daemon – a small monitoring application that runs all the time on the server
- A License file (or files, for some configurations)
- License administration applications (lmutil, lmdiag, lmstat, and so forth)

The user installs lmgrd.exe and the vendor daemon on the computer specified in the license file. The license file is obtained from Autodesk and the license manager is configured using LMTOOL.exe. 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 using LMTOOLS.exe.

Network Licensing Questions and Answers AutoCAD 2007

When the AutoCAD 2007 network version is started, a request for a license is sent to the FLEXlm license server. If a license is available, it is granted, and the AutoCAD 2007 application starts on the workstation. Once a license has been granted, a communication (called a "heartbeat") is established between the AutoCAD session and the license server. The frequency of the heartbeat (communication) is approximately once per minute. When the AutoCAD session ends, the license is returned to the server and the communication is terminated. The FLEXlm license server is passive in that it does not communicate itself, and thus it does not generate unnecessary network traffic.

3.2 What are the components of the FLEXlm license server?

The following terms are used to describe FLEXlm concepts and software components:

Feature—Any functionality requiring licensing. For Autodesk applications, each application has a uniquely defined feature. For AutoCAD 2007, the feature is 51200ACD_2007_OF and can be seen in your license file.

Client—An application program requesting or receiving a license.

Daemon—A process (program) that must continuously run in the background and is often designed to respond to requests from other processes across a network. On Microsoft Windows, 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 FLEXlm 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 FLEXlm 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, FLEXlm 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 network interface card's 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 2007 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 Deployment Wizard prompts you for the server host name and server host ID. The server host name is the name of the computer running FLEXlm, and the server host ID is the MAC address of the network card from the host server. The Deployment Wizard can look up the server host ID of the computer specified under server host name. If the Deployment Wizard is unable to look up the server host ID it can be obtained by running *lmtools.exe* from the computer where FLEXlm is installed. *LMTOOLS* can be installed from the AutoCAD 2007 Media Browser by installing the Network License Manager found under Network Deployment. The server host ID is the Ethernet address found on the System Settings tab in the *LMTOOLS* window. The server host ID is the identification key used to bind the license file to a particular license server machine. The Deployment Wizard also creates a license file (*licpath.lic*) from the information supplied on the local workstation during installation, telling AutoCAD 2007 software where to find the license manager.

5. FLEXlm 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 FLEXlm file, and click the Find Version button.

5.2 I have products from several companies at various FLEXlm 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 FLEXlm. Do I need to update FLEXlm?

Yes. You need to update the license manager. After backing up the license file and stopping the service, uninstall the current version and install the newer version.

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

Yes. Older FLEXlm license files are always valid with newer versions of FLEXlm.

6. License File Locations

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

For Autodesk products using FLEXlm, 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.

Note: Distributed server configurations do not use *licpath.lic*. Instead an environment variable `ADSKFLEX_LICENSE_FILE` is set which specifies the server search order.

Based on the error code displayed, you can reference the specific error in the FLEXlm documentation to resolve why AutoCAD cannot retrieve a license.

6.2 I have received FLEXlm 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 FLEXlm licenses. It's purely a matter of preference. Autodesk recommends running separate license files between different companies software. Autodesk recommends combining Autodesk 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 authorize the Network License Manager.

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 <Expiration>
NumberofLicenses \
    VENDOR_STRING=UsageType:LicenseBehavior BORROW=###
SUPERSEDE \
DUP_GROUP=DupGroup ISSUED=IssueDate SN=SerialNumber
SIGN=nnnnnnnnnnnn \
```

Network Licensing Questions and Answers AutoCAD 2007

The following table defines each license file parameter.

Parameter	Definition
ServerName and HostID	Binds the license to a particular server and network adapter.
VendorDaemon	The name of the server-side Autodesk license daemon (adskflex).
Portnumber	Reserved and assigned for use only for Autodesk products running the Autodesk/FLEXlm vendor daemon. By default port 2080.
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.
BORROW	Keyword allows license borrowing.
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.
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 issuing 3 licenses:

```
SERVER NLMSVR1 000476e5cb3d
USE_SERVER
VENDOR adskflex port=2080
INCREMENT 51200ACD_2007_OF adskflex 1.000 permanent 3 \
  VENDOR_STRING=commercial:permanent BORROW=4320 SUPERSEDE \
  DUP_GROUP=UH ISSUED=10-MAR-2006 SN=341-12345678 SIGN="1FBC
  0A61 9D93 AA5E A581 BFB3 AAE5 17D6 08EC 2814 E51C 638D"
```

Network Licensing Questions and Answers AutoCAD 2007

Following is an example of a completed license file for a redundant server model issuing 10 licenses:

```
SERVER NLMSVR1 0002008B5DB2 27005
SERVER NLMSVR2 00020086FC64 27005
SERVER NLMSVR3 00020086FC50 27005
USE_SERVER
VENDOR adskflex port=2080
INCREMENT 51200ACD_2007_0F adskflex 1.000 permanent 10 \
  VENDOR_STRING=commercial:permanent BORROW=4320 SUPERSEDE\
  DUP_GROUP=UH ISSUED=13-Mar-2006 SN=341-01234567
SIGN="0D6B \
  36CE B604 B481 1709 C6E5 EC24 BA3F 549F D5DD EB90 3497"
```

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

8. Using FLEXlm

8.1 How do I obtain and set up the FLEXlm license file?

The easiest method is to use the AutoCAD 2007 Network License Activation Utility. Install the utility and run the application to obtain your license file. The utility is available for installation from the Network Deployment option of the Media Browser. 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 manually:

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.

The Autodesk Registration and Authorization office will email you the license file in text format, usually as an attachment to an email.

To set up a license file:

Copy the attachment 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 FLEXlm license server?

You configure the license server with the *lmtools.exe* utility. LMTOOLS is installed as part of the Autodesk Network License Manager. For specific steps see the technical white paper, "Installing the Autodesk Network License Manager for AutoCAD 2007 or other AutoCAD 2007-based Products."

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 *lmremove* option of *lmutil.exe* to free the license or fix the problem and restart AutoCAD on the computer that

crashed. 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.

8.4 What happens when the server stops?

AutoCAD software continues running and checks for a period to see if the license server has been restored and is available again. After that, if the license server is still not available, users on each client workstation receive a warning that their licenses have been lost and are prompted to save their work before exiting.

9. How FLEXlm 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 FLEXlm 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 FLEXlm work with ATM, ISDN, token ring, and so on?

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

9.5 Does FLEXlm work with subnets, fully qualified names, and multiple domains?

Yes.

9.6 We are using FLEXlm over a wide-area network (WAN). 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 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.

Network Licensing Questions and Answers AutoCAD 2007

To create a redundant server pool, install the network license manager on all three servers that make up the redundant server pool. 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?

The redundant server model requires Microsoft Windows 2000 Server or Windows 2003 Server. Windows 2000 Workstation editions are not supported. To start the redundant servers, use LMTOOLS.exe on each server and start each server within three minutes.

Note: The redundant server model 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. Cascading for Network Licenses

11.1 What is Cascade Licensing?

Cascade Licensing allows a product to grab the least expensive license from a network license manager pool when the license manager is servicing more than one product.

For example, you have purchased network licenses for both AutoCAD and Revit Series. In the past when AutoCAD from Revit Series is launched it would always grab a license from the Revit Series pool. If no license is available it would fail to run. With Cascade licensing, AutoCAD from Revit Series would first try to grab a license from AutoCAD pool or the least expensive license. If no license is available it will grab a license from the Revit Series pool.

11.2 Does Cascade Licensing work for stand-alone licenses?

No. This feature relates only to Network Licensing, and the manner in which licenses are drawn from a network license pool on the server.

11.3 How does Cascade Licensing work?

Implementation of cascading licenses allows a user to utilize licenses from more than one license pool on a server, based on a sequence of priorities.

For 2006 based products the network license manager allows product groups to ship a series of software which can all run using a single license. For example, Autodesk Inventor Series is shipped containing Autodesk Inventor, AutoCAD Mechanical, and Mechanical Desktop. A user who has these three applications installed on their computer can launch all three products concurrently, and will only consume a single license from the pool.

Cascading licenses will allow users who have purchased licenses for a series product, and have also purchased licenses separately for a product which is a component of the series to draw licenses from the lower-end individual product first before drawing licenses from the more expensive series pool.

Cascading license will "cascade" from the first priority product to the last priority product. When a new product is installed the cascading sequence is automatically enabled on the server.

11.4 How can I turn Cascading on?

Cascading licenses are not turned on or turned off. Cascading licensing is a feature of the network license manager and is enabled through the license file. If an application supports cascading license, the license file will contain a plist, or prioritized list of products.

11.5 How is Cascading prioritized and which products use it?

For each list of products below, the application will try to grab a license from the product listed first.

Prioritization for Infrastructure products:

1. Autodesk Land Desktop Licenses
2. Autodesk Civil 3D Licenses
3. Autodesk Civil 3D Pro Licenses

So Land Desktop will try to first grab a license from the Land Desktop license pool but if a license is not available it will try Autodesk Civil 3D, and lastly Autodesk Civil 3D Pro before denying a license.

Prioritization for Mechanical products:

1. AutoCAD Mechanical / Mechanical Desktop Licenses
2. Autodesk Inventor Series Licenses
3. Autodesk Inventor Pro Licenses

So AutoCAD Mechanical will try to first grab a license from AutoCAD Mechanical license pool. If a license is not available it will try Autodesk Inventor Series and lastly Autodesk Inventor Pro. Inventor will first try to grab a license from Inventor Series first followed by Inventor Pro.

Prioritization for Building system products:

1. AutoCAD Licenses
2. Revit Series Licenses

So AutoCAD will try to grab a license from AutoCAD pool first before trying to grab a license from the Revit Series license pool.

11.6 Can I change how Cascading prioritized?

No, the prioritization is stated as above.