

# **Arm Licence Server User Guide**

Version 20.1.3

The Arm logo, consisting of the lowercase letters 'arm' in a bold, blue, sans-serif font.

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**Product Status**

The information in this document is Final, that is for a developed product.

**Web Address**

<http://www.arm.com>

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# Introduction

Arm Licence Server provides licensing support for [Arm Allinea Studio](#) and [Arm Forge](#). This user guide describes how to install and use Arm Licence Server.

There are three licensing models for Arm HPC products:

- Evaluation (Trial) licenses
- Workstation (Node-locked) licenses
- Supercomputing (Floating) licenses

For evaluation and workstation licenses, the license file is copied to the Arm product installation directory, *{installation-directory}/licences*, and Arm Licence Server is not required.

For supercomputing licenses, Arm Licence Server is required.

**Note:** If you use a remote client, the license is configured on the remote system. A local license is not required.

Installation of licenses is discussed further in the [Adding a new license](#) section.

When you have determined that Arm Licence Server is a requirement for your site, you can proceed with [Installation](#).

## Online resources

You can find links to tutorials, training material, webinars, and white papers in our online knowledge center:

**Knowledge Center** [Help with the Arm HPC tools](#)

You can find the latest version of this user guide, and a list of known issues on the HPC web pages:

**Documentation** [Arm Developer website](#)

## Obtaining help

You can contact Arm support at [Arm support](#).

# Installation

A release of Arm Licence Server may be downloaded from the [Arm Developer website](#).

## Linux installation

Arm Licence Server is only available for Linux systems. The install script `textinstall.sh` should be used:

```
tar xf arm-licence server-20.1.3-<distro>-<arch>.tar  
cd arm-licence server-20.1.3-<distro>-<arch>  
./textinstall.sh
```

replacing `<distro>` and `<arch>` with the OS distribution and architecture of your tar package, respectively. For example, the tarball package for Redhat 7.4 OS and Armv8-A (AArch64) architecture is: `arm-licence server-20.1.3-Redhat-7.4-aarch64.tar`

Press *Return* to read the license when prompted and then enter the directory where you would like to install Arm Licence Server.

Alternatively, to run the text-mode install script `textinstall.sh`, accept the license, and point to an installation directory in one step, pass the arguments `--accept-licence` and `{installation-directory}` when executing `textinstall.sh`. For example:

```
./textinstall.sh --accept-licence <installation_directory>
```

replacing the `<installation_directory>` with a directory of your choice.

## Using Arm Licence Server

Arm Licence Server is capable of serving several floating licenses. This means one server can serve all Arm HPC software in an organization.

Arm Licence Server is not required for serving evaluation licenses or workstation licenses.

## Running Arm Licence Server

To ensure security, Arm Licence Server should only be run as an unprivileged user. For example, `no-body`, or preferably a dedicated user.

If run without arguments, Arm Licence Server uses licenses in the current directory, that is, files matching `Licence*` and `License*`. An optional argument specifies the directory to be used instead of the current directory.

Typically, floating license server files are stored in the Arm Licence Server installation directory. For example, `/opt/arm/licenceserver/licences`. This is also the directory the provided `systemd` unit and Sys-V style `init` scripts use by default.

System administrators typically configure the license server to start automatically during system boot. Arm Licence Server includes a `systemd` unit configuration file, and a SysV-style `init` script.

Before configuring Arm Licence Server to start automatically, an unprivileged user should be created, and a log directory allocated, as shown in the following example (these commands must be run as root):

```
adduser --system --no-create-home \
        --home /opt/arm/licenceserver allinea
mkdir /var/log/allinea
chown allinea: /var/log/allinea
```

This creates the user `allinea`, creates the log directory `/var/log/allinea`, and finally the user is assigned ownership of the log directory.

Note that `/opt/arm/licenceserver` is the location of the Arm Licence Server installation.

The license server log file is `/var/log/allinea/allinea.log` by default.

## Systemd-based distributions

This section shows you how to run Arm Licence Server on Systemd-based systems.

For Red Hat Enterprise Linux 7.0+, SUSE Linux Enterprise Server 12+, Ubuntu 16.04+, and Debian 8+, a `systemd` unit configuration file can be used to start Arm Licence Server. To use it, follow the procedure below (as root):

1. Edit `lib/systemd/system/allinea-licenceserver.service` in your Arm Licence Server installation. Make sure that the `Environment`, `ExecStart` and `User` settings in the `[Service]` section are correct for your system.
2. Add symlink to the `allinea-licenceserver.service` file and store it in `/etc/systemd/system/`:

```
ln -s /opt/arm/licenceserver/lib/systemd/system/allinea-
    licenceserver.service /etc/systemd/system/
```



3. Enable the license server on future boots:

```
systemctl enable \
allinea-licenceserver.service
```

4. Start the license server:

```
systemctl start allinea-licenceserver
```

5. Check that it started properly:

```
systemctl status allinea-licenceserver
```

## SysVinit-based distributions

This section shows you how to run Arm Licence Server on SysVinit-based systems.

`bin/allinea_licensing_init` is a SysV-style `init` script for both Debian and Ubuntu, and previous Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Ubuntu, and Debian releases. To use the script, follow the procedure below (as `root`):

1. Set `ALLINEA_TOOLS_PATH` at the top of the script to point to the Arm Licence Server installation, for example, `/opt/arm/licenceserver`.
2. Set `ALLINEA_LICENCE_USER` to the name of the user to run the license server as. This should be the user already created for this purpose, for example, `allinea`.
3. Install the script to `/etc/init.d`:

```
ln -s /opt/arm/licenceserver/bin/allinea_licensing_init \
/etc/init.d/
```

4. Enable the service at boot time:

```
# On Red Hat or SUSE systems:
chkconfig --add allinea_licensing_init

# On Debian or Ubuntu systems:
update-rc.d allinea_licensing_init defaults
```

5. Start the service:

```
service allinea_licensing_init start
```

6. Check that it started correctly:

```
service allinea_licensing_init status
```

## Logging

This section shows you how to enable logging.

Set the environment variable `ALLINEA_LICENCE_LOGFILE` to the file that you wish to append log information to.

Set `ALLINEA_LICENCE_LOGLEVEL` to specify the amount of information required. These steps must be done prior to starting the server.

The following list specifies the available log levels:

- Level 0: no logging.
- Level 1: client licenses issued are shown, served licenses are listed.
- Level 2: stale licenses are shown when removed, licenses still being served are listed if there is no spare license.
- Level 3: full request strings received are displayed.
- Level 6: is the maximum.

In level 1 and above, the MAC address, user name, process ID, and IP address of the clients are logged.

## Adding a new license

This section shows you how to add a floating license to Arm Licence Server.

A floating license consists of two files: the server license (a file named `Licence.xxxx`) and a client license file, `Licence`.

The following procedure demonstrates how to add a new floating license:

- Copy the server license file to the `licences` subdirectory of the Arm Licence Server installation. For example, `/opt/arm/licenceserver/licences`.
- Copy the client license file to the `licences` subdirectory in the installation of the licensed product, `{installation-directory}/licences`. For example, `/opt/arm/forged/20.1.3/licences/Licence`.
- Edit the client license file to specify the hostname of the license server in use.
- Restart Arm Licence Server for the new floating license to be picked up. Existing clients should not experience disruption if the restart is completed promptly.

You can serve multiple floating licenses from the same `licences` directory. For example, you might have one server license file for Arm DDT and another for Arm Allinea Studio. If you have multiple licenses for the same product, the server will serve them all. If a client (like Arm Forge) is configured with multiple licenses, it serves the license with the most tokens.

**Note:** Workstation and evaluation license files do not need a license server. You can copy these directly to the `licences` subdirectory. For example, `/home/user/arm/forged/20.1.3/licences/Licence.ddt`.

## Example

In this example it is assumed that there is a dedicated license server machine running Red Hat Enterprise Linux 6. The Arm Licence Server is installed in `/opt/arm/licenceserver` and the server license files are stored in `/opt/arm/licenceserver/licences`.

**Note:** If you install the Arm Licence Server to a different installation path you will need to edit the `ALLINEA_TOOLS_PATH` variable in the `allinea_licensing_init` script.

To run Arm Licence Server program as the dedicated `allinea` user, serving all licenses in `/opt/arm/licenceserver/licences`, and logging most events to the `/var/log/allinea/allinea.log`, use the following procedure:

```

$ su - root
% adduser --system --no-create-home \
        --home /opt/arm/licenceserver allinea
% mkdir /var/log/allinea
% chown allinea: /var/log/allinea
% ln -s /opt/arm/licenceserver/bin/allinea_licensing_init \
    /etc/init.d/
% chkconfig --add allinea_licensing_init
% service allinea_licensing_init start

```

If the server license file is `/opt/arm/licenceserver/licences/Licence.server.physics` and is served by the machine `server.physics.acme.edu`, on port 4252, the server license file would resemble the following:

```

type=3
serial_number=1014
max_processes=48
expires=2004-04-01 00:00:00
support_expires=2004-04-01 00:00:00
mac=00:E0:81:03:6C:DB
interface=eth0
debuggers=gdb
serverport=4252
max_users=2
beat=60
retry_limit=4
hash2=c18101680ae9f8863266d4aa7544de58562ea858

```

Then the client license could be stored at `/opt/arm/forged/20.1.3/licences/Licence.client.physics` and contain:

```

type=2
serial_number=1014
hostname=server.physics.acme.edu
serverport=4252

```

**Note:** The client file `hostname` parameter has been edited to reference Arm Licence Server.

## Running product clients

### Before you begin

- License file names must begin with either `License`, or the variant spelling `Licence`.
- License file names are not case-sensitive.
- You can append any other characters to the name, such as the server license serial number and other identifiers, such as "client", to give unique names to multiple licenses stored in the same directory, for example, `license.client.1234`.

### Procedure

1. For each floating license, copy the corresponding client license file to the relevant `licences` sub-directory in the product installation directory, `{installation_directory}/licences`. For example, copy the Arm Forge client license to `/opt/arm/forged/20.1.3/licences`.

2. Edit `hostname` in the client license file to include the hostname or IP address of the machine on which the Arm Licence Server runs.
3. If your `Licenses` directory is not in the product installation directory, you can specify the directory path to point to the location of the product licenses using the environment variable `ALLINEA_LICENCE_DIR`.

#### Notes

- If you include a specific license file name in the `ALLINEA_LICENCE_DIR` path, the Arm Licence Server always attempts to serve that specific license.
- You can set the environment variable in a *module* file for the product. For example:

```
export ALLINEA_LICENCE_DIR=${HOME}/SomeOtherLicenceDir
forge
```

The fields in the client license file are:

Name	Required	Description
hostname	Yes	The hostname, or IP address of the license server
ports	No	A comma separated list of ports to be tried locally for GUI-backend communication, Defaults to 4242,4243,4244,4244,4245
serial_number	Yes	The serial number of the server license to be used
serverport	Yes	The port the server listens on
type	Yes	Must have value 2—this indicates that the license requires a server to run correctly

**Note:** The serial number of the server license is specified as this enables a user to be tied to a particular license.

## Architecture licensing

Licenses issued after the release of Arm Licence Server 6.1 specify the compute node architectures that they may be used with. Licences issued prior to this release will enable the `x86_64` architecture by default. Existing users for other architectures will be supplied with new licenses that will enable their architectures.

If there is any problem then contact Arm support at [Arm support](#).

## Using multiple architecture licenses

If you are using multiple license files to specify multiple architectures, Arm recommends that you follow these steps.

### Procedure

1. Ensure that the default licenses directory is empty.
2. Create a directory for each architecture.

3. When you want to target a specific architecture, set `ALLINEA_LICENSE_DIR` to the relevant directory.  
Alternatively, set `ALLINEA_LICENSE_FILE` to specify the license file.

## Example

On a site that targets two architectures, `x86_64` and `AArch64`, create a directory for each architecture, and name them `licenses_x86_64` and `licenses_aarch64`. Then, to target the architectures, set the license directories as follows:

To target `AArch64`:

```
export ALLINEA_LICENSE_DIR=/path/to/licenses/licenses_aarch64
```

To target `x86_64`:

```
export ALLINEA_LICENSE_DIR=/path/to/licenses/licenses_x86_64
```

## Accessing Arm Licence Server behind a firewall

In some scenarios Arm Licence Server may be located behind a firewall. This is the case if you are accessing a license server hosted by Arm. You may also be debugging a system that is not on the same network as the license server. In this case SSH forwarding can be used to access the license server that is behind the firewall.

A local client license file is created or modified to specify `localhost` as the `hostname` parameter:

```
type=2  
serial_number=1014  
hostname=localhost  
serverport=4252
```

Communication is then forwarded over the secure SSH connection to Arm Licence Server, which is listening on port 4252.

An example of the command to set up the SSH forwarding is shown here:

```
ssh -C -L 4252:server.physics.acme.edu:4242 login.physics.acme.edu
```

The `-C` switch is optional, and enables compression for the situation where communication takes place over relatively slow links.

## Querying status

Arm Licence Server provides a simple HTML interface to allow for querying of the current state of the licenses being served. This can be accessed in a web browser at the following URL:

```
http://<hostname>:<serverport>/status.html
```

For example, using the values described in the section [Example](#), the URL would be:

```
http://server.physics.acme.edu:4252/status.html
```

Initially, no licenses are being served, and the output in your browser window would be similar to the following:

```
[Licences start]
  [Licence Serial Number: 1014]
    [No licences allocated - 2 available]
[Licences end]
```

You can see that two licenses are available in this example.

As licenses are served and released, the information displayed will change. To update the status display, simply refresh your web browser window. For example, after one Arm product is started, the output is updated:

```
[Licences start]
  [Licence Serial Number: 1014]
    [1 licences available]
      [Client 1]
        [mac=00:04:23:99:79:65; uname=gwh; pid=14007; licence=1014]
        [Latest heartbeat: 2004-04-13 11:59:15]
[Licences end]
```

Then, after another Arm product is started and the web browser window is refreshed (notice the value for number of licences available), the output is updated:

```
[Licences start]
  [Licence Serial Number: 1014]
    [0 licences available]
      [Client 1]
        [mac=00:04:23:99:79:65; uname=gwh; pid=14007; licence=1014]
        [Latest heartbeat: 2004-04-13 12:04:15]
      [Client 2]
        [mac=00:40:F4:6C:4A:71; uname=graham; pid=3700; licence=1014]
        [Latest heartbeat: 2004-04-13 12:04:59]
[Licences end]
```

Finally, after the first Arm product finishes:

```
[Licences start]
  [Licence Serial Number: 1014]
    [1 licences available]
      [Client 1]
        [mac=00:40:F4:6C:4A:71; uname=graham; pid=3700; licence=1014]
        [Latest heartbeat: 2004-04-13 12:07:59]
[Licences end]
```

## Handling lost clients

Should Arm Licence Server lose communication with an instance of a client, the license allocated to that client is made unavailable for new clients until a timeout period has expired. The length of this timeout period can be calculated from the license server file values for `beat` and `retry_limit`:

**`lost_client_timeout_period = (beat seconds) * (retry_limit + 1)`**

For the example license files above, the timeout period would be:

**`60 * (4 + 1) = 300 seconds`**

During this timeout period, details of the 'lost' client continue to be output by the status display. As long as additional licenses are available, new clients can be started. However, once all of these additional licenses have been allocated, new clients are refused a license while this timeout period is active.

After this timeout period has expired, the status continues to display details of the 'lost' client until another client is started. Arm Licence Server grants a license to the new client and the status display then reflects the details of the new client.

## Troubleshooting

Licenses are plain-text which enables you to see the parameters that are set. A checksum verifies the validity of the license.

If problems arise, the first step is to check the parameters specified in the license file are consistent with the machine that is being used (MAC and IP address), and that the number of users is as expected.

A port which is already used can not be used by Arm Licence Server. Check that you have specified an unused port.

Only privileged users can use ports below 1024, so you should use port 1024 or higher. You should not launch Arm Licence Server as root due to security issues.

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