Arm® Licence Server

Version 22.0.3

User Guide

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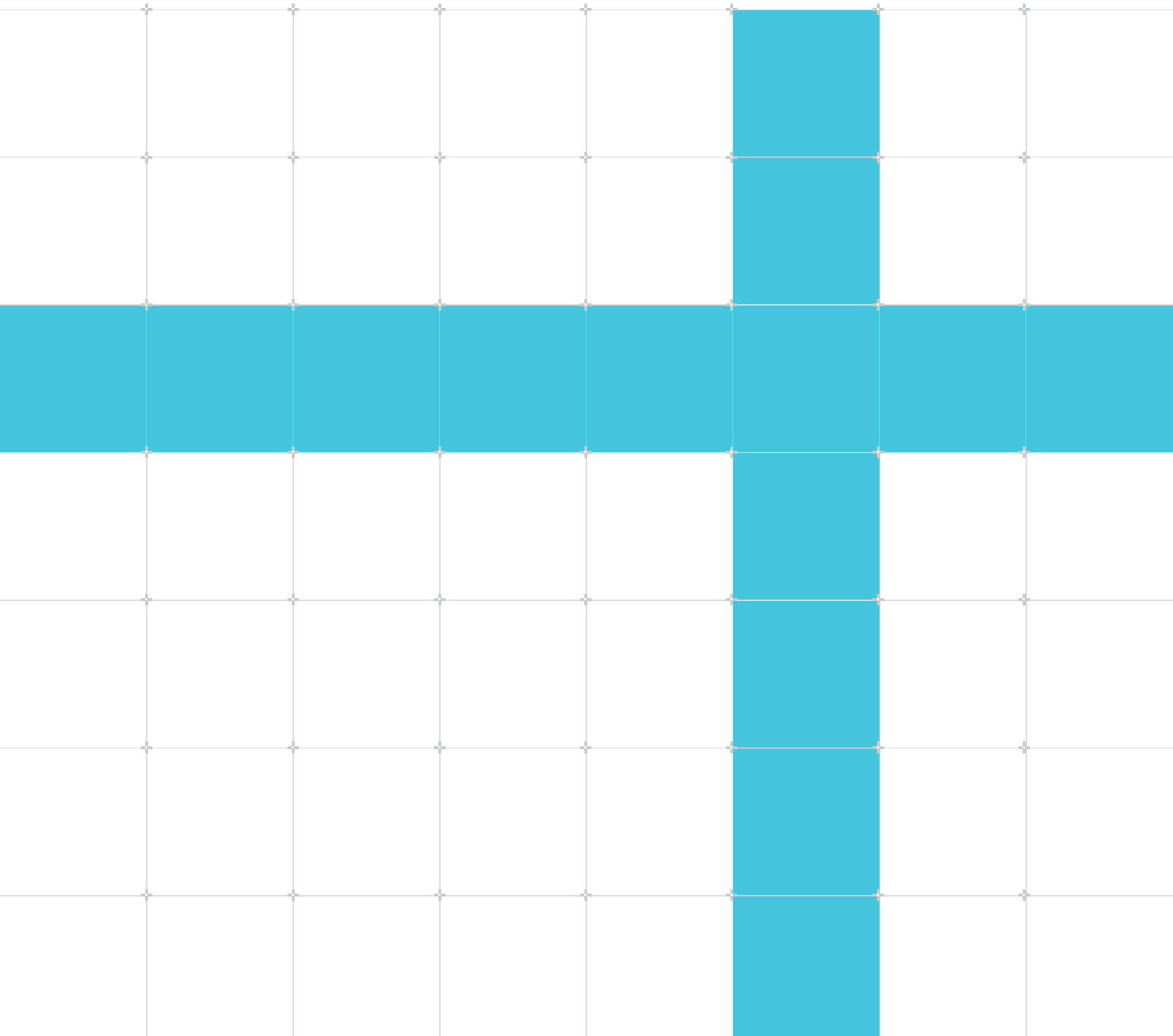

Arm® Licence Server
User Guide

Release information

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Feedback

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Inclusive language commitment

Arm values inclusive communities. Arm recognizes that we and our industry have used language that can be offensive. Arm strives to lead the industry and create change.

Previous issues of this document included language that can be offensive. We have replaced this language.

To report offensive language in this document, email terms@arm.com.

Contents

1. Introduction

This document describes how to install and use Arm® Licence Server.

1.1 Conventions

The following subsections describe conventions used in Arm documents.

Glossary

The Arm Glossary is a list of terms used in Arm documentation, together with definitions for those terms. The Arm Glossary does not contain terms that are industry standard unless the Arm meaning differs from the generally accepted meaning.

See the Arm® Glossary for more information: developer.arm.com/glossary.

Typographic conventions

Arm documentation uses typographical conventions to convey specific meaning.

Convention	Use
italic	Citations.
bold	Interface elements, such as menu names. Signal names. Terms in descriptive lists, where appropriate.
`monospace`	Text that you can enter at the keyboard, such as commands, file and program names, and source code.
`monospace bold`	Language keywords when used outside example code.
`monospace underline`	A permitted abbreviation for a command or option. You can enter the underlined text instead of the full command or option name.
`<and>`	Encloses replaceable terms for assembler syntax where they appear in code or code fragments. For example: `MRC p15, 0, <Rd>, <CRn>, <CRm>, <Opcode_2>`
SMALL CAPITALS	Terms that have specific technical meanings as defined in the *Arm® Glossary*. For example, **IMPLEMENTATION DEFINED**, **IMPLEMENTATION SPECIFIC**, **UNKNOWN**, and **UNPREDICTABLE**.
Caution	Recommendations. Not following these recommendations might lead to system failure or damage.
Warning	Requirements for the system. Not following these requirements might result in system failure or damage.

Convention	Use
	Requirements for the system. Not following these requirements will result in system failure or damage.
	An important piece of information that needs your attention.
	A useful tip that might make it easier, better or faster to perform a task.
	A reminder of something important that relates to the information you are reading.

1.2 Other information

See the Arm website for other relevant information.

- Arm® Developer.
- Arm® Documentation.
- Technical Support.
- Arm® Glossary.

2. Introduction to Arm Licence Server

This section describes when you need to use Arm® Licence Server.

2.1 Arm Licence Server

Arm® Licence Server provides licensing support for Arm Forge.

There are three licensing models for Arm HPC products:

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

For evaluation and workstation licenses, copy the license file to the Arm product installation directory, `{installation-directory}/licences`. Arm Licence Server is not required for these license types.

For supercomputing licenses, Arm Licence Server is required.

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 Add a new license.

When you have determined that Arm Licence Server is a requirement for your site, you can proceed with Install Arm Licence Server.

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

Contact Arm support.

3. Installation

This chapter describes how to install Arm® Licence Server.

3.1 Install Arm Licence Server

Install remotely using the `textinstall.sh` text-mode install script.

Before you begin

Arm® Licence Server is only available for Linux systems.

Procedure

1. Download a release of Arm Licence Server from the Arm Licence Server downloads webpage.
2. Run the `textinstall.sh` install script provided by using these commands:

```
tar xf arm-licence-server-<version>-linux-<arch>.tar
```

```
cd arm-licence-server-<version>-linux-<arch>
```

```
./textinstall.sh
```

   - Replace `<version>` with the four digit version number of your installation package using the format `xx.x` for major product releases, and the format `xx.x.x` for support releases.
   - Replace `<arch>` with the required architecture (`aarch64`, `x86_64`, `ppc64le`).
3. When you are prompted, press **Return** to read the license, and enter the path of the installation directory.

Alternatively, run the text-mode install script `textinstall.sh`, accept the license, and point to an installation directory in one step. You can do this when you execute `textinstall.sh` using `-accept-licence` and `<installation-directory>`.

For example:

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

Replace `<installation_directory>` with your preferred directory.

Next steps

- See Use Arm Licence Server for details about using Arm Licence Server.
- See the `RELEASE-NOTES` file in the install package when the installation is complete.

4. Use Arm Licence Server

Arm® Licence Server is capable of serving several different types of license, enabling one server to serve all your Arm Allinea Studio and Arm Forge tools.

Arm Licence Server is required only for floating licenses on HPC clusters. Arm Licence Server is not required for single evaluation licenses, named-user licenses (Arm® Allinea Studio), and workstation licenses (Arm® Forge).

4.1 Run Arm Licence Server

This section describes the process for setting up the Arm® Licence Server and configuring it to start automatically during system boot.

Before you begin

- For security reasons, ensure that Arm Licence Server runs as an unprivileged user. For example, `nobody`, or preferably a dedicated user. Furthermore, Arm recommends restricting the visibility of the host running the Arm Licence Server only to trusted users, and hidden externally.
- Arm Licence Server includes a systemd init configuration file for Linux systems.
- If Arm Licence Server runs without arguments, it uses licenses in the current directory (files matching `Licence*` or the variant spelling `License*`). You can include an optional argument to specify an alternative directory location instead of the current directory.
- Floating license server files are stored by default in the Arm Licence Server installation directory (`/opt/arm/licenceserver/<version>/licences`). This is also the directory the systemd unit configuration uses by default.

Procedure

1. To create an unprivileged user and allocate a log directory, run these commands as root.

```
useradd --system --user-group --no-create-home \
     --home-dir /opt/arm/licenceserver/<version> allinea
mkdir /var/log/arm
chown allinea: /var/log/arm
```

   This creates the user `allinea` and the log directory `/var/log/arm`. The user is assigned ownership of the log directory. The `/opt/arm/licenceserver/<version>` directory is the location of the Arm Licence Server installation. The license server log file is `/var/log/arm/allinea.log`.

Note

If you install the Arm Licence Server in a custom installation path, set the `ARM_LICENSE_DIR` environment variable to point to the custom license

directory. `ALLINEA_LICENSE_DIR` is still supported and can be used instead of `ARM_LICENSE_DIR`.

Ensure that the directory `/var/log` has appropriate access controls to limit access to the log files.

2. 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.
3. Create a symbolic link to the systemd directory:
```
ln -s lib/systemd/system/allinea-licenceserver.service \
     /etc/systemd/system/
```
4. Enable Arm Licence Server on future boots:
```
systemctl enable allinea-licenceserver
```
5. Start the Arm Licence Server:
```
systemctl start allinea-licenceserver
```
6. Check that the Arm Licence Server has started correctly:
```
systemctl status allinea-licenceserver
```

4.2 Enable logging

This section shows you how to enable logging. These steps must be done prior to starting the server.

Procedure

1. Set the environment variable `ALLINEA_LICENCE_LOGFILE` to the file that you wish to append log information to.
2. Set `ALLINEA_LICENCE_LOGLEVEL` to specify the amount of information required.
   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. If you need to limit access to the log files, ensure that the directory of the file has appropriate access controls.

4.3 Add a new license

This section shows you how to set up a floating license on Arm® Licence Server.

Before you begin

- A floating license consists of two files: Server license (`Licence.xxxx`), and Client license (`Licence`).
- Server license file names must begin with `License`, or the variant spelling `Licence`.
- License file names are not case-sensitive.
- You can append unique identifiers to license file names for storing them in the same directory.

  For example, add the server license serial number, `license.server.1234`, or include `client` in the client license name, `license.client.5678`.

Procedure

1. Copy the server license file to the `licences` subdirectory of the Arm Licence Server installation. For example:

   ```
   /opt/arm/licenceserver/<version>/licences
   ```

2. Copy the client license file to the `licences` subdirectory of the licensed product installation, `<product-installation>/<version>/licences`.
   For example:

   ```
   /opt/arm/<product>/<version>/licences/Licence
   ```

3. Edit the client license file to specify the hostname of the license server in use.
4. Restart Arm Licence Server for the new floating license to be picked up. Existing clients should not experience disruption if the restart completes promptly.

4.4 Licensing example

This section shows an example of how the Arm® Licence Server is set up with details of the license file content.

For detailed instructions about how to set up the Arm Licence Server, see Run Arm Licence Server.

In this example, a dedicated Linux server machine is running the Arm Licence Server. It is installed in `/opt/arm/licenceserver/<version>` and the server license files are stored in `/opt/arm/licenceserver/<version>/licences`.

The Arm Licence Server program runs as the dedicated `allinea` user, and serves all licenses in `/opt/arm/licenceserver/<version>/licences`. Arm Licence Server logs events to the `/var/log/arm/allinea.log`.

These commands were run to set up the Arm Licence Server to:

- create the `allinea` user.
- specify the location of licenses and logs.
- link to the systemd init configuration.
- run the Arm Licence Server and check its status.

```
% useradd --system --user-group --no-create-home \
          --home-dir /opt/arm/licenceserver/<version> allinea
% mkdir /var/log/arm
% chown allinea: /var/log/arm
% ln -s /opt/arm/licenceserver/<version>/lib/systemd/system/allinea-
licenceserver.service \
        /etc/systemd/system/
% systemctl enable allinea-licenceserver
% systemctl start allinea-licenceserver
% systemctl status allinea-licenceserver
```

The example server license file is `/opt/arm/licenceserver/<version>/licences/Licence.server.physics` and is served by `server.physics.acme.edu` on port 4252.

It contains:

```
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
```

The example client license is stored at `/opt/arm/forge/<version>/licences/Licence.client.physics`.

It contains:

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


Note

The client file `hostname` parameter is manually edited to reference the Arm Licence Server.

4.5 Run product clients

This section describes how to configure the license files for your Arm products.

Before you begin

- A floating license consists of two files: Server license (`Licence.xxxx`), and Client license (`Licence`).
- Server license file names must begin with `License`, or the variant spelling `Licence`.
- License file names are not case-sensitive.
- You can append unique identifiers to license file names for storing multiple licenses in the same directory.

  For example, add the server license serial number, `license.server.1234`, or include `client` in the client license name, `license.client.5678`.

Procedure

1. For each floating license, copy the corresponding client license file to the relevant licences subdirectory in the product installation directory, `<product_installation_directory>/licences`. For example, copy the Arm® Forge client license to `/opt/arm/forge/<version>/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`.

4.6 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 contact Arm support.

Use multiple architecture licenses

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

Procedure

1. Ensure that the default licenses directory is empty.
2. Create a directory for each architecture.
3. To target a specific architecture, set `ALLINEA_LICENSE_DIR` to the relevant directory. Alternatively, set `ALLINEA_LICENSE_FILE` to specify the license file.

Multiple architectures 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
```

4.7 Access Arm Licence Server behind a firewall

In some scenarios, Arm® Licence Server might be located behind a firewall. This is the case if you are accessing a license server hosted by Arm. You might also be debugging a system that is not on the same network as the license server. In this case, you can use SSH forwarding 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 listens on port 4252.

This is an example of the command to use for setting up the SSH forwarding:

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

The -c switch is optional, and enables compression for communication over slow links.

4.8 Query 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 Licensing 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]
```

If you do not want this page to be widely accessible, Arm recommends authenticating it using a third-party proxy. You can also disable it, before starting the server, by setting the environment variable `ALLINEA_SILENT_LICENCESERVER=1`.

4.9 Handle lost clients

If Arm® Licence Server loses 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.

4.10 Troubleshoot Licenses

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 ensure that the parameters specified in the license file are consistent with the machine that is being used (MAC address 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. Ensure 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.