# User-based Licensing

Version 1.2022011

# License Server Administration Guide



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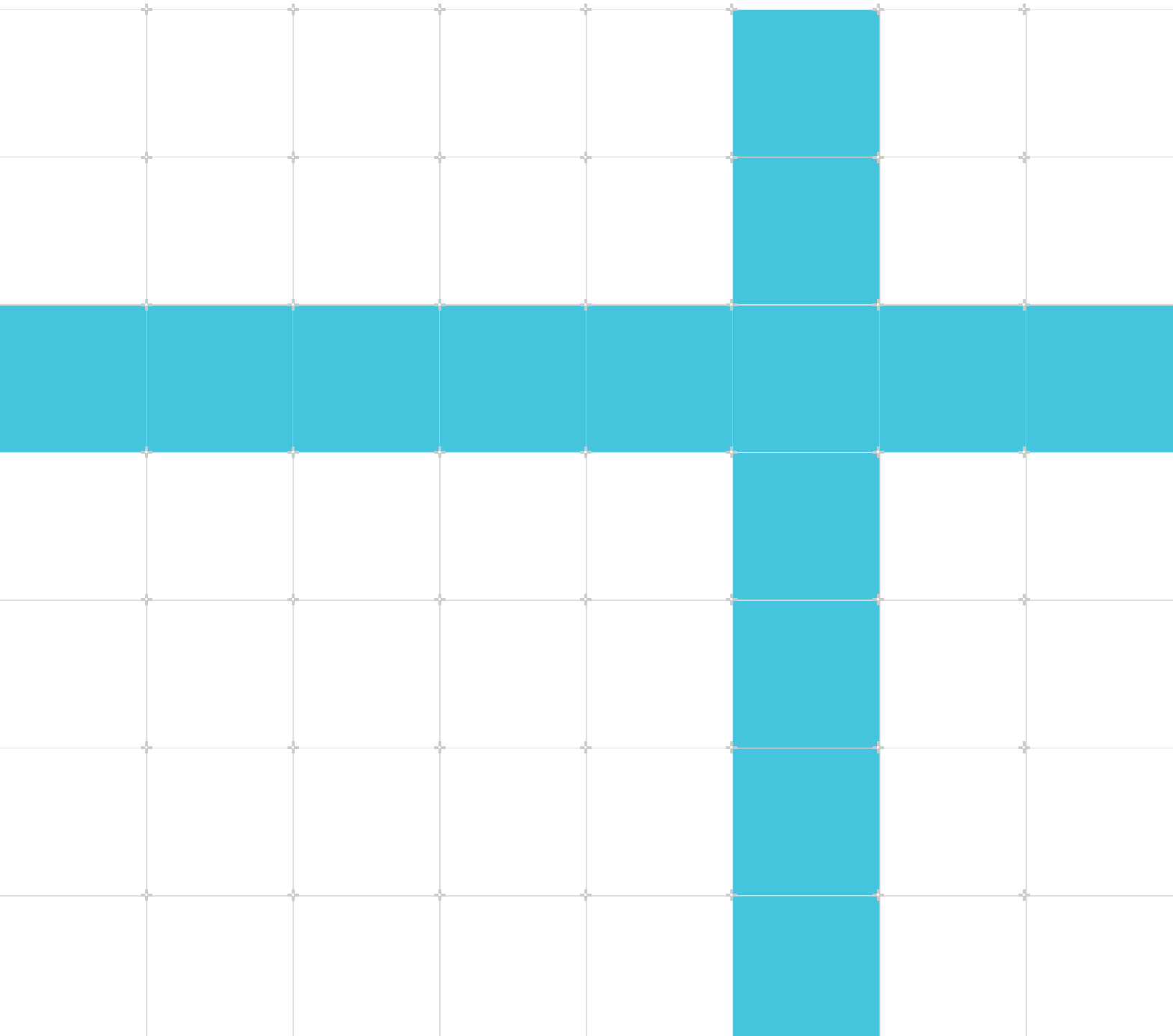

# User-based Licensing
## License Server Administration Guide



## Release information

### Document history

| Issue | Date | Confidentiality | Change |
|---|---|---|---|
| 1.2022010-00 | 21 June 2022 | Non-Confidential | New document for v1.2022010 Beta |
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## Feedback

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## Inclusive language commitment

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We believe that this document contains no offensive language. To report offensive language in this document, email terms@arm.com.

# Contents

# 1. Introduction

This guide describes how to install and manage a license server for Arm software products licensed under the user-based licensing model.

## 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.<br><br>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 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.<br><br>For example:<br><br>`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. |
| Danger | Requirements for the system. Not following these requirements will result in system failure or damage. |

| Convention | Use |
|---|---|
|   | 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. Getting started with user-based licensing

Describes how to install, configure, and register the license server for Arm software products licensed under the user-based licensing model.


The user-based licensing license server software is different from, and incompatible with, other license models used by Arm software products, including:

- FlexNet Publisher node-locked and floating
- Keil® node-locked and floating
- Allinea node-locked and floating

## 2.1 Hardware and software requirements

The hardware and software requirements presented in this section are for the Arm user-based licensing license server software. In a typical deployment setup, the license server software runs on a dedicated license-managed device, separate from Arm software products running on client devices.

### Hardware requirements

The license server has the following minimum hardware requirements:

- Processor: A dual core 64-bit x86 2GHz processor (or equivalent)
- Memory: 4GB
- Storage: 500MB

### Supported operating systems

The license server is supported on the following operating systems:

- Red Hat Enterprise Linux or CentOS 7
- Red Hat Enterprise Linux or CentOS 8
- Ubuntu 20.04 LTS

### Required system software

The license server and utilities require the following software to be installed and, where applicable, running:

- Common Linux utilities: `bash`, `tar`, `sed`, `getopt`, `uname`, `sleep`, and `grep`
- `Systemd` Linux service manager
- Python 3.6 or higher
- One of the following Java Virtual Machine (JVM) implementations:
  - Oracle Java SE 8

- OpenJDK 8
- OpenJDK 11

## 2.2 Install your license server

To install the license server, use the following procedure.

### Before you begin

Download the license server Linux installation package from https://lm.arm.com/downloads.

The installation requires elevated privileges to:

- Create a new `flexnetls` group and user for the license server service
- Create the installation directory (`/opt/flexnetls-armlmd` by default)
- Create the data storage directory (`/var/opt/flexnetls-armlmd` by default)
- Register the license server service with `systemd` and start the service

### Procedure

1. From the command line, change directory to the directory containing the downloaded software bundle and then extract it using the following command:

   ```
   tar -xf flexnetls-armlmd-<version>.tar.gz
   ```

   The extraction creates the installer directory, `flexnetls-armlmd-<version>`.

   
   Note

   The `flexnetls-armlmd-<version>` installation directory can be placed in any disk location and can be deleted after the installation process has completed.

2. Install the license server by running the following command as root:

   ```
   sudo [-E] flexnetls-armlmd-<version>/install_license_server [--port <port>] [--
   install-dir <installation_directory>] [--data-dir <data_directory>]
   ```

   Where:

   - The `-E` parameter preserves the environment of the current user when running the command as root. This might be required if the location of the Java Virtual Machine (JVM) relies on the JAVA_HOME environment variable set in the environment of the current user.
   - `<port>` specifies the TCP network port that the license server listens on. If the `--port` parameter is not specified, the port defaults to *7070*.


You cannot specify a port number of 1024 or lower because this port range is reserved for processes running as `root`. For security reasons, the license server runs as the `flexnetls` user and Arm does not recommend changing this user to `root`.

- `<installation_directory>` is the installation directory for the license server software. If the `--install-dir` parameter is not specified, the installation directory defaults to `/opt/flexnetls-armlmd`.
- `<data_directory>` is the directory used to store the license server state files and logs. If the `--data-dir` parameter is not specified, the data directory defaults to `/var/opt/flexnetls-armlmd`.

The license server is automatically started after the installation process completes. The license server also starts automatically when the server device is restarted.

3. You must change the default installed administrator user (`admin`) password because you cannot use this password to perform administration tasks:
   a) From the command line, change to the `bin` directory in the license server installation directory, for example:

```
cd /var/opt/flexnetls-armlmd/bin
```

   b) Run the following command:

```
./armlm_change_default_admin_password
```

   The new password must meet the following criteria:

   - Between 8 and 64 characters
   - At least one digit
   - At least one uppercase character
   - At least one special character (for example, ^*$-+?_&=!%{}/#@)
   - No whitespace characters

   You are asked to confirm the new password by entering it again.

   The following is output when the administration password is successfully changed:

```
New password for 'admin':
{
  "id" : 2,
  "user" : "admin",
  "enabled" : true,
  "userExpiry" : "permanent",
  "roles" : [ {
    "id" : 6,
    "role" : "ROLE_DROPCLIENT"
  }, {
    "id" : 3,
    "role" : "ROLE_RESERVATIONS"
  }, {
    "id" : 7,
    "role" : "ROLE_ADMIN"
```

```
  }, {
    "id" : 4,
    "role" : "ROLE_READ"
  } ]
}
```

### Results

After the license server is installed, it starts automatically. The license server service is configured to start and stop automatically with the operating system.

The installation directory has the following content:

- `bin` contains the administration utilities.
- `server` contains the license server daemon and related configuration files.
- `license_terms` contains the software license agreement.

### Next steps

Configure your license server

## 2.3 Configure your license server

After the license server has been installed, you must configure the server.

### Before you begin

- Install your license server

### Procedure

1. The port number that the license server uses can be set on installation. If not set, the port number defaults to `7070`. You can change the port number as follows:
   a) Edit the `<installation_directory>/server/local-configuration.yaml` file.
   b) Modify the `port` value, for example:
   ```
   port: 7071
   ```
   c) Restart the license server using the following command:
   ```
   sudo systemctl restart flexnetls-armlmd
   ```
2. Set the following environment variables on the license server device:
   - `PATH`

     Update this environment variable to include the `bin` directory in the license server installation directory.
   - `FLEXNETLS_BASEURL`

     This environment variable must be set to:

     `http://localhost:<port>/api/1.0/instances/~`

Where `<port>` is the license server port number. For example:

```
export FLEXNETLS_BASEURL=http://localhost:7070/api/1.0/instances/~
```

### Next steps

Register your license server

## 2.4 Register your license server

You must register your license server on the Arm licensing portal, so you can add product licenses to the server.

### Before you begin

- Install your license server
- Configure your license server

### Procedure

1. Make sure the license server is running using the following command:

   ```
   systemctl status flexnetls-armlmd
   ```

   If the server is not running, start it using the following command:

   ```
   sudo systemctl start flexnetls-armlmd
   ```

2. When you install the license server, the installation process selects a hostid. Several other hostids could be available, depending on the hardware configuration of the host. You must check that the selected hostid is appropriate, for example to ensure the most stable hostid is used.

   
   

   The licenses generated for a license server are locked to the hostid of the license server. You cannot change the license server hostid after you have registered your license server.

   Use the following command to review the selected hostid:

   ```
   armlm_show_hostid
   ```

   The password for `admin` is requested. The output shows the selected hostid and the available hostids. For example:

   ```
   {
     "selected" : {
   ```

```
    "hostidType" : "ETHERNET",
    "hostidValue" : "0800270AA6FF"
  },
  "hostids" : [ {
    "hostidType" : "ETHERNET",
    "hostidValue" : "0800270AA6FF"
  }, {
    "hostidType" : "ETHERNET",
    "hostidValue" : "080027503FFF"
  } ]
}
```

If you want to change the hostid used by the license server:

a) Edit the `<installation_directory>/server/local-configuration.yaml` file.
b) Uncomment the following line:
   `#active-hostid:`
c) Add one of the hostids identified by `armlm_show_hostid` command as the `active-hostid` value in the format `<hostid>/ETHERNET`. For example:
   `active-hostid: 080027503FFF/ETHERNET`

3. Create an identity file, `identity.bin`, for the license server using the following command:

```
armlm_generate_server_identity --identity-file identity.bin
```

The password for `admin` is requested.

4. Register your license server with Arm:
   a) Access the Arm user-based licensing portal on https://developer.arm.com/support/licensing/user-based.
   b) Click **Manage License Servers** and then click **Register Local License Server**.
   c) Click **Browse**, select the `identity.bin` file and then click **Open**.
   d) Click **Upload**. After a short while, you are returned to the **Manage License Servers** page with your license server shown in the list of license servers. The name of the server is the license server hostid.
5. Allocate licenses to the license server:
   a) Click **Manage Server** on the required license server.
   b) The server page displays any product licenses associated with server. For your new license server, this should be empty. Click **Add Products**.
   c) The **Add Products to License Server** page shows the available products with used licenses and expiry date. In the **Quantity** field for each required product, enter the number of licenses to transfer to your license server. Click **Add Products** to return to the server page.
   d) Click **Download all licenses allocated to this server** and a license file containing the license data is downloaded. The license file name has the following format:
      `licenses-<server_ID>-<timestamp>.bin`

      Where `<server_ID>` is the license server name and `<timestamp>` is the date and time the license file was created.
   e) If the license file was not downloaded to the license server device, transfer the file to this device.
   f) Use the following license command to load the license data:

```
armlm_update_licenses --data-file <license_file>
```

Where `<license_file>` is the name of the license file. The password for `admin` is requested.

The output from the command is as follows, confirming no further action is required when adding licenses:

```
{
  "confirmationRequestNeeded" : false
}
```

### Next steps

User license activation

### Related information

List licenses and usage on page 17
Modify number of licenses on page 17

## 2.5 User license activation

After the license server has been registered, you must inform your users how to activate the licenses for their Arm products. In this case, a user could be a human using an Arm product or an automated process. Users can license a product using one of the following methods:

- Use one of the following methods to manually activate the license:
  - Activate your product from the command line
  - Activate your product in the License Manager
- Dynamically activate the license by setting the `ARMLM_ONDEMAND_ACTIVATION` environment variable to the following:

  `<product_code>@<server_URL>`

  Where `<product_code>` is the product code and `<server_URL>` is the URL to access the license server. For example, `HWSKT-STD0@https://license.serv.mycom.com`.


This method might not be suitable where a large number of parallel processes can make initial license requests, as the license server could time-out some of the requests.

After activation, the user is assigned to the license for 30 days. Subsequent use of any Arm product that supports user-based licensing on the same device by that user renews the license for the next 30 days by contacting the license server. If the license cannot be extended, for example there is no connection to the license server, you can still use the product as licensed until the 30-day limit expires.

## Activating licenses on multiple devices

The license assigned to a user can be used on multiple devices. You can make the license assigned to a user available on another device using one of the following methods:

- On the new device, activate the license for an Arm product that has the same user.
- The cached Arm license details are stored in the `.armlm` directory. Other devices using Arm products can use the cached license by, for example:
  - Copying the `.armlm` directory to a local directory on the new device.
  - Copying the `.armlm` directory to a network directory. On the new device, set the `ARMLM_CACHED_LICENSES_LOCATION` environment variable to the location of `.armlm` on the network drive.

# 3. License server administration

Describes how you can administer the Arm user-based licensing license server, including the available license server commands.

## 3.1 Stop the license server

The license server is automatically started after installation and when the server device is restarted.

### Procedure

Stop the license server with the following command:

```
sudo systemctl stop flexnetls-armlmd
```

### Related information

Finding the license server status on page 17
Start the license server on page 16

## 3.2 Start the license server

The license server is automatically started after installation and when the server device is restarted.

### Before you begin

The license server has been stopped by the administrator.

### Procedure

Start the license server with the following command:

```
sudo systemctl start flexnetls-armlmd
```

### Related information

Finding the license server status on page 17

## 3.3 Restart the license server

Use this procedure to restart the license server.

### Before you begin

The license server must be running.

### Procedure

Restart the license server using the following command:

```
sudo systemctl restart flexnetls-armlmd
```

### Related information

Finding the license server status on page 17

## 3.4 Finding the license server status

Use this procedure to find the status of your license server.

### Procedure

Check the license server service status using the following command:

```
systemctl status flexnetls-armlmd
```

### Related information

Restart the license server on page 16
Stop the license server on page 16
Start the license server on page 16

## 3.5 List licenses and usage

Use this procedure to list the product licenses and their usage on your license server.

### Before you begin

The license server must be running.

### Procedure

List the licenses on your license server using the following command:

```
armlm_list_products
```

The following is an example of the output from this command:

```
3 product(s) found on license server
Hardware Success Kit Standard, HWSKT-STD0, 60 seat(s), 33 seat(s) used
  Order 273591004, valid until: 2023-02-24, 50 seat(s), 28 seat(s) used
  Order 273591034, valid until: 2023-12-31, 10 seat(s), 5 seat(s) used
Keil MDK Professional, KEMDK-PRO0, 20 seat(s), 12 seat(s) used
  Order 273591003, valid until: 2023-02-15, 20 seat(s), 12 seat(s) used
```

### Related information

List users on page 19

# 3.6 Modify number of licenses

Use the following procedure to modify the number of licenses available on the license server.

### Before you begin

The license server must be running.

### Procedure

1. On the Arm user-based licensing portal, modify the number of licenses allocated to the license server as follows:
   a) Access the user-based licensing portal on https://developer.arm.com/support/licensing/user-based.
   b) Click **Manage License Servers** to display the list of servers.
   c) Click **Manage Server** on the required license server. The server page displays any product licenses associated with server.
   d) Click **Edit seats** on the required product.
   e) The number of seats currently allocated for this product are shown under **Total seat count**. Modify the number of licenses under **Total seat count** and then click **Confirm Changes**. If the number of licenses has been reduced, a warning dialog is shown and you need to click **Confirm Changes** in this dialog.

   A file containing the new license data is downloaded. This file has the following filename:
   `licenses-<server_ID>-<timestamp>.bin`

   Where `<server_ID>` is the identifier of the server and `<timestamp>` is the time the file was created.

   
   Note

   If you have reduced the number of licenses for a product, you cannot make changes to the number of licenses for that product until a confirmation file is uploaded (see step 3).

2. Transfer the file to the license server device and use the following license command to load the modified license data:

   ```
   armlm_update_licenses --data-file licenses-<server_ID>-<timestamp>.bin
   ```

   The password for `admin` is requested. The output determines if further action is required:

   - If licenses are removed, the following output confirms that further action is required:

     ```
     {
        "confirmationRequestNeeded" : true
     }
     ```

   - If licenses are added, the following output confirms that no further action is required:

     ```
     {
        "confirmationRequestNeeded" : false
     }
     ```

3. If licenses have been removed, a confirmation is required:
   a) Use the following license server command to generate a confirmation file:
   ```
   armlm_generate_server_confirmation --confirmation-file confirmation.bin
   ```
   The password for `admin` is requested.
   b) Access the user-based licensing portal on https://developer.arm.com/support/licensing/user-based.
   c) Click **Manage License Servers** to display the list of servers.
   d) Click **Manage Server** on the required license server. The server page displays any product licenses associated with server.
   e) For a product that has reduced licenses, click **Edit Seats**.
   f) In Server Configuration File, click browse to select the `confirmation.bin` file. Click **Upload Confirmation**.
   When file has been uploaded successfully, a "Capability request accepted, seat changes confirmed" message is displayed.

### Related information
List licenses and usage on page 17

## 3.7 List users

Use this procedure to list the users on your license server and their associated products.

### Before you begin
The license server must be running.

### Procedure
List the users on your license server using the following command:
```
armlm_list_users
```

The following is an example of the output from this command:

```
User    Product Code  Product Name          Last Access               Held Until
----    ------------  ------------          -----------               ----------
adlxho  HWSKT-STD0    Hardware Success Kit  2022-Apr-19 10:13:19 UTC  2022-May-19
hxyiso  HWSKT-STD0    Hardware Success Kit  2022-Apr-14 09:08:38 UTC  2022-May-14
jxycot  HWSKT-STD0    Hardware Success Kit  2022-Apr-12 09:58:42 UTC  2022-May-12
jxyche  HWSKT-STD0    Hardware Success Kit  2022-Apr-03 00:25:09 UTC  2022-May-03
```

### Related information
List licenses and usage on page 17

## 3.8 Find your license server version

Use this procedure to find the version of your license server.

### Before you begin

The license server must be running.

### Procedure

Print the license server version using the following command:

```
flexnetlsadmin -version
```

## 3.9 Change the administrator password

You can change the administrator password from the command line.

### Before you begin

The license server must be running.

### Procedure

1. From the command line, change to the `bin` directory in the license server installation directory. For example:
   ```
   cd /var/opt/flexnetls-armlmd/bin
   ```
2. Run the following command:
   ```
   ./armlm_change_admin_password
   ```
3. Enter the existing password.
4. Enter the new password. The new password must meet the following criteria:
   - Between 8 and 64 characters
   - At least one digit
   - At least one uppercase character
   - At least one special character (for example, ^*$-+?_&=!%{}/#@)
   - No whitespace characters
5. Confirm the new password by entering it again.

### Results

The following is output when the administration password is successfully changed:

```
New password for 'admin':
{
  "id" : 2,
  "user" : "admin",
  "enabled" : true,
  "userExpiry" : "permanent",
  "roles" : [ {
```

```
    "id" : 6,
    "role" : "ROLE_DROPCLIENT"
  }, {
    "id" : 3,
    "role" : "ROLE_RESERVATIONS"
  }, {
    "id" : 7,
    "role" : "ROLE_ADMIN"
  }, {
    "id" : 4,
    "role" : "ROLE_READ"
  } ]
}
```

## 3.10 Monitoring the license server

Log files for the Arm user-based licensing license server are stored in the `<data_directory>/logs` directory, where `<data_directory>` is the data directory set up when the license server was installed. If no data directory was specified during installation, the logs are stored in `/var/opt/flexnetls-armlmd/logs`.

# 4. Obsoleting the license server

Describes how to obsolete the Arm® user-based licensing license server so that the Arm product licenses are made available for use on another server.

## 4.1 Obsolete a license server

When the license server is no longer required, you must delete the licenses on the license server device and in the Arm® user-based licensing portal. This process ensures that the Arm product licenses become available for other servers.

### Before you begin

- The license server must be running.
- If your Arm users accessing the license server to be deleted still need to use Arm products, you must set up an alternative license server. For details see Install your license server.

### Procedure

1. Review the licenses on the license server. For further details, see List licenses and usage.
2. Remove all Arm product licenses from the license server, including uploading confirmation files into Arm user-based licensing portal for all products on your server.
   For further details, see Modify number of licenses.
3. In the licensing portal, delete the license server as follows:
   a) At the top level, click **Manage License Servers**.
   b) In the list of servers on this page, click **Manage Server** on the server to obsolete.
   c) Click **Obsolete Server** to remove the server from the Arm user-based licensing portal.
4. Stop the license server service with the following command:
   ```
   sudo systemctl stop flexnetls-armlmd
   ```
5. Stop the license server service being restarted when your server device is rebooted with the following command:
   ```
   sudo systemctl disable flexnetls-armlmd
   ```
6. Remove the license server files using the following commands:
   ```
   sudo rm /etc/systemd/system/flexnetls-armlmd.service
   sudo rm -r /etc/systemd/system/flexnetls-armlmd.service.d
   sudo rm -r <data_directory>
   sudo rm -r <installation_directory>
   ```

   Where:

   - `<installation_directory>` is the installation directory. If not specified during installation, this directory defaults to `/opt/flexnetls-armlmd`.
   - `<data_directory>` is the directory used to store the license server state and log files. If not specified during installation, this directory defaults to `/var/opt/flexnetls-armlmd`.