Administrator manual for
CLC License Server 4.0
Windows, macOS and Linux

May 29, 2018
This software is for research purposes only.

QIAGEN Aarhus
Silkeborgvej 2
Prismet
DK-8000 Aarhus C
Denmark
Contents

1 Introduction .................................................. 5
   1.1 Overview ................................................... 5
   1.2 Server requirements ...................................... 6
   1.3 Network requirements ..................................... 6
   1.4 Firewall settings .......................................... 7
   1.5 Quick overview of license server setup .................. 7

2 License server installation and launch ....................... 8
   2.1 Windows installation and launch ......................... 8
   2.2 macOS installation and launch ......................... 10
   2.3 Linux installation and launch ......................... 13
   2.4 Upgrading the CLC License Server ...................... 17

3 License server configuration .................................. 19
   3.1 General configuration ..................................... 19
   3.2 Access configuration ...................................... 20

4 Monitoring the license server ................................ 26
   4.1 The LM-X Graphical License Server Client ............. 26
   4.2 The LM-X End User Utility ............................... 27
   4.3 The license server log file .............................. 28

5 Configuring Workbenches to use network licenses ........ 30

Appendix ................................................................ 33

A License download ................................................ 34
Chapter 1

Introduction

Welcome to the CLC License Server 4.0 – software for hosting network licenses for QIAGEN Aarhus products.

This manual is written for system administrators and thus assumes some degree of familiarity with standard administration concepts on the platform being used.

Please contact us at ts-bioinformatics@qiagen.com if you have any questions or comments about this product.

1.1 Overview

The CLC License Server enables you to host licenses for QIAGEN Aarhus applications on a central server. These licenses can then be checked out by client software installed on computers with access to the license server.

If users need to run a licensed application while offline, they can borrow a license for a certain period of time. In addition, access to and reserving of licenses for particular users or machines can configured.
1.2 Server requirements

The CLC License Server does not require much processing power and only consumes a few megabytes of memory. This means that if you are putting together a dedicated server specifically for use as a license server, a modestly powered system equipped with a high number of redundant components will probably be a better investment than a system which is faster, has more memory, etc.

The system requirements for the CLC License Server are:

- Windows 8.1 and Windows 10
- macOS 10.8, 10.9, 10.10, 10.11, and 10.12
- CentOS 6

The CLC License Server is based on the LM-X License Manager. The list of systems above has been derived from the LM-X supported system list: https://docs.x-formation.com/display/LMX/Supported+platforms. The CLC License Server will likely work on other Windows, Linux and (newer) macOS systems, but we cannot guarantee this.

1.3 Network requirements

To check out a license, the software client needs to establish a TCP-connection to the license server program running on your server machine. This means that the server system needs to be contactable by clients on the LAN or WAN network.
Clients at remote locations can also use network licenses if they are on systems that can contact the license server, e.g. if they are on systems connected via a VPN gateway or a similar solution. Access to the license server can be configured. See section 3 for further details.

### 1.4 Firewall settings

To allow clients to connect to the license server, incoming TCP-traffic to the port that the server is listening on must be allowed. The default port number used by the CLC License Server is 6200. This can be changed if desired, as described in section 3.1.

To allow use of the auto-discovery feature of the license server, incoming broadcast UDP traffic to port number 6200 must be allowed. This port number cannot be changed.

### 1.5 Quick overview of license server setup

The general steps for setting up a CLC License Server are:

1. Install the software.
2. Configure the service.
3. Download license files.
4. Start the CLC License Server and check it is running as expected.
5. Optionally, customize the license server to suit local requirements.
6. Configure clients to connect to the CLC License Server.

The remainder of this manual expands on each of these steps.
Chapter 2

License server installation and launch

This chapter describes how to install and launch the CLC License Server for each supported OS type separately.

2.1 Windows installation and launch

If upgrading from an earlier version of the CLC License Server, please refer to section 2.4 before continuing to install the new CLC License Server.

To install the CLC License Server:

1. Download the installer from https://www.qiagenbioinformatics.com/products/clc-license-server-direct-download/ or from your myCLC account.

2. Double-click the installer icon to launch it. You will be prompted to choose the location to install the software to. If the C: drive is the default drive, then the default installation location offered will be C:\Program Files\CLCLicenseServer4.

To run the CLC License Server as a Windows Service, right-click on the installservice file in the installation directory and choose the option Run as administrator from the menu. See figure 2.1.

This will open a terminal window and guide you through the service installation procedure. Press a key on the keyboard when asked to do so. See figure 2.2.

Once successfully installed, the services will be visible in the Services control panel in Windows. See figure 2.3.

The name of the service is LM-X License Server - CLCBIO. From here you can start, stop and restart the service if needed.

You are now ready to download a license file. See section 2.1.1.

2.1.1 Downloading license files for Windows

On a networked machine, license files can be downloaded by running the licensedownload.bat script with administrator privileges. To do this, view the contents of the CLC License Server
installation directory, and right-click on the `licensedownload.bat` file. Choose the option **Run as administrator** from the context menu. This will result in a window like that shown in Figure 2.4.

Paste the Order ID supplied by QIAGEN.

When you run the `licensedownload.bat` script, a new license file is downloaded into the `licenses` folder, which is under the installation area of the CLC License Server software. This is where the CLC License Server looks for licenses by default.

If the license server is already running, you need to restart it for the new licenses to be loaded.
You can restart the License Server through the Services control panel, as shown in figure 2.3. It can also be restarted by right-clicking on the `restartservice` script and choosing the option **Run as administrator**.

To download and install a license file on a non-networked machine, please see section A.4**Downloading license files on non-networked machines**

**Upgrading an existing license:** If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).

If you have not received a license order ID or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.

### 2.1.2 Checking that the server is ready

After starting the CLC License Server, check that it is up and running and the licenses you expect to see are available. See section 4 for further details about this.

### 2.1.3 Uninstalling the Windows Service

To uninstall the service, you can use the `uninstallservice.bat` script. Run this by right-clicking on the icon and choosing the menu option **Run as administrator**.

### 2.2 macOS installation and launch

#### 2.2.1 Installing the software on macOS

If upgrading from an earlier version of the CLC License Server, please refer to section 2.4 before continuing to install the new CLC License Server.

To install the CLC License Server:

1. Download the installer from [https://www.qiagenbioinformatics.com/products/clc-license-server-direct-download/](https://www.qiagenbioinformatics.com/products/clc-license-server-direct-download/) or from your myCLC account.

2. Double-click the installer icon to launch it. You will be prompted to choose the installation location. The default location on macOS is: `/Applications/CLCLicenseServer4/`. 
CHAPTER 2. LICENSE SERVER INSTALLATION AND LAUNCH

The installer extracts the relevant files, places them in the chosen installation folder, and starts the server daemon.

2.2.2 Configure the service to be run by a designated user

We recommend that the license server is configured to be run as a standard user rather than the default daemon user. These steps need to be done by someone working with administrative privileges.

1. Create a user for running the CLC License Server if you do not already have one.
   
   We will refer to a user with username `joebloggs` for the purposes of these instructions.

2. Ensure the CLC License Server is not running. If you are not sure, then run the `stopserver.command` script (e.g. by double clicking on it its icon).

3. Check that there is no lock file. If there is one, remove it.
   
   `ls /var/tmp/clcbio.lock`
   `sudo rm /var/tmp/clcbio.lock`

4. Change the ownership of the license server installation directory and its contents to the user that should own the CLC License Server process.

   `sudo chown -R joebloggs /Applications/CLCLicenseServer4/`

5. Set the user to run the process in the job description file at
   
   `/Library/LaunchDaemons/com.clcbio.licenseserver.plist`

   Find this section:

   ```
   <key>UserName</key>
   <string>daemon</string>
   ```

   And edit the name between the string tags:

   ```
   <key>UserName</key>
   <string>joebloggs</string>
   ```

   After making changes, the plist must be reloaded. This can be done using the following commands or by restarting the computer.

   `sudo launchctl unload /Library/LaunchDaemons/com.clcbio.licenseserver.plist`
   `sudo launchctl load /Library/LaunchDaemons/com.clcbio.licenseserver.plist`

2.2.3 Downloading license files for macOS

Downloading and installing licenses on a machine with the CLC License Server installed and with access to the external network is described in this section. To download and install a license file on a system without access to the external network, please see section A.4.

To download and install licenses in the CLC License Server on a machine with access to the external network:
1. Run the `downloadlicense.command` script, found in the CLC License Server installation area. Usually this will need to be done as a user with administrator privileges.

For example, if the default installation location for the CLC License Server was used, the following command could be run:

```
sudo /Applications/CLCLicenseServer4/downloadlicense.command
```

This script launches a terminal window like that shown in Figure 2.5.

![Figure 2.5: Enter a License Order ID at the prompt to download a license.](image)

2. Paste in the license order ID supplied by QIAGEN and press Enter.

A new license file is downloaded into the `licenses` folder of the installation area of the CLC License Server software. This is where the CLC License Server looks for licenses by default. The location of the file is printed to the terminal.

3. To load the new license information, the CLC License Server service must be started up, or re-started if it is already running. See section section 2.2.5 for details about how to do this.

**Upgrading an existing license:** If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).

**If you have not received a license order ID** or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.

### 2.2.4 Check the newly installed license server is running on macOS

After starting or restarting the CLC License Server after licenses have been installed, check that it is running as expected, including that the installed licenses have been loaded. See section 4 for further details about this.

### 2.2.5 Starting and stopping the license server on macOS

The following scripts are provided for starting, stopping and restarting (stopping then starting) the CLC License Server respectively.

- **startserver.command** Run this script to start up the CLC License Server.
- **stopserver.command** Run this script to stop a running CLC License Server.
- **restartsserver.command** Run this script to stop a running CLC License Server and start it up again.
The CLC License Server is installed as a service, and should start up automatically when the system is restarted.

2.3 Linux installation and launch

The instructions provided here are for installing the CLC License Server on a CentOS Linux distribution.

If upgrading from an earlier version of the CLC License Server, please refer to section 2.4 before continuing to install the new CLC License Server.

2.3.1 Installing the software on Linux

1. Download the installer from https://www.qiagenbioinformatics.com/products/clc-license-server-direct-download/ or your myCLC account.

2. Launch the installer.
   From within the same folder the installer is in, a command of this form could be used to launch the installer:
   ```
   sudo /bin/sh ./<installerName.sh>
   ```
   Installing to a central location on the server machine usually requires administrator privileges.

   You will be prompted for the location to install the software to. Locations in this section of the manual refer to the software installation location as `<installationDirectory>`. The default location on Linux is `/opt/CLCLicenseServer4`.

2.3.2 Initial configuration steps on Linux

1. **Create a user to run the CLC License Server service** Create a standard user account for running the CLC License Server service if you do not already have one. Please ensure that this user account has a home directory, such that $HOME exists and can be found. For some Linux flavors, you can do this simply with a command like:
   ```
   useradd <serviceusername>
   ```
   For other Linux flavors, you may need to add a flag to enable the creation of a home directory.

2. **Ensure appropriate ownership of the license server files** Change the ownership of the installation directory and all files under that area to be owned by the user that will run the license server process.
   ```
   chown -R <serviceusername> <installationDirectory>
   ```
   e.g.
   ```
   chown -R cllicsrv /opt/CLCLicenseServer4
   ```
3. **Configure the password for remote access to the license server**

   - Open the configuration file `<installationDirectory>/licenseserver.cfg` with a text editor (e.g. nano, pico, emacs, vi or similar).
   - Change the value of the variable `REMOTE_ACCESS_PASSWORD`.

   This password is needed when remotely starting or stopping the server, or carrying out certain other administrative tasks remotely.

4. **Optional: make any other desired changes to the configuration file** See section 3 for further details on configuring the CLC License Server.

### 2.3.3 Running the CLC License Server as a service

The CLC License Server can be run as a service and configured to start when the system is booted. Here we include instructions for doing this using systemd and SystemV. The service should be configured either under systemd or SystemV, not both.

#### systemd service configuration

To configure the CLC License Server to run as a systemd service and to start up when the system boots up:

1. Edit the file `<installationDirectory>/runscript/cllicsrv.service` using a text editor (e.g. nano, pico, emacs, vi or similar), following the instructions contained in the file. This includes editing the User and Group variables as well as setting the correct password and providing the installation location of the CLC License Server. Notice: the password must be identical to the `REMOTE_ACCESS_PASSWORD` in the license server configuration file, licenseserver.cfg. This file can be found in the installation directory of the CLC License Server.

2. Copy the configured `<installationDirectory>/runscript/cllicsrv.service` file to `/etc/systemd/system/`.

3. For the service to be started when the system boots up, run the command:
   ```bash
   systemctl enable cllicsrv.service
   ```

At this point, the CLC License Server normally has not been started. The following sections cover downloading license files and starting up the CLC License Server.

**Note:** When upgrading the CLC License Server in place, the file `<installationDirectory>/runscript/cllicsrv.service` may be overwritten. Configuration files in central locations like `/etc/systemd/system/` will not be overwritten on upgrade.

#### SystemV service configuration

To configure the CLC License Server to run as a SystemV service and to start up when the system boots up:
1. Edit the file `<installationDirectory>/runscript/clclicsrv` with a text editor (e.g. nano, pico, emacs, vi or similar), providing the relevant information for your installation and environment.

If you have installed the software to the default location, `/opt/CLCLicenseServer4`, you should only need to edit the values for the variables:

- **USER** Set this to the user that should own the license server process.
- **PASSWORD** Set this to the same value given for the `REMOTE_ACCESS_PASSWORD` in the license server configuration file, licenseserver.cfg. This file can be found in the installation directory of the CLC License Server.

If you have installed the software to a location other than the default, edit the value of the `DIRECTORY` variable accordingly and check the other variables are correct for your installation.

2. Copy the configured `<installationDirectory>/runscript/clclicsrv` file to your startup-script directory. Typically this is `/etc/init.d`.

**Note:** When upgrading the CLC License Server in place, the file `<installationDirectory>/runscript/clclicsrv` may be overwritten. Configuration files in central locations like `/etc/init.d/` will **not** be overwritten on upgrade.

**Enable on-boot startup using chkconfig** It is common to want the license server service to start up whenever the system is started up. If you are installing on a Red Hat-style distribution you can use the `chkconfig` tool to do this.

```bash
chkconfig clclicsrv on
```

To check if the license server is set to startup automatically use the following command:

```bash
chkconfig --list
```

In the output look for a line similar to:

```
clclicsrv 0:off 1:off 2:on 3:on 4:on 5:on 6:off
```

Make sure that the service is listed as **on** for the appropriate run-level (typically 3 or 5).

### 2.3.4 Downloading license files for Linux

On a networked machine, license files can be downloaded using the `downloadlicense` script with administrator privileges. For example, if the default installation location for the CLC License Server was used, the following command could be run:

```bash
sudo /opt/CLCLicenseServer4/downloadlicense
```

Paste in the license order ID supplied by QIAGEN and press Enter.
A new license file is downloaded into the licenses folder, which is under the installation area of the CLC License Server software. This is where the CLC License Server looks for licenses by default. The location of the license file is printed to the terminal.

If the license server is already running, it must be restarted for new licenses to be loaded.

**To download and install a license file on a non-networked machine, please see section A.4 Downloading license files on non-networked machines**

**Upgrading an existing license:** If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).

If you have not received a license order ID or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.

### 2.3.5 Starting and stopping the CLC License Server on Linux

**Starting and stopping the CLC License Server under systemd**

If you have configured the CLC License Server service under systemd, then:

- To start the service, run the command:
  ```bash
  systemctl start clclicsrv.service
  ```

- To stop the service, run the command:
  ```bash
  systemctl stop clclicsrv.service
  ```

- To restart the service, run the command:
  ```bash
  systemctl restart clclicsrv.service
  ```
  If you make changes to the service while it is running by editing or replacing the file at `/etc/systemd/system/clclicsrv.service` or by editing the licenseserver.cfg file, or if you add or remove license files from the licenses folder, you will need to restart the service to get the changes to take effect.

- To check the status of the service, run the command:
  ```bash
  systemctl status clclicsrv.service
  ```

The commands given in this section must be run by a user with administrative privileges.

For more detailed monitoring of a running license server, including getting information on the licenses available and usage data, please refer to section 4.

**Starting and stopping the CLC License Server under SystemV**

If you have configured the CLC License Server service under SystemV, then the clclicsrv script is used to start and stop the CLC License Server.
To start the service, run the command:

```
service clclicsrv start
```

To stop the service, run the command:

```
service clclicsrv stop
```

To restart the service, run the command:

```
service clclicsrv restart
```

If you make changes to the service while it is running by editing or replacing the file at `/etc/init.d/clclicsrv` or by editing the licenseserver.cfg file, or if you add or remove license files from the `licenses` folder, then you need to restart the service to get the changes to take effect.

The commands given in this section must be run by a user with administrative privileges.

For information about monitoring a running license server, including getting information on its status, the licenses available and usage data, please refer to section 4.

### Starting and stopping the CLC License Server without running it as a service

If you choose not to run the CLC License Server as a service, you can start, stop and restart the server directly by editing the file `<installationDirectory>/runscript/clclicsrv` with a text editor (e.g. nano, pico, emacs, vi or similar), providing the relevant information for your installation and environment and then running that script with the argument `start`, `stop` or `restart`.

- To start the server, run the command:
  
  `<installationDirectory>/runscript/clclicsrv start`

- To stop the server, run the command:
  
  `<installationDirectory>/runscript/clclicsrv stop`

- To restart the service, run the command:
  
  `<installationDirectory>/runscript/clclicsrv restart`

If you make changes to the service while it is running by editing the licenseserver.cfg file, or if you add or remove license files from the `licenses` folder, then you need to restart the server to get the changes to take effect.

The commands given in this section must be run by a user with administrative privileges.

For information about monitoring a running license server, including getting information on its status, the licenses available and usage data, please refer to section 4.

### 2.4 Upgrading the CLC License Server

When upgrading from an earlier version of the CLC License Server, the general steps are:
• Stop the old license server process running.

• Install the new CLC License Server in a **new location**, following the installation instructions for the relevant platform.

• Install the licenses, following the instructions for downloading license files for the relevant platform. Alternatively copy the old license files, usually this is from within the `licenses` folder of the old CLC License Server installation area, into the `licenses` folder of the new installation.

If upgrading the CLC License Server around the time of a major release of the CLC analysis software, we recommend downloading new license files.

• If you have customized the `licenseserver.cfg` file in the earlier CLC License Server release, then either copy that file into the installation area of the new CLC License Server or edit the new `licenseserver.cfg` file.

When upgrading from CLC License Server 3.6.1, we recommend that you read and keep a copy of the new `licenseserver.cfg` file as it contains more information about possible configurations than earlier versions of that file.

• If you were previously running the CLC License Server as a service, check that the service configuration is correct.

  **When upgrading on Linux:** If the service is configured under SystemV, check that the `clclicsrv` script under `/etc/init.d` has the correct information for the upgraded installation. If changing from using SystemV to systemd for handling the CLC License Server service, ensure that you remove any earlier SystemV configuration files from `/etc/init.d`.

• Start up the new CLC License Server following the instructions given for the relevant platform.
Chapter 3

License server configuration

Configuration of the CLC License Server is done by editing the licenseserver.cfg file and subsequently restarting the license server. Many customizations are possible, including setting the paths to various files and creating access restrictions. Many of the configuration options are described within the licenseserver.cfg file itself.

Information in this section can also be found at https://docs.x-formation.com/display/LMX/License+server+configuration+file, although not all options described there are supported.

3.1 General configuration

Below are descriptions of configuration options that specify the environment of the license server, paths to various files, and the administration password.

TCP_LISTEN_PORT This option defines the TCP port number that the license server will use to listen for connections. The TCP port is used for the data traffic protocol.

The default TCP port is 6200, but can be changed by editing the TCP_LISTEN_PORT setting.

TCP_LISTEN_PORT = 6200

A separate UDP port is used for automatic server discovery protocol. The UDP port is fixed to 6200. It cannot be changed.

LICENSE_FILE Specify the path to a license file to be read by the server. The filenames must be lowercase. You can specify one or multiple paths as needed.

By default, all licenses in the folder called licenses in the installation area of the CLC License Server will be read.

Examples:

LICENSE_FILE = d:\server\network.lic
LICENSE_FILE = /home/licserver/floating_license.lic
LICENSE_FILE = /home/licserver/floating_license2.lic
**REMOTE_ACCESS_PASSWORD** Specify the remote administration password which is used when remotely stopping and restarting the license server and removing users from it. The password is case-sensitive.

*Example:*

```plaintext
REMOTE_ACCESS_PASSWORD = MyPassword123
```

**LOG_FILE** Specify where the log file should be written to.

If you do not specify this setting, the log file is written to the default location. See section 4.3 The license server log file.

If editing this entry, the absolute path to the log file is recommended.

*Examples:*

```plaintext
LOG_FILE = c:\program files\licenserver.log
LOG_FILE = /var/log/licenseserver.log
```

**LOG_EXCLUDE**

Exclude specific messages from the log. The following messages can be excluded: CHECKOUT, CHECKIN, STATUS, BORROW, BORROW_RETURN, REMOVE_USER, REMOTE_RESTART or REMOTE_SHUTDOWN.

*Example:*

```plaintext
LOG_EXCLUDE = CHECKOUT, CHECKIN, STATUS
```

### 3.2 Access configuration

This section describes how to customize access to licenses. This includes things like defining users or systems that can connect to the CLC License Server, as well as which licenses they have access to, reserving licenses, and restricting borrowing rights.

Configurations are specified as a set of rules. These rules are applied in the sequence they appear in the configuration file. The first rule matched for a particular type of configuration is the one used for that user or system.

Access configurations can be applied for all products or for specific products. An individual product is specified using its feature name. This is indicated in the information below as `<feature>`. The feature names for the products supported by your network licenses can be found by either of the following methods:

- Running the `lmxendutil` command as described in section 4.2.1.
- Running the LM-X License Server Client, described in section 4.1, and referring to the drop down list labelled Feature in the right hand pane.

Feature names for a number of CLC products are also provided in appendix 5.
Configurations are set using IP addresses, hostnames or usernames. Multiple entries for a given configuration must be specified as a space-separated list. IP addresses must be specific addresses with the form: A.B.C.D or with wildcards A.*.B.*

To specify that a rule should apply to a group of users, provide the username of each member individually. Alternatively, for CLC Workbenches, members of a particular group could use a single custom username for their license server connection. Then this custom username could be entered in configurations, instead of individual group member user names. See section 5.

3.2.1 Permissions

Standard license checkouts

By default, software on any machine able to connect to the CLC License Server could request a license. This can be restricted, with fine grained configurations limited access to certain hosts, domains or users.
Rules that can be configured:

<table>
<thead>
<tr>
<th>Option</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW_IPADDR_ALL</td>
<td>One or more IP addresses</td>
<td>Allow access to all features for the specified IP addresses.</td>
</tr>
<tr>
<td>ALLOW_IPADDR_&lt;feature&gt;</td>
<td>One or more IP addresses</td>
<td>Allow access to a specific feature for the specified IP addresses.</td>
</tr>
<tr>
<td>DENY_IPADDR_ALL</td>
<td>One or more IP addresses</td>
<td>Deny access to all features for the specified IP addresses.</td>
</tr>
<tr>
<td>DENY_IPADDR_&lt;feature&gt;</td>
<td>One or more IP addresses</td>
<td>Deny access to a specific feature for the specified IP addresses.</td>
</tr>
<tr>
<td>ALLOW_HOST_ALL</td>
<td>One or more host names</td>
<td>Allow access to all features for the specified host names.</td>
</tr>
<tr>
<td>ALLOW_HOST_&lt;feature&gt;</td>
<td>One or more host names</td>
<td>Allow access to a specific feature for the specified host names.</td>
</tr>
<tr>
<td>DENY_HOST_ALL</td>
<td>One or more host names</td>
<td>Deny access to all features for the specified host names.</td>
</tr>
<tr>
<td>DENY_HOST_&lt;feature&gt;</td>
<td>One or more host names</td>
<td>Deny access to a specific feature for the specified host names.</td>
</tr>
<tr>
<td>ALLOW_USER_ALL</td>
<td>One or more users</td>
<td>Allow access to all features for the specified users</td>
</tr>
<tr>
<td>ALLOW_USER_&lt;feature&gt;</td>
<td>One or more users</td>
<td>Allow access to a specific feature for the specified users</td>
</tr>
<tr>
<td>DENY_USER_ALL</td>
<td>One or more users</td>
<td>Deny access to all features for the specified users</td>
</tr>
<tr>
<td>DENY_USER_&lt;feature&gt;</td>
<td>One or more users</td>
<td>Deny access to a specific feature for the specified users</td>
</tr>
</tbody>
</table>

In the example below, 2 clients on 2 subnets are allowed to connect to the license server, and two users, *alice* and *bob* are allowed to connect. All others are denied access.

*Example 1:*

```
ALLOW_IPADDR_ALL = 192.168.1.* 192.168.2.*
ALLOW_USER_ALL = alice bob
DENY_IPADDR_ALL = *.*.*.*
```

In the example below, machines with hostname 'lab1' or 'office1' are denied access to CLC Main Workbench licenses. Other clients on the internal network are allowed to request CLC Main Workbench licenses, but any others are denied access to CLC Main Workbench licenses.

*Example 2:*

```
DENY_HOST_CLCMAINWB = lab1 office1
ALLOW_IPADDR_CLCMAINWB = 192.168.*.*
DENY_IPADDR_CLCMAINWB = *.*.*.*
```
Borrowing restrictions

By default users can borrow network licenses, allowing them to work for a period of up to 7 days without being connected to the license server. Borrowing is cases useful in situations like taking a laptop home to work, or when traveling off-site. Workbench users can select the license(s) they wish to borrow from within the Workbench License Manager, and select the duration to borrow the license for. The durations offered are between 1 hour and 7 days.

Rules that can be configured:

<table>
<thead>
<tr>
<th>Option</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW_BORROW_IPADDR_ALL</td>
<td>One or more IP addresses</td>
<td>Allow all features to be borrowed for the specified IP addresses.</td>
</tr>
<tr>
<td>ALLOW_BORROW_IPADDR_&lt;feature&gt;</td>
<td>One or more IP addresses</td>
<td>Allow the specific feature to be borrowed for the specified IP addresses.</td>
</tr>
<tr>
<td>DENY_BORROW_IPADDR_ALL</td>
<td>One or more IP addresses</td>
<td>Deny all features to be borrowed for the specified IP addresses.</td>
</tr>
<tr>
<td>DENY_BORROW_IPADDR_&lt;feature&gt;</td>
<td>One or more IP addresses</td>
<td>Deny the specific feature to be borrowed for the specified IP addresses.</td>
</tr>
<tr>
<td>ALLOW_BORROW_HOST_ALL</td>
<td>One or more host names</td>
<td>Allow all features to be borrowed for the specified host names.</td>
</tr>
<tr>
<td>ALLOW_BORROW_HOST_&lt;feature&gt;</td>
<td>One or more host names</td>
<td>Allow the specific feature to be borrowed for the specified host names.</td>
</tr>
<tr>
<td>DENY_BORROW_HOST_ALL</td>
<td>One or more host names</td>
<td>Deny all features to be borrowed for the specified host names.</td>
</tr>
<tr>
<td>DENY_BORROW_HOST_&lt;feature&gt;</td>
<td>One or more host names</td>
<td>Deny the specific feature to be borrowed for the specified host names.</td>
</tr>
<tr>
<td>ALLOW_BORROW_USER_ALL</td>
<td>One or more users</td>
<td>Allow all features to be borrowed for the specified users</td>
</tr>
<tr>
<td>ALLOW_BORROW_USER_&lt;feature&gt;</td>
<td>One or more users</td>
<td>Allow the specific feature to be borrowed for the specified users</td>
</tr>
<tr>
<td>DENY_BORROW_USER_ALL</td>
<td>One or more users</td>
<td>Deny all features to be borrowed for the specified users</td>
</tr>
<tr>
<td>DENY_BORROW_USER_&lt;feature&gt;</td>
<td>One or more users</td>
<td>Deny the specific feature to be borrowed for the specified users</td>
</tr>
</tbody>
</table>

The rules are written and used in the same way as the access restriction rules described in the previous section.

The following line would disable borrowing for all users:

```
DENY_BORROW_IPADDR_ALL = *.*.*.*
```

Borrow limits

Two limits are available that can be used to prevent clients from borrowing all the available licenses for a given feature, or from borrowing a feature for an unreasonable long time.

- BORROW_LIMIT_COUNT Imposes a limit on the number of licenses which can be borrowed
to prevent all licenses from being borrowed at the same time. Borrow limits are configured separately for each feature.

The syntax is:

BORROW_LIMIT_COUNT_<feature name> = <limit count>

Where <limit count> is number from 1 to the number of available licenses for the given feature. If you wish to restrict the feature from being borrowed completely you should specify a restriction as described in the previous section.

Example:

BORROW_LIMIT_COUNT_CLCMAINWB = 1
BORROW_LIMIT_COUNT_CLCGENOMICSWB = 5

The configuration in the example above will allow one license for the CLC Main Workbench to be borrowed and five licenses for the CLC Genomics Workbench to be borrowed.

- BORROW_LIMIT_HOURS Limit the number of hours that licenses can be borrowed to prevent licenses from being borrowed too long. Borrow limits are configured separately for each feature.

  The syntax is:

  BORROW_LIMIT_HOURS_<feature name> = <limit hours>

  Where <limit hours> is a number between 1 and the maximum borrow period imposed by the license. The maximum borrow limit for CLC

  Example:

  BORROW_LIMIT_HOURS_CLCMAINWB = 48
  BORROW_LIMIT_HOURS_CLCGENOMICSWB = 12

  The configuration in the example above will allow licenses for the CLC Main Workbench to be borrowed and for 48 hours and licenses for the CLC Genomics Workbench to be borrowed for 12 hours.

3.2.2 Reservations

A specified number of licenses can be reserved for particular users or systems. Rules are applied in the order specified, allowing you to give some users higher priority than others.

Example:

RESERVE_USER_CLCGENOMICSWB_1 = joebloggs marysmith
RESERVE_IPADDR_CLCGENOMICSWB_3 = 192.168.2.* 192.168.4.*

This would have the effect of reserving 1 CLC Genomics Workbench license for use by joebloggs or marysmith and 3 CLC Genomics Workbench licenses for use on machines with particular IP addresses.

RESERVE_HOST_feature name_reservenumber is also available for reserving licenses by hostname.
3.2.3 Limitations

The number of licenses that can be used by particular users or groups of users can be limited, to help support the desired distribution of licenses. Limiting particular users’ access is done by a first match rule, so if a user is listed in more than one rule, the first rule encountered will apply to that user.

Example:

LIMIT_USER_CLCGENOMICSWB_1 = joebloggs marysmith
LIMIT_IPADDR_CLCGENOMICSWB_3 = 192.168.2.* 192.168.4.*

The first statement would limit the number of CLC Genomics Workbench licenses available to joebloggs and marysmith to one, meaning only one of them could be running a CLC Genomics Workbench at any given time. The second statement specifies that a maximum of 3 CLC Genomics Workbench licenses can be checked out at any given time by machines with IP addresses matching the pattern provided.

LIMIT_HOST_featurename_limitcount is also available for limiting licenses by hostname.
Chapter 4

Monitoring the license server

4.1 The LM-X Graphical License Server Client

The LM-X License Server Client software can be used to monitor license usage as well as carry out administrative tasks, such as restarting or shutting down the license server and editing the configuration file.

Documentation for the LM-X License Server Client can be found at https://docs.x-formation.com/display/LMX/Using+LM-X+License+Server+Client.

Figure 4.1 shows a view of the LM-X License Server Client when running and connected to a CLC License Server. The Feature Usage chart shown on the right hand side displays license usage for the selected software over a maximum period of the previous month. For information on longer running instances, the license server log file can be referred to. See section 4.3 and section 4.2.1.

Figure 4.1: The LMX License Server Client provides views of license usage and allows administrative tasks to be carried out. The version of the software reported is that of the underlying LM-X License Manager.
The LM-X License Server Client is distributed as a jar file called LicserverClient.jar and is included with the CLC License Server distribution. It can be used on any system as long as Oracle JRE v1.8 or newer is present on that system.

The operating system of the machine LM-X License Server Client is used on does not need to match the operating system of the machine the CLC License Server is running on. So, for example, a license server running on Linux can be monitored from a computer running Windows.

To get the LicserverClient.jar onto a client machine, you can either copy the file from the installation area of the CLC License Server, or you can download the CLC License Server installer for the client machine from https://www.qiagenbioinformatics.com/products/clc-license-server-direct-download/ or from your myCLC account, run the installer, and then use the LicserverClient.jar file that is included with the distribution.

4.2 The LM-X End User Utility

The LM-X End User Utility is a command line client distributed with the CLC License Server that can be used to query the license server. It is available for all platforms.

It is distributed as a binary file called lmxendutil and is included with the CLC License Server distribution.

The LM-X End User Utility output displays the current status of the server. This differs from the information presented using the LM-X License Server Client described in section section 4.1, which provides information on current and past usage.

In the commands below, the information enclosed in angle-brackets, < and >, must be replaced by the relevant information for your system. Angle brackets should not be included in the command used.

If you are running the LM-X End User Utility on the same machine as the CLC License Server and it is using the standard port (6200), you can omit the -host and -port options from the commands. If you omit the -password option from the command, you will be prompted for it when executing the command if it is needed.

To display the current status of the license server, use the command:

```bash
lmxendutil -licstat -host <server host> -port <port>
```

This returns a listing of the licenses in use, including the user and host name, and date and time a license was checked out.

Licenses checked out for a particular user can be retrieved using the following command:

```bash
lmxendutil -removeuser -clientusername <user> -clienthostname <host> -host <host> -port <port> -password <password>
```

The operating system of the machine the LM-X End User Utility is used on does not need to match the operating system of the machine the CLC License Server is running on. So, for example, a license server running on Linux can be monitored from a computer running Windows.
To get a copy of the `lmxendutil` suitable for a particular operating system, download the corresponding CLC License Server installer from https://www.qiagenbioinformatics.com/products/clc-license-server-direct-download/ or from your myCLC account, run the installer, and then use the `lmxendutil` program that is included.

### 4.2.1 XML format status information

The `lmxendutil` End User Utility can also be used to extract the CLC License Server status in XML format.

The syntax for displaying the license statistics in XML format is:

```
/lmxendutil -licstatxml -host <server host> -port <server port>
```

The output produced will look something like that shown below. The values for the `FEATURE_NAME` tags refer to the products licenses being offered on this system.

```
<?xml version="1.0" encoding="UTF-8"?>
<LM-X STAT_VERSION="4.9.1">
<LICENSE_PATH TYPE="NETWORK" HOST="6200@localmachine" SERVER_VERSION="4.9.1" UPTIME="2 day(s)
1 hour(s) 59 min(s) 59 sec(s) " STATUS="SUCCESS">
<FEATURE NAME="ASSEMBLY_CELL" VERSION="5.99" VENDOR="CLCBIO" USED_LICENSES="0" TOTAL_LICENSES="2"
DENIED_LICENSES="0" RESERVED_LICENSES="0" SHARE="VIRTUAL">
</FEATURE>
<FEATURE NAME="BIOMEDICALGENOMICSWB" VERSION="5.99" VENDOR="CLCBIO" USED_LICENSES="1" TOTAL_LICENSES="2"
DENIED_LICENSES="0" RESERVED_LICENSES="0" SHARE="VIRTUAL">
<USED>
<User NAME="joebloggs" HOST="macbook-xx.local" IP="::1" USED_LICENSES="1" LOGIN_TIME="2018-01-04 09:05"
CHECKOUT_TIME="2018-01-04 09:05"/>
</USED>
</FEATURE>
<FEATURE NAME="CLCGENOMICSWB" VERSION="11.99" VENDOR="CLCBIO" USED_LICENSES="1" TOTAL_LICENSES="2"
DENIED_LICENSES="0" RESERVED_LICENSES="0" SHARE="VIRTUAL">
<USED>
<User NAME="marysmith" HOST="macbook-yy.local" IP="::1" USED_LICENSES="1" LOGIN_TIME="2018-01-04 09:04"
CHECKOUT_TIME="2018-01-04 09:04"/>
</USED>
</FEATURE>
<FEATURE NAME="CLCMAINWB" VERSION="8.99" VENDOR="CLCBIO" USED_LICENSES="0" TOTAL_LICENSES="2"
DENIED_LICENSES="0" RESERVED_LICENSES="0" SHARE="VIRTUAL">
</FEATURE>
</LICENSE_PATH>
</LM-X>
```

A list of the feature names for many of our licensed products is given in the appendix 5.

Depending on how this output is processed you can use this functionality for many different purposes including:

- Automatic monitoring of license server health and usage
- Generating statistics about license usage
- Presenting the status of the license server in some other way (for example on a web page)

### 4.3 The license server log file

A good source of information about a running CLC License Server is the log file. It contains information about the license server software itself (e.g. start up, shutdown, version, location...
of the configuration file, etc.) as well as about the licenses available, and the usage of those licenses. By default, the log file is created anew when the CLC License Server is started up.

The log file is a text file called licenseserver.log and is located in the installation area of the CLC License Server. It can be viewed directly using standard tools for reading text files, or it can be viewed and searched using the the LM-X License Server Client described in section section 4.1.

The name and location of the log file, and aspects of its contents, can be customized as described in section 3.1.

The log file can be used for generating license usage statistics directly, but for this purpose, the LM-X License Server Client or the XML output that can be generated using the LM-X End User Utility tool, described in section 4.2.1 may be of interest.

The top of a CLC License Server log file is shown below. This example information is from a server running on macOS, but the output looks similar on all platforms. In this case, two license files were found in the licenses folder, and two licenses are available, one for the CLC Genomics Workbench and one for the CLC Microbial Genomics Module.

```
[2017-08-16 16:50:31] LM-X License Server v4.9.1 build xxxxxxxx on <..host info..> (MacOSX_Universal)
[2017-08-16 16:50:31] Copyright (C) 2002-2018 X-Formation. All rights reserved.
[2017-08-16 16:50:31] License server has pid xxxx.
[2017-08-16 16:50:31] Serving licenses for vendor CLCBIO.
[2017-08-16 16:50:31] License file(s):
[2017-08-16 16:50:31] Log to stdout: Yes
[2017-08-16 16:50:31] Log format: Normal
[2017-08-16 16:50:31] Serving following features:
[2017-08-16 16:50:31] CLCGENOMICSWB (v11.99) (1 license(s)) license type: exclusive
[2017-08-16 16:50:31] CLC_MICROBIAL_GENOMICS_MODULE (v2.99) (1 license(s)) license type: exclusive
[2017-08-16 16:50:31] To administrate the license server go to your enduser directory and run the License Server Client.
```

Ready to serve...
Chapter 5

Configuring Workbenches to use network licenses

Workbench users configure their software to connect to the CLC License Server using the Workbench License Manager.

Once configured, the information about how to connect to the license server is stored in a file called license.properties under the settings directory in the installation area of the Workbench (e.g. C:\Program Files\CLC Main Workbench 8\settings\license.properties).

A running Workbench uses a Workbench license, whether or not it is in use. A Workbench needs to be shut down to release the license for others to use. It is possible to retrieve a license from running software, but in practice, a Workbench will immediately re-contact the license server and thus would almost always get the license back right away.

The Workbench License Manager is shown in figure 5.1.

![Figure 5.1: Select "Configure license server connection".](image)

To configure the Workbench to connect to a CLC License Server, select the Configure License Server connection option and click on the Next button. A dialog for the license server connection configuration is then presented. See figure 5.2.

The options in that dialog are:

- **Enable license server connection.** This box must be checked for the Workbench is to
contact the CLC License Server to get a license for CLC Workbench.

- **Automatically detect license server.** By checking this option the Workbench will look for a CLC License Server accessible from the Workbench. Automatic server discovery sends UDP broadcasts from the Workbench on port 6200. Available license servers respond to the broadcast. The Workbench then uses TCP communication for to get a license, if one is available. Automatic server discovery works only on local networks and will not work on WAN or VPN connections. Automatic server discovery is not guaranteed to work on all networks. If you are working on an enterprise network on where local firewalls or routers cut off UDP broadcast traffic, then you may need to configure the details of the CLC License Server using the **Manually specify license server** option instead.

- **Manually specify license server.** Select this option to enter the details of the machine the CLC License Server software is running on, specifically:
  - **Host name.** The address for the machine the CLC License Server software is running on.
  - **Port.** The port used by the CLC License Server to receive requests.

- **Use custom username when requesting a license.** Optional. If this is checked, a username can be entered. That will be passed to the CLC License Server instead of the username of the account being used to run the Workbench.

- **Disable license borrowing on this computer.** Check this box if you do not want users of the computer to borrow a license. See section 5 for further details.

**Special note on modules needing a license**

This note concerns CLC Genomics Workbench 11.0, Biomedical Genomics Workbench 5.0 and CLC Main Workbench 8.0.

A valid module license is needed to start a module tool, or a workflow including a module tool. Module licenses obtained through a License Server connection will be valid for four hours after starting the tool or the workflow. A process started (whether a module tool or a workflow including a module tool) will always be completed, even if its completion exceeds the four hours period where the license is valid.
If the tool or the workflow completes before the four hour validity period, it is possible to start a new tool or a workflow, and this will always refresh the validity of the license to a full four hours period. However, if the tool or the workflow completes after the four hour validity period, a new license will need to be requested after that to start the next tool or workflow.

These measures ensure that more licenses are available to active users, rather than blocked on an inactive computer, i.e., where the workbench would be open but not in use.

**Borrowing a license**

A network license can only be used when the Workbench is connected to the license server. If you wish to use the CLC Workbench when you are not connected to the CLC License Server, you can borrow an available license for a period of time. During this time, there will be one less network license available for other users. The Workbench must have a connection to the CLC License Server at the point in time when you wish to borrow a license.

The procedure for borrowing a license is:

1. Go to the Workbench menu option:
   **Help | License Manager**

2. Click on the "Borrow License" tab to display the dialog shown in figure 5.3.

   ![Figure 5.3: Borrow a license.](image)

3. Use the checkboxes at the right hand side of the table in the License overview section of the window to select the license(s) that you wish to borrow.

4. Select the length of time you wish to borrow the license(s).

5. Click on the button labeled **Borrow Licenses**.

6. Close the License Manager when you are done.

You can now go offline and work with CLC Workbench. When the time period you borrowed the license for has elapsed, the network license you borrowed is made available again for other users to access. To continue using CLC Workbench with a license, you will need to connect the Workbench to the network again so it can contact the CLC Licence Server to obtain one.

**Note!** Your CLC License Server administrator can choose to disable to the option allowing the borrowing of licenses. If this has been done, you will not be able to borrow a network license using your Workbench.
Common issues when using a network license

No license available at the moment  If all the licenses are in use, you will see a dialog like that shown in figure 5.4 when you start up the Workbench.

![Figure 5.4](image)

**Figure 5.4:** This window appears when there are no available network licenses for the software you are running.

This means others are using the network licenses. You will need to wait for them to return their licenses before you can continue to work with a fully functional copy of the software. If this is a frequent issue, you may wish to discuss this with your CLC License Server administrator.

Clicking on the **Viewing Mode** button in the dialog allows you to start CLC Workbench for data import, export, the ability to access your CLC data and to run a few selected tools.

Lost connection to the CLC License Server  If the Workbench connection to the CLC License Server is lost, you will see a dialog as shown in figure 5.5.

![Figure 5.5](image)

**Figure 5.5:** This message appears if the Workbench is unable to establish a connection to a CLC License server.

If you have chosen the option to **Automatically detect license server** and you have not succeeded in connecting to the License Server before, please check with your local IT support that automatic detection will be possible to do at your site. If it is not possible at your site, you will need to manually configure the CLC License Server settings using the License Manager, as described earlier in this section.

If you have successfully contacted the CLC License Server from your Workbench previously, please consider discussing this issue with your CLC License Server administrator or your local IT support, to make sure that the CLC License Server is running and that your Workbench can connect to it.
Appendix A

License download

A.1 Downloading license files for Windows

On a networked machine, license files can be downloaded by running the `licensedownload.bat` script with administrator privileges. To do this, view the contents of the CLC License Server installation directory, and right-click on the `licensedownload.bat` file. Choose the option **Run as administrator** from the context menu. This will result in a window like that shown in Figure 2.4.

![Figure A.1: Enter a License Order ID at the prompt to download a license.](image)

Paste the Order ID supplied by QIAGEN.

When you run the `licensedownload.bat` script, a new license file is downloaded into the `licenses` folder, which is under the installation area of the CLC License Server software. This is where the CLC License Server looks for licenses by default.

If the license server is already running, you need to restart it for the new licenses to be loaded. You can restart the License Server through the Services control panel, as shown in figure 2.3. It can also be restarted by right-clicking on the `restartservice` script and choosing the option **Run as administrator**.

**To download and install a license file on a non-networked machine**, please see section A.4 Downloading license files on non-networked machines

**Upgrading an existing license**: If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).
If you have not received a license order ID or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.

A.2 Downloading license files for macOS

Downloading and installing licenses on a machine with the CLC License Server installed and with access to the external network is described in this section. To download and install a license file on a system without access to the external network, please see section A.4.

To download and install licenses in the CLC License Server on a machine with access to the external network:

1. Run the downloadlicense.command script, found in the CLC License Server installation area. Usually this will need to be done as a user with administrator privileges.

   For example, if the default installation location for the CLC License Server was used, the following command could be run:

   sudo /Applications/CLCLicenseServer4/downloadlicense.command

   This script launches a terminal window like that shown in Figure 2.5.

   ![Figure A.2: Enter a License Order ID at the prompt to download a license.](image)

2. Paste in the license order ID supplied by QIAGEN and press Enter.

   A new license file is downloaded into the licenses folder of the installation area of the CLC License Server software. This is where the CLC License Server looks for licenses by default. The location of the file is printed to the terminal.

3. To load the new license information, the CLC License Server service must be started up, or re-started if it is already running. See section section 2.2.5 for details about how to do this.

Upgrading an existing license: If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).

If you have not received a license order ID or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.

A.3 Downloading license files for Linux

On a networked machine, license files can be downloaded using the downloadlicense script with administrator privileges. For example, if the default installation location for the CLC License Server was used, the following command could be run:
sudo /opt/CLCLicenseServer4/downloadlicense
Paste in the license order ID supplied by QIAGEN and press Enter.

A new license file is downloaded into the licenses folder, which is under the installation area of the CLC License Server software. This is where the CLC License Server looks for licenses by default. The location of the license file is printed to the terminal.

If the license server is already running, it must be restarted for new licenses to be loaded.

**To download and install a license file on a non-networked machine**, please see section A.4 Downloading license files on non-networked machines

**Upgrading an existing license:** If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).

**If you have not received a license order ID** or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.

### A.4 Downloading license files on non-networked machines

The license download tools distributed with the CLC License Server assume the machine the tool is running on has access to the external network. This section outlines how to download a license when this is not the case.

Please make sure you have your license order ID before you start the below process.

1. Find the host ID of the machine that will run the CLC License Server software by running the license download script located in the installation area of the software. The relevant script name for each OS is:
   - On Linux: downloadlicense
   - On macOS: downloadlicense.command
   - On Windows: licensedownload.bat

   Note down the host ID.

2. Go to a computer with internet access, open a browser window and go to the network license download web page
   

3. Paste in your license order ID and the host ID noted down earlier.

4. Click on the 'Download License' button and save the resulting .lic file.

5. Copy this file onto the machine with the CLC License Server software installed, placing it in the folder called licenses in the CLC License Server installation directory.

6. Restart the CLC License Server by following instructions in the "Downloading Licenses" section of this manual pertinent to the operating system you are running the CLC License Server on.
We recommend that all license files are placed in the licenses subfolder of the installation directory. This location is used by default by the CLC License Server without requiring further configuration.

If license files are placed elsewhere their locations must be configured. See section 3 for further details.

**Upgrading an existing license:** If you are upgrading an existing license file, then it is very important that old license files, that is, the ones you are replacing, are deleted before the CLC License Server is restarted. The old file(s) can be removed before or after you download the new license file(s).

**If you have not received a license order ID** or there are problems with your license order ID, please contact bioinformaticslicense@qiagen.com.
## Appendix B

### Feature names

Feature names are used when configuring the CLC License Server to limit or restrict access to licenses for particular products. The feature names supported by your network licenses can be found by running the `lmxendutil` command as described in section 4.2.1. Below is a table of the feature names for some of our licensed products.

<table>
<thead>
<tr>
<th>Product name</th>
<th>Feature name for configuration purposes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Genomics Workbench</td>
<td>BIOMEDICALGENOMICSWB</td>
</tr>
<tr>
<td>CLC Assembly Cell</td>
<td>ASSEMBLY_CELL</td>
</tr>
<tr>
<td>CLC Genomics Workbench</td>
<td>CLCGENOMICSWB</td>
</tr>
<tr>
<td>CLC Main Workbench</td>
<td>CLCMAINWB</td>
</tr>
<tr>
<td>CLC Genome Finishing Module</td>
<td>CLC_MICROBIAL_GENOME_FINISHING_MODULE</td>
</tr>
<tr>
<td>CLC Microbial Genomics Module</td>
<td>CLC_MICROBIAL_GENOMICS_MODULE</td>
</tr>
<tr>
<td>CLC MLST Module</td>
<td>CLCMLSTMODULE</td>
</tr>
</tbody>
</table>

If a licensed product you are interested in is not listed in the table above and you have not been able to determine it using the `lmxedutil`, as described in section 4.2, please contact us at ts-bioinformatics@qiagen.com.
Index

Access restrictions, 20
Auto-discover, firewall problems, 7

Borrow
  disable, 23
  limit number, 23
  limit time, 24
  restrictions, 23

Borrow Workbench network license, 32

Configuration, 19

Feature names, 38
Firewall settings, 7

Host name, restrict access, 20

Installation, 8
IP addresses, restrict access, 20

License access
  limiting, 38
  per product configuration, 38
  restricting, 38

License download
  Linux, 35
  macOS, 35
  non-networked machine, 36
  Windows, 34

License file, path to, 19

License server: use Workbench license offline, 32

Linux
  download licence file, 11, 35
  installation on, 10
  server requirements, 6

Monitor license server, 26

Network license: use Workbench offline, 32
Network requirements, 6

Offline access to a license, 23

Overview
  setup, 7

Password for remote access, 20

Requirements
  network, 6
  server, 6

Restrictions
  access, 20
  borrowing, 23
  reserving licenses, 24

Server requirements, 6

Statistics
  license usage, 26

Status
  checking, general, 26
  graphs, 26
  Linux, systemd, 16
  macOS, 12
  Windows, 8

Subnet, restrict access, 20

System requirements, 6

TCP port, specify, 19
TCP, server firewall settings, 7

UDP port number, 7
Upgrading, 17

Usage information, 26
Usage, view, 28
Username, restrict access, 20

macOS

download licence file, 11, 35
installation on, 10
server requirements, 6

Monitor license server, 26

Network license: use Workbench offline, 32
Network requirements, 6

Offline access to a license, 23
Overview
  setup, 7

Password for remote access, 20

Requirements
  network, 6
  server, 6

Restrictions
  access, 20
  borrowing, 23
  reserving licenses, 24

Server requirements, 6

Statistics
  license usage, 26

Status
  checking, general, 26
  graphs, 26
  Linux, systemd, 16
  macOS, 12
  Windows, 8

Subnet, restrict access, 20

System requirements, 6

TCP port, specify, 19
TCP, server firewall settings, 7

UDP port number, 7
Upgrading, 17

Usage information, 26
Usage, view, 28
Username, restrict access, 20

macOS
VPN connection, 6

Windows
  download licence file, 8, 34
  installation on, 8
  server requirements, 6
Workbenches, connecting from, 30
Working offline, 23

XML output for usage statistics, 28