OpenLab CDS ChemStation Edition

System Topologies and Architectural Concepts

Notices

Manual Part Number

M8305-90030
EDITION 04/2019

Copyright

Software Revision

This guide is valid for revision C.01.10 of OpenLab CDS ChemStation Edition.

Warranty

Technology Licenses

Restricted Rights Legend

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Contents

1 System Topologies

Overview

OpenLab CDS ChemStation Edition contains the following software and interface modules:

- OpenLab Control Panel

  The OpenLab Control Panel is the user interface that provides access to OpenLab CDS components, as well as administrative functions used for managing Shared Services features.

- Shared Services

  These services offer central access, central configuration, lab status at a glance, and remote control of instruments. The central functions can be used by all OpenLab modules.

- Instrument control, data acquisition and data analysis module

- Reporting (Classic and Intelligent Reporting)

- File System or Central Data Storage (Content Management provided by OpenLab Server)

Workstation

In a workstation, all components (shared services, control panel, instrument configuration, methods, sequences and data files) are installed on the same computer.

The following figure shows the configuration of a ChemStation Workstation. You can have multiple instruments on one workstation (see *OpenLab CDS ChemStation Edition Requirements* guide).
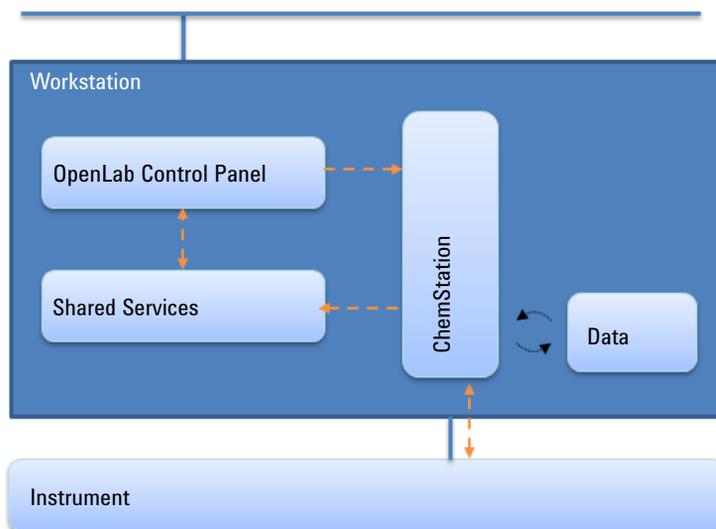
Figure 1   ChemStation Workstation
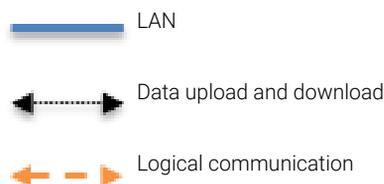
Networked Workstation

The Networked Workstations concept offers central administration of users, roles, and licensing. The instrument status can be viewed from any Networked Workstation. However, you can launch and configure instruments only from the PC on which you configured the instrument.

The following figure shows a Networked Workstation configuration. Multiple workstations can be part of the Networked Workstation system. The figure shows only one ChemStation instance, but you can configure multiple instances and associated instruments on the same machine.
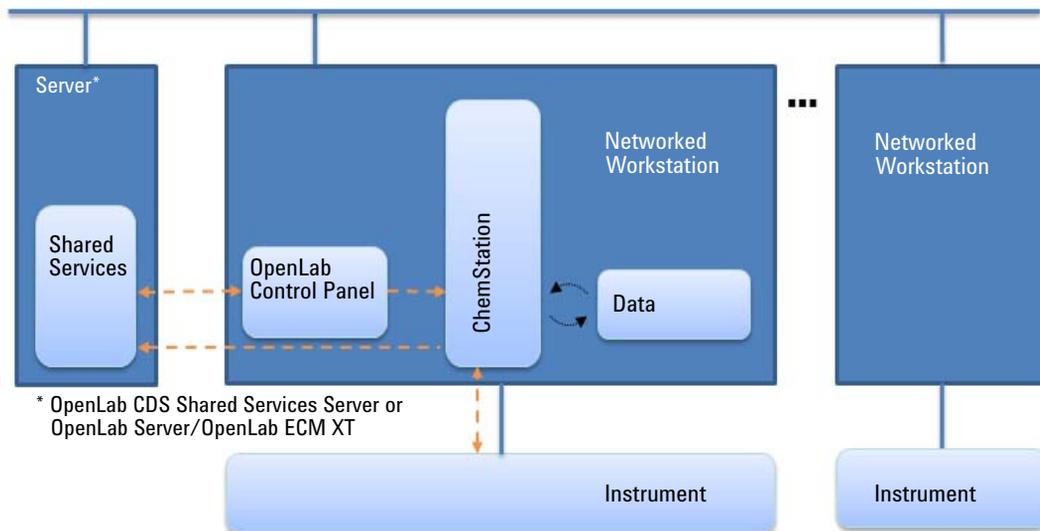
Figure 2   ChemStation Networked Workstation

LAN

Data upload and download

Logical communication

You can use the OpenLab CDS ChemStation Edition Networked Workstation configuration with or without central data storage. If you are connected to a central repository, the data stored on the workstation is synchronized with the central repository. For more information on ChemStation with central data storage, refer to the *OpenLab CDS ChemStation Edition with Content Management Systems Administrator's Guide* (CDS_CS_withCM-admin.pdf).

In case of OpenLab ECM 3.x systems, separate Shared Services servers are required per ECM Account.

Distributed Systems

With OpenLab CDS ChemStation Edition installed as a Distributed System, you are able to access and run instruments from any ChemStation Client PC in the system.

As in the Networked Workstation installation, the OpenLab Control Panel provides an overview of all instruments in the system. You can access all information provided by Shared Services from any ChemStation Client. For example, you can see the availability, location, and status (Online, Offline, Error, In Run, Not Ready, etc.) of your instruments.

In contrast to the Networked Workstation installation, in a Distributed System you can configure, launch and control any instrument from any ChemStation Client PC.

The Distributed System configuration enables you to work more flexibly with instrument sessions. You can launch an online instrument, start a sequence, and then disconnect the ChemStation Client while the instrument continues to run on the Analytical Instrument Controller machine (AIC). Later any user can connect to this instrument again from any client to finish work on the online instrument or to analyze the data.

NOTE   The Distributed System configuration requires either OpenLab Server/OpenLab ECM XT or OpenLab ECM 3.x.

In a ChemStation Distributed System, the instruments are controlled by the AIC. The AIC is a Windows server. Each AIC can control up to ten instruments. You can access the ChemStation instance on the AIC machine from any ChemStation Client. The connection between the ChemStation Client and the AIC is transparently using Remote Desktop Services. When you disconnect the ChemStation Client, you disconnect the Remote Desktop Connection. ChemStation continues to run on the AIC. For more information on remote instrument control, session takeover, session disconnect, or force shutdown, refer to the *OpenLab CDS ChemStation Edition Concepts and Workflows Guide* (CDS_CS_concepts.pdf).

The Distributed System configuration of OpenLab CDS ChemStation Edition requires a central data storage. The data acquired on each AIC is uploaded to the central repository. For more information on ChemStation with central data storage, refer to the *OpenLab CDS ChemStation Edition with Content Management Systems Administrator's Guide* (CDS_CS_withCM-admin.pdf).

The following figure shows the system architecture of ChemStation with OpenLab ECM 3.x. If you use the Content Management provided by OpenLab Server/OpenLab ECM XT, Content Management and Shared Services are installed on one server. In case of OpenLab ECM 3.x systems, separate Shared Services servers are required per ECM Account.
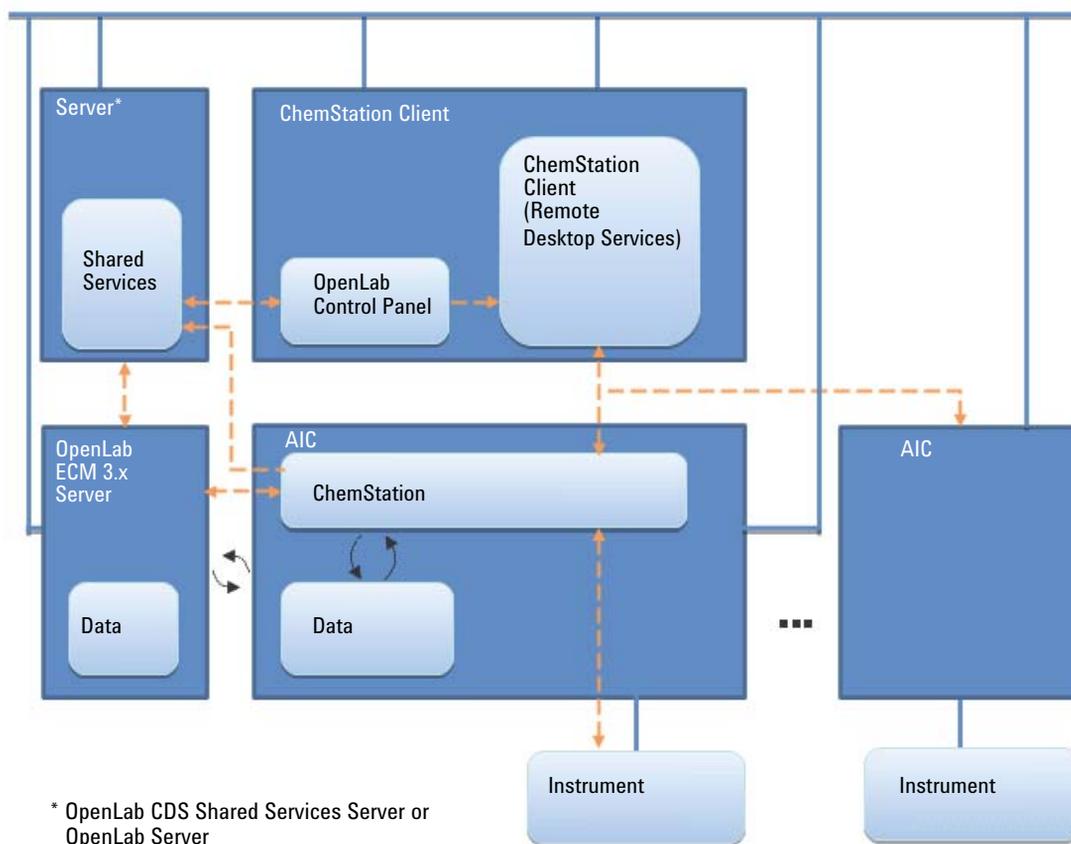
Figure 3   Distributed System with ChemStation and OpenLab ECM 3.x

Networked Workstations in Distributed Systems

When an instrument cannot be controlled by an AIC or needs to be isolated and controlled by a single computer, you can add one or multiple Networked Workstations to a distributed environment.

Figure 4 on page 12 shows a mixed topology with one Networked Workstation, one ChemStation Client, one AIC, and central data storage. You can have multiple Networked Workstations, multiple clients, and multiple AICs in this topology.

In a mixed environment, you can use the Networked Workstation to access all instruments configured on this workstation, and you can also use it as a client for all instruments configured on AICs. On the contrary, instruments configured on a Networked Workstation cannot be controlled from a pure ChemStation Client of a Distributed System.

Systems with both ChemStation Edition and EZChrom Edition being controlled by the same OpenLab CDS Shared Services Server are not supported.
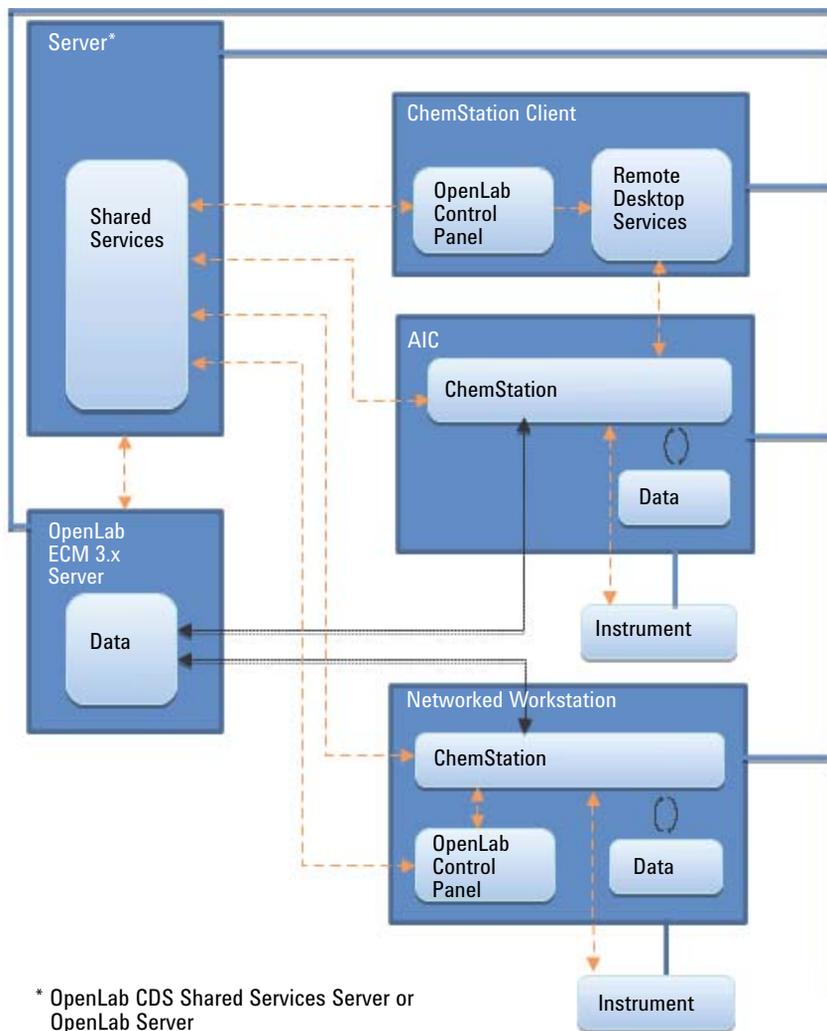
Figure 4   Mixed topology with ChemStation and OpenLab ECM 3.x

LAN

Data upload and download

Logical communication

Backward Compatibility During Upgrade

Backward compatibility was introduced OpenLab CDS ChemStation Edition rev. C.01.06. It allows lab operation and minimizes lab downtime during an upgrade by having the existing and the newer version of the data system on the same Networked or Distributed environment. The environment with different versions is to be used only during the upgrade phase. Procedures must be in place so older clients or workstations are not used to access and reprocess data created by newer clients or workstations.

During the upgrade phase, the **Instruments** and **Projects** tabs will be fully functional in the existing revision of the Control Panel. You can start and operate an instrument that was configured and running prior to the upgrade. Administrative tasks such as adding users or changing passwords must be done on the newer revision of the software. No other functionality is supported until the system upgrade is completed.

The following table shows the compatibility between the ChemStation edition with OpenLab Shared Service Server during an upgrade:

	OpenLab CDS Shared Services Server 2.2	OpenLab CDS Shared Services Server 2.3	OpenLab CDS Shared Services Server 3.2
ChemStation C.01.08	Yes	Yes	Yes
ChemStation C.01.09	Yes	Yes	Yes
ChemStation C.01.10	Yes	Yes	Yes

The following table shows compatibility between the ChemStation edition with Content Management and OpenLab Server/OpenLab ECM XT during an upgrade:

|	OpenLab Server 2.2	OpenLab Server 2.3 or OpenLab ECM XT 2.3	OpenLab Server 2.4 or OpenLab ECM XT 2.4
ChemStation C.01.08	Yes	Yes	Yes
ChemStation C.01.09	Yes	Yes	Yes
ChemStation C.01.10	Yes	Yes	Yes

NOTE   Different revisions can be used during the upgrade phase. Agilent recommends that installations are on the same software version. Acquisition and data analysis are supported on the same version of software last used for reprocessing, or on a newer version of the software.

Mixed Environment with ChemStation and OpenLab CDS 2.x

An environment with OpenLab Server 2.x supports using clients and AICs from both ChemStation C.01.10 and OpenLab CDS 2.x. For details on the supported server versions, see "Backward Compatibility During Upgrade" on page 13.

All instruments are visible on any client or Networked Workstation.

Routine work   During routine work, use the ChemStation clients to access instruments that are controlled by a ChemStation AIC, and use OpenLab CDS clients to access instruments controlled by an OpenLab CDS AIC. The data storage is provided by OpenLab Server. ChemStation and OpenLab CDS environments share the same storage.
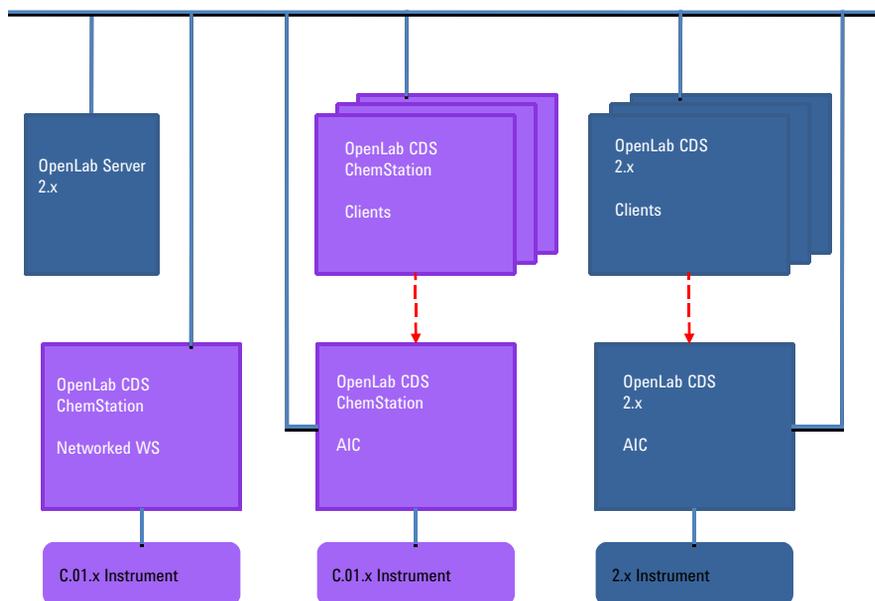
Figure 5   Routine work with ChemStation C.01.10 and OpenLab CDS 2.x

———— LAN connection

- - - - - Access

Use an instrument structure in the OpenLab Control Panel that helps you differentiating the instruments.

Figure 6   Instrument structure example

Migration   The mixed environment allows to transfer your acquisition method setpoints from ChemStation systems to OpenLab CDS 2.x.

1 Configure the same instrument on both ChemStation AIC and OpenLab CDS 2.x AIC.

2 Start the instrument from a ChemStation Client, and upload the acquisition method setpoints to the instrument. Close the ChemStation (a simple disconnect is not sufficient).

3 Start the same instrument from the OpenLab CDS 2.x Client, and download the acquisition method setpoints from the instrument. Save with a new method name.

Close the instrument connection before starting it again from a ChemStation Client.

CAUTION	**Instrument access from different systems** The instrument may become inaccessible ✓ **Always launch and close instruments from the same system. Do not launch an instrument from ChemStation and close it from OpenLab CDS, or vice versa.**
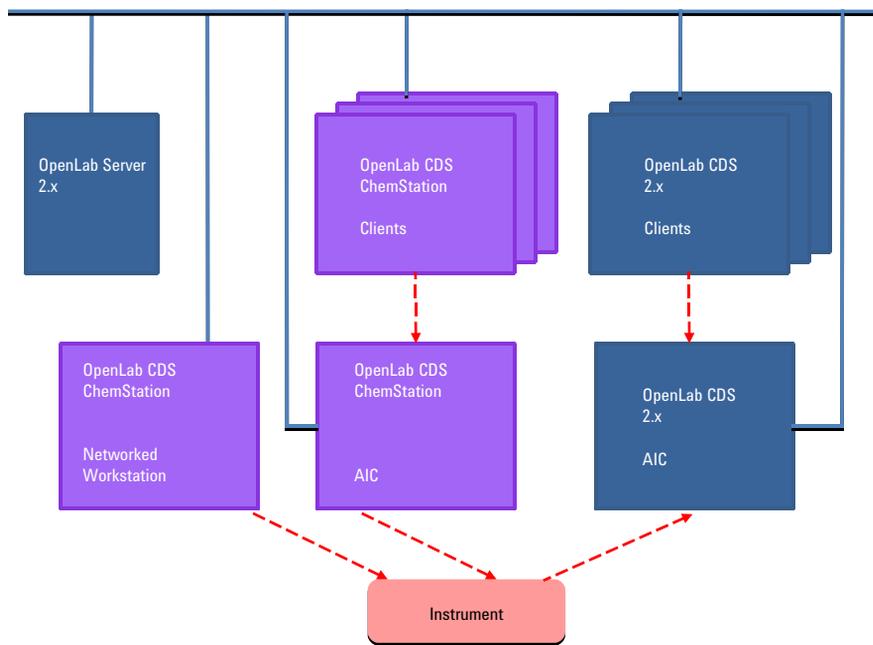
Figure 7   Transfer of method setpoints from ChemStation C.01.10 to
                OpenLab CDS 2.x

────────	LAN connection
‒ ‒ ‒ ‒ ‒	Access/transfer

The transfer is one-way only. After transferring, you can use the ChemStation method on the OpenLab CDS 2.x system. You cannot transfer acquisition methods from OpenLab CDS 2.x to ChemStation, or process OpenLab CDS 2.x data in ChemStation.

For details, refer to the *Migrating from OpenLab CDS ChemStation Edition to OpenLab CDS Version 2.3 - Workstation to Workstation* guide (MigrationGuide_OpenLabCDSChemStnToCDS2.3.pdf, available with OpenLab CDS rev. 2.3).

2   About Licensing

General Product Structure

OpenLab CDS ChemStation Edition has been designed as a combination of software modules for instrument control, data acquisition and data analysis (integration, quantification and reporting), automation and customization. Technique-specific single instrument products provide control capabilities for a given separation technique, e.g. for a Gas Chromatograph or Liquid Chromatograph. A single instrument configuration may be expanded by additional software modules (Add-ons).

The sections below describe the product modules. For more information on the product licenses, see "Licensing Scheme" on page 23.

Core module

The core module provides data analysis, automation and customization functions (no instrument control) for the following separation techniques:

- Gas chromatography (GC)
- Liquid chromatography (LC)
- Analog data acquisition with external event protocol (A/D)
- Capillary Electrophoresis (CE)

Instrument drivers

Technique-specific single instrument drivers provide control capabilities for the separation techniques listed above. By installing multiple instrument drivers, Agilent OpenLab CDS ChemStation Edition is capable of controlling more than one analytical system, for example, two LCs, two GCs, or an LC and a GC.

The instrument control capability of OpenLab CDS ChemStation Edition may be expanded by purchasing additional modules to allow mixed technique configurations.

Add-ons

The acquired data is typically two-dimensional ("2D"), that is, by measuring detector response over time. Spectroscopic detectors can deliver three-dimensional ("3D") data, by additionally measuring detector response over a third axis (for example, wavelength or mass range).

For 3D data, the following modules permit analysis and reporting:

- OpenLab CDS 3D UV Add-on
- OpenLab CDS ChemStation CE 3D MS Add-on
- OpenLab CDS ChemStation LC 3D MS Add-on
- OpenLab CDS ChemStation LC/MS Deconvolution and Bioanalysis

License Types

The licensing strategy introduced with OpenLab CDS ChemStation Edition helps you use your licenses more effectively. In contrast to B.04.xx ChemStation revisions, licenses for instrument control, drivers and add-ons are *floating licenses*. Any instrument that starts up requests the necessary licenses from license management, and when the instrument is closed, it returns the licenses. Therefore, you only need licenses to cover the maximum number of concurrently running instruments rather than one for each installed instrument. License management is accessed via the OpenLab Control Panel.

Licenses are of two types:

- *Counted licenses* are consumed once for each associated software or instrument module.

- *Shared licenses* can be shared per PC or instrument. For example, the Agilent OpenLab CDS core license is a shared license, which means you need only one license per PC, no matter how many ChemStation or EZChrom instances you run on it.

There is a 60-day Startup License for the entire OpenLab CDS ChemStation Edition installation. The expiration period starts with the installation.
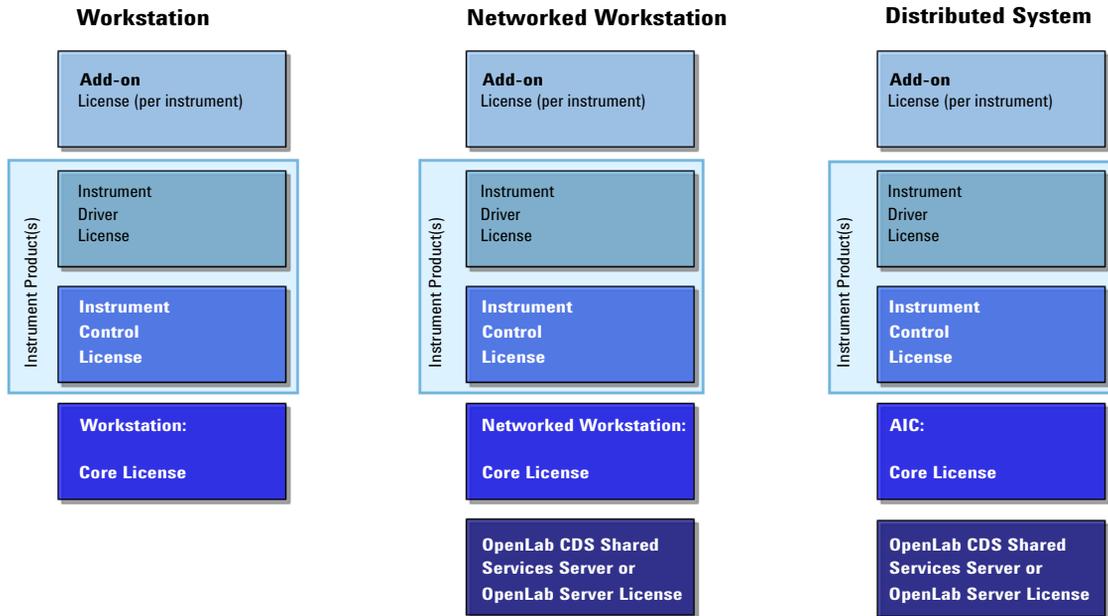
Licensing Scheme

Figure 8 on page 24 shows the licenses for OpenLab CDS ChemStation Edition in the different installation scenarios:

- Workstation

  - One OpenLab CDS ChemStation Edition core license

  - Instrument and Add-on licenses as needed; you can run up to four 2D LC or GC instruments on the same workstation.

- Networked Workstation

  - One OpenLab CDS Shared Services server license

  - One OpenLab CDS ChemStation Edition core license for each Networked Workstation; you can connect multiple Networked Workstations to the OpenLab CDS Shared Services server.

  - Instrument and Add-on licenses as needed; you can run up to four 2D LC or GC instruments on the same Networked Workstation.

- Distributed System

  - One OpenLab CDS Shared Services server license or one or OpenLab Server license

  - One OpenLab CDS ChemStation Edition core license and AIC-Add-on license for each Analytical Instrument Controller (AIC) machine. You need on AIC license for each AIC connected to the server.

  - Instrument and Add-on licenses as needed; you can run up to ten 2D LC or GC instruments on the same AIC.

To control instruments from vendors other than Agilent, an Agilent Instrument Control License is required in addition to the driver license for the other vendor's instrument. A list of driver licenses that are available for instruments from other vendors can be found in the *Supported Instruments and Firmware Guide*.

For Agilent instruments, Analytical Instrument Controller licenses and Agilent Driver licenses are always bundled together. They are shown as one product license in the License Management. You can see these items as separate lines in the license file itself only.

Workstation

Add-on
License (per instrument)

Instrument
Driver
License

Instrument
Control
License

Instrument Product(s)

Workstation:

Core License

Networked Workstation

Add-on
License (per instrument)

Instrument
Driver
License

Instrument
Control
License

Instrument Product(s)

Networked Workstation:

Core License

OpenLab CDS Shared
Services Server or
OpenLab Server License

Distributed System

Add-on
License (per instrument)

Instrument
Driver
License

Instrument
Control
License

Instrument Product(s)

AIC:

Core License

OpenLab CDS Shared
Services Server or
OpenLab Server License

Figure 8   Licensing schema

Flexera License Manager

Shared Services use the *FlexNet Producer Suite* from Flexera to manage the licenses. The required components are installed by default together with OpenLab CDS Shared Services. The license server can be the local PC or a remote Shared Services server.

License Management in Shared Services requires an additional Windows service to be running. This Windows service is called *Agilent OpenLab License Server*. This service must be running on the server where you manage your licenses. Each time you start an instrument, the instrument requests licenses from the License Server service; therefore, you can only start an instrument if this service is running.

License Upgrade

Get Upgraded License File

You will need to upgrade your licenses in SubscribeNet prior to upgrading to the next version of OpenLab CDS ChemStation Edition. We strongly recommend upgrading your workstation licenses *before* upgrading the core software. Standalone workstations which are upgraded to the new core software version, without a new workstation license, will not work until the new workstation licenses are added to the OpenLab Control Panel.

If you are under SMA subscription, proceed as follows to upgrade your licenses:

1 During the following process, you will be prompted in SubscribeNet for the host name or MAC address of the workstation where OpenLab CDS ChemStation Edition is already installed.

To retrieve this hostname and MAC address, open the Control Panel and browse to the **Administration > Licenses** section. Note down the host name and use the **Copy MAC Address** or **Save MAC Address** function to obtain the MAC address.

2 Log into the Agilent Electronic Software and License Delivery (https://agilent.subscribenet.com/).

3 Navigate to **Manage Licenses by Host**. In the **Host ID** field, enter the previously noted MAC address, and click **Search**.

If the relevant host name does not appear, you may be managing your licenses in multiple SubscribeNet accounts. You will need to log into those accounts to upgrade those workstation licenses.

4 If your license(s) are eligible for an upgrade, you will see the **Upgrade All** button. Otherwise you will need to contact your Agilent Sales Representative to renew your Software Maintenance Agreement (see "Sales and Support Assistance" on page 29). To proceed with generating your upgrade license, click the button.

5 On the **Upgrade All Licenses for License Host** page, review the data, and confirm by clicking **Upgrade All**.

This upgrades the license file to the most current version. SubscribeNet will send you an email with a new license file.

6 Put the new license file on your system (see "Add Upgraded License File to the System" on page 27.

If you have multiple standalone Workstations, repeat this step for each individual workstation.

Note that each workstation's MAC address is the file name. This helps identify the correct license file to import into the workstation's Control Panel.

Add Upgraded License File to the System

If you have purchased new options, such as additional instrument controls or client license and regenerated your license in SubscribeNet, the upgraded license file must be re-applied to the system.

1 Start the Control Panel from any machine connected to the system you want to install the license for.

2 Navigate to **Administration > Licenses**.

3 In the ribbon, click **Remove License** ✕ .

4 In the ribbon, click **Add License** ＋ .

5 Browse to and open the license file saved from the license generation process in SubscribeNet.

6 Restart the following Windows services:

- **Agilent OpenLab License Server**
- **Agilent OpenLab Licensing Support**

3 Appendix

Sales and Support Assistance

Please check the following web site for your local sales and support contact:

http://www.agilent.com/en-us/contact-us/page

In This Book

This manual describes the system topologies and licensing concepts of OpenLab CDS ChemStation Edition.

Agilent