



Agilent OpenLab Server and OpenLab ECM XT

# Hardware and Software Requirements Guide



# Notices

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DocNo D0007295  
April 2021

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## Software Revision

This guide is valid for the 2.6 revision of the Agilent OpenLab Server and OpenLab ECM XT program until superseded.

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## Introduction

This document describes the minimum hardware, software, and network requirements for supporting Agilent OpenLab Server or OpenLab ECM XT. The information provided here applies to both products unless specified otherwise.

### CAUTION

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**Hardware requirements vary depending on many factors. Always review your requirements with your Agilent representative before purchasing or configuring any hardware.**

# Hardware

OpenLab Server/ECM XT is used to store data from different types of instruments. OpenLab Server/ECM XT can be deployed as a one of the following systems:

- 1-server all-in-one system (**Figure 1** on page 6)
- 2-server system, with the database hosted on a separate machine (**Figure 2** on page 6)
- 4-server system (**Figure 3** on page 7), consisting of:
  - 1 server with Content Management and Shared Services
  - 1 Database server
  - 1 Index server
  - 1 file server
- Scalable system (**Figure 4** on page 7), consisting of:
  - 3 Content Management servers
  - 1 Index server
  - 1 Database server
  - 1 Windows file server or NAS that meets the hardware requirements
  - 1 load balancer

Choice of topology depends on a number of factors. Talk to your Agilent Representative about which server topology is best suited for your environment.

### NOTE

The following diagrams are conceptual representations of the system topology. They are not intended to represent the topology's network architecture.

## Hardware



Figure 1. OpenLab Server/ECM XT all-in-one system architecture

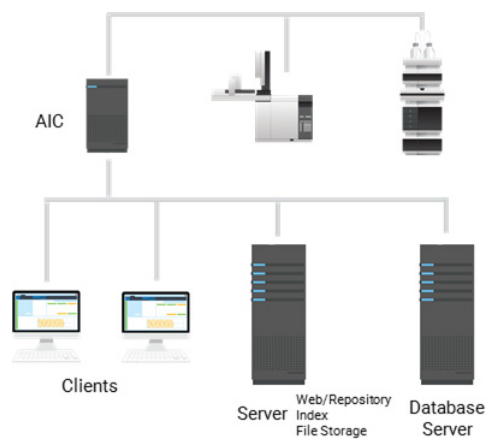


Figure 2. Two-server system architecture

## Hardware



Figure 3. Four-server system architecture

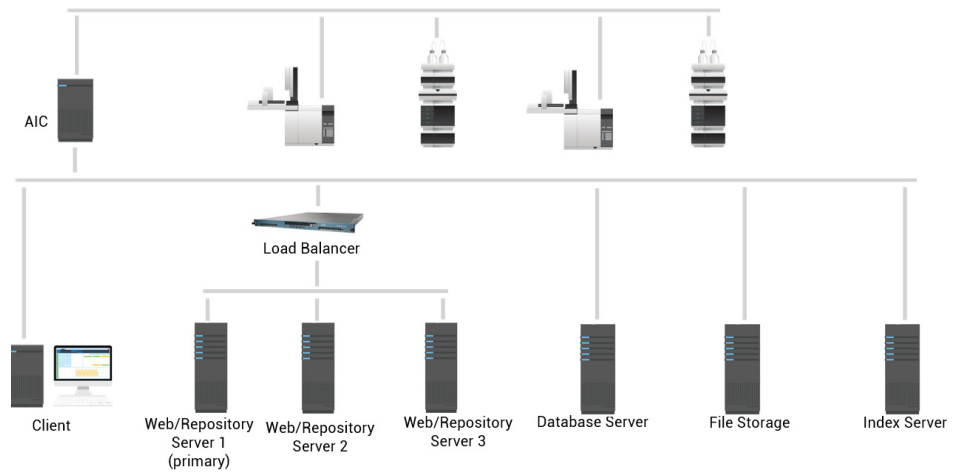


Figure 4. Scalable-system architecture

**CAUTION**

The following recommended hardware specifications are for reference purposes. The hardware specifications should be adjusted based on the actual use pattern in the lab.

For example, if a lab acquires larger files as compared to those listed for a typical use pattern, consider adding more disk storage or using an external NAS system for storing files.

Always consult with your Agilent representative to determine the actual hardware required for your needs.

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## Hardware

**Table 1. Minimum Hardware for an all-in-one system**

Hardware*	Small system <sup>†</sup>	Medium system	Large system
Processor	1 × CPU - 2.6 GHz or higher Minimum of 8 vCPU <sup>‡</sup>	2 × CPU - 2.6 GHz or higher Minimum of 16 vCPU <sup>‡</sup>	2 × CPU - 2.6 GHz or higher Minimum of 16 vCPU <sup>‡</sup>
Minimum Ram	16 GB	24 GB	48 GB
Disk (OS and software)	2 × (100 GB 7.2 K rpm RAID 1)	2 × (300 GB 15 K rpm RAID 1)	2 × (600 GB 15 K rpm RAID 1)
Disk (Data)**	2 × (100 GB 7.2 K rpm RAID 1)	3 × (500 GB 7.2 K rpm RAID 5)	3 × (1 TB 7.2 K rpm RAID 5)
Network	1 GB	1 GB	1 GB
Operating System <sup>††</sup> and Database	Windows Server 2016 or 2019 PostgreSQL 11.5 SQL Server 2014, 2016, 2017, or 2019 Note: Oracle is not supported.	Windows Server 2016 or 2019 PostgreSQL 11.5 SQL Server 2014, 2016, 2017, or 2019 Note: Oracle is not supported.	Windows Server 2016 or 2019 PostgreSQL 11.5 SQL Server 2014, 2016, 2017, or 2019 Note: Oracle is not supported.

\* Agilent recommends a server dedicated to OpenLab Server/ECM XT as the host machine.

† Basic Server license is only supported on a small system. Basic Server can support a maximum of 4 configured instruments.

‡ A vCPU is a logical CPU (each vCPU is a thread of Intel or an AMD core). For example, a single quad core CPU can contain 8 threads.

\*\* The recommended disk space for these systems was estimated based on four years of use with the maximum number of recommended instruments. The actual disk size required should be calculated based on planned use patterns. For better performance, use a solid state drive (SSD).

†† See **“Operating system”** on page 14 for details.

## Hardware

**Table 2. Minimum hardware for a 2-server solution**

Hardware*	OpenLab Server/ECM XT Server System	Database Server System
Processor	2 × CPU – 2.6 Ghz or higher Minimum of 16 vCPU <sup>†</sup>	2 × CPU – 2.6 Ghz or higher Minimum of 16 vCPU <sup>†</sup>
Minimum Ram	32 GB	32 GB
Disk (OS and software)	2 × (300 GB 15 K rpm RAID 1)	2 × (300 GB 15 K rpm RAID 1)
Disk (Data) <sup>‡</sup>	5 × (1 TB 7.2 K rpm RAID 5)	2 × (100 GB Raid 1) – Transaction logs 3 × (300 GB 15k rpm Raid 5) – Actual data  Separate disks for storing data and transaction /redo logs is recommended.**
Network	1 GB	1 GB
Operating System	Windows Server 2016 or 2019 <sup>††</sup>	Check database operating system requirements. For SQL Server, the enterprise version is recommended.

\* Agilent recommends a server dedicated to OpenLab Server/ECM XT as the host machine.

† A vCPU is a logical CPU (each vCPU is a thread of Intel or an AMD core). For example, a single quad core CPU can contain 8 threads.

‡ The recommended disk space for these systems was estimated based on four years of use with the maximum number of recommended instruments. The actual disk size required should be calculated based on planned use patterns.

\*\* Refer to the database vendor documentation for additional configuration information.

†† See **“Operating system”** on page 14 for details.

## Hardware

**Table 3. Minimum hardware for a 4-server solution**

Hardware*	Content Management Server	Index Server	Database Server	File Server
Processor	2 x CPU – 2.6 Ghz or higher Minimum of 16 vCPU†	2 x CPU – 2.6 Ghz or higher Minimum of 8 vCPU†	2 x CPU – 2.6 Ghz or higher Minimum of 16 vCPU†	1 x CPU – 2.6 Ghz or higher Minimum of 8 vCPU†
RAM	24 GB‡	32 GB	32 GB	8 GB
Disk (OS and Software)	2 x (150 GB 15K Raid 1)	2 x (150 GB 15K rpm Raid 1)	2 x (150 GB 15K rpm Raid 1)	2 x (150 GB 15K rpm Raid 1)
Disk (Data)**	Not Applicable	3 x (300 GB 15k rpm Raid 5)	2 x (150 GB Raid 1) – Transaction logs 3 x (300 GB 15k rpm Raid 5) – Database data  Separate disks for storing data and transaction /redo logs is recommended.††	5 x (2 TB 7.2k rpm RAID 5)
Network	1GB	1 GB	1 GB	2 GB‡‡

\* Agilent recommends a server dedicated to OpenLab Server/ECM XT as the host machine.

† A vCPU is a logical CPU (each vCPU is a thread of Intel or an AMD core). For example, a single quad core CPU can contain 8 threads.

‡ For a system to support 300 logical instruments. This value can be adjusted based on planned usage pattern.

\*\* The recommended disk space for these systems was estimated based on four years of use with the maximum number of recommended instruments. The actual disk size required should be calculated based on planned use patterns.

†† Note: For better performance, use solid state drives (SSD). For Index server, SSDs are recommended for indexed content.

‡‡ Network teaming

## Hardware

**Table 4. Minimum recommended hardware for servers in an OpenLab Server/ECM XT scalable system**

Hardware*	OpenLab Server/ ECM XT Content Management server	OpenLab Index server	Database server†	File server
CPU	2 x CPU – 2.6 Ghz or higher Minimum of 16 vCPU‡	2 x CPU – 2.6 Ghz or higher Minimum of 8vCPU	2 x CPU – 2.6 Ghz or higher Minimum of 16 vCPU	1 x CPU – 2.6 Ghz or higher Minimum of 8 vCPU
Memory	24 GB**	32 GB	64 GB	8 GB
Disk (OS and Software)	2 x (150 GB 15 K rpm Raid 1)	2 x (150 GB 15 K rpm Raid 1)	2 x (150 GB 15 K rpm Raid 1)	2 x (150 GB 15 K rpm Raid 1)
Disk (Data)††	Not Applicable	3 x (300 GB 15 K rpm Raid 5)*	2 x (150 GB Raid 1) – Transaction logs 3 x (300 GB 15k rpm Raid 5) – Database data Separate disks for storing data and transaction /redo logs is recommended.††	5 x (2 TB 7.2 K rpm Raid 5)
Network	1 GB	1 GB	1 GB	2 GB***
Operating System†††	Windows Server 2016 or 2019	Windows Server 2016 or 2019	Check database operating system requirements. For SQL Server, the enterprise version is recommended.	Windows Server 2016 or 2019
Load Balancer	Gigabit capability network load balancer with support for session persistence, layer 4 and layer 7 load balancing and SSL offloading			

\* Agilent recommends a server dedicated as the host machine.

† Refer to the database vendor documentation for additional configuration.

‡ A vCPU is a logical CPU (each vCPU is a thread of Intel or an AMD core). For example, a single quad core CPU can contain 8 threads.

\*\* For the system to support 300 logical instruments. Value can be adjusted based on planned use pattern.

†† Disk space is estimated based on 4 years of use with 300 logical instruments. The actual disk space needs to be adjusted based on planned use pattern. In an OpenLab Server/ECM XT Index server, this disk is for OpenLab Server/ECM XT index files. In a Database server, this disk is for database files. In a Windows server, this disk is for OpenLab Server/ECM XT content store.

††† For better performance, use a solid state drive (SSD). SSD is recommended for the Index Server.

\*\*\* Network teaming

†††See **“Operating system”** on page 14 for details.

## Hardware

**Table 5. Minimum recommended hardware for an Import Scheduler server**

Hardware	Minimum hardware
Processor	2 GHz or higher
Minimum Ram	8 GB, recommended 16 GB
Hard Disk	Minimum free space for installation: 500 GB Minimum free space for file cache: 250 GB

**Table 6. Minimum recommended hardware for an Import Services client machine**

Hardware	Minimum hardware
Processor	2 GHz or higher
Minimum Ram	8 GB
Hard Disk	100 GB

**Table 7. Minimum hardware requirements for PDF Metadata Extraction**

Hardware	Minimum hardware
Processor	2 GHz or higher
Minimum Ram	8 GB
Hard Disk	100 GB

# Software

## Operating system

An OpenLab Server/ECM XT server system can be installed on the following:

- Windows Server 2016 (64-bit) Standard or Datacenter
- Windows Server 2019 (64-bit) Standard or Datacenter

An OpenLab Server/ECM XT client system can be installed on the following:

- Windows 10 (64-bit) Professional or Enterprise Edition
- Windows Server 2016 (64-bit) Standard or Datacenter
- Windows Server 2019 (64-bit) Standard or Datacenter

The Import Scheduler, Import Services, and PDF Metadata Extraction add-ons are supported on the same operating systems as OpenLab ECM XT. The Import Scheduler add-on for Empower supports Windows 7.

## Databases

OpenLab Server/ECM XT manages information using a database. The database is installed and configured either manually or automatically during installation.

The following database software are supported:

- Microsoft SQL Server 2014 (64-bit) SP3
- Microsoft SQL Server 2016 (64-bit) SP2
- Microsoft SQL Server 2017 (64-bit)
- Microsoft SQL Server 2019 (64-bit)
- PostgreSQL Server 11.5 (64-bit)
- Oracle 18c (not supported for an all-in-one system)
- Oracle 19c (not supported for an all-in-one system)

# Licensing

- OpenLab Server/ECM XT uses Flex-Net Publisher for the distribution and tracking of license entitlements. This software is installed with the OpenLab Server/ECM XT components.

## Virtual machines

OpenLab Server/ECM XT can be run on a virtual machine hosted by VMWare vSphere 64-bit 6.x or Hyper-V for Windows Server. The virtual machine must meet the OpenLab Server/ECM XT hardware and software requirements.

For instructions on how to install, configure, and optimize a virtual machine, see the VMWare or Hyper-V documentation. Consider the following when optimizing for your particular environment:

- Dedicated resources allocated to the OpenLab Server/ECM XT server (the resource requirements are the same as those of physical machines)
- Potential performance overhead by using the virtual infrastructure

Notes:

- Do not take a snapshot on systems running data acquisition from instruments. Take snapshots only when the system is idle.
- Using a Windows Server virtual machine with the network interface card (NIC) teaming feature is not recommended. With this configuration, OpenLab Server/ECM XT cannot retrieve the MAC address of a network team interface. If you must use this configuration, an extra virtual network adaptor is needed to which the OpenLab Server/ECM XT license can bind.
- Each license is based on the MAC address of the network interface card, being physical or virtual. If you are planning to use NIC teaming for the OpenLab Server/ECM XT server, it is recommended that you use the teaming configuration tool from the vendor of the network interface card.
- To prevent OpenLab CDS licensing issues when using Microsoft Hyper-V, disable the (default) dynamic MAC address.

## Other software

The following software must be installed on any supported operating system before installing OpenLab Server/ECM XT components.

**Table 8. Other software requirements**

Component	Details
Internet browser	One of the following Internet browsers: <ul style="list-style-type: none"><li>• Internet Explorer 64-bit v11</li><li>• Microsoft Chromium Edge 64-bit as shipped with Windows 10</li><li>• Google Chrome 64-bit v40 or higher</li></ul>
.NET	<ul style="list-style-type: none"><li>• .NET Framework 64-bit 4.x</li><li>• .NET Core 64-bit 3.1.5</li></ul>
PDF reader	Required to view manuals and other PDF documents. You can install Adobe Reader from the OpenLab Server/ECM XT installation media.
Adobe Acrobat	Required for the OpenLab ECM XT PDF Template Plug-In add-on. <ul style="list-style-type: none"><li>• Adobe Acrobat Pro DC</li><li>• Adobe Acrobat Classic 2017</li></ul>
Antivirus software	<ul style="list-style-type: none"><li>• Symantec Endpoint Protection</li><li>• Trend Micro</li><li>• Microsoft Security Essentials</li><li>• McAfee</li></ul>
Office applications	<ul style="list-style-type: none"><li>• Office 2016 64-bit</li><li>• Office 365 64-bit</li></ul>

## Language compatibility

The OpenLab Server/ECM XT Installer and Content Management user interfaces are displayed in the language of the Windows operating system for the following languages:

- English
- Chinese
- Japanese
- Brazilian Portuguese

OpenLab Control Panel supports the following languages:



## Language compatibility

- English
- Chinese
- Japanese
- Brazilian Portuguese
- Russian

The OpenLab Server/ECM XT Add-ons are supported in the following languages:

- English
- Chinese
- Japanese
- Brazilian Portuguese

All OpenLab Server/ECM XT programs support the use of localized data files.

Test Services (QualA) are supported in the following languages:

- English
- Chinese
- Japanese
- Brazilian Portuguese

## Cloud Support

# Cloud Support

OpenLab CDS with ECM XT can run in an Amazon Web Services (AWS) or Azure cloud environment, where OpenLab ECM XT is configured as the secured repository for OpenLab CDS. AWS China and Azure China are not supported. A Software Maintenance Agreement (SMA) is required. For details on supported configurations and how to deploy ECM XT in a cloud environment, contact your local Agilent representative.

## Network

# Network

OpenLab Server/ECM XT uses standard TCP/IP protocols to communicate between the server and client computers. For optimum performance, the network must meet the design criteria for available bandwidth, IP address assignment, name resolution, and appropriate isolation of the lab subnet from the corporate network.

TCP/IP networking is required for all products. Wide Area Networks (WANs) are not supported.

## LAN communications

### Communication method

Connect OpenLab Server/ECM XT clients to the OpenLab Server/ECM XT server with an isolated switch using standard CAT-5 network cabling.

Use 100/1000 mbps speed capable LAN communication hardware.

### LAN power management

Avoid data capture or transfer interruptions in your data acquisition system by making LAN communication cards available for instrument and system component communications.

Windows may be set to turn instruments and components off to save power while sleeping or hibernating.

To change the setting:

- 1 Go to **Windows > Control Panel > Network Connections > Local Area Network Properties**.
- 2 Select the **Power Management** tab.
- 3 Uncheck **Allow the computer to turn off this device to save power**.

## Requirements for a compliant system

If you intend to use your system in a compliant environment, ensure the following settings related to time synchronization:

- Your network must have a time synchronization service to make sure that all systems are using a consistent and valid time.
- To ensure that users cannot change the time on a client system, users must not operate using an administrator account. This is important as the client time is used during buffered activity logging during network outages.

## Firewall settings

# Firewall settings

If you are using a third-party firewall or antivirus software on the network where OpenLab Server/ECM XT is installed, open these firewall ports to allow communication between the system components of OpenLab Server/ECM XT.

The OpenLab Server/ECM XT installer will automatically open these ports on an enabled Windows firewall during installation.

The following terms are used in the table:

CM: Content Management

OLSS: OpenLab Shared Services

DCS: Data Collection Service

CertSvc: Certificate Service

ATS: Audit Trail Service

DR: Data Repository

## OpenLab Server and OpenLab ECM XT

### Inbound rules

**Table 9. OpenLab Server and OpenLab Server/ECM XT firewall settings: Inbound rules**

Application	Protocol	Port	Remote System	Description
CM Server	TCP	21	Any	[Optional] Only if FTP service is turned on for OpenLab Server. By default, it is off.  Used by: C:\Program Files (x86)\Agilent Technologies\OpenLAB Data Store\tomcat\bin\tomcat8.exe
OpenLab Reverse Proxy (Apache HTTPD)	HTTP	80	Any	OpenLab Reverse Proxy
OpenLab Reverse Proxy (Apache HTTPD)	HTTPS	443	Any	OpenLab Reverse Proxy
OLSS Diagnostics	TCP	3424	Clients, AICs, Servers	Used for collecting diagnostic logs.
Content Management PostgreSQL Server	TCP	5432	Alfresco	For Database Access
DR PostgreSQL Server	TCP	5433	DR Services	Database port (Firewall rule gets applied during installation of DR)  Used by all internal and external applications and services, which connect against DR/PG: CDS, ATS, QualA.

## OpenLab Server and OpenLab ECM XT

**Table 9. OpenLab Server and OpenLab Server/ECM XT firewall settings: Inbound rules (continued)**

Application	Protocol	Port	Remote System	Description
CM Server	TCP	5701	Cluster Servers	OpenLab Server Cluster  Used by: C:\Program Files (x86)\Agilent Technologies\OpenLAB Data Store\tomcat\bin\tomcat8.exe
DCS	HTTP	6328	Any	Data Collection Service Legacy Port (ChemStation and CDS 2.4 and earlier)  Used by: C:\Program Files\Agilent Technologies\OpenLab Data Collection Server\Bin\DataCollectionService.exe
OLSS Server	TCP	6570	Clients, AICs	OpenLab Licensing (Flexera) Server
OLSS Server	TCP	6577	Clients, AICs	OpenLab Shared Services WCF APIs
OLSS Server	HTTP	6624	Clients, AICs, Others	Legacy Shared Services REST API Legacy Licensing Support service REST API
OLSS Server	HTTP	6625	Clients, AICs	Shared Services REST API Licensing Support service REST API
OLSS Server	TCP	8084	Clients, AICs	Licensing Support service WCF API
OLSS Server	TCP	8085–8099	Clients, AICs	OpenLab Licensing view-only Web UI (Flexera). Default is 8090. If 8090 is already in use, Flexera web UI is automatically moved to another port in the 8085-8099 range.
CM Search Service	TCP	8983	Clients, AICs	Search Service (Index Server)  Used by: C:\Program Files (x86)\Agilent Technologies\OpenLAB Data Store\java\bin\java.exe
CM Server	HTTP	9083	Internal (accessed via Reverse Proxy only)	OpenLab Server website and REST APIs
CM Server	HTTPS	8443	CM and Index Server	OpenLab Server website and REST APIs for index service  Used by: C:\Program Files (x86)\Agilent Technologies\OpenLAB Data Store\tomcat\bin\tomcat8.exe

## OpenLab Server and OpenLab ECM XT

**Table 9. OpenLab Server and OpenLab Server/ECM XT firewall settings: Inbound rules (continued)**

Application	Protocol	Port	Remote System	Description
Test Services	HTTPS	9092	Any	Test Services Web Service hosts REST APIs and website on this port. The port number can be changed using the Test Services Config tool.
Reverse Proxy Configuration Service	HTTP	12876	Internal (accessible on localhost only)	Reverse Proxy Configuration Service hosts REST APIs to configure the Reverse Proxy Server (by programmatically modifying the configuration file). Currently, this modifies the Apache HTTPD server's httpd.conf file.  Used by: C:\Program Files (x86)\Agilent Technologies\OpenLab Reverse Proxy Configuration Service\ConfigurationService\Agilent.OpenLab.ReverseProxy.ConfigurationService.exe
OLSS Server	TCP	27000–27009	Clients, AICs	OpenLab Licensing (Flexera) Server



## OpenLab Server and OpenLab ECM XT

**Table 9. OpenLab Server and OpenLab Server/ECM XT firewall settings: Inbound rules (continued)**

Application	Protocol	Port	Remote System	Description
DCS CertSvc ATS OLSS Server	HTTPS	52088	Any	Audit Trail Service  Data Collection Service Used by: C:\Program Files\Agilent Technologies\OpenLab Data Collection Server\Bin\DataCollectionService.exe  Certificate Service Used by: C:\Program Files\Agilent Technologies\OpenLab Certificate Service\Bin\Agilent.OpenLab.CertService.CertServiceCore.exe  Shared Services REST API  Licensing Support services REST API  Test Services (QualA) Central mgmt Service  Sample Scheduler Webserver
RabbitMQ Server	TCP	5671, 5672	Any	AMQP Ports (http, https)
		15671, 15672	Any	RabbitMQ Management UI (http, https)
		4369	Server, Clients	Peer discovery service (used by RabbitMQ bodes and CLI tools)

## Outbound rules

**Table 10. OpenLab Server and OpenLab Server/ECM XT firewall settings: Outbound rules**

Application	Protocol	Port	Remote System	Description
OLSS Server	TCP	25	Email Server	If email server uses a different port or uses secure ports, the destination port will be different.
	TCP/UDP	53	DNS Server	DNS
	TCP/UDP	67, 68	DHCP Server	DHCP or BootP
	TCP	137–139	NetBios WINS	For NetBios/Name resolution for NT Share
OLSS Server	TCP	389	LDAP Server	LDAP
	TCP	445	NAS/Share Server	Server Message Block (SMB). Used for storage on a remote NAS share
OLSS Server	TCP	636	Secure LDAP Server	Secure LDAP
CM Server, OLSS	TCP	1433	SQL Server	Only when using MS SQL Server. Configurable.
CM Server, OLSS	UDP	1434	SQL Server	Only when using MS SQL Server. UDP.
CM Server, OLSS	TCP	1521	Oracle Server	Only when using Oracle Server. Configurable.
OLSS Server	TCP	3268	LDAP Server	Global Catalog LDAP
OLSS Server	TCP	3269	LDAP Server	Global Catalog LDAP SSL
CM Server, OLSS	TCP	5432	PostgreSQL Server	Only when using external PostgreSQL Server. Configurable.

## ECM XT Add-ons

### Inbound rules

Table 11. Common Licensing Layer: Outbound rules

Application	Protocol	Port	Remote System	Description
Import Scheduler	HTTP	9091	Server, Services for CM	Import Scheduler communication port for Web UI and REST API
Import Scheduler	HTTPS	9093	Server, Services for CM	Import Scheduler communication port for Web UI and REST API

## OpenLab CDS 2.x AIC

### Inbound Rules

Table 12. OpenLab CDS 2.x AIC firewall settings: Inbound rules

Application	Protocol	Port	Remote System	Description
OLSS Storage Client	TCP	2886	localhost	OpenLab Automation Service (Work Area, Buffered Upload)
OLSS Diagnostics	TCP	3424	Clients, AICs, Servers	Used for collecting diagnostic logs
OLSS Storage Client	HTTP	6628	Clients	Remote Work Area REST API
OLSS Storage Client	HTTPS	6629	Clients	Remote Work Area REST API
Test Services	TCP	9092	Any	Test Services hosts REST APIs and website on this port. The port number can be changed using the Test Services Config tool.
Acquisition	TCP (until CDS 2.5)	9753	Clients	CDS 2.5 or earlier messaging communication
Acquisition	HTTPS	9753	Clients	CDS 2.6 or later Messaging communication

### Outbound Rules

For more ports that are used by an AIC to communicate with instruments that it is connected to, see [“Agilent Instruments”](#) on page 32.

Table 13. OpenLab CDS 2.x Client firewall settings: Outbound rules

Application	Protocol	Port	Remote System	Description
	TCP/UDP	53	DNS Server	DNS
	TCP/UDP	67, 68	DHCP Server	DHCP or BootP
CM	TCP	80	OpenLab Server	OpenLab Server website and REST APIs

**Table 13. OpenLab CDS 2.x Client firewall settings: Outbound rules (continued)**

Application	Protocol	Port	Remote System	Description
CM	TCP	443	OpenLab Server	OpenLab Server secure website and Secure REST APIs. Needed only if HTTPS is used.
OLSS Client API	TCP	6570	OpenLab Server	OpenLab Licensing (Flexera) Server
OLSS Client API	TCP	6577	OpenLab Server	OpenLab Shared Services WCF APIs
OLSS Client API, Control Panel	TCP	6624	Clients, AICs, Others	Legacy Shared Services REST API Legacy Licensing Support service REST API
Control Panel	HTTP	6625	Clients, AICs	Shared Services REST API Licensing Support service REST API
Control Panel	TCP	8084	Clients, AICs	Licensing Support service WCF API
Control Panel	TCP	8085–8099	OpenLab Server	OpenLab Licensing view-only Web UI (Flexera). Default is 8090. If 8090 is in use, other ports may be used.
Control Panel	TCP	27000–27009	OpenLab Server	OpenLab Licensing (Flexera) Server

## OpenLab CDS 2.x Client

### Inbound Rules

Table 14. OpenLab CDS 2.x Client firewall settings: Inbound rules

Application	Protocol	Port	Remote System	Description
OLSS Storage Client	TCP	2886	localhost	OpenLab Automation Service
Control Panel	TCP	3424	Clients, AICs, Servers	Used for collecting diagnostic logs.
Test Services	TCP	9092	Any	Test Services Web Service hosts REST APIs and website on this port. The port number can be changed using the Test Services Config tool.

### Outbound Rules

Table 15. OpenLab CDS 2.x Client firewall settings: Outbound rules

Application	Protocol	Port	Remote System	Description
	TCP/UDP	53	DNS Server	DNS
	TCP/UDP	67, 68	DHCP Server	DHCP or BootP
	TCP	80	OpenLab Server	OpenLab Server website and REST APIs
	TCP	443	OpenLab Server	OpenLab Server secure website and Secure REST APIs. Needed only if HTTPS is used.
OLSS Client API	TCP	6570	OpenLab Server	OpenLab Licensing (Flexera) Server
OLSS Client API	TCP	6577	OpenLab Server	OpenLab Shared Services WCF APIs
OLSS Client API, Control Panel	HTTP	6624	Clients, AICs, Others	Legacy Shared Services REST API Legacy Licensing Support service REST API
Control Panel	HTTP	6625	Clients, AICs	Shared Services REST API Licensing Support service REST API
	TCP	6628	AIC	Agilent OpenLab remote work area. Client talks to AICs on this port.

## OpenLab CDS 2.x Client

**Table 15. OpenLab CDS 2.x Client firewall settings: Outbound rules (continued)**

Application	Protocol	Port	Remote System	Description
Control Panel	TCP	8084	Clients, AICs	Licensing Support service WCF API
Control Panel	TCP	8085–8099	OpenLab Server	OpenLab Licensing view-only Web UI (Flexera). Default is 8090. Other ports may be used if 8090 is in use.
Acquisition	TCP (until 2.5)	9753	AIC	CDS 2.5 or earlier messaging communication
Acquisition	HTTPS	9753	AIC	CDS 2.6 or later messaging communication
Control Panel	TCP	27000–27009	OpenLab Server	OpenLab Licensing (Flexera) Server
Control Panel	HTTPS	52088	Any	Shared Services REST API
OLCF Data Collection API, Data Collection Agent	HTTP	6328 (http) 52088 (https)	OpenLab Server	Data Collection Service, 6328 used as fallback only if https is not available.
Sample Scheduler	HTTPS	52088 https	OpenLab Server	Sample Scheduler activation check
Sample Scheduler	TCP	5433	OpenLab Server	Sample Scheduler OLDR connection (only if activated, only if OLDR configuration)

## Agilent Instruments

### Inbound rules

**Table 16. Agilent instruments firewall settings: Inbound rules**

Protocol	Port	Remote System	Description
TCP,UDP	20	AIC, Workstation	FTP is required for some instruments
TCP	21	AIC, Workstation	FTP: GC/MSD - Firmware installation (FTP). Needs to be open from PC used to do FW update to instrument.
TCP	22	AIC, Workstation	SFTP is required for some instruments
TCP,UDP	23	AIC, Workstation	Required for several instruments. LC for LAN config only, no telnet protocol implemented
SMTP	25	AIC, Workstation	Instrument communication (MSD, 7000 series GC/MS)
TCP	37	AIC, Workstation	Firmware installation & SmartCard Trace (7000 series GC-QQQ, 7200A GC-QTOF)
UDP	69	AIC, Workstation	TFTP: Required for communication with legacy instruments (Jet Direct Cards)
TCP	80	AIC, Workstation	Embedded web server (9000 and 88x0 series GC, and 5977, 5975 & 5973 MSDs)
UDP	111	AIC, Workstation	7000 Series Triple Quad GC/MS
TCP	113	AIC, Workstation	GC/MS instrument communication (7000 Series Triple Quad, 7200A GC-QTOF) auth
UDP	512	AIC, Workstation	GC/MS instrument communication (7000 Series Triple Quad, 7200A GC-QTOF) biff
TCP	1007, 1024–1026	AIC, Workstation	LC/MS instrument communication
TCP	2883–2886	AIC, Workstation	GC/MSD - Instrument control (proprietary/SunRPC/TCP)
TCP	3068, 3071	AIC, Workstation	GC/MSD - Instrument control (Proprietary/SunRPC/TCP)
TCP	4879	AIC, Workstation	Instrument communication (headspace)
TCP	5123	AIC, Workstation	GC/MS Firmware backdoor (7000 Series Triple Quad, 7200A GC-QTOF)



**Table 16. Agilent instruments firewall settings: Inbound rules (continued)**

Protocol	Port	Remote System	Description
TCP	5813	AIC, Workstation	GC/MSD - Firmware installation (ICMP/Ping)
TCP	5973	AIC, Workstation	GC/MSD - Instrument control (Proprietary/SunRPC/TCP)
TCP	6001	AIC, Workstation	GC/MSD instrument communication (7200A GC-QTOF)
TCP	6002	AIC, Workstation	GC/MSD instrument communication (7000 Series Triple Quad)
TCP	7972, 7973	AIC, Workstation	GC/MSD Instrument Control (5977)
TCP	7980–7983	AIC, Workstation	GC, GC/MSD Instrument Control (5977)
TCP	8194	AIC, Workstation	PAL3, data subscription
TCP	9001, 9002	AIC, Workstation	Instrument communication (GC/LC)
TCP, Licop	9100	AIC, Workstation	Instrument communication (GC/LC/35900)
TCP	9101, 9102	AIC, Workstation	Instrument communication (GC/LC)
TCP	9110	AIC, Workstation	Instrument communication (GC/LC)
TCP	9111	AIC, Workstation	Instrument control (8697 Headspace)
TCP	10000–10020	AIC, Workstation	Instrument communication (GC 78xx, 88xx, 9000)
TCP	30718	AIC, Workstation	Instrument utilities
TCP	55055-55057	AIC, Workstation	Instrument utilities
UDP	55065	AIC, Workstation	Direct Communication (5977 MSD, 7890B GC)
TCP	60000	AIC, Workstation	Instrument Control (PAL Sampler)
TCP	61001	AIC, Workstation	Instrument utilities
TCP	64000, 64001	AIC, Workstation	PAL3 communication
TCP	64500	AIC, Workstation	PAL3, plain socket protocol

## Outbound rules

Table 17. Agilent instruments firewall settings: Outbound rules

Protocol	Port	Remote System	Description
TCP/UDP	53	DNS Server	DNS
TCP/UDP	67, 68	DHCP Server	DHCP or BootP

## Common Licensing Layer (Agilent Licensing 2.0)

### Inbound rules

Table 18. Common Licensing Layer: Inbound rules

Application	Protocol	Port	Remote System	Description
Agilent.Licensing REST API	HTTP	52080	Clients	Machine hosting Agilent.Licensing service
Agilent.Licensing REST API	HTTPS	52088	Clients	Machine hosting Agilent.Licensing service

### Outbound rules

Table 19. Common Licensing Layer: Outbound rules

Application	Protocol	Port	Remote System	Description
FNE License Server	HTTP	7070	Clients	Machine hosting FNE Licensing Server
FNE License Server	HTTPS	7071	Clients	Machine hosting FNE Licensing Server

# Domain guidelines

Domains support the flow of information and user access rights across machines in the network. This means that all machines within the networked OpenLab Server/ECM XT server system must reside within the same domain or have the appropriate cross domain trusts to allow name-based communications between the client and server.

When installing the OpenLab Server/ECM XT, you must log into the machine as a domain user that is a local administrator. This allows the OpenLab installer to apply network exceptions to the Windows firewall under the domain profile resulting in a functional system. The components necessary to support OpenLab Server/ECM XT on a domain are:

- **Domain controller** - broadcasts the domain name and negotiates access to machines
- **Domain name server (DNS)** - maintains records of what host names belong to which IP on the network. This component is always required for effective components communications in networked systems.
- **Active directory** - maintains the list of users and their access rights on the domain

### NOTE

OpenLab Server/ECM XT server components may not be installed on the same machine as the domain controller.

The domain components above host many services and settings that must be configured appropriately to allow communication across machines. The following services and settings will need to be configured to fit your domain. Your internal IT group is responsible for proper configuration of any custom domain solution. These include settings for:

- Lookup zones and hostnames
- Group and security policies
- Subnet masks and virtual LANs

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DocNo 0007295  
April 2021

