LABWORKS Exchange Portal v. 7.1

Installation Guide

LABWORKS

REVISION HISTORY

DATE	REVISION #	COMMENTS
01/31/2022	0.8.17.1	Initial revision
02/28/2022	7.1.0.1	The section for Azure Cache for Redis is added. Integration with LABWORKS LIMS section is updated. The Logs section is added.
03/23/2022	7.1.0.9	"Install Redis on Windows Server with WSL" section is updated. The section for self-signed certificate for SSL/HTTPS is added.
04/05/2022	7.1.0.17	Troubleshooting recommendations about Reinstalling Portal are added. The "Configure SSL/HHTPS" section is updated. Added recommendation for connection between LIMS and Portal.
05/31/2022	7.1.0.34	Redis became optional. It became available to upgrade the Portal. Added section about *appsettings.json* parameters. Added Encryption Tool and recommendation to cipher sensitive data. Appeared it is possible to use SMTP server without authorization.

CONTENTS

1   OVERVIEW

LABWORKS Exchange Portal is an extension of LABWORKS software, intended to give users the ability to order laboratory samples and analyses. It is a browser-based client application, that uses server-side services for synchronization with LABWORKS Enterprise LIMS.

1.1   DOCUMENT PURPOSE

The purpose of this document is to provide instructions for LABWORKS Exchange Portal software installation.

2 GETTING STARTED

LABWORKS Exchange Portal installation requirements:

1. **Minimum hardware requirements**
   - Memory (RAM) - 8 GB;
   - Processor – 4 x 3.0 GHz or higher quad core processor

2. **Recommended hardware requirements**
   - Memory (RAM) - 16 GB;
   - Processor – 4 x 3.0 GHz or higher quad core processor
   - SSD storage for the database

3. **Software requirements**
   - **Operation system**
     - Windows Server 2016 STD/ENT
     - Windows Server 2019 STD/ENT

   - **Installed Internet Information Services (IIS), version 10.0 or above**
     - Please follow the current *Installation Guide* instructions below to correctly install the services.
     - LABWORKS Exchange Portal files by default will be installed into the following directory: *C:\inetpub\wwwroot\LabworksXP*. You can change directory before start installation.
       - Make sure that IIS_IUSRS has edit rights to this disk/folder.

   - **Installed .Net Framework, version 4.5 or above.**
     - Please follow the current Installation Guide instructions below to correctly install the framework.

   - **Network**
     - LABWORKS Exchange Portal connectivity to the SQL Server database from the Webserver.
     - LABWORKS Exchange Portal connectivity to the Redis from the Webserver.
     - Clients must be able to connect to the Webserver. All clients should be able to resolve the same name to browse to the Webserver.

4. **Recommended database version**
   - There is a performance benefit into using the Enterprise Edition version of MSSQL databases.

     Moreover, there are performance limitations with using LABWORKS Exchange Portal with SQL Express Edition and SQL Standard Edition.
     - It is not recommended to use SQL Express Edition if more than 1000 orders are stored in the database.
     - It is not recommended to use SQL Standard Edition if more than 100 000 orders are stored in the database.

5. **Recommended web and mobile browsers**

- Safari 13x (iOS 13x) - release date September 2019 or later
- Chrome 97 – release date February 2021
- Android Chrome + Android 9 OS - release date August 2018 or later

The LABWORKS Exchange Portal installation package includes:

1. **LABWORKS Exchange Portal web-site files**
   The Labworks.XP.Setup-7.1.0.34.msi file that extracts the all web-site and server files.

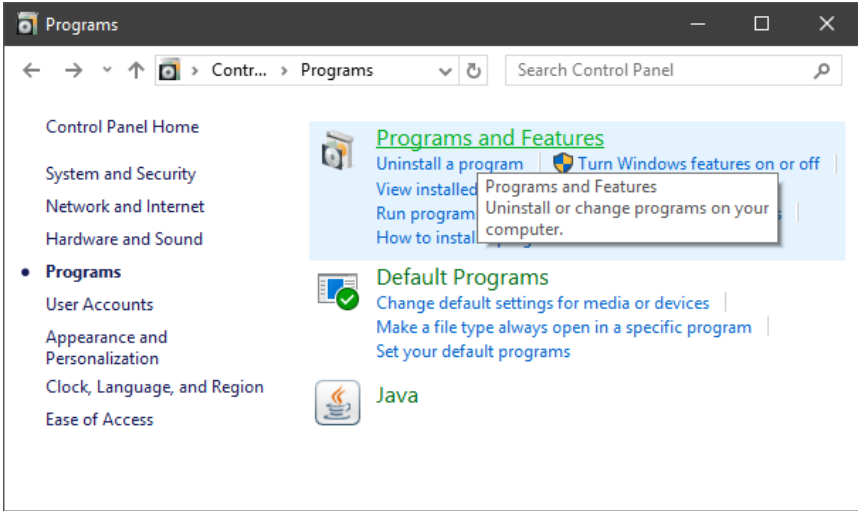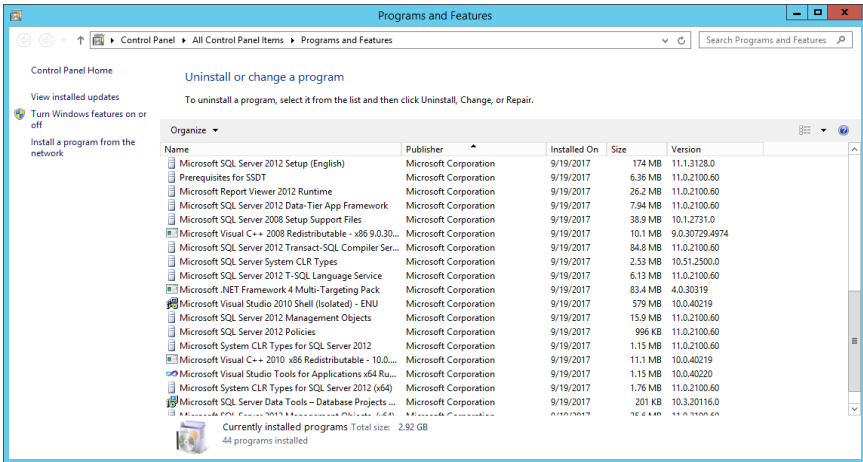2. **Extensions for IIS and .NET**

   - The *urlrewrite2.exe* file is used to set additional properties to IIS.

   - The *dotnet-hosting-3.1.22-win.exe* file is added for the ability execute a .Net Core 3.1 application to IIS.

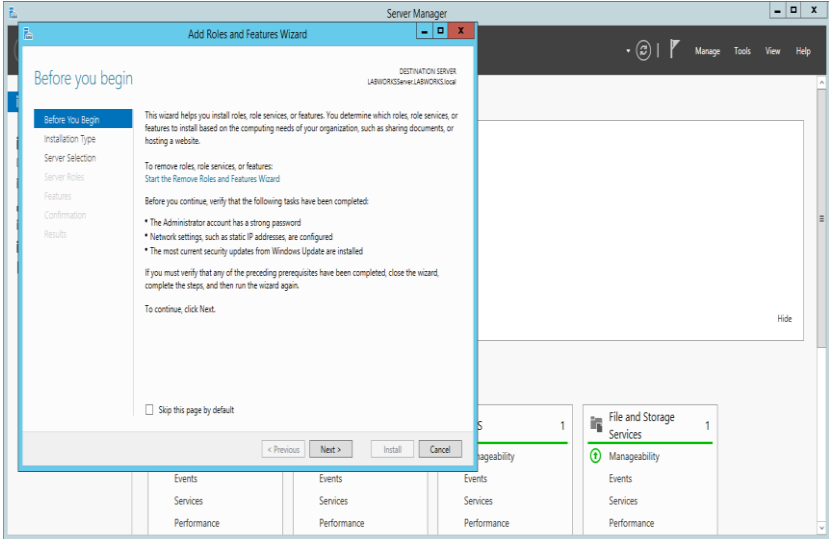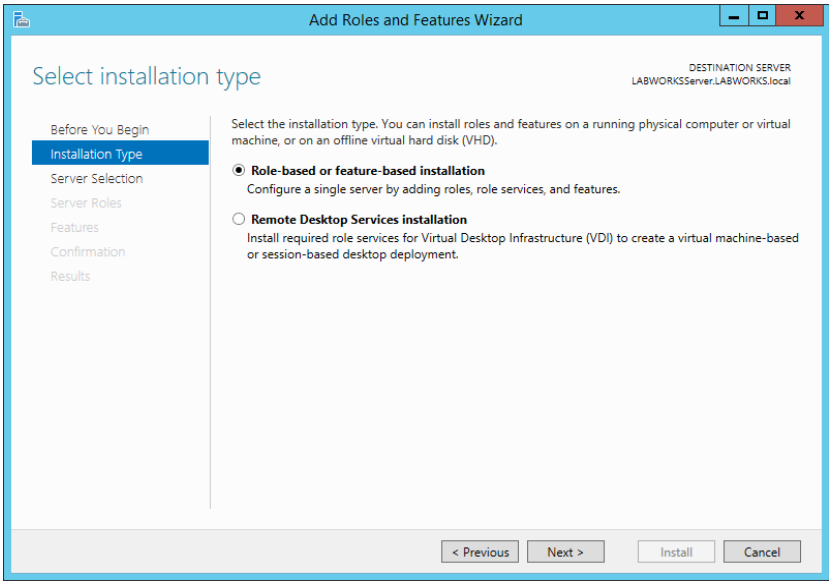   - The *ndp48-web.exe* file is added for printing features.

Note: *We recommend you print the last page of this guide containing an installation checklist as that will help you verify all installation steps as you follow them.*

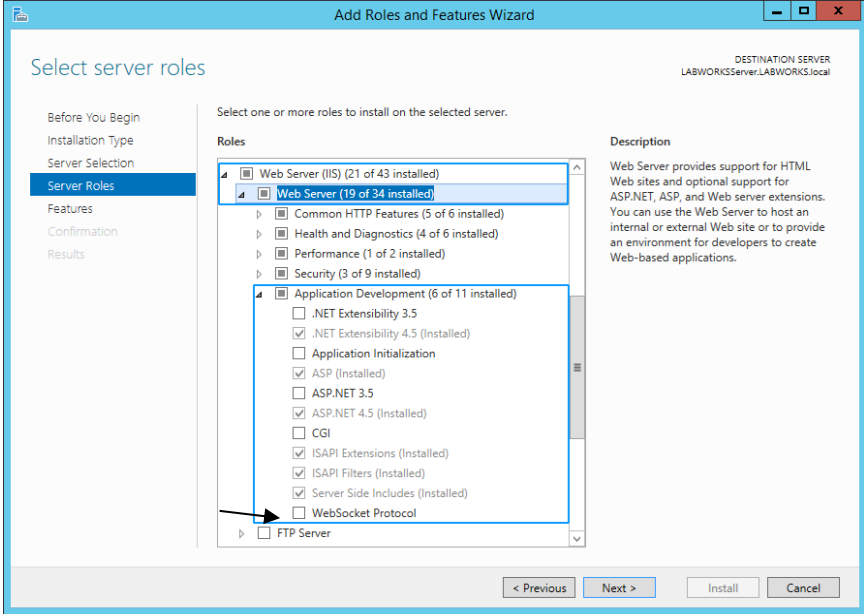## 3 PREREQUISITES CHECK

3.1 IIS AND .NET AVAILABILITY

Please follow these steps to verify whether Internet Information Services and .NET framework are installed:
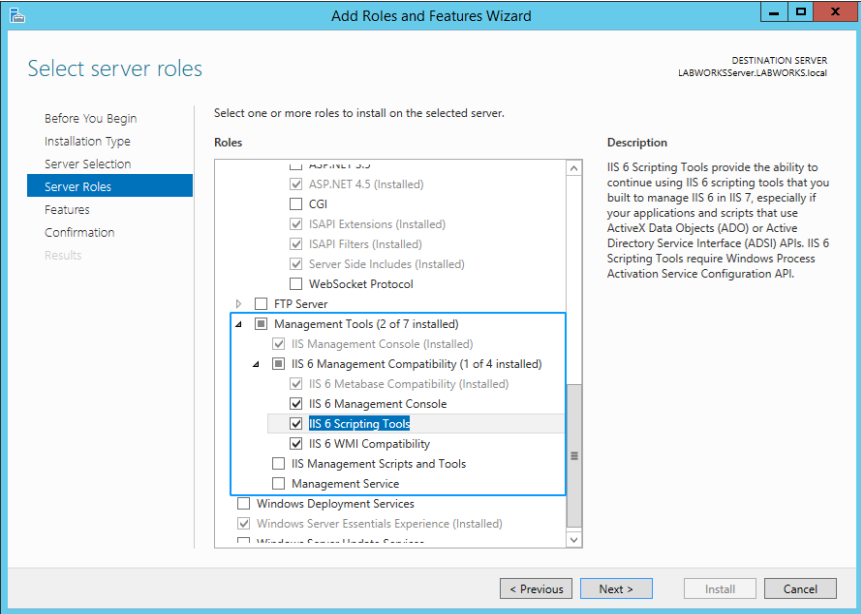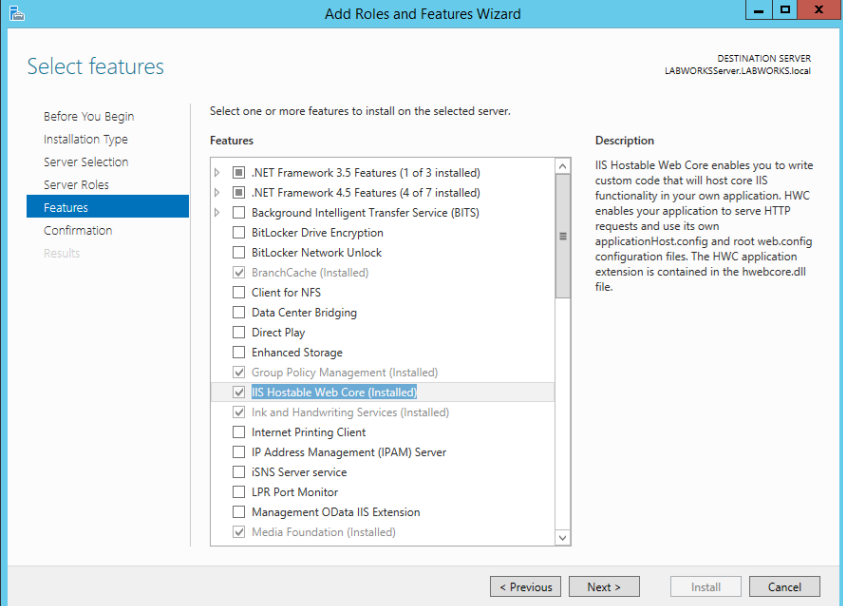
Step	User Input / Action	Expected Results
1	Navigate to the Windows Control Panel "Programs and Features" window using the Start menu. 	"Programs and Features" window is displayed.
2	Click the "Turn Windows features on or off" link on the left-hand side of the window. 	The "Server Manager" and "Add Roles and Features Wizard" windows are displayed.
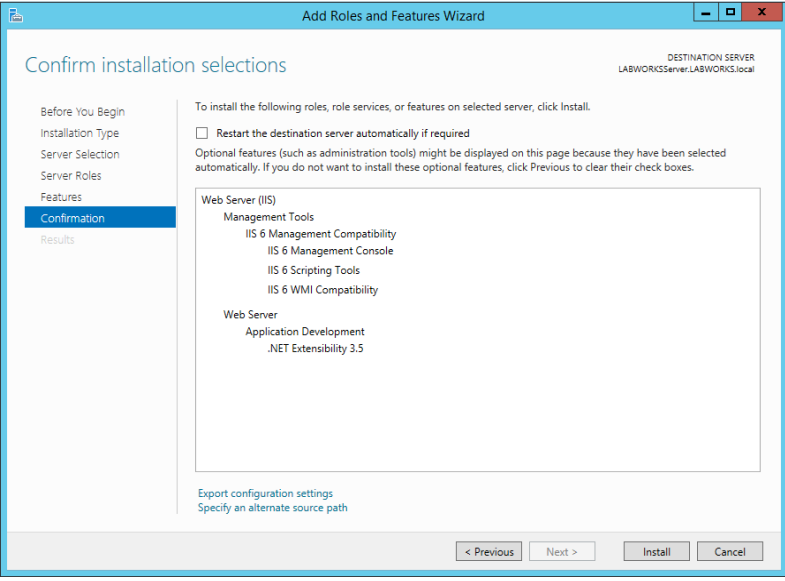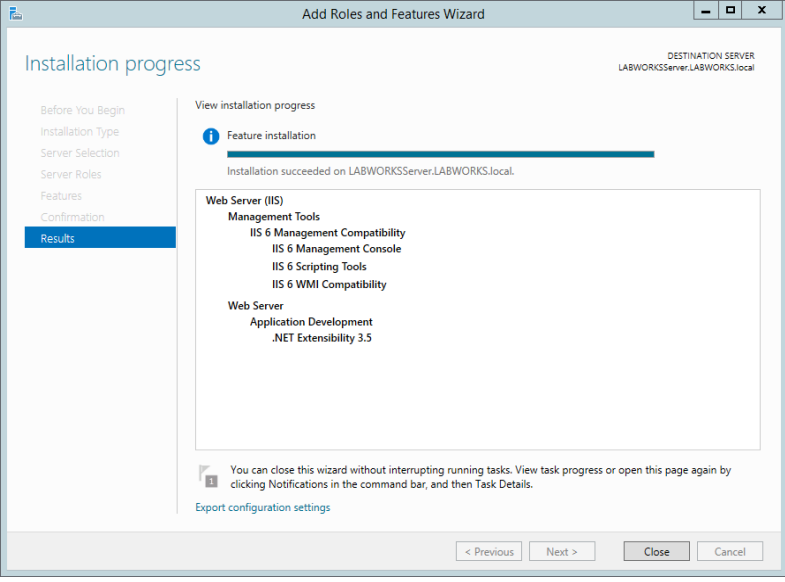
Step	User Input / Action	Expected Results
3	Click the "Next" button in the Add Roles and Features Wizard. 	"Installation Type" page is displayed.
4	Click the "Next" button. 	"Select destination server" page is displayed.

Step	User Input / Action	Expected Results
5	Click the "Next" button.	"Select server roles" page is displayed.

Step	User Input / Action	Expected Results
6	Expand the "Web Server (IIS) > Web Server > Application Development" node and make sure that following options are checked: • .NET Extensibility (4.5 or above) • ASP • ASP .NET (4.5 or above) • ISAPI Extensions • ISAPI Filters • Server Side Includes • WebSocket Protocol 	All listed options are checked.

Step	User Input / Action	Expected Results
7	Scroll down and expand the "Management Tools > IIS 6 Management Compatibility" node and make sure that following options are checked: • IIS 6 Metabase Compatibility • IIS 6 Management Console • IIS 6 Scripting Tools • IIS 6 WMI Compatibility And click the "Next" button. 	"Select features" page is displayed.
8	Check the option "IIS Hostable Web Core" and click the "Next" button. 	"Confirm installation selections" page is displayed.

Step	User Input / Action	Expected Results
9	If any of the options were unchecked, click "Install".	"Installation progress" page is displayed.
10	Click "Close" to exit, after the installation process is finished.	Window is closed.
11	Verify whether IIS has been installed: • Use "Windows + R" button combination to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	If IIS is installed, IIS Manager will be launched. Otherwise, an error message will be displayed.
12	Please reboot the computer after the installation of missing components.	

3.2 "URL REWRITE" IIS EXTENSION

Please install the "URL Rewrite" IIS extension. The executable file *urlrewrite2.exe* is included in the installation package.

Also, you can download the URL Rewrite extension from the official Microsoft website: https://www.iis.net/downloads/microsoft/url-rewrite.

3.3 ".NET CORE 3.1 HOSTING" .NET EXTENSION

Please install the ".NET Core 3.1 Hosting" .NET extension. The executable file *dotnet-hosting-3.1.22-win.exe* is included in the installation package.

Also, you can download this extension from the official Microsoft website: https://dotnet.microsoft.com/en-us/download/dotnet/3.1.

Please restart IIS after the installation of the new components.

3.4 ".NET FRAMEWORK 4.8 SETUP" .NET EXTENSION

Please install the "Microsoft .NET Framework 4.8" .NET extension. The executable file *ndp48-web.exe* is included in the installation package.

It is necessary for printing orders and printing labels.

Also, you can download this extension from the official Microsoft website: https://dotnet.microsoft.com/en-us/download/dotnet-framework/net48.

3.5 DATABASE CONFIGURATION

Install SQL Server, version 2019 or later.

Please, make sure that the database user that is used in the LABWORKS Exchange Portal is owner for DB schemas or, otherwise, meets the following requirements:
- The database user is a member one of the following roles:
  - "sysadmin fixed server" role
  - "db_owner fixed database" role
  - "db_ddladmin fixed database" role.

3.6 REDIS

Redis is an open source (BSD licensed), in-memory data structure store, used as a database, cache, and message broker. Using Redis is optional. You can choose to use Redis or cache the data to portal internal memory during installation. If you select an option to cache data to portal internal memory, it may cause the following issues:
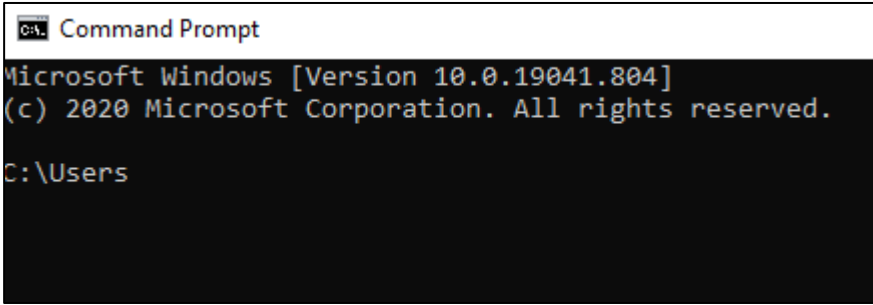
- There can be performance issues. The portal may work slowly in some cases.

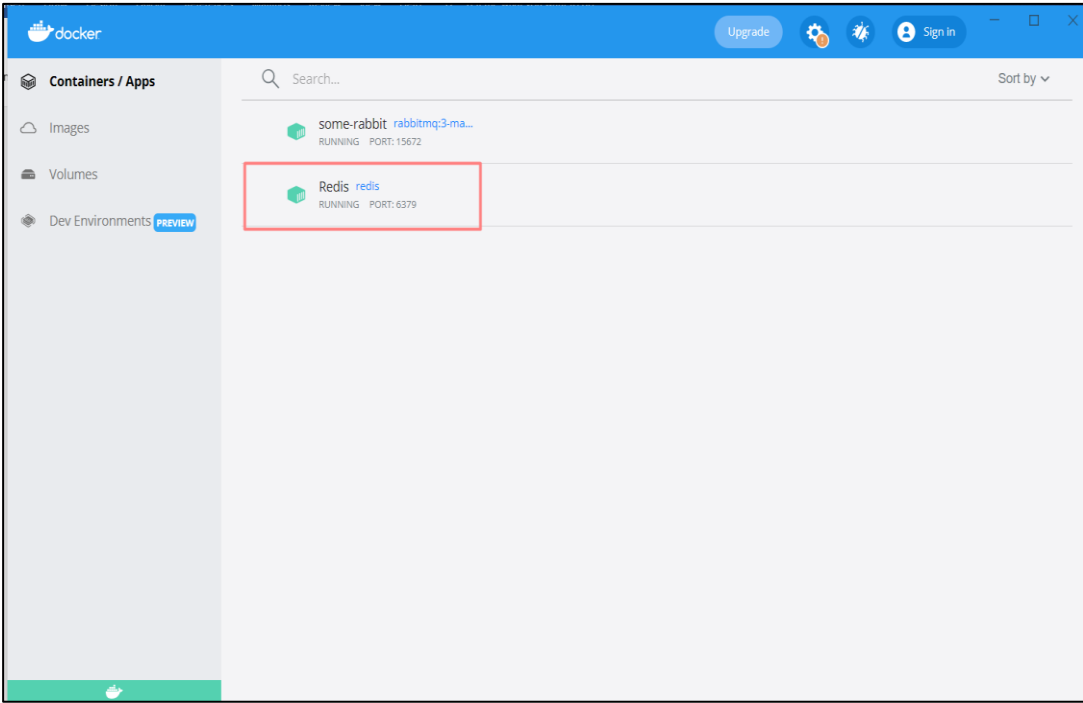- You need more RAM on the server (at least plus approximately 2 GB).

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If you choose to cache data by Redis, install Redis before the Exchange Portal installation.

There are 4 ways to install Redis:

- Install Redis using Docker

- Install Redis on a separate server

- Install Redis on Windows with WSL

- Use the Azure Cache for Redis

3.6.1 Install Redis using Docker
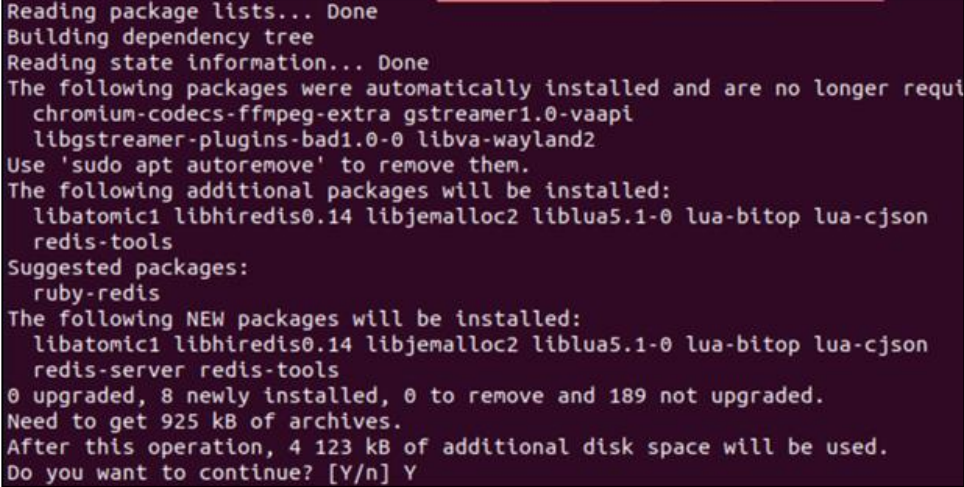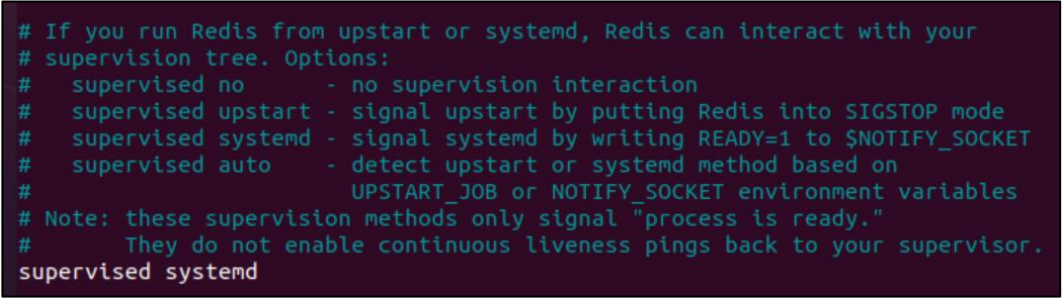
Step	User Input / Action	Expected Results
1	Install Docker using distributions from the official site https://www.docker.com/ and follow the manufacturer's installation instructions. You can use Docker Desktop for Windows. Before doing so, you need to be familiarized with the changed license restrictions.	
2	Run Command Prompt. Command Prompt Microsoft Windows [Version 10.0.19041.804] (c) 2020 Microsoft Corporation. All rights reserved. C:\Users	

3	Run a command to download the image, create and run the container:
	
	`docker pull redis`
	`docker run --name=Redis --restart=always -p 6379:6379 -v redis-data:/data -d redis`	

4	After the installation is complete, Redis will be running and available by parameters:
	
	``json
	"Redis": {
	    "Configuration": "localhost:6379"
	}
	``	

5	Docker container launch options can be changed if needed. In this case, the installer input fields or the api/*appsettings.json* configuration file should be updated with the actual values.	
6	Check that the container has started using the command: ``` docker ps ```	

The Redis container can be installed on another server (both Windows-based and Linux-based). In this case, instead of "localhost" use the name or IP of the server where the container is running.

3.6.2   Install Redis on a separate server

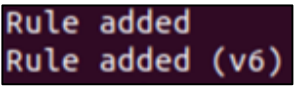| Step	User Input / Action	Expected Results
1	Install a Linux-based operating system on a separate server.	

2	Open terminal and update packages:
	
	`sudo apt-get update`
	
	``
	Hit:1 http://archive.ubuntu.com/ubuntu focal InRelease
	Hit:2 http://archive.ubuntu.com/ubuntu focal-updates InRelease
	Hit:3 http://archive.ubuntu.com/ubuntu focal-backports InRelease
	Hit:4 http://security.ubuntu.com/ubuntu focal-security InRelease
	Reading package lists... Done
	``	

3	Install Redis:
	
	`sudo apt-get install redis-server`
	
	``
	Reading package lists... Done
	Building dependency tree
	Reading state information... Done
	The following packages were automatically installed and are no longer requi
	   chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi
	   libgstreamer-plugins-bad1.0-0 libva-wayland2
	Use 'sudo apt autoremove' to remove them.
	The following additional packages will be installed:
	   libatomic1 libhiredis0.14 libjemalloc2 liblua5.1-0 lua-bitop lua-cjson
	   redis-tools
	Suggested packages:
	   ruby-redis
	The following NEW packages will be installed:
	   libatomic1 libhiredis0.14 libjemalloc2 liblua5.1-0 lua-bitop lua-cjson
	   redis-server redis-tools
	0 upgraded, 8 newly installed, 0 to remove and 189 not upgraded.
	Need to get 925 kB of archives.
	After this operation, 4 123 kB of additional disk space will be used.
	Do you want to continue? [Y/n] Y
	``	

4	Open settings file: `sudo nano /etc/redis/redis.conf`	
5	Select the supervised system option. This setting will allow to initialize the start of Redis as a service. According to the official documentation, this will allow to have more control over the database. ``` # If you run Redis from upstart or systemd, Redis can interact with your # supervision tree. Options: # supervised no - no supervision interaction # supervised upstart - signal upstart by putting Redis into SIGSTOP mode # supervised systemd - signal systemd by writing READY=1 to $NOTIFY_SOCKET # supervised auto - detect upstart or systemd method based on # UPSTART_JOB or NOTIFY_SOCKET environment variables # Note: these supervision methods only signal "process is ready." # They do not enable continuous liveness pings back to your supervisor. supervised systemd ```	

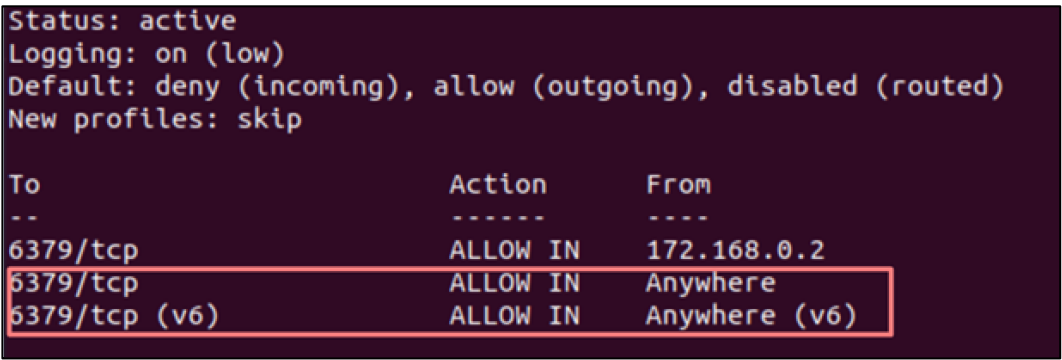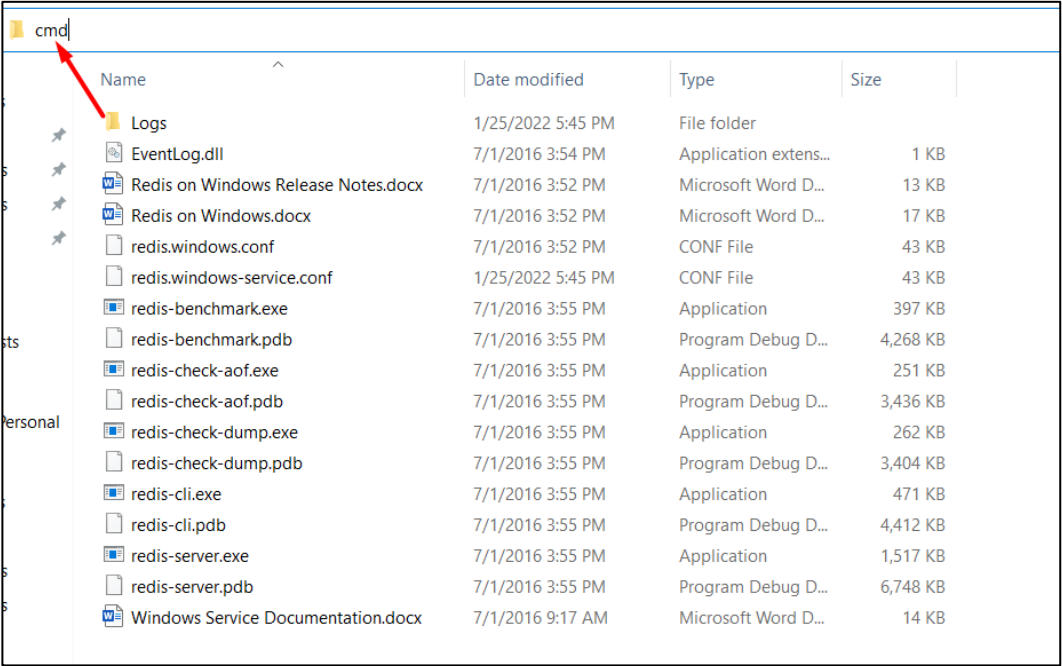| 6	Disable Protected Mode. Official documentations: "If you want to connect from external computers to Redis you may adopt one of the following solutions: 1) Just disable protected mode sending the command 'CONFIG SET protected-mode no' from the loopback interface by connecting to Redis from the same host the server is running, however MAKE SURE Redis is not publicly accessible from internet if you do so. Use CONFIG REWRITE to make this change permanent. 2) Alternatively, you can just disable the protected mode by editing the Redis configuration file, and setting the protected mode option to 'no', and then restarting the server. 3) If you started the server manually just for testing, restart it with the '--protected-mode no' option. 4) Setup a bind address or an authentication password. NOTE: You only need to do one of the above things in order for the server to start accepting connections from the outside." ```# By default protected mode is enabled. You should disable it only if # you are sure you want clients from other hosts to connect to Redis # even if no authentication is configured, nor a specific set of interfaces # are explicitly listed using the "bind" directive. protected-mode no```	
7	Save the changes to the file and exit, e.g., ctrl + X - exit and confirm to save the file.	

8	Enable service autostart:
	
	`systemctl enable redis-server`
	
	``Synchronizing state of redis-server.service with SysV service script with /lib/
	systemd/systemd-sysv-install.
	Executing: /lib/systemd/systemd-sysv-install enable redis-server```	

9	Restart redis-server: `systemctl restart redis-server`	

10	The server is ready to go. You can view the version of the installed DBMS with the command:
	
	`redis-server –version`
	
	``Redis server v=5.0.7 sha=00000000:0 malloc=jemalloc-5.2.1 bits=64 build=636cde3
	b5c7a3923```	

11	Configure the port for external access. Install the firewall and enabling: `sudo apt install ufw && sudo ufw enable`	

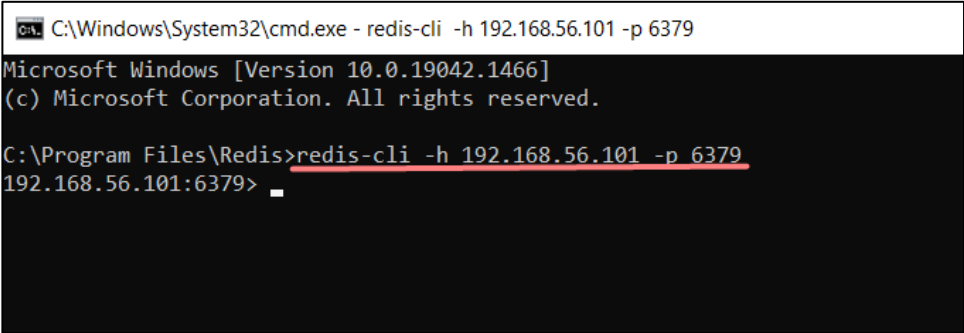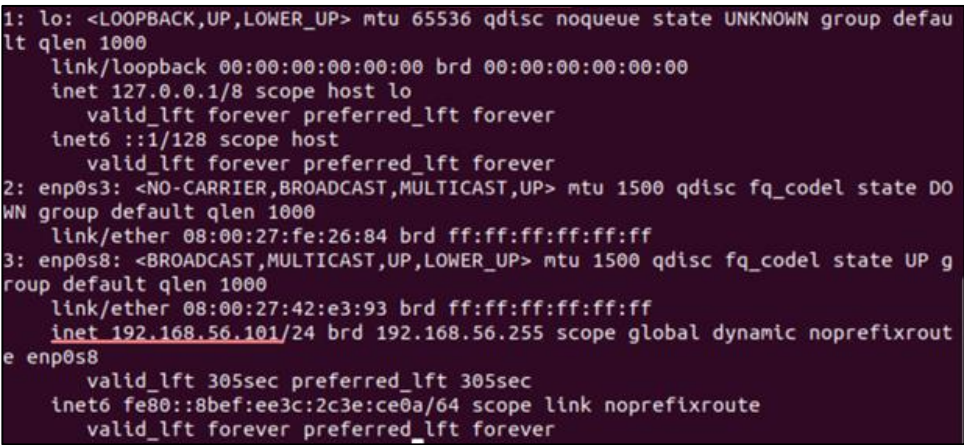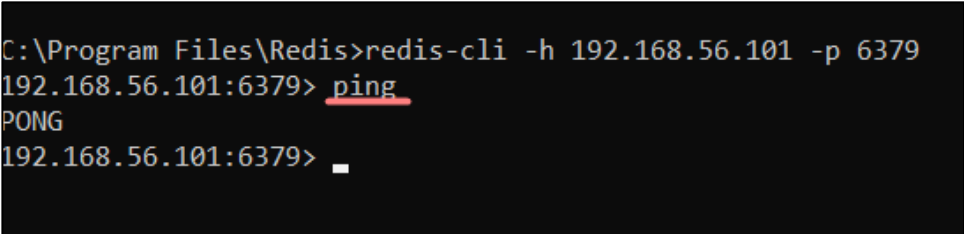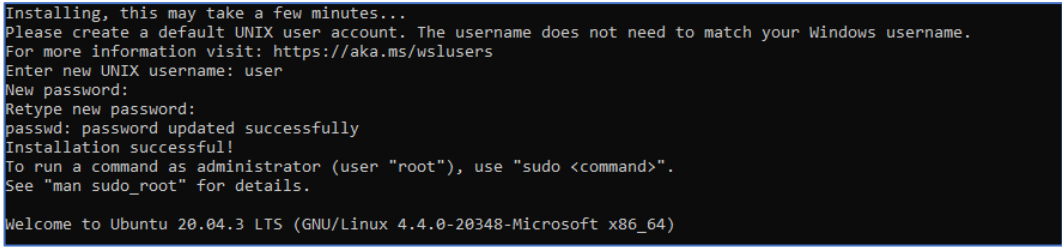| 12 | Add port:

`sudo ufw allow 6379/tcp`

Rule added
Rule added (v6)

Check with the command:

`sudo uft status verbose`

Status: active
Logging: on (low)
Default: deny (incoming), allow (outgoing), disabled (routed)
New profiles: skip

To   Action   From
--   ------   ----
6379/tcp   ALLOW IN   172.168.0.2
6379/tcp   ALLOW IN   Anywhere
6379/tcp (v6)   ALLOW IN   Anywhere (v6) | |
| 13 | Check the functionality.
Open the folder where redis-cli.exe is located, by default "C:\Program Files\Redis", and open the console in this folder.
To launch the console, enter the command cmd instead of the path.

 | |

| 14 | Run redis-cli:

`redis-cli -h <ip> -p <port>`

Where
<ip> = IP of redis service
<port> = port value

![redis-cli cmd window]
C:\Windows\System32\cmd.exe - redis-cli -h 192.168.56.101 -p 6379
Microsoft Windows [Version 10.0.19042.1466]
(c) Microsoft Corporation. All rights reserved.

C:\Program Files\Redis>redis-cli -h 192.168.56.101 -p 6379
192.168.56.101:6379>

The server port can be found on a Linux machine using the command:
`Ip addr show`

1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s3: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DO
WN group default qlen 1000
    link/ether 08:00:27:fe:26:84 brd ff:ff:ff:ff:ff:ff
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:42:e3:93 brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.101/24 brd 192.168.56.255 scope global dynamic noprefixrout
e enp0s8
       valid_lft 305sec preferred_lft 305sec
    inet6 fe80::8bef:ee3c:2c3e:ce0a/64 scope link noprefixroute
       valid_lft forever preferred_lft forever | |
| 15 | Check the connection using the `ping` command, the response should be `PONG`.

C:\Program Files\Redis>redis-cli -h 192.168.56.101 -p 6379
192.168.56.101:6379> ping
PONG
192.168.56.101:6379> | |

16	Enter the actual values into the configuration input fields of the installer or directly into the api/*appsettings.json* configuration file.	

```
|
"Redis": {
  "Configuration": "192.168.56.101:6379,allowAdmin=true,abortConnect=false"
},
```

3.6.3   Install Redis on Windows Server with WSL

Step	User Input / Action	Expected Results

1	Install WSL on Windows Server 2019 or above.
	
	First, enable the "Windows Subsystem for Linux" optional feature. Open PowerShell as Administrator
	
	1. Hold Windows and X keys together to open the Windows menu.
	
	2. Select Windows PowerShell (Admin) to launch the PowerShell with admin permissions.
	
	And run:
	
	`Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Windows-Subsystem-Linux`
	
	Administrator: Windows PowerShell
	PS C:\Users\Administrator> Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Windows-Subsystem-Linux
	
	Enable-WindowsOptionalFeature: Microsoft-Windows-Subsystem-Linux
	  Running
	  [oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo]	

2	Reboot. For example, press 'Y' to restart your server.	
3	Download a Linux distribution. Find an appropriate version on this page. If you prefer, you can also download your preferred distribution(s) via the command line, you can use PowerShell with the Invoke-WebRequest cmdlet. For example, to download the latest version of Ubuntu: `Invoke-WebRequest -Uri https://aka.ms/wslubuntu -OutFile Ubuntu.appx -UseBasicParsing`	

4	Extract the \<DistributionName>.appx package's contents, using PowerShell:
	
	`Rename-Item .\ <DistributionName>.appx .\Ubuntu.zip`
	
	`Expand-Archive .\Ubuntu.zip .\Ubuntu`	

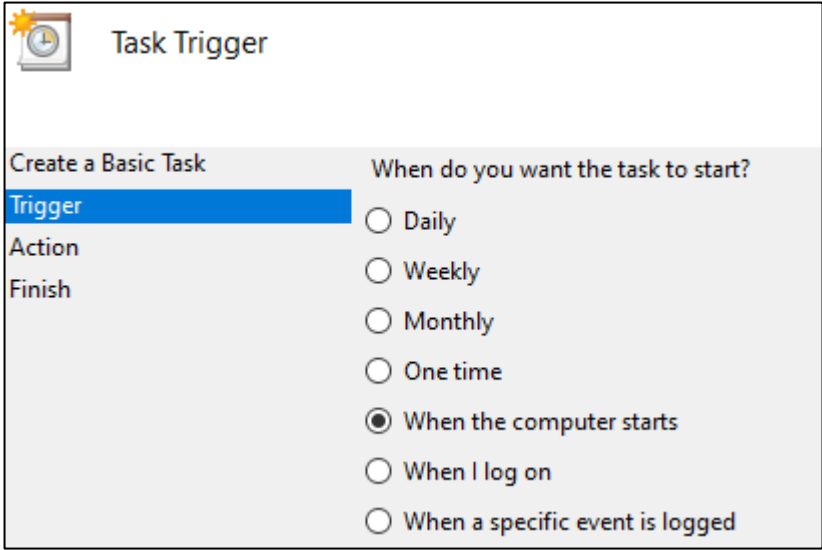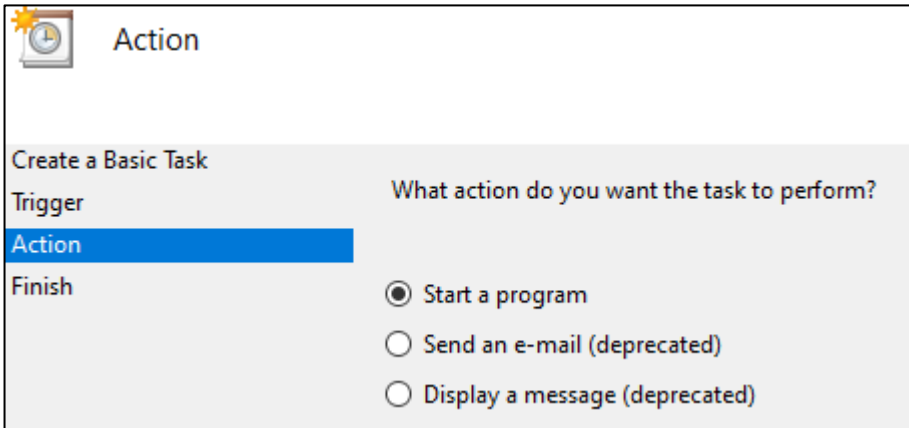| 5	Once the distribution has been downloaded, navigate to the folder containing the download and run the following command in that directory, where app-name is the name of the Linux distribution <app_name>.appx file: `Add-AppxPackage .\<app_name>.appx`	
6	You can now launch your distribution. Go to Windows button, click the Ubuntu Logo and wait for the installation to finish.	
7	Once installation is complete, you can create a user account and password for your new Linux distribution. • This Username and Password is specific to each separate Linux distribution that you install and has no bearing on your Windows user name. • Once you create a Username and Password, the account will be your default user for the distribution and automatically sign-in on launch. • This account will be considered the Linux administrator, with the ability to run `sudo` (Super User Do) administrative commands. • Each Linux distribution running on WSL has its own Linux user accounts and passwords. You will have to configure a Linux user account every time you add a distribution, reinstall, or reset. ```Installing, this may take a few minutes... Please create a default UNIX user account. The username does not need to match your Windows username. For more information visit: https://aka.ms/wslusers Enter new UNIX username: user New password: Retype new password: passwd: password updated successfully Installation successful! To run a command as administrator (user "root"), use "sudo <command>". See "man sudo_root" for details. Welcome to Ubuntu 20.04.3 LTS (GNU/Linux 4.4.0-20348-Microsoft x86_64)```	
8	We recommend that you regularly update and upgrade your packages using the preferred package manager for the distribution. Use the command: `sudo apt update && sudo apt upgrade`	
9	Install Redis. Run in WSL terminal: `sudo apt install redis-server -y`	
10	Verify the Redis version number: `redis-server --version`	

11	Add rights to the user to work without a password.	
	5.1. Open file with permissions	
	`sudo visudo`	
	5.2. Append to end of file	
	`<your_linux_username> ALL=NOPASSWD: /usr/sbin/service redis-server *`	
	Or if you want to disable sudo passwords generally add this to the end:	
	`<your_linux_username> ALL=(ALL:ALL) NOPASSWD:ALL`	
12	Set up Redis on a new port, for example 6377. To do this, make changes to the configuration:	
	`sudo nano /etc/redis/redis.conf`	
	Specify the needed port.	

	`# Accept connections on the specified port, default is 6379 (IANA #815344).`
	`# If port 0 is specified Redis will not listen on a TCP socket.`
	`port 6377`	

13	Set up Redis autorun by creating a task in task scheduler to launch WSL when the computer starts. Tap the Windows key on the keyboard, and then search for "Task Scheduler." Launch the "Task Scheduler" shortcut. **Best match** **Task** Manager App Apps **Task** Scheduler › Search the web 🔍 task - See web results ›	

14	Look under the "Actions" section and select "Create Basic Task".	
15	Input the task name and a description. For example, "Redis". Click the "Next".	

16	Choose the "When the computer starts" radio button and click "Next".	
17	In the next section, select the "Start a Program." Click the "Next" button.	
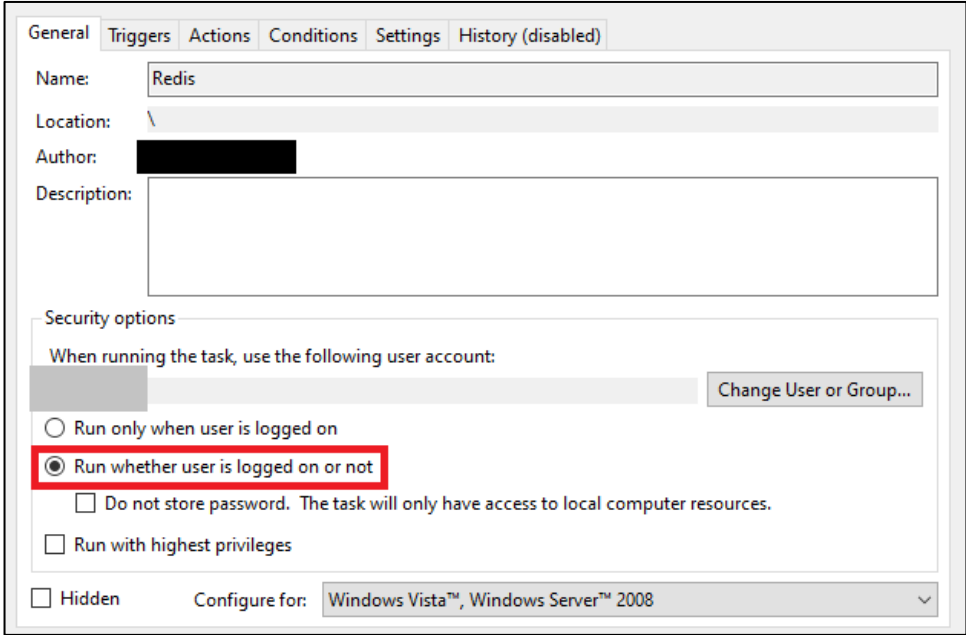
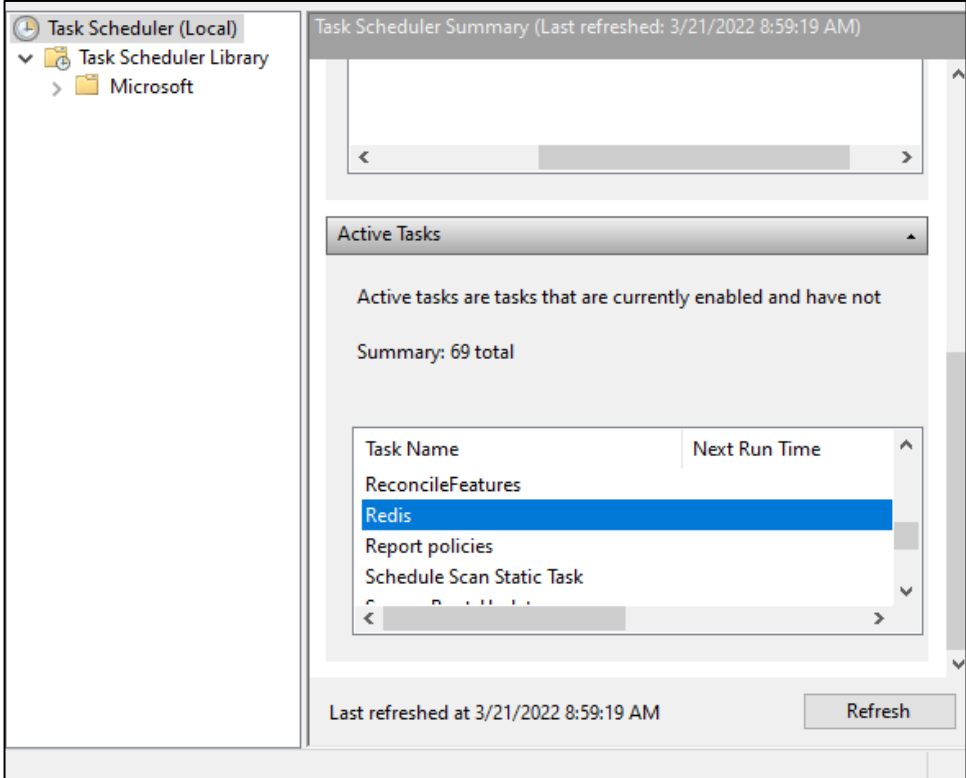| 18 | Specify the program that should be run, which is WSL. Enter the following into the "Program/Script" text entry box: `C:\Windows\System32\wsl.exe` or just `wsl`. In the Add Arguments field, input:

`sudo service redis-server start --daemonize yes`

Click the "Next" button.

Create Basic Task Wizard
Start a Program

Create a Basic Task
Trigger
Action
Start a Program
Finish

Program/script:
wsl   Browse...
Add arguments (optional): ver start –daemonize yes
Start in (optional): | |
| 19 | Check the "Open the Properties dialog for this task when I click Finish" checkbox.
Click the "Finish" button.

Create Basic Task Wizard
Summary

Create a Basic Task
Trigger
Action
Start a Program
Finish

Name: Redis
Description:

Trigger: At startup; At system startup
Action: Start a program; C:\Windows\System32\wsl.exe sudo service redis-server star
☑ Open the Properties dialog for this task when I click Finish
When you click Finish, the new task will be created and added to your Windows schedule.

< Back   Finish   Cancel | |

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20	The task details should be open. Select the radio button "Run whether user is logged on or not". Click the "OK" button.	
21	Test the created task. First, in the main window of the Task Scheduler, scroll down until you see your task name. Right-click the task and select "Run."	

22	Check the status of the server. In the WSL terminal type in: `sudo service redis-server status`	
23	Check that your port works. Run in Windows cmd: `netstat -na | findstr <port>`	

23	Restart your PC, and when you get back, check that the Redis is started and the port works.
	
	 23.1. Open a WSL terminal and run
	
	 `sudo service redis-server status`
	
	 which should report that Redis is now running.
	
	 23.2. Open Widows cmd and run:
	
	 `netstat -na | findstr <port>`	

25	If you need to change Redis settings after the Exchange Portal is installed, make changes to the *appsettings.json* configuration file.
	
	 ``json
	"Redis": {
	    "Configuration": "localhost:6377,allowAdmin=true,abortConnect=false"
	},
	``	

3.6.4   Azure Cache for Redis
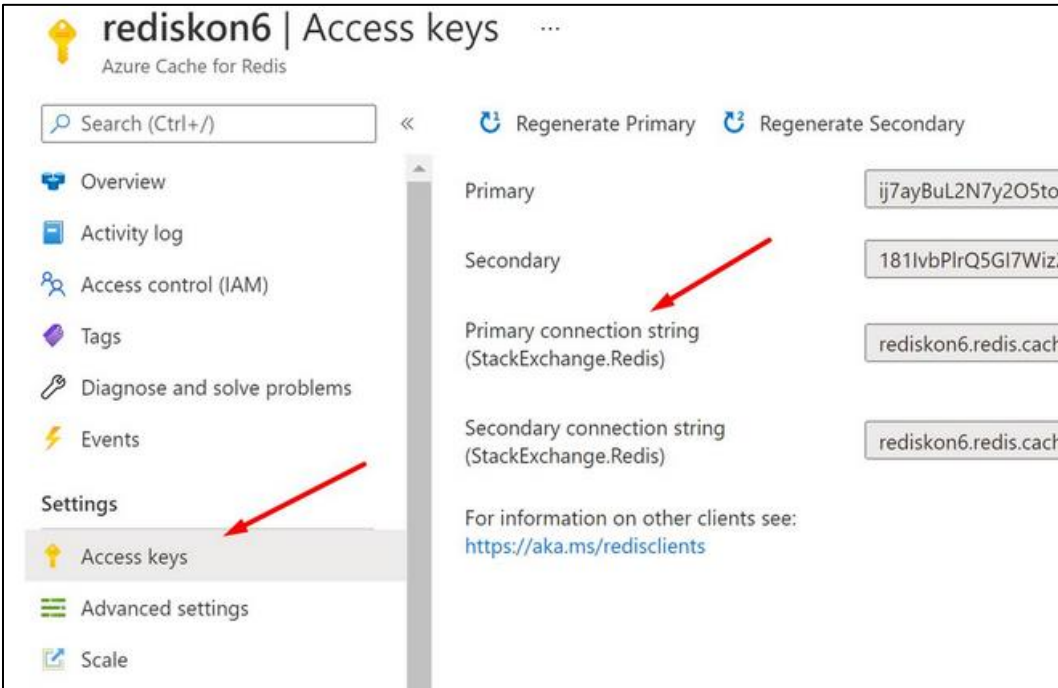
As an alternative to previous ways to install Redis, you can use the Azure Cache for Redis. It is a Microsoft Azure service. Azure Cache for Redis a fully managed, in-memory cache that enables high-performance and scalable architectures. It can be used to create cloud or hybrid deployments that handle millions of requests per second at sub-millisecond latency—all with the configuration, security, and availability benefits of a managed service.
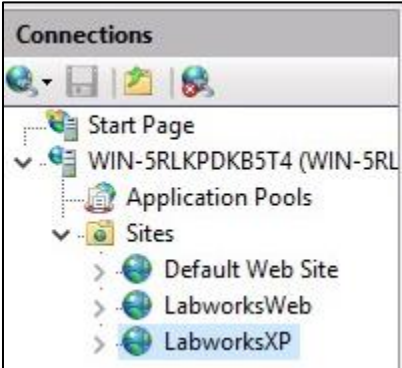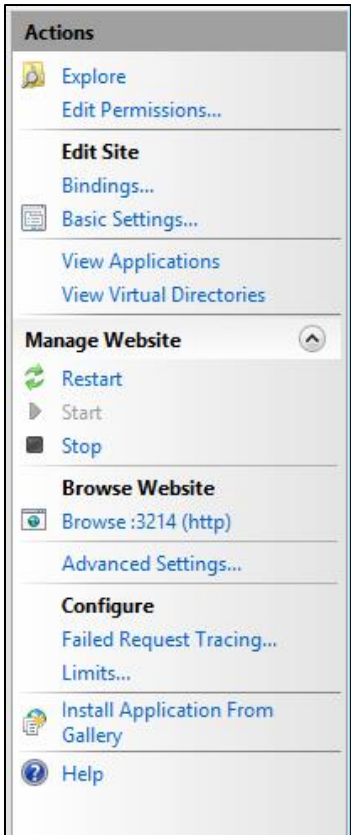Find more details here: https://azure.microsoft.com/en-us/services/cache.
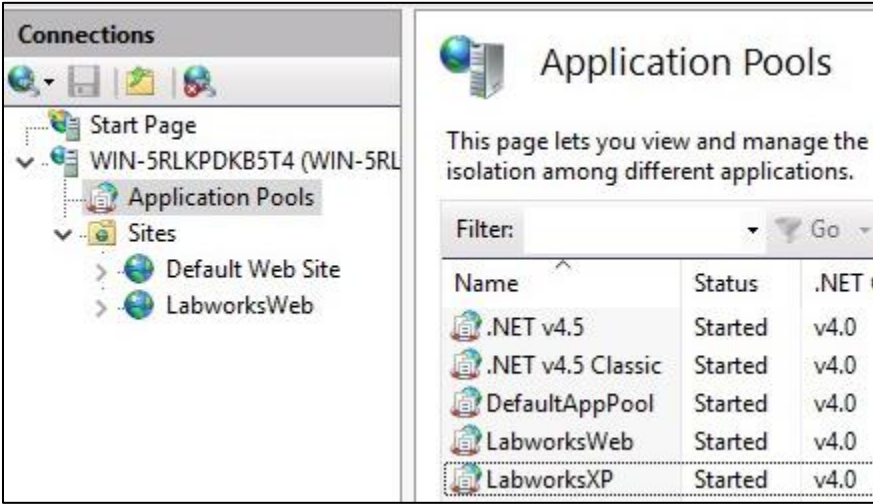
LABWORKS estimates each active user will consume anywhere from 10-15 MB of data (so 100 active users are expected to consume between 1-1.5GB of Redis memory).

How to connect Azure Cache for Redis to LABWORKS Exchange Portal.

Step	User Input / Action	Expected Results
1	Install the Exchange Portal as described in the 4.2 LABWORKS EXCHANGE PORTAL FILES section of this document. Leave fields empty on the "Configure Redis" step of the installer wizard. Finish installation.	Exchange Portal is installed.
2	Create an Azure Cache for the Redis instance. Select version 6 during installation. 	Azure Cache for the Redis is installed.
3	Run the instance. 	Azure Cache for Redis is running.

4	Go to the Access keys page. Copy the connection string "Primary connection string (StackExchange.Redis)". Connection to Azure Cache for Redis will already be password protected. 	The value is copied to the clipboard.

5	Paste the copied line in *appsettings.json* into the "Redis: Configuration" section.
	The *appsettings.json* should be created after the LABWORKS Exchange Portal installation.
	Save the file.
	
	``
	"Redis": {
	    "Configuration": "localhost:6379,allowAdmin=true,abortConnect=false"
	},
	``
		File is updated.

6	Restart the portal (pool + portal). • Use "Windows + R" button combination, to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	IIS Manager is open.

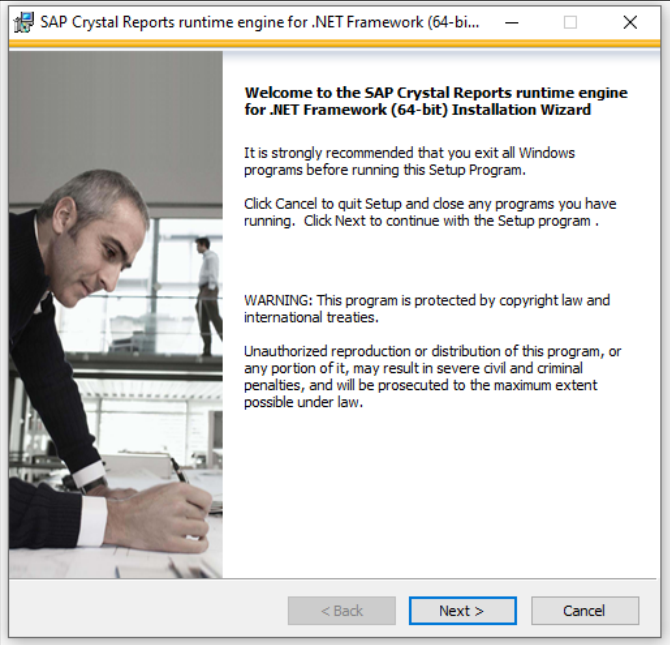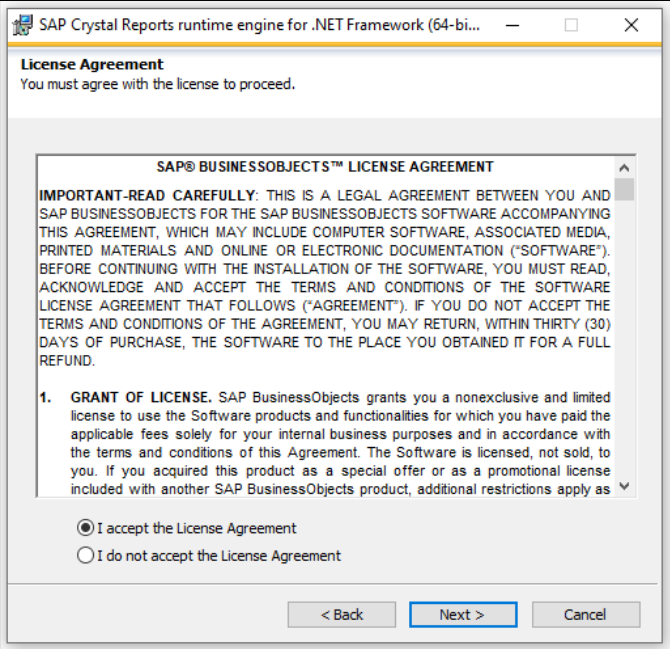| 7	Find and select the *LABWORKSSERVER > Application Pools* in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window.	"Actions" panel appeared on the right-hand side of the window.
8	Click the "Restart" button in the Actions panel (or "Stop" and then "Start").	The pool is restarted.
9	Find and select the *LABWORKS Exchange Portal* application under *LABWORKSSERVER > Sites* folder in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window.	"Actions" panel appeared on the right-hand side of the window.

10	Click the "Restart" button in the Actions panel (or "Stop" and then "Start").	The portal is restarted.

3.7 CRYSTAL REPORT
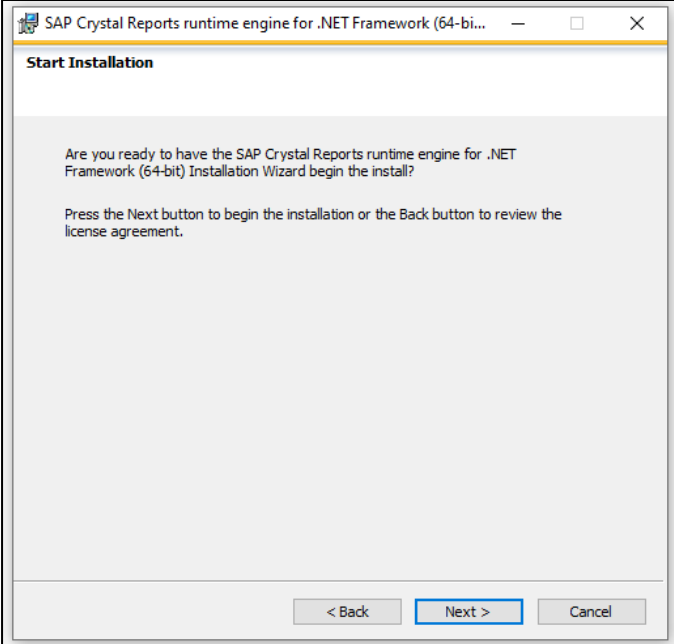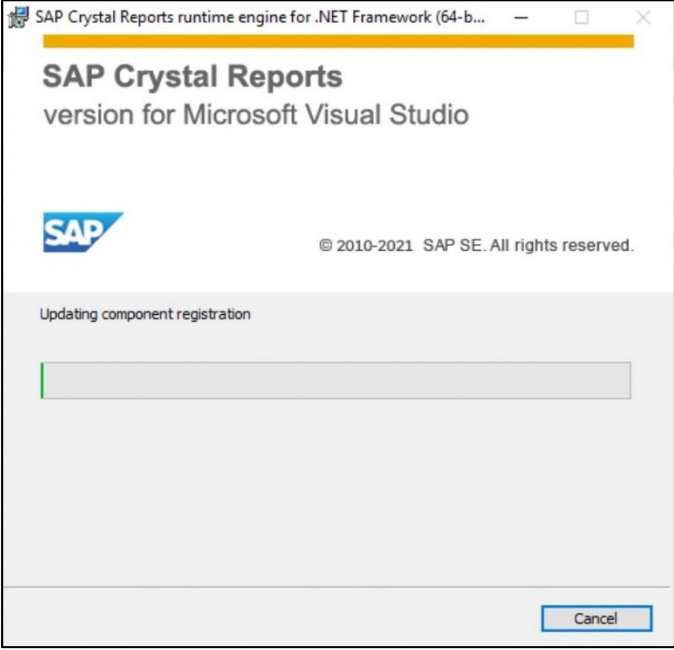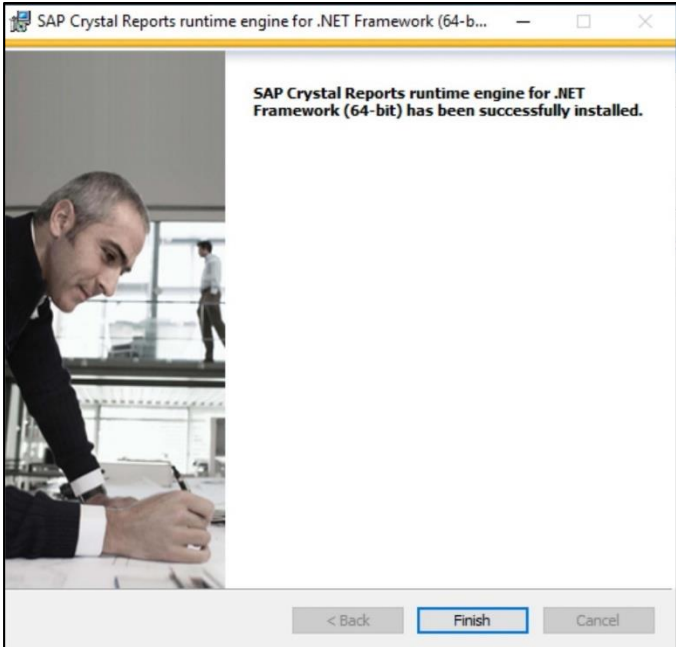
Install the Crystal Report for printing reports.

The executable file *CRRuntime_64bit_13_0_30.msi* is included in the installation package.

Follow the steps bellow to install the Crystal Report.

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Step	User Input / Action	Expected Results
1	Launch the CRRuntime_64bit_13_0_30.msi file from the LABWORKS Exchange Portal Installation Package. Click the "Next" button.	Next step is open.
2	Accept the license and click the "Next" button.	Next step is open.

3	Click the "Next" button to begin the installation.	Installation is started.
4	Wait until the Crystal Report is installed.	Installation is in progress.

| 5	Click the "Finish" button to finish the installation.	Installation is finished.

3.8 SMTP Server

SMTP Server should be installed or you can use external SMTP server.

SMTP stands for Simple Mail Transfer Protocol, and it is an application used by mail servers to send, receive, and/or relay outgoing mail between email senders and receivers. It should be used for sending email notifications to Exchange Portal users.

3.9 Install LABWORKS LIMS

LABWORKS Exchange Portal should work together with LABWORKS Enterprise LIMS so that users can order samples and analyses and these 2 applications are synchronized.

- Install LABWORKS LIMS application, version 7.1.0.184 or above using the LABWORKS Enterprise LIMS Installation Guide.
- Find the Client ID running the System Management application: Utilities > System Manager Mode (or in the SYSMGR table of the database): *LWCPKey*.
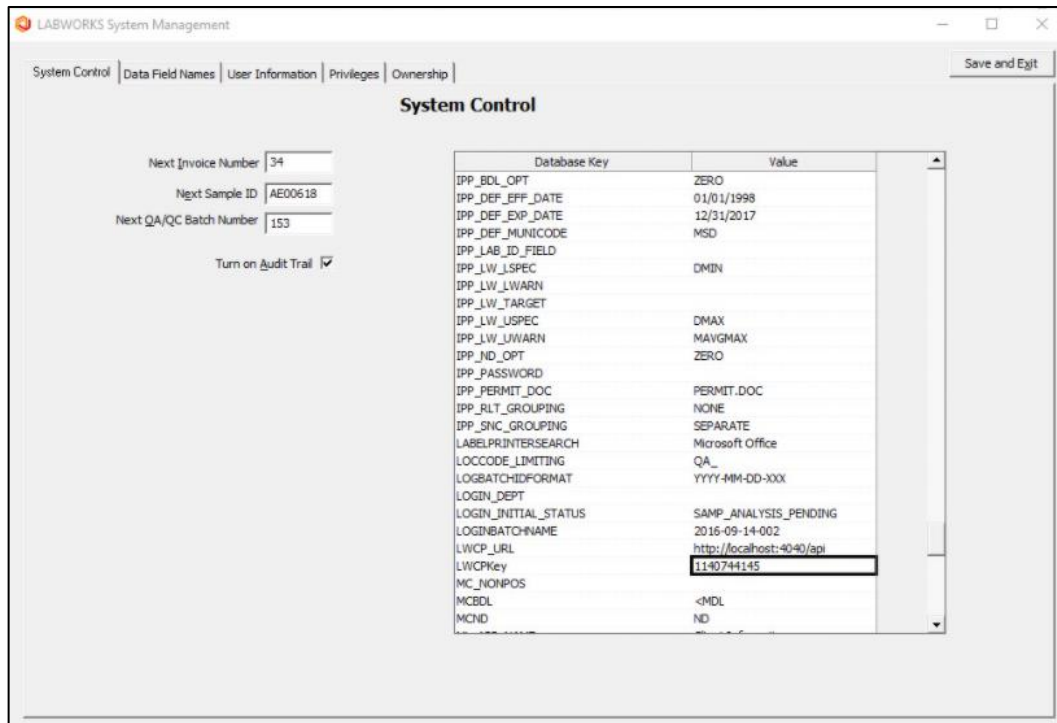
- o
- o   LWCPKey value should be used as the value for the Client ID.
- o   It will fill in by itself, if the value is empty in the database at the first start of the data service. Or it can be set manually.

- Find the Secret key in the config file of the Data service (*LWeLIMSData.exe.config*): *LWCPSecret*.

```
<setting name="LWCPSecret" serializeAs="String">
    <value>ECFCB35F-25C3-46B4-A5CD-386045AE782B</value>
```
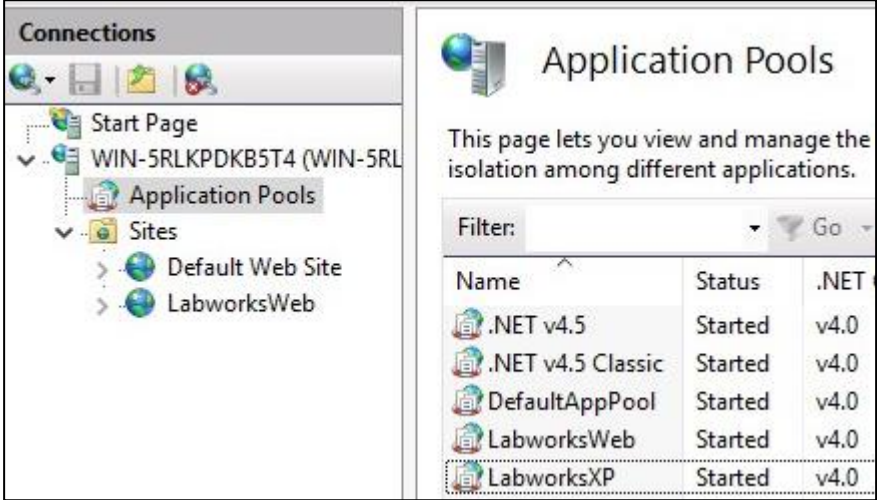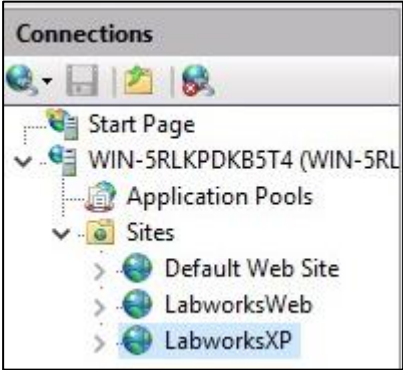
- o
- o   LWCPSecret value should be used as the value for the Secret key.

These data will be needed for the LABWORKS Exchange Portal installation.

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4 LABWORKS EXCHANGE PORTAL INSTALLATION

4.1 LABWORKS EXCHANGE PORTAL UPDATE

To install the latest version of the LABWORKS Exchange Portal, you can use the Labworks.XP.Setup-

7.1.0.34.msi file from the LABWORKS Exchange Portal Installation Package. Before upgrading the portal, we

recommend to stop the portal and the pool. To do it, follow the steps below.
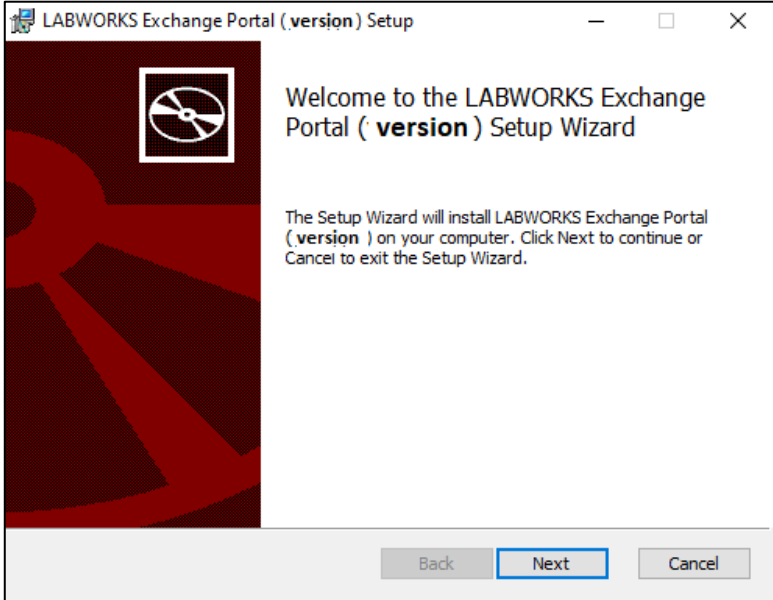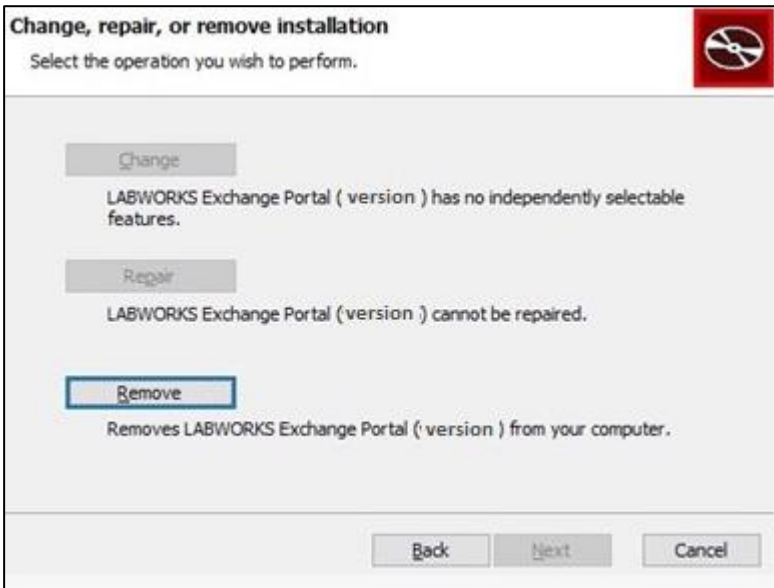
Step	User Input / Action	Expected Results
1	• Use "Windows + R" button combination, to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	IIS Manager is open.
2	Find and select the *LABWORKSSERVER > Application Pools* in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window. 	"Actions" panel appeared on the right-hand side of the window.
3	Click the "Stop" button in the Actions panel. 	The pool is stopped.

4	Find and select the *LABWORKS Exchange Portal* application under *LABWORKSSERVER > Sites* folder in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window.	"Actions" panel appeared on the right-hand side of the window.
5	Click the "Stop" button in the Actions panel.	The portal is stopped.

In the upgrade mode, you will see all parameters configured in the *appsettings.json* file, relevant to the moment of the last start of the portal. If no changes are needed, you can skip steps and just click the "Next" button. If you need to make some changes, input new values. All parameters except the destination folder and the portal URL can be changed.

We recommend encrypting user names and passwords. For that purpose, you can use the LABWORKS Exchange Portal Encryption Tool included into the installation package. See instructions in the corresponding section of this document.

To upgrade the LABWORKS Exchange Portal, follow the steps below.
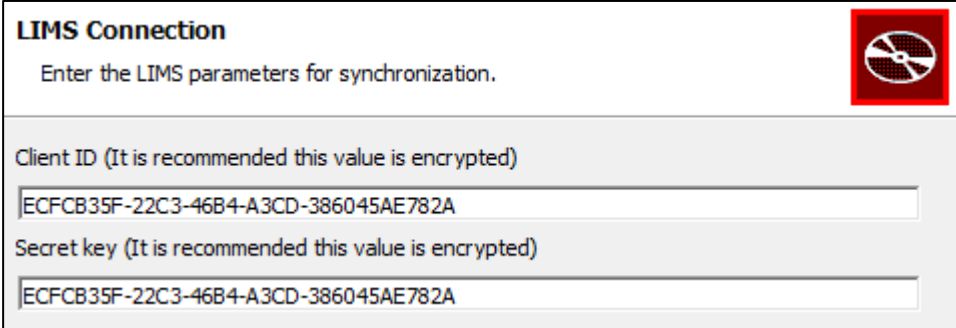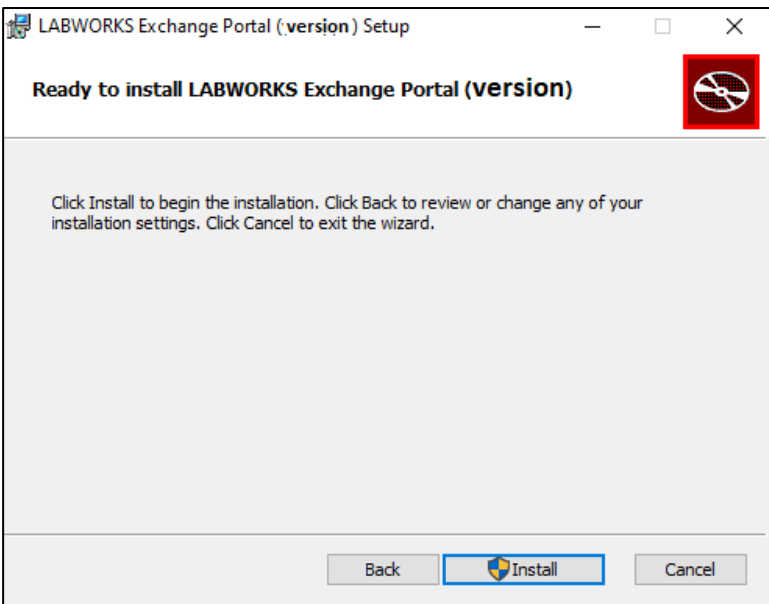
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Step	User Input / Action	Expected Results
1	Launch the Labworks.XP.Setup-7.1.0.34.msi file from the LABWORKS Exchange Portal Installation Package. Click the "Next" button to start update. 	Next step is open.
2	If you are trying to install the same version that is already installed, you will see the following screen where you can click the "Remove" button and delete the application. The database and all created data (folder, *appsettings.json*, logs, attached images and files, etc.) will not be removed. Or you can click the "Cancel" button. 	
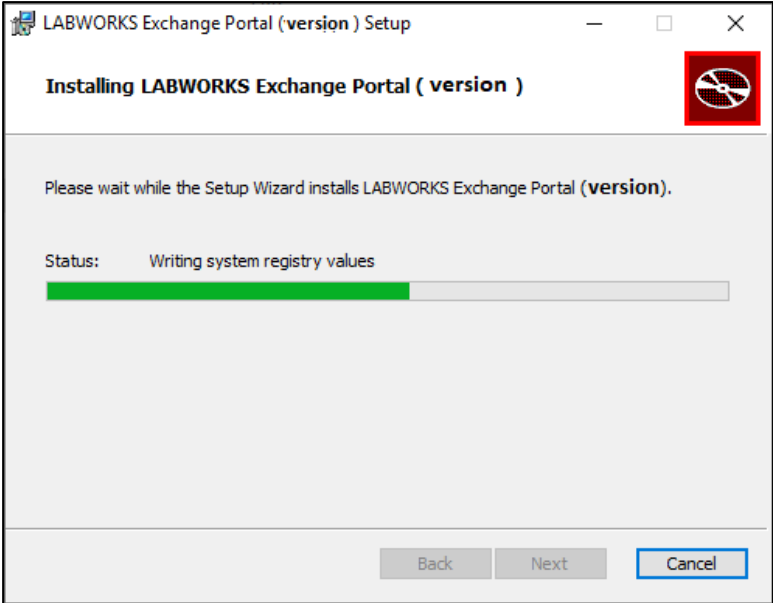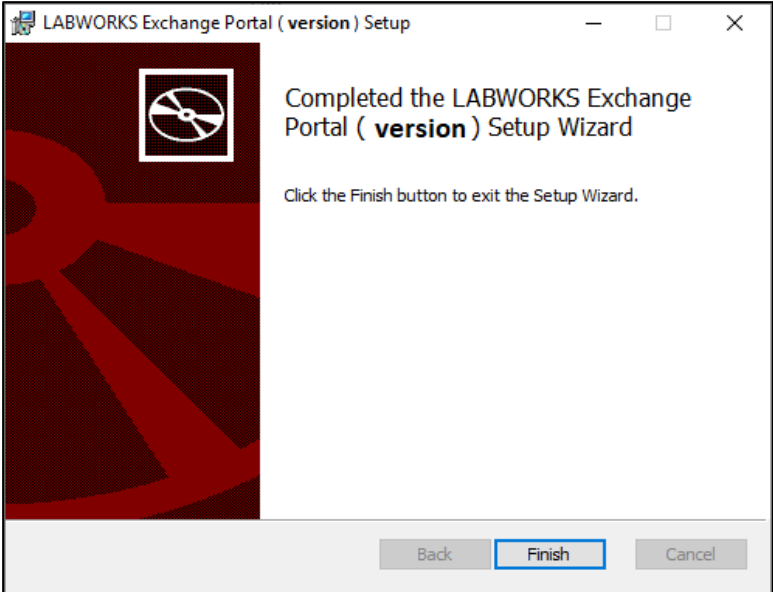
Step	User Input / Action	Expected Results
3	If you are installing one of the next versions, you will see steps with application parameters. The first of them is the **Configure Host** step. The portal URL cannot be changed. Just click the "Next" button. **Configure Host** Enter the Host Address. Portal URL (without http:// or https://) * localhost	Next is step open.
4	**Configure Database** You can update the Database configuration if needed: input server name or IP address of the new database. Specify the database name. Do not forget to update the Username and the Password of the SQL Server. The database will be created or updated. Or leave as it was configured for the previous version. Click the "Next" button. **Configure Database** Enter the database parameters. Server name or IP servername Database name database User name (It is recommended this value is encrypted) encrypted username Password (It is recommended this value is encrypted) encrypted password	Next step is open.

Step	User Input / Action	Expected Results
5	**Configure Redis** On this step, you can change parameters of where to cache data: using Redis or in portal internal memory. If you prefer using internal memory, leave the "Use Redis" checkbox unchecked. If you plan to use Redis for caching, check the "Use Redis" checkbox. Then configure Redis: input server name or IP and port to connect to the installed Redis. Or you can leave as it was configured for the previous version. Click the "Next" button. **Configure Redis** Enter the Redis parameters. ☑ Use Redis Server name or IP servername Port 8080	Next step is open.

Step	User Input / Action	Expected Results
6	**Configure SMTP** If you want to change the SMTP server, update all needed SMTP parameters to sending system email notifications to Exchange Portal's users. Update Sender name and Sender email address from which the emails will be sent. Input SMTP server address. Enter the User name and the Password to the SMTP server. If you use the SMTP server without authentication, uncheck the "Authentication required" checkbox. Check the "Enabled SSL" checkbox if your SMTP Server is configured using SSL. Or you can leave as it was configured for the previous version. Click the "Next" button. **Configure SMTP** Enter the SMTP parameters for sending emails. Sender name: LABWORKS Exchange Portal (no reply) Sender email: noreply@your-organization.com Server: smtp.your-server.com Port: 8080 ☐ Enabled SSL ☑ Authentication required It is recommended these values are encrypted Username: ecrypted username Password: ecrypted password	Next step is open.

Step	User Input / Action	Expected Results
7	**LIMS Connection** If you want to change LIMS that should be integrated with the Portal, input new Client ID and new Secret key. Or you can leave as it was configured for the previous version. Click the "Next" button. **LIMS Connection** Enter the LIMS parameters for synchronization. Client ID (It is recommended this value is encrypted) ECFCB35F-22C3-46B4-A3CD-386045AE782A Secret key (It is recommended this value is encrypted) ECFCB35F-22C3-46B4-A3CD-386045AE782A	Next step is open.
8	Click the "Install" button to start update. LABWORKS Exchange Portal (version) Setup **Ready to install LABWORKS Exchange Portal (version)** Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard. Back Install Cancel	Installation is started.

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Step	User Input / Action	Expected Results
9	Wait until the installation is completed.	Installation is in progress.
10	Click the "Finish" button.	Installation is completed.

When the upgrading process is finished, there will be updated *appsettings.json* file with your changes. In the same folder, there will be a backup version of the *appsettings.json* file; this copy will contain the version number for which it was relevant.

After upgrading process, start the portal and the pool in the Internet Information Services (IIS) Manager.

4.2 LABWORKS EXCHANGE PORTAL FILES

The installation procedure will extract the LABWORKS Exchange Portal files to the web server.

The web server should be run by Internet Information Services (IIS) of version 10.0 or above.
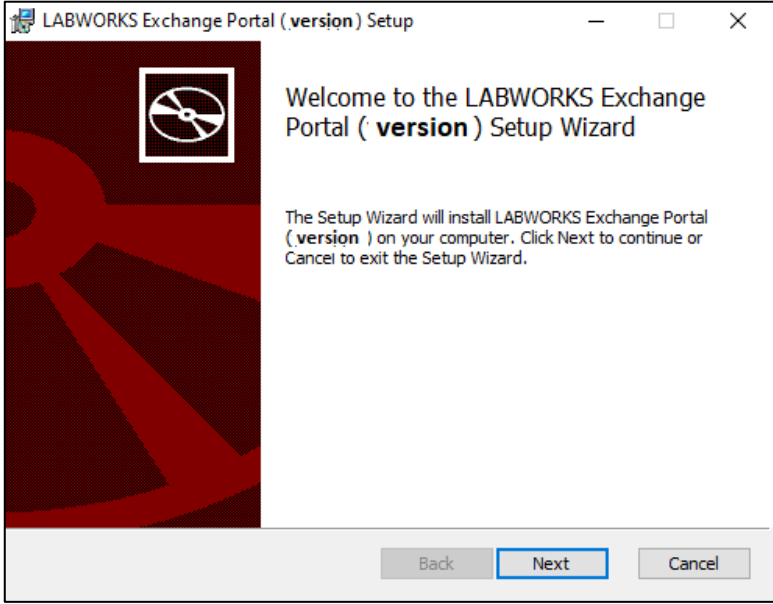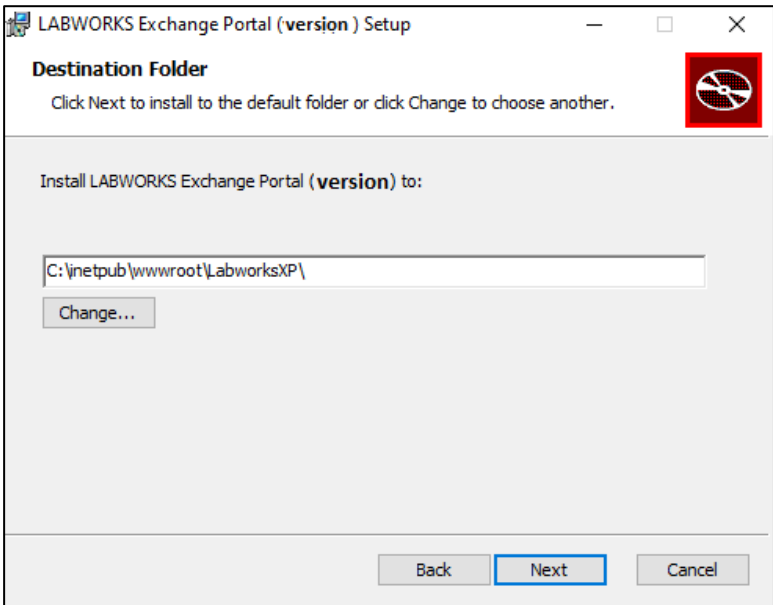
Check all requested preconditions.

LABWORKS Exchange Portal files will be installed into the following directory:
C:\inetpub\wwwroot\LabworksXP. The installation location can be changed during installation.
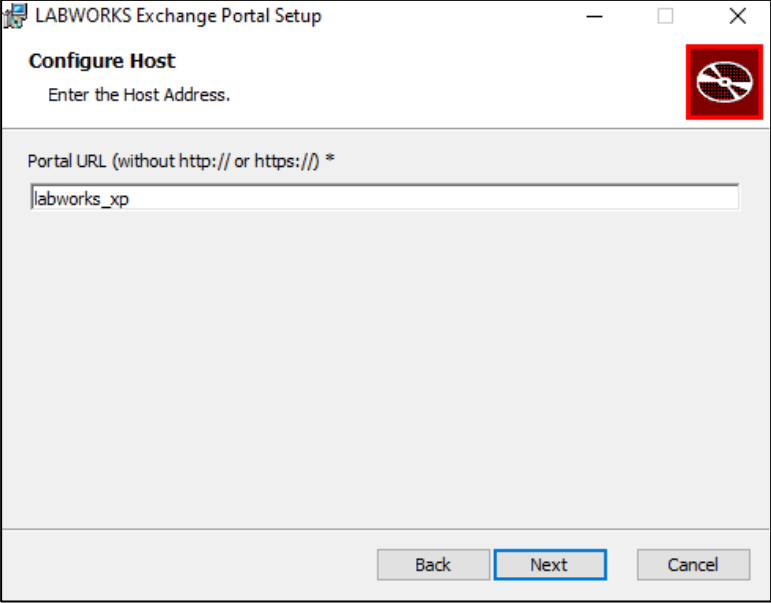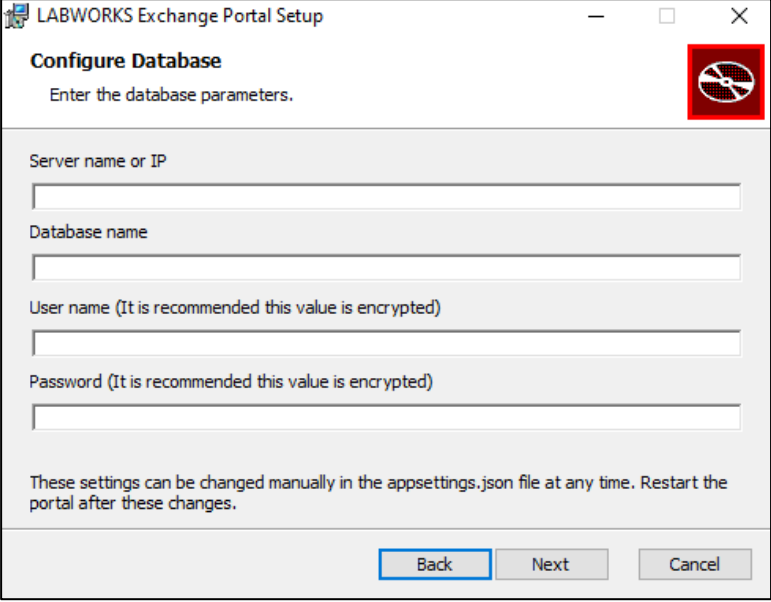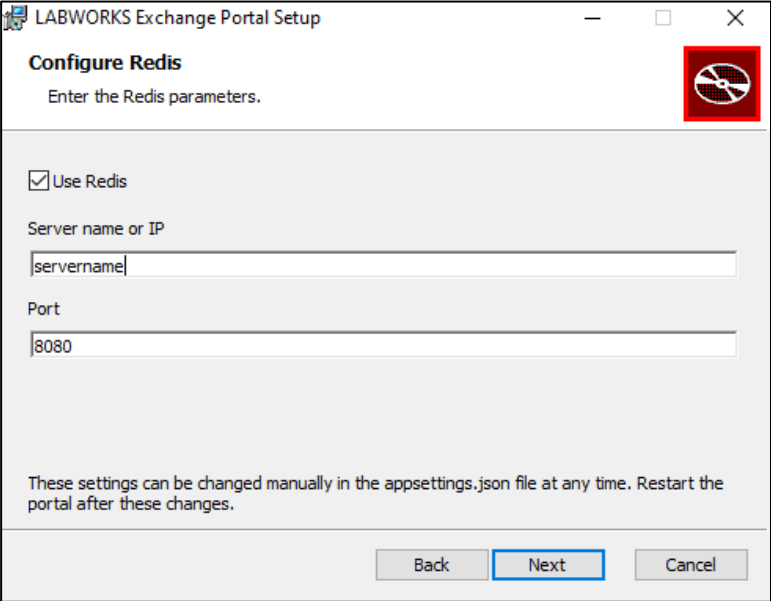
Some steps can be skipped and parameters can be left empty. Anyway, all parameters should be filled in order the portal works correctly, but you can do it later. When you are ready to fill them, please update the *appsettings.json* file as it is described in the corresponding section of this document. Restart the portal and the pool after that.
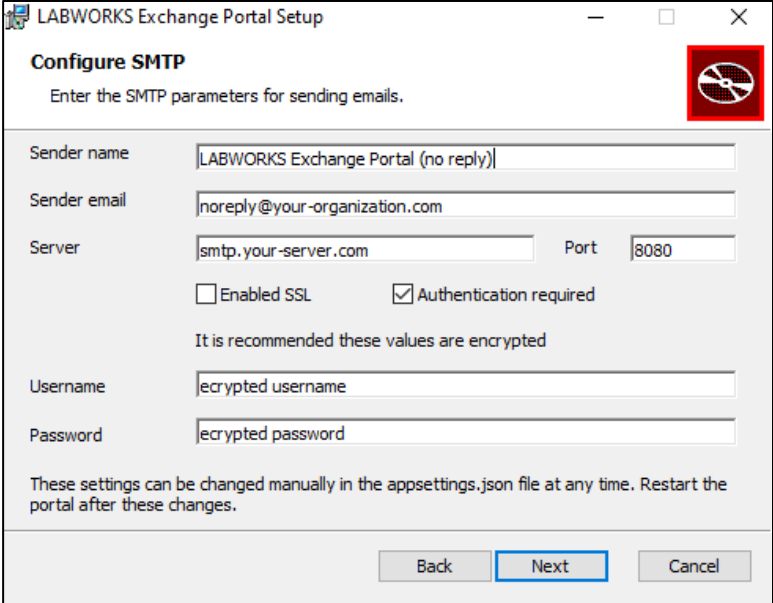
We recommend encrypting user names and passwords. For that purpose, you can use the LABWORKS Exchange Portal Encryption Tool included into the installation package. See instructions in the corresponding section of this document.

To install the LABWORKS Exchange Portal, follow the steps below.
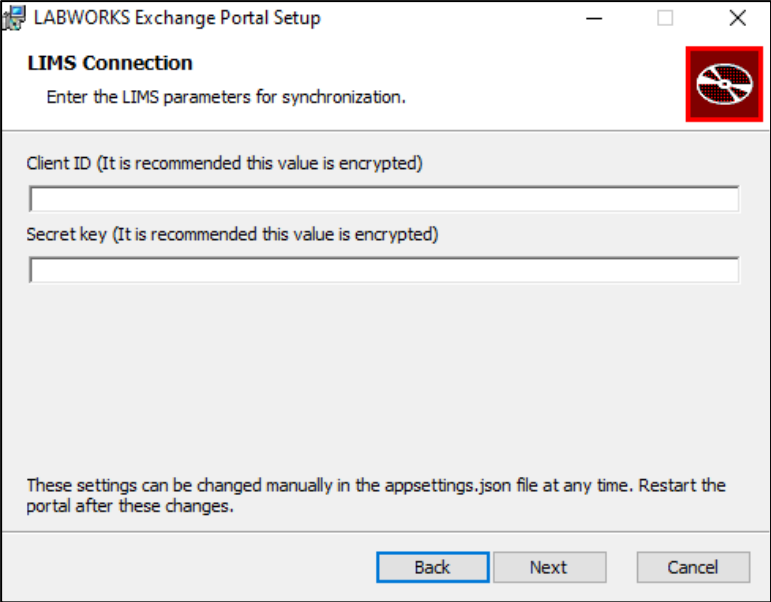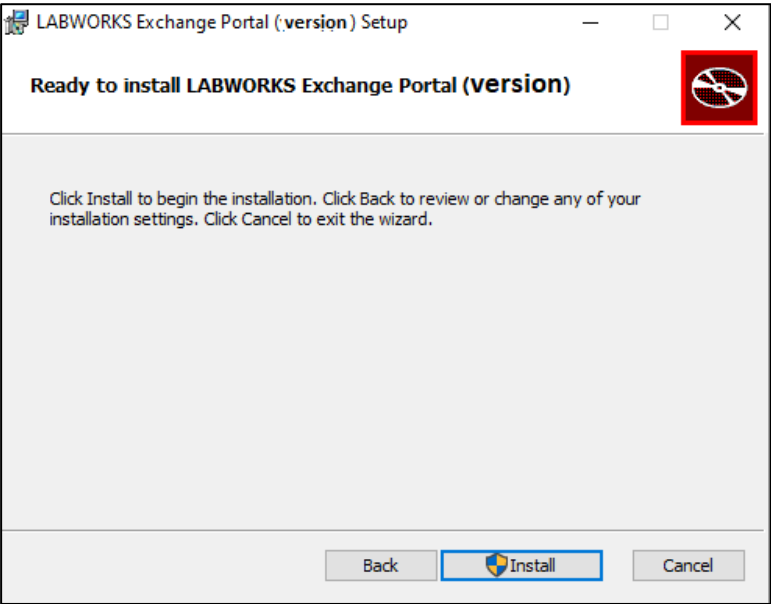
Step	User Input / Action	Expected Results
1	Launch the Labworks.XP.Setup-7.1.0.34.msi file from the LABWORKS Exchange Portal Installation Package. Click the "Next" button to begin installation. 	Next step is open.
2	Select the folder to install the LABWORKS Exchange Portal application to. Click the "Change" button to open the default File Browser and select the needed folder. Click the "Next" button. 	Next step is open.
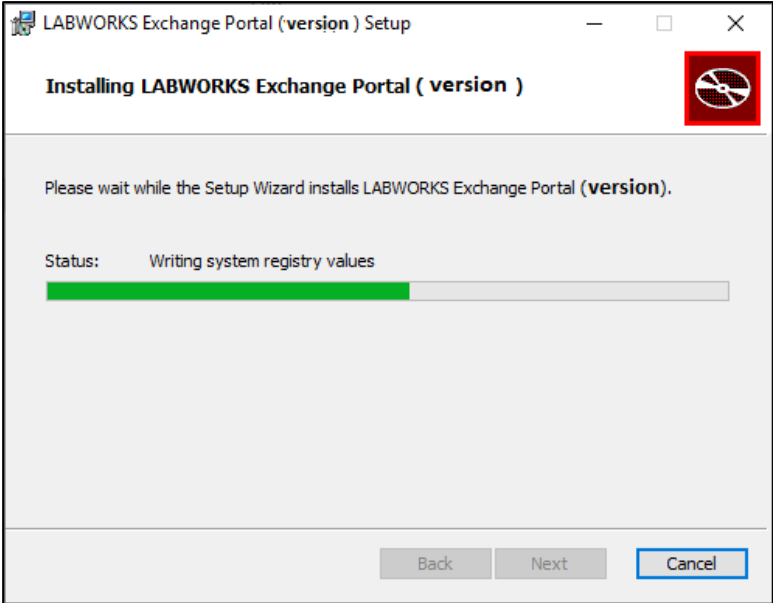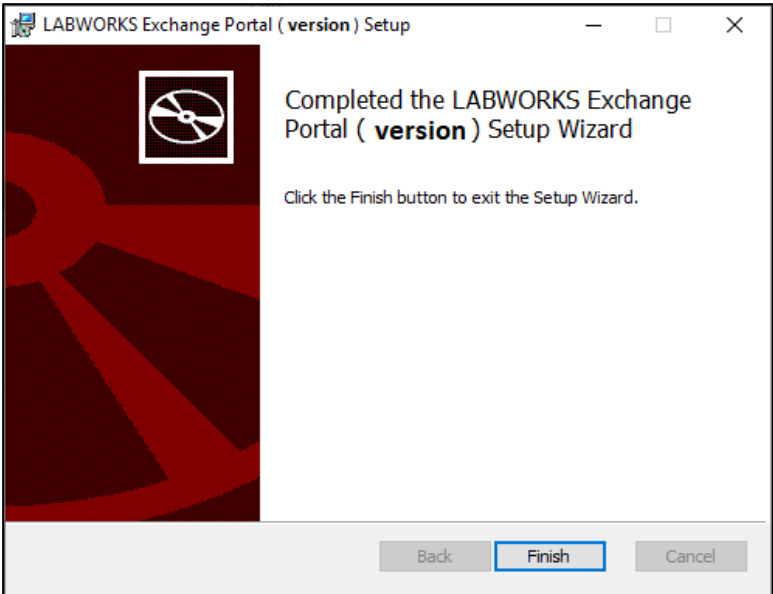
Step	User Input / Action	Expected Results
3	Enter the portal URL: the address where the site will be located on the network. Click the "Next" button.	Next step is open.
4	Configure the Database: input server name or IP address of the database. Specify the database name. Input the Username and the Password of the SQL Server. The database will be created or updated. Click the "Next" button.	Next step is open.

Step	User Input / Action	Expected Results
5	On this step, you can choose where to cache data: using Redis or in portal internal memory.

If you prefer using internal memory, leave the "Use Redis" checkbox unchecked.
If you plan to use Redis for caching, check the "Use Redis" checkbox.
Then configure Redis: input server name or IP and port to connect to the installed Redis.

Click the "Next" button. | Next step is open. |

Step	User Input / Action	Expected Results
6	Configure SMTP: input all needed SMTP parameters to sending system email notifications to Exchange Portal's users. Enter Sender name and Sender email address from which the emails will be sent. Input SMTP server address. Enter the Username and the Password to the SMTP server. If you use the SMTP server without authentication, uncheck the "Authentication required" checkbox. Check the "Enabled SSL" checkbox if your SMTP Server is configured using SSL. Click the "Next" button.	Next step is open.

Step	User Input / Action	Expected Results
7	Configure connection to LIMS: input the Client ID and the Secret key. Find ClientID in the *LWCPKey* variable of the System Manager settings (run the System Manager app or open the SYSMGR table in the DB). Find Secret key in the config file of the Data service - *LWeLIMSData.exe.config*: *LWCPSecret*. Click the "Next" button.	Next step is open.
8	Click the "Install" button to begin installation.	Installation is started.

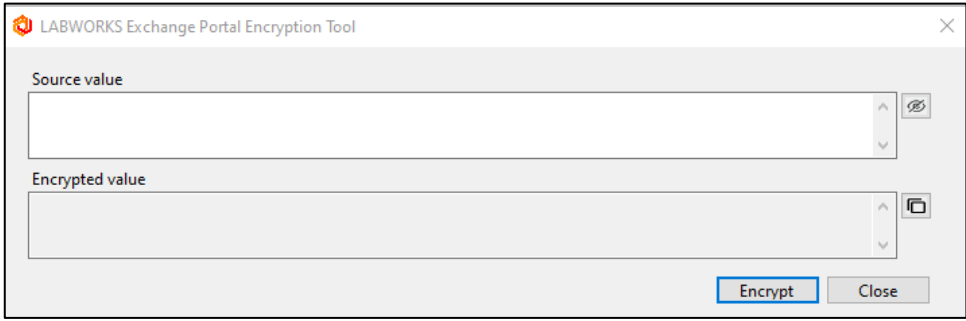| Step	User Input / Action	Expected Results
9	Wait until the installation is completed. LABWORKS Exchange Portal (version) Setup **Installing LABWORKS Exchange Portal (version)** Please wait while the Setup Wizard installs LABWORKS Exchange Portal (**version**). Status: Writing system registry values Back Next Cancel	Installation is in progress.
10	Click the "Finish" button. LABWORKS Exchange Portal (version) Setup Completed the LABWORKS Exchange Portal (**version**) Setup Wizard Click the Finish button to exit the Setup Wizard. Back Finish Cancel	Installation is completed.

After the LABWORKS Exchange Portal is installed, the *appsettings.json* file will be generated. It contains all main settings that were specified during the installation and some other settings.

4.4 LABWORKS EXCHANGE PORTAL ENCRYPTION TOOL

We recommend encrypting user names and passwords. For that purpose, you can use the LABWORKS Exchange Portal Encryption Tool included into the installation package.
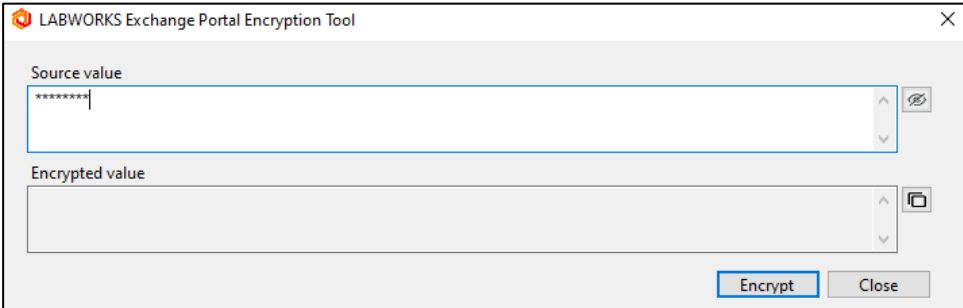
To launch the application, you should install .NET Core desktop app first.

To encrypt your credentials, follow the steps below:
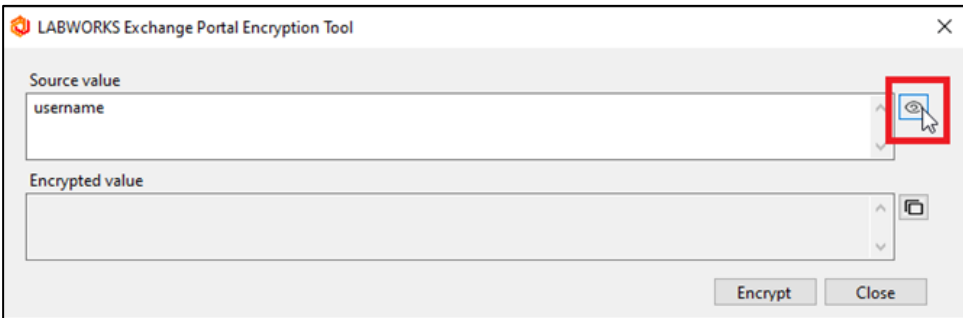
Step	User Input / Action	Expected Results
1	Launch the lw-xp-encryptor.exe file from the LABWORKS Exchange Portal Installation Package. 	The Encryption Tool is open.

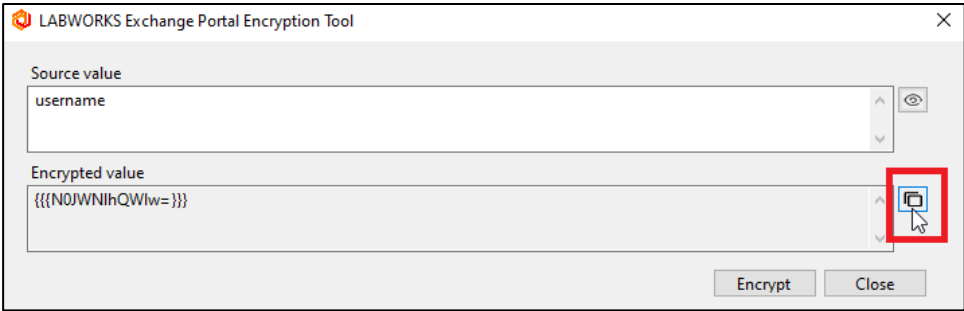| 2	Find your username, login, password, or the whole string (for example, connection settings) that you want to encrypt. Copy this value into the clipboard and paste into the *Source value* field. Or input it manually.	The value is encrypted.
	If you want to view the entered value, click the eye icon. If you want to hide it, click the same eye icon once again.	
	Click the "Encrypt" button.	
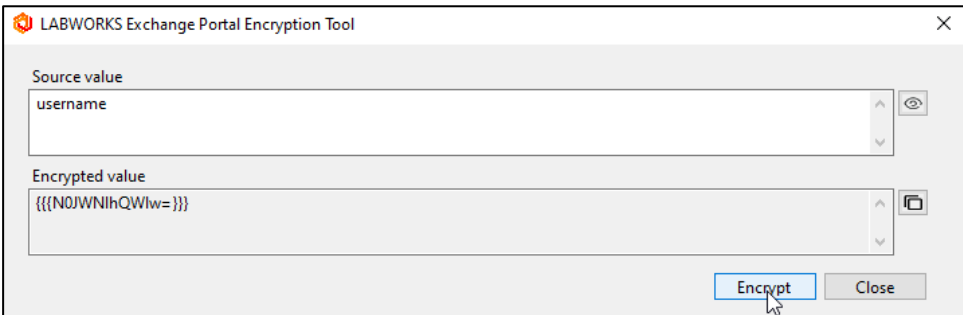
3	Click the "Copy to clipboard" button.	The value is copied.
4	Paste the copied encrypted value into the needed field of the Set Up Wizard or of *appsettings.json*.	The value is pasted.
5	Go through these steps to encrypt every value that is needed to be ciphered.	

The LABWORKS Exchange Portal will decrypt these values automatically.

Please, check in the *appsettings.json* that all encrypted values contain {{{ at the beginning and }}} at the end.

4.3 CONFIGURE SSL/HTTPS

By default, the Exchange Portal will be deployed on HTTP. For internal purposes (checking, debugging), you can use HTTP, in that case, you can skip this section. For external purposes (using the portal by end users), you need to protect the Exchange Portal by IIS.

If you want your Exchange Portal to be protected by IIS, you need to make a certificate. Or you can use other https protections like use a proxy. Please check with your system administrator about your company's security practices. In this document, it is described how to use certificates.

To be able to create an SSL connection between the web application and your server, the web server requires an SSL certificate. An SSL certificate is a digital file that contains information about the identity of the web server. It also contains the encryption technique to use when establishing a secure channel. An SSL certificate must be created by the owner of the website and digitally signed. There are three types of certificates: CA-signed, domain, and self-signed.
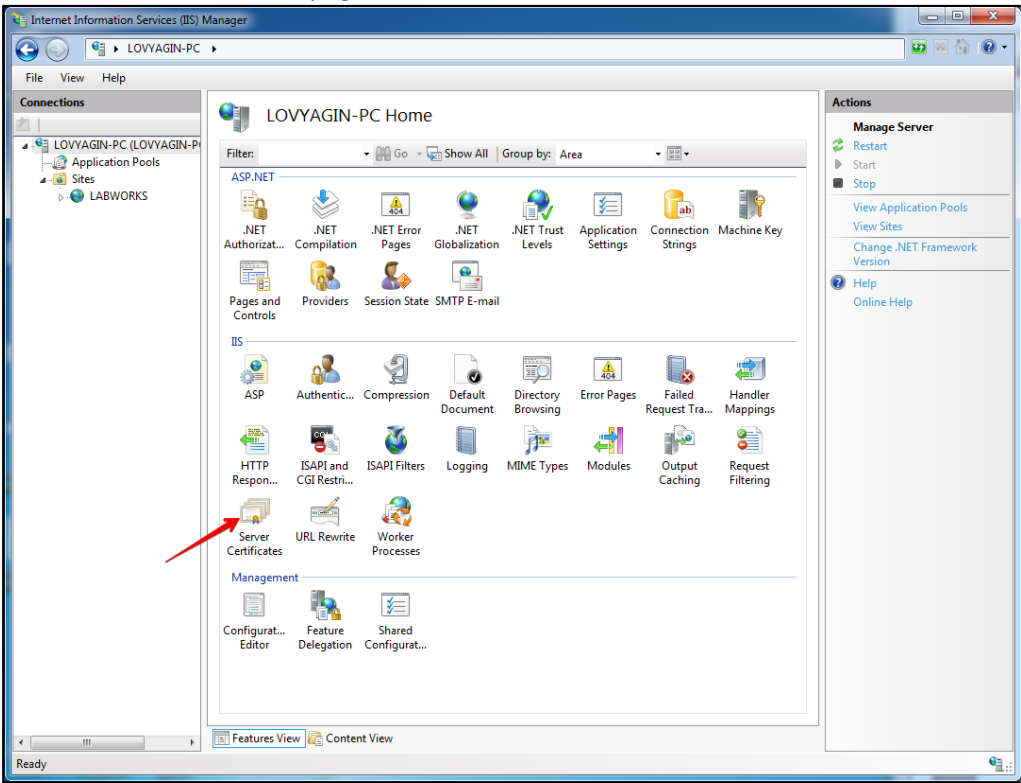
For external usage we recommend using a Domain Certificate, because it is secure and reliable.

Self-signed certificates are commonly used on websites that are only available to users on the organization's internal (LAN) network. If you communicate with a website outside your own network that uses a self-signed certificate, you have no way to verify that the site issuing the certificate really represents the party it claims to represent. You could actually be communicating with a malicious party, putting your information at risk.
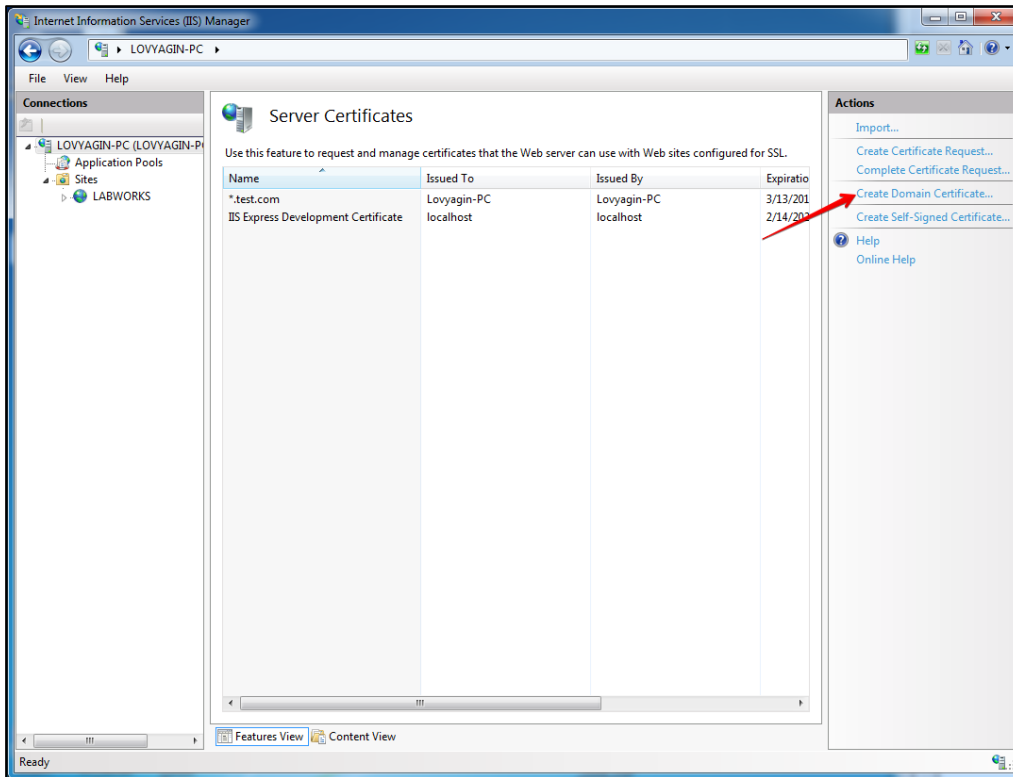
We do not recommend using a Self-Signed Certificate for external purposes, only for internal checks and debugging.

4.3.1 Domain Certificate

In order to enable SSL/HTTPS requests you should do the following steps:

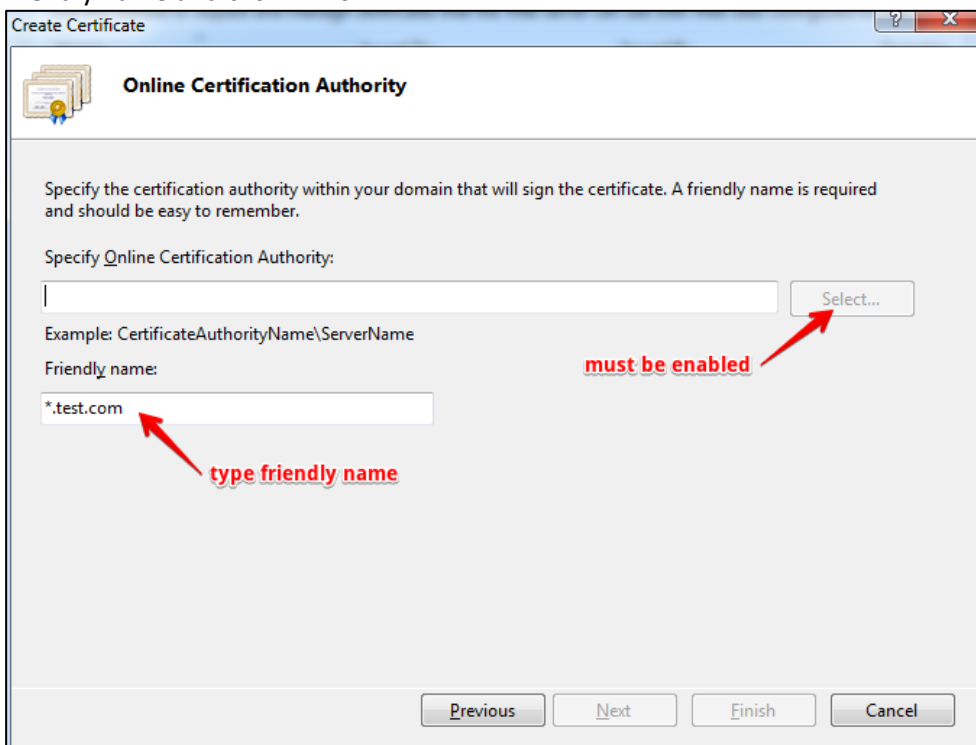| Step	User Input / Action	Expected Results
1	Contact your verified CA provider and get valid SSL certificate for your domain name (assuming ww.test.com domain as example here) and necessary instructions to install CA on your machine	
2	Go to the IIS Manager window: • Use "Windows + R" button combination to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	
3	Go to "Server Certificates page". 	

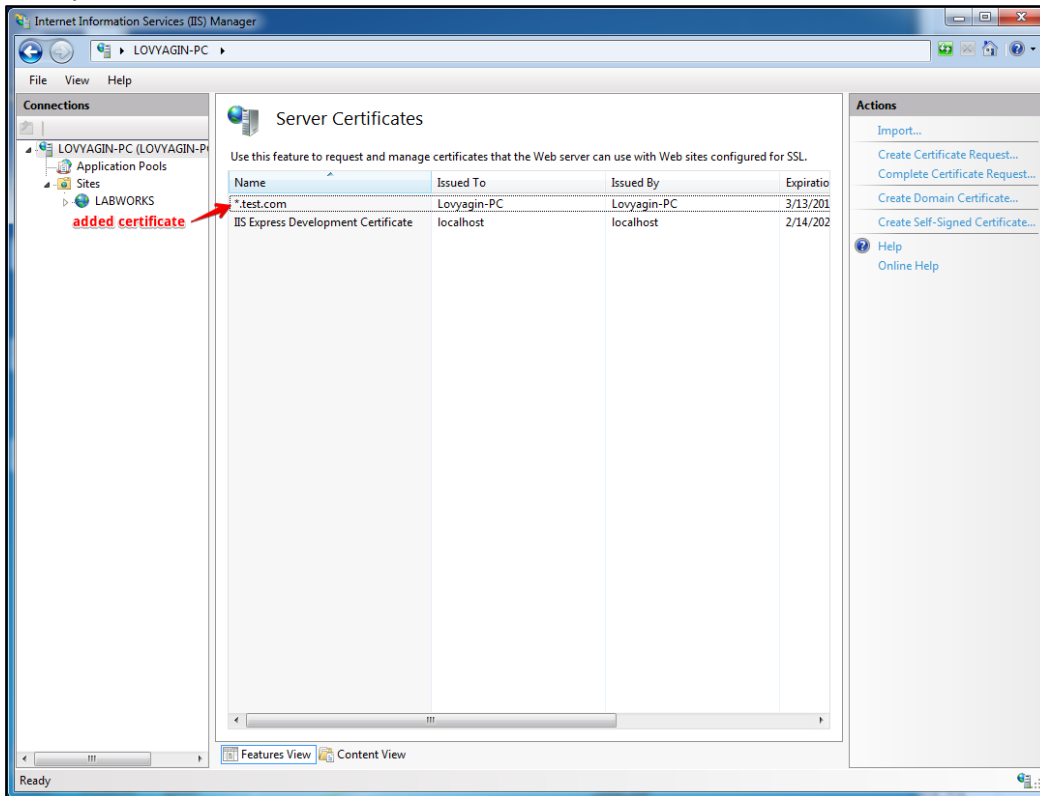| 4	Click "Create Domain Certificate…".
5	Fill in necessary information.
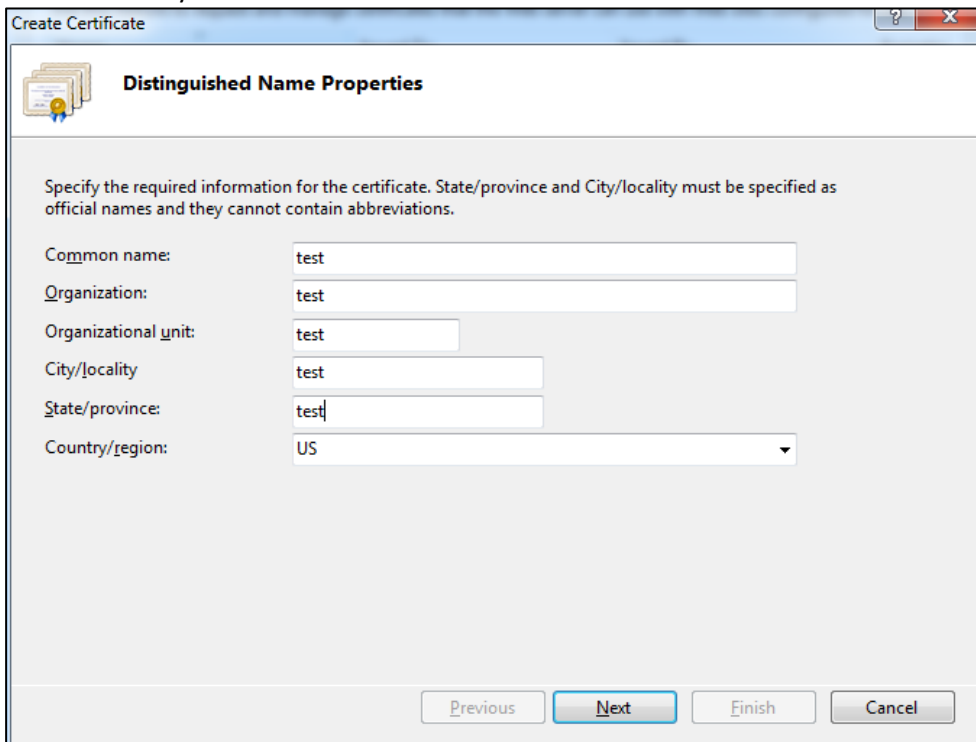
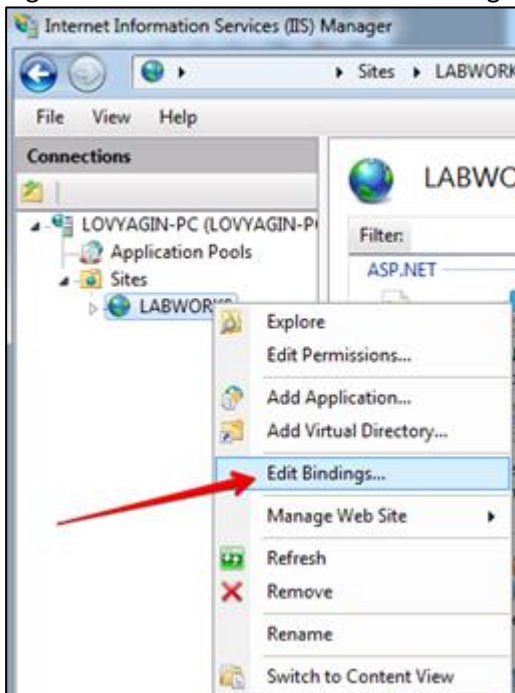| 6	Select your CA (if you have installed CA on your machine, "Select" button must be enabled, otherwise contact your CA provider and ask for additional instructions), enter friendly name and click "Finish".	
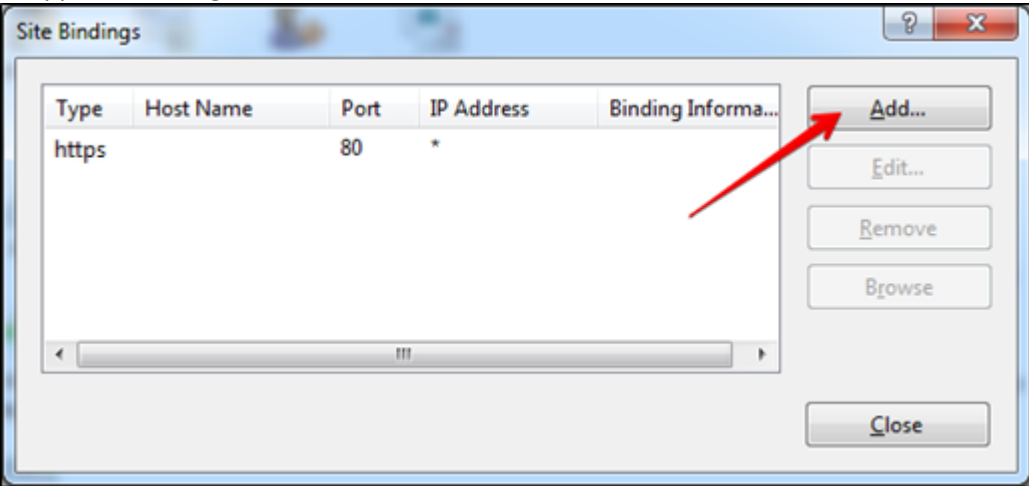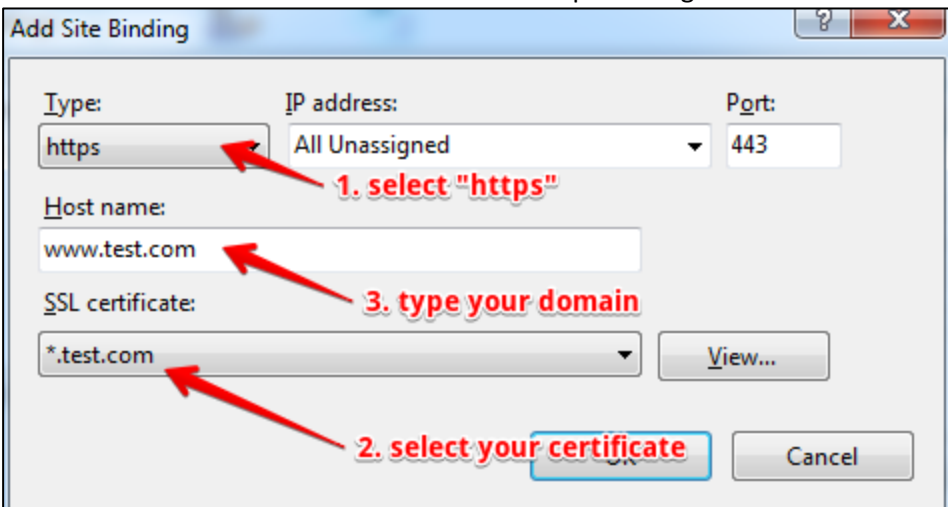
7	Then you can see new certificate in cert-list.

8	Right-click on site and select "Edit bindings".

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9	In appeared dialog click "Add…".
10	Follow instruction on screenshot to add new https binding and click "OK".

11	Now go to "SSL settings".
12	Here you can make SSL requests as required (https only). Note: In case you choose this option, end users can't access the web site using http.
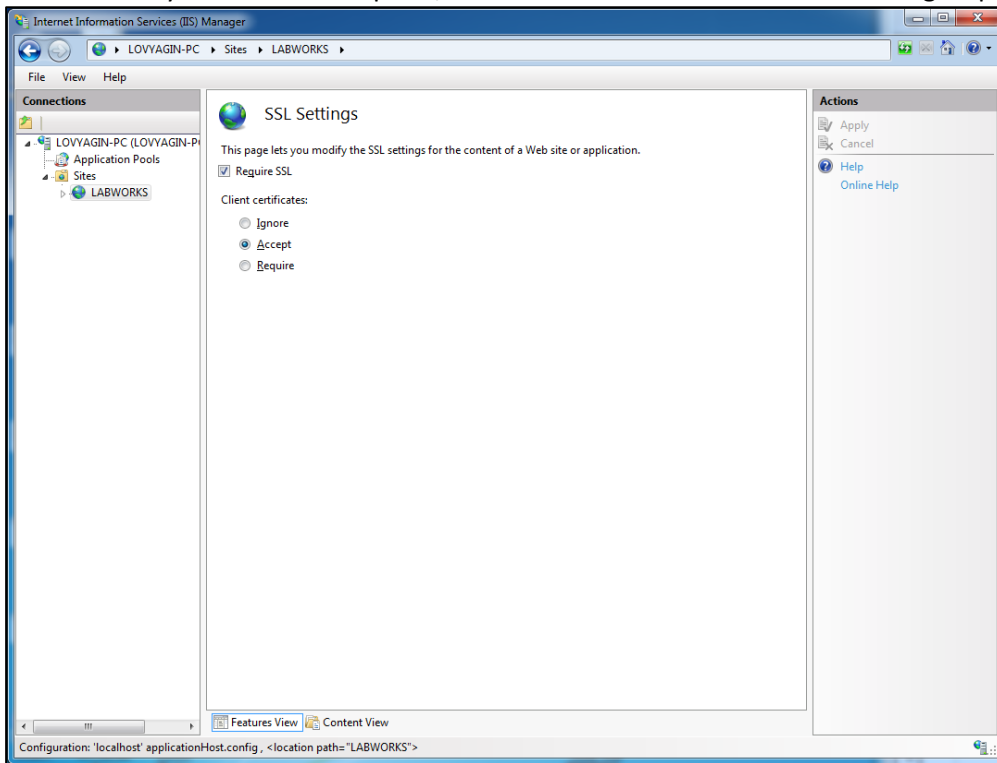
13	Now you should see two options for browsing your site from IIS, click on "https" binding to make sure that SSL is set up	

14	Update the *appsettings.json* file. There should be *https://* at the beginning of your site address in the MainUri field.
	
	```"MainUri": "https://labworks_xp.com",```
	```"ApiPrefix": "api",```
	```"OpenApiEnabled": "true",```	

15	Restart the Portal and the pool. 	

4.3.2   Self-Signed Certificate

For internal purposes, you can use self-signed certificates. Do the following steps:

Step	User Input / Action	Expected Results
1	Go to the IIS Manager window: • Use "Windows + R" button combination to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	
2	Go to "Server Certificates page". 	

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3	Click "Create Self-Signed Certificate...".
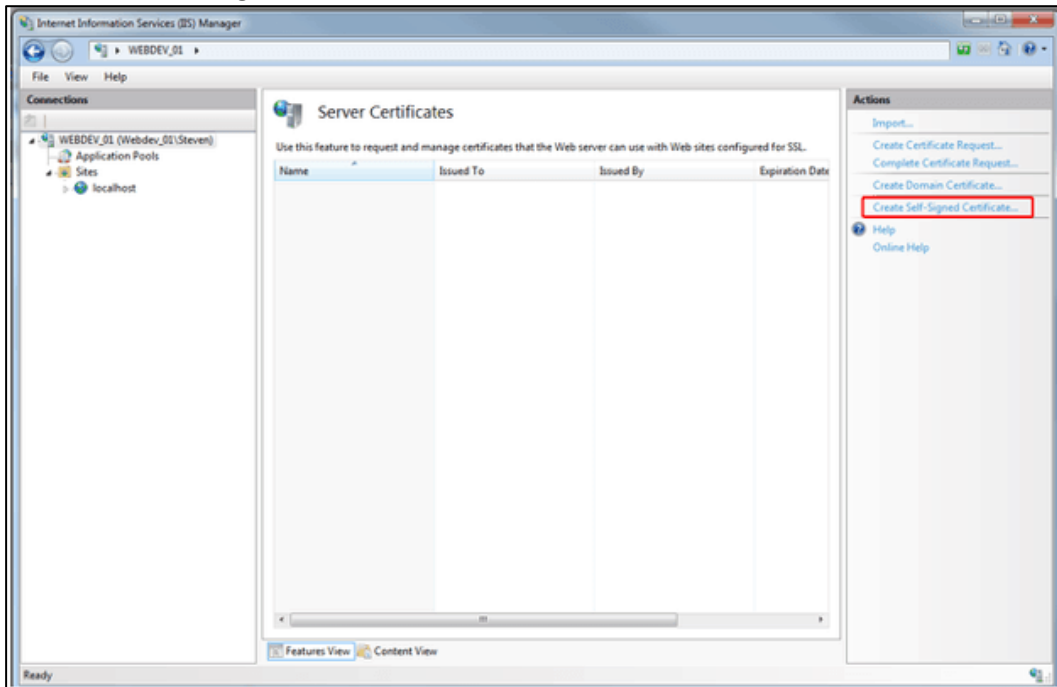
4	Specify the certificate name and click "OK".
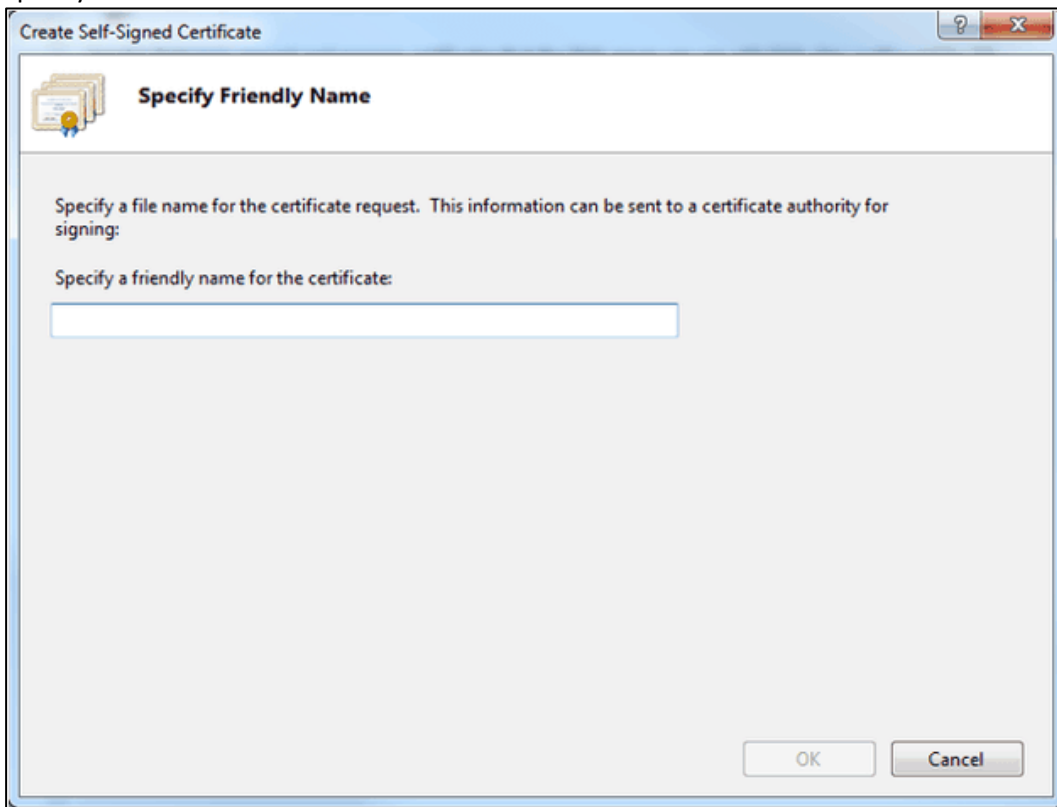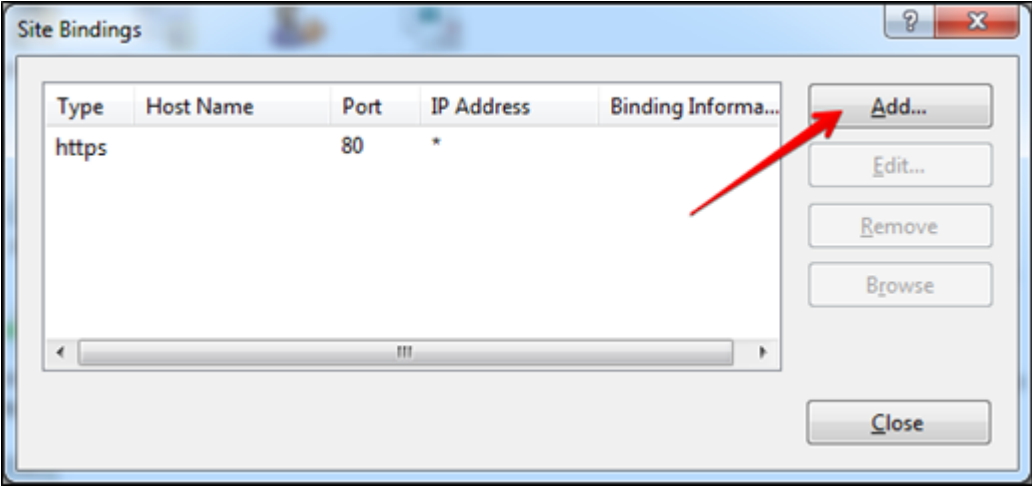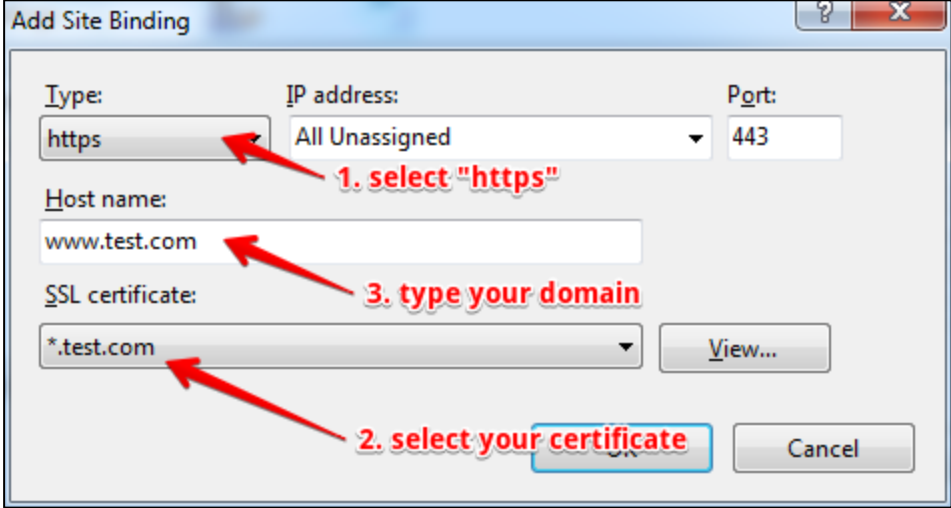
5	Once that is complete you should now see the SSL in the list of Self-Signed certificates. Now, you have IIS Self-Signed Certificate with 1 year validation.	
6	Right-click on site and select "Edit bindings"	
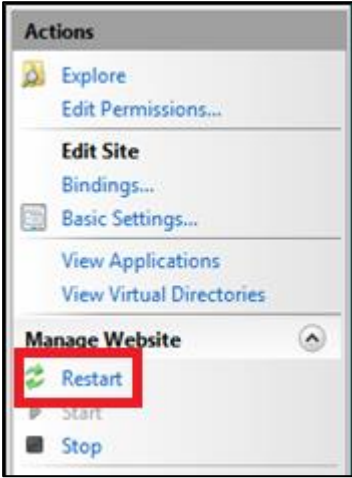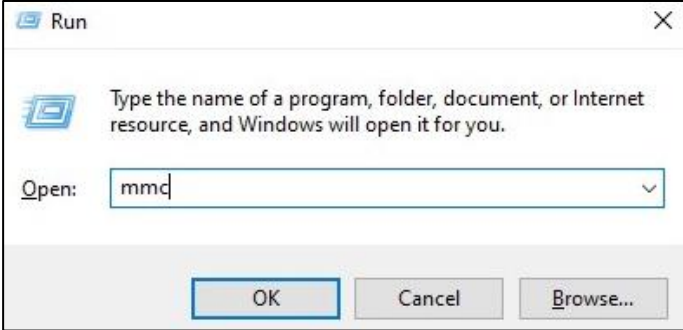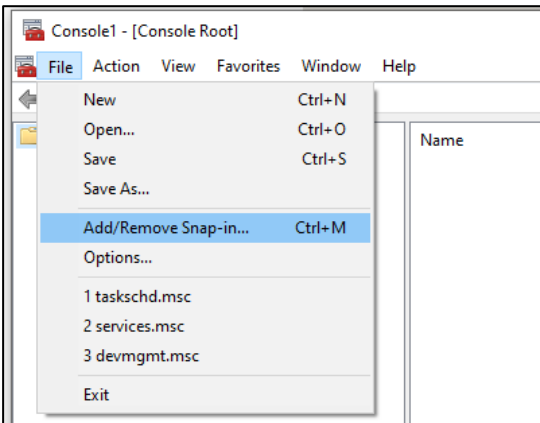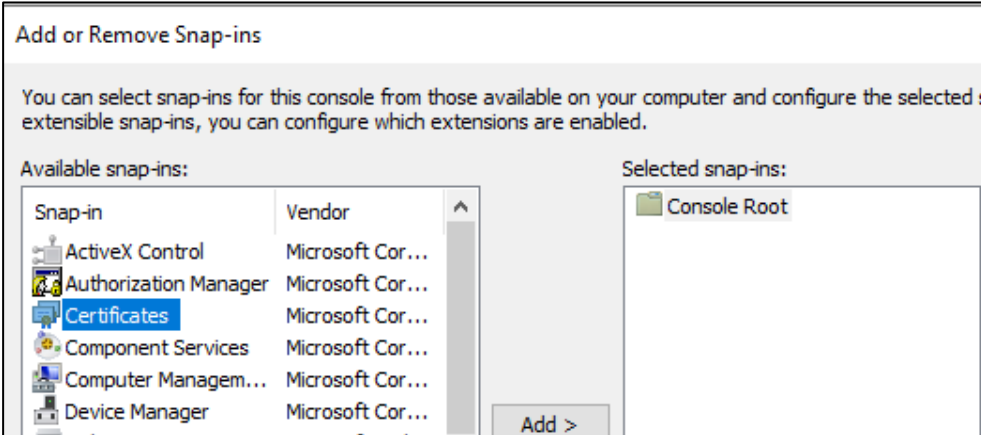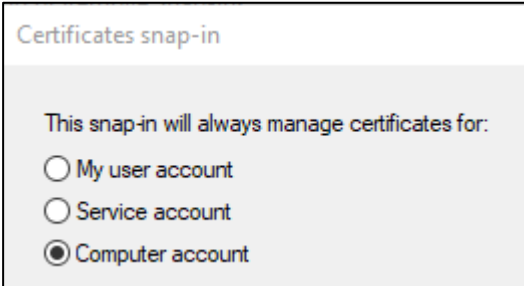
LABWORKS
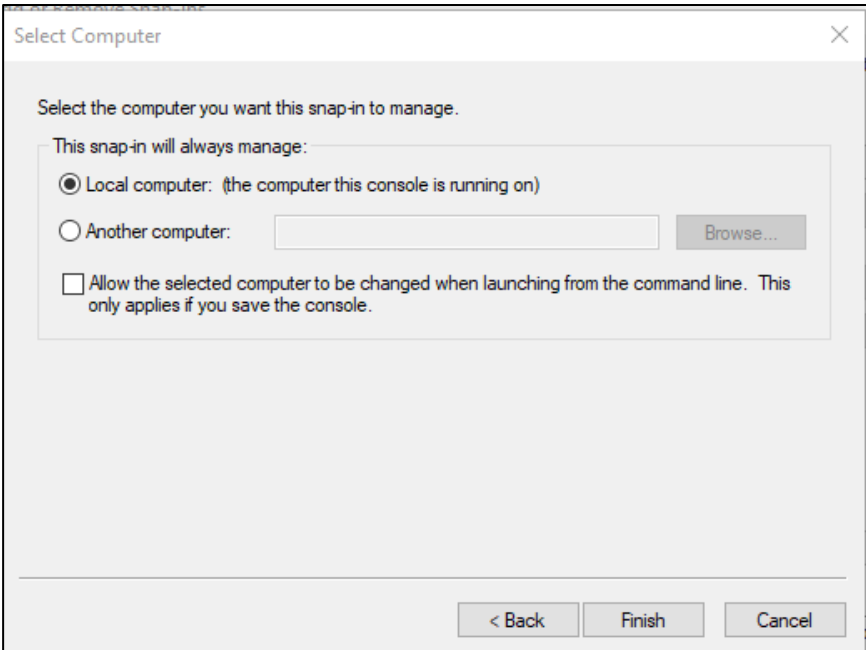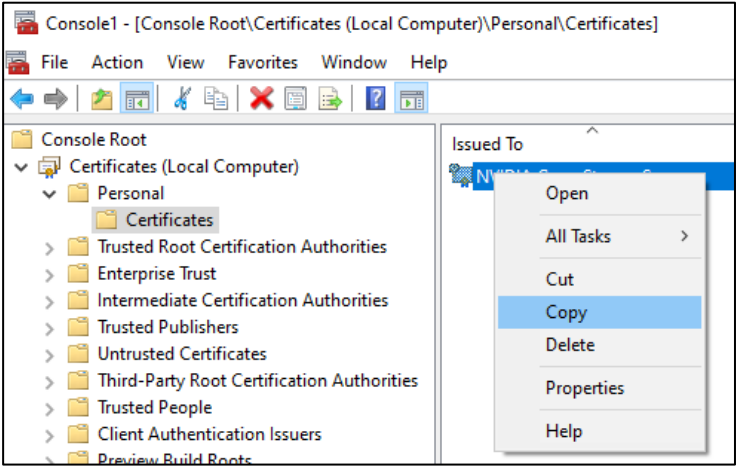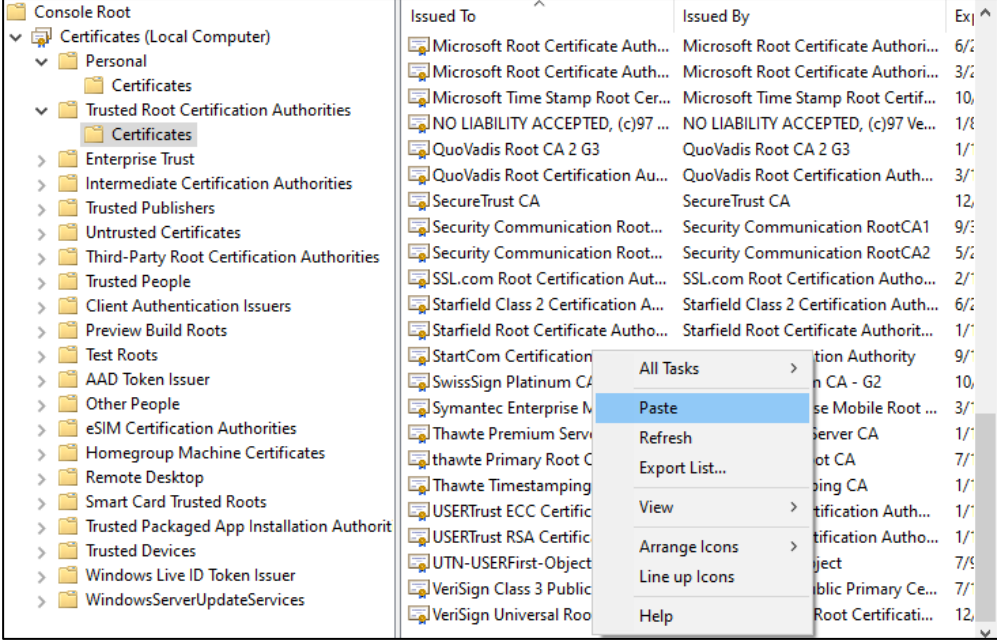
7	In appeared dialog click "Add…"	
8	Follow instruction on screenshot to add new https binding and click "OK". The certificate should be given to the site that it is designed to protect. For example, if the portal is deployed as XP.COMPANY.COM, then the certificate should be given to XP.COMPANY.COM.	
9	Update the *appsettings.json* file. There should be *https://* at the beginning of your site address in the MainUri field.	

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10	Restart the Portal and the pool.	
11	In a browser, go to the Website using the certificate. You should see a warning that there is an issue with the site's security certificate—specifically, the security certificate was issued for a different website's address. This occurs because IIS uses the server's name as the common name when using a self-signed certificate, which usually does not match the hostname to access the site in your browser. To access the website, click the "continue to the website" link or button. You will have to do this each time you access the site. Because this is a test environment, this should not be an issue. It is possible to remove the warning by adding the self-signed certificate to the trusted root certificate authorities. Click on the Start menu and click Run. Type in mmc and click OK. 	

12	Click on the File menu and click Add/Remove Snap-in…	
13	Double-click on Certificates.	
14	Select the Computer Account and click "Next".	
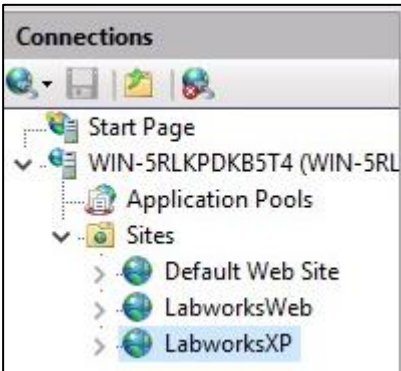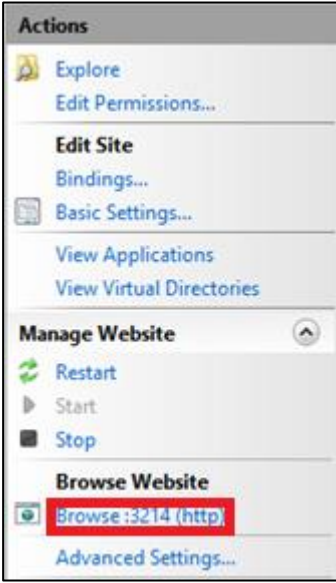
15	Leave Local Computer selected and click "Finish".	
16	Expand the Certificates item on the left and expand the Personal folder. Click on the Certificates folder and right-click on the self-signed certificate that you just created and select Copy. 	
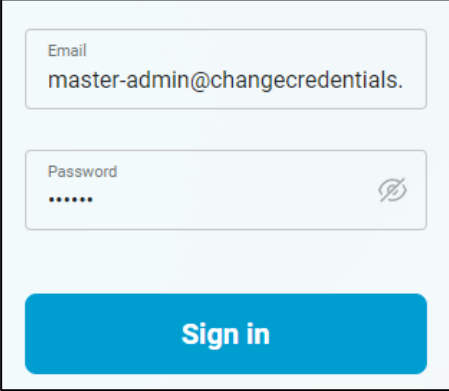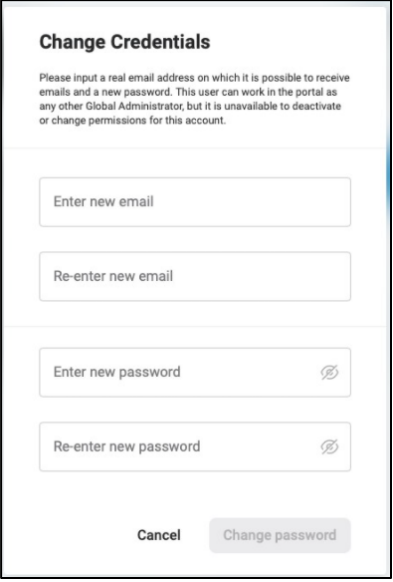
17	Expand the Trusted Root Certification Authorities folder and click the Certificates folder underneath it. Right-click in the white area below the certificates and click Paste.	
18	Now you can visit your site with https in your web browser and you should not receive any errors because Windows will now automatically trust your IIS self-signed certificate.	

4.4 OPEN LABWORKS EXCHANGE PORTAL IN A BROWSER

Now that LABWORKS Exchange Portal installed and configured, please verify that the installation was successful.

Step	User Input / Action	Expected Results
1	• Use "Windows + R" button combination, to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	"Internet Information Services (IIS) Manager" window displayed.
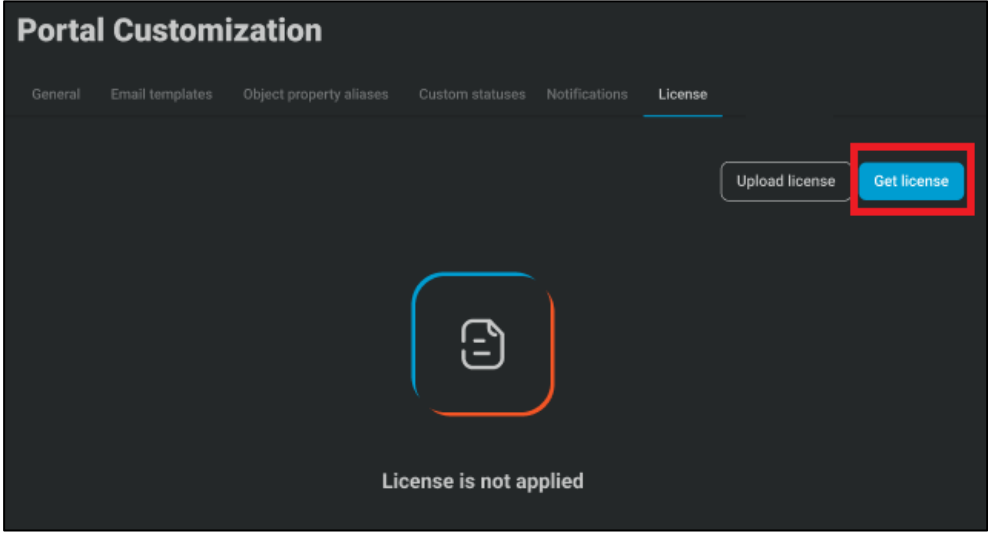
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2	Find and select the *LABWORKS Exchange Portal* application under *LABWORKSSERVER > Sites* folder in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window.	"Actions" panel appeared on the right-hand side of the window.
3	Click the "Browse:[input during the installation URL](https or http)" button in the Actions panel.	LABWORKS Exchange Portal application Sign In page is open in the web browser.
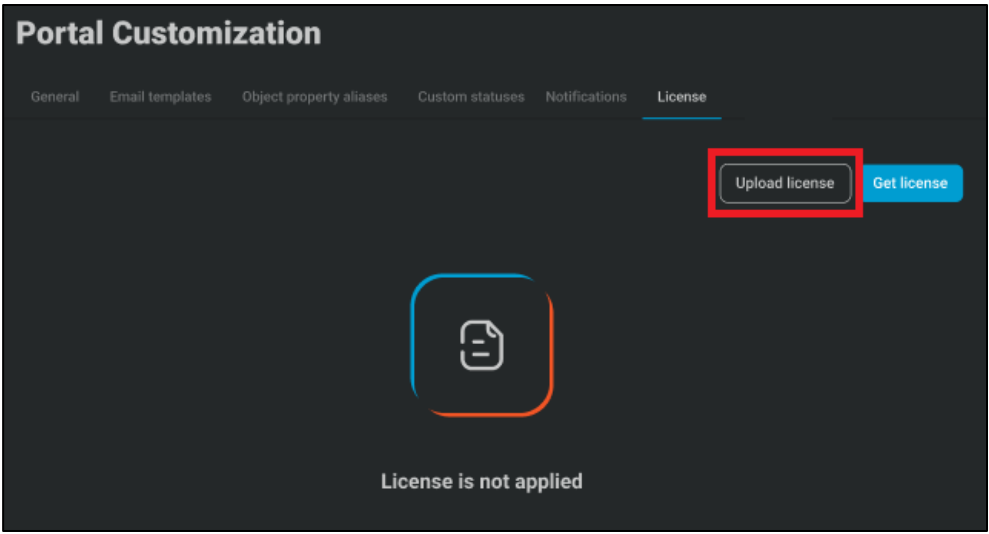
4	Input the following credentials to login as a Master Admin: Email: master-admin@changecredentials.com Password: MASTER Click the "Sign in" button. Email master-admin@changecredentials. Password ●●●●● Sign in	Change credentials dialog is open.
5	Change the email and password for the Master Admin. This administrator has all needed permissions. Use existing email address you have access to. Email notifications and support requests will be sent to this address. Choose a strong password. Write down these credentials for the future. Re-enter the email. Re-enter the password. Click the "Change credentials" button. **Change Credentials** Please input a real email address on which it is possible to receive emails and a new password. This user can work in the portal as any other Global Administrator, but it is unavailable to deactivate or change permissions for this account. Enter new email Re-enter new email Enter new password Re-enter new password Cancel Change password The Master Admin cannot be deactivated. User data can be updated if needed and this administrator can use the application as any other global administrators.	Master Admin is logged in.

4.5 **LABWORKS EXCHANGE PORTAL LICENSE**

The LABWORKS Exchange Portal needs the LABWORKS license data.

When the portal is installed, it will require a license to continue working with it. Download the environment data (order) and send it to support@labworks.com. The LABWORKS support will generate the license and send it to you.

Step	User Input / Action	Expected Results
1	Sign in to the LABWORKS Exchange Portal as a global administrator.	Portal Customization – License tab is open.
2	Click the "Get license" button	A file with information about the server is downloaded.
3	Send this file to support@labworks.com and order a license.	Support should answer to the email and send the license file.
4	When the LABWORKS sent you the license file, save the received license to your PC.	

5	Go back to the License tab, click the "Upload license" button and select this file on your computer.	The license is uploaded.
6	Once the license is uploaded you can see its details. Now the application is available for customization and working with it.	

Configure the LABWORKS Exchange Portal web application, create organizations and invite new users. Find recommendations in the LABWORKS Exchange Portal Administrator Guide.

4.6 INTEGRATION WITH LABWORKS LIMS

First, to allow LABWORKS LIMS and LABWORKS Exchange Portal to work with each other, you should establish a connection between them. It means that the Exchange Portal name that you used when installing the portal must resolve to the IP of the server on which this portal is installed, from the side of the server on which LIMS is installed. We recommend using DNS for this purpose. Please ask your system administrator for assistance.

If you cannot use DNS, there are several ways to establish the connection:

- All components (including LIMS and Exchange Portal) should be installed on the same server.

- Add the Exchange Portal's IP address and Exchange Portal name to the hosts file for the machine with LIMS.

o The computer should be able to resolve the address of the site where the portal is deployed by its name. Modifying your hosts file enables you to override the domain name system (DNS) for a domain on a specific machine. DNS management is useful when you want to test your site without the test link prior to going live with SSL, verify that an alias site works prior to DNS changes, and for other DNS-related reasons. Modifying your hosts file causes your local machine to look directly at the Internet Protocol (IP) address that you specify.

o Open *C:\Windows\System32\drivers\etc\hosts* file with Notepad as administrator.

o Add entry with the IP address and a version of the Internet address of the Exchange Portal. For example,

```
# localhost name resolution is handled within DNS itself.
#        127.0.0.1        localhost
#        ::1              localhost
        54.192.55.103    www.youtube.com
        192.168.1.1      youtube.com
        54.192.55.103    microsoft.com
        127.0.0.1        vimeo.com
```
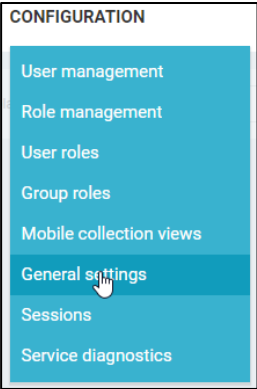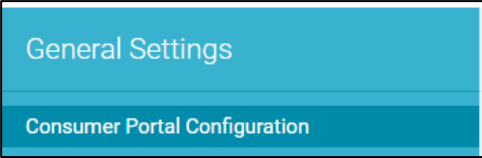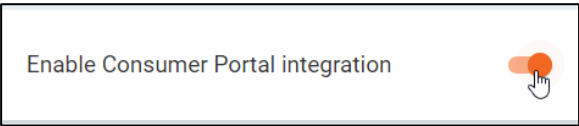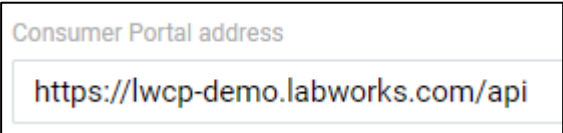
o Save the file.

o Please do not forget to update the hosts file when IPs have been changed.

- System administrators can use other ways to provide network access between these machines: LAN, OpenVPN, or other methods.
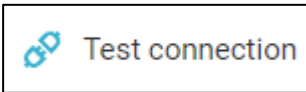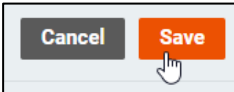
While the integration with the LABWORKS Exchange Portal is disabled on the LABWORKS LIMS side, these 2 applications cannot work together.

When the LABWORKS Exchange Portal is installed and the license is applied the integration should be enabled on the LIMS side. After that, all dictionaries with location codes and analyses will be pushed, all laboratory users will be synchronized. Which means that the administrators can continue the Exchange Portal configuration and the consumers will be able to create orders.

Follow the steps below to configure integration with the LABWORKS Exchange Portal.

Step	User Input / Action	Expected Results
1	During the installation process, LABWORKS LIMS sets up integration parameter defaults. So, all that you need to do next is to enable the integration and specify the portal address. Go to the LABWORKS Enterprise LIMS. Sign in as an administrator with the *Configuration -> General Settings -> Manage Consumer Portal integration* permissions.	Admin is authorized.

2	Click the **Configuration menu** button.	General Settings are open.
	Select the **General Settings** menu option.	
3	Take a look at the **Consumer Portal Configuration** section.	Edit mode is enabled.
	Click the "Edit" button.	
4	Turn on the "Enable Consumer Portal integration" switcher to be able to specify the portal address and start the synchronization process.	The integration is enabled.
5	Enter the address that was configured for the Exchange Portal during the installation. The Exchange Portal address value must contain the portal address and the "/api" substring at the end. For example, it can be specified as "https://lwcp-demo.labworks.com/api".	The Exchange Portal address is specified.

6	The connection can be checked by clicking the "Test connection" button. Click it to make sure that the portal is accessible. Test connection	
7	All the data about the last synchronization between databases will be displayed in the "Database" subsection. Database Last synchronization 01/28/2022 03:50:05 PM	
8	Click the "Save" button to save changes. Cancel Save	Changes are saved.
9	Restart the Data Service (LWeLIMSData service) to finish the integration configuration.	The integration is configured.

Follow the steps below to change the default integration LIMS parameters if you need this.

Step	User Input / Action	Expected Results
1	Run the desktop *System Management* application (Utilities > System Manager Mode).	The *System Management* application is launched.

2	Change the LABWORKS Exchange Portal client ID in the *LWCPKey* variable of the System Manager settings.
	
	Format: A string up to 50 characters without spaces. Example: *"elims_mediator"*
	
	The client can only be integrated with a single LABWORKS eLIMS server instance. This key guarantees a single integration of the Exchange Portal client and eLIMS server. The *LWCPKey* value must be copied to the LABWORKS Exchange Portal configuration file – *appsettings.json*.
	
	<pre>"ElimsIntegration": {
	    "Enabled": "true",
	    "Requests_Enabled": "true",
	    "Credentials": {
	        "ClientId": "elims_mediator", |
	        "ClientSecret": "ECFCB35F-22C3-46B4-A3CD-386045AE782A"</pre>
		The system settings are updated.

3	Open the *LWeLIMSData.exe.config* file located under *C:\Program Files (x86)\LABWORKS eLIMS\LWeLIMSData* directory on the server side with a text editor.	The file is open.

| 4 | Change the secret key in the *LWCPSecret* parameter.

Format: A string up to 50 characters without spaces. Example: *"ECFCB35F-22C3-46B4-A3CD-386045AE782A"*

LABWORKS eLIMS requests this value from the Exchange Portal to verify its identity. The *LWCPSecret* value must be copied to the LABWORKS Exchange Portal configuration file – *appsettings.json*.
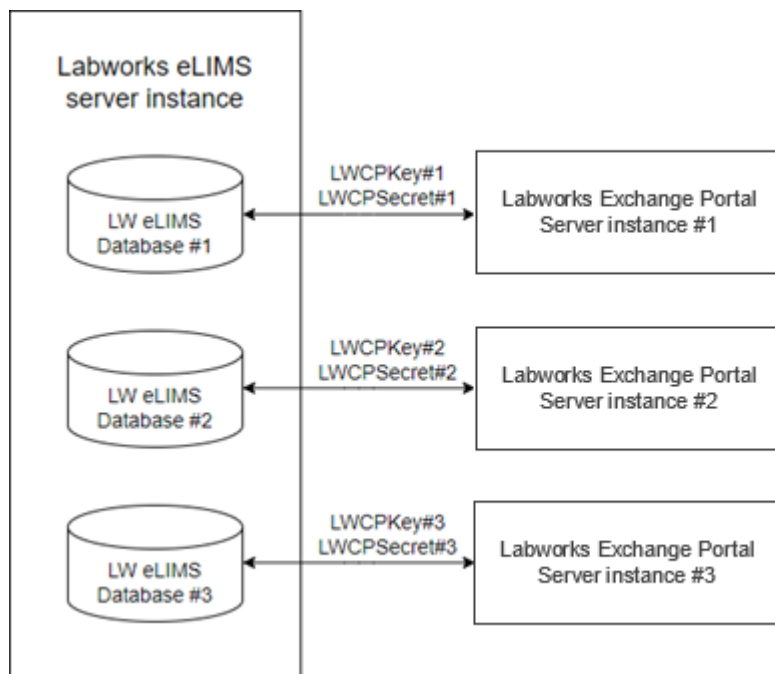
```json
"ElimsIntegration": {
    "Enabled": "true",
    "Requests_Enabled": "true",
    "Credentials": {
        "ClientId": "elims_mediator",
        "ClientSecret": "ECFCB35F-22C3-46B4-A3CD-386045AE782A"
```| The file is updated. |
| 5 | Restart the Data Service (LWeLIMSData service). | The integration parameters are updated. |

A LABWORKS Exchange Portal server instance can only be integrated with one LABWORKS eLIMS data service. However, you can set up LABWORKS eLIMS integration with different instances of the LABWORKS Exchange Portal server. Each eLIMS database must contain different integration parameters for different portals.

Note: *eLIMS admins must not point multiple databases to the same exchange portal. Otherwise, the portal data may be spread across multiple databases.*

4.7   CONFIGURATION PARAMETERS CHANGES IN *APPSETTINGS.JSON*

After installing the Exchange Portal, the *appsettings.json* file should be created in the specified during installation folder (*C:\inetpub\wwwroot\LabworksXP* by default). This file contains all configuration parameters.

If you need to change parameters, you can update the *appsettings.json* file, save it, restart the portal and the pool.

The *appsettings.json* file contains the following parameters:

Parameter name	Meaning	Default	Options
General parameters			
MainUri	External address of the portal on which it can be open in the browser Required	http://	
ApiPrefix	Relative path to portal's API Required	api	
OpenApiEnabled	Swagger is visible or not visible Should be "false" for production	false	true false
Logger	Logging settings		
Level	Logging level: what level of log items should be logged	Information	Verbose Debug Information Warning Error Fatal
Path	Where should the log file be placed	./logs	
ConnectionStrings	Database connection string according to Microsoft rules		
MainContext	Connection string to the main portal database	Data Source=;Initial Catalog=lw_cp;User id=;Password=;	
IdentityServer section			
Uri	Path to the portal's identity server, that authorizes users and clients	http://	= Main URI (usually)
Clients	Internal clients and their parameters: systems that work with identity server		
Api	Portal's backend		
Id		lwcp_api	
Secret		{secret key}	
Frontend	Portal's client		
Id		lwcp	
Secret		{secret key}	
Swagger	API documentation tool		
Id		client_id_swagger	
Secret		{secret key}	

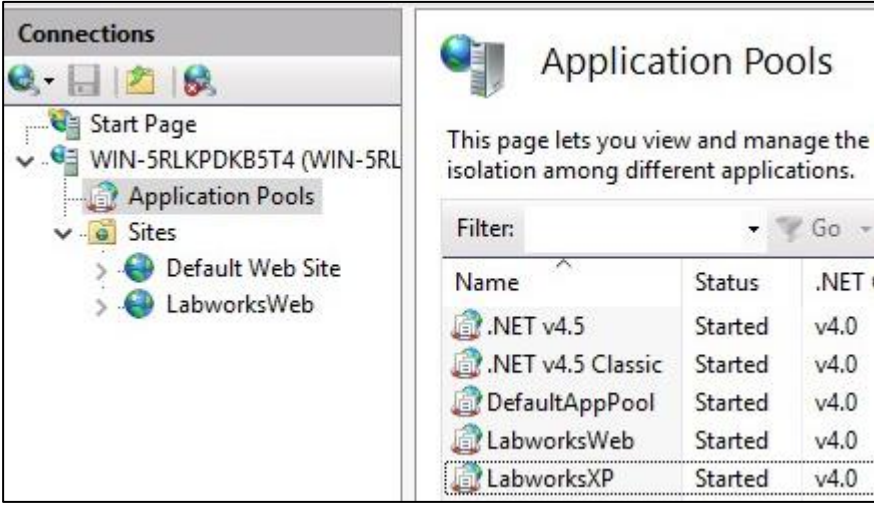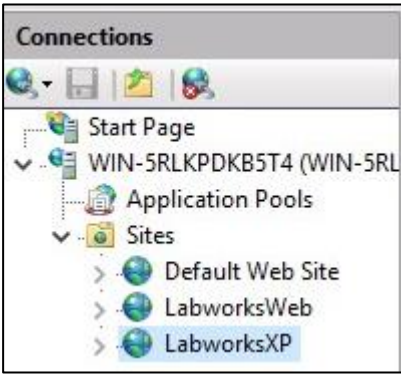| Parameter name	Meaning	Default	Options
ReportingService section			
Uri	URI of the Crystal Report (for reports generation)	http://	
Redis section			
Enabled	If false, data is cached in internal memory If true, Redis is used for caching data	false	true false
Configuration	Redis parameters If false, should be empty If true, should contain connection string to Redis, like: "{Machine IP}:6379, allowAdmin=true, abortConnect=false"	empty	
EmailHandler section			
Provider	Type of the provider to send emails to users Should not be changed, always SMTP	SMTP	
FromName	The name of the sender from whom the emails will be sent	Labworks Exchange Portal (noreply)	
FromEmail	Email address from which the emails will be sent: e.g., noreply@labworks.com		
SMTP			
Server	URL of the SMTP server: e.g., smtp.server.com		
Port	Port that is used for the SMTP server	587	
Login	Login of the mailbox		
Password	Password of the mailbox		
SSL	SSL setting of the used SMTP server	false	true false
Auth	Whether authorization is required on the SMTP server	true	true false
ElimsIntegration section			
Enabled	Whether integration between eLIMS and Exchange Portal is enabled	true	true false
Requests_Enabled	Whether the portal needs to make a request to update the dictionaries of loccodes, analyses and users	true	true false
Credentials			
ClientId	Synchronized eLIMS instance credentials	elims_mediator	
ClientSecret	Synchronized eLIMS instance credentials	{secret key}	
Requests_Intervals			
LocationCodeIds	How often the location codes dictionary is cleared in the portal (in minutes)	1440	> 60
AnalysisCodeIds	How often the analyses dictionary is cleared in the portal (in minutes)	1440	> 60

Parameter name	Meaning	Default	Options
UserIds	How often the eLIMS users dictionary is cleared in the portal (in minutes)	1440	> 60
Defaults section			
Attachments_MaxAmount	The maximum number of files that can be attached at a time (in units)	10	
Multiline_MaxLength	Maximum allowed length of input fields with "multiline" type (in characters)	65535	
Text_MaxLength	Maximum allowed length of input fields with "text" type (in characters)	255	
Email_MaxLength	Maximum allowed length of input fields with "email" type (in characters)	320	
Email_MinLength	Minimum allowed length of input fields with "email" type (in characters)	3	
Decimal_MaxValue	Maximum allowed value that can be input in fields with "decimal" type (value)	99999999	
Integer_MaxValue	Maximum allowed value that can be input in fields with "integer" type (value)	99999999	
Phone_MaxLength	Maximum allowed length of input fields with "phone" type (in characters)	15	
Phone_MinLength	Minimum allowed length of input fields with "phone" type (in characters)	5	
DateTime_MinValue	Minimum allowed value that can be input in fields with "date" type (value in the format DD/MM/YYYY)	01/01/1970	

Please, note that in the *appsettings.json* all encrypted values contain {{{ at the beginning and }}} at the end. If you want to update them, check that curly brackets are included. To encrypt values, use the LABWORKS Exchange Portal Encryption Tool from the installation package. See instructions in the corresponding section of this document.

To update the pool and the portal follow the steps below.

Step	User Input / Action	Expected Results
1	• Use "Windows + R" button combination, to open the "Run" window. • Type "inetmgr" in the field and press "Enter".	IIS Manager is open.

Step	User Input / Action	Expected Results
2	Find and select the *LABWORKSSERVER > Application Pools* in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window. 	"Actions" panel appeared on the right-hand side of the window.
3	Click the "Restart" button in the Actions panel (or "Stop" and then "Start"). 	The pool is restarted.
4	Find and select the *LABWORKS Exchange Portal* application under *LABWORKSSERVER > Sites* folder in the "Connections" panel on the left-hand side of the "Internet Information Services (IIS) Manager" window. 	"Actions" panel appeared on the right-hand side of the window.

Step	User Input / Action	Expected Results
5	Click the "Restart" button in the Actions panel (or "Stop" and then "Start"). ⟳ Restart ▷ Start ■ Stop	The portal is restarted.

4.8 Logs

Logs are placed in the folder where the LABWORKS Exchange Portal application was deployed in the subfolder api/logs.
For example, C:\inetpub\wwwroot\LabworksXP\api\logs.
The path can be changed by administrators in the *appsettings.json* file (Logger section – Path).

6 KNOWN ISSUES

7 TROUBLESHOOTING

7.1 YOU RECEIVED AN ERROR MESSAGE DURING INSTALLATION

"LABWORKS Exchange Portal Setup Wizard ended prematurely".
This may indicate that IIS has not been installed yet. Please install IIS or wait until the IIS installation is complete and start the LABWORKS Exchange Portal installation again.

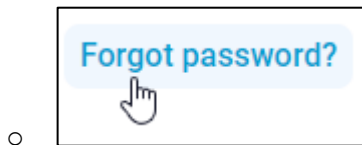If the required components are not installed, we recommend installing them first and running the installer again.

7.2 YOU CANNOT LOG IN AS THE MASTER ADMIN

If you cannot log in as the Master Admin using standard credentials (login: master-admin@changecredentials.com, password: MASTER), it is possible that someone has already changed the password and the email of this account.
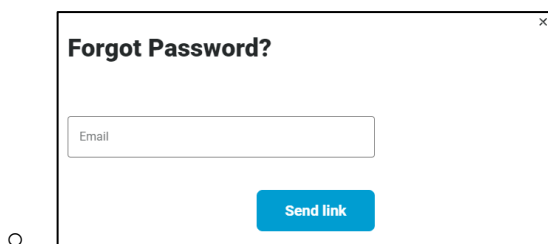
You can reset the password using the Exchange Portal. Find out to which email the predefined email address for the Master Admin was changed (for example, ask colleagues or check it in the DB).

To reset the password, follow these steps:

- Click the "Forgot password?" Button on the Sign In screen

  o

- Input the new email for the Master Admin profile and click the "Send link" button on the open dialog.

  o

- Check the Inbox for the specified email address and follow instructions from the received email.

7.3 INTERNET EXPLORER ISSUES

Since the Exchange Portal does not support any version of Internet Explorer browsers, using them can lead to unexpected errors. Check out the browser version recommendations in the Getting Started section.

7.4 REINSTALLING THE EXCHANGE PORTAL

There can be issues with the first synchronization between LIMS and Exchange Portal, if you had the data service job for integration between them before.

In that case, follow the steps below:

- Stop the DataService.

- Open the MonitoringDB.sdf that should be placed on the folder of the DataService. It can be open by the application CompactView.

- Open the MonitoringData table.

- Switch the table editor from read-only mode to Allow editing.

- Next, you need to sort in this table by AggregationJobID, find the 19th job and delete the LastUpdate field.

- Close this application.

- Restart the DataService.

LABWORKS

8   LABWORKS EXCHANGE PORTAL INSTALLATION CHECKLIST

☐ Verify that IIS and .NET are installed.

☐ Install "URL Rewrite" IIS extension.

☐ Install ".NET Core 3.1 Hosting" .NET extension.

☐ Install ".NET Framework 4.8 Setup" .NET extension.

☐ Install SQL Server.

☐ Install Redis (optional).

☐ Install Crystal Report.

☐ Install SMTP Server or get credentials to existing one.

☐ Install LIMS using the LABWORKS LIMS Installation Guide recommendations.

☐ Install the LABWORKS Exchange Portal files.

☐ Configure SSL/HTTPS for the installed Exchange Portal.

☐ Open the LABWORKS Exchange Portal web application in the browser using IIS Manager or with direct link.

☐ Setup the license.

☐ Turn on the "Enable Consumer Portal integration" on LIMS. (Check the LABWORKS LIMS User Guide for more details).