CMX

Calibration Web Service Interface (CWSI) Help

By Beamex

Calibration Web Service Interface (CWSI) Help

This resource is written for the Calibration Web Service Interface (CWSI) shipped with **CMX**.

Background

Due to issues and restrictions with USB redirection over Ethernet in a virtualized environment, communication between CMX and calibrators has not been optimal.

Beamex have addressed this issue and integrated the Calibration Web Service Interface (later CWSI) into CMX.

CWSI enables the possibility to communicate with supported calibrators over Wide Area Networks. Supported Calibrators are:

- Beamex MC6 Advanced Field Calibrator and Communicator
- Beamex MC4 Document Process Calibrator
- Beamex MC2 Process Calibrator
- A number of 3rd party calibrators supporting standard FCINTF protocol. For more information about supported calibrators, contact Beamex.

Architecture

CWSI introduces two new components: the **CWSI Client**, which is locally installed on every computer that is physically connected to a calibrator and the **CWSI Server**, which is a common gateway for all CWSI Clients. In addition to this, CWSI support

is implemented into the CMX Client, which enables CMX to communicate with calibrators connected to CWSI clients via the familiar Send/Receive window.
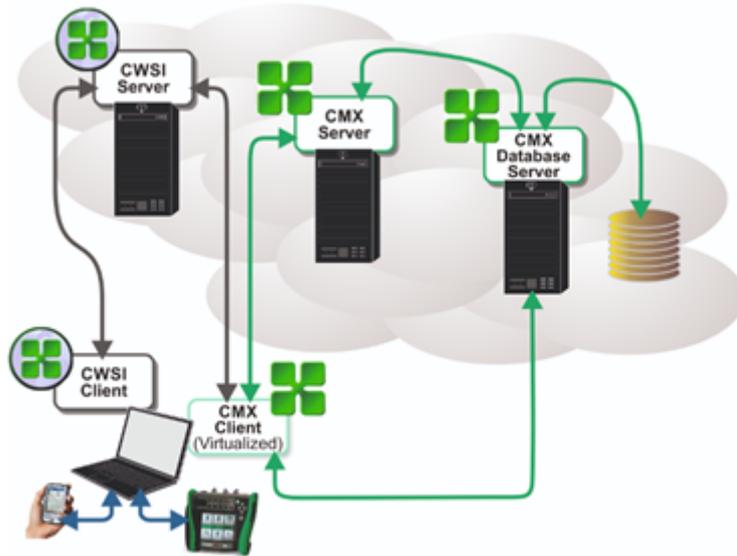
Figure 1: CWSI Client and Server

It is recommended to virtualize the CMX Client to reduce latency for database communication. While the CWSI Client must be installed on multiple computers, only one CWSI Server installation is needed. The CWSI Server can for example be installed on the same server as CMX Server. The CWSI Server is installed as a Windows Service, just like the CMX Server.

Communication between the CWSI client, the CWSI server and the CMX client utilizes the WebSocket protocol (RFC 6455, http://tools.ietf.org/html/rfc6455), which enables two-way communication without the need for complex Firewall rules.

Instructions on how to install the CWSI Server and the CWSI Client is included in the **CMX Installation Manual**.

CWSI Server

The CWSI Server consists of two executables:

- **Beamex.CWSI.WebSocketServer.Service.exe**, which is installed as a Windows Service (CWSI service).
- **Beamex.CWSI.Server.Configurator.exe**, which is a graphical tool to configure parameters for the Windows Service.

Configuring CWSI Server

To configure the CWSI Server service, start 'CWSI Server Configurator'. The picture below is from Windows 10.

Figure 2: CWSI Server Configurator

In previous versions of Windows, starting is done similarly by searching the application from the Windows Start menu.

In Windows 8.1, open the **Charms View**.

Figure 3: Charms View

Select **Search**, enter CWSI in the opened search window and click on the CWSI Server Configurator icon.
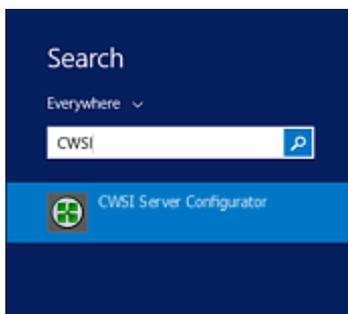
Figure 4: Search Function

CWSI Server's Settings

The picture below shows the configuration's setting page of the CWSI Server
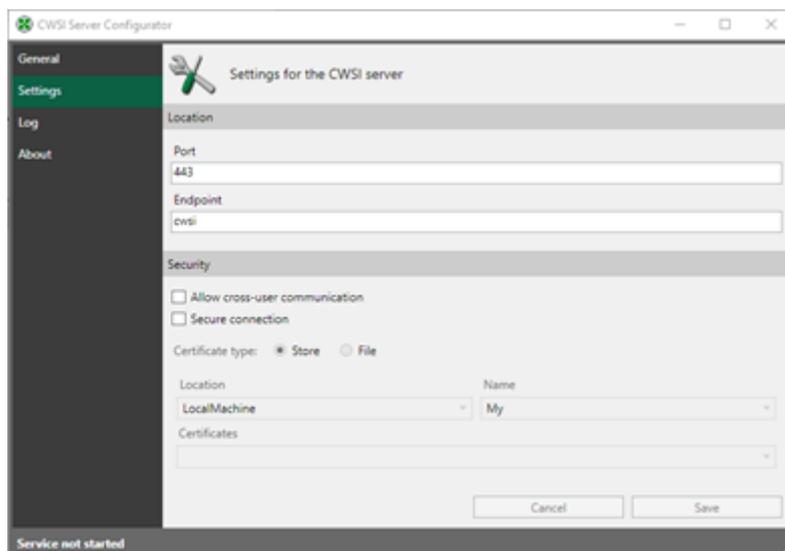
Figure 5: CWSI Server Setting Page

- **Port**, this is the TCP port that the server is listening on. Make sure that no other applications on the same machine is listening on the same port. Default port is **8080**.
- **Endpoint**, this is the endpoint that the server is listening on. Default is value **cwsi**.
- **Allow Cross-User communication**, if checked, this provides the opportunity for a user with supervisor privileges in CMX to communicate with all CWSI Clients connected to the CWSI Server.
- **Secure connection**, if checked, communication will be secured using SSL/TLS. A X.509 Certificate is required. This is highly recommended in production usage.
- **Certificate type**, if secure connection is checked, a X.509 Certificate is required. A certificate can either be loaded from a Certificate Store or from a Local File. File is recommended for test usage only.
- **Store Parameters**
  - **Location**, specifies the X.509 Certificate Store Location to be used as search parameter. Local Machine is recommended since Current User can only be used if the CWSI Server Configurator and CWSI Server Service is executed as the same user.
  - **Name**, specifies the X.509 Certificate Store Name to be used as search parameter.
  - **Certificate**, specifies the X.509 Certificate to be used. Please note that the CN attribute specified in the certificates subject distinguished name must match the server location used by CWSI client and CMX.

- **File Parameters**

  ◦ **File**, the absolute path to the pfx-file. Please note that the CN attribute specified in the certificates subject distinguished name must match the server location used by CWSI client and CMX.

  ◦ **Password**, the password for the pfx-file. Please note that this password is stored in plain text on the machine running the CWSI Server. This option should therefore be used with caution.

Please note that any changes made to the configuration won't be taken into use until the CWSI Server Service is restarted.

Starting and Stopping CWSI Server

Starting and stopping the CWSI Server service can be done either via the CWSI Server Configurator or via the Services snap-in in Microsoft Management Console.

For advanced startup configuration (startup type, logon, etc.), use Services snap-in in Microsoft Management Console. Look for 'Beamex CWSI Server Service'.

CWSI Client

The CWSI Client consists of one executable: **Beamex.CWSI.Client.exe**

Starting and Stopping CWSI Client

The **CWSI Client** system tray application needs to be started to be able to connect to the **CWSI Server**.
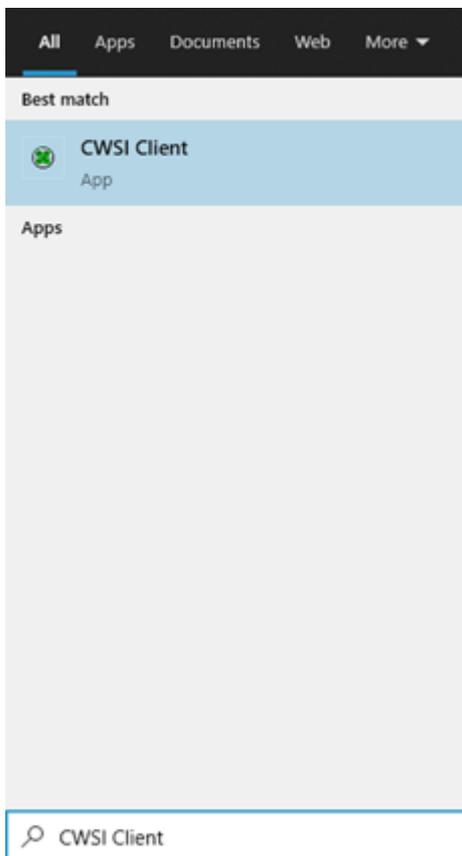
Figure 6: CWSI Client

The picture above is from Windows 10. To start the tray application, start **CWSI Client** from the programs menu.

In Windows 8.1, open the **Charms View**.

Figure 7: Charms View

Select **Search**, enter CWSI in the opened search window and click on the CWSI Client icon
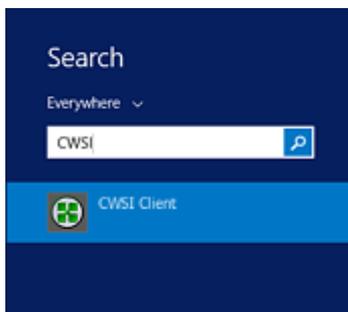
Figure 8: Search Function

When **CWSI Client** system tray application is started the following CMX Client icon is seen in the system tray:

Figure 9: CMX Client Icon

Connecting CWSI Client with CWSI Server

Connecting and disconnecting CWSI Client with CWSI Server is done via the context menu on the tray icon.

CWSI Client's Options includes a possibility to **Automatically Connect the Client** with the CWSI Server.
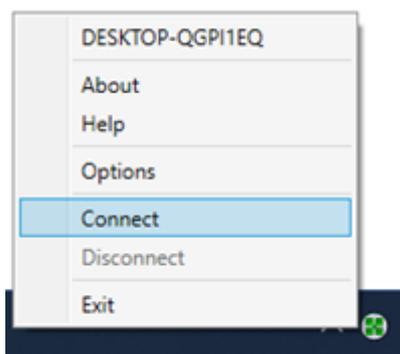
Figure 10: Connecting CWSI Client with CWSI Server

CWSI Client Options

Viewing/Editing CWSI Client options is done via the context menu on the tray icon.
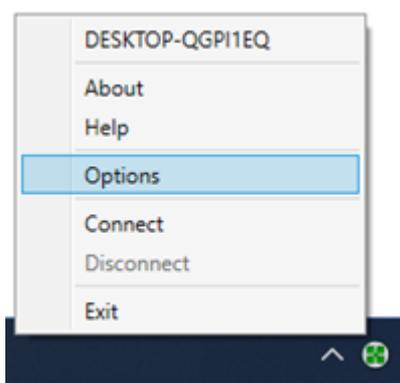
Figure 11: CWSI Client Options

General Options
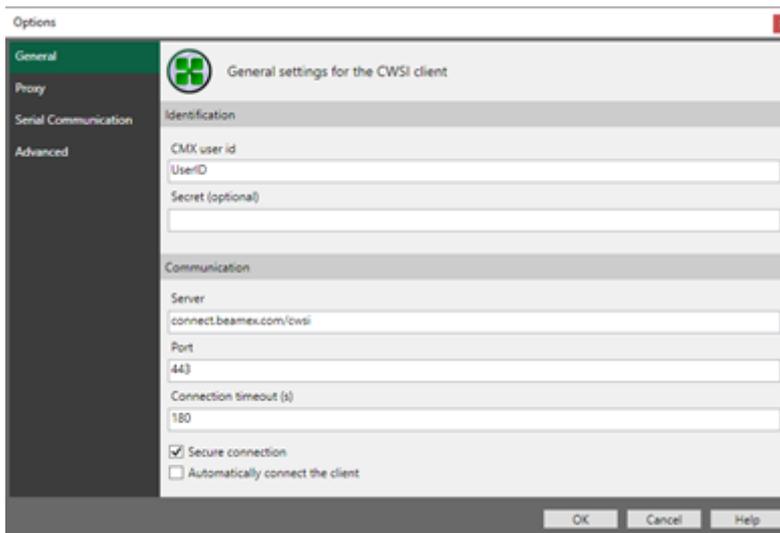
Figure 12: General Options

- **CMX user id** specifies the Id to be used when connecting to the **CWSI Server**. Please note that this must correspond with the CMX User Id used to log on to **CMX**.
- **Secret (optional)**, an optional secret that can be used to secure the CWSI Client connection. If a secret is entered, then the same secret must be entered in CMX when trying to connect to the CWSI client. This is highly recommended if the same CMX user id is used by multiple users.
- **Server** specifies the location of the **CWSI Server** (including the endpoint specified in server). If a secure connection is used, this would most likely correspond to the CN of the Certificates subject distinguished name used by the server.
- **Port** specifies the TCP port that the **CWSI Server** is listening on.
- **Connection Timeout** specifies the time in seconds the **CWSI Client** will attempt to connect to the **CWSI Server** before cancelling.
- **Secure Connection**, this specifies if the server is using secure connection (SSL/ TLS). This must correspond to the **CWSI Server** settings.
- **Automatically Connect the Client**, this specifies if the **CWSI Client** should automatically try to connect to the **CWSI Server** on application startup.

Proxy Options
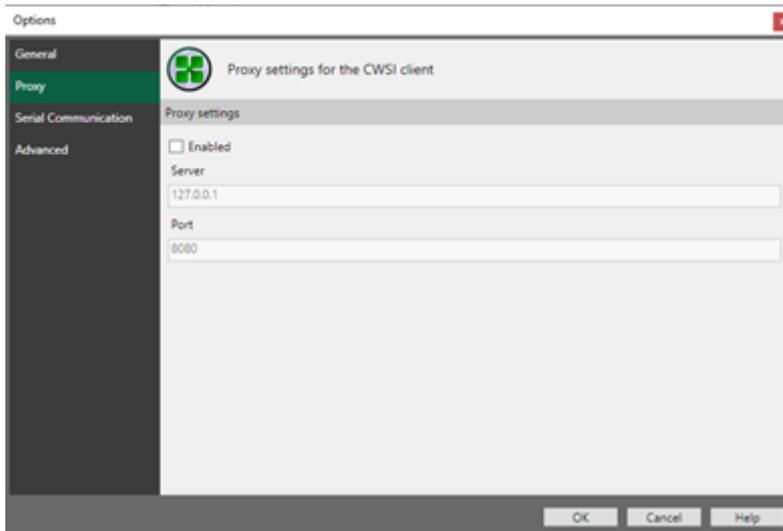
Figure 13: Proxy Options

- **Enabled** Check to enable the use of a proxy server.
- **Server** specifies the location of the proxy server. The address of the Proxy Server can be specified either as an IP address or a host name.
- **Port** specifies the TCP port of the proxy server.

Serial Communication Options
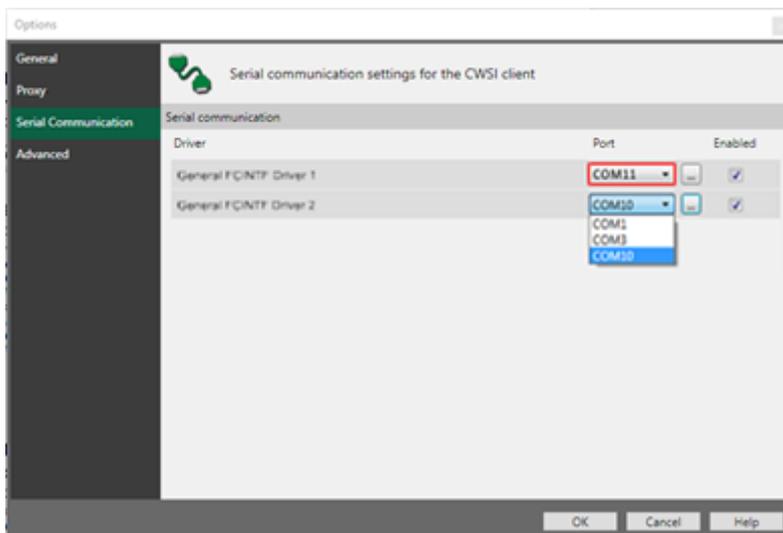
Figure 14: Serial Communication Options

Serial Communication tab is used to configure Serial Device Calibrators. Currently only FCINTF devices are supported. No FCINTF drivers are shipped with the CWSI client. FCINTF drivers must be installed separately.

When you have installed applicable FCINTF drivers, connect a calibrator to the computer where **CWSI Client** resides. If needed, use an **RS232 to USB converter**

cable. CWSI shows a COM port for the connected device, for example COM1, -3, -10 and -11 in the picture above.

When a communication cable is removed from a USB port, the CWSI Client's Port selection list has a red frame.

The small button with three dots allows you to check **Driver Properties** or Calibrator **Properties**. Usually there is no need to change the driver properties. The communication between CWSI Client and the calibrator should work using the default values. Calibrator properties displays Calibrator's serial number, software version number etc.

Advanced Options
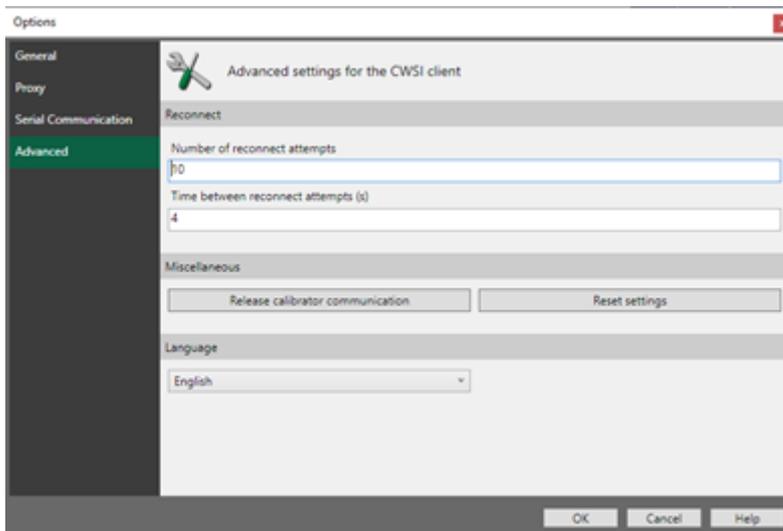
Figure 15: Advanced Options

- **Number of reconnect attempts** and **Time between reconnect attempts** settings need normally not be changed. IT specialist may want to change these if communication problems exist.
- **Release calibrator communication**, will release and close connections to all calibrators. This might be useful if a calibrator is left reserved for some reason.
- **Reset settings**, will reset all fields in the Options window of CWSI Client.
- **Language** offers a set of available User Interface languages for CWSI Client.

CMX

CWSI is integrated as a new protocol (Web Service) in both the **Send** and **Receive** windows in **CMX**. To configure the CWSI parameters, open Send or Receive window, select Web Service as protocol and click the button with three dots next to the protocol:
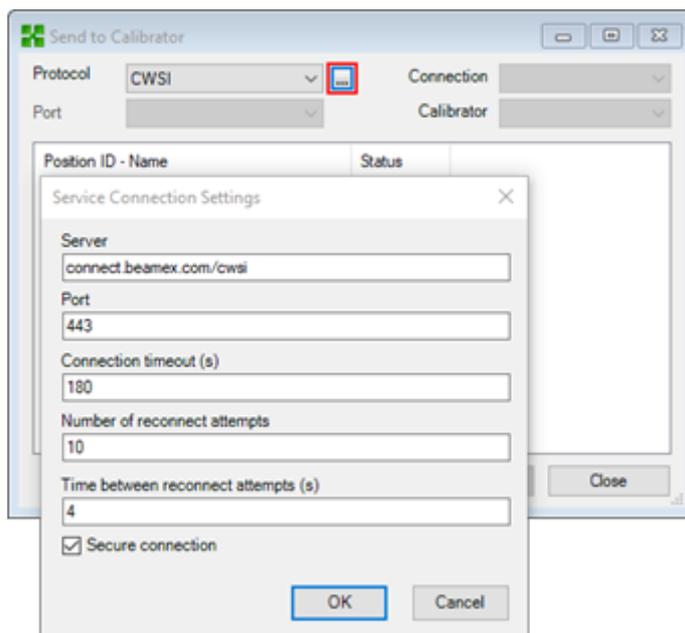
Figure 16: Configuring the CWSI Parameters

- **Server**, this specifies the location of the CWSI Server (including the endpoint specified in server). If secure connection is used, this would most likely correspond to the CN of the Certificates subject distinguished name used by the server.
- **Port** specifies the TCP port that the CWSI Server is listening on.
- **Connection timeout** specifies the time in seconds the CMX will wait before cancelling a request.
- **Number of reconnect attempts** and **Time between reconnect attempts** settings need normally not be changed. IT specialist may want to change these if communication problems exist.
- **Secure Connection** specifies if the server is using secure connection (SSL/TLS). This must correspond to the CWSI Server settings.

When CWSI is correctly configured and one or more matching CWSI Clients are found (i.e. when **CMX user id** in CWSI matches the **User ID** in CMX), they are listed in the **Connection** combo box. Each connected calibrator of the CWSI Client is listed in the Calibrator combo box. Both send and Receive window can be used normally.

If the CWSI Client have specified a secret, then the secret is prompted when selecting the client connection.

Troubleshooting

Please refer to the troubleshooting chapters if issues occur.

CWSI Server Troubleshooting

If the server is having issues loading a configured X.509 certificate. Please note that CWSI Server Configurator and CWSI Server Service might be executed as different users. By default, the CWSI Server Service is configured to be executed by the LocalSystem Account and might not have access to the configured file.

The above might also be an issue if Certificate Store Location is set to *Current User*.

CWSI Client Troubleshooting

All configuration changes made in the CWSI Client are stored individually per user under

%APPDATA%\Beamex Oy Ab\CWSI\\<version>

Where:

%APPDATA% is currently logged user's application data directory. ***<version>*** is the current software version number of CWSI Client.

If the CWSI client for some reasons crash during startup, try to delete the settings.xml file in the folder above to load the factory default settings.

To copy CWSI settings between user profiles, simply copy the settings.xml between the user profiles.

To modify default CWSI settings, modify **BeamexClient** and **appSettings** sections in file **Beamex.CWSI.Client.exe.config** located in CWSI installation directory.

CMX Troubleshooting

All configuration changes made in the CMX are stored individually per user under

%APPDATA%\Beamex Oy Ab\CMX Calibration Management Software \\<version>\ServiceConnectionSettings.xml

Where:

%APPDATA% is currently logged user's application data directory. *<version>* is the current software version number of CMX.

If CMX for some reasons crashes during opening of Send or Receive window, try to delete the file above to load the factory default settings.

To copy CWSI settings between user profiles, simply copy the ServiceConnectionSettings.xml between the user profiles.

To modify default CWSI settings, modify ServiceConnectionDefaults section in file BxbMUIPD.exe.config located in CMX installation directory.

Third Party Licenses

CMX, CWSI Server and CWSI Client include a number of third party libraries that are used to provide certain features. Additional copyright and legal notices and license terms applicable to the third party libraries may apply. A list of the third party libraries included in CMX, CWSI Server and CWSI Client is provided further on. By accepting the terms of the Beamex software license agreement you also accept the third party terms.

Third Party Licenses Used in CMX, CWSI Server and CWSI Client

This chapter presents third party licenses used in CMX, CWSI Server and CWSI Client.

protobuf-net

Copyright © 2008 Marc Gravell.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

The core Protocol Buffers technology is provided courtesy of Google. At the time of writing, this is released under the BSD license. Full details can be found here

http://code.google.com/p/protobuf/

Third Party Licenses Used in CMX and CWSI Client

This chapter presents third party licenses used in CMX and CWSI Client.

Automapper

Json.NET

FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

WebSocket4Net

Copyright © 2014 Kerry Jiang.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

Third Party Licenses Used in CWSI Server and CWSI Client

This chapter presents third party licenses used in CWSI Server and CWSI Client.

CommonServiceLocator

Copyright © 2008 CommonServiceLocator Open Source Project.

Microsoft Public License (Ms-PL)

This license governs use of the accompanying software. If you use the software, you accept this license. If you do not accept the license, do not use the software.

1. Definitions

   The terms "reproduce," "reproduction," "derivative works," and "distribution" have the same meaning here as under U.S. copyright law.

   A "contribution" is the original software, or any additions or changes to the software.

   A "contributor" is any person that distributes its contribution under this license.

   'Licensed patents' are a contributor's patent claims that read directly on its contribution.

2. Grant of Rights

   1. Copyright Grant - Subject to the terms of this license, including the license conditions and limitations in section 3, each contributor grants you a non-exclusive, worldwide, royalty-free copyright license to reproduce its

contribution, prepare derivative works of its contribution, and distribute its contribution or any derivative works that you create.

2. **Patent Grant** - Subject to the terms of this license, including the license conditions and limitations in section 3, each contributor grants you a non-exclusive, worldwide, royalty-free license under its licensed patents to make, have made, use, sell, offer for sale, import, and/or otherwise dispose of its contribution in the software or derivative works of the contribution in the software.

3. Conditions and Limitations

1. No Trademark License - This license does not grant you rights to use any contributors' name, logo, or trademarks.

2. If you bring a patent claim against any contributor over patents that you claim are infringed by the software, your patent license from such contributor to the software ends automatically.

3. If you distribute any portion of the software, you must retain all copyright, patent, trademark, and attribution notices that are present in the software.

4. If you distribute any portion of the software in source code form, you may do so only under this license by including a complete copy of this license with your distribution. If you distribute any portion of the software in compiled or object code form, you may only do so under a license that complies with this license.

5. The software is licensed "as-is." You bear the risk of using it. The contributors give no express warranties, guarantees or conditions. You may have additional consumer rights under your local laws which this license cannot change. To the extent permitted under your local laws, the contributors exclude the implied warranties of merchantability, fitness for a particular purpose and non-infringement.

log4net

Copyright © 2004-2013 Apache Software Foundation.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

MVVM Light Toolkit

Copyright © 2009 - 2014 Laurent Bugnion

Third Party Licenses Used in CWSI Server

This chapter presents third party licenses used in CWSI Server.

Fleck

Third Party Licenses Used in CWSI Client

This chapter presents third party licenses used in CWSI Client.

Hardcodet WPF NotifyIcon

Copyright © 2009 Philipp Sumi.

Licensed under The Code Project Open License (CPOL) 1.02. You may obtain a copy of the License at

http://www.codeproject.com/info/cpol10.aspx

SecondLanguage

Copyright © 2013, 2015 James F. Bellinger.

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgement in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Third Party Licenses Used in CMX

This chapter presents third party licenses used in CMX.

csharp-argon2

Copyright © 2016 Kevin Spinar (Alipha).

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Soft-ware"), to deal in the Software without re-striction, including without limitation the rights to use, copy,

modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

This software is a binding around Daniel Dinu and Dmitry Khovratovich's Argon2 library. At the time of writing, this is licensed under a Creative Commons CC0 1.0 License/Waiver. Full details can be found here:

https://github.com/alipha/csharp-argon2/blob/a4bf41dee76a403baac8aa0281ee4c6b2161c24e/libargon2/phc-winner-argon2/LICENSE