



COPADATA
do it your way

zenon manual

zenon Web Server

v.7.60





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1. Welcome to COPA-DATA help

ZENON VIDEO-TUTORIALS

You can find practical examples for project configuration with zenon in our YouTube channel (https://www.copadata.com/tutorial_menu). The tutorials are grouped according to topics and give an initial insight into working with different zenon modules. All tutorials are available in English.

GENERAL HELP

If you cannot find any information you require in this help chapter or can think of anything that you would like added, please send an email to documentation@copadata.com (<mailto:documentation@copadata.com>).

PROJECT SUPPORT

You can receive support for any real project you may have from our Support Team, who you can contact via email at support@copadata.com (<mailto:support@copadata.com>).

LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email sales@copadata.com (<mailto:sales@copadata.com>).

2. zenon Web Server

With zenon Web Server, visualization content can be called up and displayed with a web browser. In doing so, no installation of zenon Runtime is necessary on end devices. All components for the display of

the user interface on the end device are provided automatically. Additional web clients can thus be incorporated into the system dynamically.

zenon Web Server, Web Server Pro and Web Server Pro Light constitute the complete scope of functions of a zenon visualization. A web browser plug-in required for this can be installed automatically the first time the web client is started.

The HTML web engine provides zenon visualization content in the HTML5 web standard. Selected functionalities (on page 85) can be applied.

3. zenon Web Server, Web Server Pro and Web Server Pro Light

zenon Web Server is currently available in three different versions: Their functions are briefly described in the following:



License information

zenon Web Server, zenon Web Server Pro and zenon Web Server Pro Light require a license to run. For more details, see the Licensing (on page 34) chapter.

ZENON WEB SERVER:

- ▶ Forwards data packets from the Primary Server via the zenon Web Server to the zenon Web Client.
- ▶ Handles licensing.
- ▶ Only acts as a viewer.
This means: No operations are possible, with the exception of screen switching, logging in and logging out.
- ▶ Can be installed on a separate computer, such as in a DMZ for example.
- ▶ Supports network encryption.
- ▶ Supports HTTP tunneling.
- ▶ Many clients possible (depending on the license).

ZENON WEB SERVER PRO:

- ▶ Same functionality as zenon Web Server, except:

- Allows active user actions with zenon Supervisor and zenon Operator Runtime.
- ▶ Start and operation under Windows CE are subject to certain limitations.
- ▶ Can be installed on a separate computer, such as in a DMZ for example.
- ▶ Supports network encryption.
- ▶ Supports HTTP tunneling.
- ▶ Many clients possible (depending on the license).

ZENON WEB SERVER PRO LIGHT:

- ▶ Allows active user actions with zenon Supervisor and zenon Operator Runtime.
- ▶ The Primary Server that zenon Web Client connects to must be the same computer on which zenon Web Server Pro Light runs.
Note: For projects with redundancy, zenon Web Server Pro Light must be implemented redundantly - one instance on the Server and one on the Standby Server.
- ▶ Maximum 3 clients.
- ▶ No support for encrypted network traffic. It does not start or it ends itself with encrypted communication.
- ▶ HTTP tunneling is not supported.
- ▶ Projects must run on the same computer as the "server". Projects that run on this computer as a client are not supported.
- ▶ Multiple projects are supported if all projects run locally as a server.

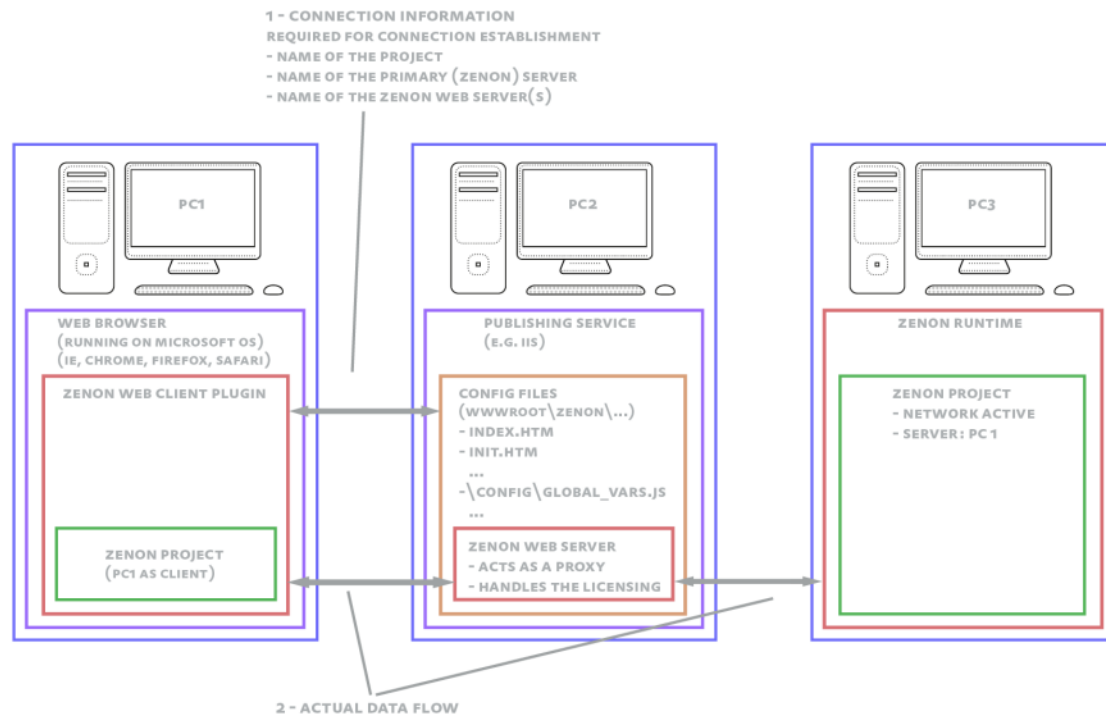
Note: Web Server is supplied as a 32-bit application up to zenon 7.10. From version 7.11 onwards, it has also been available as a 64-bit application.

3.1 Example of configuration with zenon Web Server:

From PC1, you connect as a client via the zenon Web Server to PC2 as a gateway, to the Primary Server, i.e. to PC3 (see the following illustration). With the help of zenon Web Server and zenon Web Client, the project can be displayed on PC1 in a web browser by PC3, without an additional local installation of Runtime being necessary on PC1. The following installations are necessary for this function:

Note: The following arrangement of components is merely a recommendation. You are free to decide which components are installed on which computer. However it must be noted that a zenon Web Client for a project **A** cannot be used on a computer that is the server for project **A**.

Furthermore: When using zenon Web Server Pro Light, this must be installed on the computer on which Runtime is running. This is PC3 in our example.



IMPORTANT NOTES

ALSO OTHER CONFIGURATIONS ARE POSSIBLE DEPENDING ON THE CIRCUMSTANCES/ENVIRONMENT/LICENSING

- THE PUBLISHING SERVICE (HOSTING THE CONFIG FILES) COULD BE INSTALLED ON ANOTHER PC THAN THE ZENON WEB SERVER
- THE ZENON WEB SERVER AND THE PUBLISHING SERVICE COULD BE INSTALLED ON THE SAME PC AS THE PRIMARY (ZENON) SERVER (MUST BE INSTALLED ON THE SAME PC FOR ZENON WEB SERVER PRO LIGHT)
- THE WEB CLIENT (FOR THE SAME PROJECT) CANNOT RUN ON THE PC WHERE THE PRIMARY (ZENON) SERVER IS RUNNING
- THERE IS NO NEED FOR THE PUBLISHING SERVICE IF THE CONFIG FILES ARE AVAILABLE LOCALLY RESP. HOSTED SOMEWHERE ELSE (E.G. VIA A NET WORK SHARE) - ALTHOUGH USING THE PUBLISHING SERVICE IS THE MOST COMFORTABLE WAY

1. **PC1:** Install **zenon Web Client** (on page 19) and the **web browser** (on page 44) on this computer.
2. **PC2:** Install the **publishing service** (on page 10) and **zenon Web Server** (on page 12) on this computer.

Note: With regard to the publishing service, this handbook relates to the IIS Publishing Service. If the IIS Publishing Service is installed on this computer, the home page for the zenon Web Client is configured automatically. However there are also alternative publishing services, such as the one from Apache. You are free to decide which of these you use. Furthermore, there is the possibility to not have the publishing service at all. However in this case there are additional steps that you have to carry out manually. You can find these steps in detail in the Publishing service (on page 10) chapter.

3. **PC3:** **zenon Runtime** and the **project** must be on this computer, and optionally also the **zenon Editor**.

Note: If zenon Web Server is not licensed, it starts in demo mode. Automatic start with the operating system does not happen in this case and the zenon Web Server must be started

manually via the user interface. The session is automatically ended after 30 minutes. A maximum of 2 clients can connect to it.

Configuring the individual components:

Configuration is usually still necessary after installation. For example, after installation of zenon Web Server on PC2, the `global.vars` file is important. This file is, among other things, automatically installed as well and still needs some amendments. For details, read the **global_vars.js settings** (on page 15) chapter.

The Runtime project on PC3 requires the following basic settings (on page 29) in the zenon Editor:

- ▶ Project property -> Network -> Activate active network.
- ▶ Enter project property -> network -> **Server 1** -> computer (name) with Runtime.

If you have finished the installation and configuration, you can have Runtime displayed on **PC1**. To do this, you open a web browser and enter: `RechnernamePC2\zenon\index.htm`

3.2 Required components and their definitions

Components	Description
Primary Server (on page 7)	The server on which Runtime, the Editor and the project is running and to which a client connects via the zenon Web Server.
zenon Web Server (on page 6)	Forwards data packets from the Primary Server via the zenon Web Server to the zenon Web Client. Also handles licensing. Cannot write values.
zenon Web Server Pro (on page 6)	Allows active user actions with zenon Supervisor. Starting and operation with Windows CE is subject to certain limitations.
zenon Web Server Pro Light (on page 6)	Allows active user actions with zenon Operator and zenon Supervisor.
Publishing service (on page 10)	For publishing documents, such as HTML pages, via the HTTP protocol.
zenon Web Client (on page 19)	The zenon Web Client is a program that runs in a standard web browser and displays a project. It connects to a Primary Server using a zenon Web Server. It shows the project of the Primary Server, just as a normal client would do. Only difference: With the zenon Web Client the project is displayed in a browser.
Web browser (on page 44)	Web browsers are special computer programs for the display of web sites in the World Wide Web or the general display of documents and data. Source: http://de.wikipedia.org/wiki/Webbrowser

Administrator rights are required for installation or configuration of zenon Web Server, zenon Web Client and the publishing service.

Note: No administrator rights are required for normal operation. The normal user rights are sufficient.

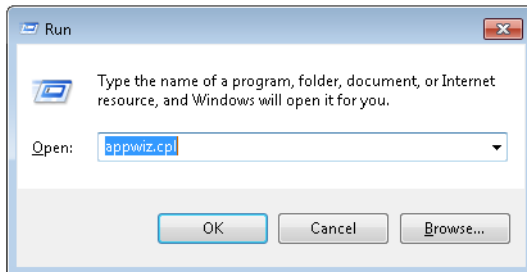
3.2.1 Publishing service installation

If you use a Windows operating system on your computer, it is no longer necessary to install the publishing service. This need only be activated via Windows features. The following example relates to the IIS Publishing Service. However others can also be used, such as the one from Apache. In this case, the file storage locations may be different. Please note the following info box in this case.

To activate the IIS publishing service:

1. Press the Windows key + R keyboard shortcut.

The dialog to enter a command for the command input is opened.



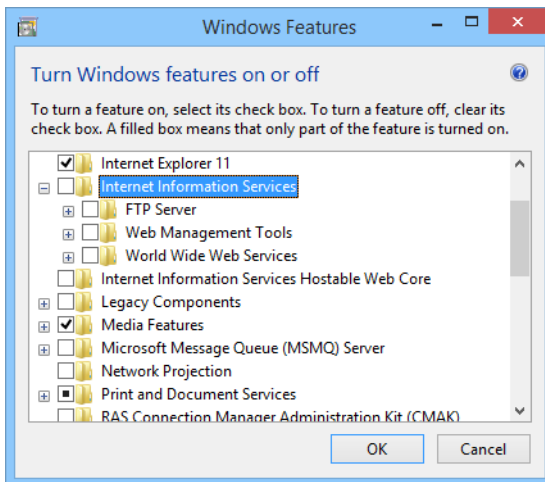
2. Enter `appwiz.cpl` in the input field.

Click on **OK**.

A new control panel window to configure programs and **Windows features** is opened.

3. In this window, click on **Turn Windows features on or off**.

The window to select features of the operating system is opened.



4. Expand the **Internet Information Services** option.
5. Activate all **World Wide Web services** there.

If the services have been activated successfully, you will find the following folder in the root folder:
`\inetpub\wwwroot`



Info

If the zenon Web Server was already installed before the publishing service, or if a different publishing service is used, the folder created during installation of the zenon Web Server `C:\Program Files (x86)\COPA-DATA\zenonWebserver\zenon` must be moved manually to `C:\inetpub\wwwroot` or to the root folder of the alternative publishing service.

***Note:** The publishing service provides easier access to the configuration files for the web browser. However if the configuration files are accessible locally or in the network, the publishing service need not be used at all.*

3.2.2 zenon Web Server Installation

Note the following criteria when selecting the computer for the zenon Web Server and the publishing service:

- ▶ TCP communication from the zenon Web Server to the Primary Server must be possible.
- ▶ There must be complete naming resolution between the zenon Web Server and the Primary Server in the network.

Hint: If the zenon Web Server is to be contactable from outside, it is strongly recommended that a VPN connection is used and the zenon Web Server and the computer with the publishing service is placed in a DMZ.

It is recommended that the zenon Web Server is installed on the same computer on which you have activated and installed the publishing service.

To do this:

1. Start the installation from the installation medium.
2. Follow the instructions given to you by the installation wizard.
3. Restart the computer

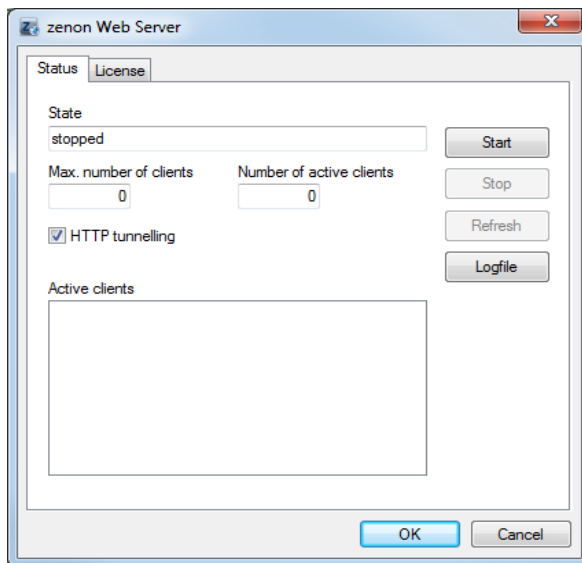
The **zenon** folder is automatically created in the **wwwroot** folder of the IIS publishing service. This folder contains, among other things, some important configuration files that must be installed. For example, `global_vars.js` is an important file. You must amend some settings in this file. Read more about this in the zenon Web Server configuration (on page 12) chapter.

zenon Web Server configuration/start

To configure the Web Server, or start it manually:

1. Open the **Control Panel** or the **Start Menu**.
2. Click on **zenon Web Server**.

The dialog for configuration and licensing (on page 34) opens:



Note: This dialog is only available in English.

3. Select a connection via TCP or HTTP

Attention: Only activate the option for `HTTP tunneling` if you have also explicitly configured all zenon Web Clients for this. TCP is used as a standard.

4. Click on the **Start** button to start the Web Server manually.

Note: In normal operation, zenon Web Server is automatically started with the computer as a Windows service. If it has been closed or if you are in the process of entering a new license number, it must be restarted manually. If there is no valid license, the Web Server is not started as a service but in demo mode via the dialog.

Parameter	Description
State:	<p>Displays version and status of the Web Server:</p> <p>Possible versions:</p> <ul style="list-style-type: none"> ▶ zenon Web Server ▶ zenon Web Server Pro ▶ zenon Web Server Pro Light <p>Possible status messages:</p> <ul style="list-style-type: none"> ▶ <code>running:</code> Web Server is running with valid license ▶ <code>stopped:</code> Web Server stopped: ▶ <code>Demo mode:</code> Web Server is running in demo mode without license ▶ <code>not installed:</code> Web Server not registered as service or installation error
Max. number of clients:	<p>Maximum number of clients that are permitted to connect to the Web Server. The number is defined by the license.</p> <p>Two clients are licensed for 30 minutes in demo mode.</p> <p>Default: 0</p>
Number of active clients:	Displays the number of clients currently connected.
Start	Starts the Web Server
Stop	Stops the Web Server
Refresh	Refreshes the display.
Diagnosis Viewer	Opens the Diagnosis Viewer.
HTTP tunnelling (on page 41)	<p><code>Active:</code> HTTP tunneling is activated.</p> <p>Not available in the Web Server Pro Light version.</p> <p>Note: Can only be changed if the Web Server has the status <code>stopped</code>. Cannot be switched during operation.</p> <p>Default: <code>Inactive</code></p>
Active clients	List of connected clients.
OK	Applies settings and closes the dialog.
Cancel	Discards the changes and closes the dialog.

STARTING AND CONFIGURING UNDER WINDOWS CE.

There is no start dialog for Windows CE. zenon Web Server is already integrated into Runtime.

To start zenon Web Server under Windows CE, the following must be the case:

- ▶ The `Network active` property must be activated in the project,
- ▶ Runtime must have been started,
- ▶ zenon Web Server must be licensed

Note: HTTP tunneling is not available with Windows CE.

With Windows CE, the functionality is subject to all the limitations that are generally applicable for Windows CE and zenon Web Server under Windows CE.



Information

No publishing service is installed with Runtime and the integrated Web Server. However any desired publishing service can be used on a Windows computer with the corresponding configuration files.

Configuration of the `global_vars.js`

The connection parameters that are required to establish the connection from the zenon Web Client to the Primary Server are in the **`global_vars.js`** configuration file. You can find this file when using the IIS publishing service in the `C:\inetpub\wwwroot\zenon\config\` folder on the computer on which the IIS publishing service runs.

Amend the content of this file in a text editor. You can also find notes on the required content in the comments text.

CONTENT OF `GLOBAL_VARS.JS`:

```
// Please enter here the string name of your project and make sure that it is
identical with the project name in the Editor

var PROJECTNAME = "PROJECT";

// Please enter here the computer name, on which the zenon Runtime is installed
and on which it is actively running

// For redundant Runtime servers, please enter both "server1;server2"

var RUNTIMESERVER= "Runtime server";

// Please enter here the computer name, on which you have installed the zenon Web
Server
```

```

var WEBSERVER    = "Webserver";

// Please enter here an optional initial function to be executed when the Web Client
connects to its server. Defaultvalue = "Init"

var INITFUNCTION = "Init";

// Optional: Please enable the zoom feature (This step will stretch the project
resolution to the size of the Web Client control) OFF = "0" / ON = "1"

var ZOOM = "0";

// Please enter the version number corresponding to the Web Client.

var VERSION    = "7,60,0,0";

// Optional: Please enable HTTP tunnelling feature: 0 = inactive (available on
Web Client version 7.00 and higher)

var HTTP = "0";

```

PARAMETER

Parameter	Description
PROJECTNAME=	<p>Defines the name of the Runtime project.</p> <pre>var PROJECTNAME = "PROJECT NAME";</pre> <p>Note: The project must run as a server project on the defined Runtime server.</p>
RUNTIMESERVER =	<p>Denotes the target computer on which Runtime for the project runs.</p> <ul style="list-style-type: none"> ▶ Standalone: <pre>var RUNTIMESERVER = "SERVE RNAME";</pre> ▶ Network project (on page 18): <pre>var RUNTIMESERVER = "Runtime server; Runtime server2"</pre> Note: Runtime server = Server 1; Runtime server2 = Server 2; <p>The name must correspond with the server name in the project configuration.</p> <p>Note: The IP address must not be used here. There must be naming resolution between the computer with the zenon Web Server and the Primary Server in the network in both directions. A ping to the computer name must work in both directions.</p> <p>You can find further information on the correct configuration of the zenon Web Server when operating a redundant network in the zenon Web Client in the redundant network (on page 18) chapter.</p>

WEBSERVER=	<p>Denotes the target computer on which zenon Web Server was installed.</p> <p>Attention: It does not necessarily need to be the publishing server!</p> <p>var WEBSERVER = "WEBSERVER";</p> <p>zenon Web Server redundancy</p> <p>If, in addition to zenon Server, the zenon Web Server is also to be operated as redundant, the following must be the case:</p> <ul style="list-style-type: none"> ▶ two copies of zenon Web Server are installed and licensed on different computers ▶ both copies of zenon Web Server, separated by a comma, are entered in the variable declaration on the HTML page: <p>var WEBSERVER = "WEBSERVER, WEB-STANDBY-SERVER";</p> <p>Note: Instead of the computer name on which the zenon Web Server is installed, the IP address can also be used here. If the Web Server is behind an NAT router and <code>Port Forwarding</code> is configured, the IP address of the NAT router can also be used here.</p>
INITFUNCTION=	<p>Defines a zenon function that is executed when a project is started in the browser.</p> <p>This setting is optional.</p> <p>var INITFUNCTION = "Init";</p> <p>Note: The wording must correspond to the function names in zenon (capitalization).</p>
ZOOM=	<p>Defines if the project can be zoomed in or out of in the browser view.</p> <p>This setting is optional.</p> <p>var ZOOM = "VALUE";</p> <ul style="list-style-type: none"> ▶ 0: OFF ▶ 1: ON <p>Default: 0 : OFF</p> <p>For example:</p> <p>var ZOOM = "0";</p> <p>Note: The zoom adjustment is only considered on initializing, not when the Runtime is running. If a certain size is wanted, it has to be defined by the ActiveX control. If you do not open the browser window as maximized and then maximize it later, this can lead to display problems.</p>
var VERSION=	<p>Defines the zenon Web Client version.</p>

	<pre>var VERSION = "VALUE";</pre> <p>for example:</p> <pre>var VERSION = "7,60,0,0";</pre> <p>This must always be the same or higher than the version of zenon Runtime.</p>
var HTTP=	<p>Defines type of communication and allows communication via HTTP. If this property is deactivated, communication is via TCP/IP.</p> <p>This setting is optional:</p> <ul style="list-style-type: none"> ▶ 0: inactive ▶ 1: active <p>Default: 0: inactive:</p> <p>Note: You can find further information in the HTTP tunneling (on page 41) chapter in this manual.</p>

Note: When entering parameters in the **global_vars.js** file, note capitalization.

zenon web client in the redundant network

With a redundant zenon network configuration, the issuing of roles for the primary server and standby server depends on the **Redundancy mode** set. In doing so, the role of the configured **Server 1** and **Server 2** computers can change over time in Runtime, depending on the configuration of the **Redundancy mode** and the current evaluation (for *evaluated*).

You should therefore configure both servers for the zenon Web Server. To do this, in the `global_vars.js` configuration file, change the line with the entry **RUNTIMESERVER=** and enter both computers there.

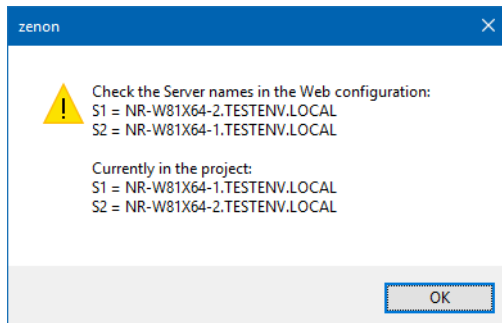
In doing so, the sequence should conform to the configuration in the zenon Editor.

You can find details on configuration in the configuration of `global_vars.js` (on page 15) chapter.

AMENDED SERVER CONFIGURATION

If the server names configured in the Editor do not correspond to the server names of `global_vars.js`, the zenon Web Client will not start.

If the configuration of the server is amended for a running system in zenon, the "Runtime is busy" dialog will be shown in the zenon Web Client.



After a project synchronization, the currently-running and the actual project configuration will be shown in a further dialog. In this case, the browser window must be closed by the user and the zenon Web Client must be restarted.



Attention

*If the project configuration of **Server 1** and **Server 2** is changed in the zenon Editor, the `global_vars.js` file must also be amended accordingly.*

You can find further information in the zenon web server (on page 5) manual in the configuration of `global_vars.js` (on page 15) chapter.

3.2.3 zenon Web Client Installation

There are four possibilities for installation of zenon Web Client as a 32-bit application.

Note: It is recommended that you carry out the installation using the first possibility.

1. VIA THE INDEX.HTM PAGE:

It is recommended that you carry out the following steps on the computer on which the Publishing service has been installed or activated. It is PC2 in this example. For details, see the screen in the Example configuration with zenon Web Server (on page 7) chapter. However the zenon Web Client is not necessarily required on this computer. You are free to choose the computer.

1. Start the `index.htm` page by entering the following in the web browser:
`http://Publishingserver//zenon/index.htm`



2. Then click on the **Starting the zenon Web Client** icon.
3. The `WebClientSmall` setup must be carried out first.

Note: Administrator rights are required for this. The `WebClientSmall` setup also requires an Internet connection during installation, in order to download further components. If your computer does not have an Internet connection, use the major installation and one of the other methods of installation.

4. The `init.htm` page continues to be called up by the `index.htm` page.
5. The `init.htm` uploads the Javascript files. These then load the zenon Web Client plug-in.

Note: If you need the larger file from the zenon Web Client, you must amend the `index.htm` page manually. You can read more about this in the `index.htm` (on page 25) chapter.

You can also, as an option, open the `index.htm` page from the `zenon` folder. This folder is automatically created in the `\wwwroot` folder when the zenon Web Server is installed.

2. VIA COPY AND PASTE

After installation of the publishing service (IIS) and the zenon Web Server, the installation files for the zenon Web Client are in the following subdirectory:

`\inetpub\wwwroot\zenon\controlversions\version720SP0\WebClient.exe` oder `WebClient_small.exe`.

Copy the `WebClient_small.exe`. or `WebClient.exe`. application from there.

1. Add these into your preferred local save location.
2. Install the application.

3. VIA THE START INSTALLATION MEDIUM:

1. Copy, from the folder
`...\Setup\wwwroot\controlversions\version720SP0\WebClient.exe`, the `WebClient.exe` or `WebClient_small.exe` application.
2. Add these into your preferred local save location.
3. Install the application.

Note: zenon Web Client primarily consists of an ActiveX control. This provides the information in a browser exactly as in a normal Runtime client. The connection to the Runtime server is implemented with zenon Web Server. zenon Web Client logs errors in the local Diagnosis Server. The Diagnosis Server is also installed when zenon Web Client is installed.

4. VIA THE INIT.HTM PAGE:

Start the web browser and go to the `init.htm` page, in which you enter the following:

`http://Publishingserver/zenon/init.htm`

1. From there, start the `WebClient.exe` application

Note: The number of zenon Web Clients that can be used at the same time depends on your license.

Attention: This may need to be added as a "**trusted site**" in the Internet Explorer settings under *Extras* -> *Internet options* -> *Security*.

To do this:

- ▶ Open the web browser.
- ▶ Click on **Internet Options**.
- ▶ Click on **Security**.
- ▶ Click on **Trusted sites**
- ▶ Click on **Sites**.
- ▶ Enter the page.

zenon Web Client - compatibility

With the zenon Web Client, you access different versions of Runtime, along the lines of Runtime compatibility. The version number of the zenon Web Client must be the same or higher than the Runtime version.

The Runtime online compatibility makes interoperability of Runtime systems (also via zenon Web Clients) in the zenon network possible even if the version of the client Runtime is higher than the version of the server Runtime.

The current Runtime can load projects of the following versions:

- ▶ 6.20 SP4
- ▶ 6.21 SP0
- ▶ 6.21 SP1
- ▶ 6.22 SP0
- ▶ 6.22 SP1
- ▶ 6.50 SP0
- ▶ 6.51 SP0
- ▶ 7.00 SP0
- ▶ 7.10 SP0
- ▶ 7.11 SP0
- ▶ 7.20 SP0
- ▶ 7.20 SP0[latest build nr.]
- ▶ 7.50 SP0
- ▶ 7.60 SP0

Due to the multi-project administration projects from different versions can be loaded. For example the Integration project can have version 7.60, a sub project version 7.50 and another sub project version 6.51.

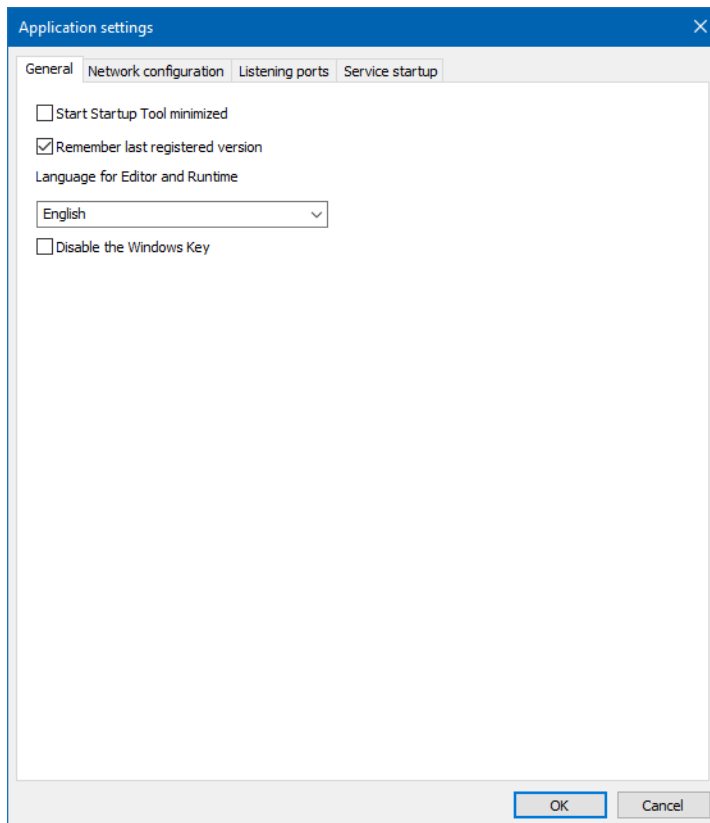


Information

It is best to always use the zenon Web Client with the highest Service Pack number within a version.

Language setting of zenon Web Client

TO CONFIGURE THE LANGUAGE FOR THE WEB CLIENT:



1. Start **Startup Tool**.
2. Select the **General** menu entry.
3. Select the desired language in the **Language for Editor and Runtime** drop-down list.

AVAILABLE LANGUAGES FOR THE WEB CLIENT:

- ▶ Chinese
- ▶ German
- ▶ English
- ▶ French
- ▶ Italian
- ▶ Russian
- ▶ Spanish

- ▶ Czech



Information

You can get further information for the language setting in the **Startup Tool** in the Tools manual in the General chapter.

Creation of the HTML page for the project entry

A project start page (on page 25) is required, so that the web browser can start zenon Web Client and then connect to the corresponding Primary Server. This page contains the necessary code. Java Script is used as a script language.

Requirements:

- ▶ JavaScript must be activated in the browser.
- ▶ The zenon Web Client must also be installed locally on the computer on which the web browser is executed.

Recommendation: Switch, before the project entry page (init.htm) (on page 24), to a start page (index.htm) (on page 25), that allows the download of the zenon Web Client. This start page contains hyperlinks:

- To download the zenon Web Client controls
- To project entry page **init.htm**, which carries out a browser check and makes the connection from zenon Web Server to the Primary Server.

Example of project start page init.htm for TCP and HTTP

On the project entry page (on page 25), a browser check verifies which browser the zenon Web Client uses. Depending on the result, the zenon Web Client is started or an error message is given.

Example of project start:

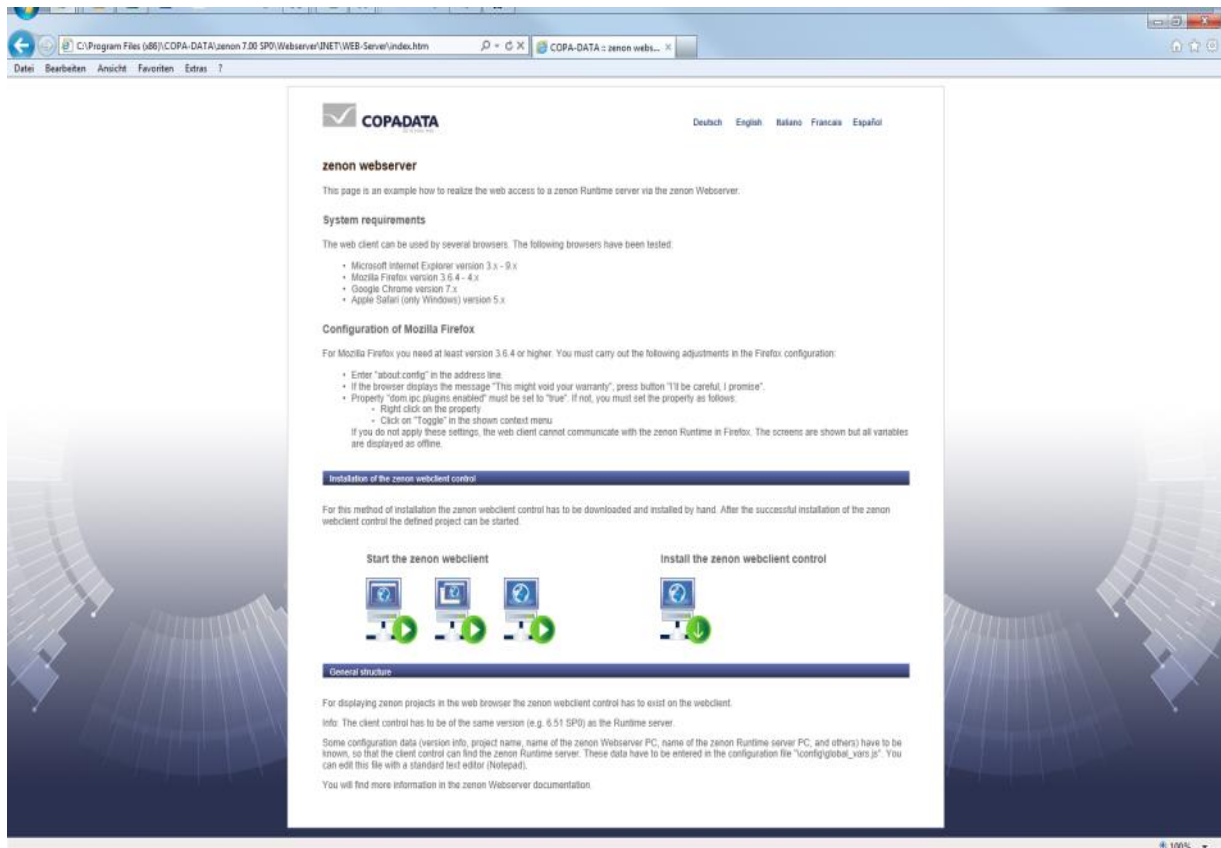
The start page (on page 25) calls up three scripts in order to check the browser used and either to establish a connection to Runtime or to issue an error message:

- ▶ global_vars.js (on page 15): Defines values of transfer parameters to start the zenon Web Client
- ▶ browsercheck.js (on page 27): Checks the version of the browser
- ▶ initcode.js (on page 27): Defines functions that are used to start the zenon Web Client

Note: The settings only differ for connections using TCP and HTTP in terms of the **UseHTTP** entry.

index.htm

The page **index.htm** is the start page for our example. It starts by default in English and can be switched to other languages directly on the page on the top right.



The page **index.htm**:

- ▶ Informs you about compatible browsers
- ▶ Offers links to start the zenon Web Clients
- ▶ Offers a link to the installation of zenon Web Client controls; this is necessary if zenon is not installed on the computer with the zenon Web Client.
- ▶ Calls up the project entry page **init.htm** (on page 24) when the zenon Web Client is started, which carries out the browser check.

init.htm

The **init.htm** file checks the browser being used and then either starts the project or gives an error message.

Scripts are used for this:

1. The configuration is loaded from **global_vars.js** (on page 15).
2. The browser is determined by **browsercheck.js** (on page 27).
3. If it is a supported browser, the appropriate function to include the zenon Web Client from **initcode.js** (on page 27) is executed.

EXAMPLE:

```
<html>
<head>
<title></title>
</head>
<BODY scroll="no" leftmargin="0" topmargin="0" marginwidth="0" marginheight="0"
BGCOLOR=#FFFFFF>
<script language="javascript" type="text/javascript" src="global_vars.js"></script>
<script language="javascript" type="text/javascript" src="browsercheck.js"></script>
<script language="javascript" type="text/javascript" src="initcode.js"></script>
<script language="JavaScript" type="text/javascript">
switch(browsercheck()) {
    case "IEEXPLORER":

        runIexplorer(PROJECTNAME,RUNTIMESERVER,WEBSEVER,INITFUNCTION,ZOOM,VERSION);

        break;
    case "NPAPI":
        runNPAPI(PROJECTNAME,RUNTIMESERVER,WEBSEVER,INITFUNCTION,ZOOM,VERSION);

        break;
    case "UNSUPPORTED_BROWSER":
        alert(navigator.appName + ' : ' + navigator.appVersion + ' is not
supported!');

        break;
    default:
        alert("invalid parameter");

        break;
}
</script>
</html>
```

browsercheck.js

This JavaScript finds out which browser the zenon Web Client wants to start and gives the result back to **init.htm** (on page 25).

```
function browsercheck(){
    var UserAgent = navigator.userAgent;
    var fWin32 = (UserAgent.lastIndexOf('Win') != -1) &&
(UserAgent.lastIndexOf('Windows 3.1') == -1) && (UserAgent.lastIndexOf('Win16') == -1);
    var fMSIE = (UserAgent.lastIndexOf('MSIE ') != -1);
    var fNPAPI = (UserAgent.lastIndexOf('Firefox/') != -1) ||
(UserAgent.lastIndexOf('Chrome/') != -1) || ((UserAgent.lastIndexOf('Safari') != -1) &&
(UserAgent.lastIndexOf('Version/') != -1));
    if(fWin32)
    {
        //Win32-Browser
        if(fMSIE)
        {
            //Internet Explorer --> use ActiveX-Control
            return "IEXPLORER";
        }
        if(fNPAPI)
        {
            //Firefox, Chrome or Safari --> use NPAPI-Plugin
            return "NPAPI";
        }
    }
    //Non-Win32-Browser or not supported Browser (Opera, ...)
    return "UNSUPPORTED_BROWSER";
}
```

initcode.js

This Javascript sets:

- ▶ The **<embed>** entry to start zenon Web clients in Apple Safari, Google Chrome or Mozilla Firefox
- ▶ The **<object>** entry to start zenon Web clients in Microsoft Internet Explorer

Script:

```
function runNPAPI(PROJECTNAME,RUNTIMESERVER,WEBSERVER,INITFUNCTION,ZOOM,VERSION) {
    document.write ('<embed type="application/x-zenon">');
```

```

document.write ('    width=100%');
document.write ('    height=100%');
document.write ('    Project="' +PROJECTNAME+ '"');
document.write ('    Server="' +RUNTIMESERVER+ '"');
document.write ('    WebServer="' +WEBSERVER+ '"');
document.write ('    Load="-1");
document.write ('    ScrollV="0");
document.write ('    Scrollh="0");
document.write ('    InitFunction="' +INITFUNCTION+ '"');
document.write ('    Zoom="' +ZOOM+ '"');
document.write ('    UseHTTP = "' +HTTP+ '"');
document.write ('>');
document.write (' </EMBED> ');
}

function runIexplorer(PROJECTNAME,RUNTIMESERVER,WEBSERVER,INITFUNCTION,ZOOM,VERSION) {
    document.write ('<object');
    document.write ('    id="CD_IClient1");
    document.write ('
classid="clsid:2A3BC66B-03D7-11D4-991A-080009ABB492");
    document.write ('    codebase="zenWebCli.ocx#version=' +VERSION+ '"');
    document.write ('    width=100%');
    document.write ('    height=100%');
    document.write ('>');
    document.write ('    <PARAM NAME="Project" VALUE="' +PROJECTNAME+ '">');
    document.write ('    <PARAM NAME="Server" VALUE="' +RUNTIMESERVER+ '">');
    document.write ('    <PARAM NAME="WebServer" VALUE="' +WEBSERVER+ '">');
    document.write ('    <PARAM NAME="Load" VALUE="-1">');
    document.write ('    <PARAM NAME="ScrollV" VALUE="0">');
    document.write ('    <PARAM NAME="Scrollh" VALUE="0">');
    document.write ('    <PARAM NAME="InitFunction" VALUE="' +INITFUNCTION+
'>');

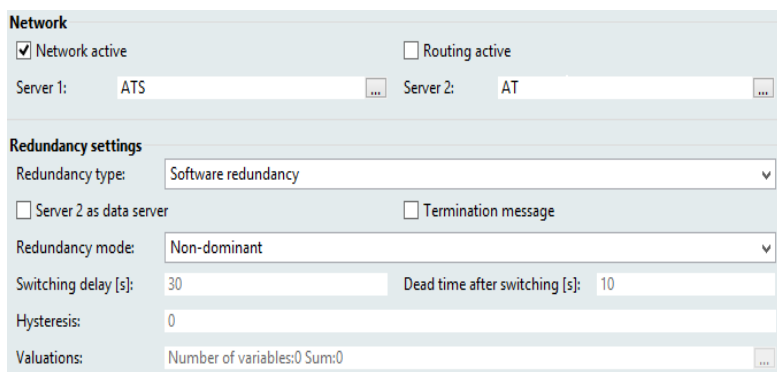
    document.write ('    <PARAM NAME="Zoom" VALUE="' +ZOOM+ '">');
    document.write ('    <PARAM NAME="UseHTTP" VALUE="' +HTTP+ '">');
    document.write ('</object>');
}

```

3.3 Project configuration

The project that is to be started using zenon Web Server requires the following basic settings in the zenon Editor:

- ▶ Activate the > **Network** -> **Network active** project property
- ▶ Project properties -> **Network** -> **Server 1** -> Name of the computer that acts as a server to Runtime.
With a redundant configuration, the **Server 2** property must also be configured.
- ▶ This computer name must also be started in the project start page (`globalvars.js` (on page 15)) so that a connection can be established.




Attention

*The configuration for **Server 1** and **Server 2** must correspond in the project and zenon web server. The information must not overlap under any circumstances. That means: **Server 1** in the project must not correspond to **Server 2** on the zenon web server and vice versa.*

START UP THE ZENON WEB SERVER:

To put the zenon Web Server into operation:

1. Ensure that the **WWW publishing services** were started and that the **entry page** (on page 24) is ready
2. Start the Runtime project on the computer.
3. Start the **zenon Web Server**.



Attention

VBA/VSTA AND DATA EXECUTION PREVENTION

The operating system also uses the **Data Execution Prevention (DEP)** function to prevent VBA code being executed in the browser.

Microsoft Internet Explorer 8 and 9:

Microsoft Internet Explorer version 8 or higher offers the possibility to deactivate DEP for the browser.

- ▶ go to *Extras* -> *Internet options* -> *Advanced*-> *Security*
- ▶ deactivate the option **Activate memory protection in order to reduce the risk of online attacks**

Other browsers and Internet Explorer from Version 10 (from Windows 8)

DEP must be turned off completely as the browser process cannot be excepted explicitly. This is not recommended due to security issues.

to deactivate DEP:

- ▶ Run the command line with administrative rights
- ▶ Execute the following command:
bcdedit.exe/set {current} nx AlwaysOff
- ▶ restart the computer

*The setting can be undone with the command **bcdedit.exe/set {current} nx AlwaysOn***

General recommendation: Use VSTA instead of VBA.

3.3.1 General limitations

Projects that are operated using zenon Web Client have the following limitations:

- ▶ Alarms:
Acknowledgement of alarms is only possible when **zenon Web Server Pro** is used.
- ▶ Command Processing:
The Command Processing module is not supported.
- ▶ User Administration
AD and ADAM/ADLDS only work with certain limitations (as on standard clients too):
AD: The computers must be in the same domain
ADAM/ADLDS: The zenon Web Client needs a physical connection to the zenon Web Server (plus an open port) and to the ADAM/ADLDS server

► Screens:

- The screen of type Archive revision is not available.

► Print:

Before the first printing on the zenon Web Client the function **Select printer** has to be executed. Here the printers for the client can be defined. These settings are saved in the `zenon6.ini` so that this procedure does not have to be executed again with each new print job.

► IPA:

The Industrial Performance Analyzer (IPA) module is only available on zenon Web Clients in an intranet, because no connection can be made to the database via the internet. If there is an intranet connection, the database authorizations have to be set accordingly, so that a remote computer can access the database as a zenon Web Client.

► Menus

On the zenon Web Client Main menus are not displayed.

► Monitor Administration:

The Monitor Administration works only with limited functionality. The zenon Web Client can only be operated with one monitor.

► PFS:

The Production & Facility Scheduler (PFS) is only available in versions 6.01 or higher.

► Status information:

The status information, which is displayed by pressing the right mouse button, is not available.

► Keyboard combinations:

The key combinations on buttons like e.g. F3 are not available.

► VBA:

VBA is only available if VBA has been installed on the zenon Web Client manually. For detailed information, please contact zenon Support.

Note: Message boxes of VBA macros are not shown in the zenon Web Client if Internet Explorer is used as a web browser.

► VSTA: zenon Web Server and zenon Web Client support different versions of VSTA.

In general, zenon Web Client supports VSTA, **with the exception of:**

- Debugging
- **Display VSTA editor** function
- Compiling

For details, see the VSTA with zenon Web Client, zenon Web Server and zenon Web Server Pro (on page 46) chapters.

► zenon Logic is not supported by the zenon web client.

ADDITIONAL RESTRICTIONS FOR WINDOWS CE:

- ▶ A maximum of three zenon Web Clients can be connect with a CE Runtime simultaneously.
- ▶ The zenon Web Server must be running on the same device as the CE Runtime to which it is connected. It is not possible to connect to a CE Runtime on another device.

The zenon Web Server for CE is licensed via the Remote Licensing.

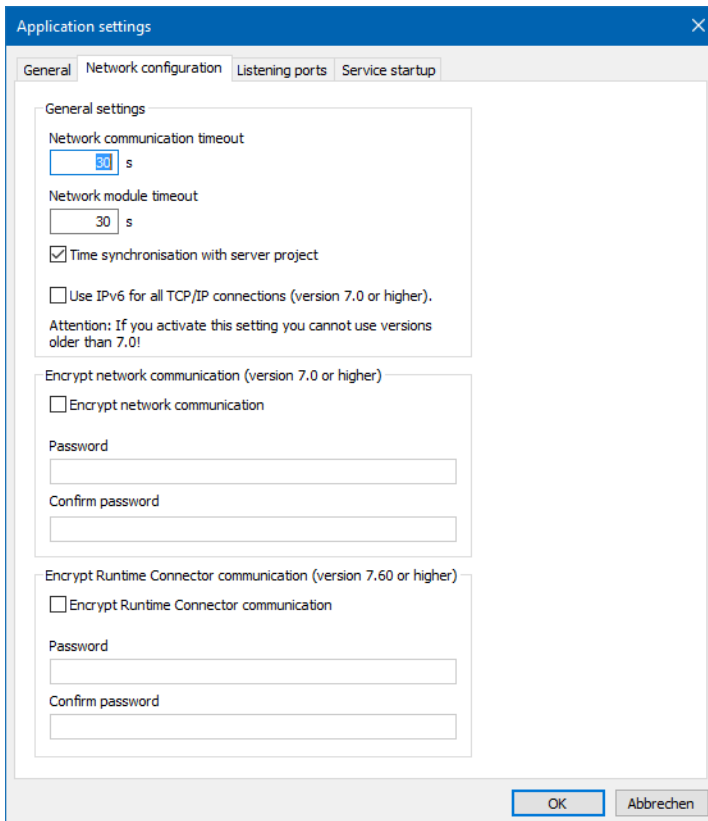
3.3.2 Encryption of the communication in the network.

From zenon version 7, communication in the network can be protected with strong encryption. From zenon version 7.11, the configuration for the encryption of the communication of the Web Server has been integrated into the Startup Tool.

TO ACTIVATE ENCRYPTION IN THE WEB CLIENT:

1. Start the **Startup Tool**.
2. Select the **Options...** menu entry.
3. Switch to the **Network configuration** tab.

4. Activate the **Encrypt network communication** checkbox to activate encrypted zenon Web Client communication.



Application settings

General Network configuration Listening ports Service startup

General settings

Network communication timeout
20 s

Network module timeout
30 s

☒ Time synchronisation with server project

☐ Use IPv6 for all TCP/IP connections (version 7.0 or higher).
Attention: If you activate this setting you cannot use versions older than 7.0!

Encrypt network communication (version 7.0 or higher)

☐ Encrypt network communication

Password
[Empty field]

Confirm password
[Empty field]

Encrypt Runtime Connector communication (version 7.60 or higher)

☐ Encrypt Runtime Connector communication

Password
[Empty field]

Confirm password
[Empty field]

OK Abbrechen



Information

You can get further information for the network configuration in the **Startup Tool** in the *Tools manual in the Network Configuration chapter*.

3.4 IPv6

As of zenon version 7.00 you can use IPv6 in the network.



Information

With IPv6, more users and devices can communicate via the Internet in that they use greater numbers to create IP addresses. With IPv4, each IP address is 32- bits long, as a result of which 4.3 billion unique addresses can be formed. Example for an IPv4 address:

172.16.254.1

For comparison: IPv6 addresses are 128- bits long, which allows formation of approximately 340 sextillion ($3,4e+38$) unique IP addresses. Example of an IPv6 address:

2001:db8:ffff:1:201:02ff:fe03:0405

However IPv6 offers other advantages for network traffic. In most cases, computers and programs recognize IPv6-compatible networks and use the corresponding advantages without the user having to do anything more. IPv6 also frees other network problems that can occur due to the limited addressing area of IPv4. Example: IPv6 reduces the necessity of network address translations (NAT), a service that allows several clients to use a joint IP address, but which does not always work reliably.

The zenon network allows the choice of using IPv6 or IPv4. Dual operation is not possible. The setting is made via:

- ▶ in the **Network configuration** in the **Startup Tool**
or
- ▶ In zenon6.ini

Attention: IPv6 only works with version 7 onwards.

No versions prior to version 7 can be started if this is active. This concerns **zenAdminSrv**, **zenSysSrv**, **zenLogSrv** und **zenDBSrv** in particular.

The following components are not affected by the setting; they always use IPv4:

- ▶ Driver communication with the PLCs
- ▶ Protocol communication in the Process Gateway plug-ins
- ▶ Workbench and Runtime communication in zenon Logic

DIAGNOSIS VIEWER

The Diagnosis Server also works with Diagnosis Clients which addresses via IPv6 addresses. For this the format of the log file has been adapted. The Diagnosis Viewer only reads the new format of the log files. If files from older zenon versions are opened (or vice versa), the IP address of the Diagnosis Client is not displayed correctly.

3.5 Licensing

The licensing determines:

- ▶ The version of zenon Web Server that runs:
 - zenon Web Server
 - zenon Web Server Pro
 - zenon Web Server Pro Light
- ▶ Number of possible parallel zenon Web Client connections (Concurrent Use License)

Note: **zenon Web Server** runs in demo mode without a valid license. In doing so, the following restrictions apply:

- ▶ the **zenon Web Server** can only be started manually
- ▶ The duration that the program can run for is limited to 30 minutes
- ▶ The number of possible clients is limited to 2

To switch from demo mode to a valid license, stop the **zenon Web Server** and enter a valid license number in the License (on page 34) tab. Restart the **zenon Web Server** manually.



Information

The following **dynamic text** elements can be used without a license for **zenon Web Server Pro** and **zenon Web Client**:

- ▶ **User name**
- ▶ **Password**
- ▶ **Signature**

ZENON OPERATOR AND WINDOWS CE:

zenon Web Server Pro Light is available for zenon Operator.

For Windows CE, there is zenon Web Server Pro Light built into Runtime available - Runtime must be started in order for zenon Web Server Pro Light to run. This is limited in functionality due to the platform. Licensing is checked via Remote Transport in the Editor with remote licensing.

You can also enter the license for the zenon Web Server via the licensing:

1. Open **Start -> All programs -> COPA-DATA -> Licensing**.
or:
Start the **zenon Web Server** via **Control panel -> zenon Web Server**.
2. The dialog for entering license data opens.
 - Select zenon **Web Server**.
3. enter the serial number and the activation number

You find the data for this:

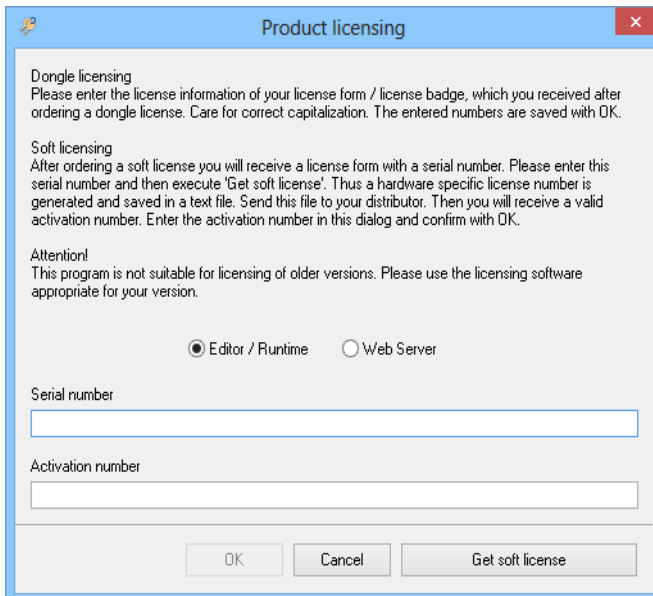
- on your license certificate
- On the license sticker

Path Windows 7/8: C:\Users\Public\Documents\zenon_Projects\

Note: Pay attention to capital letters and small letters when entering the data!

4. restart the **zenon Web Server** on the **State** tab.
5. Once you have restarted the computer, you will use zenon Web Server with the license entered.

LICENSING DIALOG



The image shows a 'Product licensing' dialog box with a blue title bar and a red close button. It contains instructions for 'Dongle licensing' and 'Soft licensing'. Below the instructions are two radio buttons: 'Editor / Runtime' (selected) and 'Web Server'. There are two text input fields: 'Serial number' and 'Activation number'. At the bottom are three buttons: 'OK', 'Cancel', and 'Get soft license'.

Product licensing

Dongle licensing
Please enter the license information of your license form / license badge, which you received after ordering a dongle license. Care for correct capitalization. The entered numbers are saved with OK.

Soft licensing
After ordering a soft license you will receive a license form with a serial number. Please enter this serial number and then execute 'Get soft license'. Thus a hardware specific license number is generated and saved in a text file. Send this file to your distributor. Then you will receive a valid activation number. Enter the activation number in this dialog and confirm with OK.

Attention!
This program is not suitable for licensing of older versions. Please use the licensing software appropriate for your version.

☒ Editor / Runtime ☐ Web Server

Serial number

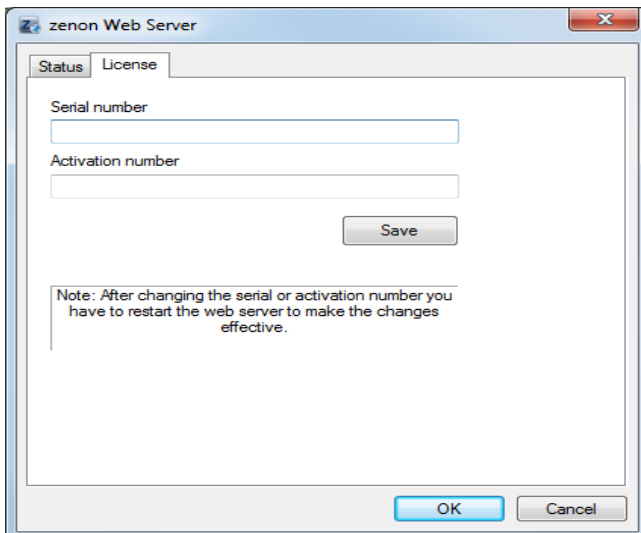
Activation number

OK Cancel Get soft license

Parameter	Description
Editor/Runtime	Active: License is valid for the zenon Editor or the zenon Runtime.
Web Server	Active: License valid for zenon Web Server.
Serial number	License serial number. If there is already a license available, its serial number is displayed here. Enter the current serial number here.
Activation number	License activation number. If there is already a license available, its activation number is displayed here.
OK	Import data and start zenon with this license when it is next started.
Cancel	Discard entries and use zenon with the previous license or no license.
Request soft license	Opens the dialog to request a soft license.

Alternative:

1. Start the zenon Web Server via **Control panel -> zenon Web Server**.
2. Enter, in the **License** tab in zenon Web Server, the serial number and the activation number that is shown on the license form.



3. Click on **Save** in order to save the two numbers.
4. Restart the **zenon Web Server** on the **State** tab.



Attention

The zenon Web Clients that are connected lose their connection when restarted. The zenon Web Clients will do an automatic reconnect after a certain timeout.

Note: License number and activation number are entered in the **zenWebSrv.ini**.

3.5.1 Dongle licensing

zenon supports the **WibuKey** and **CodeMeter** systems for licensing via a dongle. For details on this, see the Dongle licensing section in the Licensing handbook.

Licensing via a dongle is implemented by means of:

- ▶ A computer-based dongle or
- ▶ Network dongle

COMPUTER-BASED DONGLE:

Using a computer-based dongle:

1. You receive a dongle and a license certificate with a serial number and activation number.
2. Close the dongle with the same computer on which you have installed the zenon Web Server.
3. Register the license (on page 34) in the system.

NETWORK DONGLE:

As an alternative to the dongle on the same computer, you can also use the central COPA-DATA network dongle. This can be plugged into any desired computer in the network. Licensing is carried out in the same way as the computer-based dongle.



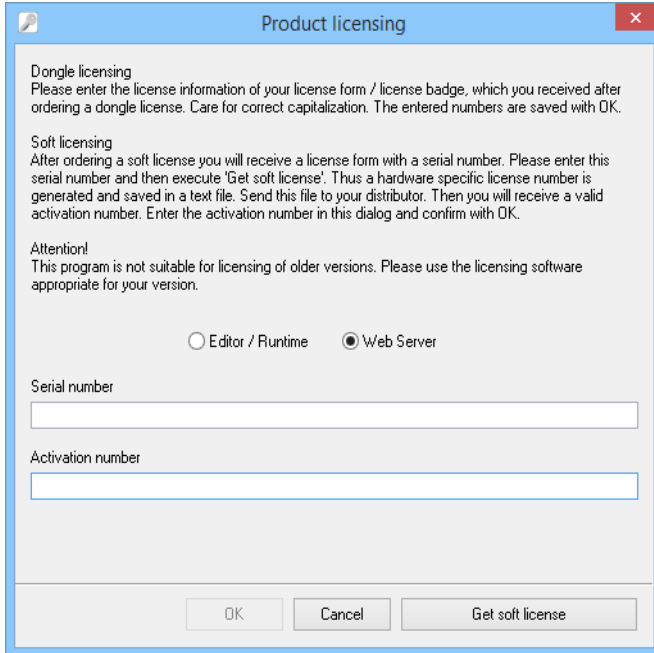
Information

If a copy of zenon Web Server licensed with a CodeMeter loses the connection to the dongle, the zenon Web Server is stopped.

3.5.2 Soft licensing

For soft licensing:

1. Start the Web Server licensing program.



Product licensing

Dongle licensing
Please enter the license information of your license form / license badge, which you received after ordering a dongle license. Care for correct capitalization. The entered numbers are saved with OK.

Soft licensing
After ordering a soft license you will receive a license form with a serial number. Please enter this serial number and then execute 'Get soft license'. Thus a hardware specific license number is generated and saved in a text file. Send this file to your distributor. Then you will receive a valid activation number. Enter the activation number in this dialog and confirm with OK.

Attention!
This program is not suitable for licensing of older versions. Please use the licensing software appropriate for your version.

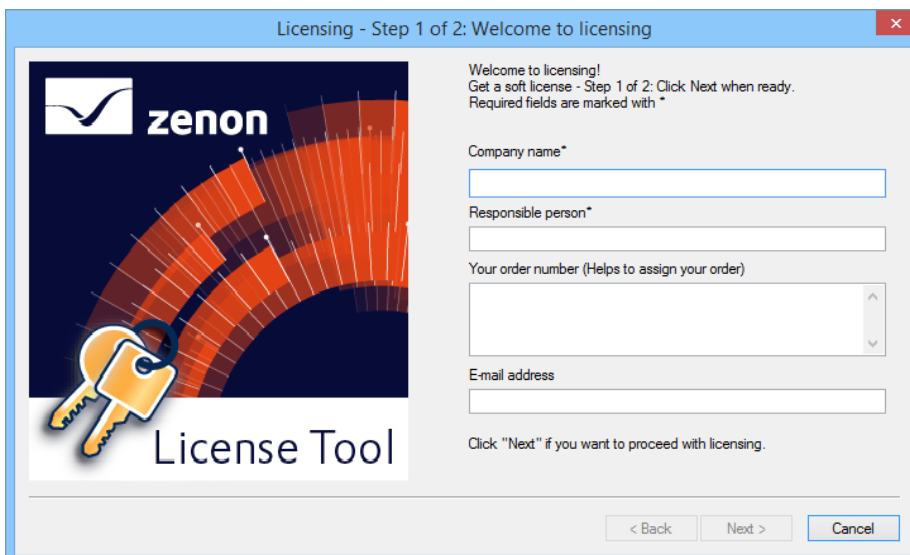
☐ Editor / Runtime ☒ Web Server

Serial number

Activation number

OK Cancel Get soft license

2. Click on the **License request** button for **soft licensing**.
3. The form for your license data is opened.



Licensing - Step 1 of 2: Welcome to licensing

Welcome to licensing!
Get a soft license - Step 1 of 2: Click Next when ready.
Required fields are marked with *

Company name*

Responsible person*

Your order number (Helps to assign your order)

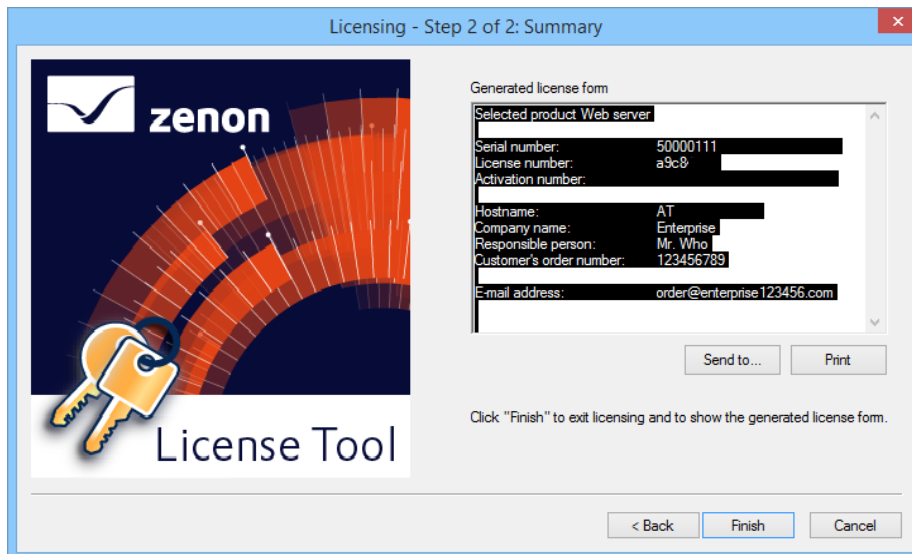
Email address

Click "Next" if you want to proceed with licensing.

< Back Next > Cancel

4. Fill out all fields and click on **Next**

5. The program creates a license request certificate with the license number that is valid for your computer.

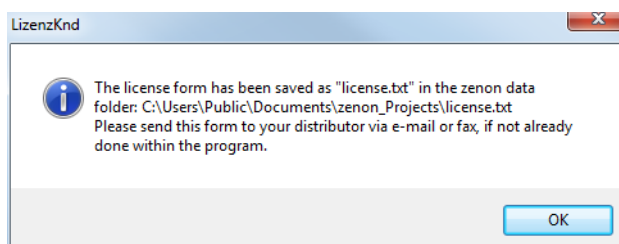


6. Send your license request to your sales partner:

- a) By clicking "Send via email"
- b) By clicking "Print as print-out or fax"

The license number is also included on the license certificate and must correspond to that of your computer.

7. An infobox summarizes the process.



8. As soon as you have received your license data, register the license (on page 34) in the system.



Information

Please note that the **License request for soft-licensing** button is not available for all OEM versions.

3.6 Redundancy operation

The zenon Web Server can also be operated as redundant. If a zenon Web Server fails or is stopped, the zenon Web Client automatically switches to the Standby zenon Web Server.

Attention

An automatic switch back - as with the Primary Server - is not carried out. zenon Web Client remains connected to the Standby zenon Web Server until:

- ▶ zenon Web Client is restarted or
- ▶ The Standby zenon Web Server is stopped or fails

Then the zenon Web Client tries to connect with the first zenon Web Server defined as standard.

If only one zenon web server is used, it is strongly recommended that this is not operated on the Primary Server or the standby server. If this computer fails, the zenon web server will also fail.

3.7 HTTP Tunneling

The zenon Web Server can also, instead of TCP connections, accept HTTP connections. HTTP connections are only accepted by zenon Web Clients. The connection from the zenon Web Server to the Primary Server is always made via TCP. A separate HTTP connection is created for each connection from the zenon Web Client to the zenon Web Server.

Connections are made via TCP by default.

To use HTTP tunneling, the following must be the case:

- ▶ HTTP must be activated using the configuration dialog or the entry in **zenon6.ini**.
- ▶ Port 8080 or the alternative port configured in **zenon6.ini** must be reachable on the computer of the zenon Web Server.
- ▶ The Project entry page for zenon Web Clients, which should connect to the zenon Web Server with HTTP tunneling, should have the **UseHTTP** parameter with a value that is not 0 in the `<embed>` and `<object>` entry

Note: HTTP tunneling is not available with Windows CE.

CONFIGURATION OF THE PORT:

On the computer with zenon Web Server:

1. Open the **zenon6.ini** file.
2. Navigate to the **NET_PROXYPORT=** entry or create this

3. Configure the desired port

Default: 8080

The zenon Web Server listens on the port, the zenon Web Client connects to the port.

4. Save the **zenon6.ini** file.

On the computer with zenon Web Client:

- ▶ Configure the HTTP port in the **zenon6.ini** file on the computer with the zenon Web Client by carrying out the above-mentioned steps again on this computer.

Note: Each change to the port number in zenon6.ini on the computer on which the zenon Web Server is running must also be created accordingly on all computers configured with zenon Web Client.

Furthermore, the HTTP port may need to be configured manually on the computer with the zenon Web Server in the Windows Firewall, as an exceptional port for incoming connections.

PROCEDURE:

The zenon Web Client sends its messages for the Runtime server to the zenon Web Server via HTTP POST. This forwards it to the assigned connection to the Runtime server via TCP. The Runtime server sends its messages for the zenon Web Client via TCP to the zenon Web Server, which buffers them.

The buffer of a connection is emptied by the zenon Web Client via a HTTP GET requests. If no message is available for a connection, the client waits for a configurable time (**POLLING_INTERVALL** entry in **zenon6.ini** with a set default of 2 seconds).

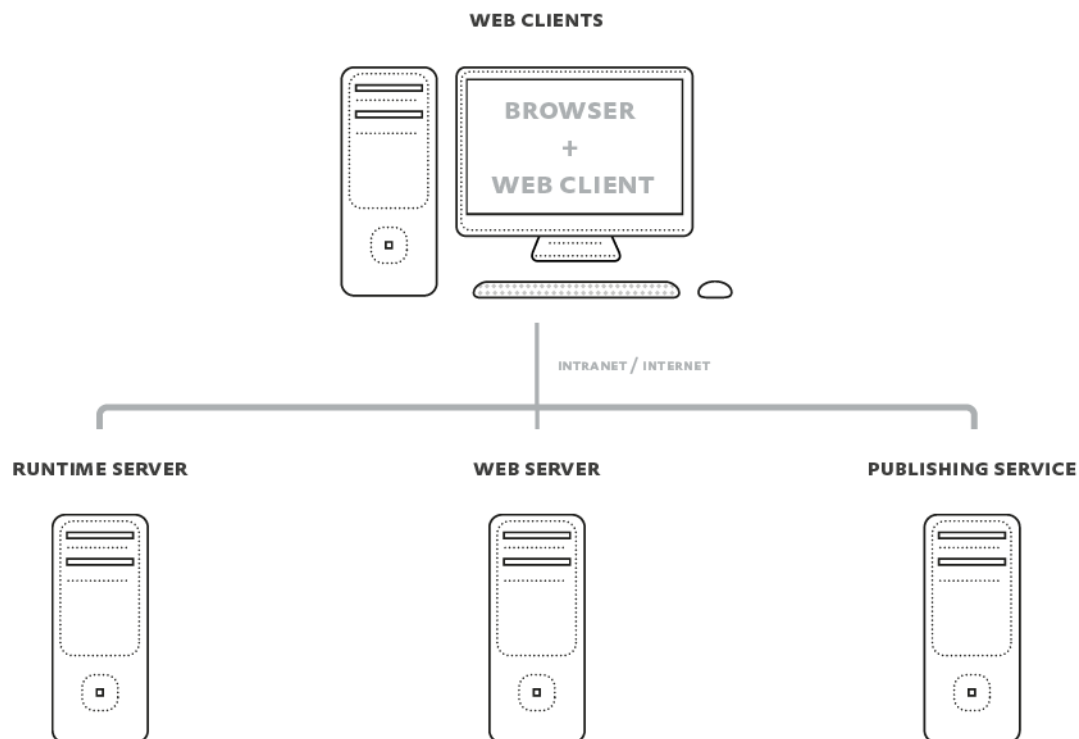
For details, see the Procedure for HTTP connection (on page 43) chapter.

ERROR MESSAGES:

If the HTTP connection is active, network-specific messages are sometimes shown in the Diagnosis Viewer instead of HTTP-specific messages. For example, if a connection is made or disconnected or in the event of an HTTP error.

3.7.1 Procedure with HTTP connection

If a zenon Web Client is started, it connects to the Primary Server via the zenonWeb Server:



1. The user starts the browser and opens the project entry page (on page 25).
2. The project entry page instigates the browser to start the zenon Web Client with the pre-defined HTTP tunneling configuration.
3. The zenon Web Client makes 3 HTTP connections (control, data and file synchronization connection) to the zenon Web Server:
 - a) A connection ID is requested by the zenon Web Client.
 - b) The zenon Web Server sends a free connection ID if one is available. The ID sent is entered into the list of connection IDs issued. This happens so that no ID can be issued twice and to transfer the HTTP connection to a TCP connection.
 - c) The network init packet is sent to the zenon Web Server via the HTTP connection.
 - d) The zenon Web Server checks to evaluate if this zenon Web Client is already in the list of active clients. If the client is new, a check is made to see if the maximum number of clients has already been reached. If the client connection can be accepted, a TCP connection is made in Runtime and the init packet is forwarded. The accepted client connection and the server connection that has been made are mapped to each other until the connection has ended: Data from the client connection is forwarded via the server connection and vice versa.

4. Data exchange:
 - a) The zenon Web Server works as a protocol translator between TCP and HTTP and buffers the messages.
 - b) Data from Runtime for the zenon Web Client is buffered on the server. The zenon Web Client calls this up by means of GET requests.
 - c) Data from the zenon Web Client for Runtime is sent by the zenon Web Client by means of a POST request and forwarded to Runtime zenon Web Server.
5. If the zenon Web Client is ended in the browser (the browser is closed or the project entry page is left), all connections are disconnected by the zenon Web Client.
 - a) The zenon Web Client sends a network-end package to the zenon Web Server. The zenon Web Server forwards this to the Runtime, ends the connection and clears the occupied resources (working memory, ports, connection ID ...).
 - b) When the client is cleaning up, an additional HTTP end packet is sent to the zenon Web Server, to ensure that the connection ID was removed from the list.

3.8 Supported web browsers:

zenon Web Client supports the following browsers:

- ▶ Microsoft Internet Explorer

Attention: zenon Web Client, as a 32-bit application, must be used with the 32-bit version of Internet Explorer.

The 64-bit version cannot be used due to the lack of ActiveX support.

It is recommended that you always use the most up to date version.



Information

The browser for zenon Web Client must support one of the following operating systems:

- ▶ Windows 7
- ▶ Windows 8 and 8.1
- ▶ Windows Server 2008 and 2008 R2
- ▶ Windows 10
- ▶ Windows Server 2012

Other operating systems, such as Windows CE, Linux or others are only usable in combination with a terminal server.

BROWSER START:

The project entry page (on page 25) decides the basis of browser identification, if and how the zenon Web Client is started:

- ▶ Internet Explorer:
Start as ActiveX component
- ▶ Other browsers or non-supported versions:
An error message is shown; zenon Web Client does not start

SUPPORTED VERSIONS:

Browser	From version	Remark
Microsoft Internet Explorer	▶ 6.0	<ul style="list-style-type: none"> ▶ Recommended from: 8.0 ▶ 32-bit version only ▶ Note the information on memory protection for IE 8/9 <p>Attention: The 64-bit version of Internet Explorer 11 does not support ActiveX and therefore cannot be used as a zenon Web Client. This also applies for IE as a mobile app, Metro Style and under RT.</p>

3.9 Folder for Runtime files

zenon Web Server saves the Runtime files in the %Temp%\zenWebCli folder as standard.

%Temp% signifies the temporary file folder under Windows. This is saved individually for each user and can be changed under **System control-> System -> Advanced system settings-> Environment variables**.

Note: The %Temp% folder is user-dependent. Each Windows user thus loads the Runtime files from the Primary computer.



Attention

*When using Microsoft Internet Explorer in **secure mode** the Runtime files are saved in the %Temp%\Low folder.*

You can define any desired folder as the storage location for the Runtime files with the **zenon6.ini** entry:

1. Open the **zenon6.ini** file.
2. Navigate to the section

[PATH]

3. Create or modify the entry

WEB_PROJECT_PATH=

3.10 VSTA and VBA with zenon Web Client, zenon Web Server and zenon Web Server Pro

Note: VBA is supported by zenon in zenon Web Server and zenon Web Server Pro. However for security reasons, we recommend that you switch to VSTA. You can find out further information on VBA in the macro list.

VSTA is supported by zenon with different versions of zenon Web Server und zenon Web Server Pro (on page 6).

Function	zenon Web Client with zenon Web Server Standard	zenon Web Client with zenon Web Server Pro
Show VSTA macro dialog	+	+
Execute VSTA macro	+	+
Open VSTA editor	-	-
VSTA events	+	+
Remark	<ul style="list-style-type: none"> ▶ No values are written to zenon variables. ▶ Windows messages boxes can be opened. ▶ Compiling and debugging is not possible. To do this, a standard zenon Runtime must be used. 	<ul style="list-style-type: none"> ▶ All zenon VSTA functionalities are available in full. ▶ Compiling and debugging is not possible. To do this, a standard zenon Runtime must be used.

INSTALLATION:

For the use of VSTA

- ▶ The following applications must be present on the system or installed manually:
 - Microsoft Visual Studio Tools for Applications 2.0 (VSTA 2.0)
 - Microsoft .NET Framework 3.5

Both programs are on the installation medium for zenon Web Server or zenon 7.60.

- **VSTAIntegration.dll** must be in the zenon program folder.
This is installed automatically when zenon is installed.

INI ENTRIES:

The following entries must be set in **zenon6.ini**:

[VSTA]

ON=1

CSHARP=1

[VBA]

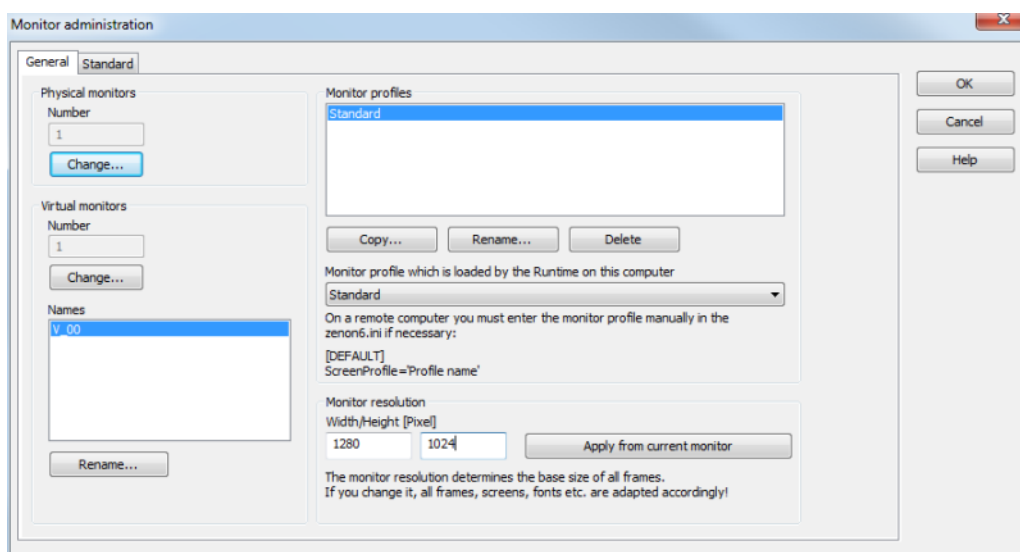
EIN=1

EVENT=1

3.11 Screen resolution and monitor administration

zenon monitor administration is available in zenon Web Client with limitations.

Important for configuration: The automatic adaptation of the resolution to the client cannot be used for web use. For this reason, the screen size must be set accordingly during configuration. zenon Web Client uses the screen size set for the project as standard: **Project properties** -> **Graphical design** -> **Monitor administration** -> Click on the ... button -> Tab **General** - **Screen resolution**.



The resolution can be scaled using the zenon Web Client setting. For details, see Configuration of the example page chapter.

With the help of the zoom property, zenon Web Client can be zoomed to the size of an ActiveX element.

SIZE IN THE BROWSER:

The browser always needs some screen area for menus and scroll bars. So the area, which is available for the zenon Web Client, is always smaller than the defined monitor resolution. If you would like to have a full screen of the project in the browser, you must set the screen size as smaller than the screen size on the zenon Web Client.

For example:

Monitor resolution on zenon Web Client PC: 1024x768 pixel

Screen size in monitor administration: 800 x 600.



Information

If you want to use the multi-project administration on the zenon Web Client, the screen size has to be the same for all projects!

MULTI-MONITOR SYSTEM:

On a multi-monitor system, the process screens are opened as defined in the profile, on different real monitors. When using a zenon Web Client, these are then outside of the visible area, but can be reached by scrolling.

Recommendation: Configure the monitor profile in such a way that all monitors are on Main monitor mapped; you then have access to all monitors.



Information

*The standard profile is always loaded by default on the zenon Web Client. However, you can stipulate a different monitor profile using the **SCREENPROFILE=** entry in `zenon6.ini`.*

3.12 Implementing the zenon Web Server in the internet environment

Note: If the zenon Web Client is to contact the zenon Web Server via the Internet, it is recommended that a VPN connection is set up between the network with the zenon Web Client computer, the network with the zenon Web Server computer, and the zenon Server.

To integrate zenon Web Server into an internet environment:

- ▶ Any firewall that may be present must be configured accordingly:
 - **Port 1102** on the firewall must be open for incoming packages, so that a zenon Web Client can access a zenon Web Server and therefore access a Primary Server.

- NAT (Network Address Transformation) must run on the gateway station. NAT transforms the internal LAN address to the address of the gateway station. If, for example, somebody surfs inside the LAN, it always looks as if the gateway station were sending the requests from outside.
- Static IP address for zenon Web Server:
The firewall on the gateway station has to be configured in such a way that all incoming packages for port 1102 are **automatically** sent to the station with the zenon Web Server. That means: This station must have a static IP address.
- ▶ The project entry page has to be adapted so that zenon Web Client knows which station to access in the internet: The amendment is made in **global_vars.js** or, for older versions, in **project_A_X.html** (X stands for the language version, such as G for German) :
 - For Web Server **VALUE=** WEB-SERVERNAME, the `computer` name of the gateway station (the station visible from the Internet) and not the computer name of the real zenon Web Server has to be entered. The real zenon Web Server is not visible from the internet. The gateway station then automatically forwards the requests from the zenon Web Client to port 1102, then automatically to the real zenon Web Server.

3.13 Error treatment

Known error messages or execution errors:

- ▶ Crash after browser refresh (on page 49)
- ▶ ActiveX control failed to load (on page 50)
- ▶ ActiveX control not installed correctly (on page 51)
- ▶ Exceptional Web Client error in Internet Explorer 8 (on page 51)
- ▶ HTTP error messages (on page 52)
- ▶ Init Runtime Error (on page 56)
- ▶ Keyboards in Firefox (on page 56)
- ▶ Max. clients (on page 57)

3.13.1 Crash after browser refresh

Using Internet Explorer 6 with the zenon Web Client can lead to Internet Explorer crashing if the browser **refresh** button is clicked. We therefore recommend that you do not use the **refresh** button.

This button causes a complete closure and restart of the zenon Web Client. This means, that the connection to the Runtime server is closed and has to be re-established by the zenon Web Client.

ERROR 101

If zenon Web Client was already installed on the client computer, the following error message can be displayed when zenon Web Client connects to zenon Web Server or Runtime:

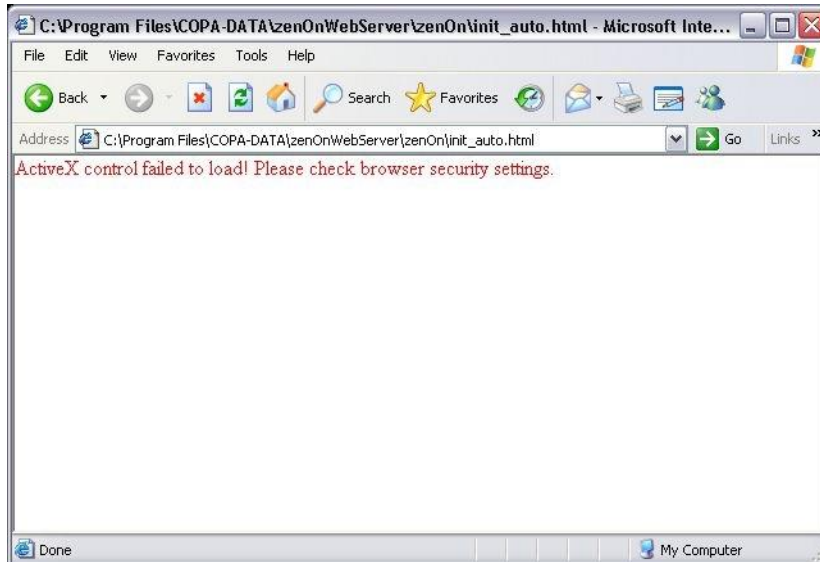
Error 101

Project XXX was edited with version XXX and cannot be opened here

In this case:

1. Uninstall zenon Web Clients
2. Restart the computer
3. New installation of zenon Web Client

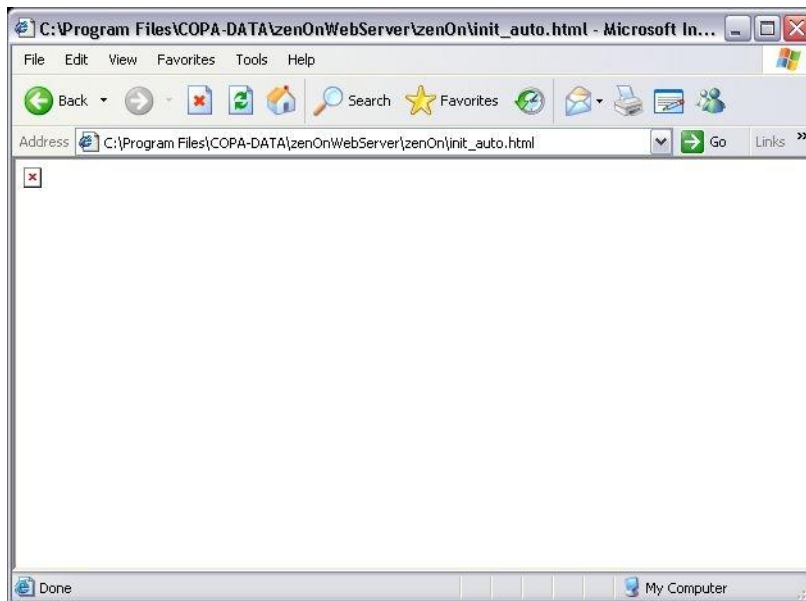
3.13.2 ActiveX control failed to load



If the browser displays an Init Runtime Error, there are several possible reasons for that: The most probable thing:

- The browser's security settings prevent the correct execution of the ActiveX control.

3.13.3 ActiveX control not installed correctly



If the browser only displays an X, instead of Runtime, after the project start page has been called up:

- ▶ The ActiveX control for zenon Web Client was not installed correctly
- ▶ The wrong version (on page 22) of zenon Web Client is installed

3.13.4 Exceptional zenon Web Client error in Internet Explorer 8 or higher

ERROR

The zenon Web Client is ended with an exceptional error if VSTA or VBA is executed in the project in the project.

REASON

Microsoft Internet Explorer has a setting for memory protection from version 8. If this is active, executing VBA leads to an exceptional error and Internet Explorer ends. VSTA always activates VBA too.

SOLUTION

Deactivate the memory protection in Internet Explorer under:

Extras->Internet options->Advanced->Enable memory protection to help mitigate online attacks

3.13.5 HTTP error messages

Error messages and what they mean:

Entry	Level	Description
NetSrv Error Do Send HTTP failed! HTTP-Status: [HTTP-Status]	ERRORS	The HTTP Web Server has responded to an HTTP POST request with an error.
NetSrv Error Do Send HTTP failed!	ERRORS	The HTTP POST request failed (e.g. timeout).
NetSrv Error Do Send HTTP Server failed! Data Management Class Error!	ERRORS	An error occurred when saving a message in the buffer to the HTTP Web Server. The error occurred in the data management class.
NetSrv Error Do Send HTTP Server failed!	ERRORS	An error occurred when saving a message in the buffer to the HTTP Web Server. The error occurred in the buffer list.
NetSrv Error Do Recv HTTP failed! HTTP status: [HTTP-Status]	ERRORS	The HTTP Web Server has responded to an HTTP GET request with an error.
NetSrv Error Do Recv HTTP failed!	ERRORS	The HTTP Get request failed (e.g. timeout).
NetSrv Error Do Recv HTTP Server failed! Data Management Class Error!	ERRORS	An error occurred when reading a message in the buffer to the HTTP Web Server. The error occurred in the data management class.
NetSrv Error Do Recv HTTP Server failed! Buffer Too Small!	ERRORS	The packet read from the buffer list is too large for the data buffer. Note: Due to the uniform maximum packet size, which also serves as a buffer length definition, this should never occur.
NetSrv Error Do Recv HTTP Server failed! Error While Copying Data Into Buffer!	ERRORS	An error occurred when copying data from the buffer list.
Error Out Of Memory While Adding Data to HTTP GET Response	ERRORS	Creation of a memory area was not possible when compiling an HTTP response at the HTTP Web Server.
Error On Adding Data to HTTP GET Response	ERRORS	An error occurred when copying data from the buffer list in the HTTP response.
HTTP Send Get Response Failed: [Status]	ERRORS	Sending of a response to an HTTP GET request has failed. The status code is a system error code (can be looked up in the MSDN library).
Error Out Of Memory While Receiving Data from HTTP POST	ERRORS	Creation of a memory area was not possible when reading off an HTTP POST response at the HTTP Web Server.
Error on Receiving Data from HTTP POST [Status]	ERRORS	Reading off data from the HTTP-POST request has failed. The status code is a system error code (can be looked up in the MSDN library).
Error Data Block Of HTTP Post Request Too Large	ERRORS	The data from the request received exceeds the defined maximum packet size.
HTTP Send Post Response Failed: [Status]	ERRORS	Sending of a response to an HTTP POST request has failed. The status code is a system error code (can be looked up in the MSDN library).

Error Out Of Memory While Parsing HTTP Request	ERRORS	Creation of a memory area was not possible when forwarding an HTTP response to the relevant thread.
Memory Error on Creating Receive Buffer	ERRORS	Creation of a memory area when creating the HTTP receipt buffer was not possible.
Error on Creating HTTP Request Event	ERRORS	Creation of events for the receipt of HTTP requests has failed.
Error While Waiting For HTTP Request: [Status] --> Exiting Listening Thread	ERRORS	An error occurred when waiting for an HTTP request. The status code is a system error code (can be looked up in the MSDN library).
Unexpected Result While Waiting For HTTP Request: [Status] --> Exiting Listening Thread	ERRORS	Waiting for an HTTP request provides an unexpected result. The status code is a system error code (can be looked up in the MSDN library).
HTTP Request Without ID Received	ERRORS	The connection ID was not present in the HTTP request.
Error on Extracting HTTP-Request-ID From URL	ERRORS	The connection ID of the HTTP request cannot be read off.
Error: Closing HTTP Connection ID [ID] Could Not Be Resolved	ERRORS	An attempt was made to close a connection that does not exist or was already closed. This error is less critical because the request to delete the connection ID when clearing connection resources can be made more than once after it has ended.
HTTP Request With Incompatible ID Format Received	ERRORS	The connection ID in the HTTP request does not have the expected format.
Could Not Assign New HTTP ID Because The Map Is Full	ERRORS	A new connection could not be accepted because there is no more space in the connection list. The list contains space for over 4.2 billion connections, so this message should therefore never appear.
Error During HTTP Accept	ERRORS	An error occurred when accepting the HTTP connection.
Error On Sending HTTP ID: [Status]	ERRORS	The sending of an HTTP response with the connection ID for the new client connection has failed. The status code is a system error code (can be looked up in the MSDN library).
Error: HTTP Connection ID [ID] Could Not Be Resolved	ERRORS	The connection ID of the HTTP request cannot be resolved.
Error: HTTP Request Could Not Be Assigned To The Socket	ERRORS	The HTTP request could not be forwarded to the relevant thread.
Unsupported HTTP-Request Received	ERRORS	An unsupported HTTP request was received. GET and POST requests are supported.
Error While Receiving HTTP Request: [Status] --> Exiting Listening Thread	ERRORS	An error occurred when receiving an HTTP request.
Error on Removing HTTP	ERRORS	An error occurred when removing a connection ID from the list.

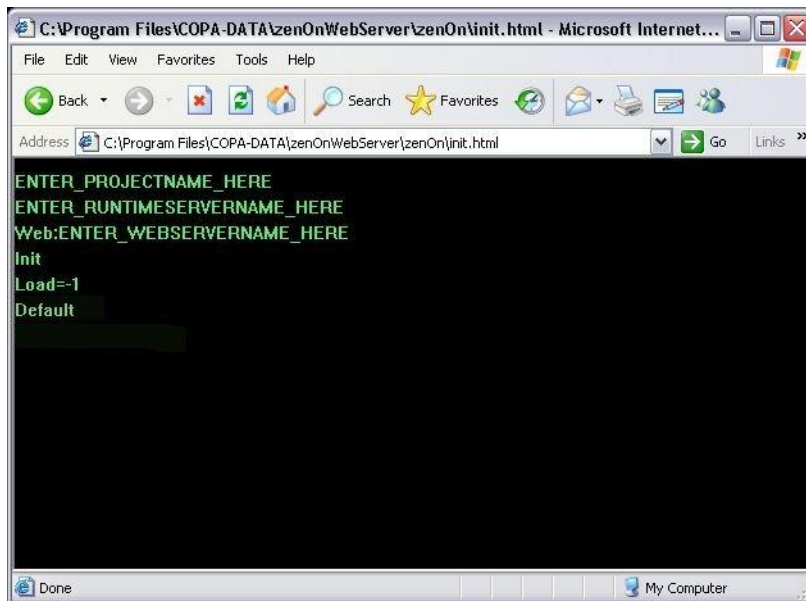
Connection ID From The Map!		Connection IDs are removed if a connection is closed.
Removing HTTP Connection ID [ID] From The Map!	DEBUG	The connection was closed and the ID was removed from the list.
Error on Removing Non-Active HTTP Connection ID From The Map!	ERRORS	An error occurred when removing an inactive connection ID. A connection is then active if no HTTP requests have been received for 5 minutes. Such a connection should really already be removed due to the lack of a watchdog.
Removing Non-Active HTTP Connection ID [ID] From The Map!	DEBUG	The connection ID was removed from the list because the connection is inactive. A connection is then active if no HTTP requests have been received for 5 minutes. Such a connection should really already be removed due to the lack of a watchdog.
Error While Waiting for HTTP Connection Map Check [Status]!	ERRORS	The thread to check the connection ID established an error when waiting for the next cycle and is ended. The status code is a system error code (can be looked up in the MSDN library).
NetSrv Accept HTTP Client Socket Error On Starting HTTP Reply Thread	ERRORS	The thread to respond to HTTP requests could not be started.
NetSrv Info Accept HTTP Client IP:[IP-Adressr]:[Port] Ok	DEBUG	The HTTP connection has been accepted successfully.
NetSrv Memory Error Do Recv HTTP failed!	ERRORS	An error occurred due to too little memory being available when receiving data via HTTP tunneling.

LOG ENTRIES FROM CNSBLOCKINGSOCKETEXCEPTIONS

Level: Always ERRORS

Entry: Exception text	Description
Connect: HTTP error	The HTTP Web Server has responded to a connection ID request with an error.
Connect: ID-Data did not have the expected Format	The connection ID provided by the HTTP Web Server does not have the expected format.
Connect: Server denied HTTP ID	The HTTP Web Server has rejected the granting of a connection ID.
Connect: Error during ID-Acquisition	An error occurred when requesting a connection ID (e.g. timeout).
HttpInitialize Failed	HTTP server API could not be initialized
HttpCreateHttpHandle Failed	The HTTP request list could not be created
HttpAddUrl Failed	The server could not enter list mode

3.13.6 Init Runtime Error



If the browser displays an Init Runtime Error, there are several possible reasons for that:

- ▶ Runtime is not active on Runtime Server
- ▶ SERVER NAME in `Globalvars.js` (on page 15) is spelled or defined incorrectly (always use capital letters).
- ▶ PROJECT NAME in `Globalvars.js` (on page 15) is spelled or defined incorrectly (always use capital letters).
- ▶ The naming resolution between the zenon Web Server and the Primary Server is not present in the network.
- ▶ The zenon Web Server is not started.

You may find notes on the causes of errors in the `zenNetErr.txt` file. This logs network information.

3.13.7 Keyboards in Firefox

If individual keyboards do not work correctly in Firefox, consider the following note:



Attention

Individually adapted screens of type **Keyboard** may under certain circumstances not work properly with the Mozilla Firefox browser.

Reason: Mozilla Firefox loads new windows in the background without putting the focus on them. Depending on the project configuration, individually-adapted keyboard screens are closed as soon as they are no longer in focus.

Solution: Use a different browser such as Microsoft Internet Explorer or Google Chrome, or use the "Close on loss of focus" frame option".

Automatic keyboards are not affected!

3.13.8 Max. clients



Message to the zenon Web Client.

More clients than are licensed (on page 34) are attempting to connect to the zenon Web Server.

3.13.9 Behavior of the zenon Web Client in the event of a loss in connection

In the event of a loss of the connection to the Primary Server, the zenon Web Client uses the next connection configuration.

Possible reasons for a loss of connection:

- ▶ The Primary Server fails and the Standby Server takes on its role.
- ▶ The Primary Server comes back and resumes its role again (= the Standby Server quits the connection).
- ▶ The zenon Web Server that is currently being used fails.

The connection configurations are gone through in this sequence (from the start again once the end has been reached):

1. zenon Web Server and Primary Server
2. zenon Web Server and Standby Server

3. Standby zenon Web Server and Primary Server
4. Standby zenon Web Server and Standby Server

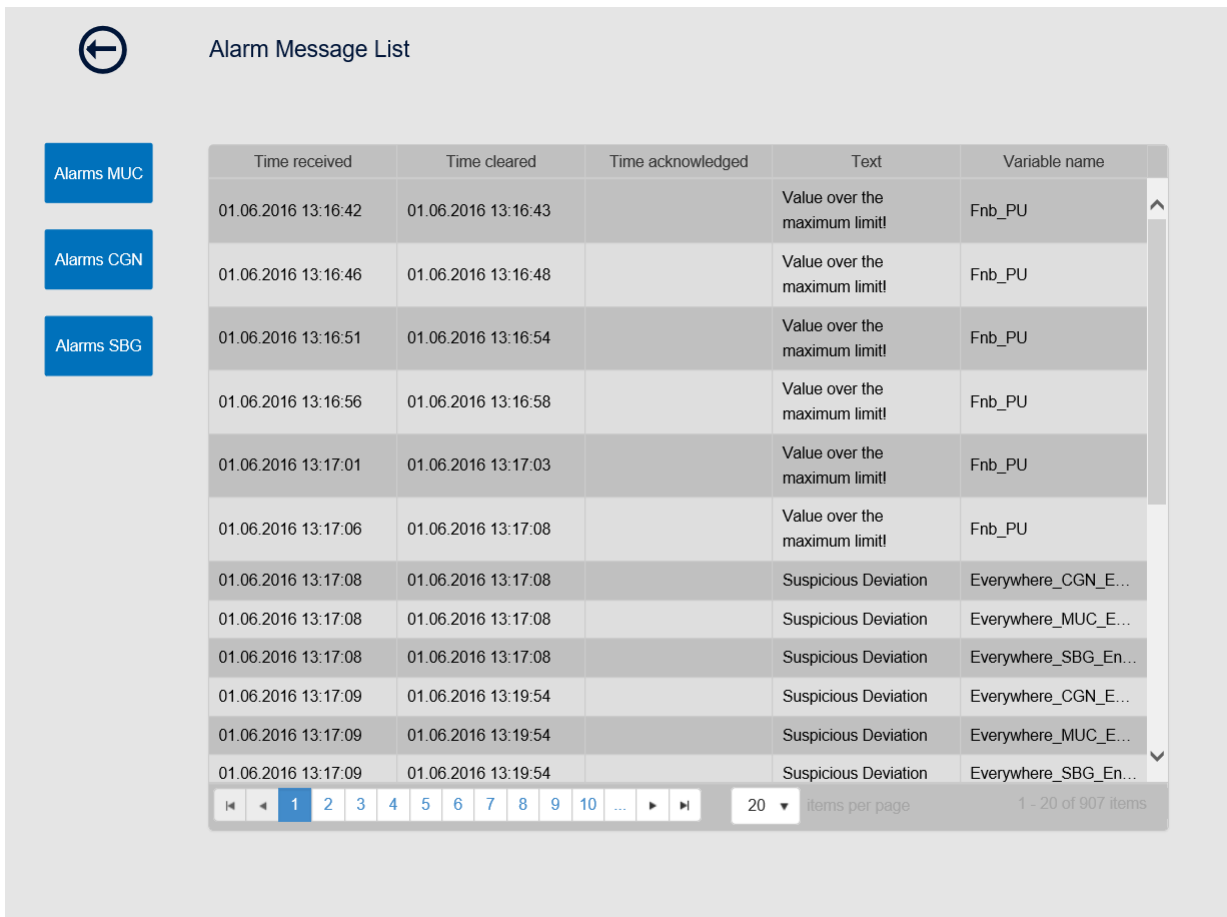
If a Standby zenon Web Server has been configured but cannot be contacted, the following happens if the Primary Server comes back:

1. The zenon Web Client is currently in connection configuration 2 and loses the connection because the Primary Server takes over the process management again.
2. The zenon Web Client attempts to connect with connection configuration 3 again, but times out because the Standby zenon Web Server cannot be reached.
3. The zenon Web Client attempts to connect with connection configuration 4 again, but times out because the Standby zenon Web Server cannot be reached.
4. The zenon Web Client attempts to connect again with connection configuration 1, which works. The zenon Web Client is online again.

In the event of a failed connection, the zenon Web Client cannot establish whether it is the zenon Web Server (or the Standby zenon Web Server) or the Primary Server (or Standby Server) that cannot be contacted, which is why these four connection possibilities must be gone through.

4. HTML Web Engine

The **HTML Web Engine** is for the provision of zenon screens as a HTML5 web page. The user interface is called up and displayed on the visualization end device using a web browser. No special software installation - or any browser plug-ins - are required on the end device. Process data for the visualization is taken from zenon Runtime.



Alarm Message List

Time received	Time cleared	Time acknowledged	Text	Variable name
01.06.2016 13:16:42	01.06.2016 13:16:43		Value over the maximum limit!	Fnb_PU
01.06.2016 13:16:46	01.06.2016 13:16:48		Value over the maximum limit!	Fnb_PU
01.06.2016 13:16:51	01.06.2016 13:16:54		Value over the maximum limit!	Fnb_PU
01.06.2016 13:16:56	01.06.2016 13:16:58		Value over the maximum limit!	Fnb_PU
01.06.2016 13:17:01	01.06.2016 13:17:03		Value over the maximum limit!	Fnb_PU
01.06.2016 13:17:06	01.06.2016 13:17:08		Value over the maximum limit!	Fnb_PU
01.06.2016 13:17:08	01.06.2016 13:17:08		Suspicious Deviation	Everywhere_CGN_E...
01.06.2016 13:17:08	01.06.2016 13:17:08		Suspicious Deviation	Everywhere_MUC_E...
01.06.2016 13:17:08	01.06.2016 13:17:08		Suspicious Deviation	Everywhere_SBG_En...
01.06.2016 13:17:09	01.06.2016 13:19:54		Suspicious Deviation	Everywhere_CGN_E...
01.06.2016 13:17:09	01.06.2016 13:19:54		Suspicious Deviation	Everywhere_MUC_E...
01.06.2016 13:17:09	01.06.2016 13:19:54		Suspicious Deviation	Everywhere_SBG_En...

1 2 3 4 5 6 7 8 9 10 ... 20 items per page 1 - 20 of 907 items

FUNCTIONALITIES OF THE HTML WEB ENGINE

Overview of the functions of the HTML web engine:

- ▶ Session-based provision of HTML5 visualization content on HTML web clients.
- ▶ Display of basic visualization content that was created in the zenon Editor.
- ▶ Data view:
 - Variable values
Displays are updated dynamically in the HTML Web Engine.

- Chronological Event List (CEL)
Entries in the CEL are updated dynamically in the HTML Web Engine.
 - Extended Trend (ETM)
The display in the ETM is not updated dynamically in the HTML Web Engine. This means that the ETM only draws with existing data when called up and is then no longer updated.
 - Messages from the Alarm Message List (AML)
Entries in the AML are updated dynamically in the HTML Web Engine.
- ▶
- ▶ Forwarding of process information, such as variable values, alarm messages or event messages from a zenon Runtime to one or more HTML web clients.
 - ▶ Support of active operations, such as write set value.
 - ▶ Mobile, location-independent operation and observation.
 - ▶ No installation and/or configuration on the end device i.e. the client is necessary.
Platform-independent display in HTML5 standard.
 - ▶ Operation of the HTML web server on a different computer, such as is possible in a DMZ for example.
 - ▶ Secure network communication via HTTPS, based on SSL certificates.
 - ▶ Protection of sensitive visualization areas or processes by means of user authentication and support of user levels.

The HTML Web Engine supports the authentication of a Web Engine client with increased security in relation to the zenon user authentication and Active Directory. Login is via entry of the user name and password.

4.1 Required components and their definitions

Components	Description
zenon Runtime	The process data for the HTML5 visualization is provided by a zenon Runtime (server or client).
HTML Web Engine (on page 59)	<p>The HTML Web Engine is for the provision of process screens as an HTML5 web page. The user interface is called up and displayed on the visualization end device using a web browser. Neither special software installation nor a software plug-in are required on the end device. Process data for the visualization is taken from zenon Runtime.</p> <p>Note: The HTML Web Engine processes process data for the purpose of visualization and operation by the HTML web client. The process data is only administered by zenon Runtime.</p>
IIS (on page 67)publishing service	(on page 10)Services platform of Microsoft for PCs and servers. It can be used to make documents and files accessible in the network. The HTML Web Engine uses IIS as a runtime environment and for the publishing of zenon process screens. HTTPS is used as a communication protocol. Deployment (on page 75) is used to instance the HTML Web Engine on the IIS.
Web browser (on page 44)	Web browsers are special computer programs for the display of documents and data, especially web sites in the World Wide Web.
zenon Web Engine Deployment Tool (on page 75)	Provides the HTML Web Engine as a web application in IIS and allows the configuration thereof. An existing HTML Web Engine instance can also be updated or deleted.
Web engine compiler	Generates, from a zenon project, the data that the HTML Web Engine needs to provide HTML5 content for the zenon Web Client. When translating this project data, the HTML Web Engine compiler checks the project contents and provides information on non-supported functions or properties. As a result of the translation process, a file is created that is provided to the Web Engine.
SCADA Runtime Connector (on page 74)	Serves as a communication interface to zenon Runtime.

4.2 Basic system construction of the HTML Web Engine

The HTML Web Engine is a web application that provides an HTML5 web page.



Attention

Recommendations:

- ▶ Always operate the whole system configuration in a trusted network area.
- ▶ Never publish the HTML5 web site in the Internet directly.

In the course of a session, a distinction between two different connection levels is made:

1. Display of visualization pages without process data
2. Display of the visualization pages and display of process data

DISPLAY OF VISUALIZATION PAGES WITHOUT PROCESS DATA

The zenon Web Client connects itself to the HTML Web Engine by calling up the URL (Uniform Resource Locator) for the HTML5 web page. Once the session has been set up successfully, the project can be visualized without access to process data of zenon Runtime.

DISPLAY OF THE VISUALIZATION PAGES AND DISPLAY OF PROCESS DATA

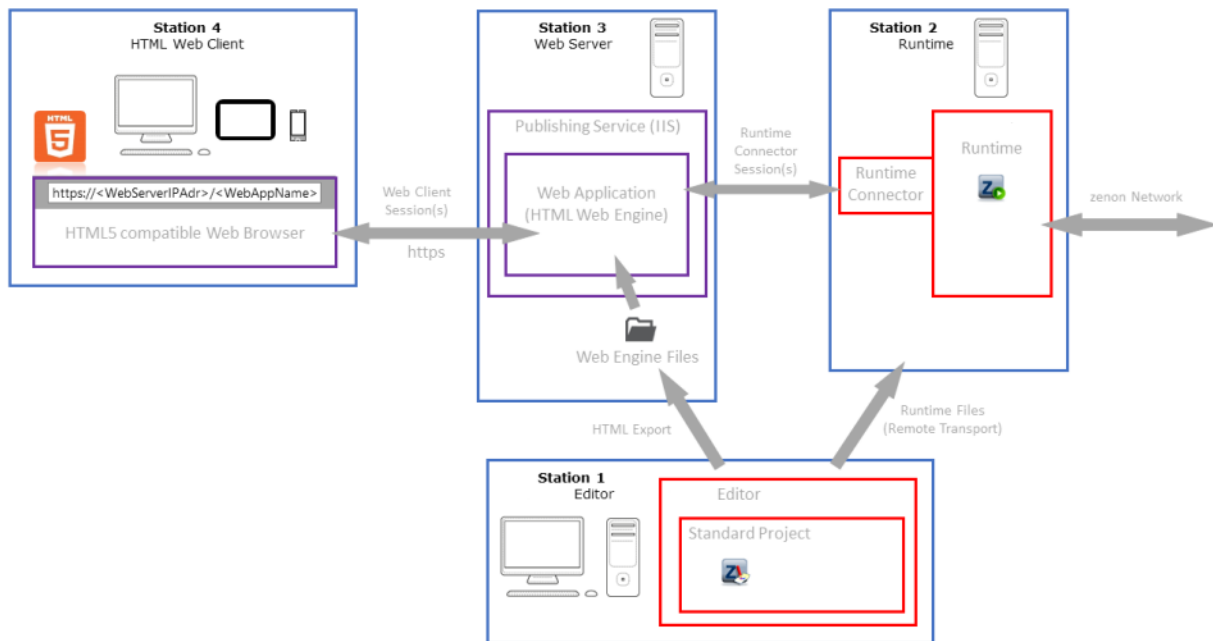
The HTML Web Engine connects itself to zenon Runtime via the SCADA Runtime Connector. This connection is only approved if user authentication on the basis of a user name and password has been carried out successfully. Authentication is carried out by means of external authentication to the user administration of zenon Runtime. The transfer of user information can be either manual by the zenon Web Client operator or automatic by the Web Engine.

No special tools are required to configure the HTML5 visualization. The screens and functions are created in the zenon Editor by default.

You can find a list of the supported elements, properties and functions in the **Supported functionalities for HTML visualization** (on page 85) chapter.

ACCESS TO HTML5 VISUALIZATION FROM AN END DEVICE

This is how you use an HTML5-compatible web browser to access the HTML5 visualization from a visualization end device:



Note: The breakdown of the components is only for simple display. The complete configuration shown here can be operated in a network or also on any one of the individual computers in any desired distribution of the components.

Procedure:

1. The operator on Station 4 connects with a standard web browser by entering the web page URL to the web server on Station 3.
As a result, it gets the visualization pages there from the Web Engine.
2. Process data is only displayed in the HTML5 visualization after successful user authorization. After a check of the user name and password has been carried out, the connection to zenon Runtime is established (to Station 2 in the example).
3. The interface between zenon Runtime and Web Engine is formed by the **SCADA Runtime Connector**.
The SCADA Runtime Connector must be started on the computer the zenon Runtime is running.
4. The configuration of the HTML5 visualization is derived from a zenon Editor project (on Station 1 in this case).
The project states on Station 2 (zenon Runtime) and Station 3 (Web Engine) should be identical for this.
With the **Web Engine Compiler**, the project data is translated for use by the HTML Web Engine.
The necessary steps for the installation of the HTML Web Engine on Station 3 and the

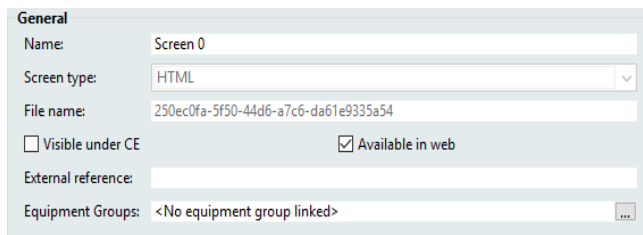
deployment on the Internet Information Server are described in the Deployment of the web engine (on page 75) chapter.

The file from the **Web Engine Compiler** is saved in a freely-definable folder. It is read by the HTML Web Engine from here.

Note: Provide, for the connection of HTML5 visualization, a dedicated zenon Runtime, in order to guarantee smooth interaction for process-related procedures. After changes are made in the zenon project, carry out the compiling process again.

RELEASE SCREENS

Certain screens from the active project can be called up in a web browser by means of the HTML Web Engine. You determine the screens that are unlocked for display in the web browser for each screen using the **Available in web** property.



All screens for which this property has been activated are compiled with the **Web Engine Compiler** for the Web Engine and are primarily available for provision in the web browser on the client. Screens that have not been activated for this property can be used for the zenon Runtime visualization, but are not available in the web browser.

The following screen types can be used for visualization in the web:

- ▶ AML
- ▶ CEL
- ▶ ETM
- ▶ Login
- ▶ HTML
- ▶ Standard

4.3 System requirements

WEB SERVER

The HTML Web Engine supports the following operating systems:

Operating system	Description
Windows 7 (SP1)	Professional, Enterprise and Ultimate Edition, both x86 and x64 versions.
Windows 8 and 8.1	Standard, Professional and Enterprise, both x86 and x64 versions.
Windows 10	Pro, Enterprise and Education, both x86 And x64 versions.
Windows Server 2008 R2 (SP1)	All editions with the exception of the Core Edition.
Windows Server 2012 and 2012 R2	All editions with the exception of the Core Edition.

Note: For operation of the HTML Web Engine, the .NET Framework 4.5 or higher is required.

WEB CLIENT

No special installation is required for the HTML Web Client. It generally works with any web browser that supports the following technologies:

- ▶ HTML5
- ▶ HTML5 Canvas
- ▶ JavaScript (ECMAScript 5.1)

HTML5 content is processed in the web browser regardless of the operating system. Use of a current version of one of the following web browsers is recommended:

- ▶ Windows Internet Explorer from version 11
- ▶ Microsoft Edge
- ▶ Mozilla Firefox
- ▶ Apple Safari
- ▶ Google Chrome

Note: JavaScript must be activated in the web browser.

CLIENT-SERVER CONNECTIONS

There must be a sufficient data rate available for the connection between web server and HTML client. With a data rate that is too low, corresponding messages are displayed on the HTML web client. A data rate that is too low can lead to a session not taking place or having to be canceled.

Note: When using Windows Server operating systems, the number of simultaneous client connections is not limited by the Microsoft IIS. When using Windows desktop operating systems, the possible number of simultaneous connections depend on the version the installed operating system.

4.4 Licensing

The HTML Web Engine checks the licensing of the zenon Web Server. You can find information about licensing the zenon Web Server in the **Licensing** (on page 34) chapter of the general zenon user documentation for zenon Web Server.

The functionality of the HTML Web Engine is amended on the basis of the licensed zenon Web Server variants:

- ▶ zenon Web Server: Only read access to the visualization. The **HTML Web Client** can be used as an observer.
- ▶ zenon Web Server Pro: Full access to the visualization, read and write.



Information

Note the limitation of the number of simultaneous client connections by the Microsoft IIS. If there is no license, the HTML Web Engine is started in a time-limited demo mode. Once the demo period and the demo extension has expired, the HTML Web Engine can be started in demo mode again.

Note: When using Windows Server operating systems, the number of simultaneous client is not limited by the Microsoft IIS. When using Windows desktop operating systems, this number varies depending on the version of the installed operating system.

4.5 Installation

You need the following installations to operate the HTML Web Engine:

Web Server:

- ▶ IIS publishing service:
Set up the publishing service in accordance with the instructions in the Install IIS publishing service (on page 67) chapter.
- ▶ zenon Web Server.
Install zenon Web Server from the installation medium.
Microsoft Web Deploy is also installed automatically during setup.

Project configuration and runtime application:

- ▶ zenon (Editor and Runtime).

Note: No special installation is required for the HTML Web Client.

4.5.1 IIS Publishing service installation

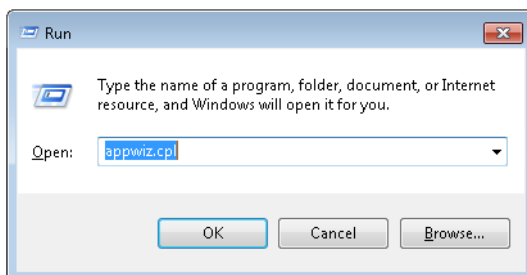
Internet information Services, abbreviated to IIS, are for the publication of documents, such as HTML pages, using the HTTP protocol. For the operating systems listed in the System requirements (on page 64) chapter, the IIS publishing service is already included in the standard installation. This need only be activated by means of the Windows features.

IIS 7, WINDOWS 7

To activate the IIS publishing service:

1. Press the Windows key + R keyboard shortcut.

The dialog to enter a command for the command input is opened.



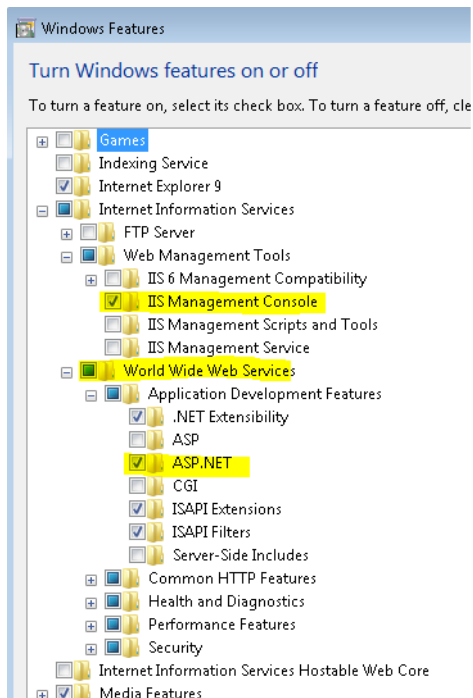
2. Enter `appwiz.cpl` in the input field.

Click on **OK**.

A new control panel window to configure programs and **Windows features** is opened.

3. In this window, click on **Turn Windows features on or off**.

The window to select features of the operating system is opened.



4. Expand the **Internet information services** in this node.
5. Activate **WWW services**.
The default settings are thus set in all subfolders of the property.
6. Expand the **Application development features** node.
7. Activate the **ASP.NET** option:
8. Expand the **Web administration tools** node.
9. There, activate the **IIS administration console**.
10. Click on **OK**.

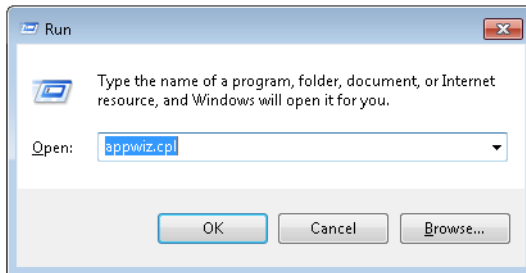
Note: In the event of subsequent installation or upgrading of the NET framework under Windows 7, this software must be registered manually in the IIS publishing service. For more details, see the chapter **.NET registration on IIS for Windows 7** (on page 73).

IIS 8, WINDOWS 8/8.1

To activate the IIS publishing service:

1. Press the Windows key + R keyboard shortcut.

The dialog to enter a command for the command input is opened.



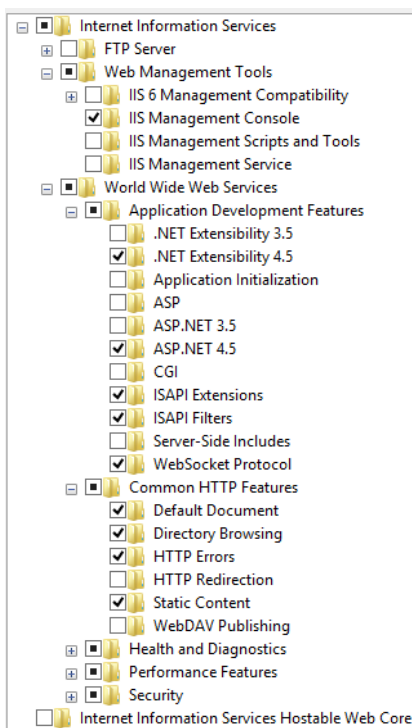
2. Enter `appwiz.cpl` in the input field.

Click on **OK**.

A new control panel window to configure programs and **Windows features** is opened.

3. In this window, click on **Turn Windows features on or off**.

The window to select features of the operating system is opened.



4. Expand the **Internet information services** in this node.
5. Activate all **World Wide Web Services** there.
6. Expand the **Application development features** node.
7. Activate **ASP.NET 4.5**
8. Expand the **General HTTP features** node
9. There, activate the **static content**.
10. Expand the **Web administration tools** node.

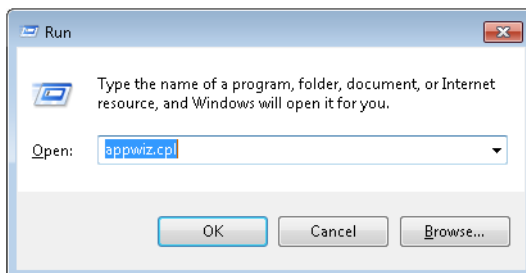
11. Optionally, activate the IIS administration console there.
12. Expand the **Application development features** node.
13. Activate the `WebSocket-Protokoll`.
14. Click on **OK**.

WINDOWS 10

To activate the IIS publishing service:

1. Press the Windows key + R keyboard shortcut.

The dialog to enter a command for the command input is opened.



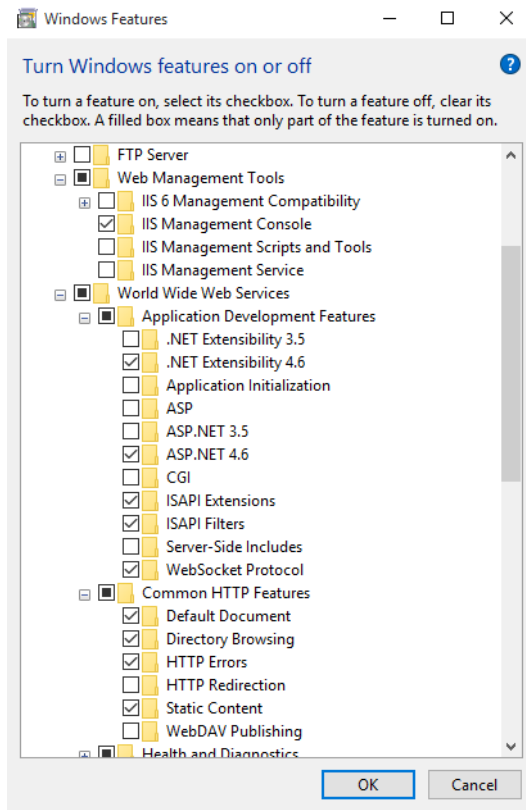
2. Enter `appwiz.cpl` in the input field.

Click on **OK**.

A new control panel window to configure programs and **Windows features** is opened.

3. In this window, click on **Turn Windows features on or off**.

The window to select features of the operating system is opened.



4. Expand the **Internet information services** in this node.
5. Activate all `World Wide Web Services` there.
6. Expand the **Application development features** node.
7. Activate `ASP.NET 4.6`
8. Expand the **General HTTP features** node
9. There, activate the `static content`.
10. Expand the **Web administration tools** node.
11. Optionally, activate the `IIS administration console` there.
12. Expand the **Application development features** node.
13. Activate the `WebSocket-Protokoll`.
14. Click on **OK**.

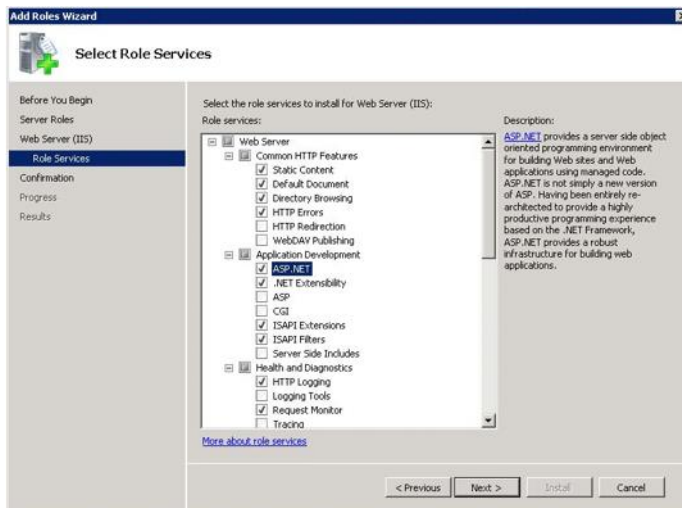
WINDOWS SERVER 2008 R2

Follow the instructions from Microsoft: <https://technet.microsoft.com/en-us/library/cc771209.aspx>

1. Open the **Add roles** assistant.

2. Activate the Web Server (IIS) role

The **Add roles** assistant opens.



3. Click on **Role services**.
4. Expand the **Application development features** node.
5. Activate the following role services:
 - ▶ ASP.NET
 - ▶ .NET expandability
 - ▶ ISAPI extensions
 - ▶ ISAPI filter

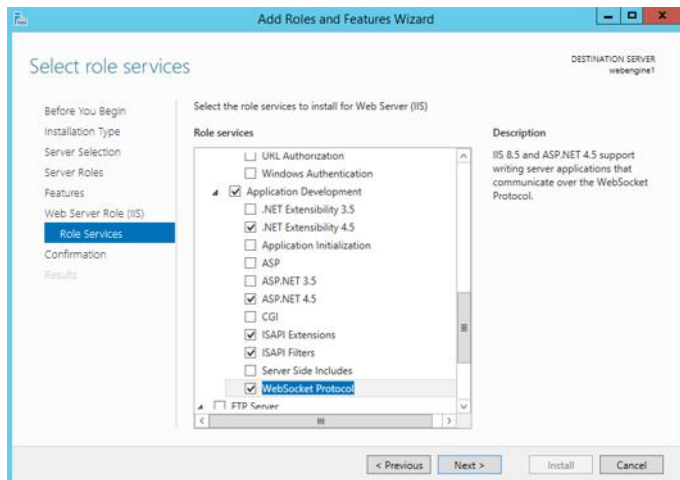
Attention: Do not deactivate any role services that have already been pre-selected by Microsoft.

Note: Use of Windows Server 2012 is recommended, because Windows Server 2008 R2 does not support WebSocket protocols.

WINDOWS SERVER 2012 (R2)

Follow the instructions from Microsoft: <https://technet.microsoft.com/en-us/library/hh831475.aspx>

1. Open the **Assistant to add roles and features** wizard.



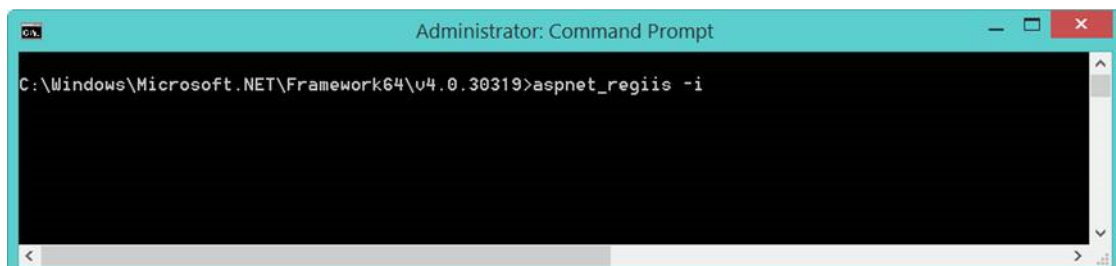
2. Expand the **Application development** node.
3. Activate the following role services:
 - NET expandability 4.5
 - ASP.NET 4.5
 - ISAPI extension
 - ISAPI filter
 - WebSocket protocol

.NET registration on IIS under Windows 7

In the event of a subsequent installation or upgrade of the .NET framework under Windows 7, it is necessary to register with the IIS publishing service.

To do this:

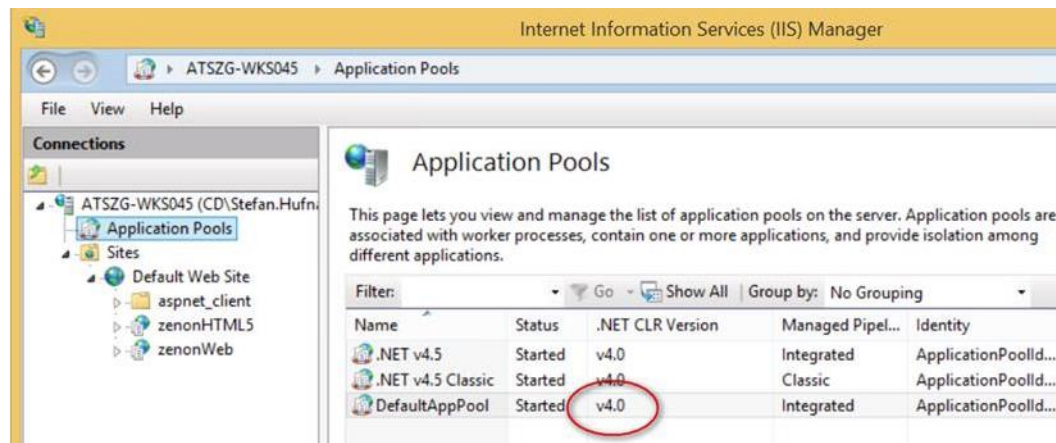
1. Open the Windows command prompt with the `as administrator` option.
2. Switch to the Microsoft.NET installation directory with the highest version number.
3. Enter command **aspnet_regiis -i**.



After successful registration, the current Microsoft .NET framework version is available for use with IIS.

4. Ensure that the Application Pool on the IIS in which the HTML Web Engine is operated uses the current .NET version.

This can be checked and set with the Information Services Manager:



4.6 SCADA Runtime Connector

The **SCADA Runtime Connector** must also be started on zenon Runtime, as soon as interaction with the HTML Web Engine is required. The **SCADA Runtime Connector** is also installed when zenon Runtime is installed. The interaction starts with the user authentication for the first HTML web client.

The SCADA Runtime Connector is started manually. To do this, start the application directly from the following folder:

`%programfiles(x86)%\Common Files\COPA-DATA\Connectors\zrsConnector.exe.`

For each HTML Web Engine session, a separate **SCADA Runtime Connector** session is set up. The following are transferred in this session:

- ▶ Variables that are needed for the current screen display on the HTML client:
 - for example for the display of variable values or element dynamics. Variables can be registered and deregistered for a session. Once the user has been authenticated successfully for an HTML web client, the HTML Web Engine reports a list of variables for communication and spontaneous updating by means of the SCADA Runtime Connector. The HTML Web Engine can thus forward value changes to the web clients that are currently connected.

Note: Only variables that are needed for display on the HTML web clients are reported.

- ▶ Write set value via the SCADA Runtime Connector:
 - To increase security before a value change, an explicit check of the authenticity is carried out with zenon Runtime on the basis of the user data of the **HTML Web Client**. A block or removal of users by zenon Runtime becomes effective for the writing of set values immediately.

ENCRYPTED COMMUNICATION

The TCP connection between **SCADA Runtime Connector** (**zrsConnector.exe**) and **SCADA Runtime Connector Client** (**zrsConnCli.dll**) can be encrypted with AES.

To use the encrypted communication, issue an encryption password for Runtime and Client.
To do this:

1. In the zenon Startup Tool, enter the password in the **Network configuration** tab.
This is also saved in zenon6.ini in encrypted form.
Section: **[ZRSCONNECTOR]**
Entry: **ENCRYPTION_PWD**
2. In the **Deployment Tool** of the **HTML Web Engine**, in the **Security options** window, set the same password in the **Security options** (on page 81) tab. This is saved in encrypted form in **web.config** in the **Encryption_Password** setting.

If, during validation, the **SCADA Runtime Connector** can be reached on the set target computer but the encryption password does not correspond, the connector test times out. You receive notification that the password set may be incorrect.

4.7 Client authentication for a connection to Runtime

Runtime data from zenon Runtime, such as variable values for display or for display dynamics, are only provided if the HTML client can authenticate itself to zenon Runtime. This can happen in two ways by means of user name and password:

- ▶ Automatic login by configuring a user as part of deployment.
For more details, see the Deployment of the Web Engine (on page 75) chapter.
- ▶ Manual login by the zenon Web Client in a `login` screen.
For details, see the Create `login` screen chapter.

Note: Authentication can be carried out by transferring the login data (user name and password) for a zenon user or an Active Directory user. The user data is validated by zenon Runtime.

4.8 Deployment of the Web Engine

The **zenon Web Engine Deployment Tool** offers important operations for the management of the web engine as a web application in the Internet Information Services (IIS).

To start the **Deployment Tool**:

1. Open the zenon **Startup Tool**.
2. click on the **Tools** button.

3. Under **Available Application**, select the Web Engine Deployment Tool .
4. Click **Start**.

The tool is started



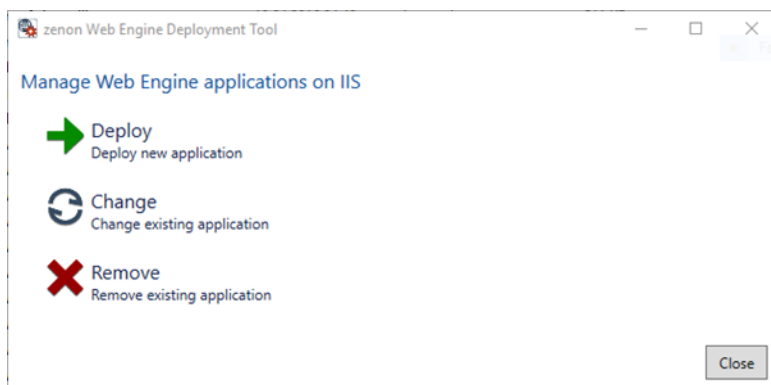
Information

Note: The **Deployment Tool** is automatically installed with the zenon Web Server. Administrator rights are required for the use of this tool.

The **Deployment Tool** is only available in English.

4.8.1 zenon Web Engine Deployment Tool

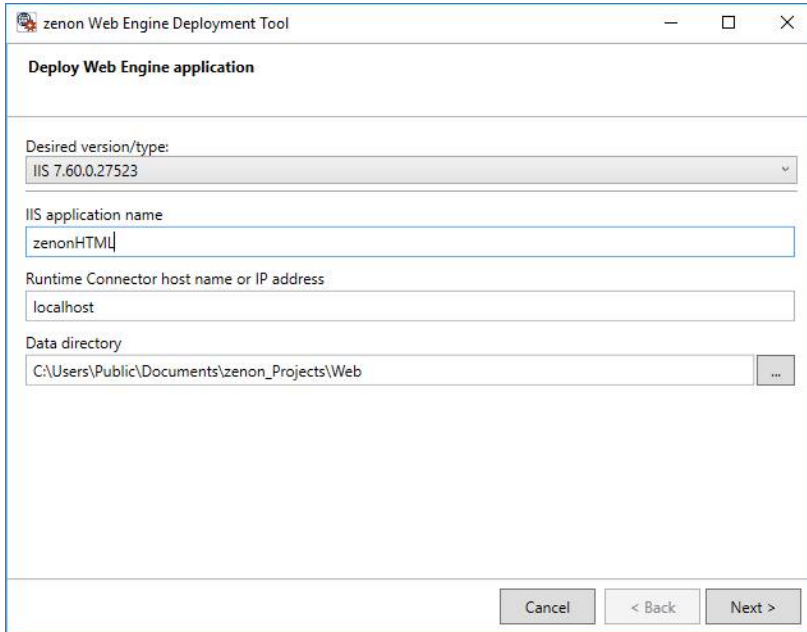
HTML web engine instances are administered on the IIS with the **zenon Web Engine Deployment Tool**. You can create new instances and amend or remove existing ones.



Option	Description
Deploy	<p>Provides a new instance of the HTML Web Engine on the IIS.</p> <p>The necessary options are configured in the following tabs.</p>
Change	<p>Updates existing Web Engine Applications.</p> <p>The following can be amended for the HTML Web Engine in the following tab:</p> <ul style="list-style-type: none"> ▶ Version. ▶ Configuration. ▶ SCADA Runtime Connector: Host name, IP adress. ▶ Path of the data folder. Data Directory in which the exported project data (*.webx) is. ▶ Security settings: User name, password or switch for automatic sign-in. <p>Note: Not available if no valid Web Engine application is available on the IIS.</p>
Remove	<p>Removes a running application of the HTML Web Engine.</p> <p>The version to be removed is selected in the following tab.</p> <p>If the web engine is to be replaced by a more recent version, use the Change option.</p> <p>Note: Not available if no valid Web Engine application is available on the IIS.</p>

General settings for the Web Engine

In this dialog, you configure the general settings for the operation of the HTML Web Engine.



The options that are available depend on the option that was selected in the start dialog:

- ▶ **Deploy:** New configuration of a **HTML Web Engine**.
- ▶ **Change:** Amendment to an existing **HTML Web Engine**.
- ▶ **Remove:** Removal of an existing **HTML Web Engine**.

Option	Description
Web Engine application to change	Selection of the instance that is to be amended. Note: Not available with the Change selection in the start dialog.
Web Engine application to change	Selection of the instance that is to be deleted. Note: Not available with the Remove selection in the start dialog.
Desired version/type	Selection of the version from the drop-down list. Note: Only available for Deploy and Change .
IIS application name	Entry of the desired name for the Web Engine application This name will be part of the URL under which the HTML5 web page will later be reached. Example: <i>https://ServerAddress/<ApplicationName></i> Note: Only available for Deploy and Remove (display only).
Application version	zenon version of the instance (display only). Note: Only available for Remove .
Runtime Connector host name or IP address	Enter the host name or the IP address of the computer on which the zenon Runtime and the SCADA Runtime Connector are installed. Note: Only available for Deploy and Change .
Data directory	Folder from which the Web Engine is to read the exported project data. Note: The webx file generated by the Web Engine Compiler must be available in this folder. When the HTML Web Engine is first accessed, the first webx file in the file list is loaded. If a webx file that was loaded by the web engine is amended or deleted, the Web Engine automatically restarts and in turn loads the first webx in the folder. Default folder: C:\Users\Public\Documents\zenon_Projects\Web Note: Only available for Deploy and Change .

NAVIGATION

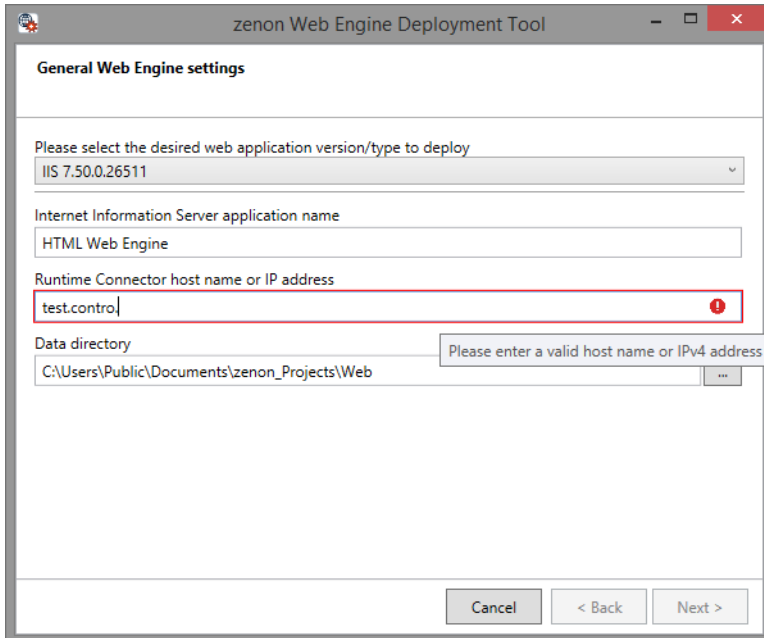
Cancel	Discards changes and closes the dialog.
Back	Goes back one tab in the tool.

Next

Goes forward one tab in the tool.

CHECKING OF THE ENTRY

This is checked during entry:

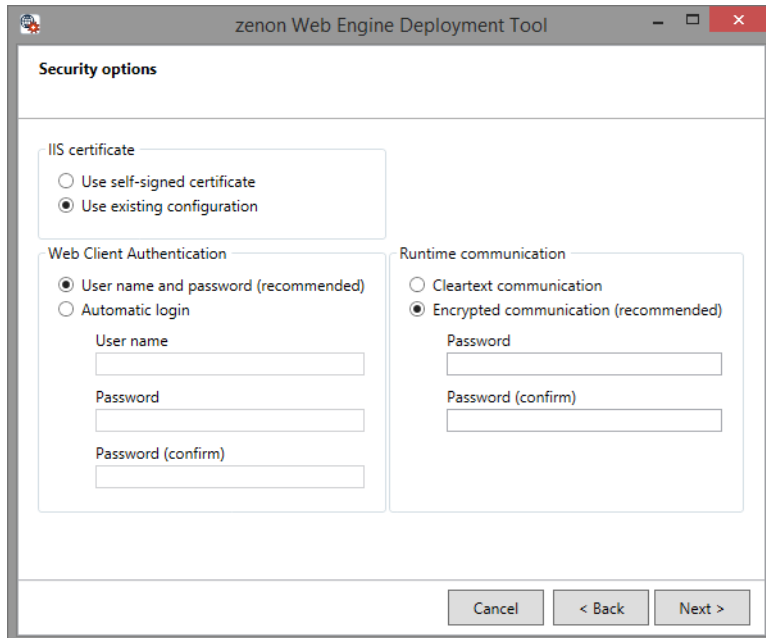


The screenshot shows the 'General Web Engine settings' window of the 'zenon Web Engine Deployment Tool'. The window has a title bar with standard Windows controls. Inside, there are four main input fields: a dropdown menu for 'Please select the desired web application version/type to deploy' (set to 'IIS 7.50.0.26511'), a text box for 'Internet Information Server application name' (set to 'HTML Web Engine'), a text box for 'Runtime Connector host name or IP address' (set to 'test.control'), and a text box for 'Data directory' (set to 'C:\Users\Public\Documents\zenon_Projects\Web'). The 'Runtime Connector host name or IP address' field is highlighted with a red border and a red warning icon (an exclamation mark inside a circle) on the right. A tooltip is visible over the 'Data directory' field, displaying the text 'Please enter a valid host name or IPv4 address'. At the bottom of the window, there are three buttons: 'Cancel', '< Back', and 'Next >'.

If incorrect entries are detected, these are shown with a red warning signal. If you move the mouse over the warning signal, you get further information in a tool tip.

Security settings

In this dialog, you configure the security settings for the operation of the HTML Web Engine.



The screenshot shows a window titled "zenon Web Engine Deployment Tool" with a "Security options" dialog box. The dialog has three main sections: "IIS certificate", "Web Client Authentication", and "Runtime communication".

- IIS certificate:** Contains two radio buttons: "Use self-signed certificate" (unselected) and "Use existing configuration" (selected).
- Web Client Authentication:** Contains two radio buttons: "User name and password (recommended)" (selected) and "Automatic login" (unselected). Below these are three text input fields: "User name", "Password", and "Password (confirm)".
- Runtime communication:** Contains two radio buttons: "Cleartext communication" (unselected) and "Encrypted communication (recommended)" (selected). Below these are two text input fields: "Password" and "Password (confirm)".

At the bottom of the dialog are three buttons: "Cancel", "< Back", and "Next >".

IIS CERTIFICATE

zenon HTML Web Engine communication is always via a secure (HTTPS, port 443) connection.

In this area, you define whether the **Deployment Tool** uses a self-signed certificate for communication. If there is not yet a self-signed certificate, it is created by the **Deployment Tool**. This certificate is assigned to the IIS.

Note: A security certificate is a mandatory requirement for communication between the zenon Web Server and zenon Web Client.

Option	Description
Use self-signed certificate	Activate this option if you want to create a temporary, self-signed certificate. This option is offered as a default for the first Deploy . Note: This option is mandatory if there is no certificate present on the IIS.
Use existing certificate	Select this option if there is already a valid configuration. If there is already a valid configuration, this option is offered as a default. Note: Use of an official certificate from a certification body is recommended. Possible certification body: https://www.digicert.com/ssl-certificate-installation-microsoft-iis-8.htm

WEB CLIENT AUTHENTICATION

In this area, you define how the authentication of the zenon Web Client is to be carried out.

Option	Description
User name and password (recommended)	Input field for authentication of the zenon Web Client. The zenon Web Client is authenticated by manual entry of user name and password. Note: The user name and password must be entered in a zenon login screen.
Automatic login	Activate this option if you want the web engine to automatically establish a connection to zenon Runtime. The given user data is used for authentication. Attention: When this option is used, each zenon Web Client receives a connection to zenon Runtime.
User name	Input field for zenon user name. Enter the desired user name here.
Password	Input field for zenon user password. Enter the user password here. Note: Not available if <code>User name and password</code> has been selected for Web Client Authentication .
Password (confirm)	Enter the user password again. Note: Not available if <code>User name and password</code> has been selected for Web Client Authentication .

RUNTIME COMMUNICATION

Type of communication to the web engine.

Option	Description
Cleartext communication	Communication to the web engine is implemented by means of plain text without encryption.
Encrypted communication (recommended)	Communication to the web engine is encrypted. Note: The settings for Runtime are configured in the Startup Tool in Network configuration tab with the Encrypt Runtime Connector communication property. The passwords for Runtime and the HTML Web Engine must correspond.
Password	Input field for password for secure communication. Enter the user password here.
Password (confirm)	Enter the user password again.

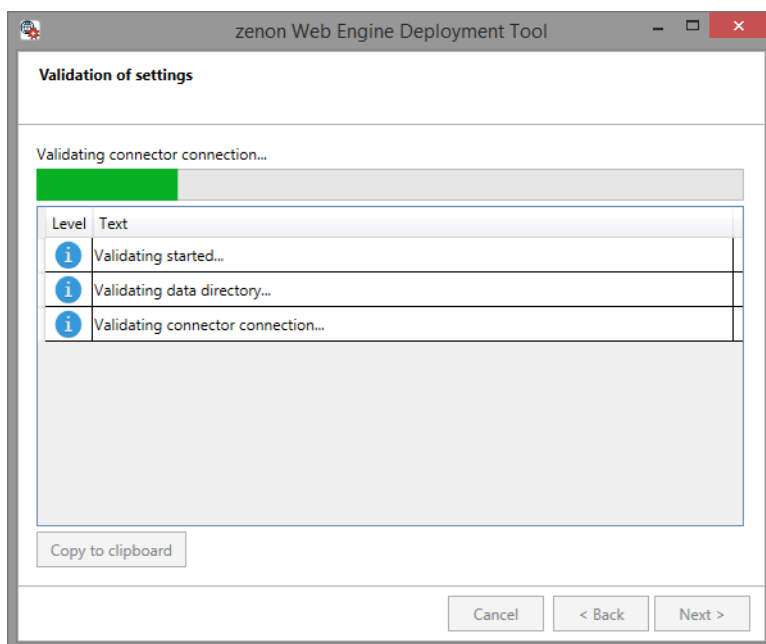
NAVIGATION

Cancel	Discards changes and closes the dialog.
Back	Goes back one tab in the tool.
Next	Goes forward one tab in the tool.

Validation of the settings

The settings are validated in this dialog. The progress is shown with a green bar during validation.

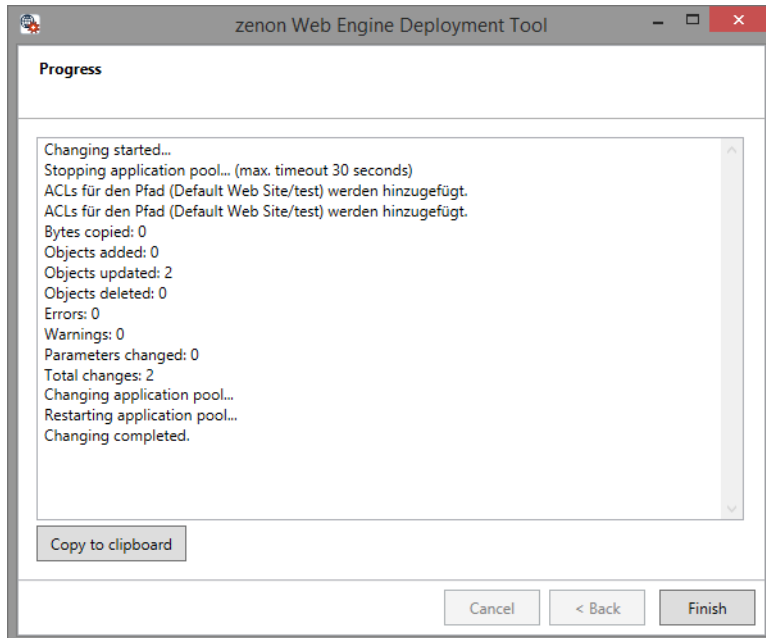
The result of the validation is shown in a list.



Copy the output to the clipboard by clicking on the **Copy to clipboard** button.

Progress

In this dialog, you see the progress of the **Web Engine Deployments** on the IIS.



Copy the output to the clipboard by clicking on the **Copy to clipboard** button.

Once the procedure has been completed, click on the **Finish** button to close the Deployment Tool.

4.9 Engineering in the Editor

The data required by the Web Engine for HTML5 visualization is created from a zenon standard project. The zenon Editor must be open for this.

Note: When configuring the HTML5 visualization, note the supported properties, screen elements and functions of the HTML Web Engine.

CREATE PROJECT

For HTML5 visualization with the zenon web server, create a standard zenon project. You can also use certain resources from a global project for this.

4.9.1 Supported functionalities for HTML5 visualization

For HTML5 visualization, basic elements, properties and functions are available:

GENERAL

Functionality	Description
Variables	<ul style="list-style-type: none"> ▶ Display of static and dynamic values. ▶ Write set value in the HTML Web Engine directly ▶ Making the element display dynamic with variable values. For example Visibility/flash, rotation, positioning, size adjustment... ▶ Limit values for the dynamic aspects of the element display (such as Limit value color, Limit value text) are fundamentally supported. <p>Attention: Limit value information of reaction matrices is not supported!</p>
Font types and font lists.	<ul style="list-style-type: none"> ▶ Selection and display of any desired font lists that are available on the system. Note: Selected font types must be available on both the project configuration computer and on the zenon Web Client. The steps must be defined in the local project. ▶ Display in <code>Normal</code> font style, <code>italic</code> and <code>bold</code>. ▶ Selection and display of the font in accordance with the font list. ▶ Online switching of the font list. <p>Note: The first font list of the zenon project is shown when a session starts</p>

FRAMES AND SCREENS

Screen/Frame	Description
Frame	<ul style="list-style-type: none"> ▶ Calling up rectangular frames at an absolute position.
Screens, general:	<ul style="list-style-type: none"> ▶ Display of screens in the size of the linked frame. ▶ Display of background color and background graphics. ▶ Execution of a start and end function for a screen.
Standard screen	<ul style="list-style-type: none"> ▶ Display of this type of screen.
Login screen	<ul style="list-style-type: none"> ▶ Display of this type of screen. ▶ User authentication with the screen-type-specific elements Enter user name and Enter password or Login command.
AML screen type (on page 95)	<ul style="list-style-type: none"> ▶ Display of this type of screen. ▶ Display of dynamic AML lists. Dynamic means that the data displayed is updated.
CEL screen type (on page 95)	<ul style="list-style-type: none"> ▶ Display of this type of screen. ▶ Display of dynamic CEL lists. Dynamic means that the data displayed is updated.
HTML screen type (on page 90)	<ul style="list-style-type: none"> ▶ Display of this type of screen. ▶ Display of the elements specific to the screen type, such as web browser
ETM screen type (on page 100)	<ul style="list-style-type: none"> ▶ Display of this type of screen. ▶ Static display of simple line diagrams. Static means the the data displayed is not updated.

SCREEN ELEMENTS

STATIC SCREEN ELEMENTS

The following are generally supported:

- ▶ Basic support of element-specific display options (display, color and fill options, no effects).
- ▶ Basic support of display dynamics using variables (color and position dynamics).

The following are supported:

- **Circle**
- **Arc of a circle**
- **Segment of a circle**

- **Line**
- **Polygon**
- **Polyline**
- **Rectangle**
- **Static text**

Notes:

Element	Description
Circle	<ul style="list-style-type: none"> ▶ Supports the Invert color gradient property. When selecting <code>color gradient</code> for the Fill pattern property, the brightness gradient of the fill pattern is shown as inverted.
Segment of a circle	<ul style="list-style-type: none"> ▶ Supports the Invert color gradient property. When selecting <code>color gradient</code> for the Fill pattern property, the brightness gradient of the fill pattern is shown as inverted.
Polygon	<ul style="list-style-type: none"> ▶ Supports the Invert color gradient property. When selecting <code>color gradient</code> for the Fill pattern property, the brightness gradient of the fill pattern is shown as inverted.
Rectangle	<ul style="list-style-type: none"> ▶ Supports the Invert color gradient property. When selecting <code>color gradient</code> for the Fill pattern property, the brightness gradient of the fill pattern is shown as inverted.

GENERAL SCREEN ELEMENTS

The following are generally supported:

- ▶ Basic support of element-specific display options (display, color and fill options, no effects).
- ▶ Basic support of display dynamics using variables (color and position dynamics).

Notes:

Element	Description
Button	<ul style="list-style-type: none"> ▶ Execution of functions of the local project. Note: The corresponding user level is checked for the execution of the action. ▶ Fill pattern and Color gradient properties: Color gradient only has an effect if <code>color gradient</code> is selected for Fill pattern.
Dynamic text	<ul style="list-style-type: none"> ▶ Display of variable information <code>variable value</code>, Name, Identification, Resources label, Measuring unit and Limit value text possible. ▶ Write set value with dialog. <p>Note: The corresponding user level is checked for the execution of the action.</p>
Numeric value	<ul style="list-style-type: none"> ▶ Write set value with dialog, taking into account static setpoint limits. <p>Note: The corresponding user level is checked for the execution of the action.</p>

ELEMENT GROUPS AND SYMBOLS

Functionality	Description
Element group	<ul style="list-style-type: none"> ▶ Display of element groups. ▶ The elements contained are displayed in accordance with their configuration and supported properties.
Linked symbol	<ul style="list-style-type: none"> ▶ Display of linked symbols. ▶ Support for replace linking for application in the screen, whereby resulting entries must refer to resources in the local project. ▶ The elements contained are displayed in accordance with their configuration and supported properties.

FUNCTIONS

Function	Description
Screen switch	<ul style="list-style-type: none"> ▶ Calling screens of the local project. ▶ Support for <code>replace linking</code>, whereby resulting entries must refer to resources in the local project.
Close frame	<ul style="list-style-type: none"> ▶ Closing of frames with the given frame name.

Write set value	▶ Direct writing of pre-defined variable values.
Language switch	▶ Online switching of language file and font list .
Switch palette	▶ Online switching of the color palette for graphic display.
Script: execute	▶ Execution of functions of the local project. Non-supported functions are excluded from execution.
Logout	▶ Logging a user out of a zenon Web Client session and disconnecting from zenon Runtime ▶ The zenon Web Client session is continued in offline mode

GLOBAL PROJECT

The HTML export takes the use of the following resources from a **global project** into account:

- ▶ **Frames**
- ▶ **Color Palettes**
- ▶ **Language Files**

Create, amend and call up an HTML screen

Set up an **HTML** screen and create a screen-switch function

CREATING A SCREEN OF THE TYPE HTML

Engineering

Steps to create the screen:

1. Create a new screen:
In the tool bar or the context menu of the **Screens** node, select the **New screen** command.
An empty **Standard** screen is created.
2. Change the properties of the screen:
 - a) Name the screen in the **Name** property.
 - b) Select **HTML** in the **Screen type** property.
 - c) Select the desired frame in the **Frame** property.
3. Configure the content of the screen:
 - a) select menu item **Control elements** from the menu bar
 - b) Select **Insert template** in the drop-down list.
The dialog to select pre-defined layouts is opened. Certain control elements are inserted into the screen at predefined positions.

- c) Remove elements that are not required from the screen.
 - d) If necessary, select additional elements in the **Elements** drop-down list. Place these at the desired position in the screen.
4. Create a screen switch function.

HTML SCREEN

Browser window
Typ: STATIC
ID: 53505

Control element	Description
Insert template	<p>Opens the dialog for selecting a template for the screen type.</p> <p>Templates are shipped together with zenon and can also be created by the user.</p> <p>Templates add pre-defined control elements to pre-defined position in the screen. Elements that are not necessary can also be removed individually once they have been created. Additional elements are selected from the drop-down list and placed in the zenon screen. Elements can be moved on the screen and arranged individually.</p>
Browser	Control elements for the browser.
Browser Window	The browser is displayed.
Address field	Field for entry of the address (URL).
Home page	The start page is called up.

Search forward	Go forward.
Search back	Go back.
Refresh search	Refresh display.
Cancel	Stop navigation.
Search	<p>Control elements for the search.</p> <p>When clicking a link in the Search field, the corresponding page is shown in the browser. So e.g. in the field Search a navigation bar or the results of a search engine can be displayed without changing the contents, when a link is activated.</p>
Search window	Display of the search.
Search field	Search for address or file.
Home	Back to home in the search area.
Forward	Page down in the search area.
Search back	Page up in the search area.
Refresh	Refresh display in search area.
Stop	Cancel search action.
Filter	Open filterbox.

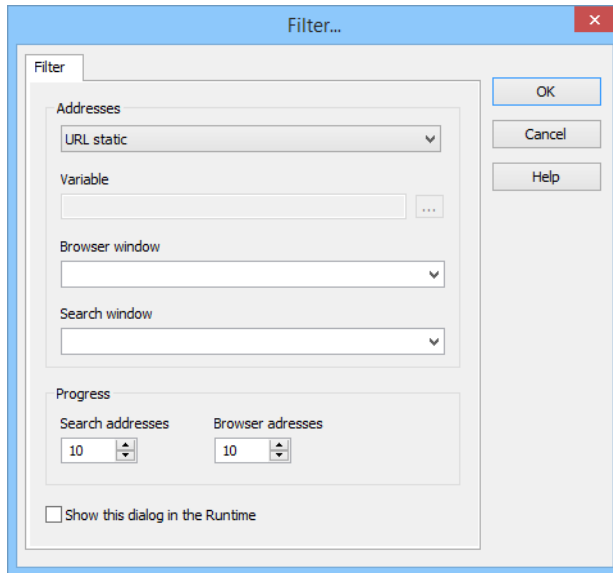
AMEND SCREEN

To amend the screen for use with the HTML Web Engine:

1. Activate the **Available in web** property in the group **General** for this screen.
2. Note the **options for opening external web pages** (on page 93).

CREATE SCREEN SWITCHING

Create a screen switch function in order to be able to call up the screen in Runtime.



The HTML Web Engine supports the following options:

Option	Description
Addresses	<p>► URL static</p> <p>The URL is set as static.</p> <p>Note: This setting is mandatory.</p>
Browser window	<p>Enter the complete URL of the external web page here, including https://</p> <p>Example: <i>https://serveraddress</i></p>

Options for opening external web pages

The opening of external web pages is supported by the HTML Web Engine either by means of an embedded browser or as a new browser window.

EMBEDDED BROWSER WINDOW: _

To see an embedded browser window that you have entered in the screen switching function from the URL in Runtime:

- In the **Control elements** menu, select **Browser -> Browser window**.

- ▶ Draw the frame for the browser window in the screen. The given website (URL) is displayed in this frame.

Note: The opening of the embedded display (**iFrame**) only works if the X-Frame options on the remote server are configured accordingly. In addition, the address of the embedded web page must also be available for HTTPS via the HTTPS connection between the HTML Web Engine and HTML web client.

NEW BROWSER WINDOW:

To open an external web page in a new browser window:

- ▶ Delete the browser window control from the inserted template in the screen.
The external web page is opened in a new browser window if there is no browser window control element in the screen.

Note: The calling up of several URLs is supported via script. However some browsers prevent tabs being called up with their pop-up blocker. In such cases, a dialog appears with the URLs that cannot be called up. These URLs can be opened manually.

Example: Simple start screen

Check the functionality of the HTML Web Engine with a simple example.

To do this:

1. Create a `standard` screen.
2. Activate the **Available in web** property in the group **General** for this screen.
3. Enter this screen into the project properties in the **Graphical design** group as **Start screen**.
Note: You can define any desired start page for the web with an Autostart script.
4. Add simple elements to the screen, for example a **Rectangle**, **Circle** or **Static text**.
5. Ensure that the current project is set as a start project.
6. Export the project for HTML5 visualization.

EXTENSION: AUTHENTICATION WITH LOGIN

In order to be able to exchange data with zenon Runtime, the zenon Web Client must be authenticated as a user to Runtime. You can read more details about this in the following chapter: **Client authentication for a connection to Runtime** (on page 75).

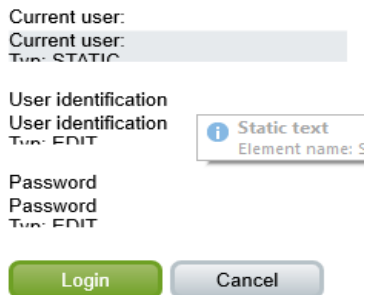
This is how you expand a project for manual authentication:

1. Add a dynamic element to display a variable value, for example **dynamic text** or **numeric value**.
2. Assign this element a variable from the project.

Note: Variable values can also be used for position or color dynamics of an element.

3. Create a new `login` screen which you can display in the visualization.
Use the **Screen switch** function for display.
4. Activate the **Available in web** property in the screen in the **General** group.
5. In the `login` screen, add the elements **user name**, **password**, **login** and **Cancel**.

Login



6. Carry out the HTML export for the current project.

The zenon Web Client now has the possibility to carry out authentication by means of entry of the user data. If authentication is successful, a connection to zenon Runtime is established. As a result of this, variable values for HTML5 visualization are available, for example.

AML and CEL: Supported functionalities

The `AML` and `CEL` screen types support the following functions for the HTML Web Engine:

ALARMS: ALARM CAUSE REQUIRED

Alarms for limit values can be created with the **Alarm cause required** property activated.
The acknowledgment of these alarms is however not supported by the HTML Web Engine.

LIST DISPLAYS

Lists are subdivided into pages. A footer for navigation is shown under the list.
List entries can be called up by clicking on the symbols. The number of the list entries shown can be defined by clicking on the drop-down list.

SORTING IN RUNTIME

Lists in `AML` and `CEL` can be shown in sorted form.
To change the sorting of a list, click on the column title.
Clicking switches between:

- Ascending

- ▶ Descending
- ▶ Standard (as supplied in zenon Runtime)

The behavior of the header, the sorting and the column widths is configured in the zenon Editor in the project properties.

SORTING OF TEXT

Text is sorted according to natural sorting:

- ▶ alphabetic sequence
- ▶ Figures with several digits are seen as a character

Example:

- ▶ Alphabetic sorting: 1, 11, 2, 3, 33, 4
- ▶ Natural sorting: 1, 2, 3, 4, 11, 33

COLUMN LABELING

The **Identification** and **Resources label** columns are shown with the labeling **Identification** and **Resource Label**. The language of the texts used in these columns can be switched.

LANGUAGE SWITCHING IN RUNTIME

Language switching is available for the following columns of the AML and CEL:

- ▶ **Text**
- ▶ **Identification**
- ▶ **Resources label**
- ▶ **Measuring unit**

Note: Language switching is carried out for each cell individually. If switching takes place in Runtime, the switching to the new language can take some seconds.

TIME FORMATS

Date and time in AML and CEL are shown in the localized display of the respective client. In doing so, the **UTC-DateTime** is transferred and reformatted on the basis of the settings of the local computer.

You can find further information and examples in the **Runtime** manual, in the **Handling of date and time** chapter.

Properties and options

The HTML Web Engine supports the following properties and options for control elements, screen switching and project properties:

AML AND CEL SCREEN SWITCH FUNCTION:

Tab	Group	Settings and notes
General	Variable filter	<ul style="list-style-type: none"> ▶ Variable name ▶ Identification <p>Note: Capitalization is not taken into account.</p>
	Alarm type (AML only)	<p>Options:</p> <ul style="list-style-type: none"> ▶ Only non-acknowledged alarms ▶ Only cleared alarms ▶ Only current alarms <p>Note: Other settings are ignored.</p>
	Origin of the data	<p>Settings are ignored.</p> <p>Historical data from zenon Runtime is always used.</p> <p>Maximum: 65535</p>
	Runtime settings	<p>Settings are ignored.</p> <p>The Show list without refresh list is always used.</p> <p>The list entries that were present at the time of the screen switching in zenon Runtime are shown.</p>
Time	Filter	<p>Options:</p> <ul style="list-style-type: none"> ▶ No time filter ▶ Absolute time period ▶ Relative period of time
	Settings	<p>The Preset option only.</p> <p>All other settings are ignored.</p>

Column settings	Columns	<ul style="list-style-type: none"> ▶ Alarm condition (Including display by means of circle symbol or graphics file.) ▶ Time received ▶ Time cleared (AML only) ▶ Time acknowledged (AML only) ▶ Text ▶ Variable name ▶ Value ▶ Measuring unit ▶ User - full name ▶ Computer name ▶ Comments (AML only) <p>Note: The set display sequence is taken into account as follows.</p> <p>The column labeling can be edited and the language can be switched.</p>
	Table settings	<p>Always active:</p> <ul style="list-style-type: none"> ▶ Use alternating background colors ▶ Display grid ▶ Sort descending <p>Note: Color palette switching is supported for:</p> <ul style="list-style-type: none"> ▶ Row color 1 ▶ Row color 2
Equipment Modeling		From local and global project.

CONTROL ELEMENTS FOR THE ALARM MESSAGE LIST SCREEN TYPE

Group	Subgroup	Settings and notes
Header and grid	Header	<p>Show header: Setting always active.</p> <p>Display style: Setting always standard.</p> <p>Fill color: provides background color. Is also used in the footers in the web for:</p> <ul style="list-style-type: none"> ▶ Static/fixed color. ▶ Color palette and switching of color palettes. <p>Font is also in the footer in the web Applied for:</p> <ul style="list-style-type: none"> ▶ Static selection. ▶ Switching of font lists. <p>Text color is also in the footer in the web Applied for:</p> <ul style="list-style-type: none"> ▶ Static/fixed color. ▶ Color palette and switching of color palettes.
Fill	Fill	<p>Text color is used for:</p> <ul style="list-style-type: none"> ▶ Static/fixed color ▶ Color palette and switching of color palettes
Representation	Representation	<p>Is used for:</p> <ul style="list-style-type: none"> ▶ Static selection ▶ Switching of font lists

AML PROJECT PROPERTIES

Property group	Supported properties
Alarm Message List	Header AML
Data storage AML	not available.
Alarm received	All.
Alarm cleared	All.

Alarm acknowledged	All.
Confirm alarm acknowledgement	Not available. Alarms whose acknowledgment has been confirmed are not shown in the HTML Web Engine.
Alarm status line	not available.

Alarm acknowledgment

Alarms can be selected and acknowledged individually. Only alarms with the **To acknowledge** property activated are supported.

For this, the following applies:

- ▶ Alarms are acknowledged using the **Acknowledge** button in the `alarm administration` screen type.
- ▶ If the **To acknowledge** property is not activated for a limit value, the **Acknowledge** button in the `alarm administration` screen is deactivated.
- ▶ The **Acknowledge all** button of the `alarm acknowledgment` screen type is not supported.
- ▶ The acknowledgment of an alarm required the necessary function authorizations for signed-in users.
An error message is shown if this is not the case.

Note: Ensure that the user has the `Acknowledge alarm via Alarm Message List` screen function authorization.

You can find further information in the User administration manual in the Function authorizations chapter.

- ▶ Not supported:
 - **Comment required**
 - **Alarm cause required**

Note: Limit values can be configured with these properties. The acknowledgment of alarms that require these properties is not supported in the HTML Web Engine.

Screens of type Extended Trend

The `Extended Trend` screen type supports the following functionalities for the HTML Web Engine:

OPTIONS WITH THE SCREEN SWITCH FUNCTION

Tab	Group	Settings and notes
Data	Origin of the data	Option: Archive data
	Options	The Options settings are not supported for the HTML Web Engine.
	Curves	Display of simple curves without further options.
Display	Diagram name	Display of the diagram name, as configured
	Refresh	Options in the Refresh properties group are not supported.
	Design	Options in the Design properties group are not supported. A pre-defined display is shown.
	Runtime	The display of this dialog is not supported in the HTML Web Engine. Filtering is not possible.
X-Axis	X-Axis	Option: ► Only YT display Note: XY display is not supported.
Time	Filter	The following are supported: ► Absolute time period ► Relative time period All other time filters are not supported. Attention: Screen switching with invalid time configurations are not available in the HTML Web Engine. Buttons with corresponding calls are deactivated.
Lots		The settings of the Lots tab are not supported for the HTML Web Engine.
Column settings		The settings of the Column settings tab are not supported for the HTML Web Engine.

Printer properties		The settings of the Printer settings tab are not supported for the HTML Web Engine.
---------------------------	--	--------------------------------------------------------------------------------------------

DIAGRAM CONTROL ELEMENT

Group	Subgroup	Settings and notes
Darstellung		The configuration of the display is not supported for the HTML Web Engine. The action is defined and fixed.
Linien		The configuration of the lines is not supported for the HTML Web Engine. The action is defined and fixed.
Füllung		The configuration of fills is not supported for the HTML Web Engine. The action is defined and fixed.

Data aggregation

Data is aggregated under certain conditions for display in the Extended Trend. The speed of the display via the HTML Web Engine is thus sped up so that it corresponds to that of zenon Runtime.

Procedure:

- ▶ The maximum number of data points to be displayed is determined by the width of the template (in pixels) on which the screen is based.
- ▶ There is no aggregation if, during an archive query, fewer data points are returned than pixels are present.
- ▶ If the number of the archived data points exceeds the column width, average values are generated.
to do this, the time axis is divided into time ranges.
The archive values that are transferred by Runtime are arranged into the respective time ranges.
The average value within a time range is calculated using the archive values. If there is no archived value within a time range, this time range is deleted.
Note: The generation of the average values is not just carried out for numeric values, but also binary variables.
- ▶ Redundant data points are filtered out. This happens regardless of the number of archived values and the generation of average values.
To do this, 3 archived values of a variable that are consecutive in terms of time are analyzed. If all 3 data points have the same value, the average data point is removed.
If, for example, a recorded archive variable has the same value over the queried time period, only 2 data points (start and end) are displayed.

Note: When generating average values, the trend line is generally shown differently to with raw values.

Automatic script call when starting a zenon Web Client session

A script can be called up automatically when starting an HTML web client session. A special start page can thus be prescribed for the web application, for example.

The following script name is reserved for the script: `AUTOSTART_HTML_WEBCLIENT`

Note: This script is executed whenever a session of an HTML web client starts. The name of the script must not be changed.

Individual script call by means of URL expansion when starting a zenon Web Client session

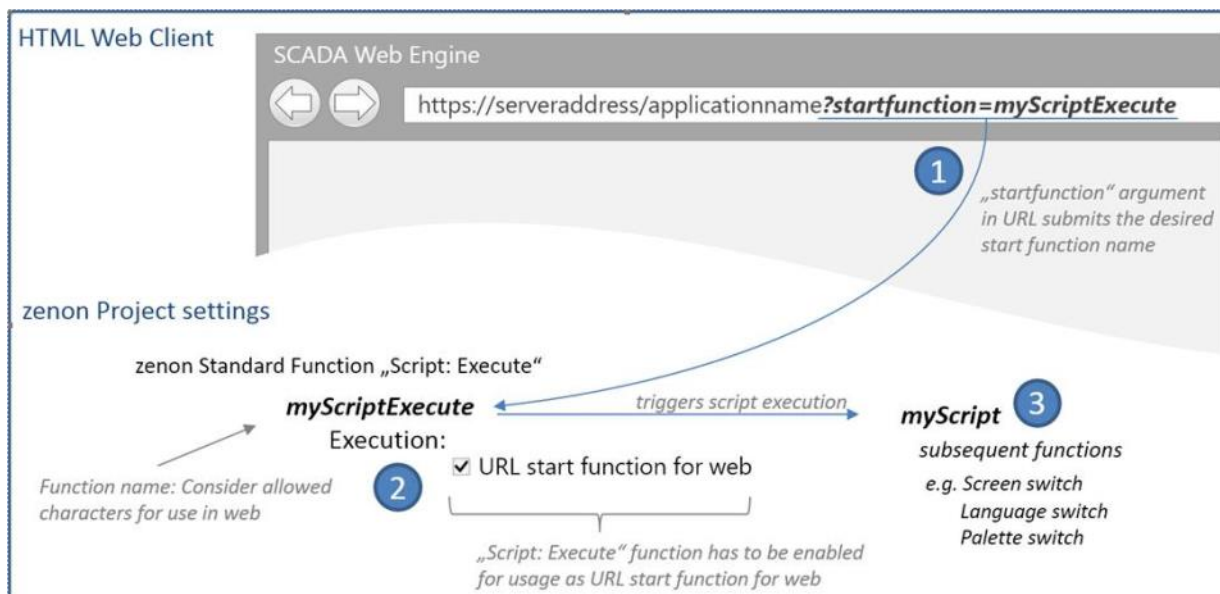
The HTML Web Engine allows the individual execution of zenon functions as part of a session start for an HTML web client. The function is executed by a script that is started using the **Script: execute** function. The name of the desired start function is transferred in the URL for the call to the web page with the **startfunction** argument. The function for the execution of the script must be explicitly approved for call-up as a URL start function.

Note: All settings that are required for the use of the URL start function must be set in the project at the time of compilation for the web.

Process for the application of the functionality:

1. The web page is called up with the additional **startfunction** argument for the call of the desired **Script: execute** function:
The call is made using the function name.

2. If the function for the use as a URL start function has been approved, the assigned script is executed. The execution of the script is carried out individually for this HTML web client session. If the addressed function does not exist or has not been unlocked, a standard web page call is made. The session is then set up according to the call without **startfunction** argument.



Note: This screenshot is only available in English.

The following limitations are applicable for naming the function name in the web:

Permitted	Forbidden
Alphanumeric characters (0-9, a-z, A-Z)	Umlauts
\$ - _ . + ! * ' () ,	ASCII control characters (0x00-0x1F;0x7F)
	Reserved characters (& / : ; ? @)
	Unclear characters (such as spaces and " ' < > # % { } \ \ ^ ~ [])

4.10 Compile project for web

With the **Web Engine Compiler**, the data that the HTML Web Engine needs to provide HTML5 content for the zenon Web Client is provided from a zenon project. When translating this project data, the **Web Engine Compiler** compiler checks the project contents and provides information on non-supported functions or properties. As a result of the translation process, a file is created that is provided to the web engine.

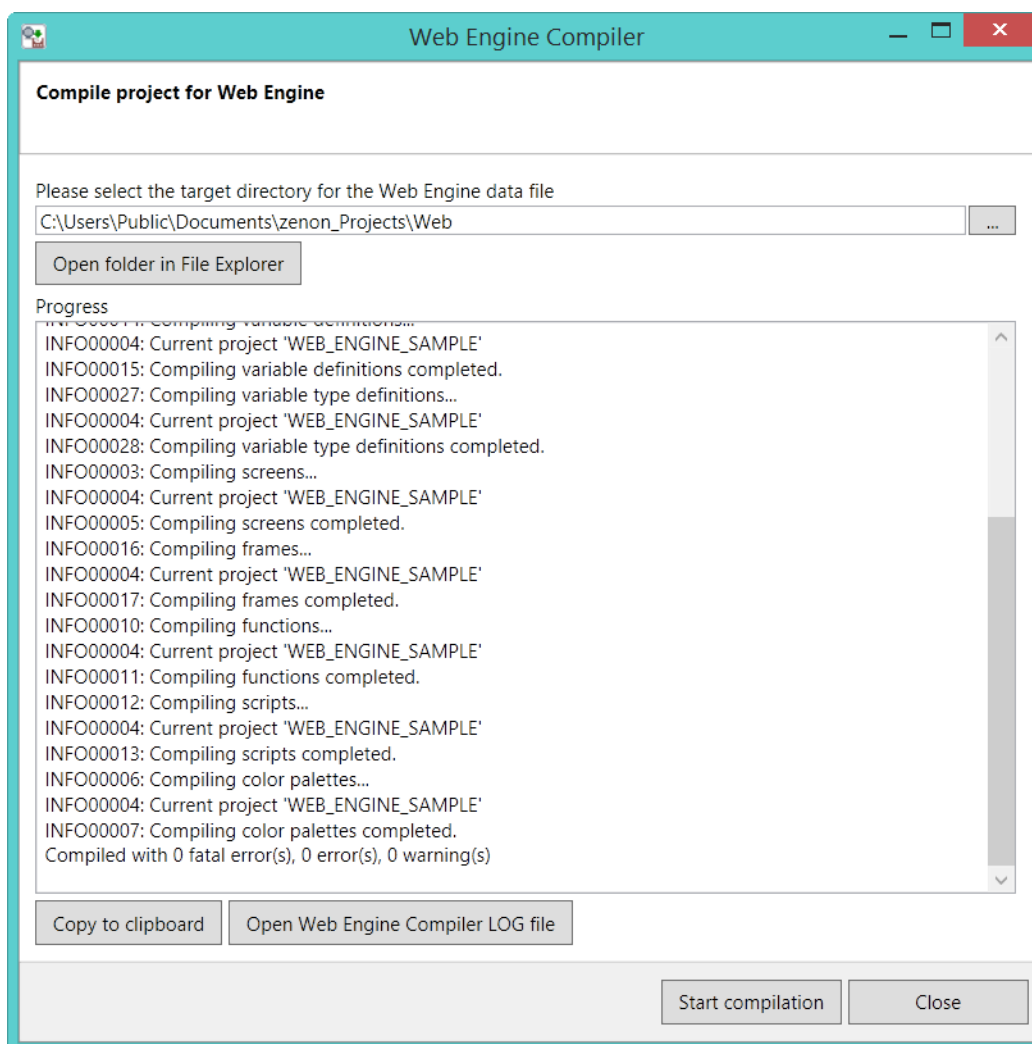
To open the web engine compiler:

1. Click on **Options** in the menu bar of the Editor.
2. Click on **Compile project for web...**

The dialog to compile the project is opened.

Note: This is only available in English.

HTML WEB ENGINE COMPILER DIALOG.



Option	Description
Please select the target directory for the Web Engine data file	Select a directory to save the Web Engine file here. Click the ... button and a dialog opens to select a folder.
Open folder in File Explorer	Opens the selected folder in the Windows Explorer.
Progress	Shows warnings, error messages and information during compilation.
Copy to clipboard	Copies the content of the Progress output window to the clipboard.
Open Web Engine Compiler LOG file	Opens the LOG file for the Web Engine Compiler . This contains the messages from the Progress output window.
Start compilation	Starts the compilation process.
Close	Closes the Web Engine Compiler .

4.11 Process of an HTML web engine session

The HTML visualization is available after a successful compilation of the project data.

To call up the web page:

1. Open an HTML 5-compatible web browser.
You can find the list of recommended web browsers in the System requirements (on page 64) chapter.
2. Enter the web site URL into the address bar of the web browser for the HTML5 visualization:
https://ServerAddress/<ApplicationName>.
The HTML 5 content is provided automatically. In doing so, a separate session is created and administered for each zenon Web Client. The runtime data of zenon Runtime is available as soon as you have been successfully authenticated as a user. You can read more details about this in the **Client authentication for a connection to Runtime** (on page 75).
3. As soon as you leave the web page, the HTML Web Engine session and the connection to zenon Runtime is disconnected automatically.

Note: The web page is left when the web browser is closed, its tab is closed, view is updated or the URL is entered again (among other things).

4.12 System diagnosis and troubleshooting

If there are problems during a system start or during operation, error messages that provide information on the possible cause of the problem are given in the HTML web client. The detailed graph of the error messages depends on how the HTML5 web page is called up:

- ▶ Local web browser: You receive detailed messages.
To do this, the web browser must be on the same computer (with the same IP address) on which the Web Engine is being operated.
- ▶ Remote browser: General messages.
This is applicable when being called up from a different device and/or a different IP address.

CHECKLISTS

FOR ERROR-FREE SYSTEM OPERATION

The following checks are recommended for general checking of the system configuration:

- ▶ HTML Web Engine has been installed on the IIS. The web engine deployment was carried out without any errors. The web server is in operation.
- ▶ Visualization data is generated with the **Web Engine Compiler**. There are no errors during the compilation process. The resultant data of the **Web Engine Compilers** is ready for access by the Web Engine.
Note: The occurrence of warnings does not influence the ability of the HTML Web Engine to run in principle. However, there can be limitations to the configured functionality depending on the type of warning
- ▶ The versions of **Web Engine Compiler** and HTML Web Engine are identical.
Note: The data created by the **Web Engine Compiler** can only be interpreted correctly by the HTML Web Engine (web application) with the same version number.

FOR THE TRANSFER OF PROCESS DATA

Please note when transferring process data:

- ▶ zenon Runtime and SCADA Runtime Connector have been started. The SCADA Runtime Connector can be contacted via the network.
Note: The processes for zenon Runtime and **SCADA Runtime Connector** must run in the same user context.
- ▶ The Users who need to be authenticated must be available in zenon Runtime.