



**The OPC-HTTP Gateway
PRINTED MANUAL**

OPC-HTTP Gateway

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1 About

This program implements a simple OPC-HTTP gateway and allows your web server pages to interact with OPC servers through secure channels. The program acts as an HTTP server and an OPC DA1 & DA2 client at the same time. It translates each HTTP(S) request into a corresponding call to an OPC server.

2 License, Registration and technical support

2.1 License

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Should any term of these terms and conditions be declared void or unenforceable by any court of competent jurisdiction, such declaration shall have no effect on the remaining terms hereof.

If you do not agree to these conditions you should not install this software.

2.2 Limitations

Program is distributed on shareware terms. This means limited and unavailable secondary program possibilities, which become valuable or available after program registration. To register the program read [here](#).

In trial version of our program are the following limits:

- Trial period is limited by 21 days. After that time program won't work until it is registered.
- Continuous program work time is limited. After set period a message will be displayed and program stops its work;
- All data export modules can handle first 100 records only;

2.3 How to register

The program is distributed on shareware terms. This signifies limited or unavailable many features of the program, getting of full value or available after program registration.

If you'd like to be a registered user, to get information about the release of new versions, to use technical support and, at last, to get access to disabled functions of the program, register your copy. For registration, please, read [license agreement](#).

If you want to buy a program through the Internet visit the [registration page](#) of our site. On this page you can get the newest information about the registration process, and also find an order link. After you've have the form of order registration. Enter your personal information and choose the most convenient payment method for you. Further, you'll get notification and follow the notes in it.

More information about services, registration documents, payment means you can get on our [registration page](#) of our site.

2.4 Support

Technical questions	support@aggsoft.com
Common questions	info@aggsoft.com
Sales questions	sales@aggsoft.com

3 Installation

3.1 System requirements

Windows 2000 Professional - Windows 10, including x64 and x86 OS, Workstation and Server OS.

3.2 Installation process

If any beta-version was installed on your computer, remove it.

Quit of the working OPC-HTTP Gateway on installation time.

Run an installation file.

By default, OPC-HTTP Gateway will be installed to the directory "C:\Programs Files\OPC-HTTP Gateway" or "C:\Programs Files (x86)\OPC-HTTP Gateway" of your system disk, but you can change this path.

In the standard distributive of OPC-HTTP Gateway are no additional modules files, which you can download from our [site](#).

4 Configuration

4.1 File with settings

The opchttpgate.xml file contains server configuration and must be placed in the same folder as the opchttpgate.exe file. If you have changed anything in the configuration file, you need to restart the HTTP server.

Example:

```
<Config>
  <Log file="opchttpgate.log" info="1" warning="1" error="1" limit="1000000" />
  <HTTPServer port="80;443" ssl="0" auth="1" staticfilepath="files\" log="1"
logdetailed="0">
    <Users>
      <User login="admin" password="admin" />
      <User login="user" password="user" />
    </Users>
    <AllowedIPs>
      <IP>127.0.0.*</IP>
      <IP>192.168.1.*</IP>
    </AllowedIPs>
  </HTTPServer>
</Config>
```

4.2 Log

The "Log" XML node contains the configuration of the program's log file. The program can output all messages of a selected type to the specified log file for debugging, security, or process monitoring purposes.

Example:

```
<Log file="opchttpgate.log" info="1" warning="1" error="1" limit="1000000" />
```

file (optional; default: empty value) - The path and name of the log file. If this value is empty, the server will not write anything to the log file.

info (optional; default: 1) - If "1" (true), the program will write all informational messages to the log file.

warning (optional; default: 1) - Same as above for warning messages.

error (optional; default: 1) - Same as above for error messages.

limit (optional; default: 100000) - The log file size limit in bytes.

4.3 Main window

The "DesktopModeSettings" XML node contains the configuration of the main window when the program running in the desktop mode.

Example:

```
<DesktopModeSettings>
  <CustomTitle addversion="1">OPC-HTTP Gateway</CustomTitle>
  <CustomLabel>Uptime</CustomLabel>
  <ExitPassword enabled="1">admin</ExitPassword>
  <StopPassword enabled="1">admin</StopPassword>
</DesktopModeSettings>
```

CustomTitle (optional; default: empty) - The program will place this text in the window caption. If the "addversion" attribute is "1" then the program will append a version number to the custom title.

CustomLabel (optional; default: empty) - If this value is not empty the program will place this text above the uptime label.

ExitPassword (optional; default: empty) - If this value is not empty and the "enabled" attribute is "1" the program will ask for a password when a user close the program. If the "blockuserlogout" attribute is "1" the program will try to block computer reboot or user log out.

StopPassword (optional; default: empty) - If this value is not empty and the "enabled" attribute is "1" the program will ask for a password when a user click the "Stop" button.

4.4 HTTP server

This XML node contains the configuration of the HTTP server itself.

Example:

```
<HTTPServer port="80;443" ssl="0" auth="1" staticfilepath="files\" log="1"
logdetailed="0">
```

port (optional; default: 80) - One or more TCP ports. Use the semicolon (";") as a delimiter. The HTTP server will listen to all these ports.

ssl (optional; default: 0) - If "1" (true), the server will enable the SSL protocol for the selected port. If this parameter is "0" but the port number is 443, the HTTP server will always use the SSL protocol.

auth (optional; default: 0) - If "1" (true), the HTTP server will use the "Basic" HTTP authentication for all HTTP requests. The "Users" node contains a list of Login/Password pairs.

staticfilepath (optional; default: files\) - A relative or absolute path to a folder with static files. The server will return that path in response to a GET request.

log (optional; default: 1) - If "1" (true), the HTTP server will write messages to the log file.

logdetailed - If "1" (true), the HTTP server will write detailed messages to the log file.

Users

The XML node contains a list of authorized users.

Example:

```
<User login="admin" password="admin" />
```

AllowedIPs

The XML node contains a list of allowed IP addresses. If the list is empty, the HTTP server will never check the IP addresses of the clients.

You can use the wildcard characters "?" and "*" to specify a range of IP addresses.

Example:

```
<AllowedIPs>  
<IP>192.168.1.*</IP>  
</AllowedIPs>
```

192.168.1.* - Allows all IP addresses from 192.168.1.0 to 192.168.1.255

4.5 SSL certificates

If you use the SSL protocol with your HTTP server, you need to prepare SSL certificates and place them in the program folder.

01ServerCert.pem - The certificate file.

01ServerKey.pem - The server key file.

The program contains self-signed certificates for the "127.0.0.1" host address.

You can use an OpenSSL distribution to prepare your own self-signed certificates.

The disadvantage of using self-signed certificates is that you have to trust them in your web browser.

You can also purchase trusted SSL certificates from an authorized reseller.

5 Service mode

The program can work in the Windows Service mode and start automatically with Windows. If the program is already running in the service mode, you cannot start other instances of it in the desktop mode.

Install/Uninstall

To install or uninstall the service, execute one of the following commands in the "cmd.exe" command prompt. If you have Windows Vista or higher, you need to run "cmd.exe" with elevated administrator privileges.

Install: `opchttpgate.exe /AI`

Uninstall: `opchttpgate.exe /R`

Start/Stop

To start or stop the service, open the "Services" control panel, find "OPC-HTTP Gateway Service" there, and execute the necessary command.

More commands

To get a list of possible commands, execute the following command in the "cmd.exe" command prompt:

`opchttpgate.exe /?`

6 HTTP requests

6.1 Common information

1. The HTTP server accepts GET and POST requests.
2. POST request type: "application/x-www-form-urlencoded".
3. If a POST request contains a query string and POST data, the HTTP server will search for the value in the "Post Data" part first, and then in the query string.
4. The HTTP server returns a JSON response with the "Content-Type" "application/json; charset=utf-8" for all valid requests.
5. The HTTP server returns the 400 (Bad Request) HTTP response code for any invalid request (for example, if some parameters or the server name are invalid).
6. The HTTP server returns the 403 (Access Denied) HTTP response code for any unauthorized request (if you have enabled this feature in the server configuration).
7. The HTTP server does not distinguish between different clients' requests. If one client subscribes to tags, another client can execute the "unsubscribe" request for the same tags.

6.2 Data types

The following data types can be used in the "write" request and some responses.

Data type code	Description
13	Unknown
1	Null

2	Smallint
3	Integer
4	Single
5	Double
6	Currency
7	Date
8	String
11	Boolean
16	ShortInt
17	Byte
18	Word
19	LongWord
20	Int64
21	Word64

6.3 JSON response items

success - May contain "true" or "false"; means a response type.

processed - Contains the number of data items that have been processed by the corresponding request. If this value is greater than the size of the "data" array, it means that some items did not match the input parameters.

data - Contains an array of data items. Each data item can contain the following elements. The content of the data item depends on the request.

name - The name of an OPC tag or OPC server.

group - The group name of an OPC tag.

value - The value of an OPC tag.

data_type - The data type of the value above.

quality - The OPC value quality.

timestamp - The time stamp of the last value change.

clsid - A unique GUID of an OPC server.

desc - The description of an OPC server.

6.4 Get Server List

This request allows you to get a list of OPC servers from the specified host.

Request page: get-servers.json

Parameters:

host (optional, case insensitive) - The host IP address. If this parameter is empty, the HTTP server will return a list of local servers.

Example:

```
http://127.0.0.1/get-servers.json?host=192.168.1.180  
http://127.0.0.1/get-servers.json
```

Response example:

```
{"success": true, "processed": 1, "data":  
[{"name": "opcserver.sim.Instance.1", "desc": "Demo server", "clsid": "{0a9db5fd-  
4ca5-4611-84fb-3f5b75692fa9}", }]}
```

6.5 Get Tag List

This request allows you to get a list of tags from the specified OPC server.

Request page: get-tag-tree.json

Parameters:

server (required, case sensitive) - The OPC server name.

host (optional, case insensitive) - The host IP address of the OPC server.

Example:

```
http://127.0.0.1/get-tag-tree.json?server=opcserver.sim.Instance.1
```

Response example:

```
{"success": true, "data":  
[{"name": "Channel1.Device1.Tag1", "data_type": 8},  
{"name": "Channel1.Device1.Tag2", "data_type": 3},  
{"name": "Channel1.Device1.Tag3", "data_type": 3},  
{"name": "Channel2.Device1.Tag1", "data_type": 3}]}
```

6.6 Subscribe

This request allows you to add a tag to a subscription list. The server will poll the tag value periodically (every 100 ms for local OPC servers, or every 1000 ms for remote OPC servers) and store the OPC tag value internally. Subsequent "read" requests will get the value from the internal buffer, so they will work much faster.

Request page: subscribe.json

Parameters:

server (required, case sensitive) - The OPC server name.

host (optional, case insensitive) - The host IP address of the OPC server.

group (required, case sensitive) - The group name. This name is not related to the OPC group's name on the OPC server. You can use this group name as a shortened version for the "read" request. For example, you can read a whole group.

tag (required, case sensitive) - The OPC server tag name (names). You can get these names using the "get-tag-list" request. You can specify multiple tag names by using the "|" (pipe) character as a delimiter.

Example:

```
http://127.0.0.1/subscribe.json?server=opcserver Instance.1&group=MyGroup1&tag= Channel1. Device1.Tag1|Channel1.Device1.Tag2
```

Response example:

```
{"success": true, "processed": 1}
```

Or

```
{"success": false, "processed": 0}
```

6.7 Unsubscribe

This request is an opposite of the "subscribe" request and allows you to remove tags from the subscription list. If the HTTP server removes all connected tags from the subscription list, the HTTP server will close the connection with the OPC server.

Request page: unsubscribe.json

Parameters:

server (required, case sensitive) - The OPC server name.

host (optional, case insensitive) - The host IP address of the OPC server.

group (optional, case sensitive) - The group name from the "subscribe" request. You can omit the "tag" value in this request. In this case, all tags for this group will be removed from the subscription list. If the the "group" is equal to "*", all tags in all groups will be removed.

tag (optional, case sensitive) - The list of tags (see the "subscribe" request). If you specify this parameter, the group parameter will not be used.

Example:

```
http://127.0.0.1/unsubscribe.json?server=opcserver.sim.Instance.1&tag=Channel1.Device1.Tag1|
Channel1.Device1.Tag2
http://127.0.0.1/unsubscribe.json?server=opcserver.sim.Instance.1&group=MyGroup
http://127.0.0.1/unsubscribe.json?server=opcserver.sim.Instance.1&group=*
```

Response example:

```
{"success": true, "processed": 1}
```

Or

```
{"success": false, "processed": 0}
```

6.8 List Subscribed

This request allows you to get a list of tags from the internal subscription list.

Request page: list-subscribed.json

Parameters:

server (required, case sensitive) - The OPC server name.

host (optional, case insensitive) - The host IP address of the OPC server.

group (required, case sensitive) - The group name from the "subscribe" request. If the "group" is equal to "*", all tags in all groups will be processed.

Example:

```
http://127.0.0.1/list-subscribed.json?server=opcserver.sim.Instance.1&group=*
```

Response example:

```
{"success": true, "data":
[{"name": "Channel1.Device1.Tag1", "group": "MyGroup"},
{"name": "Channel1.Device1.Tag2", "group": "MyGroup"},
{"name": "Channel1.Device1.Tag3", "group": "MyGroup"}]}
```

6.9 Read

This request allows you to read an OPC tag value from the specified OPC server. If the specified OPC tag exists in the subscription list, the HTTP server will return the cached value. If you try to read a single tag that does not exist in the subscription list, the server will connect to the server and read the value. If a request contains tag names that are either subscribed or not subscribed, the HTTP server will return only tags from the subscription list.

Request page: read.json

Parameters:

server (required, case sensitive) - The OPC server name.

host (optional, case insensitive) - The host IP address of the OPC server.

group (optional, case sensitive) - The group name from the "subscribe" request. You can omit the "tag" value in this request. In that case, the server will return values for all tags in the specified group. If the the "group" is equal to "*", the server will return values for all tags in all groups.

tag (optional, case sensitive) - The list of tags (see the "subscribe" request). If you specify this parameter, the server will ignore the "group" parameter.

Example:

```
http://127.0.0.1/read.json?server=opcserver.sim.Instance.1&tag=Channel1.Device1.Tag1
```

Response example:

```
{"success": true, "processed": 1,  
"data": [{"name": "Channel1.Device1.Tag1", "group": "MyGroup", "value"  
: "123", "quality": "0xC0", "timestamp": "2016-10-27 06:23:24", "data_type": 8}]}
```

6.10 Write

This request allows you to write a new value to a single OPC tag on the specified OPC server. If you try to write to a tag that does not exist in the subscription list, the program will connect to the server and try to write the value.

Request page: write.json

Parameters:

server (required, case sensitive) - The OPC server name.

host (optional, case insensitive) - The host IP address of the OPC server.

group (optional, case sensitive) - The group name from the "subscribe" request. The server searches for a subscribed tag using this group name.

tag (required, case sensitive) - An OPC tag name.

value (required, case sensitive) - A new value.

data_type (optional, number only) - The data type of the specified value. You can omit this parameter for subscribed tags. In that case, the server will use the data type of the cached value.

Example:

```
http://127.0.0.1/write.json?server=opcserver.sim.Instance.1&group=MyGroup&tag=Channel1.Device1.
```

Tag1&value=321&data_type=8

Response example:

```
{"success": true, "processed": 1}
```

6.11 Demo

We have prepared a demo page that uses jQuery and illustrates all features of the program. We have placed the "demo.html" page in the "files" folder with all static files.

Just start the program and open the following URL in your web browser:

<http://127.0.0.1/demo.html>