System Requirements Server for the use of IngSoft InterWatt (operating the server in the licensee's network)

(Version: 2022-12-20)

§ 1 Preliminary remark

This document describes the system requirements necessary to install the server components of the software "IngSoft Inter-Watt". This document only becomes contractually binding when this document is incorporated into a contract.

This document describes the current state of system requirements at the time of its writing and thus those system requirements that are necessary to run the current version at that time of the software. Subsequent versions of the software may have different system requirements, if they improve in the performance or security of the overall system.

Further details on the system requirements for the client software can be found in a separate document.

§ 2 Basics

IngSoft InterWatt consists of several server software components that can be distributed to one or more servers in different ways. In this way, installations are also possible that meet increased requirements for availability.

In addition, the specific requirement of hardware resources depends on numerous factors such as the number, type, resolution, and storage duration of the data points, so that in the following the illustration is exemplary of some assumed scenarios.

§ 3 Prerequisite Software

Regardless of the installation scenario, the following software is required; (Licensing, installation and maintenance are in the sphere of the customer):

Category	Supported alternatives	Hints
Server Operating System	(Microsoft Windows Server 2012) (Microsoft Windows Server 2012 R2) Microsoft Windows Server 2016 Microsoft Windows Server 2019 Microsoft Windows Server 2022	It must be allowed to download current versions of the Microsoft .NET Framework, .NET frameworks and standard components of the operating system such as the Internet Information Server (IIS). Windows Server 2012 and 2012 R2 versions will only be supported until October 2023. TLS 1.2 needs to be enabled on the server.
Database Management-System	Microsoft SQL Server 2016 Microsoft SQL Server 2017 Microsoft SQL Server 2019 Microsoft SQL Server 2022	At least the standard edition is required in each case.
Other		Virus protection, system management software, etc. at the discretion of the customer

Exception: the IngSoft InterWatt SoftLogger and the IngSoft InterWatt Fieldservice (smaller programs (services) for collecting and forwarding data, e.g. from building control systems) also run on current Microsoft client operating systems.

When licensing the required software, please note:

a) The Microsoft SQL Server can also be purchased via IngSoft, this requires a corresponding agreement in the license agreement.

b) IngSoft InterWatt includes its own user administration. Usually license agreements with Microsoft in such cases require one license per user created in IngSoft InterWatt; IngSoft therefore recommends licensing according to cores for Microsoft SQL Server; such licences are available starting from 4 core in steps of 2 cores.

c) IngSoft InterWatt is often operated in such a way that it is accessible via the internet; this must be covered by the license.

d) If the use of IngSoft InterWatt is made possible for third parties for a fee, this is usually only possible through a so-called Microsoft SPLA licensing.

§ 4 Exemplary hardware dimensioning

IngSoft InterWatt can be operated in numerous hardware constellations. The power requirement depends on many factors (e.g., number of meters, data acquisition frequency, interfaces for data collection, number of years to be collected), so that only exemplary configurations are given here:

	Minimal standalone configuration	**Installation in a data centre, smaller scenario**	**Installation in a data centre, medium scenario**	**Redundant configuration, large scenario**
Number of counters	500	1.000	5.000	25.000
thereof with data with a resolution finer than 1 day	100	500	2.500	12.500
Concurrent users	5	10	25	50
Environment	Standalone computer	Virtualized data centre	Virtualized data centre	(Virtualized) data centre
Existing resources in the data center		SQL server, space for database 50-150 GB	SQL server, space for database 200-600 GB	Storage solution with min. 10,000 IOPS and 1.0 - 2.5 TB space, load balancer
Server 1	32 GB, 4 Cores, 2 SSD with 256 GB in a Raid 1 array	32 GB, 4 Cores	Application server: 16 GB RAM, 4 Cores	Application server A: 24 GB RAM, 4 Cores
Server 2	-	-	Services: 32 GB RAM and 8 cores	Services A: 32 GB RAM und 8 Cores
Server 3	-	-	-	Application server B: 24 GB RAM, 4 Cores
Server 4	-	-	-	Services B: 32 GB RAM und 8 Cores
Server 5	-	-	-	2 servers with 128 GB RAM each, 8 cores as database cluster
Server 6	-	-	-	

Unless otherwise specified, the virtual machines require not only the storage space for the operating system and, if necessary, for the operating system but also up to 10 GB hard disk space for the IngSoft InterWatt program files and temporary data.

§ 5 Data backup

IngSoft InterWatt stores all data in a database. The backup of the software stored on the servers and their configuration is therefore theoretically only necessary when installing updates.

For the database, hourly log backups and daily full backups are recommended. If the data backup is not carried out via mechanisms established on the customer side (e.g., central backup system), IngSoft InterWatt can be configured to perform these backups automatically. To do this, sufficiently large and suitable backup targets must be provided.

§ 6 Network integration of the server

In the following, the individual connections required by the IngSoft InterWatt server(s) are described. It is at the discretion of the licensee via which network connection these connections are ensured.

Lfd. Nr.	Designation	Remote Station Protocols	Connection establishment Communication direction	Note
1	Communication between the servers	Different only participating servers	Bidirectional Bidirectional	Not applicable if all components are installed on one machine
2	Backup	At the choice of the customer	At the choice of the customer	Obligatory
3	Access for internal users (web client)	http/https + WebSockets internal clients	Inbound Bidirectional	Obligatory
4	Access for external users (web client)	https + WebSockets public internet	Inbound Bidirectional	obligatory
5	Sending emails	e.g., SMTP, outbound	Outbound Outbound	Obligatory
6	Access for users (mobile app)	https public internet	Inbound Bidirectional	Necessary to use the app
7	Sending push notifications to the app	https, Google Firebase Cloud Messaging	Outbound Outbound	Highly recommended when using the app
8	License request	https supervisor.interwatt.net	Outbound Bidirectional	Recommended, but obligatory for software rental
9	Maintenance access for IngSoft GmbH	At the choice of customer IngSoft GmbH network	At the choice of the customer bidirectional	Obligatory
10	Software updates from IngSoft	ftp update.interwatt.net	Outbound Inbound	Highly recommended
11	Software updates from Microsoft	Based on the customer's choice	Outbound Inbound	Obligatory
12	Remote monitoring of the server	https supervisor.interwatt.net	outbound outbound	Highly recommended, TLS 1.2. mandatory
13	Weather data via IngSoft proxy	https kds.interwatt.net	Outbound Inbound	Highly recommended, TLS 1.2. mandatory
14	Alternatively: Weather data directly from the provider	different	Miscellaneous	Only if "Weather data via IngSoft proxy" is not desired
15	Connection to data sources for energy data	e.g., http, https, WebSockets, MQTT, POP3, IMAP, BACnet, OPC via DCOM, ODBC diverse	Miscellaneous	Necessary if energy data is to be recorded automatically
16	Determination of geographical coordinates	https mapquestapi.com	Outbound Bidirectional	Optional, necessary for map display, sun position calculations
17	Registration of energy certificates	https energieausweis.dibt.de	Outbound Outbound	Optional, necessary for online registration of energy certificates

1. Communication between the servers

If the server components of IngSoft InterWatt are distributed over several servers, they must be able to communicate with each other. In particular, all components access the database or database server. This connection must be as latency-free as possible. In addition, all server components communicate with the so-called IngSoft InterWatt Watchdog Service, which is installed on each of the client's servers. This service can restart the other components in the event of an error.

2. Access for backup

IngSoft's preferred concept for data backup is that the IngSoft InterWatt server automatically writes a complete backup of the database to a *.bak file once a day. The file is either written directly to a network share provided (and backed up there) or the backup file is stored in a special folder on the IngSoft InterWatt server, which is then backed up by the licensee's backup system.

If the transaction log backups are stored outside the IngSoft InterWatt server, a corresponding network share is required.

3. Access for internal users (web client)

Users use the web application "EnergieMonitor" to access the system. This application communicates via http/https or WebSockets with the server (i.e. with the Microsoft Internet Information Server installed on it as part of the operating system); it must therefore be possible to establish a corresponding connection to the IngSoft InterWatt server from the computers of these users.

Additional note, valid until the beginning of 2023: for a few rare administrative tasks, the "StrukturEditor" is still required, which is installed on the client computer as a ClickOnce application. This also communicates with the server via https. The program "IngSoft InterWatt StrukturEditor" is a .NET Framework application that runs on the user's personal computer. To ensure that the IngSoft InterWatt Structure Editor is always up to date on the user's PCs, it is published on the IngSoft InterWatt server as a so-called IngSoft Structure Editor ClickOnce installation. For this purpose, the corresponding files (including *.application, *.deploy, *.exe and *. dll) are may not be blocked by a firewall. Alternatively, the structure editor can also be provided by simply copying the program files to the client computer or a network share.

4. Access for external users (web client)

It is at the discretion of the licensee whether external users such as planners, customers or citizens should have access to the IngSoft InterWatt server via the internet. From the point of view of the IngSoft InterWatt server, there are no requirements other than in stated in 3., only that it is strongly recommended to generally access only via encrypted protocols (https or WebSockets based on https); the procurement and regular renewal of the necessary SSL certificate is the responsibility of the licensee.

5. Sending e-mails

The IngSoft InterWatt server regularly sends e-mails, e.g., with attachments to users created in the software. He can use the SMTP server available in the operating system on the IngSoft InterWatt server or another SMTP server to be named by the licensee. Receiving of e-mails by the IngSoft InterWatt server is only necessary for certain configurations of remote data acquisition.

If the SMTP server is used on the IngSoft InterWatt server, the licensee must take appropriate measures to ensure that the SMTP server can function properly (opening ports, setting up a DNS reverse lookup for the public IP used, etc.). This variant is particularly recommended if a high volume of e-mails is expected.

If an SMTP server provided by the licensee is to be used, its accessibility for the IngSoft InterWatt server must be ensured.

6. Access for users (mobile app)

The apps for Android and iOS belonging to IngSoft InterWatt communicate with the IngSoft InterWatt Server using the same protocols as the other client programs. If the mobile devices of the users access the IngSoft InterWatt server exclusively via an organization's own network or VPN, the instructions as stated above in section 3 apply, otherwise also as described in section 4. The distribution and updating of the apps take place via the app stores of Google or Apple; appropriate access must therefore be possible.

7. Sending push messages to the app

To send push notifications to the apps, access to

- https://fcm.googleapis.com and
- https://www.googleapis.com/auth/firebase.messaging

is required.

If communication with the external services of Google and Apple is not desired, this function can be turned off, but then no notifications are sent to the users of the app (e.g., about the existence of new reading orders).

8. Licence retrieval

To use IngSoft InterWatt, a license key is required, which is tied to the hardware and the URL used for client access. This key can be retrieved automatically during the initial installation but also for any extensions of the license if the service can be reached under https://supervisor.interwatt.net. In the case of such a retrieval, the license-relevant information (including the number of meters used, URL and a so-called hardware hash are transmitted to IngSoft).

If IngSoft InterWatt is operated with a perpetual license, the installation of the license can also be conducted by retrieving a request file via the web interface, transmission of this by e-mail to IngSoft, receipt of a license file by e-mail and upload of this file via the web interface.

9. Maintenance access for IngSoft GmbH

Optimally, IngSoft has a dedicated VPN access to the server, through which the system can be managed via Microsoft remote desktop. In addition, updates of the IngSoft components are transferred in this way. This access can and should be limited to a fixed IP address from the public part of the IngSoft network and secured via IPSEC or equivalent.

10. Software updates from IngSoft

IngSoft InterWatt can automatically download updates of the server components from IngSoft (ftp://update.interwatt.net). These are then installed by IngSoft support during a remote session as part of the software maintenance. It is also planned that minor updates will be installed automatically. The customer can determine whether download and automatic installation may take place.

11. Download software updates from Microsoft

For the (automated) download of patches, it must be possible for the IngSoft InterWatt server to establish an http connection to the corresponding Microsoft servers, unless other mechanisms are used in the company network.

12. Remote monitoring of the server by IngSoft

As part of the software maintenance contract, IngSoft offers remote monitoring of the server. For this purpose, the server regularly sends https requests to a website operated by IngSoft (https://supervisor.interwatt.net). These requests contain information about the system status (including available hard disk space and number of logged-on users). IngSoft InterWatt can also be operated without this remote monitoring, but then the IngSoft Support cannot proactively respond to potential problems (such as failure of daily data backup, scarcity of storage capacity, etc.).

13. Access to weather data

IngSoft InterWatt requires up-to-date climate information. To do this, it downloads weather data from https://kds.interwatt.net daily via https.

14. Alternatively: Weather data directly from the provider

Alternatively, weather data can be can be obtained directly from weather data providers such as the DWD (dwd.de) using protocols such as http oder FTP.

15. Connection to the data loggers or to building management systems

The connections required for this differ depending on the acquisition system used, sometimes modem or ISDN cards are required. For some older systems, the supplied remote query software of the acquisition system must be used, so the further

requirements arise (e.g., modems) according to the specification of this software. It may be necessary or useful to run this software on a separate computer and then access it from the IngSoft InterWatt server via file sharing.

Very often, data loggers or similar devices also transmit data by e-mail. Then IngSoft InterWatt needs access to an incoming mail server via IMAP or POP3. MQTT is also being used increasingly frequently.

16. Determination of geographical coordinates

In IngSoft InterWatt various functions can be used for which it is necessary to return to the recorded address, e.g., determine the GPS coordinates of a building (e.g., map display or determination of the time of sunset). For this purpose, IngSoft InterWatt uses the Maquest service and only transmits the collected addresses to https://mapquestapi.com On customer request, this data transfer be completely turned off.

17. Registration of energy certificates

In IngSoft InterWatt, energy passes of different standards can be issued. An "Energieausweis" according to the the German GEG needs to be electronically registered with the German Institute for Construction Technology (DiBT). For this purpose, it is necessary to create an account there and so-called registration numbers can be purchased for a fee. IngSoft InterWatt sends the data to https://energieausweis.dibt.de at the user's request.

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