

SYSTEM REQUIREMENTS

For all waveware® application clients



waveware® FAT
ClickOnce



waveware® WEB
HTML5 web client



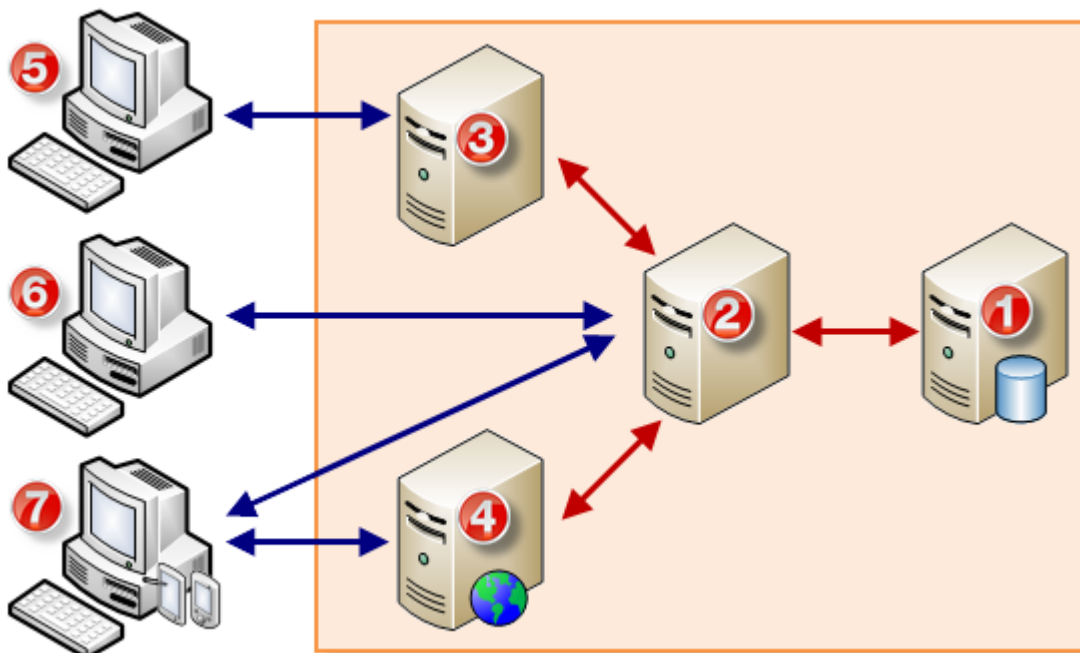
waveware® NETPROCESS
Service portal on the web



waveware® MOBILE
App

System Requirements

The access to waveware is diverse. The deployment can be differently scaled depending on the requirement:



In the above example, a system structure is displayed, as it is recommended for the larger installations.

- ① **Database server**
- ② **waveware server**
- ③ **Terminal server** (optional)
- ④ **Reverse Proxy** (optional)

For a waveware system installation, a database and the waveware server are necessary. The deployment is also possible through a terminal server. The optional Reverse Proxy serves in the above example of the deployment of the web client via the Internet. Each of the roles can be offered through any private server, as displayed above. Alternatively, you can also pool the deployment on a server.

During the performed set-up, the following access methods are available for the users:

- ⑤ **Terminal server-Client (RDP)**

6

waveware Windows Client

7

waveware Web Client / Custom Pages

Information

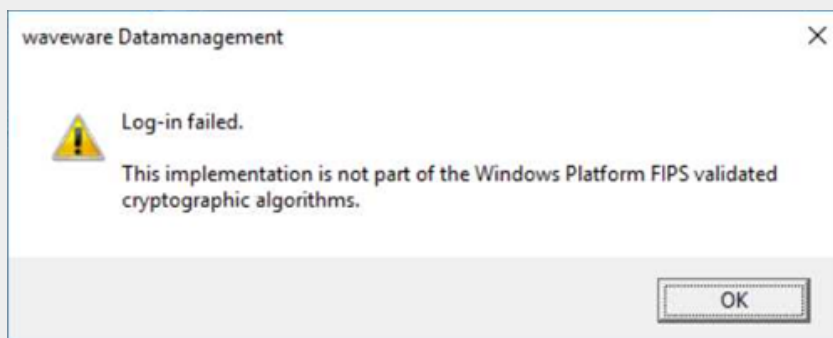
The type and method of the deployment are to be made on the grounds of the performance and reliability, depending on the installation size. The installation of all services should be considered only during small installations.

Important

The deployment of the services requires free ports on the relevant server. Check whether the default ports (Consider the FAQ: [Network-Ports](#)) can be used, or whether this must be changed directly after the installation.

Note

The FIPS (Federal Information Processing Standard) cryptography process is not supported by waveware. This is offered for example, in Windows operating systems as a security policy, but is deactivated by default. If you activate this security policy, the following error message appears when you log in:



1. Requirements

Below you can find a list of specific hardware and software terms. The mentioned products of third party producer are not the proposed item of the Loy & Hutz Solutions GmbH.

Note

waveware Support in scope of the support and maintenance agreement is applied only during the usage of the listed components.

1.1. Important Technical Changes

The following is a summary of important changes that you should definitely consider before a new installation or update:

Single Sign-On with MSAL or SAML

Single Sign-On (SSO) enables direct access to all applications and services for which authorizations exist after a one-time authentication at a workstation without having to log on again for each service. Until now, a WCF service was used in waveware for this purpose. Since Microsoft .NET 6.0, which is used from waveware 11.200, no longer supports WCF services, the previous standard procedure for single sign-on in the waveware Windows client and in the web/CustomPages must be replaced by single sign-on via MSAL (Microsoft Authentication Library - Microsoft authentication library) or SAML (Security Assertion Markup Language - XML framework for exchanging authentication information). Both methods have been integrated in waveware for a long time and offer the advantage that they can be used not only for the waveware Windows client, but also for mobile and web clients. This way you can use a single SSO standard for all platforms. For more information on setup and use, see '[Single Sign-On with SAML](#)' or '[Single Sign-On with MSAL](#)'.

Clients only for 64Bit Operating Systems

The waveware Windows client and the DataManagement are only available for 64-bit operating systems, just like the waveware server for a long time. This allows, among other things, to allocate more memory to waveware clients in order to achieve better performance. In earlier versions, RAM was limited to 2 GB. waveware Server, waveware Windows Client and DataManagement can no longer be run on x86/32bit operating systems. Only the CAD-DWG and CAD-DGN import client are still delivered as a 32-bit version for technical reasons. Please note that the ClickOnce links have also changed for this reason. Even if you have already installed the ClickOnce client in 64-bit, a new installation of the ClickOnce client is necessary.

ClickOnce changed - new installation required

The migration of clients to 64-bit has meant that ClickOnce client deployments have also changed. After updating from a lower major version (e.g. 11.190) to waveware 11.200, existing ClickOnce installations cannot be updated automatically. Uninstall existing ClickOnce clients of the previous version and install the current clients from the [ClickOnce links](#) again. This new installation is a one-off. Updates within waveware 11.200 are carried out as usual via ClickOnce.

SOAP/WSDL Web Service set up

The .NET 6.0 only supports SOAP-based web services to a limited extent. The original web service standard is very extensive and due to the high complexity (at least outside of pure Microsoft solutions) it has not been accepted. Instead of SOAP/WSDL, most applications support pure REST interfaces that do not require the complex standard. For this reason, Microsoft has reduced support for SOAP/WSDL web services from .NET 5.0. Since waveware depends on support from Microsoft or the .NET 6.0 in order to be able to offer a corresponding integration of web services, we unfortunately have to stop supporting SOAP/WSDL as well. The support of REST interfaces is still guaranteed. Packages that include WSDL or provide rules in the "Webservice" folder are affected. It is recommended to convert the previous WSDL interfaces to REST interfaces if possible. Information on providing a REST interface: '[Providing a REST Interface](#)'.

waveware Mobile Client for UWP set up

A variant of the waveware client for Mobile Devices was previously provided for UWP (universal Windows platform). However, Microsoft will end support for the UWP framework. Since the waveware UWP Mobile Client is dependent on this framework, Loy & Hutz can no longer further develop this variant of the Mobile Client and is also discontinuing support. waveware Mobile Clients for iOS and Android are unaffected.

Microsoft Edge WebView2 (from 11.200.821.31)

Web content is displayed in waveware Windows Clients using a browser control. Previously, you could choose between IE (Internet Explorer) and Chrome Engine in the settings of the waveware server. Both components are now being replaced by WebView2, the Microsoft Edge Control. Unlike the Chrome Control, the WebView2 Browser Control receives updates via the Windows update function, which ensures that the control always meets the current security criteria without any further update effort. Since Microsoft Edge uses the Chrome Engine internally, all current web technologies will continue to be supported.

The 'WebView2 Runtime x64' is required before installing the current waveware Windows Clients (waveware FAT Client and DataManagement).

Microsoft Visual C++ 2015-2022 Redistributable (ab 11.200.4928.55)

When installing waveware, the Microsoft Visual C++ 2010, 2012 and 2015 runtimes were previously required. Microsoft support has already been discontinued for Visual C++ 2010 and 2012. As of waveware

11.200.4928.55 (September release), only the Microsoft Visual C++ 2015-2022 Redistributable (a single executable runtime) is required for x86 and x64 architecture. To install, run the 'InstallRuntimes.cmd' file in the release directory or download the [x86](#) and [x64](#) runtimes from the manufacturer's website.

1.2. waveware Server

	Minimal	Recommended	Optimal
Architecture	64-Bit	64-Bit	64-Bit
Clock speed	1 GHz	1,4 GHz	≥ 2 GHz
Core	1	2	≥ 4
RAM	8 GB	16 GB	≥ 32 GB
Hard drive	4 GB		

Note

If the waveware document management system (DMS) is used, the storage place must be available for the expected amount of data.

Operating system

Microsoft Windows Server 2012,
 Microsoft Windows Server 2012 R2
 Microsoft Windows Server 2016,
 Microsoft Windows Server 2019 (mandatory for wave.IQ),
 Microsoft Windows Server 2022

Software

Microsoft .NET Framework 4.8, only when the SAP interface is used
 Microsoft Visual C++ 2010 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
 Microsoft Visual C++ 2012 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
 Microsoft Visual C++ 2015 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
 Microsoft Visual C++ 2015-2022 Redistributable (*as of 11.200.4927.55; to install, run the 'InstallRuntimes.cmd' file in the release directory or download the [x86](#) and [x64](#) runtimes from the manufacturer's website.*)
 Microsoft Edge WebView2 Runtime x64 (*ab 11.200.821.31*)

Information

The waveware server internally uses components from Microsoft .NET 6.0 from 11.200.115 and from .NET 7.0 from 11.200.3434. However, the .NET no longer has to be installed in advance, since the waveware installation already includes the required components. The supplied .NET is available exclusively for waveware and is not shared with other applications.

Furthermore, a Reverse-Proxy can be used for the web access over the Internet. For that, the Microsoft Internet Information Services (IIS) and the Apache-Server are released.

1.3. Database Server

	Minimal	Recommended	Optimal
Architecture	64-Bit	64-Bit	64-Bit
Clock speed	1 GHz	1,4 GHz	≥ 2 GHz
Core	1	2	≥ 8
RAM	8 GB	16 GB	> 16 GB

	Minimal	Recommended	Optimal
Hard drive	depending on data traffic		

Software

Microsoft SQL Server 2012,
 Microsoft SQL Server 2014,
 Microsoft SQL Server 2016,
 Microsoft SQL Server 2017,
 Microsoft SQL Server 2019,
 Microsoft SQL Server 2022,
 PostgreSQL 15.1 or higher (*BETA: not suitable for productive environments*)

The Microsoft SQL Server can be used not depending on edition. The express as well as standard and enterprise/data center editions are supported in the cluster operations. The database server must be kept as current as possible. Before a version shift, the release is to be inquired by the support of the Loy & Hutz Solutions GmbH.

1.4. Windows Client

	Minimal	Recommended	Optimal
Architecture	64-Bit	64-Bit	64-Bit
Clock speed	1 GHz	1,4 GHz	≥ 2 GHz
Core	1	2	≥ 4
RAM	1 GB	2 GB	≥ 4 GB
Hard drive	2 GB		

Graphics

DirectX 9-Graphic cards with WDDM 1.0 or higher drivers

Operating system

Microsoft Windows 10 (min. version 1803, for wave.IQ min. version 1809)
 Microsoft Windows 11

Software

Microsoft .NET Framework 4.8, only when the SAP interface is used
 Microsoft Visual C++ 2010 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
 Microsoft Visual C++ 2012 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
 Microsoft Visual C++ 2015 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
 Microsoft Visual C++ 2015-2022 Redistributable (*as of 11.200.4927.55; to install, run the 'InstallRuntimes.cmd' file in the release directory or download the [x86](#) and [x64](#) runtimes from the manufacturer's website.*)
 Microsoft Edge WebView2 Runtime x64 (*ab 11.200.821.31*)

Important

Consider that these requirements apply to all clients in the network. However, you must ensure, that deployment of the necessary software, such as the Visual C++ runtimes already exist, before the waveware Client is installed or deployed.

Information

The waveware server internally uses components from Microsoft .NET 6.0 from 11.200.115 and from .NET 7.0 from 11.200.3434. However, the .NET no longer has to be installed in advance, since the waveware installation already includes the required components. The supplied .NET is available

exclusively for waveware and is not shared with other applications. This applies to installations and updates via .msi packages as well as [ClickOnce Installations](#).

Note

When CAD is used on a FAT Client CAD, you should interpret the client on its needs, as CAD needs more resources.

1.5. Terminal Server

The following data refer to a terminal server with maximum 20 concurrent users.

	Minimal	Recommended	Optimal
Architecture	64-Bit	64-Bit	64-Bit
Clock speed	1 GHz	2 GHz	≥ 2 GHz
Core	2	2	≥ 4
RAM	4 GB	6 GB	≥ 8 GB
Hard drive	2 GB		

Operating System

Microsoft Windows Server 2012,
Microsoft Windows Server 2012 R2,
Microsoft Windows Server 2016,
Microsoft Windows Server 2019,
Microsoft Windows Server 2022

Software

Microsoft .NET Framework 4.8, only when the SAP interface is used
Microsoft Visual C++ 2010 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
Microsoft Visual C++ 2012 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
Microsoft Visual C++ 2015 Runtime (*up to and including 11.200.4370.40, no longer needed after that*)
Microsoft Visual C++ 2015-2022 Redistributable (*as of 11.200.4927.55; to install, run the 'InstallRuntimes.cmd' file in the release directory or download the [x86](#) and [x64](#) runtimes from the manufacturer's website.*)
Microsoft Edge WebView2 Runtime x64 (*ab 11.200.821.31*)

1.6. Web Clients

You can call a waveware Web-Client via each hardware, which supports the following 64-bit browsers:

Microsoft Edge

Up to waveware 11.200.2965 at least version 44, from waveware 11.200.3089 at least Edge version 106 is required.

Apple Safari

From waveware 11.200.3089 at least Safari version 13.

Google Chrome

Up to waveware 11.200.2965 at least version 79, from waveware 11.200.3089 at least Chrome version 106 is required.

Mozilla Firefox

Up to waveware 11.200.2965 at least version 68, from waveware 11.200.3089 at least Firefox version 105 is required.

Note

Microsoft Internet Explorer is no longer supported.

For the operation of the web client, a performance of at least 5MBit/s per session is recommended.

1.7. Mobile Clients

The waveware Mobile Client is offered native for the platforms iOS and Android. The following software versions are needed for the operation of the application:

Android

Supported Android versions depend on the build time of the Mobile Client. The last two major versions at the time of build are supported. In addition, only versions that are provided with security updates by Google are generally supported. Currently these are:

Android 12 and newer

Apple

Supported iOS versions depend on the build time of the Mobile Client. The last two major versions at the time of build are supported. In addition, only versions that are provided with security updates by Apple are generally supported. Currently these are:

iOS 15 and newer

This results in the following compatible Apple devices:

iPhone 6s and newer

iPad mini 5 und newer

Important

Since the switch to GRPC to establish the connection from waveware Mobile to the waveware server (from waveware 11.190), only certificates that use a public certification authority (CA) can be used. Using certificates with local CAs will result in connection errors. Be aware of this after updating from previous versions (11.170 or 11.180).

Information

End devices must be able to connect to the waveware Server (WLAN, 4G/5G, VPN etc.).

1.8. File System DMS

As the document management creates single files in sub-folders within the data directory, it should be considered, that such file system is used for many documents, that allows a relevant number of sub-folders. The file system NTFS is recommended.

1.9. Print

To print from waveware, the service 'Print queue' must run and at least a printer driver must be installed. This applies to the client and server.

1.10. Notes on Hardware Data

In general, all data apply to the current hardware. They are distinguished among:

Minimal:

waveware is completely loadable. Up to 5 CC users can execute all the possible operations in the default data world with few records; however, the execution of single operations can last for several minutes.

Recommended:

Up to 5 CC users can work in a the default data world with an amount of data of up to 500.000 records without greater latency.

Optimal:

Factors for a performant hardware equipment (and so to decide on case-by-case basis):

Number of users, who work with the system

Package and rules, which require database actions and/or computing capacity

Package for mass data processing is used, e.g.:

Dashboard/KPIs

Work directives / work stages

etc.

Intensive and regular use of the module selection,Dashboard/KPI, Import/Export:

Interfaces

Users, who work with a lot of analysis

Multi-Operations

etc.

Other applications are executed on the system alongside waveware.

A virtual machine as waveware host, must share hardware resources with other virtual machines.