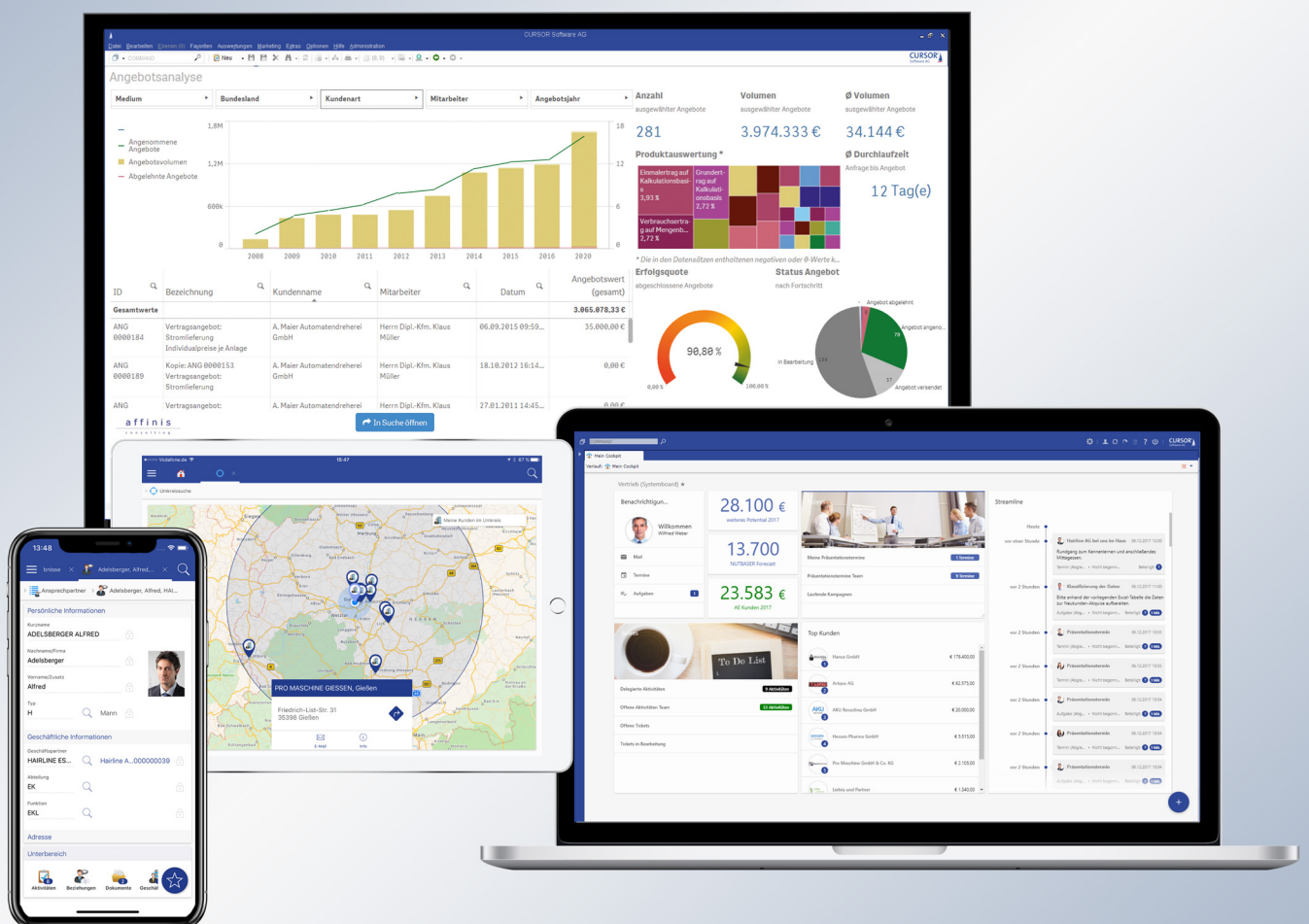


# System Requirements

VERSION  
2019.2

CURSOR-CRM, EVI, TINA

CURSOR-CRM Web, CURSOR-APP



# Topic of Contents

---

<b>1. CURSOR Systemarchitektur.....</b>	<b>2</b>
<b>2. Database server and application server.....</b>	<b>3</b>
2.1 Topology for 1 to 10 users .....	3
2.2 Topology for 11 to 75 users .....	3
2.3 Topology 76 to 150 users.....	4
2.4 Topology 151 to 300 users.....	4
2.5 Topology 300 to 500 users.....	5
2.6 Topology 500 to 800 users.....	6
2.7 Important notes .....	6
<b>3. File server .....</b>	<b>8</b>
<b>4. Clients.....</b>	<b>8</b>
4.1 Web Client.....	8
4.2 Rich Client .....	9
4.3 CURSOR-App .....	10
<b>5. Terminal server.....</b>	<b>10</b>
<b>6. Remote maintenance.....</b>	<b>11</b>
<b>7. Database system software .....</b>	<b>11</b>
<b>8. Application server software .....</b>	<b>12</b>
<b>9. Required ports .....</b>	<b>14</b>
<b>10. Report engine .....</b>	<b>14</b>
<b>11. Groupware connection .....</b>	<b>15</b>
<b>12. Office suite .....</b>	<b>16</b>
<b>13. CTI interface .....</b>	<b>16</b>
<b>14. Example of a CURSOR-CRM system landscape.....</b>	<b>16</b>
<b>15. System component release .....</b>	<b>17</b>
15.1 CURSOR – Application server .....	17
15.2 CURSOR - Rich Client.....	18
15.3 CURSOR - Web Client .....	18
15.4 CURSOR - App.....	19

# 1. CURSOR Systemarchitektur

The CURSOR system architecture comprises four layers: Presentation, Application, Data and Services.

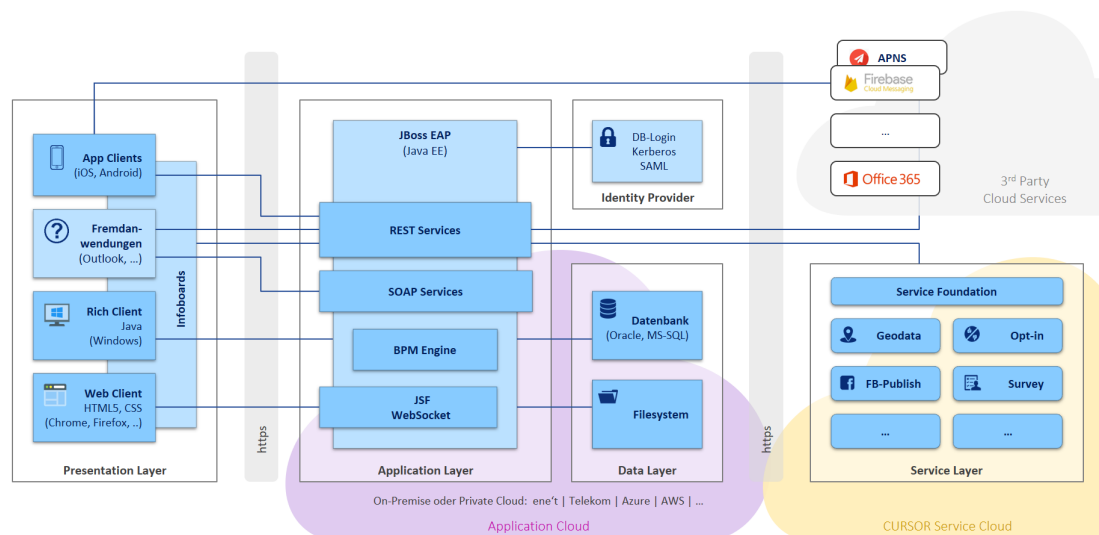
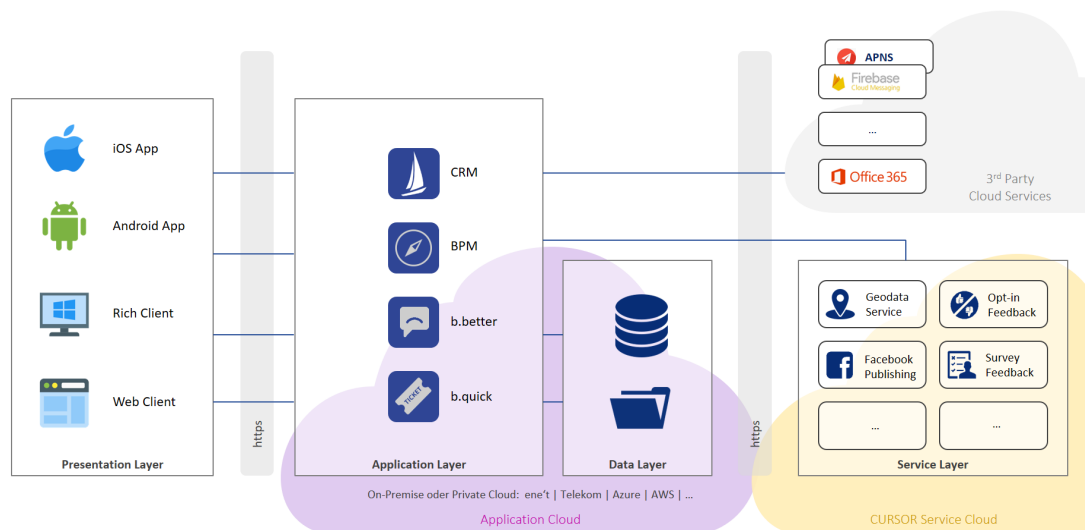
In the presentation layer the users have at present four clients available: Windows Client (Rich Client), Web Client, iOS and Android App. Infoboard technology can be used to embed foreign web applications or individual websites in the interface of these clients.

Application and data layers can be operated either in the customer environment (on-premise) or in a private cloud. This can be either the CURSOR-powered CURSOR Application Cloud or a customer-preferred cloud environment (vCloud, Azure, AWS, ...).

The microservices-based CURSOR Service Cloud provides complementary services that individually extend the application's benefits. These services can be accessed on demand by the application layer.

Instead of the front-end clients (rich client, web client and apps), third-party systems can also communicate with the CRM application. This is usually done via SOAP or, as with apps, via REST-based web services.

These can be addressed directly from technically modeled BPM processes synchronously or asynchronously, which is also the recommended EAI approach for coupling the CURSOR systems with other applications.



## 2. Database server and application server

The performance of the database is mainly defined by the cache and hard drive speeds. The performance of the application server is greatly influenced by the amount of processors and the main memory equipment. With well-equipped machines, the database server can also function as application server. In this kind of setup, it is to be noted that the processor with the higher performance is used (see below). The sum of the individual main memory specifications equals the total amount of memory (see example below). For system stability, it is generally recommended to use separate machines, e.g. to allow the rebooting of a single system.

### 2.1 Topology for 1 to 10 users

With approximately 5 active users, the following configuration has to be used:

#### **Shared application server and database server:**

- 4 CPU cores with at least 2.7 GHz
- 8-16 GB RAM
- SAS Hardware-Raid 5/10, Hardware-Cache is necessary
- Network connection to all Rich Client machines: 1 GBit/s
- Network connection to Web Client machines: min. 1 MBit/s for 10 users
- >= 20 GB of hard disk space is initially required for all components (DB-server, appl.-server, CURSOR-CRM), additionally 50-60 GB of hard disk space is required for log files (for multi-year operation without archiving)
- Windows Server 2016 (other supported operating systems in chapter "Application server software")
- Database system Oracle or MS SQL Server (further information in chapter "Database system software")
- JBoss EAP 7.2 (current version: 7.2.1)

### 2.2 Topology for 11 to 75 users

With approximately 30 active users, the following configuration has to be used:

#### **Shared application server and database server**

- 6 CPU cores with at least 2.7 GHz
- 16-24 GB RAM
- Hardware RAID and hard disks with at least 15k/min. or Solid State Disks (SSD)
- Network connection to all Rich Client machines: >= 1 GBit/s
- Network connection to Web Client machines: min. 1 MBit/s for 10 users
- >= 30 GB of hard disk space is initially required for all components (DB-server, appl.-server, CURSOR-CRM), additionally 50-100 GB of hard disk space is required for log files (for multi-year operation without archiving)
- Windows Server 2016 (other supported operating systems in chapter "Application server software")



- Database system Oracle or MS SQL Server (further information in chapter "Database system software")
- JBoss EAP 7.2 (current version: 7.2.1)

#### **To be noted**

For separate application and database server machines, 4 CPU cores should be provided for the application server and 2 CPU cores for the DB server. With regard to other components (e.g. RAM), the data of the next topology level ("Topology 76 to 150 users") would be a good orientation.

## **2.3 Topology 76 to 150 users**

With approximately 50 active users, the following configuration has to be used:

#### **Application server**

- 4 CPU cores with at least 2.7 GHz
- >= 16 GB RAM
- SAS Hardware-Raid 5/10 and hard disks with at least 10k/min. or Solid State Disks (SSD)
- Network connection to database server: >= 1 GBit/s (LAN)
- Network connection to all Rich Client machines: >= 1 GBit/s
- Network connection to Web Client machines: min. 10 MBit/s for 100 users
- >= 5 GB of hard disk space is required for JBoss incl. JRE, application files and working directory, additionally 50-100 GB of hard disk space is required for log files (for multi-year operation without archiving)
- Windows Server 2016 (other supported operating systems in chapter "Application server software")
- JBoss EAP 7.2 (current version: 7.2.1)

#### **Database server:**

- 4 CPU cores with at least 2.4 GHz
- >= 16 GB RAM
- Hardware RAID and disks with at least 15k/min. or Solid State Disks (SSD)
- Network connection to application server: >= 1 GBit/s (LAN)
- Expected database size: >= 30 GB
- Windows Server 2016 (other supported operating systems in chapter "Database system software")
- Database system Oracle or MS SQL Server (further information in chapter "Database system software")

## **2.4 Topology 151 to 300 users**

With approximately 100 active users, the following configuration has to be used:

#### **Application server**

- 8 CPU cores with at least 2.7 GHz



- >= 24 GB RAM
- SAS Hardware-Raid 5/10 and hard disks with at least 10k/min. or Solid State Disks (SSD)
- Network connection to database server: >= 1 GBit/s (LAN)
- Network connection to all Rich Client machines: >= 1 GBit/s
- Network connection to Web Client machines: min. 10 MBit/s for 100 users
- >= 5 GB of hard disk space is required for JBoss incl. JRE, application files and working directory, additionally 50-100 GB of hard disk space is required for log files (for multi-year operation without archiving)
- Windows Server 2016 (other supported operating systems in chapter "Application server software")
- JBoss EAP 7.2 (current version: 7.2.1)

#### **Database server**

- 6 CPU cores with at least 2.6 GHz
- >= 16 GB RAM
- Hardware RAID and disks with 15k/min. or Solid State Disks (SSD)
- Network connection to application server: >= 1 GBit/s (LAN)
- Expected database size: >= 35 GB
- Windows Server 2016 (other supported operating systems in chapter "Database system software")
- Database system Oracle or MS SQL Server (further information in chapter "Database system software")

## **2.5 Topology 300 to 500 users**

With approximately 160 active users, the following configuration has to be used:

#### **Application server**

- 12 CPU cores with at least 2.7 GHz
- >= 32 GB RAM
- SAS Hardware-Raid 5/10 and hard disks with 10k/min. or Solid State Disks (SSD)
- Network connection to database server: >= 1 GBit/s (LAN)
- Network connection to all Rich Client machines: >= 1 GBit/s
- Network connection to Web Client machines: min. 10 MBit/s for 100 users
- >= 5 GB of hard disk space is required for JBoss incl. JRE, application files and working directory, additionally appr. 100 GB of hard disk space is required for log files (for multi-year operation without archiving)
- Windows Server 2016 (other supported operating systems in chapter "Application server software")
- JBoss EAP 7.2 (current version: 7.2.1)

#### **Database server**

- 8 CPU cores with at least 2.7 GHz

- $\geq 24$  GB RAM
- Hardware RAID and hard disks with 15k/min. or Solid State Disks (SSD)
- Network connection to application server:  $\geq 1$  GBit/s (LAN)
- Expected database size:  $\geq 40$  GB
- Windows Server 2016 (other supported operating systems in chapter "Database system software")
- Database system Oracle or MS SQL Server (further information in chapter "Database system software")

## 2.6 Topology 500 to 800 users

With approximately 250 active users, the following configuration has to be used:

### Application server

- 16 CPU cores with at least 2.7 GHz
- $\geq 32$  GB RAM
- SAS Hardware-Raid 5/10 and hard disks with 10k/min. or Solid State Disks (SSD)
- Network connection to database server:  $\geq 10$  GBit/s (LAN)
- Network connection to all Rich Client machines:  $\geq 1$  GBit/s
- Network connection to Web Client machines: min. 10 MBit/s for 100 users
- $\geq 5$  GB of hard disk space is required for JBoss incl. JRE, application files and working directory, additionally appr. 150 GB of hard disk space is required for log files (for multi-year operation without archiving)
- Windows Server 2016 (other supported operating systems in chapter "Application server software")
- JBoss EAP 7.2 (current version: 7.2.1)

### Database server

- 10 CPU cores with at least 2.7 GHz
- $\geq 32$  GB RAM
- Hardware RAID and hard disks with 15k/min. or Solid State Disks (SSD)
- Network connection to application server:  $\geq 10$  GBit/s (LAN)
- Expected database size:  $\geq 60$  GB
- Windows Server 2016 (other supported operating systems in chapter "Database system software")
- Database system Oracle or MS SQL Server (further information in chapter "Database system software")

## 2.7 Important notes

For installations with more than 800 users, an individual hardware- and software configuration has to be worked out. In this case, the cluster mode is recommended for the application server (see more details in chapter "Application server software").



If a separated hardware cache is used for read- and write operations, then the read cache has to be activated ("performance"), and the write cache has to be deactivated ("data consistence"). If one cache is used for both operations, this cache always has to be activated.

The above-mentioned combinations of software components for database systems and application servers are commonly used by our customers. Therefore, installation and system maintenance efforts for these combinations can be calculated and thus be kept within a limit. Alternatively, different database systems and application servers can be used - if necessary also based on platforms not listed above (see the chapters "Database system software" and "Application server software"). In this case, however, higher installation and maintenance efforts are to be expected. This applies in particular to the provision of interface programmes to other applications.

The hardware requirement cited above only applies to the use of our Java-based product line. If other products are installed on one of the servers, hardware specifications may have to be adjusted. **This applies in particular to installations within virtualized environments, where the above-cited resources are to be assigned dedicatedly to the corresponding virtual machine. The CPU component is especially important in this case, because in a virtualized environment, the hardware emulation process can reduce the CPU performance by up to 25 %. Within a virtualized environment, it is advantageous if the VMs for the database system and the application server are running on the same host.**

The latency of a network line between the database server and the JBoss application server should not exceed 1 ms, which is why both servers must be in the same network segment.

It may happen, that the server CPU does not clock correctly, which would affect the general system performance. A solution for this issue is the option "high performance" in the windows power plan. The problem does not occur in virtual machines, because the clock rate within virtual machines is already at 100 %. More details are described at <https://support.microsoft.com/en-us/kb/2207548>.

The following example "Topology 11 to 75 users" is to explain the memory requirement of 16-24 GB:

- On the application server appr. 100 MB per Rich Client user are required as well as appr. 130 MB per Web Client user. Since the JBoss additionally requires 500 MB of internal heap space, a total of **ca. 3.5 GB** of heap memory are required for **appr. 30 parallel Rich Client users**.
- Additionally, the server needs **ca. 700 MB** for the internal usage of Code Cache, Metaspace and JVM.
- For the database server process, the given topology recommends reserving a main memory of **4-5 GB**.
- In case of a server-based Computer Telephony Integration (CTI), the CTI application server requires a minimum of **2 GB** of RAM (see chapter "CTI-Interface").

Furthermore, a second application server is usually needed for extensive reporting actions (csv export, serial letters, serial mails, excel or jasper reports with mass data). This server is normally configured with a heap memory **between 4 and 8 GB**. Because of system load, we recommend to install this additional application server on a separate machine (or VM).

It is recommended to equip not only the life- but also the test system well (e. g. "topology 11 to 75 users"), since the test system is used for user trainings and usually also for the acceptance of new releases in terms of system quality and performance.





### 3. File server

Although the load behaviour is similar to that of the application and database server, the number of accesses is not as decisive as the size of transferred documents. With greater user numbers, especially the net structure is heavily affected by the amount of data; for more than 500-600 users, it might be necessary to use a high performance file server.

For all topologies described above, the application server could also function as file server.

When a stand-alone server is to be used, it should be equipped as follows:

- 4 CPU cores with at least 2 GHz
- $\geq 4$  GB RAM
- SAS Hardware-Raid 5/10
- Volume by data amount:  $\geq 100$  GB (for multi-year operation without archiving)
- Network connection to application server:  $\geq 1$  GBit/s (LAN)
- Windows Server 2012 R2, 2016 or 2019 (all in standard edition)

### 4. Clients

#### 4.1 Web Client

- The internet browser requires between 300 and 500 MB of RAM (depending on the browser version and system customizing)
- Network connection (per client) to application server: Download  $\geq 1.5$  MBit/s, Upload  $\geq 750$  KBit/s
- $\geq 500$  MB of hard disk space is required for downloaded documents
- Java Runtime is not required
- Screen resolution on a desktop PC or notebook at least 1280 x 1024, on tablets 1024 x 768

The following browser versions are supported on desktop PCs / notebooks:

- Google Chrome from version 51; the current version is recommended here.
- Mozilla Firefox from version 57, ESR from version 60 (firefox quantum).
- MS Edge based on Windows 10 (from version 1803)

Furthermore, the following browsers are supported with restrictions:

- Mac devices: Use based on current Safari version, where the Safari configuration "Disable Pop-Ups" has to be deactivated. However, the operation is subject to general restrictions (e.g. no auto login, no advanced document handling, no external calls, no drag and drop of Outlook emails, no linked documents, no keyboard shortcuts).
- iPad: Use based on current Safari version, where the Safari configuration "Disable Pop-Ups" has to be deactivated. However, the operation here is subject to the same restrictions as with Mac devices and additional restrictions (e.g. no file upload, no drag and drop of documents, no double-click function, no individual positioning of mask separators).
- Android tablets: tablets using Android 5 or a newer version in connection with a Chrome or Firefox browser. With Chrome, the document download only works in combination with an



officially signed certificate. In addition, the same restrictions apply here as in case of iPads. Our internal tests are based on Samsung Galaxy Tab and Google Nexus, so the use of other device types can not be guaranteed.

For all browser variants used, "Scripting" / "JavaScript" must be activated. Moreover, it is required to set up a certificate for HTTPS operation.

When using browser extensions, e.g. SpellChecker, there may be an unexpected behavior in the Web client (especially in HTML editor), on which our software has no influence. Therefore, the use of such extensions is strongly discouraged.

**For reasons of performance Chrome and Firefox are generally recommended.**

## 4.2 Rich Client

- >= dual core with at least 2.5 GHz
- >= 4 GB RAM (the CRM application needs ca. 500 MB for average users and up to 800 MB for administrators and power users who process large quantities of data)
- Network connection (per client) to application server: >= 100 MBit/s
- The latency of a network cable between the rich client and the JBoss application server must not exceed 8 ms, otherwise the web client should be used.
- >= 1,5 GB of hard disk space required for client software incl. caches and Java runtime environment.  
The client software has to be installed on local client machine. A usage of the client over network would result in bad system performance.
- Java Runtime 11.0.x, freeware
- Windows 7, Windows 8 or Windows 10
- Screen resolution at least 1280 x 1024

### Notes

Because of not supporting vector based graphics, the rich client does not support the scaling of text, apps and other elements. Thus the rich client is not usable on MS surface tablet, similar devices or 4K-monitors.

In order to guarantee a good performance, the computers should not run in power save mode. Instead, the recommended standard "balanced" should be selected.

To use Link-Handling in MS Word and Excel (2010), the installation of Microsoft fix <http://support.microsoft.com/kb/218153> is required.

### Notes for the required space of the Rich Client

#### 1. Processing large data quantities

The selection of 40,000 data sets in an activity list with 15 columns temporarily increases the required RAM by 50 MB. A short time later, the needed space is reduced again so that the real incline is approximately 10-15 MB. However, in order to guarantee the best performance for such a selection, the temporarily required 50 MB should be provided.

Further tests with several levels and 40,000 data sets per level resulted in a required Java heap space



of 350 to 380 MB, so that with an additional 128 MB "MaxPermSize" (memory for permanent object generation), the total memory requirement was 500 MB.

## 2. Using the browser view component

The option to integrate web applications within Rich Client masks (or on the desktop) increases the basic storage requirement of the Java client by 10-20 MB. Depending on user behaviour and the number of configured browser views, the chromium instances will occupy several hundred MB of RAM on the client machine. This corresponds to the RAM required to load these views in an internet browser. Please consider this - especially when it comes to the main memory allocation in terminal server/Citrix environments.

## 4.3 CURSOR-App

- iOS >=11 (iPhone >= 5s)
- Android version >= 5: In order to use the INFOBOARDS technology in the CURSOR-App, the Android System WebView has to be installed.
- Mobile network connection: download >= 768 KBit/s, upload >= 128 KBit/s.
- **Since app version 2017.1 the system login verifies the existence of a valid certificate, which was issued from a certification center, on the JBoss server. The (self-signed) certificate of delivery status is not sufficient and has to be replaced by a customer-specific valid certificate.**  
**Note: This is necessary for all systems (development system, QA-system, productive system).**

## 5. Terminal server

### Operating system of the terminal server

Windows Server 2012, 2016 or 2019, in all cases the standard edition with terminal services.

### Additional recommended system specifications

- 8 CPU cores with at least 2.5 GHz
- >= 16 GB of RAM
- >= 150 MB of hard disk space is required for each user profile (for caches and edited CRM documents)
- Hardware-RAID 1
- Network connection to the application server: >= 1 GBit/s (LAN)

### Note to main memory

The terminal server must be very well equipped. In addition to the memory for the operating system, every application session requires approximately 428 MB (300 MB of heap space, 128 MB of PermSpace and JVM). For more applications (Outlook, Word, Excel, etc.), the memory requirement increases accordingly. Additional main memory space is required if browser views are included in CRM masks (see above).

Considering all given elements, 800 MB of main memory may be required for each user. This means that 4 GB of available memory are enough to serve 5 users simultaneously and without any restrictions.



## To be noted

These are recommendations for purchasing new servers. Generally, the applications also run on less powerful systems - although this may affect the applications' speed negatively.

The client software has to be installed locally on the terminal server machine. A usage of the rich client software over network would result in bad system performance.

To avoid data loss, we recommend the use of RAID networks (redundant data keeping) and advise you to backup your system partitions with according software (e.g. Acronis TrueImage, Powerquest Drive Image, Symantec Ghost) so that in case of a system error, the system can be completely rebooted without complex installations and configurations of the terminal server software.

All clients that offer the possibility of a remote desktop connection (min. RDP v5) to a terminal server can be used.

The server can be accessed through the internet browser or by installing the MS Remote Desktop that allows you to set up additional configurations (screen resolution, local printers and drives, programmes to be started, user names, data compressing, etc.)

For Linux and other UNIX systems, HOBLINK JWT (<http://www.hoblink.de>), which is now on the market under the name "Remote desktop VPN", as well as the Open-Source alternative rdesktop (<http://www.rdesktop.org>) can be used.

## 6. Remote maintenance

In order to ensure a prompt and smooth support and system maintenance, we use remote maintenance options. Our tried and tested way of access is via remote desktop. For remote desktop access, a VPN connection is used.

The prepared desktop needs access to all applications being maintained. Moreover, all databases and application servers in use need to be accessible. This includes the rights to start and stop the application server, to access the database through a SQL-editor and to create and start database backups. Additionally, write access is required for all relevant directories, especially for the application server and the log directories.

Last but not least, a practicable way for file transfers is required. Alternatively, an email-account is also sufficient if a direct transfer is not possible.

For a client-specific check, e.g. regarding the client configuration or MS Office, the use of Teamviewer ([www.teamviewer.com](http://www.teamviewer.com)) could be considered. Teamviewer creates a direct connection to the desktop of a remote computer through the internet and requires no additional setup.

## 7. Database system software

The manufacturers of databases and Newsgroups provide no information about hardware requirements for different database sizes and numbers of users.

For data management, the database system Oracle or MS SQL-Server can be used. Such database licenses - if not offered separately - are not included in CURSOR-CRM.

For the installation of CURSOR-CRM, an already installed database software is required. The database structure (tables, indices, etc.) will be installed through a database dump. The configuration and



setup of database parameters is conducted in advance in agreement with the customer and during the on-site installation.

Some database systems further allow the provision of database software in the form of OEM licenses. Please contact CURSOR for further information.

#### **The following DB releases are to be used**

- Oracle: version 19c, 18c, 12c (R2) or 11g (R2), in each case with the current patch
- MS SQL-Server: version 2017, 2016, 2014 or 2012 (also "R2", each with the current service pack)

While Oracle can be used on the Windows platform as well as on Linux (e.g. SuSE Linux, Red Hat Linux) and Unix systems (e.g. IBM AIX, Sun Solaris), the MS SQL-Server is only released for the Windows platform.

#### **Final Notes**

For using the crm application the standard edition of database software is sufficient. The use of an Enterprise edition is recommended when working with a lot of users and large data volumes or enterprise features are expected. The Oracle Enterprise Edition not only includes an automatic tuning of SQL execution plans but also optimally uses the existing hardware for all common database operations by means of parallelization. Thus, the above-mentioned hardware recommendations are fully exploited.

When using an Oracle database the character set "WE8MSWIN1252" has to be used. Unicode capability is ensured by using N data types.

For sorting, Latin1\_General\_CI\_AS should be selected for the MS SQL server. In order to avoid deadlocks or exclusive locks when using a MS SQL-Server, the SNAPSHOT transaction level has to be selected. When the server authentication is configured, the "SQL Server and Windows authentication mode" is to be activated.

The implementation of interfaces to other applications is only possible when the database system has a procedural addition to the SQL language, functioning similar to PL/SQL for Oracle or Transact SQL for MS SQL-Server.

We recommend avoiding the use of database collectors. A database collector is one central server, on which all databases of distinct applications are installed. Such a scenario is theoretically possible, but could globally affect all involved applications in case of performance intensive executions (e.g. batch interfaces, jobs for index creation, database compress or database statistics).

## **8. Application server software**

Our applications can usually be used with any application server with the Java EE specification. However, full functionality is currently only guaranteed with the following product:

- JBoss EAP 7.2 (current version: 7.2.1)

JBoss EAP 7.2 is delivered with activated SSL encryption. The delivered version contains a self-signed certificate that the browser classifies as insecure.

=> Therefore, another customer-specific valid certificate, which has been issued from a trustable CA, is required.



## Background:

In order to meet current IT security standards our systems use secure links for cross-technology communications. This requires the use of certificates to ensure authenticity, integrity and encryption in communications. If it was possible in the past to work with a certificate issued by CURSOR, this is no longer permitted due to current security guidelines. Third-party systems require the use of an individual authentication in case of secure communication. As of version 2017.1 our systems therefore also require the use of own certificates. Furthermore, with version 2017.2, the login procedure of rich client was reworked, with the result of individual security enhancements and the goal of more easily implementing single sign-on procedures in the future. Due to the change of the login procedure, it is also necessary for safety reasons to use own certificates.

### The following certificate files are needed to encode servers and clients:

- A server certificate, which references the FQDN of the server on which the JBoss is installed
  - When creating the certificate, make sure that the server certificate (public key) contains all DNS calling names that are used for the CURSOR Clients (Web Client, Rich Client, CURSOR App).
- The private key corresponding to the server certificate
- The public keys of the issuing certification authority and its superordinate certification authorities (if existing) [Root and Intermedia CAs]

As operating system platform, Windows Server (2019, 2016 or 2012) or the Linux versions SuSE Linux (from Enterprise server 12.x - 64 bit), Ubuntu Linux (from 16.x LTS - 64 bit) or Red Hat Linux (from 7.x - 64 bit) can be used. Other Linux versions only after consultation with CURSOR.

## Cluster Mode

To ensure high availability, it is recommended to set up an active-passive cluster. The JBoss server can be made highly available via a Windows cluster. If the main application server fails, the second JBoss server designated as failover is started and made known to the CRM clients via a DNS entry. With such a construct the JBoss server would have to be mirrored regularly.

If a JBoss cluster with load distribution is required due to high numbers of users (more than 1000 users), there must be a few prerequisites for this, for example:

- The ports for the TCP and UDP protocol have to be activated between the cluster nodes.
- For load balancing a separate JBoss Server has to be used.
- Currently the CURSOR-CRM application server cluster is only available on a Windows platform. This means that all cluster nodes have to be installed on a Windows server.
- Database configurations: In cluster mode, the oracle database parameter "processes" has to be set higher to a matching value. For example, in a two-node cluster with up to 300 sessions each in the JBoss-Session-Pool, the value for "process" is to be set to appr. 650.

## Final Notes

In case of doubt, the use of an Active-Passive-Cluster construct is preferable to a JBoss cluster. Please contact CURSOR, if there is a tendency towards active-active clusters.

The name of the server on which the JBoss application server is to be installed must be a valid internet domain name. This means that only letters, digits and the character "-" may exist, but for example no underline characters.



## 9. Required ports

**The following ports are required in order to use the CRM client with a JBoss application server:**

- 18443 (Web Port https),
- 19993 (JBoss Management https).

If port range 2 is preferred instead of port range 1, the port numbers are 28443 and 29993.

**For the operation of JBoss application server within active-active-cluster mode, the following ports are required in order to enable the cluster nodes to connect:**

- 14712 (Transaction Recovery Manager),
- 14713 (Transaction Status Manager),
- 15520 (JBoss JGroups Service, Protokoll UDP),
- 17600 (JBoss JGroups Service, Protokoll TCP).

If port range 2 is preferred instead of port range 1, the port numbers are 24712, 24713, 25520 and 27600.

- 45688 (JBoss JGroups Multicast, Protokoll UDP),
- 45700 (JBoss JGroups Multicast Ping, Protokoll UDP),
- 23364 (JBoss Web LoadBalancer, Protokoll UDP).

**On the database side, the following ports have to be considered:**

- Oracle: 1521
- MS SQL-Server: 1433

**For the groupware connection on the server side, the following ports have to be considered on groupware server:**

- E-mail reception: 143 (IMAP) or 993 (IMAPS with SSL)
- E-mail transmission: 25 (SMTP)
- Connection to Exchange Calendar: 443 (https)

## 10. Report engine

The creation of reports is currently based on JasperReports (Open Source tool). JasperReports is a Java library, which can be implemented into every Java project. The API allows the creation, manipulation and execution of the report design. The report engine is integrated on the application server, which simplifies and accelerates access to the report files.

**Advantage overview of JasperReports:**

- Very good performance
- Freeware (manuals excepted)
- Design templates in the widely used XML standard
- Additionally contains complete Java-API
- Supports internationalization
- Sub reports can be integrated into other sub reports



The installation of a runtime on the clients is not necessary. However, Acrobat Reader should be installed on the client in order to be able to read the PDF reports provided by the server. If other formats are required, the corresponding software also needs to be installed.

Designers of new reports need access to the REPORT database scheme, which has to be configured on the central database server or on another computer accessible to the report designer (maybe on the basis of the free express edition).

Moreover, a CURSOR-CRM client and the mentioned access (via JDBC) to the REPORT database/-instance are required on the workstations of report designers.

## 11. Groupware connection

There are two ways of integrating a groupware system. The first option is a client-sided Outlook integration which communicates with the Outlook Client via a MAPI interface. The second option is a direct connection to a groupware server (MS Exchange or IBM Lotus Notes).

The client-sided Outlook interface has been established as the standard for Rich Client use (see chapter "Office suite" for more information).

For the Web Client and mailbox manager, the server-sided interface technology is used. This means that data is not synchronized with the groupware client but directly with the server.

The mail interface generally requires a mail server supporting the protocols SMTP and IMAP, which means that the corresponding services must be activated on the groupware server (Note: IMAPS with SSL or TLS possible). In case of MS Exchange, it is alternatively possible to use the mail interface via the Exchange Web Service API (EWS API).

The synchronization of meetings and tasks is implemented via the API of the groupware system. Thus, for MS Exchange, Exchange Web Service (EWS) API is used which, however, has only worked reliably since Exchange 2010. This means that for using the server-sided functionality of meeting and task synchronization (for example in the Web Client), Exchange 2010 needs to be installed. The EWS interface is only supported with the authentication method "Integrated Windows Authentication" (NTLM or Kerberos).

In case of Lotus Notes interface, the CRM system accesses the Domino server via DIIOP protocol. In addition, an Internet password must be set and the "browsing" of database via Internet should also be allowed.

Authentication goes therefore via the so-called internet password within the Notes person document of NAB (name and address book).

### **Notes for CURSOR-CRM Web within a cloud**

In order to use the mail functionality, a hosted application server needs access to the mail server. For reasons of security, it should be regulated that the application server is the only unit to access the mail server from outside. In order to use the meeting and task synchronization, MS Exchange is required as groupware server. MS Exchange is accessed through an Exchange Web Service (EWS) interface.





## 12. Office suite

For the Office implementation, MS Office 2010, 2013, 2016 or 2019 has to be used.

The connection to Office 365 is only tested and released in case of local installation (but not for the web versions).

## 13. CTI interface

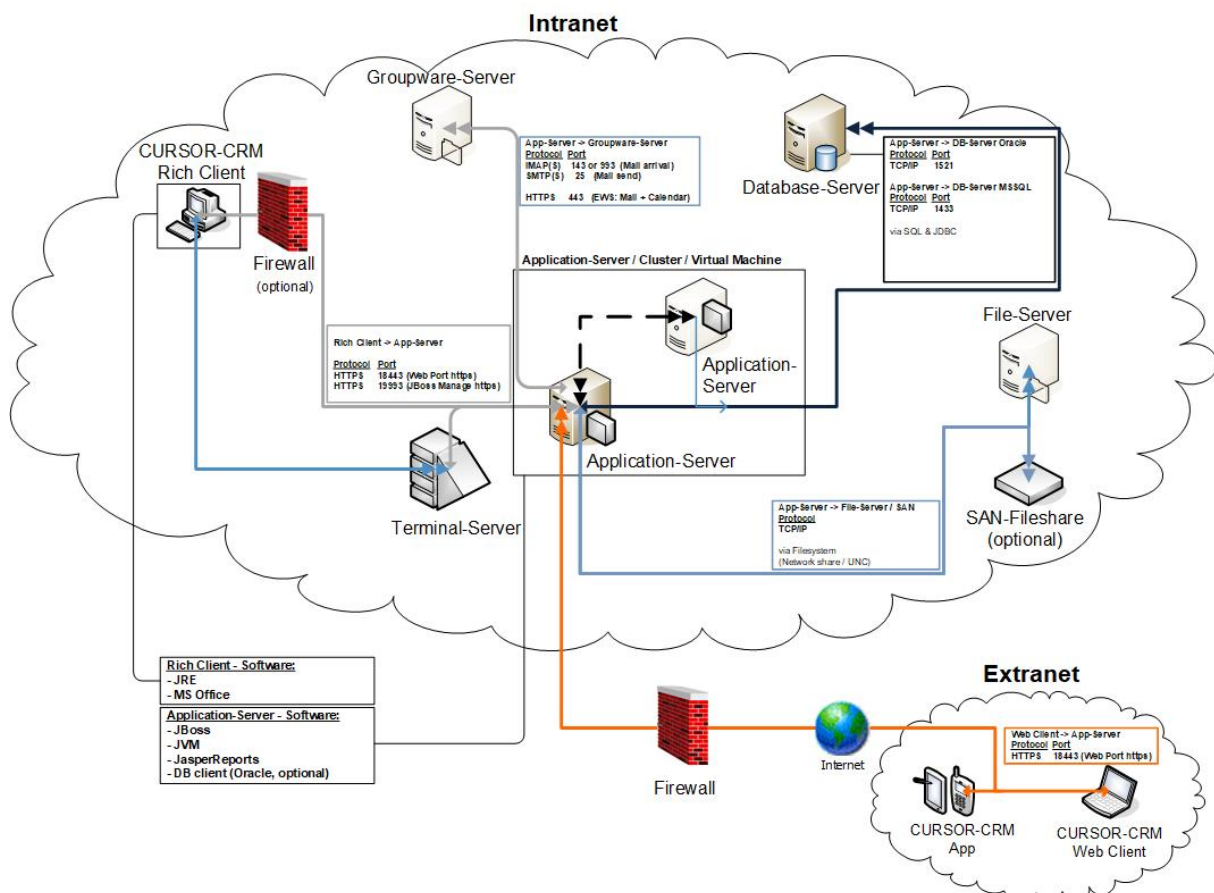
### Server based CTI integration

The telephony integration happens via the server-based CTI interface, which is usable for web and rich client. It is implemented via a software module from our partner Clarity AG. The CTI integration uses the quickstart bar of CRM system, for example in order to log and to follow up missed calls.

### Client side TAPI interface

With the conversion of rich client to 64 bit, a client-side TAPI connection is no longer possible, which is why the use of server-based CTI integration is recommended.

## 14. Example of a CURSOR-CRM system landscape



## 15. System component release

In the following, the individual CURSOR-CRM component's ability to run on the corresponding system resp. in the interplay with other software solutions is listed.

### Note

All products named in the text are brands of the corresponding companies.

### 15.1 CURSOR – Application server

App-server	Operating system / VM	Database system	Groupware server
<b>Version 19.2 (JBoss EAP 7.2.1)</b>	<ul style="list-style-type: none"><li>■ Windows Server 2012/2016/2019</li><li>■ SuSE from Enterprise Server 12.x</li><li>■ Red Hat from 6.x</li><li>■ Ubuntu from 16.x LTS</li><li>■ VMware from 6.0</li></ul>	<ul style="list-style-type: none"><li>■ Oracle 11g/12c/18c/19c</li><li>■ MS-SQL 2008/2012/2014/2016/2017</li></ul>	<ul style="list-style-type: none"><li>■ MS Exchange 2010/2013/2016/2019*</li><li>■ Lotus Domino from 9.0.x</li></ul>
<b>Version 19.1 (JBoss EAP 7.0.4)</b>	<ul style="list-style-type: none"><li>■ Windows Server 2008/2012/2016/2019</li><li>■ SuSE from Enterprise Server 12.x</li><li>■ Red Hat from 6.x</li><li>■ Ubuntu from 16.x LTS</li><li>■ VMware from 6.0</li></ul>	<ul style="list-style-type: none"><li>■ Oracle 11g/12c/18c</li><li>■ MS-SQL 2008/2012/2014/2016/2017</li></ul>	<ul style="list-style-type: none"><li>■ MS Exchange 2010/2013/2016*</li><li>■ Lotus Domino from 9.0.x</li></ul>
<b>Version 18.2 (JBoss EAP 7.0.4)</b>	<ul style="list-style-type: none"><li>■ Windows Server 2008/2012/2016</li><li>■ SuSE from Enterprise Server 12.x</li><li>■ Red Hat from 6.x</li><li>■ Ubuntu from 16.x LTS</li><li>■ VMware from 5.5</li></ul>	<ul style="list-style-type: none"><li>■ Oracle 11g/12c</li><li>■ MS-SQL 2008/2012/2014/2016/2017</li></ul>	<ul style="list-style-type: none"><li>■ MS Exchange 2010/2013/2016*</li><li>■ Lotus Domino from 9.0.x</li></ul>
<b>Version 18.1 (JBoss EAP 7.0.4)</b>	<ul style="list-style-type: none"><li>■ Windows Server 2008/2012/2016</li><li>■ SuSE from Enterprise Server 12.x</li><li>■ Red Hat from 6.x</li><li>■ Ubuntu from 12.04 LTS</li><li>■ VMware from 4.5</li></ul>	<ul style="list-style-type: none"><li>■ Oracle 11g/12c</li><li>■ MS-SQL 2008/2012/2014/2016/2017</li></ul>	<ul style="list-style-type: none"><li>■ MS Exchange 2010/2013/2016*</li><li>■ Lotus Domino from 8.5.2</li></ul>

\* only with server-sided groupware connection



## 15.2 CURSOR - Rich Client

	Operating system	MS Office
<b>Version 19.2</b>	■ Windows 7/8/10	■ Office 2010/2013/2016/2019/365**
<b>Version 19.1</b>	■ Windows 7/8/10	■ Office 2010/2013/2016/2019/365**
<b>Version 18.2</b>	■ Windows 7/8/10	■ Office 2010/2013/2016/365**
<b>Version 18.1</b>	■ Windows 7/8/10	■ Office 2007/2010/2013/2016/365**

\*\* the connection to Office 365 is only tested and released in case of local installation (but not for the web versions).

## 15.3 CURSOR - Web Client

Version	Internet Browser	Tablet browser	Network bandwidth
<b>Version 19.2</b>	<ul style="list-style-type: none"> <li>■ Google Chrome from 51</li> <li>■ Mozilla Firefox from 57 (ESR from version 60)</li> <li>■ MS Edge based on windows 10 (from version 1803)</li> <li>■ Safari on Mac devices (from version 12.x)*****</li> </ul>	<ul style="list-style-type: none"> <li>■ Safari on iOS &gt;=11</li> <li>■ Chrome and Firefox on Android 5***</li> </ul>	<ul style="list-style-type: none"> <li>■ Download &gt;=1.5 MBit/s</li> <li>■ Upload &gt;= 750 KBit/s</li> </ul>
<b>Version 19.1</b>	<ul style="list-style-type: none"> <li>■ Google Chrome from 51</li> <li>■ Mozilla Firefox from 57 (ESR from version 60)</li> <li>■ MS Edge based on windows 10 (from version 1709)</li> <li>■ Safari on Mac devices (from version 12.x)*****</li> </ul>	<ul style="list-style-type: none"> <li>■ Safari on iOS &gt;=11</li> <li>■ Chrome and Firefox on Android 5***</li> </ul>	<ul style="list-style-type: none"> <li>■ Download &gt;=1.5 MBit/s</li> <li>■ Upload &gt;= 750 KBit/s</li> </ul>
<b>Version 18.2</b>	<ul style="list-style-type: none"> <li>■ Google Chrome from 51</li> <li>■ Mozilla Firefox from 51 (recommended from 57)</li> <li>■ MS Edge based on windows 10 (from version 1703)</li> <li>■ MS Internet Explorer 11****</li> </ul>	<ul style="list-style-type: none"> <li>■ Safari on iOS &gt;=10</li> <li>■ Chrome and Firefox on Android 5***</li> </ul>	<ul style="list-style-type: none"> <li>■ Download &gt;=1.5 MBit/s</li> <li>■ Upload &gt;= 750 KBit/s</li> </ul>
<b>Version 18.1</b>	<ul style="list-style-type: none"> <li>■ Google Chrome from 51</li> <li>■ Mozilla Firefox from 51 (recommended from 57)</li> <li>■ MS Edge based on windows 10 (from version 1703)</li> <li>■ MS Internet Explorer 11****</li> </ul>	<ul style="list-style-type: none"> <li>■ Safari on iOS 9/10/11</li> <li>■ Chrome and Firefox on Android 5***</li> </ul>	<ul style="list-style-type: none"> <li>■ Download &gt;=1.5 MBit/s</li> <li>■ Upload &gt;= 750 KBit/s</li> </ul>



\*\*\* Tests are based on Samsung Galaxy Tab and Google Nexus, no guarantee for full use on other units.

\*\*\*\* Without extended document handling and external invocation. Up to the CURSOR version 2018.2 our application can be operated with the IE 11. From version 2019.1 Internet Explorer is no longer supported. If you continue to use it, you do so at your own risk.

\*\*\*\*\* Safari usage is subject to general restrictions (e.g. no auto login, no advanced document handling, no external calls, no drag and drop of Outlook emails, no linked documents, no keyboard shortcuts).

## 15.4 CURSOR - App

App version	CURSOR server version	Operating system	Network bandwidth
2019.2.x	■ 2019.2	■ iOS >=11 (iPhone >= 5s) ■ Android from 5*****	At least 768 KBit/s
2019.1.x	■ 2019.1	■ iOS >=11 (iPhone >= 5s) ■ Android from 5*****	At least 768 KBit/s
2018.2.x	■ 2018.2	■ iOS >=11 (iPhone >= 5s) ■ Android from 5*****	At least 768 KBit/s
2018.1.x	■ 2018.1	■ iOS 10 (iPhone >= 5) and iOS 11 (iPhone >= 5s) ■ Android from 5*****	At least 768 KBit/s

\*\*\*\*\* In order to use the INFOBOARDS technology on CURSOR-App, the Android System WebView has to be installed.

### Notes for CURSOR-App updates

When the server version is updated, also the CURSOR-App needs to be updated to the respective major release version.

It is not required for the server- and the CURSOR-App version to have the same patch status.



# Imprint

---

As per: Ver. 2019.2.x | 11.09.2019

Author: Gebriyel Varli

In the interest of our customers, we are constantly striving to improve our solutions and documentations. Should you have any improvement suggestions concerning the content or the presentation, or if there is any other aspect that you would like us to know about, please do not hesitate to contact us. Comments and suggestions for improvements are gladly accepted at [support@cursor.de](mailto:support@cursor.de).

The content of this documentation, including all images, illustrations, tables and drawings, is the intellectual property of CURSOR Software AG. This documentation may not be duplicated, reproduced or transmitted in any way and for any purpose whatsoever, whether in whole or in part, without the prior written permission of CURSOR Software AG. Any infringement can result in criminal proceedings.

The content of this documentation is subject to changes without prior notice. The documentation has been written and reproduced with the utmost care. Nevertheless, errors cannot be excluded. CURSOR Software AG does not assume any liability, guarantee or responsibility for any kind of damage resulting from errors in this documentation.

Please note that the software and hardware names and brand names of the respective companies mentioned in this documentation are generally protected by brand, trademark and patent laws.

Should you have any questions or need further information, please feel free to contact your contact persons from our sales, consulting and support departments. They will be glad to assist you.



**Contact Person:**  
**Gebriyel Varli**  
Software Development Director  
Phone +49 641 4 00 00 - 900  
[gebriyel.varli@cursor.de](mailto:gebriyel.varli@cursor.de)



Friedrich-List-Strasse 31  
35398 Giessen  
Phone +49 641 4 00 00 - 0  
Fax +49 641 4 0000 - 666  
[www.cursor.de](http://www.cursor.de)

