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</table>
1. TT Knowledge Force Client

1.1 Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Minimal: Single Core 2.6GHz</td>
</tr>
<tr>
<td></td>
<td>Recommended: Dual Core 2.6GHz</td>
</tr>
<tr>
<td>Memory</td>
<td>Minimal: 1 GB</td>
</tr>
<tr>
<td></td>
<td>Recommended: 3 GB</td>
</tr>
<tr>
<td>Hard-drive capacity</td>
<td>~700 MB for program data</td>
</tr>
<tr>
<td>Screen resolution</td>
<td>Minimal: 1024 * 768</td>
</tr>
<tr>
<td></td>
<td>Recommended: 1280 * 1024</td>
</tr>
<tr>
<td>Multimedia Hardware</td>
<td>16 Bit sound card and speakers or headphones</td>
</tr>
</tbody>
</table>

1.2 Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows Vista (SP 2, 32 bit) or</td>
</tr>
<tr>
<td></td>
<td>Windows 7 (SP 1, 32 and 64 bit) or</td>
</tr>
<tr>
<td></td>
<td>Windows 8 or 8.1 (only Windows Desktop, no Metro Interface, no Apps)</td>
</tr>
<tr>
<td>Additional software</td>
<td>Microsoft Visual C++ Redistributable Package</td>
</tr>
<tr>
<td>Browser</td>
<td>Internet Explorer 7 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 8 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 9 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 10 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 11</td>
</tr>
</tbody>
</table>

Please note: For new installations, the WYSIWYG browser is switched to "IE9 compatibility mode" to ensure proper display of content. Exported content will use the IE standard document mode.

For existing customers who update from a TTPS version < 2014 and use IE 8 and higher, the WYSIWYG browser and the exported content are switched to "IE7 compatibility mode" to ensure proper display of content. This can be switched to "IE9 compatibility mode" (for WYSIWYG) and browser standard mode (for exported content) via configuration.

Browser settings: JavaScript needs to be activated
Permissions

Administrator rights are required during installation; however, there will be no changes in the system folder.

Please note that it is required that all components that take part in the end-to-end-communication (i.e. TT Knowledge Force Client to and from the server component(s), as well as end-user to and from the server component(s)) support at least HTTP protocol version 1.1.

1.2.1 Optional software components

Depending on the use case of the TT Knowledge Force, additional software-components are required.

1.2.2 Export formats

› .doc
› .html
› .rtf
› .pdf

<table>
<thead>
<tr>
<th>Use case</th>
<th>Requirement</th>
</tr>
</thead>
</table>
| Output formats for MS Office | MS Office 2007 or  
MS Office 2010 or  
MS Office 2013  |

**Attention:** The evaluation version of MS Office 2010 is not supported!

PDF output

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
</table>
| MS Office 2007 or  
MS Office 2010 or  
MS Office 2013  |

and  
Ghostscript 8.54  
and  
FreePDF XP (is shipped with product) or  
FreePDF v4.02

**Attention:** The evaluation version of MS Office 2010 is not supported!  
**Attention:** The 64 bit versions of Ghostscript and FreePDF are not supported!
<table>
<thead>
<tr>
<th>Feature</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word import and export</td>
<td>MS Office 2007 or MS Office 2010 or MS Office 2013</td>
</tr>
<tr>
<td></td>
<td><strong>Attention:</strong> The evaluation version of MS Office 2010 is not supported.</td>
</tr>
<tr>
<td>PowerPoint import and export</td>
<td>MS Office 2007 or MS Office 2010 or MS Office 2013</td>
</tr>
<tr>
<td></td>
<td><strong>Attention:</strong> The evaluation version of MS Office 2010 is not supported!</td>
</tr>
<tr>
<td>Text to Speech</td>
<td>The text-to-speech engine needs to support SAPI 5.</td>
</tr>
<tr>
<td>Multimedia support</td>
<td>The following components need to be installed in case of the Internet Explorer:</td>
</tr>
<tr>
<td></td>
<td>Windows Media Player-Plug-in or -ActiveX Control from version 7.1 (usually included in Internet Explorer) and</td>
</tr>
<tr>
<td></td>
<td>MP3-Codec &quot;Fraunhofer MPEG Layer-3 Codec&quot;</td>
</tr>
<tr>
<td></td>
<td>For Firefox: Windows Media Player-Plug-in</td>
</tr>
</tbody>
</table>

1.3 Third party software

**McAfee**
Please note that a locally used virus scanner from McAfee may reduce the performance of the authoring component.
You are advised to change the anti-virus program's settings so the TT Knowledge Force installation folder is excluded from the scanning process.

**HP Quicktest**
Please note that HP Quicktest can only be installed in parallel with the authoring software under specific conditions: the user, under which the authoring software is launched, may not have reading permissions on the folder in which the Quicktest executable resides.

**HP Sprinter**
Please note that the installation will cause write access problems to the TT Knowledge Force Client profile folder which may result in a failure to load the WYSIWYG view.

**Check Point**
Please note that the virus scanner from Check Point End Security may strongly reduce the performance of the TT Knowledge Force Client.
Desktop Management Software
In case of using multiple monitors supported by desktop management software (for instance ATI Hydravision), this can cause problems with the object recognition during (re-)recording and guiding through applications.

Bamboo Drivers
As soon as Bamboo-drivers for drawing tablet and the corresponding pen are installed these drivers will interfere with the correct display and object-recognition of the guide-client.

Microsoft Snipping Tool
As long as this tool is running it will interfere with correct object-recognition needed for recording as well as playing guides.

1.4 Technology
The associated Java VM (JRE 1.7) is included in the installation package and therefore does not have to be pre-installed. Java VMs which are installed in parallel do not impact on the software’s executability.

1.5 Installation
The installation via a setup routine does not involve the copying of files to the Windows or System directories. During setup, the software is registered as an installed program, the program files are copied and the following file types are registered:

- .ttcp (TT Content Package) – document source archive which contains the sources and resources associated with a document; based on the ZIP format
- .ttlk (TT License Key) – automatically installs the license file with a double-click
- .ttcfg (TT Configuration Package) – archive containing the configuration-specific data
- .tlkr (TT License Key Request) – file containing the request for a local license key.

Special note for the Windows Vista (or newer) operating system
When User Account Control (UAC) is activated, the recording of, as well as the guidance through programs or processes that require administrator rights can only be accomplished if the TT Knowledge Force Client and/or the TT Guide Client also run with administrator rights.

1.5.1 Placing the authoring environment’s profile folder on a UNC path
If the profile folder of the TT Knowledge Force Client is installed on an UNC path, it must be ensured that the corresponding server is set to the security zone "Intranet" in the Internet Explorer security settings. This is required irrespective of whether the profile folder is addressed via UNC path, or as a "connected network-drive". If all rel-
evant endpoints are members of a windows domain, these security settings are not relevant, or more precisely, are set automatically by IE. If all UNC paths are automatically assigned to the "Intranet zone" via a global security policy, no manual adjustment is required. Please also note that in this case, the performance of TT Knowledge Force Client is highly dependent on the network performance, so that performance impacts can occur.

1.6 Working with Citrix
The following scenarios are supported, considering the aspects mentioned:

1.6.1 Published desktop
When set to Published Desktop, the user is provided with a complete Desktop, including a Start menu, links etc. This type of release supports recording within the open session. Advantage: All applications are started by the same user on the same server.

1.6.2 Published Application
When published applications are released, the respective application is made available to the end user as a Desktop link, for example. The applications are started via individual icons and are always opened in separate windows. From a user perspective, the only obvious difference is the fact that there is a lower color depth in the application, as well as a lower color depth in the taskbar icon and a tooltip for the icon stating "Application name\Remote" (depending on the configuration). The word \Remote indicates that this is a server-based application. This scenario is compatible with TT Performance Suite.

Exception 1
TT Performance Suite runs on a local PC and each target application runs as a published application on the terminal server. In this scenario, object- and context-recognition is not supported.

Exception 2
The Citrix server is part of a server farm and applications that are started are distributed to the various servers via load balancing (automatic load distribution). In this scenario, it may happen that TT Knowledge Force Client and/or TT Guide and the target application that is to be recorded are opened on different servers when published applications are started. When this happens, our clients are unable to establish a connection with the target application, thereby preventing object- and context-recognition.

How to bypass this problem for content creation: All authors who use TT Knowledge Force Client to record, log on to a dedicated server. Alternatively, it would also be possible to use a group policy to make a particular server always available to a user group.
1.7 General information on Citrix and MS-terminal server

In such environments, it is often the case that the users’ profile sizes are restricted to 20 MB. However, due to technical reasons, this is not sufficient to operate TT Knowledge Force. How to bypass this problem: A central configuration file can be used to reroute the directories required by TT Knowledge Force so that they are no longer in the user profile. In doing so, you need to ensure that this configuration is performed centrally for all users in a terminal server environment. Here, for example, it’s a good idea to use a "Home drive H:" (or similar), a map of which is made available to each user. Rerouting to an identical drive for several users is not possible and would also not be a good idea due to reasons relating to data privacy protection. Rerouting to UNC paths \Server\Release\Directory is not supported. With an average document size of ~3 MB (without sound) as well as ~10MB of local configuration data, we recommend making at least 50-100 MB of disk space available to each author.
2. TT Knowledge Force – Content

The following requirements need to be met in order to play a WBT:

2.1 Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Minimal: from 1.0 GHz&lt;br&gt;Recommended: 1.5 GHz or more</td>
</tr>
<tr>
<td>Memory</td>
<td>Minimal: 512 MB&lt;br&gt;Recommended: 1 GB</td>
</tr>
<tr>
<td>Screen resolution</td>
<td>Depends on the size of the application that is recorded and the content that is produced. However, at least approx. 100 pixels higher than the recording resolution because parts of the browser interface have to be visible (Internet Explorer).&lt;br&gt;16 bit color depth</td>
</tr>
<tr>
<td>Multimedia hardware</td>
<td>16 Bit sound card and speaker or headphones</td>
</tr>
</tbody>
</table>

2.2 Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows Vista (SP2, 32 bit) or Windows 7 (SP1, 32 and 64 bit) or Windows 8 or 8.1</td>
</tr>
<tr>
<td>Browser</td>
<td>Internet Explorer 7 or Internet Explorer 8 or Internet Explorer 9 or Internet Explorer 10 or Internet Explorer 11&lt;br&gt;Firefox 30 or Firefox 31&lt;br&gt;Safari 7.0 (tested and verified on MacOS 10.9.4)&lt;br&gt;Chrome 36</td>
</tr>
</tbody>
</table>

**Attention:** Please note that due to the different technological
basis, minor differences in the display of content between Internet Explorer and Firefox, Safari and Chrome might occur.

**Attention:** Please note that for new installations, the WYSIWYG browser is switched to "IE9 compatibility mode" to ensure proper display of content. Exported content will use the IE standard document mode.

For existing customers who update from a TTPS version < 2014 and use IE 8 or higher, the WYSIWYG browser and the exported content are switched to "IE7 compatibility mode" to ensure proper display of content. This can be switched to "IE9 compatibility mode" (for WYSIWYG) and browser standard mode (for exported content) via configuration.

**Attention:** Please note that Flash content is not supported in the Safari browser.

**Attention:** Please note that due to a security feature in new Firefox versions, it is no longer possible to redirect at the end of a LO (which is loaded via an encrypted connection) to a non-secure site. In this case, the LO will not close and no progress will be stored.

**Attention:** Please note that due to a browser security-feature, locally stored content cannot be played back in Chrome.

<table>
<thead>
<tr>
<th>Browser settings</th>
<th>Multimedia support</th>
</tr>
</thead>
<tbody>
<tr>
<td>JavaScript and session cookies have to be activated.</td>
<td>Internet Explorer: Windows Media Player-Plug-in or ActiveX Control from Version 7.1 and MP3-Codec &quot;Fraunhofer MPEG Layer-3 Codec&quot;</td>
</tr>
<tr>
<td>Firefox: Windows Media Player Plug-in</td>
<td></td>
</tr>
</tbody>
</table>
2.3 WBTs on Apple iPad

The following list defines the set of functions that is supported on iPad:

› Display of textboxes
  › including the formats bold, italic and underline
  › predefined text formats
  › text color
› Display of tables
› Display of autoshapes
› Display of images
› Display of following animations
  › Fly-in
  › Blink
  › Fade-in / Fade-out
  › Appear
  › Wipe
  › Animation loops
  › Animations on page exit
› Trigger
› Click
› Repeatable click
› Click outside the trigger object
› Test-Questions
› Single-Choice
› Multiple-Choice
› Input-Elements
› Usage of AutoTexts, like document title, description, etc.
› Date variables
› Player-Controls
  › Step forward / back
  › Pause / Play
  › Replay

Please note that due to the different technological basis, the displayed content may look different in Internet Explorer, Firefox and Safari.

Please note that automatic repetition of sounds is not supported on iPad – see chapter 2.4.
2.4 Automatic playback of sounds on iPad

Apple's policy on the playback for multimedia content is that a specific user interaction is required in order to initiate the playback.

This policy has the following consequences for automatic playback of multimedia content embedded in TT Knowledge Force learning objects:

› only the first sound on a page can be played automatically
› all additional sounds on that page will not be played automatically, even if the story is designed that way and it works in other browsers
› if more than the first sound are to be played on one page, the rest needs to be initiated by a trigger
› sounds on the very first page of a learning object cannot be played automatically at all
› if a learning object is opened with the "resume"-function at a step that is not the very first one, the sounds on that step cannot be played automatically
› It is not recommend to use sounds in the page-exit area, since they cannot be played automatically plus their use will prevent the sounds of the following page from being played automatically.

2.5 Technology

Web browser application based on HTML and JavaScript. A web server is not required; WBTs can be played / viewed on a local browser.

No installation is necessary; the exported content files are automatically loaded in the browser when the corresponding start file is accessed.

2.6 Installation

No installation necessary, the exported content files are automatically loaded in the browser when the corresponding start file is accessed.

2.7 Storage of training data

Training data can be stored via SCORM, AICC or locally via cookies. Student data is stored in a database on a user-specific basis in conjunction with the Web Publisher. SCORM versions 1.2 and 2004 (3rd edition) are supported.

2.8 Browser settings

To ensure optimal performance you are advised not to select the "Every visit to the page" browser cache setting.

If using Internet Explorer, the standard settings have to be changed as follows in order to deactivate the display of the Information bar message when accessing a lesson that is stored on the local file system:

Tools >Internet options >"Advanced" tab >Security > select the "Allow active content..."
to run in files on My Computer" checkbox > click the OK button.

**Start WBT from CD**
To start a WBT from a CD you also need to select the "Allow active content from CDs to run on My Computer" checkbox on the same tab.

**2.9 Use of multimedia content**
To enable the output in Firefox, the "Windows Media Player Plug-in for Firefox" has to be installed.

**2.10 Use of SmartComponents**
Please note that for new installations, the WYSIWYG browser is switched to "IE9 compatibility mode" to ensure proper display of content. Exported content will use the IE standard document mode.
For existing customers who update from a TTPS version < 2014 and use IE 8 or higher, the WYSIWYG browser and the exported content are switched to "IE7 compatibility mode" to ensure proper display of content. This can be switched to "IE9 compatibility mode" (for WYSIWYG) and browser standard mode (for exported content) via configuration.
SmartComponents in conjunction with the TT Player API extend the functional scope of the TT Knowledge Force player. While playing the WBT, the Smart Components are loaded once and on demand into the browser cache of the client PC.
Please note that the SmartComponents can have an impact on the performance of the TT Knowledge Force player. Rectification of these issues lies solely in the responsibility of the developer of the respective SmartComponent.
SmartComponents must be placed at their designated position within the TT Player. A modification at any other place within the TT Player is not allowed.
TTS is allowed to alter the software, the API (or both) at any time without guaranteeing the playability of existing components.
TTS in not obligated to rectify any errors that have the root cause in the Smart Component or answer any questions / provide support for rectification of these external errors.
If a customer places own SmartComponents within the TT Player, the customer acts on his own and sole responsibility.

**2.11 Flash**
The "Adobe Flash Player" (version 4 or higher) has to be installed to facilitate playing Flash films (which is also supported). The "Adobe Flash Player" (version 7 or higher) has to be installed to display Flash videos (FLV).

**Note for users of Macromedia Flash Player from version 8:**
Since the local security model in Flash 8 has been changed, you will at least have to
configure the "Documents and Settings\Username\tn.teamtrainer" directory in the local-trusted sandbox. The same holds true for the directory of an exported Web-Based Training. To find out how to introduce these settings, please refer to the Adobe website (www.adobe.com). Please remember that these settings are only necessary if you plan to start a WBT from a local drive.

2.12 Network bandwidth for playing WBTs

For this, four exemplary settings have been defined:
1. MS Office 2007, high-quality simulation, refined graphics
2. MS Office 2007, high-quality simulation, refined graphics, with sound (MP3, 56 kBit/s)
3. SAP basic course, normal simulation-depth, little refinement
4. SAP basic course, normal simulation-depth, little refinement, with sound (MP3, 56 kBit/s).

The WBTs have been worked through by learners, which resulted in the following exemplary values:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>used time</th>
<th>transferred data</th>
<th>average transfer rate</th>
<th>maximal transfer rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7min 43s</td>
<td>5.0 MB download</td>
<td>11.0 kB/s download</td>
<td>247.0 kB/s download</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 MB upload</td>
<td>1.0 kB/s upload</td>
<td>38.0 kB/s upload</td>
</tr>
<tr>
<td>2</td>
<td>9min 50s</td>
<td>7.5 MB download</td>
<td>12.7 kB/s download</td>
<td>293.0 kB/s download</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 MB upload</td>
<td>0.8 kB/s upload</td>
<td>36.8 kB/s upload</td>
</tr>
<tr>
<td>3</td>
<td>5min 45s</td>
<td>2.6 MB download</td>
<td>7.8 kB/s download</td>
<td>72.2 kB/s download</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3 MB upload</td>
<td>0.8 kB/s upload</td>
<td>31.0 kB/s upload</td>
</tr>
<tr>
<td>4</td>
<td>11min 44s</td>
<td>5.0 MB download</td>
<td>7.3 kB/s download</td>
<td>208.0 kB/s download</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3 MB upload</td>
<td>0.4 kB/s upload</td>
<td>34.2 kB/s upload</td>
</tr>
</tbody>
</table>

**Hint:** Contents 1 and 2, as well as 3 and 4, are identical. The only difference lies in the presence or absence of speaker sounds. In most cases, users will work through WBTs without sound at a quicker pace than WBTs that contain sound. Therefore, versions with sound do not necessarily need a higher bandwidth - as reflected in the test results.

Downloading the WBT player files is done automatically - and only once for all WBTs. Therefore, the test results with activated browser cache are based on the assumption that the WBT player has already been cached.
For comparison only: test results via http with deactivated browser cache or when accessing the WBT via file server (both methods not recommended):

<table>
<thead>
<tr>
<th>Scenario</th>
<th>used time</th>
<th>transferred data</th>
<th>average transfer rate</th>
<th>Maximal transfer rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4min 52s</td>
<td>14.5 MB download 5.6 MB upload</td>
<td>50.6 kB/s download 19.7 kB/s upload</td>
<td>774.0 kB/s download 217.0 kB/s upload</td>
</tr>
<tr>
<td>2</td>
<td>10min 19s</td>
<td>23.7 MB download 8.9 MB upload</td>
<td>39.2 kB/s download 14.7 kB/s upload</td>
<td>738.0 kB/s download 260.0 kB/s upload</td>
</tr>
<tr>
<td>3</td>
<td>7min 21s</td>
<td>19.1 MB download 6.8 MB upload</td>
<td>44.2 kB/s download 15.8 kB/s upload</td>
<td>742.0 kB/s download 186.0 kB/s upload</td>
</tr>
<tr>
<td>4</td>
<td>12min 14s</td>
<td>24.9 MB download 8.5 MB upload</td>
<td>34.7 kB/s download 11.8 kB/s upload</td>
<td>942.0 kB/s download 256.0 kB/s upload</td>
</tr>
</tbody>
</table>

2.13 HTML5 – Export

**Hardware**

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
</table>
| Processor | Minimal: Dualcore from 1.6 GHz  
Recommended: Quadcore from 2.6 GHz |
| Memory    | Minimal: 1 GB  
Recommended: 4 GB |

**Software**

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows 7 (SP1, 32 and 64 bit), or Windows 8 or 8.1 iOS 7.1 Android 4.2.2 Android 4.4.2</td>
</tr>
<tr>
<td>Browser</td>
<td>Internet Explorer 10 or Internet Explorer 11 Firefox 30 or</td>
</tr>
</tbody>
</table>

Please note that the functionality is tested and verified on reference devices (see below). Support cases must be reproducible on these reference devices.
Firebox 31
Safari 7.1 (on iOS)
Chrome 36

**Attention:** Please note that minor differences in the display of content between Internet Explorer and Firefox, Safari and Chrome might occur.

**Attention:** Please note that due to a browser-security-feature, locally stored content cannot be played back in Chrome.

Browser-settings: JavaScript and session cookies have to be activated.

The currently supported functions for this export format are listed below:

- **Navigation**
  - Step forward / back
  - Close
  - Swipe

- **Content elements**
  - Text boxes
  - Autoforms
  - Animations
  - Images

### 2.13.1 Reference Devices for Android

- Nexus 10
- Samsung Galaxy Tab 3
3. **Knowledge App**

The following requirements apply to both "Knowledge App" and "Knowledge App Corporate".

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>iOS 7.0, 7.1</td>
</tr>
<tr>
<td>Device</td>
<td>Apple iPad</td>
</tr>
</tbody>
</table>
4. **TT Guide Client**

The following requirements need to be met in order to run TT Guide Client:

### 4.1 Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Minimal: Single Core 1.5 GHz</td>
</tr>
<tr>
<td></td>
<td>Recommended: Dual Core 2.0 GHz</td>
</tr>
<tr>
<td>Memory</td>
<td>Minimal: 2.0 GB</td>
</tr>
<tr>
<td>Hard drive</td>
<td>~15 MB</td>
</tr>
<tr>
<td>Screen resolution</td>
<td>Depends on the size of the recorded application and the produced content. However, at least approx. 100 pixels higher than the recording resolution as parts of the browser interface must be visible (Internet Explorer). At least 16 bit color depth.</td>
</tr>
</tbody>
</table>

### 4.2 Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows Vista (SP 2, 32 and 64 bit) or Windows 7 (SP 1, 32 and 64 bit) or Windows 8 or 8.1 (only Windows Desktop, no Metro Interface, no Apps)</td>
</tr>
<tr>
<td>Browser</td>
<td>Internet Explorer 7 or Internet Explorer 8 or Internet Explorer 9 or Internet Explorer 10 or Internet Explorer 11</td>
</tr>
<tr>
<td></td>
<td>Please note that the TT Guide Client requires one of the above IE versions to be installed and executable on the system.</td>
</tr>
<tr>
<td>Permissions</td>
<td>The execution of a local application has to be permitted. In addition to that, the user must have the permission to establish an http-connection to the portal server.</td>
</tr>
</tbody>
</table>

### 4.3 Installation and distribution

We provide different MSI installation packages that allow for the following ways to install or distribute the client software:
1. Manual installation with administrator rights
2. Manual installation without administrator rights (e.g. by end users) in the profile folder
4. Integrating the product with an existing software solution. Thanks to the existing API (based on Windows DLLs), it is possible to integrate the product into an existing application and rolling them out together. The TT Guide client can then be started as an individual process and run externally, or run in the bundled application's process. This variant greatly benefits from the fact that the program is compact, has low resource demands, and does not rely on third-party components.

All distribution and installation variants share the fact that no additional components have to be installed and that no changes are made to the Windows system folder or the registry (HKEY_LOCAL_MACHINE) (Exception: MSI-based program registration when installing with administrator rights).

All MSI packages we provide are digitally signed, thus making it possible to identify us as the manufacturer and preventing unauthorized changes to the files by third parties.

**Special note for the Windows Vista (or newer) operating system**
When User Account Control (UAC) is activated, recording of / guidance through programs or processes that require administrator rights can only be accomplished if the TT Guide Client also runs with administrator rights.

### 4.4 Security and Privacy

The installed product is a generic Windows Client Application that runs in a single process* and can thus be started / terminated explicitly.

The program does neither create nor use background programs or services. It also does not establish a network or internet connection, or use socket services or comparable (network) mechanisms.

When using the server, an optional Internet Explorer web browser control is used for the integrated search feature. If installed, the browser control will use the connection and security settings defined for the installed Internet Explorer.

All executable files (.exe and DLL) that are provided by us have exclusively been created using Microsoft Visual C++ 2012 (MFC 11.0). In addition to that, all binary components named above are digitally signed. You can thus identify us as their author.

*Note:* On 64 bit operating systems, a so-called Bridge Process is additionally started (only in play mode) to make object recognition possible for 64 bit processes.

### 4.4.1 Privacy protection

As stated before, a user's interactions and (text) entries are stored as images and data during recording. It is important to note that this only happens during recording. It does not happen during any other usage of the product, e.g. during help mode. Only the data and entries necessary for the help mode are stored, and only
for the visible, recorded application. Via the program's user interface, you can check, edit, and delete the recorded data any time. For password fields that can be recognized as such, no entries will be recorded in the first place.

During help mode, no actions, screen shots, entries, or other user data are recorded, saved, or transmitted (see above, the client software does not maintain any internet or network connection). Put clearly, it is not the aim of the product to spy on or control users; the sole purpose is to guide them through the desired application.

To ensure maximum security of the data generated during recording, the Guide exchange format is highly encrypted, thus keeping it safe while being transported via e-mail or through the intra-/internet. The product also contains mechanisms and automatic features that remove / neutralize personal data or sensitive company data prior to publishing, as well as easy to use functions for manual editing of (image) data.

In addition to that, unpublished Guides can only be played back on the PC on which they were recorded. They cannot be opened on other PCs, which helps to prevent unintentional circulation of untested Guides.

4.5 Upload of Guides

The individual Guides are stored locally as simple and very compact files (single-file format). They can be copied/moved in the file system as well as exchanged (e.g. via e-mail). If a Guide is to be published and uploaded to the server, it is sent to the portal using the locally installed Internet Explorer.

More precisely put, the client starts the browser via COM interface, hands the file over as a Base64String data stream, and then instructs the browser to send it to the specified URL using http 'post'.

As this procedure makes use of the browser (and therefore the browser's standard functions, settings, and security features), the product itself does neither need a network/internet connection, nor a specific network configuration (e.g. proxy, tunnel or the like).

The only piece of information that must be provided is the server's URL – which can be preconfigured for all users, as described above.

4.6 Download of Guides

As the Guides are stored in a single file, they can simply be downloaded with the browser and stored locally.

4.7 Third party content

Desktop Management software

In case of using multiple monitors supported by desktop management software (for instance ATI Hydravision), this can cause problems with the object recognition during (re-)recording and guiding through applications.

Bamboo Drivers

As soon as Bamboo drivers for drawing tablet and the corresponding pen are in-
stalled, these drivers will interfere with the correct display and object recognition of the Guide client.

Microsoft Snipping Tool
As long as this tool is running it will interfere with correct object recognition needed for recording as well as playing guides.
5. TT Guide Client Content

5.1 Bandwidth and file sizes

5.1.1 Download
The data required for accessing / playing a Guide averages around 5-10 KB per step. This means that a typical Guide (~10 steps) will require roughly 50-100 KB. Due to the extremely low file sizes, the files are loaded ‘en bloc’.

5.1.2 Upload
Data usage is higher for uploads, as a preview video for the portal is created in addition to the Guide itself. This amounts to 20-40 KB per step, resulting in a total of 200-400 KB for an average Guide containing 10 steps.
6. Object Recognition

6.1 General
In order to provide object recognition in different applications, the product uses interfaces such as Microsoft Active Accessibility (MSAA) or the Java Access Bridge (JAB). Based on those interfaces, we can achieve very high levels of object recognition for the standard applications listed below, as well as for most software and web applications available, without the need to adapt the software and/or configuration. It is, however, essential that the application supports those APIs correctly and provides plausible data via them.

6.2 Object recognition for standard applications
The following tables list the requirements that need to be met to achieve object recognition during recordings as well as context identification.
The first column depicts the use case (i.e. the application that is to be recorded) and the second column the requirements for this application that need to be fulfilled.

<table>
<thead>
<tr>
<th>Software</th>
<th>Version(s) / notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows</td>
<td>Win Vista</td>
</tr>
<tr>
<td></td>
<td>Win 7</td>
</tr>
<tr>
<td></td>
<td>Win 8 &amp; 8.1 (only Windows Desktop, no Metro Interface, no Apps)</td>
</tr>
<tr>
<td></td>
<td>E.g. system programs, system settings, system configuration, desktop, start menu, windows explorer, design settings, network administration, printer setup, program installation, etc.</td>
</tr>
<tr>
<td>Microsoft Office</td>
<td>Office XP, Office 2003,</td>
</tr>
<tr>
<td></td>
<td>Office 2007,</td>
</tr>
<tr>
<td></td>
<td>Office 2010,</td>
</tr>
<tr>
<td></td>
<td>Office 2013,</td>
</tr>
<tr>
<td></td>
<td>Office 365</td>
</tr>
<tr>
<td>Browsers, web-enabled applications in general</td>
<td>Microsoft Internet Explorer 7, 8, 9, 10, 11</td>
</tr>
<tr>
<td></td>
<td><strong>Attention:</strong> For recording of Internet Explorer 7 and higher in Windows Vista and Windows 7, the protected mode of the Internet Explorer has to be deactivated.</td>
</tr>
<tr>
<td>SAPGUI</td>
<td>SAPGUI 7.2 Patch Level 14 or higher*,</td>
</tr>
<tr>
<td></td>
<td>SAPGUI 7.3</td>
</tr>
<tr>
<td></td>
<td>GUI Scripting must be installed and activated on the client and activated on the server side.</td>
</tr>
<tr>
<td></td>
<td><strong>sapgui/user_scripting_set readonly</strong> is sufficient, no rights</td>
</tr>
</tbody>
</table>
### System Requirements

*TT Performance Suite 2014 R2*

**Attention:** please note that SAP has dropped support for SAPGUI 7.2 on 4/12/2013. Therefore only limited support from us is available for this SAP GUI version.

### Java applications

<table>
<thead>
<tr>
<th>Java 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java 7 (min. update 60 – tested and verified with update 60)</td>
</tr>
<tr>
<td>Java 8 (min. update 20 – tested and verified with update 20)</td>
</tr>
</tbody>
</table>

**Attention:** For Java 6 applications, the JAB version 2.0.0 will be used, which does not support object recognition for 64 bit applications.

**Attention:** For Java 7 and Java 8 applications, the JAB which is provided along with the corresponding JRE will be used.

### 6.3 Object recognition in SAP GUI

The SAP GUI Scripting interface from SAP is used – and is therefore a prerequisite – for recording and guiding within the SAP GUI. Scripting is activated by default during the SAP GUI installation. Should this not be the case on the client computer, it can be easily installed via the SAP GUI installation.

To ensure object and context recognition in this context, two settings need to be set within the SAP GUI:

1. "Notify When a Script Attaches to a Running GUI" and
2. "Notify When a Script Opens a Connection"

Both need to be deactivated. These settings can be found in the GUI Options ("Adjust the local layout" button or via the shortcut Alt+F12->Options menu item) on the "Scripting" tab.

**Important note:** To ensure an optimal context and object recognition, our product attempts to automatically set the above options - provided that the user possesses the necessary rights. This behavior can be deactivated upon request. Furthermore, SAP GUI Scripting has to be activated on the server side. In order to do so, the profile parameter `sapgui/user_scripting` has to be set to the value `TRUE`. If this is not the case, please proceed in the following way:

1. Call up the RZ11 transaction
2. Enter `sapgui/user_scripting` in the field.
3. Click "Change value".
4. As the new value, enter `TRUE`
5. Click "Save".
Please refer to SAP Note No. 480149 for further information.

### 6.3.1 Security Aspects

For notes on security-related aspects, please refer to the following SAP documentation (“SAP GUI Scripting Security Guide”):


As TT Guide Client only needs read access to the SAP GUI, activating SAP GUI Scripting will not impact security. A more concise description of the security setting can be found in the document given above, from which the following quote was taken:

[...]

**Modes for server side protection**

The profile parameter described in the previous chapter controls the availability of SAP GUI Scripting in an all-or-nothing kind of way. Some users have asked for a more fine grained approach. This would allow them to enable only those features of SAP GUI Scripting that are required for their specific application.

In response to these requests we have added two additional profile parameters that modify the behavior of the sapgui/user_scripting profile parameter.

**sapgui/user_scripting_disable_recording**

This parameter disables all SAP GUI Scripting events for the system on which it is set. It is still possible to run previously recorded or written scripts. However, it is not possible to record new scripts or log any other type of information in response to SAP GUI Scripting events.

**sapgui/user_scripting_set_readonly**

In SAP GUI Scripting’s read only mode only a subset of the API can be used from a script. This comprises read access to properties and calling read only functions.

Please note that the read only restriction applies to the state of the SAP GUI session on the server. This implies that you may not execute any call which changes the data stream sent to the server, even if no actual database update is attempted.

[...]  

For the TT Guide Client, both the **sapgui/user_scripting_set_readonly** and the **sapgui/user_scripting_disable_recording** parameters can be set to TRUE. As described above, the SAP GUI cannot be controlled using TT Guide Client or any other third-party software. It is also not possible to record user interactions in the SAP GUI. Thus, there is no increased security risk.

In the following section, TTS comments on the security-related aspects outlined by SAP (excerpt from the SAP document given above):

[...]

### 8.0 Security Q&A
1. Can a script corrupt the SAP system’s data?
   No. All changes done from a script are subject to the same data validation rules as end user interaction.

2. Can a script influence the system performance?
   Yes. A script executes significantly faster than an end user, and may therefore put more load onto the system.
   **Comment by TTS:** This is not the case, as the `sapgui/user_scripting_set_readonly` parameter can be set to TRUE.

3. Can a script access data for which the end user does not have the necessary privileges?
   No. The script has only access to the data to which the end user has access rights.

4. Can a script export data that the end user could otherwise not export?
   Yes. Even if the download of a list is not allowed, an end user can extract the data from SAP GUI. Of course, the end user could also create a screen shot instead. SAP GUI Scripting can only export data that is displayed on the screen.

5. Can a script record end user interaction with SAP GUI?
   Yes. However, the end user will be notified about this, unless he disabled the notification.
   **Comment by TTS:** This is not the case, as the `sapgui/user_scripting_disable_recording` parameter can be set to TRUE.

6. Can a script record passwords?
   No. Therefore, a script cannot be played back if the user running it does not have an account on the SAP system.

7. Can a script run in the background without the end user’s knowledge?
   No. The end user will be notified when the script starts, unless she disabled the notification. In addition, SAP GUI Scripting needs to display SAP GUI for running a script.

8. Can SAP GUI Scripting be used to corrupt the client PC?
   No. The functionality of SAP GUI Scripting is limited to driving SAP GUI. However, if you use Visual Basic Script and the Windows Script Host to access the SAP GUI Scripting interface, the functionality of the VBS language or the Windows Script Host object model might very well be used to perform arbitrary operations on the client PC.

[...]

**Special note when using TT Guide Client while “‘ sapgui/user_scripting_set_readonly’” is set on true**

In this mode there are two restrictions by design:

1.) Input values automatically / Smart Link ""automatic input ": Since values can’t be entered automatically as a whole per scripting API ("”read only””), these will be entered into the input fields per Windows keyboard automation key by
key. The function therefore is restored but behaves differently for the user and is a little bit slower.

2.) Activate / focus input fields automatically: This function is also "by design" not available per SAP Scripting. For this reason there exists a second alternative method in TT Guide Client which activates the input field via mouse-automation. Since the TT Guide Client, as a default for security reasons, is not allowed to do mouse-clicks itself, this has to be explicitly activated in the configuration.

We also note that, both functions are there for comfort convenience reasons only, TT Guide Client can be used without a problem without these functions.

Due to known issues in the SAP GUI scripting interface, the following issues can occur during the "read only" mode with object recognition (highlighting the target object):

- **Table-heads in SAP table controls:**

  ![Table-heads in SAP table controls](image)

  This problem does not occur when using SAPGUI 7.2 with patch level 14 or higher or SAPGUI 7.3 with patch level 2 or higher.

- **Buttons in SAP Grid Views and SAP Table Tree Views:**

  ![Buttons in SAP Grid Views and SAP Table Tree Views](image)

  This problem does not occur when using SAPGUI 7.2 with patch level 14 or higher or SAPGUI 7.3 with patch level 2 or higher.

- **Column-marker in SAP table controls:**

  ![Column-marker in SAP table controls](image)

  This does not occur when using SAPGUI 7.3 with patch level 6 or higher.

- **Table-heads, rows and cells in SAP Grid Views:**

  ![Table-heads, rows and cells in SAP Grid Views](image)
This does not occur when using SAPGUI 7.3 with patch level 6 or higher.

Hints for these topics can be found in the sap notes 1578980 and 1751279.

6.3.2 Characteristics of F4 help

The SAP GUI scripting interface used does not support F4 help in standard mode (referred to as amodal or Control mode). Therefore, a running TT Guide Client will interrupt the connection to the SAP GUI scripting interface if F4 help is opened, to make sure that the help is opened in amodal mode nonetheless.

Please note that in this variant of F4 help, it is not possible to detect individual table rows as objects, but only the table as a whole (with free selection).

If detecting individual table rows is crucial even in F4 help (which will only be necessary if you need to record the help itself), you have to change the F4 help to modal (dialog based) for all SAP users that use TT Guide Client. Please proceed as laid out in SAP Note 977584.

For general information on this topic, please see SAP Note 977583.

6.3.3 Object recognition in SAP Netweaver Business Client (NWBC)

Object recognition via the SAP-scripting interface for the NWBC is solely possible with the NWBC client. If this SAP component is accessed via a browser, the MSAA interface will be used. Since this provides less information, this set-up is not recommended. Please note that object information from the central SAP-content area of the NWBC client can be retrieved via the SAP-scripting-API. Object information for structural and navigational elements in the left- and upper area cannot be accessed.

6.4 Object recognition in cross-platform and cross-language cases

A basic prerequisite for cross-platform object recognition is that the process of the application(s) must be identical and the object name of the interaction objects (like input fields, buttons) should match between the systems / platforms.

Please note that context recognition is explicitly ruled out if the GUI language of the recorded application is different from the one found in the live application.

Thus, we advise you, particularly in the case when creating Guides, to create separate recordings for each GUI language, as we explicitly do not support cross-language object recognition. Of course, it is possible to use different instruction languages for the same GUI language without the need for a rerecording.

**Example:** There is an enterprise-wide IT system that features an English GUI. The Guides for such a system would only have to be recorded once. Using our language packs, you could then translate the instructional and explanatory texts into all other languages needed.
6.5 Object recognition for JAVA applications

To record Java applications, the Java Access Bridge (JAB) is used. It is integrated into the Java runtime environment (JRE) and acts as an interface between native Windows programs and Java applications.

This allows receiving information on control elements within a Java application. Access to the Java Accessibility API is not limited to actual applications, but also encompasses the applets that run within a browser window.

The procedure to be applied when installing JAB depends on the type of JRE installation and may vary from application to application. To determine the correct procedure, please carefully read this entire chapter before commencing the actual installation process.

6.5.1 JAB for Java 6

In this case, the JAB has to be installed into the JRE which is used by the application to be recorded. For all applications that use a local JRE, this implies that the JAB has to be installed in each individual Java application – even if JAB has already been installed in a central JRE – and that for each new application, an additional JAB installation is required.

You are advised to install the JAB in the central JRE(s) – provided that they exist – using the setup program from Sun Microsystems. You can also try out the automatic installation for all applications with local JREs. Should this lead to difficulties with directory authorizations during the scanning of drives, you still have the option of performing a manual installation.

Using centrally installed JREs

Centrally installed JREs can be identified by the fact that they can be found in the 'Add or Remove Programs' (or – since MS Vista – 'Programs and Features') list in the Windows Control Panel. Applications that use such a JRE do not have a 'jre' sub-folder.

In this case, a single installation in the central JRE(s) is fully sufficient. This also applies to applets, as they require a JRE installed in this manner due to browser integration.

Applications with a local JRE

Some Java applications use a local JRE that is not contained in the Windows Registry. This can usually be verified by the fact that the application is not started via a jar file, but instead via an .exe or a .bat file, and the application has a 'jre' sub-folder. This is also the case if there is no JRE in the 'Add or Remove Programs' / 'Programs and Features' list in the Windows Control Panel.

Installing the Java Access Bridge

Manual installation for local JREs:

- Locate the JRE that is used by the application.
- Switch over to the JRE's 'jre\lib' directory.
- Copy the `accessibility.properties` file into this folder. Should the file already exist in this folder, you need to merge the files so that the file that already exists also includes the contents of the appropriate JAB installation file.
Switch over to the JRE's `jre\lib\ext` directory. Copy the following files into this directory:

- `access-bridge.jar` and one of the following additional files
  - `jaccess-1_2.jar` for Java 2 Version 1.2.x or
  - `jaccess-1_3.jar` for Java 2 Version 1.3.x or
  - `jaccess-1_4.jar` for Java 2 Version 1.4.x (or higher).

Install the JAB Windows DLLs:

- `JavaAccessBridge.dll`
- `JAWTAccessBridge.dll`
- `WindowsAccessBridge.dll`

- for a **32 bit Windows**, copy the DLLs mentioned above into the `Windows System32` directory
- for a **64 bit Windows**, copy the DLLs into the `Windows SysWow64` directory.

**6.5.2 JAB for Java 7 and 8**

For these Java versions the JAB that is provided with the corresponding JRE is used. No additional installation is required. By default the access bridge is disabled.

For each installed JRE the JAB can be individually activated via the file "accessibility.properties". The `assistive technologies` property specifies the assistive technologies to load into the JVM. It takes a comma-separated list as input. For example, if you set this property to "com.sun.java.accessibility.AccessBridge", the Java Access Bridge is enabled.

**Availability of JAB versions:**

- **2.0.0**: is provided along with TTPS Client package
- **2.0.4**: is provided along with standard JRE 7 Update 60
- **1.8**: is provided along with standard JRE 8 Update 20

**Compatibility overview:**

<table>
<thead>
<tr>
<th></th>
<th>JAB 2.0.0</th>
<th>JAB 2.0.4</th>
<th>JAB 1.8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Java 6</strong></td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Java 7</strong></td>
<td>✗</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Java 8</strong></td>
<td>✗</td>
<td>(✓)*</td>
<td>✔️</td>
</tr>
</tbody>
</table>

* JAB 2.0.4 is delivered with JRE 8 until update 20
6.6 Object recognition for third-party- and custom-built applications

As outlined above, object recognition works for most software products available for Microsoft Windows, as well as for custom software, due to the fact that the MSAA interface is usually available and supported with no extra effort.

In most cases, this also holds true if the software in question was developed using Microsoft products such as MS NET, Visual C++ and/or Visual Basic, or if Microsoft Common Controls are used.
7. Web Workbench

7.1 Minimal requirements

The Web Workbench depicts the browser-based access to the "Structure and Modeling" section of the TT Knowledge Force Client.

In order to use this, the corresponding server needs to be installed and running. For the requirements that need to be met on the server side, please refer to chapter 8.

Should any of the requirements defined herein not be met, the proper functioning of the Web Workbench cannot be guaranteed and there exists no claim to establish this.

7.2 Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows Vista (SP2, 32 bit) or</td>
</tr>
<tr>
<td></td>
<td>Windows 7 (SP1, 32 and 64 bit), or</td>
</tr>
<tr>
<td></td>
<td>Windows 8 and 8.1</td>
</tr>
<tr>
<td>Browser</td>
<td>Internet Explorer 7 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 8 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 9 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 10 or</td>
</tr>
<tr>
<td></td>
<td>Internet Explorer 11</td>
</tr>
<tr>
<td></td>
<td>Firefox 30 or</td>
</tr>
<tr>
<td></td>
<td>Firefox 31</td>
</tr>
</tbody>
</table>

**Attention:** Please note that due to the different technological basis, minor differences in the display of content between Internet Explorer and Firefox might occur.

| Browser settings     | JavaScript and session cookies have to be activated. |

7.3 Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Minimal: Single Core 2.6GHz</td>
</tr>
<tr>
<td></td>
<td>Recommended: Dual Core 2.6GHz</td>
</tr>
</tbody>
</table>

Please note that these are average values and that the required hardware is strongly dependent on the use case, i.e. the expected number of authors / end users respectively.
<table>
<thead>
<tr>
<th>Memory</th>
<th>Minimal: 512 MB</th>
<th>Recommended: 2 GB</th>
</tr>
</thead>
</table>

Please note that these are average values and that the required hardware is strongly dependent on the use case, i.e. the expected number of authors / end users respectively. These values depict the amount of RAM that should be available for the Java process.
8. Server Components

8.1 Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Minimal: Single Core 2.6 GHz</td>
</tr>
<tr>
<td></td>
<td>Recommended: Dual Core 2.6 GHz (for Web Workbench)</td>
</tr>
<tr>
<td></td>
<td>Quad Core 2.6 GHz (for Web Publisher)</td>
</tr>
<tr>
<td></td>
<td>Please note that these are average values and that the required hardware is strongly dependent on the use case, i.e. the expected number of authors / end users respectively.</td>
</tr>
<tr>
<td>Memory</td>
<td>Minimal: 2 GB</td>
</tr>
<tr>
<td></td>
<td>Recommended: 4 GB</td>
</tr>
<tr>
<td></td>
<td>Please note that these are average values and that the required hardware is strongly dependent on the use case, i.e. the expected number of authors / end users respectively.</td>
</tr>
<tr>
<td></td>
<td>These values depict the amount of RAM that should be available for the Java process.</td>
</tr>
<tr>
<td>Hard drive</td>
<td>200 MB for program data</td>
</tr>
<tr>
<td></td>
<td>Repository: ~ 1 GB / 500 Documents</td>
</tr>
<tr>
<td></td>
<td>Database: ~ 100 MB / 500 Documents</td>
</tr>
<tr>
<td></td>
<td><strong>Attention:</strong> These values represent averages! The actual amount of data can vary greatly, depending on the complexity and media-richness of the stored objects.</td>
</tr>
<tr>
<td></td>
<td><strong>Attention:</strong> If version management is activated, the amount of required disk space is increased significantly. For a rough estimate, multiply the values given above with the average number of document versions.</td>
</tr>
<tr>
<td></td>
<td><strong>Attention:</strong> For optimal performance, we recommend the use of SSD hard drives.</td>
</tr>
</tbody>
</table>

8.2 Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows Server 2008 or</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2008 R2 or</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2008 R2 EE or</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2011 or</td>
</tr>
<tr>
<td><strong>System Requirements</strong></td>
<td><strong>TT Performance Suite 2014 R2</strong></td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td><strong>Windows Server</strong></td>
<td>Windows Server 2012 or Windows Server 2012 R2</td>
</tr>
<tr>
<td><strong>Linux</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Browser settings</strong></td>
<td>JavaScript and session cookies have to be activated.</td>
</tr>
<tr>
<td><strong>Permissions</strong></td>
<td>Administrator-rights are required for the installation.</td>
</tr>
<tr>
<td><strong>Application server</strong></td>
<td>Apache Tomcat 6 or 7; Java version 6 (1.6), Java 7 IBM Websphere 7.0.0.31 * or Weblogic 12c</td>
</tr>
</tbody>
</table>

**Attention:** The corresponding Java Development Kit (JDK) needs to be installed on the server; the Java Runtime Environment (JRE) alone is not sufficient.

**Attention:** *Please note that for Websphere minimal the patchlevel 31 is required. For the webserver as well as the underlying JRE.*

<table>
<thead>
<tr>
<th><strong>Database</strong></th>
<th>MSSQL Server 2005 or MSSQL Server 2008 or MSSQL Server 2008 R2 or MSSQL Server 2012 or MSSQL Server 2014 Oracle 9i or Oracle 10g or Oracle 11g</th>
</tr>
</thead>
</table>

**Attention:** Please note that due to a defect in the Java SDK, Java version 1.6.29 cannot connect to MSSQL databases.

<table>
<thead>
<tr>
<th><strong>Reverse Proxy</strong> (optional)</th>
<th>Tomcat connector for Apache HTTP Server (mod_jk or mod_proxy_ajp)</th>
</tr>
</thead>
</table>

**Attention:** Tomcat connector for Microsoft IIS (ISAPI Redirector) is not supported.

### 8.3 Technology

Server application based on the Java Enterprise Edition (JEE) framework from Sun. This requires a JEE application server which, at the minimum, runs on a Java SDK 5.0 Update 12 and supports JEE 1.4 and JSP 2.0.

### 8.4 Installation

**Attention:** In order to upload content which is created in the authoring environment to the server component, all components that take part in the network communication
(e.g. proxy, VPN software, etc.) must support HTTP 1.1 incl. chunked transfer coding.

8.5 LDAP

In the following section lists the known restrictions of the provided LDAP interface:

› Only "internal" authentication with user name and password is supported. Alternative mechanisms in accordance with SASL (RFC 2222) are not possible.

› Start-TLS (RFC-2830) is currently not supported.

› LDAP groups have to be associated to user entries. Users associated with groups are not supported.

8.6 Third-party software

FortiClient

It is a known issue that if the FortiClient virus scanner is installed on the operating server, statification of WBTs is not possible.
9. Open Source Products

The following open source products are embedded and used by TT Performance Suite:

9.1 Client Applications

Eclipse
www.eclipse.org
Licensed under the Eclipse Foundation Software User Agreement

LAME
Licensed under LGPL

JACOB
Licensed under LGPLv2

JThidy
http://jtidy.sourceforge.net/license.html

HTMLCleaner
Licensed under BSD License

MP3 SPI for Java™Sound
Licensed under LGPL
www.javazoom.net/mp3spi/mp3spi.html

SWFObject
Licensed under MIT

iScroll
Licensed under MIT

JSON2
Licensed under Public Domain

jQuery
Licensed under MIT

RequireJS
Licensed under MIT

CXImage
www.xdp.it/cximage.htm
Licensed under the ZLib License

Libpng
www.libpng.org
Licensed under the Open Source License

Zlib
www.zlib.net
Licensed under the Zlib License

Tessdll
Licensed under the Apache License

MediatorJs
Licensed under the MIT license.

**Log4Javascript**
Licensed under the [Apache License 2.0](https://www.apache.org/licenses/LICENSE-2.0) license.

**HammerJs**
Licensed under the MIT license

### 9.2 Server Applications

- **Apache Jakarta POI**
  Licensed under the Apache License

- **Apache Jakarta Slide**
  Licensed under the Apache License

- **Apache Struts**
  Licensed under the Apache License

- **Apache Solr**
  Licensed under the Apache License

- **iscroll.js**
  Licensed under the MIT license

- **jQuery**
  Licensed under the MIT license

- **jquery.infinitescroll.js**
  Licensed under the MIT license

- **jquery.postmessage-transport.js**
  Licensed under the MIT license

- **jquery.xdr-transport.js**
  Licensed under the MIT license

- **jquery.ui.widget.js**
  Licensed under the MIT license

- **jquery=fileupload.js**
  Licensed under the MIT license

- **jquery=fileupload-fp.js**
  Licensed under the MIT license

- **jquery=fileupload-ui.js**
  Licensed under the MIT license

- **jquery=iframe-transport.js**
  Licensed under the MIT license

- **jquery=autosize.js**
  Licensed under the MIT license

- **jquery=caret.js**
  Licensed under the MIT license

- **jquery=mousewheel.min.js**
  Licensed under the MIT license

- **jquery=touchwipe.js**
  Licensed under the MIT license
Licensed under the MIT license

`jquery.clearabletextfield`
Licensed under the MIT license

`jquery.infinitescroll`
License included

`jquery-ui`
License included

`jquery.mcustomscrollbar`
Licensed under the LGPL (Lesser GNU Public License)

`prototype.js`
Licensed under the MIT license

`tiny.mce.js`
Licensed under the LGPL (Lesser GNU Public License)

**JSON 2**
[www.json.org/license.html](http://www.json.org/license.html)

**XML Pull Parser**
Licensed under the LGPL (Lesser GNU Public License)