tts performance suite

System Requirements 2022

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1 Producer

1.1 Hardware

Component	Requirement
Processor	Minimal: Single-core 2.6GHz Recommended: Dual-core 2.6GHz
Memory	Minimal: 4 GB Recommended: 8 GB (for 64bit operating systems)
Free space	~1000 MB for program data
Screen resolution	Minimal: 1024 x 768 Recommended: 1920 x 1080
Multimedia hardware	16-bit sound card and speakers or headphones

1.2 Software

Component	Requirement
Operating system	Windows 10
Additional software	Visual C++ Redistributables (x86+x64) for Visual Studio 2019 (version 16.7)
Webbrowser Control	Internet Explorer Webbrowser Control needs to be available in the operating system
Browser settings	JavaScript needs to be activated
Permissions	Administrator rights are required during installation; however, there will be no changes to the system folder. The Producer makes use of the Chromium project by Google. In order to ensure the proper execution of the client, the operating system and third party security tools need to enable the execution of Chromium processes.

- Please note that it is required that all components that take part in the end-to-end-communication (i.e. Producer 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.
- Please note that in order to use all functionality of the Producer policies must allow the Producer process to start an external process named “Gifcreator.exe”.
- Please note that for proper functionality of the tts performance suite the windows display-zoom needs to be set to 100%.

1.2.1 Optional Software Components

Depending on the use case of the tts performance suite, additional software-components are required.

1.2.2 Export Formats

- .doc
- .html
- .pdf

Use case	Requirement
Output formats for MS Office	MS Office 2013 or MS Office 2016 or MS Office 2019
Word import and export	MS Office 2013 or MS Office 2016 or MS Office 2019
PowerPoint import and export	MS Office 2013 or MS Office 2016 or MS Office 2019
Text-to-speech	The text-to-speech engine needs to support SAPI 5; The Producer supports Readspeaker and Acapela via Voice-as-a-Service natively.

1.2.3 Video Export

In order to encode the video of an E-Learning, that is recorded as a WebM-video, as MP4 customers need to make sure that the required library (“FFmpeg”) is available and properly licensed by the customer. Neither this library, nor the corresponding license, is part of the Producer or the tts performance suite.

1.3 Single-Sign-On (SSO)

In order to make use of Single-Sign-On-Mechanisms with the Producer the protocol needs to be NTLM. Other methods of authentication are currently not supported in the client scenario.

1.4 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 on the same computer as the authoring software under specific conditions: the user under which the authoring software is launched may *not* have reading permissions to the folder in which the Quicktest executable resides.

HP Sprinter

Please note that the installation will cause write access problems to the Producer 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.

Microsoft Snipping Tool

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

Microsoft Security Policies

If you experience problems with editing in the WYSIWYG View (i.e. no editing possible) please check if the MS Security Policy “Local Machine Lockdown” is enabled. If so, please disable this policy.

1.5 Technology

The associated Java VM 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.

1.6 Installation

The installation via a setup routine does not copy 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
- .ttlkr (tt license key request) – file containing the request for a local license key.
- .ttopt (tt options) – transport file for user preferences
- .ttscp (tt smart component package) – transport file for Smart Components

Special note for the Windows 8 (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 Producer and/or the Quick Access also run with administrator rights.

Special note for environments with activated Windows-group-policy: "Security zones use only machine settings"

In order to guarantee proper functionality of our software this policy needs to be set to the default-value (deactivated), or the following Registry-Values need to be set:

64 Bit Windows:
[HKEY_LOCAL_MACHINE\Software\Wow6432Node\Microsoft\Internet Explorer\MAIN\FeatureControl\FEATURE_BROWSER_EMULATION] "TTKnowledgeForce-Browser.exe"=dword:0000270f

32 Bit Windows:
[HKEY_LOCAL_MACHINE\Software\Microsoft\Internet Explorer\MAIN\FeatureControl\FEATURE_BROWSER_EMULATION] "TTKnowledgeForceBrowser.exe"=dword:0000270f

Our tt knowledge force installer tries to set the above mentioned values during the installation process.

1.6.1 Placing the authoring environment's profile folder on a UNC path

If the profile folder of the Producer is installed on a UNC path, it must be ensured that the corresponding server is set to the "Intranet" security zone 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 relevant 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 the tt knowledge

force client is highly dependent on the network performance, so that performance impacts may occur.

1.6.2 Running The Producer With Activated Proxy

In case that a proxy is configured it is necessary to exclude "localhost" / "127.0.0.1" from the access via proxy.

1.7 Working With Citrix

There are two main scenarios to gain access to a Citrix system: Namely access via a Browser-Plugin or an explicit, locally installed, application: "Citrix Workspace". The set of supported features depend on the set-up and are described below.

1.7.1 Execution Environment Requirements

Citrix Workspace App needs to be 32-bit.

Server	Tested on Virtual Apps and Desktops with: • Windows Server 2019 • Citrix VDA 1912
Client	Citrix Workspace for Windows Tested on: • Windows 10 Enterprise • Citrix Workspace App 2202 (32-bit only)

1.7.2 Browser-Plug-In

In case of the Browser-Plug-In-Approach one can differentiate between a "virtual desktops" and individual virtual applications. For both cases different features are supported, which are described below.

1.7.2.1 Virtual Desktop

Both, the **Producer** as well as the **Quick Access,** are fully functional and record and discover contexts within the same virtual desktop.

1.7.2.2 Virtual Application

We do not recommend or support this scenario for the use of **Producer** and/or **Quick Access**, since each application will be opened within its own browser-tab. The individual tabs are isolated, preventing inter-application-communication such that object- and context recognition functionality will not be available in this set-up.

1.7.3 Citrix Workspace

In the virtual application scenario both, the **Producer** as well as the **Quick Access,** are fully functional to record and discover contexts if the supported application is running as a "virtual application" on the same machine and inside the same user-session as well.

Exception 1
Producer run on a local PC or virtual desktop and each target application runs as a virtual application. In this scenario, object and context recognition are not supported.

Exception 2
The Citrix VDA is part of a server farm, and applications that are started are distributed to various servers via load balancing (automatic load distribution). In this scenario, it may happen that the Producer and/or Quick Access and the target application that is to be recorded are opened on different VDAs. When this happens, our clients cannot establish a connection with the target application, thus object and context recognition are impossible.

How to bypass this problem for content creation: All authors who use Producer 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.

1.8 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 tts performance suite.

How to bypass this problem: A central configuration file can be used to re-route 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), which is made available to each user via mapping. 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 tts performance suite – Content

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

2.1 Hardware

Component	Requirement
Processor	Minimal: from 1.0 GHz Recommended: 1.5 GHz or more
Memory	Minimal: 512 MB Recommended: 1 GB
Screen resolution	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. 16-bit color depth
Multimedia Hardware	16-bit sound card and speakers or headphones

2.2 Software

Component	Requirement
Operating system	Windows 10
Browser	Edge 100 on Windows 10 Firefox 98 Safari 14.0 Chrome 100 **Attention:** Please note that due to the different technological basis, minor differences in the display of content between browsers might occur. **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 learning-object (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. **Attention:** Please note that due to browser security policies the glossary is not available on locally accessed content (IE and Chrome).

	Attention: Please note that the privacy-modes of the browsers are not supported. Attention: Please note that in case a host, on which an E-Learning is started, has set specific options for compatibility-view and the topmost window does not contain the "X-UA-Compatible" meta tag, the exported content will not be displayed correctly. Attention: Please note that devices, which work with "touch-interactions" (e.g. tablets, phones, hybrid-notebooks) are not supported.
Browser settings	JavaScript and session cookies have to be activated.
Multimedia support	Audio: always uses native HTML5-Audio element Video: always uses native HTML5-Video element Attention: Please note that due to increasing browser restrictions, the automatic playback of videos containing a sound-track cannot be guaranteed on all browsers.

2.3 WBTs on Apple iPad

Automatic playback of sounds on iPad

Apples policy on the play back 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 learning object is designed that way and it works in other browsers
- if more than the first sound is 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 recommended 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

2.4 Technology

Web browser application based on HTML and JavaScript. A web server is not required; WBTs can be played / viewed on a local browser (except Chrome and IE). No installation is necessary;

the exported content files are automatically loaded in the browser when the corresponding start file is accessed.

2.5 Installation

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

2.6 Storage Of Training Data

Training data can be stored via SCORM, AICC or locally via cookies (i.e. indexedDB for HTML5 content). Student data is stored in a database on a user-specific basis in conjunction with the WebAccess. SCORM versions 1.2 and 2004 (3rd & 4th edition) are supported.

2.7 Browser settings

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

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.

2.8 Use of Smart Components

Smart Components 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 Smart Components may impact the performance of the tt knowledge force player. Rectification of these issues lies solely in the responsibility of the developer of the Smart Component in question.

Smart Components 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 may alter the software, the API (or both) at any time without guaranteeing the playability of existing components.

tts is 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 his/her own Smart Components within the tt player, the customer acts on his/her own and sole responsibility.

2.9 Network bandwidth used when 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 sim. depth, little refinement, with sound (MP3, 56 kBit/s).

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

Scenario	used time	transferred data	Average transfer rate	Maximal transfer rate
1	7min 43s	5.0 MB download 0.5 MB upload	11.0 kB/s download 1.0 kB/s upload	247.0 kB/s download 38.0 kB/s upload
2	9min 50s	7.5 MB download 0.5 MB upload	12.7 kB/s download 0.8 kB/s upload	293.0 kB/s download 36.8 kB/s upload
3	5min 45s	2.6 MB download 0.3 MB upload	7.8 kB/s download 0.8 kB/s upload	72.2 kB/s download 31.0 kB/s upload
4	11min 44s	5.0 MB download 0.3 MB upload	7.3 kB/s download 0.4 kB/s upload	208.0 kB/s download 34.2 kB/s upload

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.

2.10 HTML5 Export

Hardware

Component	Requirement
Processor	Minimal: Dual-core from 1.6 GHz Recommended: Quad-core from 2.6 GHz
Memory	Minimal: 1 GB Recommended: 4 GB

Software

Component	Requirement
Operating system	Windows 10 iOS 14.3 Android 12 Please note that the functionality is tested and verified on reference devices (see below). Support cases must be reproducible on these reference devices.
Browser	Edge 100 on Windows 10 Firefox 98 Safari 14.0 Chrome 100 Attention: Please note that minor differences in the display of content between browsers can occur. Attention: Please note that due to a browser-security-feature, locally stored content cannot be played back in Edge and Chrome. Attention: Please note that some differences in the touch-behavior within the Edge-browser might occur on some mobile Windows devices.
Browser settings	JavaScript and session cookies have to be activated.

Please find the currently supported functions described in detail in the HTML5 Authoring Guidelines.

2.10.1 Reference Devices For Android

- Samsung Galaxy Tab A8

- Google Pixel
- Nexus 9
- Nexus 10

3 Quick Access (QA)

QuickAccess makes use of the Chromium project by Google. In order to ensure the proper execution of the QuickAccess, the operating system and third party security tools need to enable the execution of Chromium processes.
Communication to the server / Webaccess can only be established via an encrypted connection; i.e. https.

3.1 Software

Component	Requirement
Operating system	Windows 10
Additional software	Visual C++ Redistributables (x86+x64) for Visual Studio 2019 (version 16.7)
Optional software	Microsoft WebView2 component
Free space	~560 MB for program data

Since ttsps version 2021r2 we allow the user to choose between two different webviews to be used in QuickAccess. The default setting is the Chromium embedded framework and as an alternative, suited for specific customer environments, we now provide the option to switch to the Microsoft WebView2 (WV2) component.

If the WV2 component is activated and used please make note of the following licensing information from Microsoft:

- Data Collection. The software may collect information about you and your end users' use of the software, and send that to Microsoft. Microsoft may use this information to provide services and improve Microsoft's products and services. There are also some features in the software that may enable you to collect data from users of your applications. If you use these features to enable data collection in your applications, you must comply with applicable law, including providing appropriate notices to users of your applications. You can learn more about data collection and use in the help documentation and the privacy statement at https://aka.ms/privacy. Your use of the software operates as your consent to these practices.
- Processing of Personal Data. To the extent Microsoft is a processor or subprocessor of personal data in connection with the software, Microsoft makes the commitments in the European Union General Data Protection Regulation Terms of the Online Services Terms to all customers effective May 25, 2018, at https://docs.microsoft.com/en-us/legal/gdpr.

3.2 Push Notifications

Please note that push notifications can only be used on Windows 10 operating system.
Please note, that in order to display the notifications properly, certain settings-requirements in Windows 10 need to be met:

- the notification-assistant needs to be turned off
- the setting "Notifications from apps and other senders are to be collected" needs to be turned on
- in addition to the above mentioned general setting, Windows 10 allows for app-specific notifications control. Here notification-collection from QuickAccess needs to be enabled as well.

We recommend using this feature on Window10 builds higher than 1804, since in earlier Windows-builds defects in the Windows pop-up-notifications have been reported.

3.3 QA for SAP

Please note that this module is only supported for already existing installations.

3.3.1 Technology

Client-side: A SAPGUI enhancement that is activated via the function modules transported in SAP Basis (package in the /TTS/ namespace). Documents are displayed via a Web browser which is installed on the client system. Server-side: An HTTP request is used to trigger a search for content on the WebAccess and content is then fed to the client via HTTP(s) protocol.
For more information, please refer to our installation guidelines.

3.4 Web-QA

In case of Chrome, which currently is blocking CrossSiteCookies, the corresponding application server needs be configured in such a way, that cookies are processed accordingly. E.g. in case of Tomcat the "Tomcat cookie processor" needs to be adjusted.

3.5 Working With Citrix

Please refer to chapter 1.7 for information on Citrix.

4 Object Recognition

4.1 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 itself supports those APIs correctly and provides plausible data.

4.2 Object recognition for standard applications

The following table lists 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.

Software	Version(s) / notes
Microsoft Windows	Windows 10
Microsoft Office	Office 2019, Office 365
Browsers, web-enabled applications in general	Microsoft Edge 100 Chrome (32-bit) 100
SAPGUI	SAPGUI 7.6* SAPGUI 7.7 (min. Patchlevel 10) **Attention:** GUI Scripting must be installed and activated on the client and activated on the server side. sapgui/user_scripting_set_readonly is sufficient, no rights are needed to control SAPGUI. **Attention:** In combination with Win10 the Windows "Control Flow Guard" must be deactivated in order to record SAP "in-process". Otherwise the recorder switches to an alternative mode, which will result in slower recording performance.
Java applications	Java 8 (min. update 20 – tested on update 321) OpenJDK 11

Please note that due to a defect in the chrome browser, the accessibility mode cannot be set automatically anymore, so object and context recognition is not possible for the chrome-builds

beginning from build #43. As a workaround, the accessibility flag can be set manually.

Please note that in case of recording of Mircosoft Office 32-bit application and the recorder-setting that all-objects should be retrieved by the recorder, the recording performance will decrease and a recorder-time of up to 15 seconds is to be expected for each step.

4.3 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.

4.3.1 Security Aspects

For notes on security-related aspects, please refer to the following SAP documentation ("SAP GUI Scripting Security Guide"):
https://help.sap.com/saphelp_nw73ehp1/helpdata/en/49/38dea6c657200be10000000a42189c/content.htm
As our software 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 Quick Access, 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 Quick Access 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.

[…]

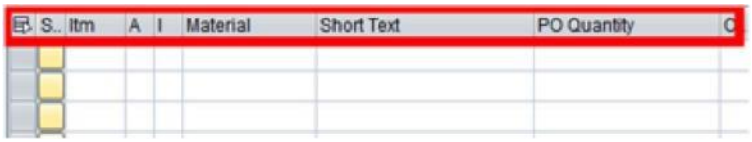
Special note when using Quick Access while "sapgui/user_scripting_set_readonly" is set to *true*
In this mode, there are two restrictions by design:

1) Input values automatically / Smart Link "Enter automatically": 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 Quick Access which activates the input field via mouse automation. Since the Quick Access, as a default for security reasons, is not allowed to do mouse clicks itself, this has to be explicitly activated in the configuration.

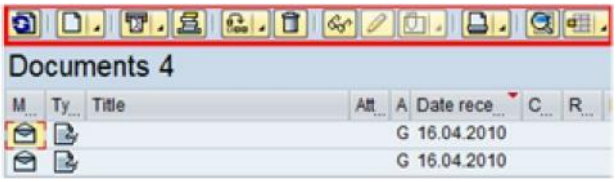
We also note that both functions are there for convenience reasons only, it doesn't pose a problem to use Quick Access without these functions.
Due to known issues in the SAP GUI scripting interface, the following issues can occur during the "read only" mode with object recognition (highlighting the target object):

- Table heads in SAP table controls:



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:

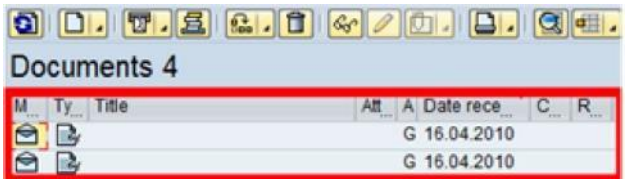


This problem does not occur when using SAPGUI 7.2 with patch level 14 or higher or SAPGUI 7.3 with patch level 2 or higher.

- Column marker in SAP table controls:

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

- Table heads, rows and cells in SAP grid views:



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.

4.3.2 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 Quick Access 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 Quick Access. Please proceed as laid out in SAP Note 977584.
For general information on this topic, please see SAP Note 977583.

4.3.3 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.
Please note, that object recognition in multiple running NWBC instances is not supported.

4.4 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 object (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, 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.

4.5 Object Recognition For JAVA Applications

Java based programs use two different accessibility technologies depending on the type of the underlying Java UI framework. For JFC/Swing-based objects, the Java Access Bridge (JAB) is used. For JavaFX objects, accessibility is available since Java 8u40 that can be queried via UI Automation.

4.5.1 JAB For Java 8 and later

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.

Please note, that from Java9 onwards Java Swing applications need to be recorded at 100% scaling in order for the object-recognition to work properly.

4.6 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.

5 Curator

5.1 Minimal requirements

The Curator depicts the browser-based access to the "Document Management area" of the tt knowledge performance suite.
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 6.
Should any of the requirements defined herein not be met, the proper functioning of the Curator cannot be guaranteed and there exists no claim to establish this.

5.2 Software

Component	Requirement
Operating system	Windows 10
Browser	Edge 100 on Windows 10 Firefox 98 Chrome 100 Attention: Please note that due to the different technological basis, minor differences in the display of content between browsers might occur. Attention: Please note that display-magnifications above 100% are not supported.
Browser settings	JavaScript and session cookies have to be activated.

5.3 Hardware

Component	Requirement
Processor	Minimal: Single-core 2.2GHz Recommended: Dual-core 2.6GHz 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.
Memory	Minimal: 512 MB Recommended: 2 GB 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.

6 Server components

6.1 Hardware

Component	Requirement
Processor	Minimal: Single-core 2.2 GHz Recommended: Dual-core 2.6 GHz (for Curator) Quad-core 2.6 GHz (for WebAccess) 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.
Memory	Minimal: 2 GB Recommended: 4 GB 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.
Hard drive	200 MB for program data Repository: ~ 1 GB / 500 Documents Database: ~ 100 MB / 500 Documents **Attention:** These values represent averages! The actual amount of data can vary greatly, depending on the complexity and media-richness of the stored objects. **Attention:** 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. **Attention:** For optimal performance, we recommend the use of SSD hard drives.

6.2 Software

Component	Requirement
Operating system	Windows Server 2016 Windows Server 2019 Windows Server 2022 Linux
Browser settings	JavaScript and session cookies have to be activated.
Permissions	Administrator-rights are required for the installation.
Application server	Apache Tomcat 9.0.62

	JDK17 OpenJDK 17.0.2 **Attention:** The corresponding Java Development Kit (JDK) needs to be installed on the server; the Java Runtime Environment (JRE) alone is not sufficient.
Database	MSSQL Server 2017 MSSQL Server 2019 Oracle 19c Oracle 21c **Attention:** Please note that the database tables need to be UTF-8 encoded.
Storage Service	MinIO v2022.04.09
Search Functionality	Solr Version 8.11.1 Redis 6.25
Reverse Proxy (optional)	Tomcat connector for Apache HTTP Server (mod_jk or mod_proxy_ajp) **Attention:** Tomcat connector for Microsoft IIS (ISAPI Redirector) is not supported.

6.3 Technology

Server application based on the Java Enterprise Edition (JEE) framework Oracle.

6.4 Installation

Attention: In order to upload content 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.

Please note that the http-communication to the server needs to be https exclusively. Unsecured http-communication is no longer supported.

For “search-functionality” within Curator and WebAccess we require a Solr instance being available.

6.5 LDAP

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.

6.6 SAML

SAML is supported in the version 2.0. With respect to the bindings, the tts performance suite supports “HTTP POST”.

6.7 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.

McAfee

Please note that a locally used virus scanner from McAfee may reduce the perfor-mance 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 ex-ecutable resides.

HP Sprinter

Please note that the installation will cause write access problems to the Producer 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 Producer.

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

Microsoft Security Policies

If you experience problems with editing in the WYSIWYG View (i.e. no editing possi-ble) please check if the MS Security Policy “Local Machine Lockdown” is enabled. If so, please disable this policy.

7 Third Party Products

7.1 HTML5-Player

Name	Version	License
HammerJs	2.0.8	MIT
jPlayer	2.9.2	MIT
jQuery	1.12.4	MIT
Log4Javascript	1.4.9	Apache License 2.0
MediatorJs	0.9.8	MIT
RequireJS	2.3.3	MIT or BSD

7.2 Default Player

Name	Version	License
DOMPurify	2.3.6	Apache 2.0 or MPL-2.0
iScroll	4.1.9	MIT
jQuery	1.12.4	MIT
mozilla/sanitizer-polyfill	0.9.0	MPL-2.0 License
RequireJS	2.1.9	MIT or BSD
XRegExp	2.2.0	MIT

7.3 QA StepList Editor

name	version	license
@aws-crypto/crc32	2.0.0	Apache-2.0
@aws-crypto/ie11-detection	2.0.0	Apache-2.0
@aws-crypto/sha256-browser	2.0.0	Apache-2.0
@aws-crypto/sha256-js	2.0.0	Apache-2.0
@aws-crypto/supports-web-crypto	2.0.0	Apache-2.0
@aws-crypto/util	2.0.0	Apache-2.0
@aws-sdk/abort-controller	3.40.0	Apache-2.0
@aws-sdk/chunked-blob-reader	3.37.0	Apache-2.0
@aws-sdk/client-s3	3.44.0	Apache-2.0
@aws-sdk/config-resolver	3.40.0	Apache-2.0
@aws-sdk/eventstream-marshaller	3.40.0	Apache-2.0
@aws-sdk/eventstream-serde-browser	3.40.0	Apache-2.0
@aws-sdk/eventstream-serde-config-resolver	3.40.0	Apache-2.0
@aws-sdk/eventstream-serde-universal	3.40.0	Apache-2.0
@aws-sdk/fetch-http-handler	3.40.0	Apache-2.0
@aws-sdk/hash-blob-browser	3.40.0	Apache-2.0
@aws-sdk/invalid-dependency	3.40.0	Apache-2.0
@aws-sdk/is-array-buffer	3.37.0	Apache-2.0
@aws-sdk/lib-storage	3.44.0	Apache-2.0
@aws-sdk/md5-js	3.40.0	Apache-2.0
@aws-sdk/middleware-apply-body-checksum	3.40.0	Apache-2.0
@aws-sdk/middleware-bucket-endpoint	3.41.0	Apache-2.0
@aws-sdk/middleware-content-length	3.40.0	Apache-2.0
@aws-sdk/middleware-expect-continue	3.40.0	Apache-2.0
@aws-sdk/middleware-host-header	3.40.0	Apache-2.0
@aws-sdk/middleware-logger	3.40.0	Apache-2.0
@aws-sdk/middleware-retry	3.40.0	Apache-2.0
@aws-sdk/middleware-sdk-s3	3.41.0	Apache-2.0
@aws-sdk/middleware-serde	3.40.0	Apache-2.0
@aws-sdk/middleware-signing	3.40.0	Apache-2.0
@aws-sdk/middleware-ssec	3.40.0	Apache-2.0
@aws-sdk/middleware-stack	3.40.0	Apache-2.0
@aws-sdk/middleware-user-agent	3.40.0	Apache-2.0
@aws-sdk/property-provider	3.40.0	Apache-2.0
@aws-sdk/protocol-http	3.40.0	Apache-2.0
@aws-sdk/querystring-builder	3.40.0	Apache-2.0
@aws-sdk/querystring-parser	3.40.0	Apache-2.0
@aws-sdk/service-error-classification	3.40.0	Apache-2.0
@aws-sdk/signature-v4	3.40.0	Apache-2.0

@aws-sdk/smithy-client	3.41.0	Apache-2.0
@aws-sdk/url-parser	3.40.0	Apache-2.0
@aws-sdk/util-arn-parser	3.37.0	Apache-2.0
@aws-sdk/util-base64-browser	3.37.0	Apache-2.0
@aws-sdk/util-body-length-browser	3.37.0	Apache-2.0
@aws-sdk/util-config-provider	3.40.0	Apache-2.0
@aws-sdk/util-hex-encoding	3.37.0	Apache-2.0
@aws-sdk/util-locate-window	3.37.0	Apache-2.0
@aws-sdk/util-uri-escape	3.37.0	Apache-2.0
@aws-sdk/util-user-agent-browser	3.40.0	Apache-2.0
@aws-sdk/util-utf8-browser	3.37.0	Apache-2.0
@aws-sdk/xml-builder	3.37.0	Apache-2.0
@log4js-node/log4js-api	1.0.2	Apache-2.0
@soda/get-current-script	1.0.2	MIT
@transloadit/prettier-bytes	0.0.7	MIT
@uppy/core	1.20.1	MIT
@uppy/dashboard	1.21.1	MIT
@uppy/drag-drop	1.4.31	MIT
@uppy/informer	1.6.6	MIT
@uppy/progress-bar	1.3.30	MIT
@uppy/status-bar	1.9.6	MIT
@uppy/store-default	1.2.7	MIT
@uppy/thumbnail-generator	1.7.11	MIT
@uppy/utils	3.6.2	MIT
@vue/cli-service	4.5.17	MIT
@vue/composition-api	1.3.2	MIT
ajv	8.6.1	MIT
assert	1.5.0	MIT
axios	0.23.0	MIT
base64-js	1.3.1	MIT
bowser	2.11.0	MIT
browserify-zlib	0.2.0	MIT
buffer	5.6.0	MIT
classnames	2.3.1	MIT
constants-browserify	1.0.0	MIT
core-util-is	1.0.2	MIT
css-loader	3.6.0	MIT
cuid	2.1.8	MIT
date-format	3.0.0	MIT
debug	4.3.1	MIT
entities	2.2.0	BSD-2-Clause
events	3.3.0	MIT

exifr	6.3.0	MIT
fabric	5.2.1	MIT
fast-deep-equal	3.1.3	MIT
fast-diff	1.2.0	Apache-2.0
fast-xml-parser	3.19.0	MIT
flatted	2.0.2	ISC
fs-extra	8.1.0	MIT
graceful-fs	4.2.8	ISC
ieee754	1.2.1	BSD-3-Clause
image-blob-reduce	4.1.0	MIT
inherits	2.0.4	ISC
isarray	1.0.0	MIT
is-shallow-equal	1.0.1	MIT
jsms	1.0.16	MIT
jsms-ext-chromium	2.0.0-alpha.0	MIT
jsonfile	4.0.0	MIT
json-schema-traverse	1.0.0	MIT
lodash	4.17.21	MIT
lodash.clonedeep	4.5.0	MIT
lodash.debounce	4.0.8	MIT
lodash.isequal	4.5.0	MIT
lodash.throttle	4.1.1	MIT
log4js	6.3.0	Apache-2.0
math-log2	1.0.1	MIT
memoize-one	5.2.1	MIT
mime-match	1.0.2	ISC
ms	2.1.2	MIT
namespace-emitter	2.0.1	MIT
node-libs-browser	2.2.1	MIT
object-assign	4.1.1	MIT
pako	1.0.11	(MIT AND Zlib)
path-browserify	0.0.1	MIT
pinia	2.0.11	MIT
preact	8.2.9	MIT
process-nextick-args	2.0.1	MIT
quill	1.3.7	BSD-3-Clause
quill-delta	4.2.2	MIT
readable-stream	3.6.0	MIT
resize-observer-polyfill	1.5.1	MIT
rfdc	1.3.0	MIT
rxjs	7.5.2	Apache-2.0
safe-buffer	5.2.1	MIT

shallow-equal	1.2.1	MIT
stream-browserify	3.0.0	MIT
streamroller	2.2.4	MIT
string_decoder	1.3.0	MIT
tslib	1.14.1	0BSD
universalify	0.1.2	MIT
uri-js	4.4.1	BSD-2-Clause
util	0.11.1	MIT
util-deprecate	1.0.2	MIT
uuid	8.3.2	MIT
vue	2.6.14	MIT
vue-class-component	7.2.6	MIT
vue-demi	0.12.1	MIT
vue-i18n	8.26.7	MIT
vue-i18n-composable	0.2.2	MIT
vue-loader	15.9.8	MIT
vue-property-decorator	9.1.2	MIT
vue-shortkey	3.1.7	MIT
vuetify	2.6.3	MIT
vuetify-loader	1.7.3	MIT
vuex	3.6.2	MIT
webpack	4.46.0	MIT
wildcard	1.1.2	MIT

7.4 C++

Name	Version	License
Java Servlet API	3.1.0	CDDL1
Eclipse	3.5.0	Eclipse Foundation Software User Agreement
Spring	3.2.4	https://pivotal.io/terms-of-use
Java Mail	1.4.1	CDDL1
Java Inject	1.0.0	Apache License 2.0
Java Native Access	4.1.0	Apache License 2.0
Google Guice	4.2.0	Apache License 2.0
Google Guava	28.1-jre	Apache License 2.0
Google Soundlibs	1.9.5	Apache License 2.0
Saxon	8.8.0	Mozilla Public License
Jaxen	1.1.1	The Werken Company License
Jackson	jackson:2.9.5 jackson-asl:1.9.9	Apache License 2.0
JSON	1.1.0	Public Domain
JSON Smart	1.2.0	-
Jayway JSON Path	0.9.1	Apache License 2.0
Apache Commons	io:2.5 codec:1.6.0 compress:1.8.1 collections:3.2.1 lang:2.4.0 logging:1.1.1 bcel:5.2.0 xml:1.3.4	Apache License 2.0
Apache ServiceMix	2.0.3	Apache License 2.0
Apache HttpComponents	HttpClient: 4.5.9 HttpCore: 4.4.11 HttpMime: 4.5.9	Apache License 2.0
Apache Jakarta POI	3.8.0	Apache License 2.0
Apache XML Commons	11.2.0	Apache License 2.0
Apache Xalan XML Serializer	12.7.1	Apache License 2.0
Apache Xerces XML Support	12.9.1	Apache License 2.0
Apache Regular Expression Library	11.5.0	Apache License 2.0
Apache Ant	11.8.1	Apache License 2.0
Apache Batik	11.7.0	Apache License 2.0

Apache Log4J	11.2.16	Apache License 2.0
Apache Groovy	12.0.1	Apache License 2.0
AspectJ	11.6.12	EPL
Code Generation Library	12.2.0	Apache License 2.0
Antlr	12.7.7	http://www.antlr2.org/license.html
JTidy	10.0.0-r938	http://jtidy.sourceforge.net/license.html
Objenesis	11.2.0	Apache License 2.0
JSoup	11.5.2	MIT
SAC	11.3.0	https://www.w3.org/Consortium/Legal/2002/copyright-software-20021231
Castor	11.2.0	Apache License 2.0
AOP Alliance	11.0.0	Public Domain
HTML Cleaner	12.7.0	BSD
Hibernate Validator	14.2.0	Apache License 2.0
Equals Verifier	11.7.5	Apache License 2.0
JDeferred	11.2.3	Apache License 2.0
JDOM	11.1.0 and 2.0.5	Apache-style open source license
Java Hamcrest	11.3.0	BSD-3-Clause
ObjectWeb ASM	11.5.3	http://asm.ow2.org/license.html
Joda Time	12.10.4	Apache License 2.0
SLF4J	11.7.7	http://www.slf4j.org/license.html
Hunspell	11.3.2	LGPL
JACOB - Java COM Bridge	11.17	LGPL
LAME	13.97	LGPL
MP3 SPI for Java™Sound	11.9.5	LGPL
Java Access Bridge (optional for recording)	12.0.4, 22.0.5, 7.0.760.13, 8.0.20.26, 8.0.40.26	Oracle Binary Code License Agreement
CXImage	6.0.0	zlib/libpng License (Zlib)
libpng	1.2.24	libpng license
TinyXML++	2.5.3	MIT/ZLib
Zlib	1.2.11	ZLib
Tessdll	2.04	Apache License 2.0
Crypto++	5.6.3	Boost Software License 1.0
Polymer	1.0.6	BSD
MediatorJs	~0.9.7	MIT
jQuery	~2.1.1	MIT
jQuery.dotdotdot	1.7.2	MIT
jquery-simple-combobox	1.1.16	MIT
node-uuid	~1.4.1	MIT
Chromium Embedded Framework	99.2.9.0	BSD
Chromium	ttkf client: 99.0.4844.51	BSD, LGPL, MIT

	QuickAccess: 99.0.4844.51	
C++ REST SDK	2.10.16	Apache License 2.0
Juniversalchardet	2.0.0	Mozilla Public License 1.1
JCrop	2.0.4	MIT
International Components for Unicode (ICU)	4.0.1	IBM ICU License
JSMS (JavaScript Message Service)	1.0.16	MIT
JSMS Chromium Extension	2.0.2	MIT
Vue	2.6.14	MIT
Vuetify	2.5.10	MIT
WinToast	1.2.0	MIT
Boost	1.74	https://www.boost.org/users/license.html (Boost Software License)

7.5 Server

Name	Version	License
AntLR Parser Generator	2.7.7	BSD License
Not Yet Commons SSL	0.3.11	Apache License v2
XMP Library for Java	6.0.6	The BSD License
AWS Java SDK for Amazon CloudWatch	1.11.890	Apache License, Version 2.0
AWS Java SDK for Amazon CloudWatch	1.12.147	Apache License, Version 2.0
AWS SDK for Java - Core	1.11.890	Apache License, Version 2.0
AWS SDK for Java - Core	1.12.131	Apache License, Version 2.0
AWS SDK for Java - Core	1.12.147	Apache License, Version 2.0
AWS Java SDK for AWS KMS	1.12.147	Apache License, Version 2.0
AWS Java SDK for Amazon CloudWatch Logs	1.12.147	Apache License, Version 2.0

AWS Java SDK for Amazon S3	1.12.147	Apache License, Version 2.0
AWS Java SDK for AWS Secrets Manager	1.12.131	Apache License, Version 2.0
ElastiCacheJavaClusterClient	1.1.2	Apache 2.0 License
JMES Path Query library	1.11.890	Apache License, Version 2.0
JMES Path Query library	1.12.131	Apache License, Version 2.0
JMES Path Query library	1.12.147	Apache License, Version 2.0
HPPC Collections	0.8.1	The Apache Software License, Version 2.0
com.drewnoakes:metadata-extractor	2.12.0	The Apache Software License, Version 2.0
Esri Geometry API for Java	2.2.0	The Apache Software License, Version 2.0
Jackson-annotations	2.12.3	The Apache Software License, Version 2.0
Jackson-annotations	2.13.1	The Apache Software License, Version 2.0
Jackson-core	2.12.3	The Apache Software License, Version 2.0
Jackson-core	2.13.1	The Apache Software License, Version 2.0
jackson-databind	2.11.4	The Apache Software License, Version 2.0
jackson-databind	2.12.3	The Apache Software License, Version 2.0
jackson-databind	2.13.1	The Apache Software License, Version 2.0
Jackson dataformat: CBOR	2.12.3	The Apache Software License, Version 2.0
Jackson dataformat: CBOR	2.13.1	The Apache Software License, Version 2.0
Jackson dataformat: Smile	2.12.3	The Apache Software License, Version 2.0
Jackson datatype: JSR310	2.13.1	The Apache Software License, Version 2.0
jackson-module-jsonSchema	2.13.1	The Apache Software License, Version 2.0
Woodstox	6.2.4	The Apache License, Version 2.0
ClassMate	1.3.1	The Apache Software License, Version 2.0

ClassMate	1.5.1	Apache License, Version 2.0
Caffeine cache	2.8.0	Apache License, Version 2.0
Caffeine cache	2.9.2	Apache License, Version 2.0
JSON.simple	3.0.2	The Apache Software License, Version 2.0
better-files	3.9.1	MIT
waffle-jna	2.1.0	Eclipse Public License
Java SemVer	0.9.0	The MIT License
FindBugs-jsr305	3.0.2	The Apache Software License, Version 2.0
error-prone annotations	2.3.3	Apache 2.0
error-prone annotations	2.7.1	Apache 2.0
Guava InternalFutureFailureAccess and InternalFutures	1.0.1	The Apache Software License, Version 2.0
Guava: Google Core Libraries for Java	31.0.1-jre	Apache License, Version 2.0
Guava ListenableFuture only	9999.0-empty-to-avoid-conflict-with-guava	The Apache Software License, Version 2.0
J2ObjC Annotations	1.3	The Apache Software License, Version 2.0
Protocol Buffers [Core]	3.11.0	3-Clause BSD License
RE2/J	1.2	Go License
Diff, Match and Patch libraries for Plain Text	0.0.0-20120106	Apache 2.0
ICU4J	68.2	Unicode/ICU License
project ':json-path'	2.4.0	The Apache Software License, Version 2.0
project ':json-path'	2.6.0	The Apache Software License, Version 2.0
Disruptor Framework	3.4.2	The Apache Software License, Version 2.0
mchange-commons-java	0.2.15	Eclipse Public License, Version 1.0 GNU Lesser General Public License, Version 2.1
Dependency Injection for Java	1.0.0	CDDL 1.0
CGLIB Code Generation Library	2.2.0	Apache 2.0
Apache Commons HTTP Client	3.1.0	Apache
Apache Commons Logging	1.1.1	Apache 2.0
Apache Xalan XML Serializer	2.7.1	Apache 2.0
Apache Xalan XSLT Support	2.7.1	Apache 2.0
Proxool JDBC connection pool	0.9.1	Proxool

com.springsource.org.w3c.css.sac	1.3.0	W3C
JDOM DOM Processor	1.1.0	Apache
Objenesis	1.2.0	Apache 2.0
Jakarta Activation	1.2.2	EDL 1.0
istack common utility code runtime	3.0.11	Eclipse Distribution License - v 1.0
istack common utility code runtime	3.0.7	CDDL 1.1 GPL2 w/ CPE
JavaMail API	1.6.2	CDDL/GPLv2+CE
Old JAXB Core	2.3.0.1	CDDL+GPL License
Old JAXB Runtime	2.3.2	Eclipse Distribution License - v 1.0
fastinfoset	1.2.15	Apache License, Version 2.0
Jakarta SOAP Implementation	1.5.2	Eclipse Distribution License - v 1.0
T-Digest	3.1	The Apache Software License, Version 2.0
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tts-struts-patched	1.2.10-patched	Apache
akka-actor	2.5.31	Apache License, Version 2.0
akka-http-core	10.1.12	Apache-2.0
akka-http	10.1.12	Apache-2.0
akka-parsing	10.1.12	Apache-2.0
akka-protobuf	2.5.31	Apache License, Version 2.0
akka-stream	2.5.31	Apache License, Version 2.0
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Apache Commons CLI	1.4	Apache License, Version 2.0
Apache Commons Codec	1.15	Apache License, Version 2.0
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HttpClient	3.1	Apache License
Apache Commons IO	2.11.0	Apache License, Version 2.0
Commons Lang	2.6	The Apache Software License, Version 2.0
Commons Logging	1.1.1	The Apache Software License, Version 2.0
Commons Logging	1.1.3	The Apache Software License, Version 2.0
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Metrics Integration with JMX	4.1.5	Apache License 2.0
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Jakarta Server Pages API	2.3.6	EPL 2.0 GPL2 w/ CPE
Jakarta Servlet	4.0.4	EPL 2.0 GPL2 w/ CPE
Jakarta Bean Validation API	2.0.2	Apache License 2.0
Jakarta SOAP with Attachments API	1.4.2	Eclipse Distribution License - v 1.0
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JSR107 API and SPI	1.1.1	Apache License, Version 2.0
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javax.persistence-api	2.2	Eclipse Distribution License v. 1.0 Eclipse Public License v1.0
JavaServer Pages(TM) Standard Tag Library API	1.2.2	CDDL + GPLv2 with classpath exception
Java Servlet API	3.1.0	CDDL + GPLv2 with classpath exception
Bean Validation API	2.0.0.Final	Apache License 2.0
Bean Validation API	2.0.1.Final	Apache License 2.0
jaxb-api	2.3.1	CDDL 1.1 GPL2 w/ CPE
Joda-Time	2.10.10	Apache License, Version 2.0
Joda-Time	2.8.1	Apache 2.0
JUnit	4.13.2	Eclipse Public License 1.0

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org.apache.xmlgraphics:batik-constants	1.14	The Apache Software License, Version 2.0
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Bouncy Castle Provider	1.69	Bouncy Castle Licence
Bouncy Castle ASN.1 Extension and Utility APIs	1.69	Bouncy Castle Licence
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Castor XML - core	1.4.1	Apache 2.0
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Stax2 API	4.2.1	The BSD License
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Jetty :: Webapp Application Support	9.4.44.v20210927	Apache Software License - Version 2.0 Eclipse Public License - Version 1.0
Jetty :: XML utilities	9.4.44.v20210927	Apache Software License - Version 2.0 Eclipse Public License - Version 1.0
Apache FreeMarker	2.3.31	Apache License, Version 2.0
JAXB Runtime	2.3.1	CDDL+GPL License
TXW2 Runtime	2.3.1	CDDL+GPL License
Expression Language 2.2 Implementation	2.2.4	CDDL + GPLv2 with classpath exception
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leveldb	0.12	Apache License 2.0
leveldb-api	0.12	Apache License 2.0
Javassist	3.26.0-GA	Apache License 2.0 LGPL 2.1 MPL 1.1
JBoss Logging 3	3.3.0.Final	Apache License, version 2.0
JBoss Logging 3	3.4.1.Final	Apache License, version 2.0
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mockito-junit-jupiter	4.3.1	The MIT License
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Objenesis	3.2	Apache License, Version 2.0
opensaml	2.6.5	Apache 2.0
openws	1.5.5	Apache 2.0
xmltooling	1.4.6	Apache 2.0
org.opentest4j:opentest4j	1.2.0	The Apache License, Version 2.0
asm	8.0.1	BSD-3-Clause
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asm-commons	8.0.1	BSD-3-Clause
OWASP AntiSamy	1.5.3	BSD License
ESAPI	2.1.0.1	BSD Creative Commons 3.0 BY-SA
Project Lombok	1.18.22	The MIT License
quartz	2.3.2	The Apache Software License, Version 2.0
reactive-streams	1.0.2	CC0
reactive-streams	1.0.3	CC0
RRD4J	3.5	Apache License Version 2.0
scala-collection-compat	2.1.6	Apache-2.0
scala-java8-compat	0.9.0	Apache-2.0
scala-parser-combinators	1.1.2	Apache-2.0
scala-xml	1.3.0	Apache-2.0
Scala Library	2.13.2	Apache-2.0
Scala Compiler	2.13.0	Apache-2.0
JCL 1.2 implemented over SLF4J	1.7.24	MIT License
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spring-boot-actuator	2.4.11	Apache License, Version 2.0
spring-boot-actuator-autoconfigure	2.4.11	Apache License, Version 2.0
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Spring REST Docs Core	2.0.5.RELEASE	The Apache Software License, Version 2.0
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Spring Retry	1.3.1	Apache 2.0
OAuth2 for Spring Security	2.5.1.RELEASE	Apache 2.0
spring-security-config	5.6.1	Apache License, Version 2.0
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XML Commons External Components XML APIs Extensions	1.3.04	The Apache Software License, Version 2.0

7.6 Server npm

Package	Version(s)	License
abortcontroller-polyfill	1.7.3	MIT
adm-zip	0.5.9	MIT

adm-zip	0.5.5	MIT
ajv	8.6.1	MIT
assert	2.0.0	MIT
available-typed-arrays	1.0.5	MIT
axios	0.25.0	MIT
@babel/polyfill	7.12.1	MIT
@babel/polyfill	7.2.5	MIT
@babel/runtime	7.15.4	MIT
@babel/runtime	7.12.1	MIT
base64-js	1.5.1	MIT
browserify-zlib	0.2.0	MIT
buffer	6.0.3	MIT
call-bind	1.0.2	MIT
chunked-file-reader	0.0.3	MIT
classnames	2.3.1	MIT
core-js	2.6.12	MIT
core-js	2.6.2	MIT
cuid	2.1.8	MIT
define-properties	1.1.3	MIT
es-abstract	1.18.6	MIT
es-to-primitive	1.2.1	MIT
es6-object-assign	1.1.0	MIT
exifr	6.3.0	MIT
fast-deep-equal	3.1.3	MIT
follow-redirects	1.14.9	MIT
font-roboto	1.0.1	BSD 3-clause
foreach	2.0.5	MIT
fromentries	1.3.2	MIT
function-bind	1.1.1	MIT
get-form-data	2.0.0	MIT
get-intrinsic	1.1.1	MIT
get-symbol-description	1.0.0	MIT
has	1.0.3	MIT
has-bigints	1.0.1	MIT
has-symbols	1.0.2	MIT
has-tostringtag	1.0.0	MIT
hydrolysis	1.19.1	BSD 3-clause
ieee754	1.2.1	BSD-3-Clause
inherits	2.0.4	ISC
internal-slot	1.0.3	MIT
iron-a11y-announcer	1.0.3	BSD 3-clause
iron-a11y-keys-behavior	1.0.6	BSD 3-clause

iron-ajax	1.0.0	BSD 3-clause
iron-autogrow-textarea	1.0.6	BSD 3-clause
iron-behaviors	1.0.8	BSD 3-clause
iron-component-page	1.0.5	BSD 3-clause
iron-doc-viewer	1.0.6	BSD 3-clause
iron-flex-layout	1.0.4	BSD 3-clause
iron-form-element-behavior	1.0.4	BSD 3-clause
iron-icon	1.0.5	BSD 3-clause
iron-icons	1.0.4	BSD 3-clause
iron-iconset	1.0.3	BSD 3-clause
iron-iconset-svg	1.0.5	BSD 3-clause
iron-input	1.0.6	BSD 3-clause
iron-localstorage	1.0.5	BSD 3-clause
iron-meta	1.0.3	BSD 3-clause
iron-pages	1.0.0	BSD 3-clause
iron-resizable-behavior	1.0.2	BSD 3-clause
iron-selector	1.0.5	BSD 3-clause
iron-validatable-behavior	1.0.4	BSD 3-clause
is-arguments	1.1.1	MIT
is-bigint	1.0.4	MIT
is-boolean-object	1.1.2	MIT
is-callable	1.2.4	MIT
is-date-object	1.0.5	MIT
is-generator-function	1.0.10	MIT
is-nan	1.3.2	MIT
is-negative-zero	2.0.1	MIT
is-number-object	1.0.6	MIT
is-regex	1.1.4	MIT
is-shallow-equal	1.0.1	MIT
is-string	1.0.7	MIT
is-symbol	1.0.4	MIT
is-typed-array	1.1.8	MIT
isomorphic-fetch	3.0.0	MIT
jquery	3.5.1	MIT
jquery-dotdotdot	1.7.2	MIT
jsms	1.0.16	MIT
jsms-ext-chromium	1.1.13	MIT
json-schema-traverse	1.0.0	MIT
lodash.debounce	4.0.8	MIT
lodash.throttle	4.1.1	MIT
@log4js-node/log4js-api	1.0.2	Apache-2.0
marked	0.3.5	MIT

marked-element	1.1.1	BSD 3-clause
math-log2	1.0.1	MIT
mediator-js	0.9.9	MIT
memoize-one	5.2.1	MIT
mime-match	1.0.2	ISC
namespace-emitter	2.0.1	MIT
nanoid	3.2.0	MIT
node-fetch	2.6.7	MIT
node-uuid	1.4.3	MIT
object-inspect	1.11.0	MIT
object-is	1.1.5	MIT
object-keys	1.1.1	MIT
object.assign	4.1.2	MIT
original-fs	1.1.0	LGPL-3.0
pako	1.0.11	(MIT AND Zlib)
paper-behaviors	1.0.3	BSD 3-clause
paper-button	1.0.0	BSD 3-clause
paper-header-panel	1.0.1	BSD 3-clause
paper-icon-button	1.0.3	BSD 3-clause
paper-input	1.0.0	BSD 3-clause
paper-material	1.0.2	BSD 3-clause
paper-radio-button	1.0.3	BSD 3-clause
paper-radio-group	1.0.4	BSD 3-clause
paper-ripple	1.0.1	BSD 3-clause
paper-styles	1.0.11	BSD 3-clause
paper-toast	1.0.0	BSD 3-clause
paper-toolbar	1.0.1	BSD 3-clause
polymer	1.0.6	BSD 3-clause
preact	10.5.14	MIT
preact	8.2.9	MIT
prism	1.1.0	MIT
prism-element	1.0.2	BSD 3-clause
process	0.11.10	MIT
promise-polyfill	1.0.0	MIT
punycode	2.1.1	MIT
qs-stringify	1.2.1	MIT
querystringify	2.2.0	MIT
readable-stream	3.6.0	MIT
redux	4.1.1	MIT
regenerator-runtime	0.13.9	MIT

regenerator-runtime	0.13.7	MIT
require-from-string	2.0.2	MIT
requires-port	1.0.0	MIT
resize-observer-polyfill	1.5.1	MIT
safe-buffer	5.2.1	MIT
shallow-equal	1.2.1	MIT
side-channel	1.0.4	MIT
spark-md5	3.0.2	(WTFPL OR MIT)
spark-md5	3.0.1	WTFPL
stream-browserify	3.0.0	MIT
string_decoder	1.3.0	MIT
string.prototype.trimend	1.0.4	MIT
string.prototype.trimstart	1.0.4	MIT
tr46	0.0.3	MIT
@transloadit/prettier-bytes	0.0.7	MIT
ts-md5	1.2.9	MIT
@types/adm-zip	0.4.34	MIT
@types/node	14.6.1	MIT
unbox-primitive	1.0.1	MIT
@uppy/aws-s3	2.0.3	MIT
@uppy/aws-s3	1.8.0	MIT
@uppy/companion-client	2.0.1	MIT
@uppy/companion-client	1.10.2	MIT
@uppy/core	2.0.3	MIT
@uppy/core	1.20.1	MIT
@uppy/dashboard	2.0.3	MIT
@uppy/dashboard	1.21.1	MIT
@uppy/drag-drop	1.4.31	MIT
@uppy/form	2.0.2	MIT
@uppy/informer	2.0.2	MIT
@uppy/informer	1.6.6	MIT
@uppy/locales	2.0.1	MIT
@uppy/progress-bar	1.3.30	MIT
@uppy/provider-views	2.0.2	MIT
@uppy/provider-views	1.12.3	MIT
@uppy/status-bar	2.0.2	MIT
@uppy/status-bar	1.9.6	MIT
@uppy/store-default	2.0.0	MIT
@uppy/store-default	1.2.7	MIT
@uppy/thumbnail-generator	2.0.3	MIT
@uppy/thumbnail-generator	1.7.11	MIT
@uppy/utils	4.0.1	MIT

@uppy/utils	3.6.2	MIT
@uppy/vue	0.2.7	MIT
@uppy/xhr-upload	2.0.3	MIT
@uppy/xhr-upload	1.7.5	MIT
uri-js	4.4.0	BSD-2-Clause
url-parse	1.5.9	MIT
util	0.12.4	MIT
util-deprecate	1.0.2	MIT
uuid	8.3.2	MIT
vue	2.6.14	MIT
vue-class-component	7.2.6	MIT
vue-i18n	8.24.5	MIT
vue-property-decorator	9.1.2	MIT
vuetify	2.6.4	MIT
webcomponentsjs	0.7.14	BSD
webidl-conversions	3.0.1	BSD-2-Clause
whatwg-fetch	3.6.2	MIT
whatwg-url	5.0.0	MIT
which-boxed-primitive	1.0.2	MIT
which-typed-array	1.1.7	MIT
wildcard	1.1.2	MIT

7.7 JS Libraries

Name	Version	License
hashmap.js	-	BSD-3-Clause
json2.js	2012-10-08	Public Domain
Prototype	1.6.1	MIT
zip.js	-	BSD-3-Clause
ttn.bd.docportal		
Bootstrap: carousel.js	3.1.0	MIT
Hammer.js	1.0.6	MIT
iscroll.js	4.1.9	MIT
jQuery Plugin: Autosize	1.17.2	MIT
jCaret	1.02	MIT
Clearable Text Field	0.3.2	MIT OR GPL

		Dual-licensed, we can use MIT.
Hammer.js jQuery Plugin	1.0.0	MIT
Infinite Scroll PACKAGED	4.0.1	Commercial license, purchased
jQuery Infinite Scroll	2.0b2.120519	MIT
jQuery custom content scroller	2.3.2	MIT
jQuery Mousewheel	3.0.6	MIT
jQuery Tag-it!	2.0	MIT
jQuery	1.12.4	MIT
jQuery UI	1.12.1	MIT
JSMS	1.0.16	MIT
JSMS extension for integration of Chromium Embedded Framework (CEF) clients	2.0.0-alpha.0	MIT
json2.js	2012-10-08	Public Domain
Prototype	1.7.1	MIT
jQuery File Upload Plugin **& jQuery Iframe Transport Plugin**	5.19.7 1.2.1 7.0 1.5	MIT
TabFocus Script	1.0	Free for private and commercial use
UUID	8.3.2	MIT