Testimony - Installation and Setup Guide

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Basis Technologies

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1. Introduction

The Testimony Installation and Setup Guide takes you through setting up Testimony for use in your SAP system landscape.

It is recommended that you check the following sections so you are familiar with Testimony before starting.

Glossary
Architecture

The following sections then take you through the installation process:

Prerequisites
Technical Setup
Validating the Installation

There are also sections on uninstalling and support as below:

Uninstallation
Software Support

Whilst setting up Testimony on your SAP estate, this setup guide should be used in conjunction with the other available Testimony documentation with the other manuals available as below:

Document	Purpose
Testimony – Administrators Guide	A guide of all of the main features of Testimony
Testimony – Quick Start Guide	A guide to quickly get you up to speed with basic recordings and playbacks with Testimony
Testimony – Testers Guide	A guide to Testimony for testers

2. Glossary

Bot
The bot is an executable program that resides on a windows machine (normally a virtual machine). During playback the bot machines log on as the recorded users and execute the recorded transactions. The requirements for bot setup can be found here.

Central System
This is the primary SAP system in which Testimony is installed and is operated. Testimony users log on to the Central system to configure Testimony, create test plans, start recordings and playbacks and analyse the results.

Check Steps
These are run manually before a recording or playback to validate the environment is ready to perform those functions. The Testimony Administrator should run the check steps and review the results prior to performing a recording or playback.

Coverage Analysis:
Allows the comparison of recorded data from the execution queue with the usage data. It provides high-level statistics (e.g., what percentage of critical priority dialog transactions you recorded) as well as detailed information on each dialog transaction, batch job, etc.

Double Playback
A double playback is where two playbacks are used to reduce the potential for false positives. The first playback occurs with no changes deployed to the target system and is termed the baseline playback. The second playback called the release or upgrade playback is competed on the target system with the release or the upgrade applied .Defects are then only raised on differences detected in the second playback, this helps to screen out environmental issues from the baseline.

Dynamic IDs
These are used to link scripts which use the same data, for example a purchase order number. If the creation of a purchase order fails during the playback then Testimony recognises that there is no point running a subsequent script that approves this purchase order. Testimony will therefore cancel the execution of the order approval script. Testimony will also recognize if a different order number is generated during playback and will adjust subsequent scripts to use this new number rather than the recorded number.

Enhancements
To record and playback Testimony has enhancements on the source or target system to enable the recording or playback to operate correctly. These are switched on before recording or playback and are automatically deactivated at the end of the recording or playback in the "Post-Processing Steps". Should a recording or playback be stopped unexpectedly or due to a technical error, the Testimony Administrator should manually deactivate the enhancements.

Execution Queue
The execution queue is built when scripts are added from the repository and contains the scripts to be played back. Logic is built into the "Add to Execution Queue" process that idnetifies and establishes

linkages between related scripts as the execution queue is being built.

Filtered Recording

A filtered recording is used when you want to record a subset of users, transactions, objects, or transaction types rather than all activity on the source system. It is typically used for testing purposes to ensure that the setup from central to source system has been completed correctly.

Filter Sets

Filter sets have two main uses: to exclude certain objects (transactions, batch jobs, etc.) from a recording; and to provide special handling of error cases during a playback. For example, if you want Testimony to ignore all occurrences of transaction SM21 from the recording, then adding this transaction to the recording filter set will achieve this. If you want to ignore occurrences of message E123 from a particular screen, you can set this message as an exclusion in the comparison filter set. Filter sets can also be defined for the transfer to repository (most commonly for setting up transaction sampling) and for the transfer to the execution queue, although this is less frequently used. This topic should be further studied via the Filter Sets section here.

Linkages

Testimony records activity deeper than just the UI so that objects such as change documents and number ranges are also observed and recorded. These objects are used to create relationships, or linkages, between scripts so that dependencies can be enforced and validated. These can then be checked at playback and during results analysis to ensure that these match, providing a deeper level of testing.

Notifications

Testimony can be configured to send out notifications when certain actions are executed or to provide regular updates on ongoing actions. Notifications are managed through the notification setup in the configuration tray.

Playback

The playback is the execution of the scripts in the execution queue, via the bots, on the target system. The playback executes the scripted activity and generates the test results for comparison and analysis.

Post-Processing Steps

These are run automatically after a recording or playback is completed. Any errors in post-processing will cause a hard stop preventing the status from moving to complete. If errors are found the operator should investigate these errors to determine if they need to be manually resolved.

Preparation Steps

These are run automatically before a recording or playback starts. Any errors will cause a hard stop preventing the recording or playback from starting. Errors should be resolved before attempting to restart the recording or playback.

Recording

A recording (either Filtered or Standard) is the process by which actions on the source system are captured by Testimony.

Repository

The repository is a staging post for recorded transactions. Once all recorded transactions have been stored in the Central System, they are transferred to the repository (potentially with some filtering) before being transferred to the execution queue for playback. The repository is where any manipulation or deletion of sessions should take place, since if a mistake is made the sessions can be restored by transferring them again from the recorded data.

Sampling

Sampling is part of Filter Set functionality and is only set at the "Transfer to Repository" stage. Sampling allows the operator to decrease the volume of a set of activities without negatively impacting the validity of the test results. Since scripts will often modify data that will be used by later scripts, sampling is designed to be used for display or read-only activities that do not manipulate data. The idea behind it is as follows:

If you recorded a read-only process that runs every 5 minutes for the duration of the recording, you can play back a small percentage of those processes to help reduce playback times while still testing that process. Sampling can be used for Dialog, Batch and RFC processes.

Shared Memory

Testimony utilises the shared memory of the source system to save the recorded data temporarily before writing it to the database. This is so that the source system does not see a significant increase in I/O activity during a recording. To prevent any negative impact on source system performance Testimony will stop the recording if it runs too low on available shared memory. The recommended settings for the shared memory parameters are [here.](#)

Source System

This is the system that is recorded and therefore acts as the source for the recording. In BAU operation of Testimony, this is usually the production system.

Standard Recording

A standard recording records all activities, excluding any defined exceptions in the "Filter Sets".

Target System

This is the regression test system into which recorded scripts are played back via the Bots. It is recommended that the Target system is dedicated for use with Testimony and is refreshed with a point-in-time backup of the Source system taken as of the start of the recording.

Test Plan

A test plan is the logical container for the recording, playback, and results of a test scenario. When setting up a test plan the operator will define a Source system, Target system, system mapping and authorizations for users. To simplify the test plan creation process, test plans can be copied for scenarios using the same Source and Target systems.

3. Architecture

The architecture of Testimony comprises four types of systems as below:

1. Central system (usually Solution Manager) Testimony is operated from here with recordings and playback details stored here.
2. Source system to be recorded (e.g. ECC development, test and production)
3. Target system to be played back into (e.g. Copies of ECC production)
4. Bot systems to run the bots used for playback (Windows machines)

The relationship between the systems is as per the image below:
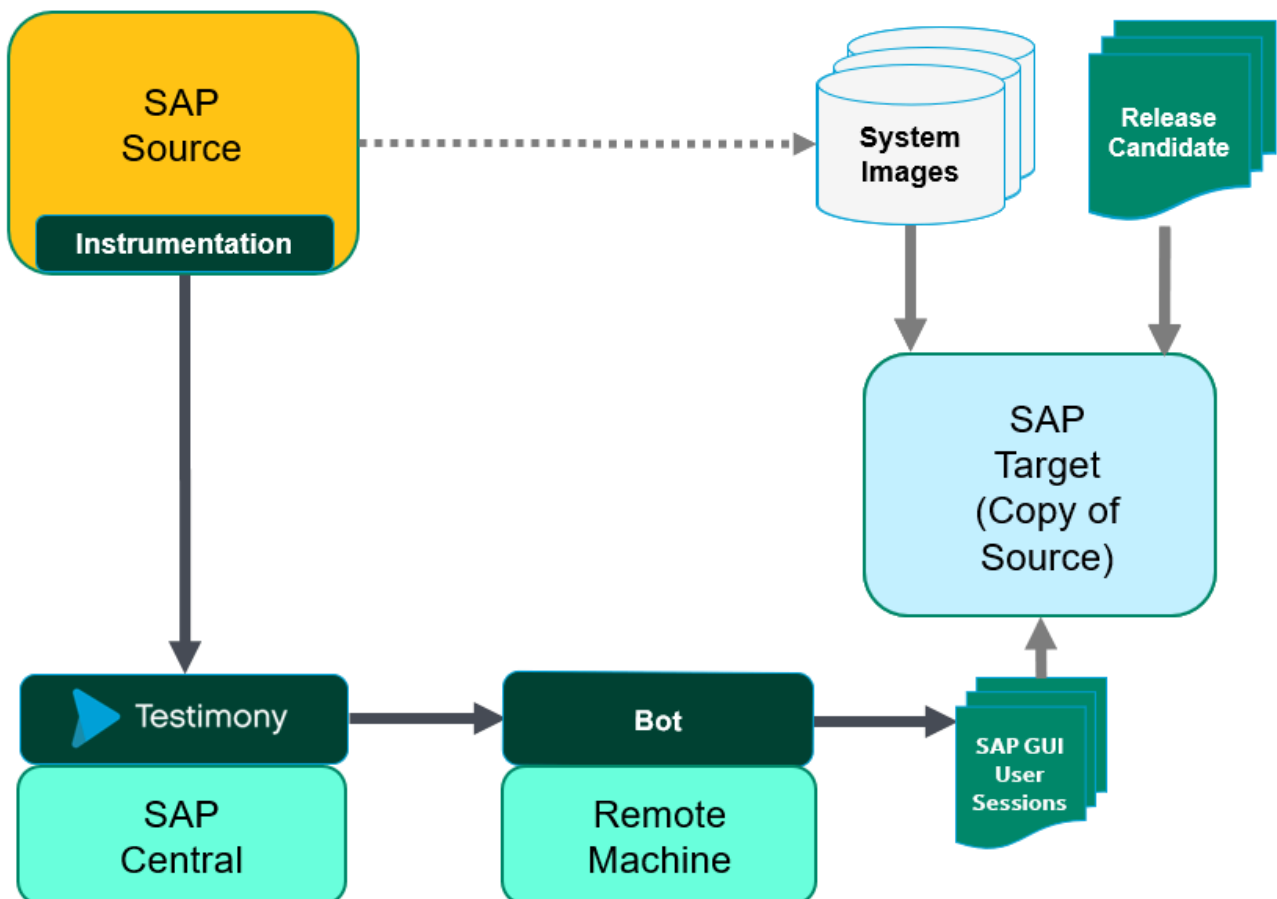
4. Prerequisites

There are five sets of activities that should be completed before Testimony is installed and configured.

1. Determine Systems

Before installing check the Architecture section and determine the "central" SAP system where Testimony will be operated from.

Testimony Central System minimum specifications

Software	SAP NW 7.01+ ABAP stack
Unicode	Central system must be Unicode enabled
Disk	400GB (350 GB for SAP install plus free space, 50GB available for growth with Testimony utilization)
System Memory	8GB (16 GB+ recommended)
CPU	Multi-core 64-bit processor (4 cores recommended)
Processes	20 BTC, 20 DIA, 1 ENQ, 1 SPO, 1 UPD, 1 UP2 (assumes up to 15 Bot machines defined)
Notes	Must have network connectivity to Source, Target, and BOT systems

In addition to the central system there will also be source SAP systems where recordings take place and target SAP systems into which recordings are played back. At the start of the installation Basis Technologies recommends that a sandbox system is used and it is likely that the same system will be used for both recording and playback. To playback you will also require a windows machine to host the Bot. Details on this are here. Once you start recording larger systems note that the target will need to be sized sufficiently to allow for all of the source system activities being run on it.

At this stage it is important to determine which systems will be acting as "central", "source" and "target" systems as each requires different setup. The Basis Technologies consultant will also want the detail of these systems entered into the Testimony Gameplan to assist with planning and documenting the installation.

2. Determine Administrators

Installing and maintaining Testimony requires a basic working knowledge of SAP plus an understanding of your organisation's testing processes.
Basis Technologies recommend 1-2 resources be assigned as Testimony Administrators. These will typically be the senior testing managers and/or basis administrators.
The proposed Testimony administrators should be determined before the installation is started.

3. Profile Parameters

The following profile parameters should be set as per the list below, note that as some of these require a

system restart planning should be taken around the production system taking note of maintenance windows. These parameters will be reviewed and may be adjusted depending on your installation.

> ✳ Parameters in **bold** are expected to require a system restart to take effect (this can vary per SAP version) and they should be changed on each app server

#	Profile Parameter	System	Details
1	**rsdb/esm/buffersize_kb**	Source	This value needs to be at least '250000' (250Mb) (the parameter is in kb).
2	**rsdb/esm/ large_object_size**	Source	This value needs be to at least '1000000' bytes (1Mb).
3	**rsdb/esm/max_objects**	Source	This value needs to be at least 100000
4	**rsdb/esm/buffersize_kb**	Central	This value needs to be at least '250000' (250Mb) (the parameter is in kb).
5	**rsdb/esm/ large_object_size**	Central	This value should be at least '51200000' bytes (50Mb).
6	**rsdb/esm/max_objects**	Central	This value needs to be at least 2000
7	sapgui/user_scripting	Target	This value needs to be TRUE which allows the bots to perform the playback properly. Only in playback system.
8	sapgui/ user_scripting_per_user	Target	This value needs to be FALSE which allows the bots to perform the playback properly. Only in playback system.
9	sapgui/ user_scripting_set_readonly	Target	This value needs to be FALSE which allows the bots to perform the playback properly. Only in playback system.
10	login/ disable_password_logon	Target	This value needs to be 0 which allows the bots to login to the playback system. Only in playback system.
11	login/ disable_multi_gui_login	Target	This value needs to be 0 this allows multiple logons. Only in playback system.
12	rdisp/tm_max_no	Target	As Testimony will be logging on with the user load from production this should be the production setting +50% Only in playback system.
13	rdisp/gui_auto_logout	Target	This value needs to be 0. This ensures that the bots and their logged on users cannot be automatically logged off by the user due to time-limits (for example, if the playback is paused or other issues arise)
14	rdisp/max_wprun_time	Target	Ensure this value is at least the value set in the production system
15	abap/buffersize	Target	Ensure this value is at least the value set in the production system

16	ztta/parameter_area	Target	This value needs to be at least 64000. The value checked can be adjusted by changing PLAYBACK_PARAM_AREA in the General Parameters. Only in playback system.
17	**snc/enable**	Target	This value needs to be 0 this is required where TimeShiftX is being operated. Only in playback system.

✳ Note some parameters will be reviewed for your system settings primarily parameters #1 #2 #3 on the source system

4. File Configuration

To enable Testimony to record and playback files then the following setup needs to be completed in each system that Testimony is intended to operate in central, source and target.

#	Activity	Details
1	Create OS Command	In each system (central, source and target) set up a new OS command called YAUT_COPY_FILE in transaction SM49 (For WINDOWS NT Operating system command is xcopy, for LINUX is cp)
2	Logical File Path	In each system (central, source and target) set up a folder for the logical path /BTI/ AUT_APPSERVER_FILES using transaction FILE

5. Operating Systems

Enter into the Game Plan the operating systems for the application and database servers for the SAP systems where Testimony is to be installed. This is needed for the installation of TimeShiftX which is required to keep the date and time of the target system aligned with the date and time of the recording when playing back, more details in the TimeShiftX section.

5. Discovery and Analysis

5.1. RFC Throughput Investigations

It is important to check the volume and size of Inbound RFCs, to identify potential issues which might arise from recording unusually large objects.

The ST03 analyzers are able to provide detailed information on the Sent and Received data of RFCs.

From transaction ST03, analyze for the desired period. Start with 1 week, and look at the RFC Server Profile:

After sorting it by Received Data(Bytes), you can select the option to view the data in Excel Inplace:

The total of the combined Send and Received is to be calculated and a ratio derived against the number of calls.

This information, for the Top 30, should be analyzed to see if there are any high volume operations which can be excluded.

Refer to the Filters and Exclusions:

6. Technical Setup

After the prerequisite processes have been completed you can now begin the Testimony implementation, including configuration of the product and preparing it for use.

Basis Technologies recommends that the first recording and playback are completed on a Sandbox system and for the first recording and playback this system can operate as both a source and target if required.

This topic has been broken down into the following sections:

- Central System
- Bot Setup
- Source System
- Target System
- TimeShiftX

6.1. Central System

The Central system is where Testimony is operated from (details on operating Testimony are found in the Administrators Guide) once setup is complete there should be relatively few times that changes are required in the source or target systems.

Follow the steps below to ensure Testimony is correctly installed on the central system.

#	Activity	Details
1	Install Testimony into Central System	Install the transports provided by Basis Technologies into your central system. This would typically be your SAP Solution Manager system.
2	Regenerate delivered roles	In each system into which transports have been deployed, go to transaction PFCG, find the /BTI/* roles and regenerate
3	Testimony administrator access	Assign the role /BTI/AUT_CENTRAL_ADMINISTRATOR to the Testimony Administrators in the Testimony central system
4	Check main transaction	In the central system, execute the main Testimony transaction **/N/BTI/AUT**. If this transaction does not exist then check the transports have been imported correctly
5	Install License Keys	Install the Testimony license keys provided by Basis Technologies into your central system only as per the central license section here.
6	Install Listener License Keys	Install the Testimony Listener Agent license keys provided by Basis Technologies into your central system. Seperate keys for the Listener Agent will need to be installed into specific systems according to the instructions here.
7	Filter Set Number range	Use SAP standard transaction SNRO for Object /BTI/AUT33 to setup three number ranges as follows 01 from 0000000001 to 0999999999 08 from 8000000000 to 8999999999 09 from 9000000000 to 9999999999
8	Assign Administrators	The first person to start Testimony using the transaction **/N/BTI/AUT** will be assigned as a Testimony administrator. You should assign the other Administrators to this role at this point,

Once this is complete you can move onto the next part of the installation:

#	Activity	Details
1	Bot User	Use SU01 to create a BOT_USER user (suggested name) in the central system. This user requires the role **/BTI/AUT_BOT_RFC** (ensure profile role is generated)

		The user needs to be of type **System User**
2	Create Source RFC	In the central system, use SM59 to create an ABAP RFC connection to the source system. This requires the user created in the source system as per the details [here](#) then test the connection using Utilities —> Test —> Authorization Test
3	Create Target RFC	In the central system, use SM59 to create an ABAP RFC connection to the target system.This requires the user created in the target system as per the details [here](#) then test the connection using Utilities —> Test —> Authorization Test

The following parameters should have been completed in the prerequisites, however, these should be double checked to ensure installation is correct.

#	Profile Parameter	Details
1	rsdb/esm/buffersize_kb	This value should be about '250000' (250Mb) (the parameter is in kb).
2	rsdb/esm/large_object_size	This value should be at least '51200000' bytes (50Mb).
3	rsdb/esm/max_objects	This value should be at least '2000'

6.2. Source System

A source system is a system that you want to record activities on. In the early stages of the installation on sandbox or development systems you might be operating with the source and target as the same system, however, it is best practice to complete the setup as below as if the source and target were separate systems.

Follow the steps below to ensure Testimony is correctly installed on the source system.

#	Activity	Details
1	Install Testimony into Source System	Install the transports specified for the source system provided by Basis Technologies into your source system, this is the system that you want to record **Note that the transports can cause short dumps for users if they are using the system at the time of the import. It is therefore important that the transports are imported when there is little or no activity taking place on the system.**
2	Regenerate delivered roles	Goto transaction PFCG, find the /BTI/* roles and ensure the profiles are generate. If they are not then generate them manually
3	Install Listener License Keys	Install the Testimony Listener Agent license keys provided by Basis Technologies into your source system. Separate keys for the Listener Agent will need to be installed into specific systems according to the instructions here.
4	Create Source RFC User	Create a **system user** with the role /BTI/AUT_SOURCE_RFC (ensure profile is generated). This user is for the RFC destination defined in the central system. **Checking the RFC setup with the user at this point is best practice.**
5	Enhancement Activation Program	After transports are deployed to the system the program /BTI/AUT_ENH_MANAGEMENT must be run before enhancements can be activated for recording or playback. The program should be run as per the standard selection screen with test mode not selected. Note this is a one off activity after the first installation.

The following parameters should have been completed in the prerequisites, however, these should be double checked to ensure installation is correct.

> ✳ The profile parameter auth/rfc_authority_check is automatically turned off by Testimony while the enhancements for recording inbound RFCs are active, the Testimony wrappers then conduct the auth check. This does not require a manual change of the system but Basis Administrators should be aware this happens.

#	Profile Parameter	Details
1	rsdb/esm/buffersize_kb	This value should be at least '250000' (250Mb) (the parameter is in kb).
2	rsdb/esm/large_object_size	This value should be at least '1000000' bytes (1Mb).
3	rsdb/esm/max_objects	This value should be at least 100000

✳ Note these parameters must be changed on each application server and will be reviewed for your system settings

6.3. Target System

A target system is a system that you want to playback the recording on. In the early stages of the installation on sandbox or development systems you might be operating with the source and target as the same system, however, it is best practice to complete the setup as below as if the source and target were separate systems.

> ✳ Note when running a playback with Testimony for a regression test the target system must be dedicated to Testimony no other operations cannot be run on the system while Testimony is operating else this will lead to unexpected failures that are not related to your regression test.

Follow the steps below to ensure Testimony is correctly installed on the target system.

#	Activity	Details
1	Install Testimony into Target System	Install the transports specified for the target system provided by Basis Technologies into your target system, this is the system that you want to playback into **Note that the transports can cause short dumps for users if they are using the system at the time of the import. It is therefore important that the transports are imported when there is little or no activity taking place on the system.**
2	Regenerate delivered roles	Goto transaction PFCG, find the /BTI/* roles and ensure the profiles are generated. If they are not then generate them manually
3	Create Target RFC User	Create a **system user** with the role /BTI/AUT_TARGET_RFC (ensure role profile is generated) This user is for the RFC destination defined in the central system. While setting up bots for the first time you should also use the role /BTI/ AUT_BOT_SIMULATION This is an optional Role that is only required for the BOT Simulation Program. This role provides authorisations for creating Users, assigning Roles to Users and Deleting Users, which is required during the Bot Simulation and can be removed after the simulation is complete. **Checking the RFC setup with the user at this point is best practice.**
4	Meta Data RFC User	Create a **system user** with the role /BTI/AUT_NCO_METADATA_ACCESS (ensure role profile is generated). This user is for playing back RFCs and collecting the meta data to ensure that they operate correctly. The suggested user name is /BTI/AUT_RFM although this can be changed in the General Parameters.
5	Batch Job User	Create a user with the role /BTI/AUT_BATCH_ADMIN (ensure role profile is generated). Before starting the playback, Testimony will verify the validity and existence of users that are present as creators of batch jobs in the recording data. If one of these users fails this check (i.e. because the user doesn't exist or is not valid), Testimony will use the default batch job user to execute the batch job. We would suggest configuring the default batch

		user in the General Parameters. The suggested user name is /BTI/AUT_BTC although this can be changed in the General Parameters.
6	Enhancement Activation Program	After transports are deployed to the system the program /BTI/ AUT_ENH_MANAGEMENT must be run before enhancements can be activated for recording or playback. The program should be run as per the standard selection screen with test mode not selected. Note this is a one off activity after the first installation

The following parameters should have been completed in the prerequisites, however, these should be double checked to ensure installation is correct.

#	Profile Parameter	System	Details
1	sapgui/user_scripting	Target	This value needs to be TRUE which allows the bots to perform the playback properly. Only in playback system.
2	sapgui/ user_scripting_per_user	Target	This value needs to be FALSE which allows the bots to perform the playback properly. Only in playback system.
3	sapgui/ user_scripting_set_readonly	Target	This value needs to be FALSE which allows the bots to perform the playback properly. Only in playback system.
4	login/ disable_password_logon	Target	This value needs to be 0 which allows the bots to login to the playback system. Only in playback system.
5	login/ disable_multi_gui_login	Target	This value needs to be 0 this allows multiple logons. Only in playback system.
6	rdisp/tm_max_no	Target	As Testimony will be logging on with the user load from the source (which could be production) this should be the source setting +50% Only in playback system.
7	rdisp/gui_auto_logout	Target	This value needs to be 0. This ensures that the bots and their logged on users cannot be automatically logged off by the user due to time-limits (for example, if the playback is paused or other issues arise)
8	rdisp/max_wprun_time	Target	Ensure this value is at least the value set in the production system
9	abap/buffersize	Target	Ensure this value is at least the value set in the production system
10	ztta/parameter_area	Target	This value needs to be at least 64000. The value checked can be adjusted by changing PLAYBACK_PARAM_AREA in the General Parameters. Only in playback system.
11	snc/enable	Target	This value needs to be 0 this is required where TimeShiftX is being operated. Only in playback system.

Note that if you have questions on the user scripting actions then the SAP documentation for this is here.

System Copies

While for the first few playbacks there won't be any need to copy the source system to the target system, when progressing to copying the source system to the target then you should adjust your current system copy process considering the steps documented here.

6.3.1. System Refresh Steps

Below are the steps that should be completed when refreshing the target system from the source system to prepare it for playback. Care should be taken to review these steps against the steps already documented for refreshing systems in the current landscape. Each organisation should create its own list of refresh steps considering the recommended steps for Testimony as below.

Note that some steps are only required if changing the time of the system which is recommended with TimeShiftX.

> **!** If upgrading the target system it is important that the recording enhancements are deactivated on the target using program /BTI/AUT_DEACT_ENH via SE38 on the copied system

> **!** If the target system is a brand new SAP system ensure that you request the license key from SAP for the period you recorded, otherwise time travelling may not be possible.

> **!** Retain the same Client Number (MANDT) between Source and Target

> ***** Note that parameters should be changed on each app server

#	Description	Required	Notes
1	Activate recording on the source system	Yes	
2	Put the source database into online backup mode	Yes	For details of how to coordinate the backup with the start of the recording, see the documentation [here]().
3	Perform a full database copy of the source database	Yes	
4	Once source database copy is complete, deactivate online backup mode	Yes	
5	Note the exact timing of the copy so that the transfer to repository step can use this date and time	Yes	
6	Setup SAP target system (system profiles etc)	Yes	

7	Optionally setup the target system in a "ring-fenced" network	Optional	
8	Install TimeShiftX onto application and database server(s) on the target system	TimeShiftX Only	
9	Ensure batch jobs are deactivated when target SAP system is started (profile setting)	Yes	The recommended option is to run btctrns1 (in SE38) to set all batch jobs to Released/Suspended mode, and then go and delete them all from SM37. Only exception should be the event-dependent RDD* jobs, as without these the transports for the release (line 24) won't work.
10	Start-up SAP target database and app server(s)	Yes	
11	Disable/deactivate recording enhancements on the target using program /BTI/AUT_DEACT_ENH via SE38 on the copied system	Yes	**If you are upgrading your system ensure you run this program before starting the upgrade process**
12	Check parameter sapgui/ user_scripting	Yes	This value needs to be TRUE which allows the bots to perform the playback properly. Only in playback system.
13	Check parameter sapgui/ user_scripting_per_user	Yes	This value needs to be FALSE which allows the bots to perform the playback properly. Only in playback system.
14	Check parameter sapgui/ user_scripting_set_readonly	Yes	This value needs to be FALSE which allows the bots to perform the playback properly. Only in playback system.
15	Check parameter login/ disable_password_logon	Yes	This value needs to be 0 which allows the bots to login to the playback system. Only in playback system.
16	Check parameter login/ disable_multi_gui_login	Yes	This value needs to be 0 this allows multiple logons. Only in playback system.
17	Check parameter rdisp/ tm_max_no	Yes	As Testimony will be logging on with the user load from the source (which could be production) this should be the source setting +50% Only in playback system.
18	Check parameter rdisp/ gui_auto_logout	Yes	This value needs to be 0. This ensures that the bots and their logged on users cannot be automatically logged off by the user due to time-limits (for example, if the playback is paused or other issues arise)
19	Check parameter rdisp/ max_wprun_time	Yes	Ensure this value is at least the value set in the production system
20	Check parameter abap/ buffersize	Yes	Ensure this value is at least the value set in the production system

21	Check parameter ztta/ parameter_area	Yes	This value needs to be at least 64000. The value checked can be adjusted by changing PLAYBACK_PARAM_AREA in the General Parameters. Only in playback system.
22	Check parameter snc/ enable	TimeShiftX Only	This value needs to be 0 this is required where TimeShiftX is being operated. Only in playback system.
23	Run post-processing steps such as RFC destination re-pointing, file system re-pointing, printer re-pointing etc.	Yes	
24	Do not delete/remove source SAP users from the target system	Yes	Testimony requires the users from the source system to playback correctly
25	Optionally run BDLS if system ID is to be renamed (e.g. PRD to QA1)	Optional	
26	Optionally use Basis Technologies System Copy GT if BDLS takes quite a long time	Optional	
27	Deploy changes that form the release being tested (e.g., transport requests or perform upgrade) to target system	Yes	
28	Deploy Testimony playback enhancement transport to target system	Optional	If the Testimony playback enhancements transport was not applied to the source system you will need to apply that transport here
29	Ensure Target RFC User exists	Yes	Ensure a **system user** with the role /BTI/ AUT_TARGET_RFC (ensure profile role is generated) This user is for the RFC destination defined in the central system. While setting up bots for the first time you should also use the role /BTI/AUT_BOT_SIMULATION This is an optional Role that is only required for the BOT Simulation Program. This role provides auths for creating Users, assigning Roles to Users and Deleting Users, which is required during the Bot Simulation and can be removed after the simulation is complete. **Checking the RFC setup with the user at this point is best practice.**

30	Ensure Meta Data RFC User exists	Yes	Ensure a **system user** with the role /BTI/ AUT_NCO_METADATA_ACCESS (ensure profile role is generated) This user is for playing back RFCs and collecting the meta data to ensure that they operate correctly the suggested user name is /BTI/AUT_RFM although this can be changed in the General Parameters.
31	Ensure Batch Job User is correct	Yes	Before starting the playback, Testimony will verify the validity and existence of users that are present as creators of batch jobs in the recording data. If one of these users fails this check (i.e. because the user doesn't exist or is not valid), Testimony will use this user to execute the batch job, we would suggest configuring the default batch user in the General Parameters. The user name defaulted into the general parameters is /BTI/AUT_BTC
32	Set the workflow batch user's password	Yes	Use the transaction SWU3 to set the RFC workflow user (WF-BATCH) to the Testimony password as set in the general parameters under the CHECK_DEFAULT_PWD parameter.
33	Disable Personas	Optional	At present, the use of Personas is not supported by Testimony. The main reason for this is that with Personas, a lot of processing happens on the front end, and Testimony, as a tool which records at the back end, cannot capture this information. In order to disable Personas for the playback, in the target system go to transaction /n/personas/settings and add the following entry: DISABLE_WEBGUI = X.
34	Take a backup of the target system	Yes	It is recommended to take a backup as this means the target system can be easily restored back to this state for a second run which means if anything goes wrong the system can be quickly restored and a second playback run, without having to repeat all of the above steps again.
35	Check the SAP system for time inconsistencies	TimeShiftX Only	Use the program RSDBTIME via transaction SE38 to check time inconsistencies between the SAP servers
36	Check current time travel status	TimeShiftX Only	Use the TimeShiftX command "tsx list" to check the current time travel status of your system this will avoid running multiple TimeShiftX commands which might lead to unexpected times on systems and might cause systems to shutdown.
37	Required if the SAP HANA version is HANA 2.0 SP04 or lower and Multi Tenant database is used. Run the SQL commands	TimeShiftX Only	Run the following SQL commands in HANA Studio on the System database (Multi Tenant database) ALTER SYSTEM ALTER CONFIGURATION ('nameserver.ini', 'SYSTEM') SET ('delta', 'preallocated_nodebuffers') = '1' WITH RECONFIGURE

			ALTER SYSTEM ALTER CONFIGURATION ('indexserver.ini', 'SYSTEM') SET ('delta', 'preallocated_nodebuffers') = '1' WITH RECONFIGURE
38	If running HANA 2.0 SP4 or lower only. Run the SQL commands	TimeShiftX Only	Run the following SQL commands in HANA Studio on the Tenant database ALTER SYSTEM ALTER CONFIGURATION ('indexserver.ini', 'SYSTEM') SET ('delta', 'preallocated_nodebuffers') = '1' WITH RECONFIGURE
39	If running a SAP HANA database server set the environment variable HDB_TIMER=system	TimeShiftX Only	
40	Shut-down SAP target system Application Servers	TimeShiftX Only	
41	Shut-down SAP target system Database Servers	TimeShiftX Only	
42	Setup virtual clock for the ADM users in TimeShiftX on both the target database and app servers	TimeShiftX Only	It is recommended to use the offset option rather than set a specific time to make life easier for multiple app servers.
43	Ensure TimeShiftX virtual clock is set close to start of recording time just before playback commences	TimeShiftX Only	It is recommended to slow time down to ensure that there is time in case there is a delay starting playback or playback is slower than expected, time can be sped up if the midnight boundary is imminent or Testimony will pause and wait.
44	Start SAP target system Database Servers	TimeShiftX Only	
45	Start SAP target system Application Servers	TimeShiftX Only	
46	Check the SAP system time	TimeShiftX Only	Use the program RSDBTIME via transaction SE38 to check the time and check for any inconsistencies between the SAP servers

6.4. Bot Setup

After completing the preparation and installation activities on the Central system, the bots can now be configured.

The following sections will take you through the bot setup

- Installing the Bot
- Config File Maintenance
- SAP GUI Configuration
- Bot Testimony Setup

There is also a section for trouble shooting should you still have issues.

Note the Bot machine requirements and architecture below.

Remote Desktop/Virtual Machine Requirements for the Bot

Operating system	64-bit Windows System (Windows 10, Server 2016, Server 2019)
Authorizations	Windows administrative access for setup
Network access	Access to the Central and Target systems (Latency should be less than 8ms)
SAP Software	SAP GUI 7.60 patch 4 required **(lower levels have memory leaks that will impact performance)**
BOT software	As supplied by BTI, Save the executable in a directory on a local drive. (e.g. C:\BTI_BOT\)
Other Software	Windows .Net (usually installed with Windows 10, Server 2016/19), MS Office, Web Browser, PDF Viewer
RAM	4+ GB
CPU	2+ GHz dual core
Disk	50 GB free space
User sessions	Expected around 50 to 100 active user sessions
Windows Updates	Automatic windows updates should be disabled on bot machines as this can result in the machines being updated while bots are running which will cause significant issues for a playback.
Notes	Must have network connectivity to Central and Target systems

The Testimony bot architecture is shown in the diagram below. You can have many physical or virtual desktop machines each running one bot, with each bot launching multiple SAP user sessions. Each bot can handle around 90 concurrent SAP user sessions. Note you will also require one worker (background) job to run each bot.

Testimony Bot Architecture
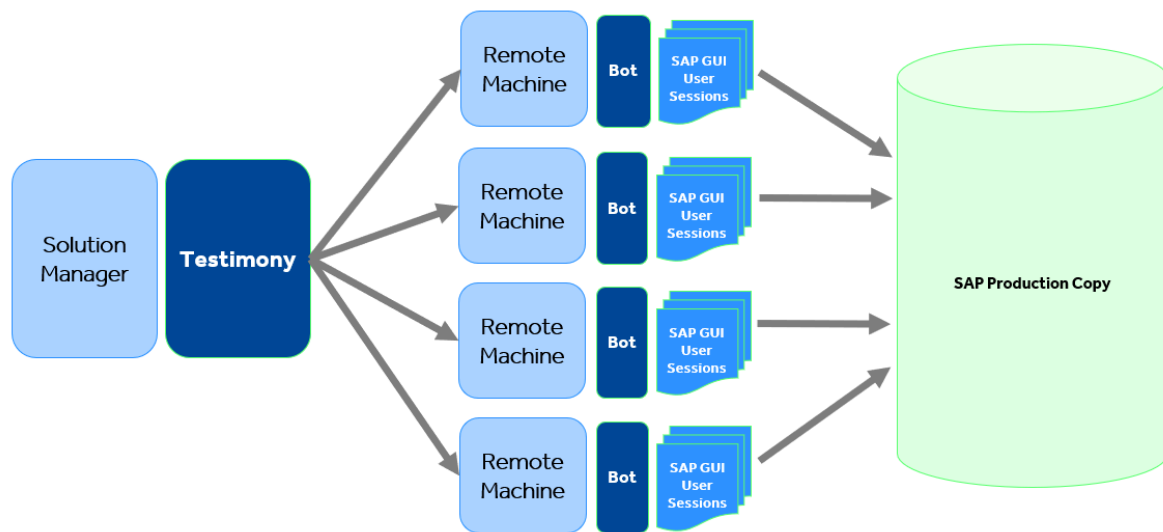
6.4.1. Installing the Bot

Installing the Bot

A link to the bot software should have already been supplied so you can simply download the folder on to the machine where you want to install the bot. The contents should be as per the example below:

The config file can now be maintained as per the Config File Maintenance section.

Example Screen-shot
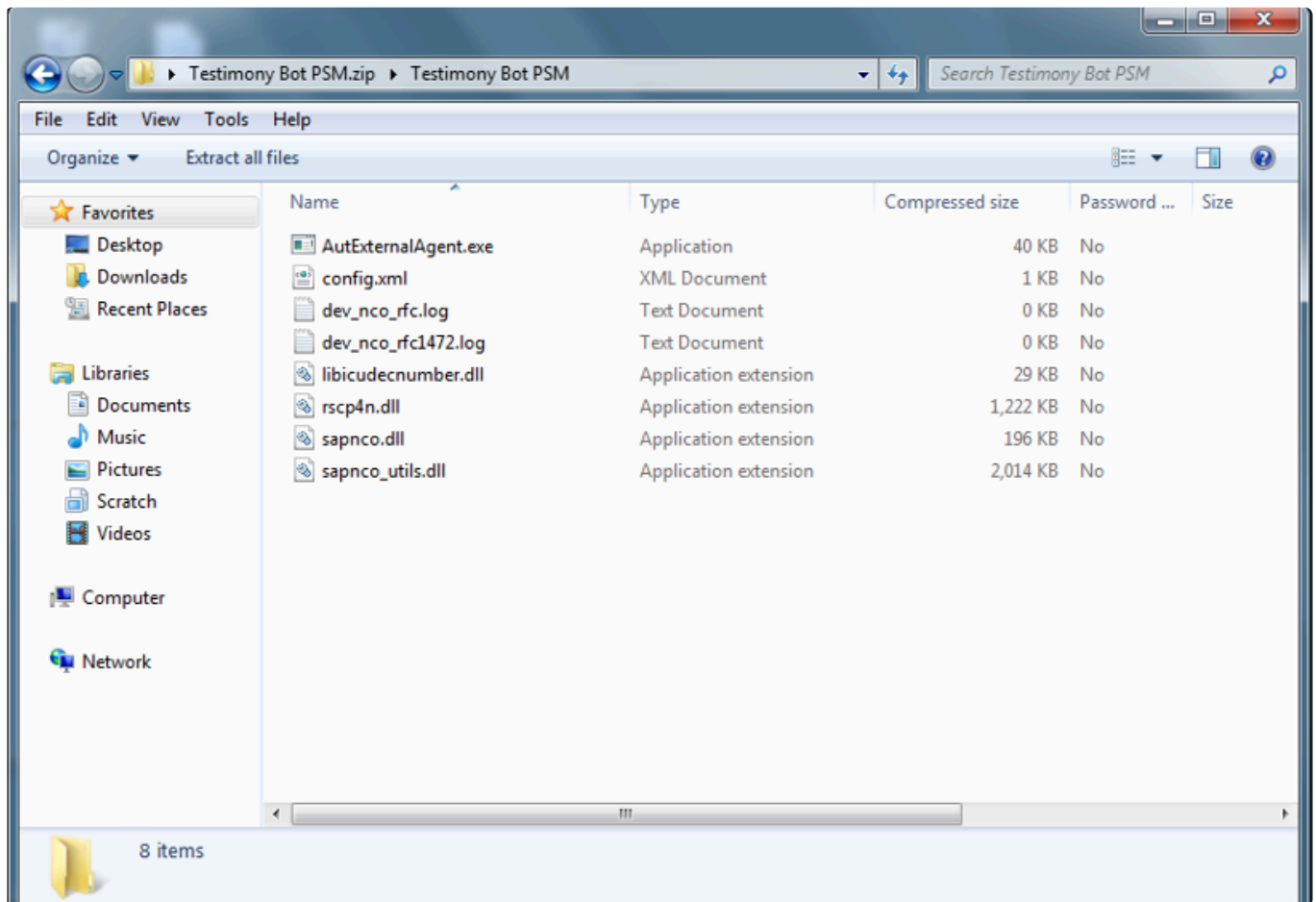
> ✳ Because SAPGUI needs to know the location of the bot executable (see here) it is important that you don't create "version-specific" folders for the bot software. Instead, create a central folder on each local machine for the bot software. When upgrading the bot software, if you want to keep the old version then you can copy it to another folder before upgrading the files in the central folder.

Setup for Internet Explorer

The following setup is required to ensure that the bot is trusted in Internet Explorer with the settings required as below:

1. Go into IE, go to Settings -> Internet options
2. Go to Security tab

3. Trusted Sites
4. Click on Sites
5. Untick checkbox "Require https for this zone"
6. Add new entry "about:security_saplogon.exe"
7. Add new entry "about:security_AutExternalAgent.exe"

6.4.2. Config File Maintenance

When installing for the first time or changing the Central system where Testimony is operating, each bot's main config file will need to be updated.

To build the config file that allows the Bot to connect to the SAP central system where Testimony is deployed, most of the information will be on the sap logon pad but you will also require the bot user's logon and password and the client where Testimony is being operated from. Please note there is a separate section here for Config file specialisations for example for Central systems with multiple app servers.

The regular elements for the bot is as below:

Tag	Element
ID	The system ID of the central system
Instance Number	The instance number of the central system
Application Server	The app server for the central system
SAProuter String	If one exists for the central system
User	The sap user name of the bot user setup on the central system
Password	The password for the bot user
Client	The client of the central system where Testimony is deployed
Gateway Host	The same as the application sever above
Gateway Service	sapgw + the the instance number (example sapgw00)

To access the config file go to the bot folder as below and right click on the config file selecting the option to edit.
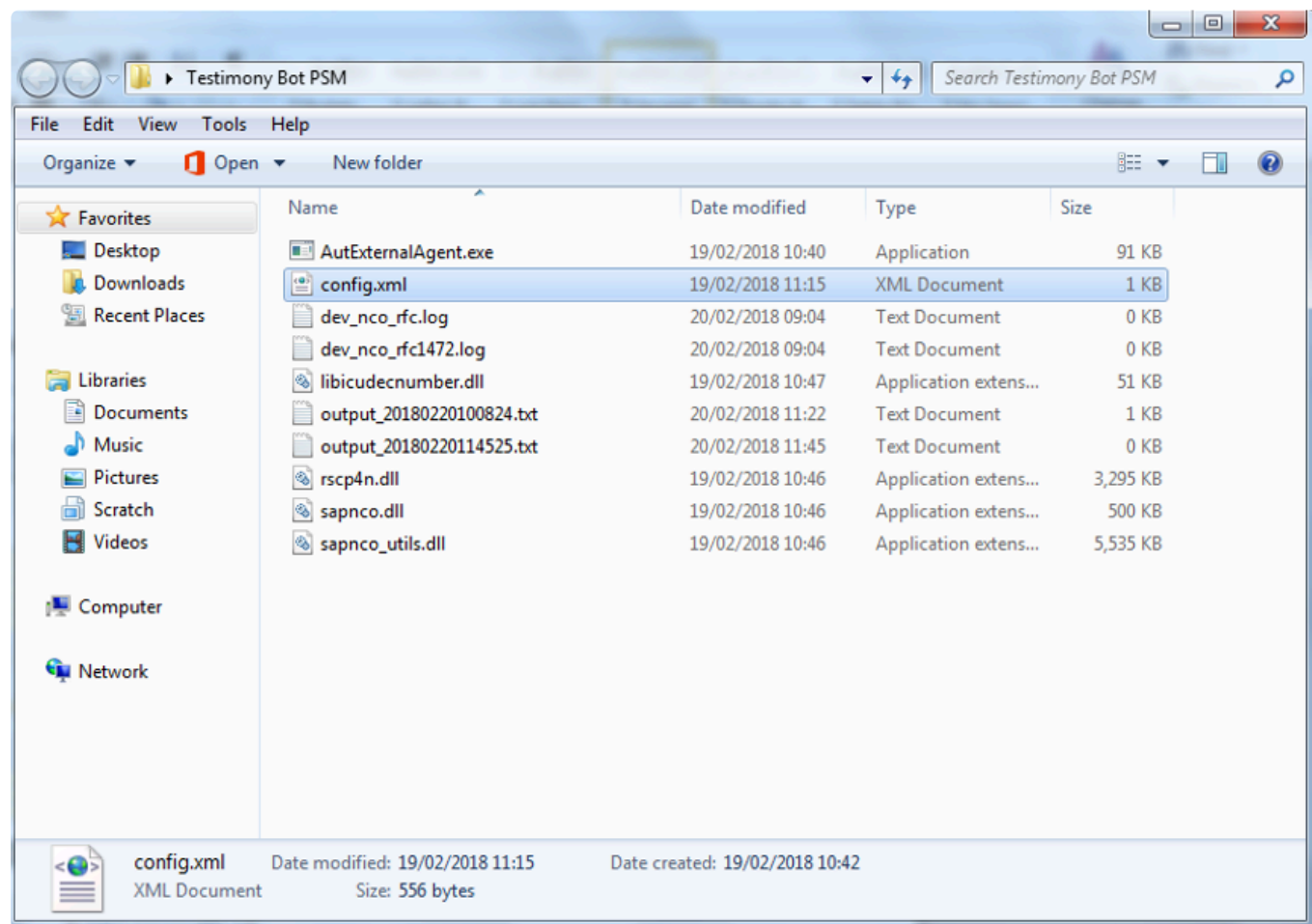
The config file should appear as below:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <ExternalAgentConfiguration xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <ID>DS0</ID>
    <InstanceNumber>00</InstanceNumber>
    <ApplicationServer/>
    <SAPRouterString/>
    <Language>EN</Language>
    <User>BOT_USER</User>
    <Password>password</Password>
    <Client>100</Client>
    <GatewayHost/>
    <GatewayService>sapgw00</GatewayService>
</ExternalAgentConfiguration>
```

6.4.2.1. Config File Specialisations

Config File – Specialisations

SAP GUI Location

The bot may be running in an environment where SAP's SAPGui.exe files are not in the standard location. The logfile on startup will report it as:

```
[15:18:55.8677] [success] Configuration file read: config.xml
[15:18:55.8677] [error] Failed to setup environment variables: SAP GUI directory not found ("%ProgramFiles(x86)%
\SAP\FrontEnd\SAPGui")
```

A new entry in the config.xml will allow an alternative path to be specified.

`<SAPGuiPath>C:\Programme\SAP\FrontEnd\SapGui</SAPGuiPath>`

Passwords

If your organisation's internal policy will not allow the password to be saved into the config file then you can remove the line below in the config file and this will prompt the password to be entered each time the Bot is started.

`<Password>password</Password>`

Message Server and logon Groups

If the central system uses a message server and logon group then the config file can be updated with these three elements below:

`<MessageServerService>MessageServer</MessageServerService>`

`<MessageServerHost>MessageServerHost</MessageServerHost>`

`<LogonGroup>LogonGroup</LogonGroup>`

`sapmsS6A   3656/tcp`

`...emptyline...`

NOTE: Make sure there is a proper 'empty line' at the end of the services file. A Carriage Return will create it.

> ✳ Note if you use the Message Server and logon group the Gateway Host and Service below must be removed

`<GatewayHost>GatewayHost</GatewayHost>`

`<GatewayService>sapgwxx</GatewayService>`

6.4.3. SAP GUI Configuration

On each remote machine where the bot is installed the SAP GUI needs to be configured.

> ❗ Please note that SAP GUI configuration is **user-specific** and so each Testimony administrator who will be starting the bots for playbacks will need to perform these steps.

On the desktop/remote desktop launch the program SAP GUI Configuration. **Note that this is a separate program and is not run through the SAP logon pad.**

Some organisations have deleted the short cut to the program, so the application name is sapsettingshow and is usually under the file path \Program Files (x86)\SAP\FrontEnd\SAPgui

Five parts of the SAP GUI setup need to be changed.

1. Default Theme

Please ensure that the default theme is selected in the configuration as "Blue Crystal".
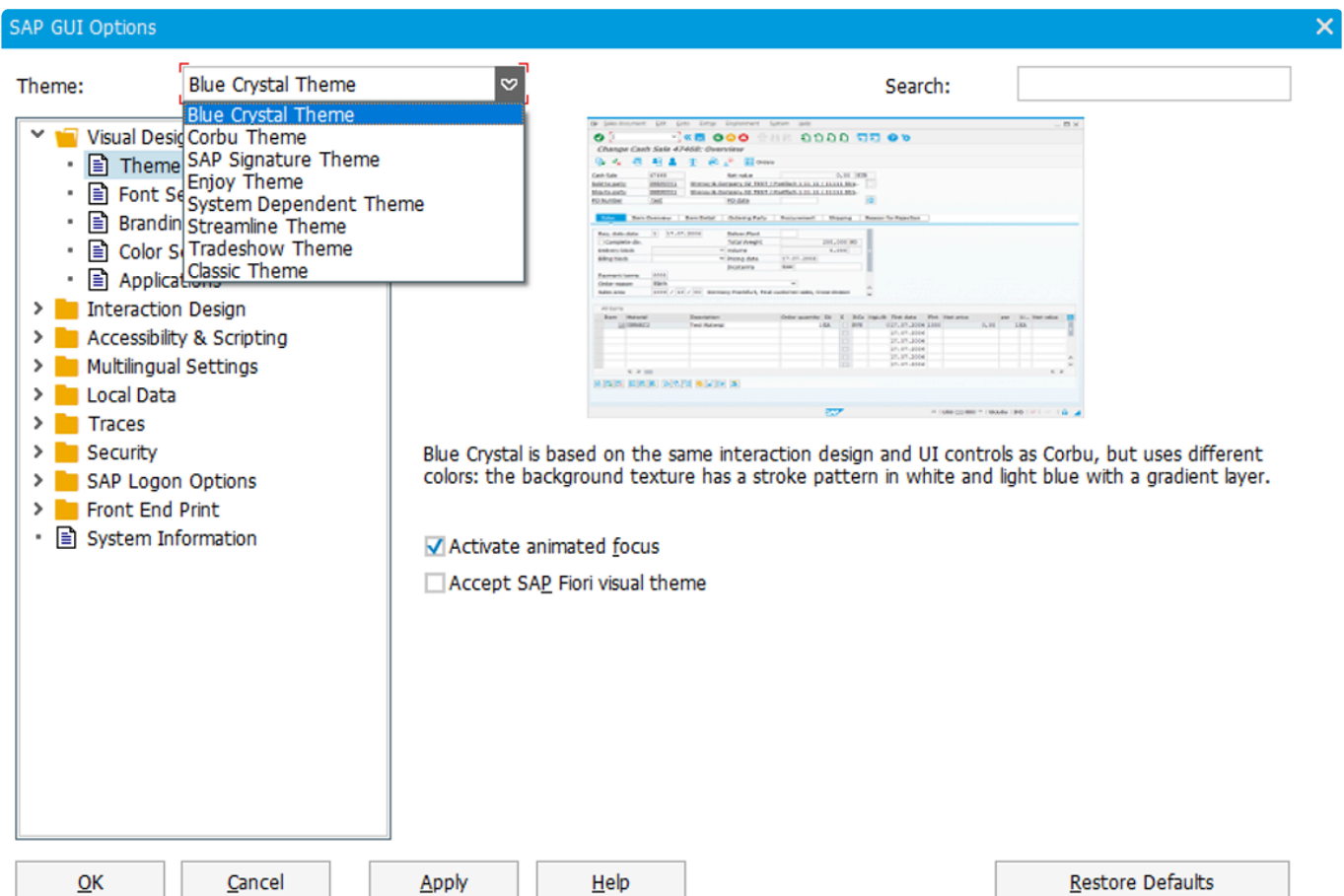
2. Visual Design

> **!** Please note if upgrading you must delete the old application and then recreate the new one.

To enable the bot to take screenshot correctly, open the 'Visual Design' folder and select 'Applications', then press the add button.
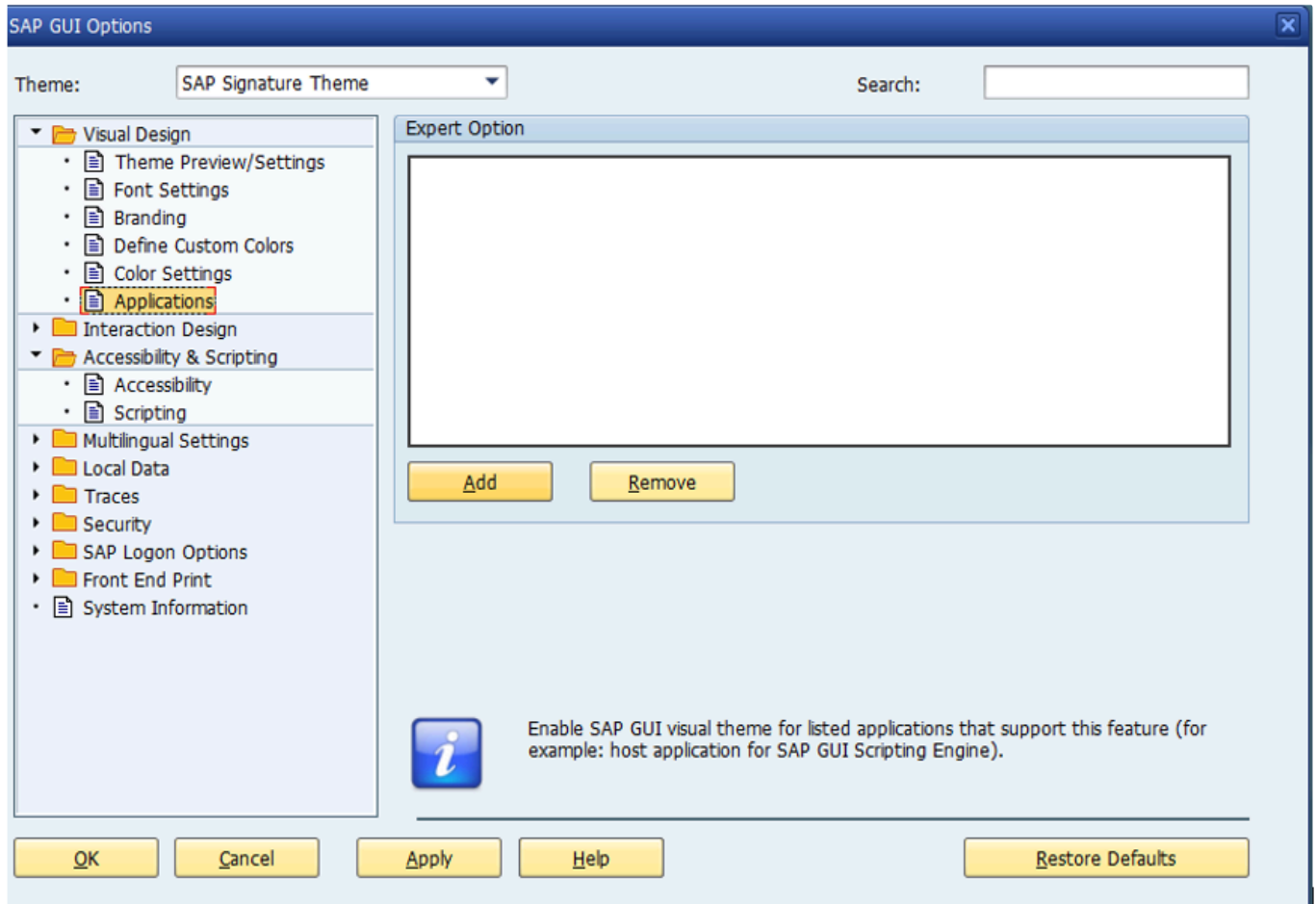
Navigate to the Bot folder and select the AutExternalAgent.exe application. The application will be added to the SAP GUI
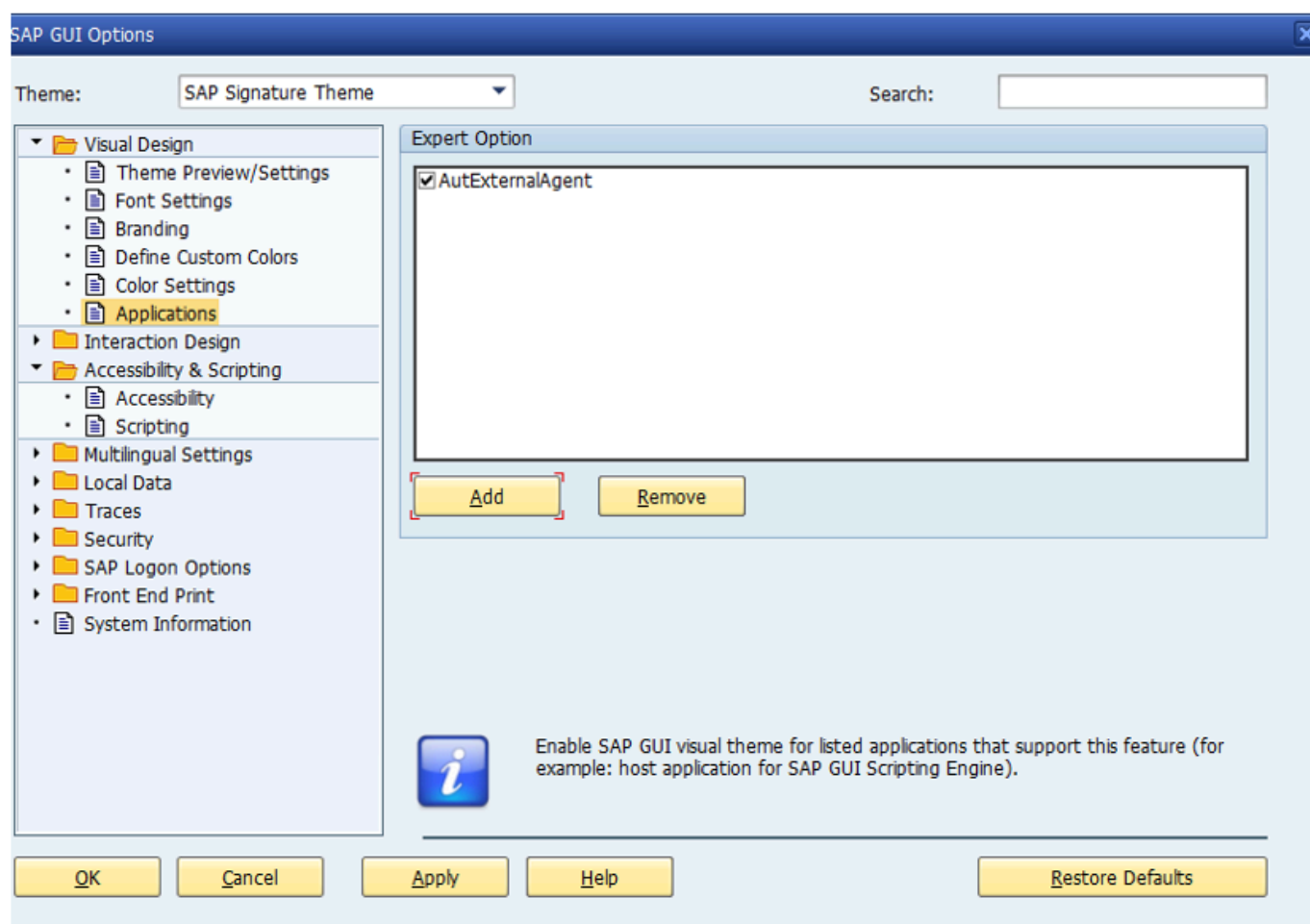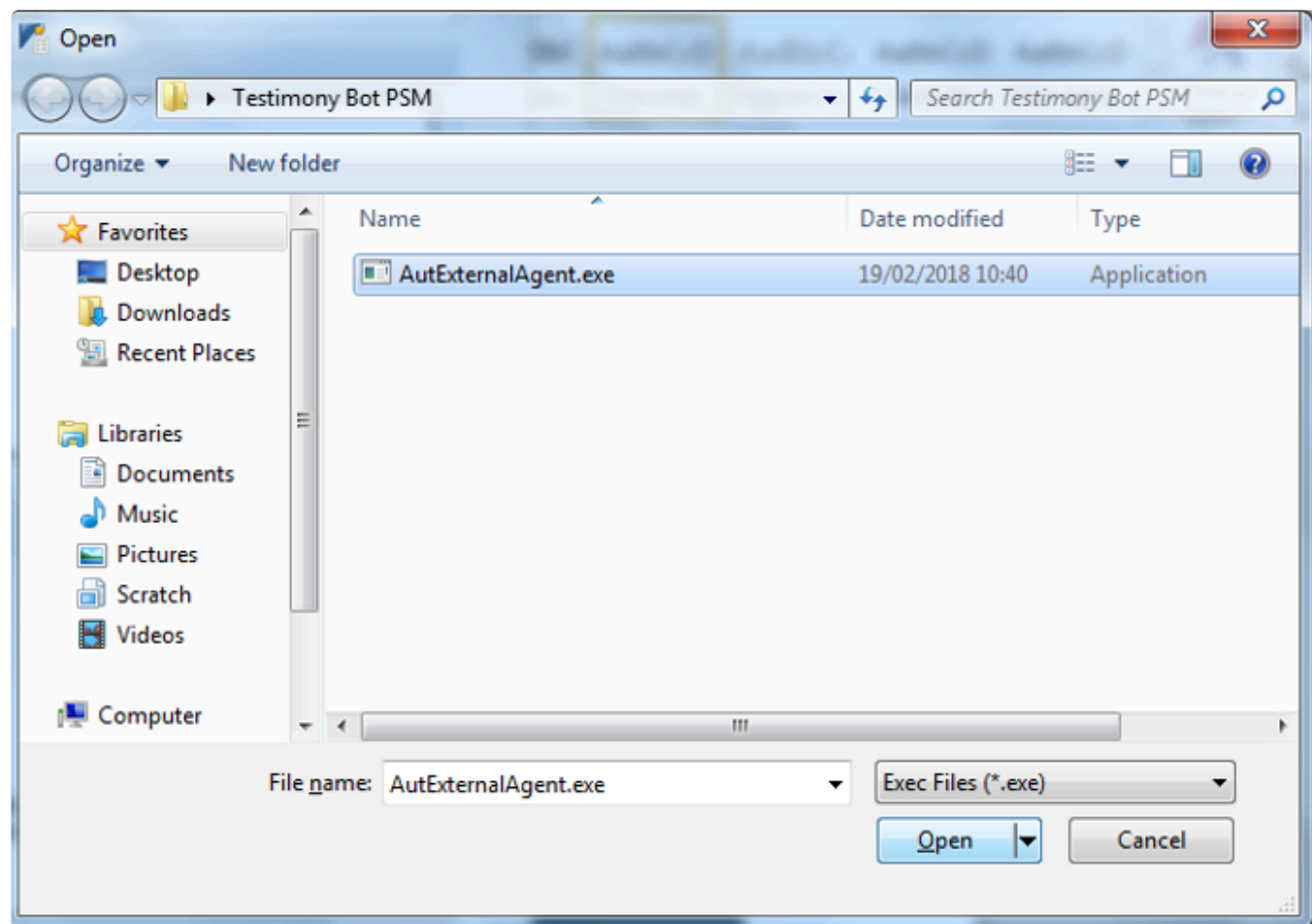
3. Scripting

To allow the bot to operate correctly scripting needs to be enabled open the 'Accessibility and Scripting' folder and select 'Scripting' as below, ensure scripting is enabled and the other checkboxes are unchecked.
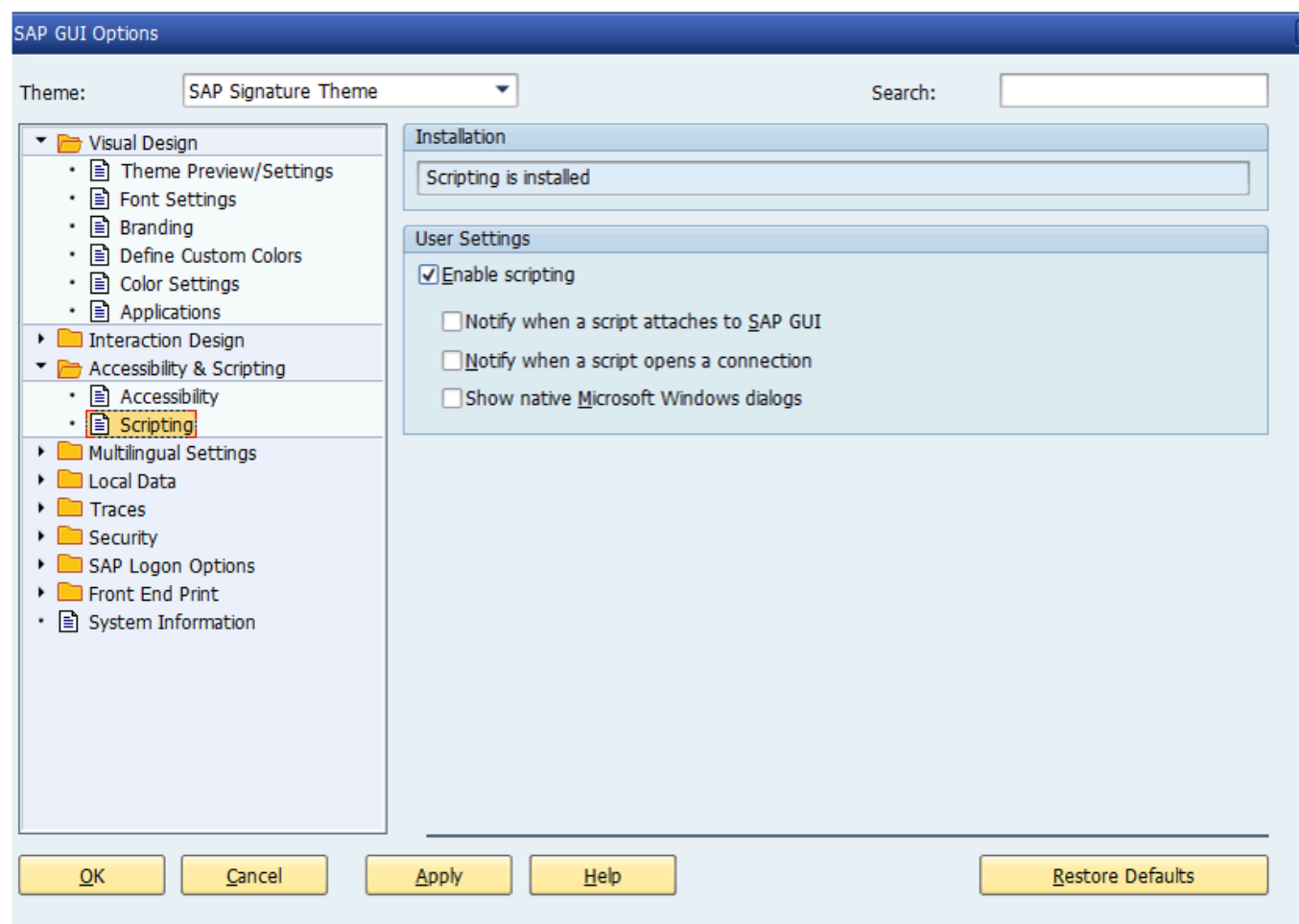
4. SAP History

Please ensure that the SAP GUI History setting (under Options -> Local Data -> History) is turned off. The playback does not require the bot to have a "history" to popup as it types.
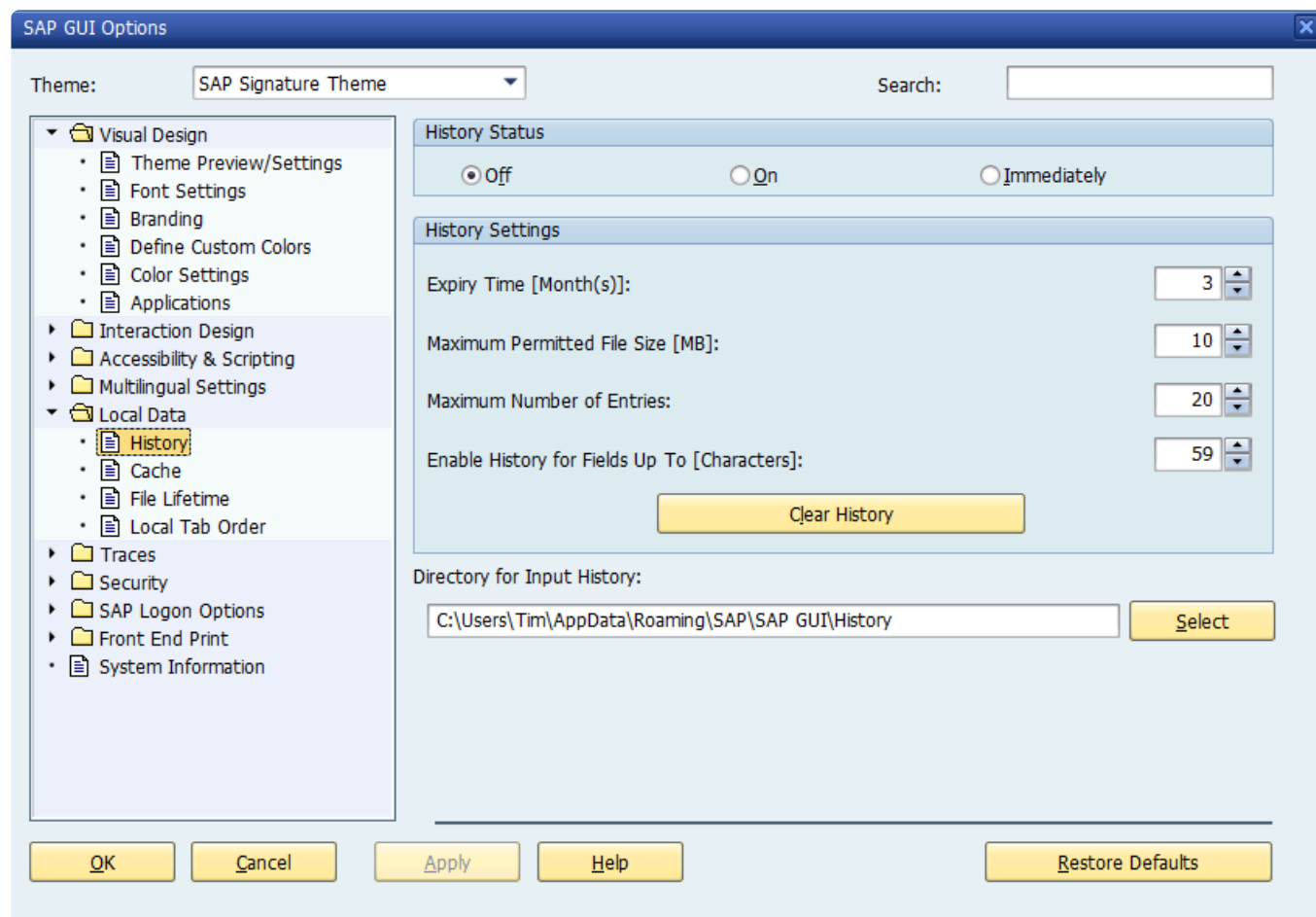
5. Security

To prevent unexpected popups open the 'Security' folder and select 'Security Settings' as below and press 'Open Security Configuration'.

Ensure the 'Default Action' is set to 'Allow' as below:

Security Configuration

Status: Customized

Default Action: Allow

Security Rules

[   ] Filter   [   ] Search

☑ Hide SAP Rules   ☑ Hide Administrator Rules

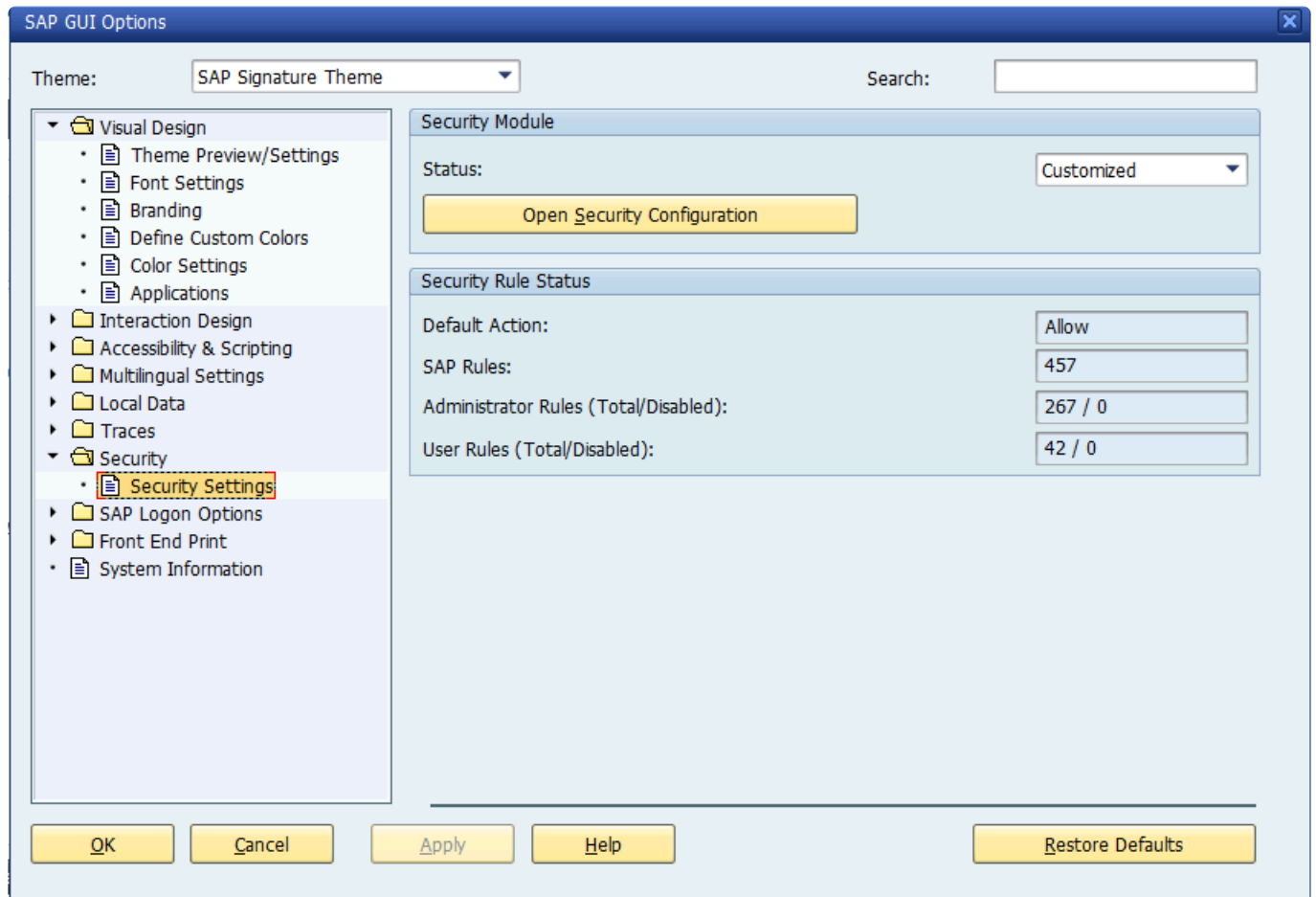| Prio... ≜	Object	Type	Access Types	Action	State	Ori
📁 724	C:/Users/Tim/Desktop/	Directory	Write	Cont...	Enabled	User
📁 725	C:/	Directory	Write	Cont...	Enabled	User
📁 726	C:/Users/Tim/Desktop/	Directory	Write	Cont...	Enabled	User
📄 727	C:/Users/Tim/Desktop/0020537154 MD2 Archive IDOC	File	Read	Cont...	Enabled	User
📁 728	C:/TRANS/	Directory	Write	Cont...	Enabled	User
📄 729	C:/TRANS/K900022.BTI	File	Read	Cont...	Enabled	User
📄 730	C:/TRANS/R900022.BTI	File	Read	Cont...	Enabled	User
📁 731	C:/Users/Tim/Desktop/	Directory	Write	Cont...	Enabled	User
📁 732	C:/TRANS/	Directory	Write	Cont...	Enabled	User
📄 733	C:/Users/Tim/Desktop/0020200159 SS0 Testimony	File	Read	Cont...	Enabled	User
📄 734	C:/Users/Tim/Desktop/0020187664 PSE Testimony	File	Read	Cont...	Enabled	User
📄 735	http://docs.basistechnologies.com/testimony-user-guide/...	File	Execute	Cont...	Enabled	User
📄 736	C:/Users/Tim/Desktop/0020187664 PRE Testimony	File	Read	Cont...	Enabled	User
📁 737	C:/Users/Tim/Desktop/New folder/	Directory	Write	Cont...	Enabled	User
📁 738	C:/TRANS/	Directory	Write	Cont...	Enabled	User
📄 739	C:/Users/Tim/Desktop/0020187664 PRE Testimony	File	Read	Cont...	Enabled	User
📁 740	C:/Users/Tim/Documents/SAP/SAP GUI/	Directory	Write	Cont...	Enabled	User
📄 741	C:/Users/Tim/Documents/SAP/SAP GUI/.06C371FA7E4F1...	File	Execute	Cont...	Enabled	User
📄 742	C:/Users/Tim/Documents/SAP/SAP GUI/.06C371FA7E4F1...	File	Execute	Cont...	Enabled	User

[Insert]   [View]   [Delete]   [Increase Priority]   [Decrease Priority]

[OK]   [Apply]   [Cancel]   [Help]

6.4.4. Bot Testimony Setup

Steps to setup the Bot in Testimony

1) In the central system, execute transaction /N/BTI/AUT, navigate to the 'Execution' tray and select 'Supporting Infrastructure'. Click the create button to add a new bot.
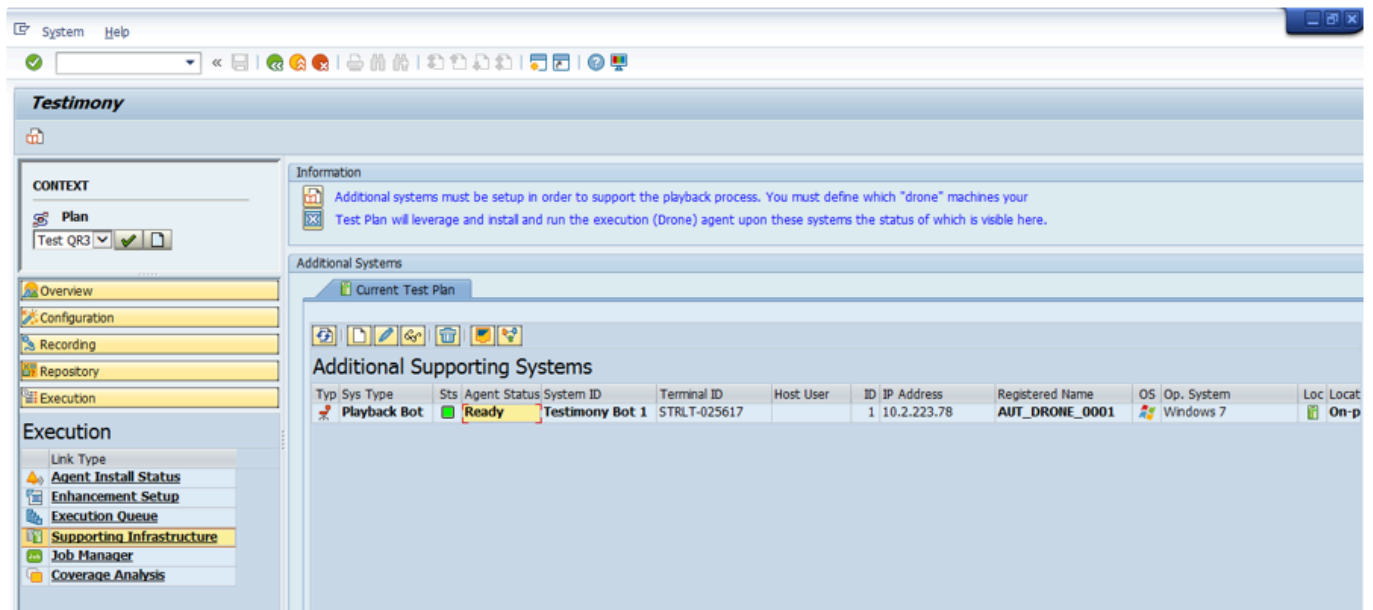
2) Fill in the details for the desktop/remote desktop. Give the Bot a unique ID and a correct description in the short text. The Hostname is the name of the desktop/remote desktop. *Case-sensitivity is important and must be maintained*. The IP address is the IP for the desktop/remote desktop.
The system type, operating system and machine location can also be added.

The Bot will appear in the 'Supporting Infrastructure' as below:

6.4.4.1. Checking Bot Setup

Steps to check the Correct Setup of the Bot in Testimony

1)To launch the bot simply go to the folder where the bot executable files are stored on the desktop/ remote desktop and double-click the AutExternalAgent.exe application. The bot should launch and provide the details as below:
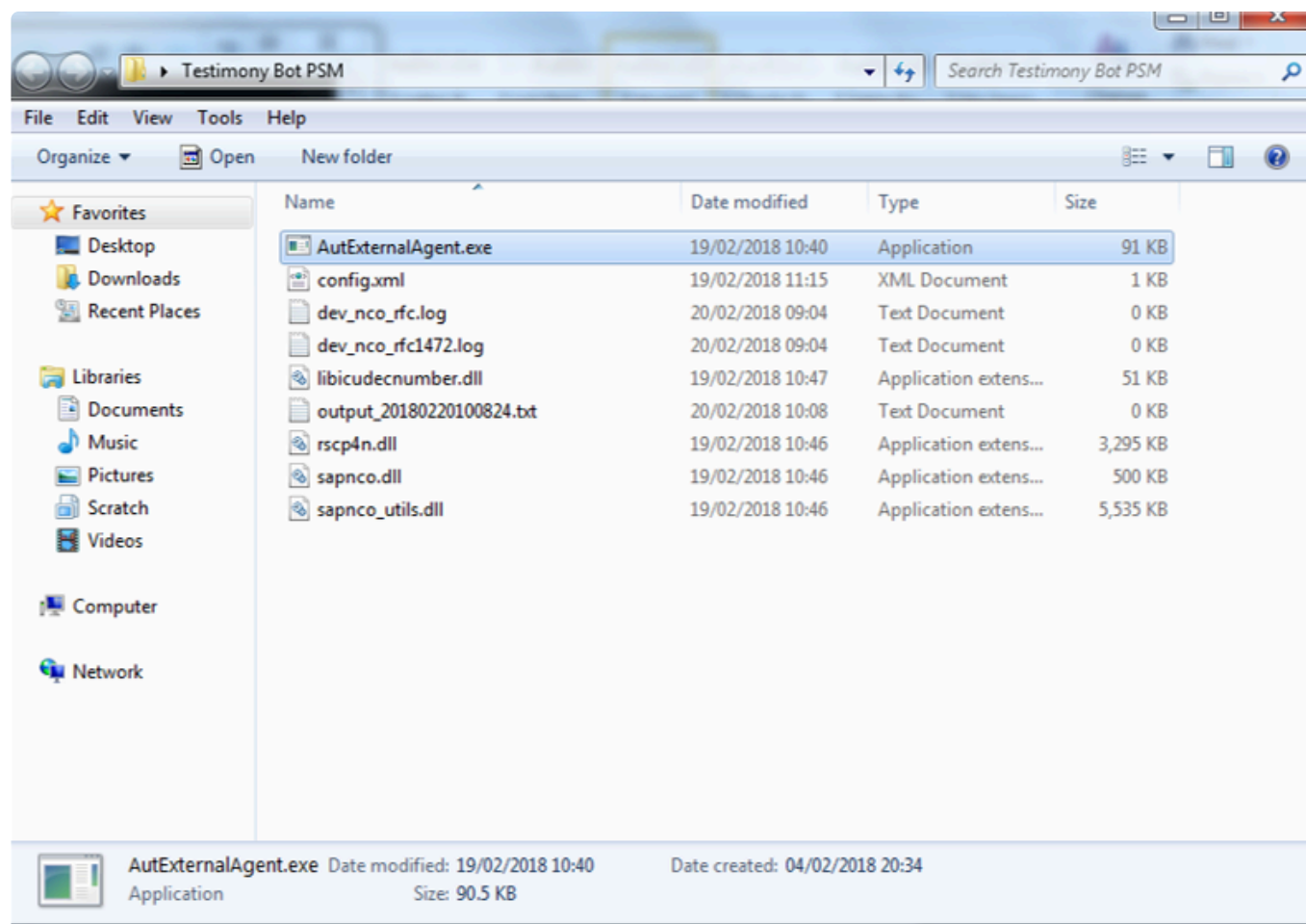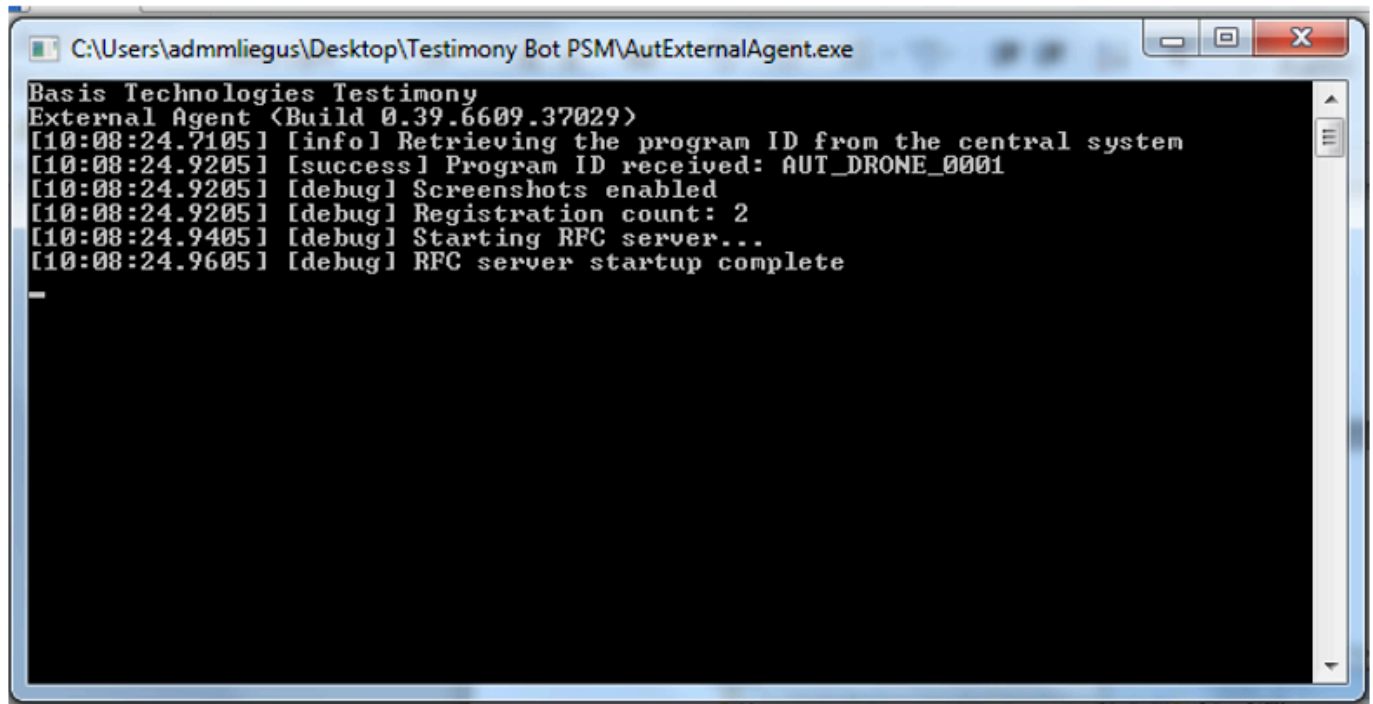
2)Execute Testimony transaction /N/BTI/AUT in SAP GUI. Navigate to the 'Execution' tray and select 'Supporting Infrastructure' and the Bot should have a status of 'Ready'
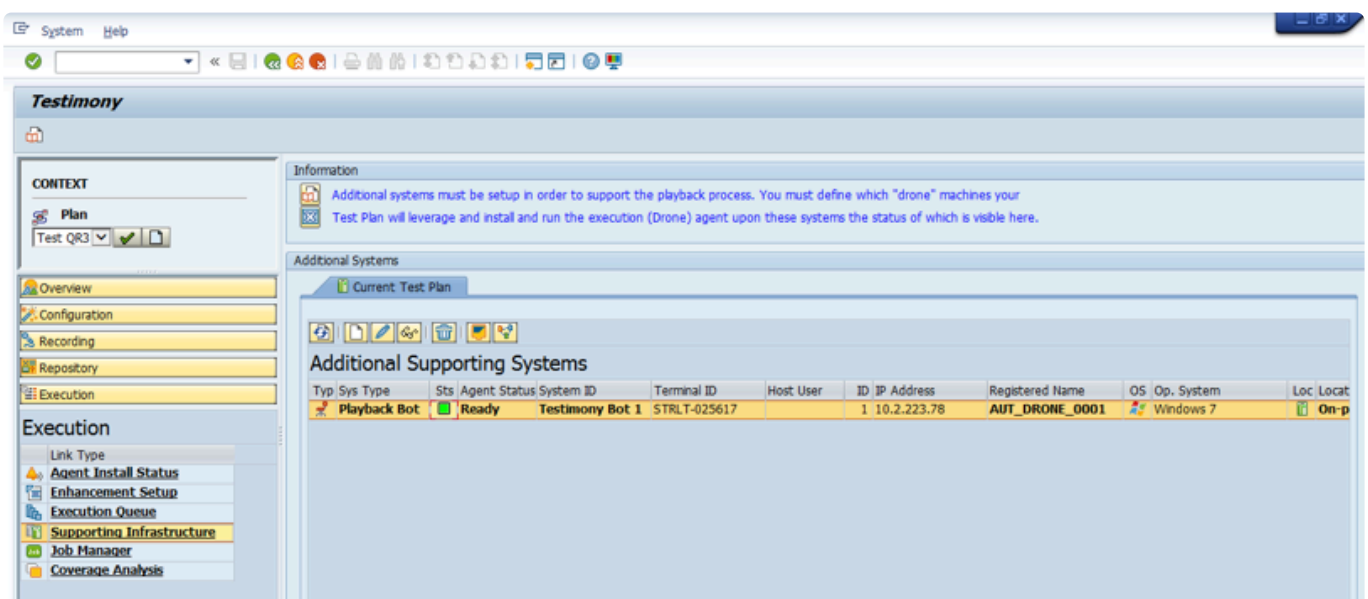
6.4.5. Trouble Shooting

When trouble shooting issues with the bots please consider the following, most important is to check the logs and see if you can solve the issue through the details provided there.

If you are considering raising a support ticket the process is here and please attach the bot log.

- Bot Logs
- SAP Gateway
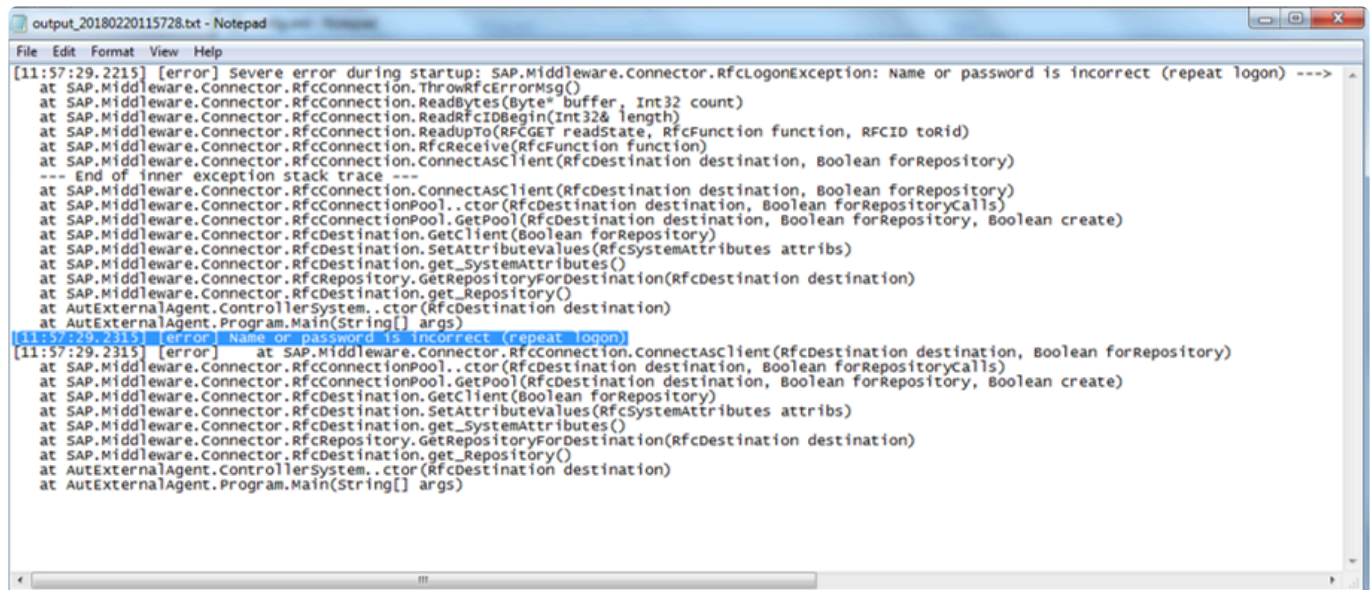
6.4.5.1. Bot Logs

If a bot is failing to connect or has an issue after being executed then make sure to check the logs. A log is stored for each run of the bot. Select the output file with the correct date and time for your error.
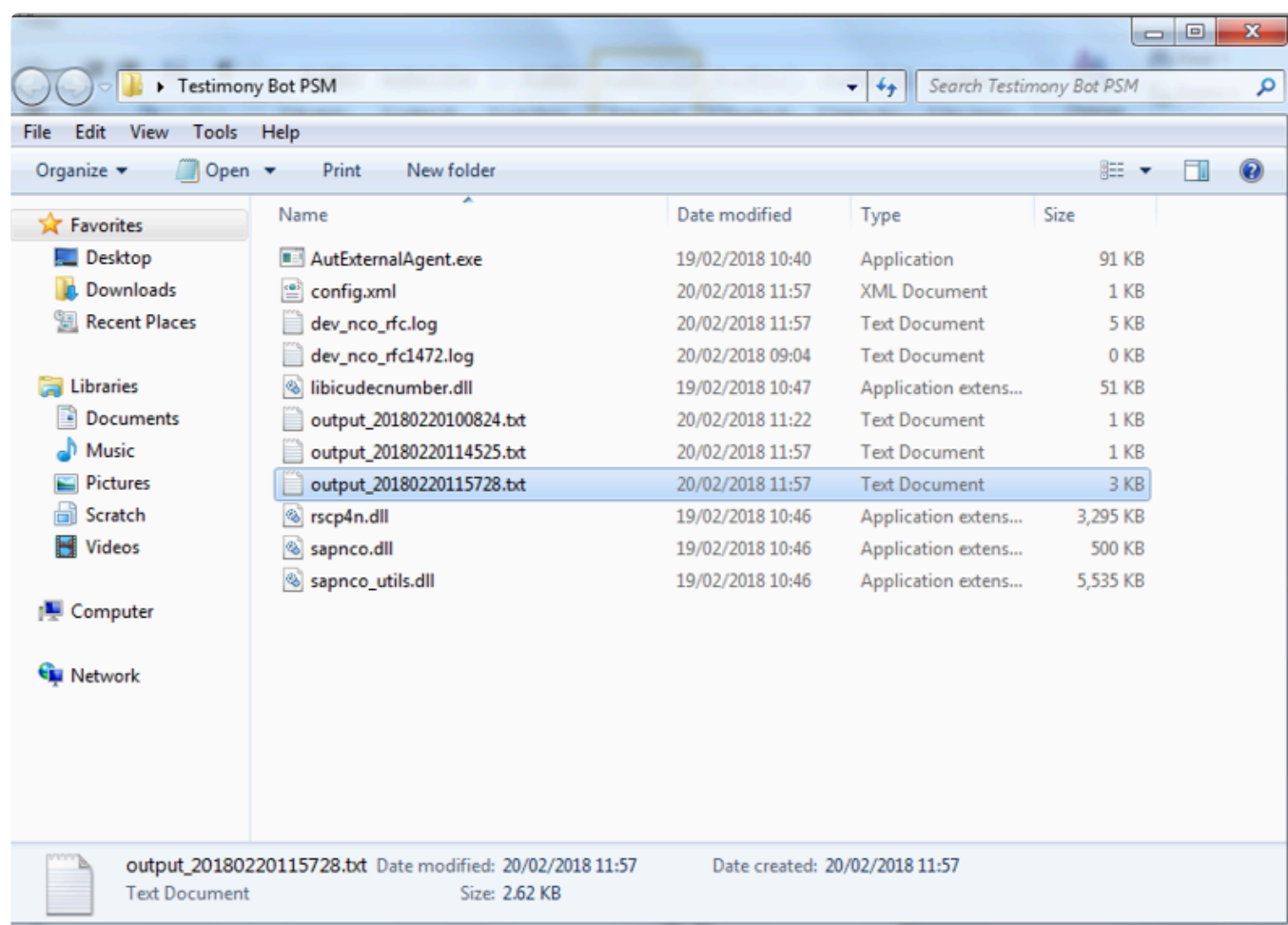
6.4.5.1.1. Name and Password

If the output log states that the name and password are incorrect please double check these details in the bot config file, see here for maintaining the bot confg file.

6.4.5.1.2. Bot Appears Inactive

If the bot is active on the bot machine and the output logs look correct, however, the bot does not appear active on the Central system check if the central system has multiple app servers as the config file will need to be updated for a system using a message server to load balance, see here for maintaining the bot confg file.

In this case the config file will need to be updated with these three elements below:

```
<MessageServerService>MessageServer</MessageServerService>
<MessageServerHost>MessageServerHost</MessageServerHost>
<LogonGroup>LogonGroup</LogonGroup>
```

> ✱ Note if you use the Message Server and logon group the Gateway Host and Service below must be removed

```
<GatewayHost>GatewayHost</GatewayHost>
<GatewayService>sapgwxx</GatewayService>
```

6.4.5.1.3. SAP GUI Directory Not Found

If the bot log shows the SAP GUI Directory Not Found error below the bot may be running in an environment where SAP's SAPGui.exe files are not in the standard location. The output file on startup will report it as below:

```
[15:18:55.8677] [success] Configuration file read: config.xml
[15:18:55.8677] [error] Failed to setup environment variables: SAP GUI directory not found ("%ProgramFiles(x86)%
\SAP\FrontEnd\SAPGui")
```

A new entry in the config.xml will allow an alternative path to be specified, see here for maintaining the bot confg file.

```
<SAPGuiPath>C:\Programme\SAP\FrontEnd\SapGui</SAPGuiPath>
```

6.4.5.1.4. Could Not Load file Or Assembly

If the bot log shows a Severe error during startup it could be because the SAP connectors for Microsoft are missing or not up to date.

The output file on startup will report it as below:

```
[20200512133826.9975287] [0MB] [0] [error] Severe error during startup: The type initializer for 'SAP.Middleware.Connector.RfcConfigParameters' threw an exception.
[20200512133826.9975287] [0MB] [0] [debug] System.TypeInitializationException: The type initializer for 'SAP.Middleware.Connector.RfcConfigParameters' threw an exception.
---> System.IO.FileNotFoundException: Could not load file or assembly 'sapnco_utils.dll' or one of its dependencies. The specified module could not be found.
```

The solution is to go to the SAP support page for Microsoft connectors via the link here.

Then download the 32 bit connector from there and run the installer to ensure that the right connectors are on the bot machine, there is a read me in the folder that you download that you should read an understand for the installation instructions. Note that the bot runs as 32 bit so it is the 32 bit connector that is required.
SAP Connector for Microsoft .NET 3.0.22.0 for Windows 32bit (x86),

If you still have issue then raise a support ticket as per the support section.

6.4.5.2. SAP Gateway

If you are having issues with the bot the SAP Gateway Monitor can also be checked. You can launch this from Testimony or use transaction SMGW.

If the SAP Gateway is causing an issue the parameter gw/acl_mode should be set to 0 on the central system and the central system opened up as much as possible, if the bot now connects correctly then the restriction is the SAP Gateway security settings.

If the gw/acl_mode of the central system cannot be set as 0 the security files will need to be maintained in the SAP Gateway. The client is responsible for understanding how this is setup on their own SAP installation and this varies by SAP version, however, essentially this should be set as follows with a TP=AUT_DRONE* the bots always connect as AUT_DRONE with a suffix as a number to identify different bots. The other settings should be as wide as possible to allow the bot to connect, if other restrictions based on the clients network then those should also be configured by the client.

Note that if there are still issues with access through the SAP Gateway then there are links to the SAP documentation on the SAP Gateway and logging here.

The external security files as well as the logged on clients can be checked as shown in the example screen-shots below:

List   Edit   Goto   Settings   System   Help

Logged on Clients
RFC Connections
Active Connections   ▶   e wswsap09_PSM_00 / Active Connections
Release Info
Parameters   ▶
Trace   ▶
Expert Functions   ▶   Load Balance Table   of Starts : 1
ASCS Gateway Monitor   Network Addresses   n Clients : 59 / 1000 (Current / Maximum)
Back   F3   Host Name Buffer   Gateways : 10 / 1000 (Current / Maximum)

Gateway ...

Trace Level =
Connections
Memory Cons...

Nu...	Local LU Name	Local TP Name	LU Nam...	Statistics ▶	Status	Symbolic Destination	Con...
2	wswsap09	jstart	wswsap	External Security ▶ Maintain ACL Files	nt>	695
3	wswsap09	jstart	wswsap	Started Programs Display NI-ACL	nt>	755
10	wswsap09	jstart	wswsap	Logging Display NI-ACL (SSL)	nt>	348
13	wswsap09.cor...	sapgw00	wswsap	List of Conversation IDs Re-Read NI-ACL	500...	709
14	wswsap09.cor...	sapgw00	wswsap	Soft Shutdown Re-Read NI-ACL Globally	500...	254
23	wswsap09.cor...	sapgw00	wswsap	Hard Shutdown		680
27	wswsap09.cor...	sapgw00	wswsap		Connected	NONE	688
37	wswsap09.cor...	sapgw00	wswsap09.cor... sapgw00	SMDAGENT_P...	Connected	wswsap09_PSM_00	346
43	wswsap09.cor...	sapgw00	wswsap09.cor... sapgw00	SMDAGENT_P...	Connected	NONE	346
47	wswsap09.cor...	sapgw00	10.2.19.15 sapdp01	MLIEGUS	Connected	TESTIMONY_QR3	685
51	wswsap09.cor...	sapgw00	wswsap09.cor... sapgw00	SM_EFWK	Connected	wswsap09_PSM_00	753
56	wswsap09.cor...	sapgw00	wswsap09.cor... sapgw00	SM_EFWK	Connected	NONE	753
57	wswsap09.cor...	sapgw00	10.2.19.15 sapdp01	MLIEGUS	Connected	TESTIMONY_QR3	688
58	wswsap09.cor...	sapgw00	wswsap01.cor... sapdp00	SM_EFWK	Connected	SM_PR3CLNT500_...	685
62	wswsap09	jstart	wswsap09.cor... sapgw00	jsmadm	Connected	UMEBackendConne...	646
63	wswsap09.cor...	sapgw00	wswsap09.cor... sapgw00	PZRICHARDSON	Connected	NONE	755
64	wswsap09.cor...	sapgw00	wswsap09.cor... sapgw00	SM_EFWK	Connected	NONE	753
68	wswsap09.cor...	sapgw00	wswsap01.cor... sapdp00	SM_EFWK	Connected	SM_PR3CLNT500_...	747
69	wswsap09	jstart	wswsap09.cor... sapgw00	jsmadm	Connected	<Java Rfc client>	550

List   Edit   Goto   Settings   System   Help

Logged on Clients
RFC Connections
Active Connections   ▶   e wswsap09_PSM_00 / Active Connections
Release Info
Parameters   ▶
Trace   ▶
Expert Functions   ▶
ASCS Gateway Monitor
Back   F3

Gateway ...

Trace Level =   Number of Starts : 1
Connections   Logged on Clients : 58 / 1000 (Current / Maximum)
Memory Cons...   (Current / Maximum)   Remote Gateways : 9 / 1000 (Current / Maximum)

Nu...	Local LU Name	Local TP Name	LU Name...	TP Name	User	Status	Symbolic Destination	ConvID	Protocol
10	wswsap09	jstart	wswsap09.cor...	sapgw00	daaadm	Connected	<Java Rfc client>	34839507	Internal Communi...
13	wswsap09.cor...	sapgw00	wswsap01.cor...	sapdp00	SM_EFWK	Connected	SM_PR3CLNT500_...	70951491	Internal Communi...
14	wswsap09.cor...	sapgw00	wswsap01.cor...	sapdp00	SM_EFWK	Connected	SM_PR3CLNT500_...	25424815	Internal Communi...
16	wswsap09	jstart	wswsap09.cor...	sapgw00	jsmadm	Connected	<Java Rfc client>	76514859	Internal Communi...
23	wswsap09.cor...	sapgw00	wswsap09.cor...	sapgw00	MLIEGUS	Connected	NONE	68024188	Internal Communi...
27	wswsap09.cor...	sapgw00	wswsap09.cor...	sapgw00	MLIEGUS	Connected	NONE	68816365	Internal Communi...
37	wswsap09.cor...	sapgw00	wswsap09.cor...	sapgw00	SMDAGENT_P...	Connected	wswsap09_PSM_00	34677661	Internal Communi...
43	wswsap09.cor...	sapgw00	wswsap09.cor...	sapgw00	SMDAGENT_P...	Connected	NONE	34672894	Internal Communi...

6.4.5.2.1. SAP Gateway Documentation

Below are links to the SAP Standard documentation for the SAP Gateway.

Making Security Settings for External Programs is <u>here.</u>

Setting Up Gateway Logging is <u>here.</u>

Evaluating the Log file is <u>here.</u>

6.5. TimeShiftX

This document details the use of Vornex's TimeShiftX software with Testimony. It explains the background to why TimeShiftX is required, as well as the installation of TimeShiftX.

Go through the following steps for installation and depending on the OS being Windows or Linux following the appropriate section.

- Background
- Windows Install
- Linux Install
- TimeShiftX Smoke Test

6.5.1. Background

The goal of a Testimony installation is to record real user transactions executed in a production SAP system and play them back into a copy of that system. The playback system is based on a backup of the production system as it was at the start of the recording, thus ensuring that the initial data state of the playback system matches the data state of production when the recording started. The problems that occur as a part of this are:

1. It will take some time to create the copy of production and therefore there will be a difference in the date and time the recording was made and when the playback is actually executed
2. Most production recordings will stretch over at least one "midnight boundary", i.e., the recording starts on one day and ends on the next (or a subsequent) day.

Unfortunately, many SAP transactions are date-bound. In other words, the date entered on the screen is validated against the system date. For example, if Testimony records a financial posting on 1st May, but the playback is run on 5th May, then the posting transaction will fail in the playback with a "Cannot post in the past error" as the playback will try to post with the recorded date of 1st May.

In order to solve this problem, one option would be to set the operating system clock at the start of the playback to the date and time at the start of the recording. However, this is not possible in many cases because, for example, servers are linked to an NTP server which synchronises the time on all servers in the estate. As a way around this, use of Testimony includes rights to use Vornex's TimeShiftX software to enable the setting of "virtual clocks". This software allows you to set the date and time (and also clock speed) for specific operating system users without physically changing the OS clock.
In an SAP environment, you would set virtual clocks for the SAP administration userid and the database userid. This has the effect of giving the SAP system a different date and time to the underlying operating system, allowing you to avoid the date-related errors mentioned above.

6.5.2. Windows Setup – TimeShiftX

To setup TimeShiftX on a Windows OS note you will need the software which comes in a 32 or 64 bit version then please go follow through the sections below:

- Windows Install – TimeShiftX
- Windows License – TimeShiftX
- Windows Switch On – TimeShiftX

The sections above provide a guide to installing and licensing TimeShiftX. The link to the full Vornex Manuals for TimeShiftX are found here.

6.5.2.1. Windows Install – TimeShiftX

To install TimeShiftX on a windows OS please follow the following steps

1. Run the TSX executable. Admin rights are required to install.

2. Click Next

3. Select the top radial button "I accept the terms in the license agreement".

4. Click Next

5. Enter your user and organization

6. Click Next

7. Click Install
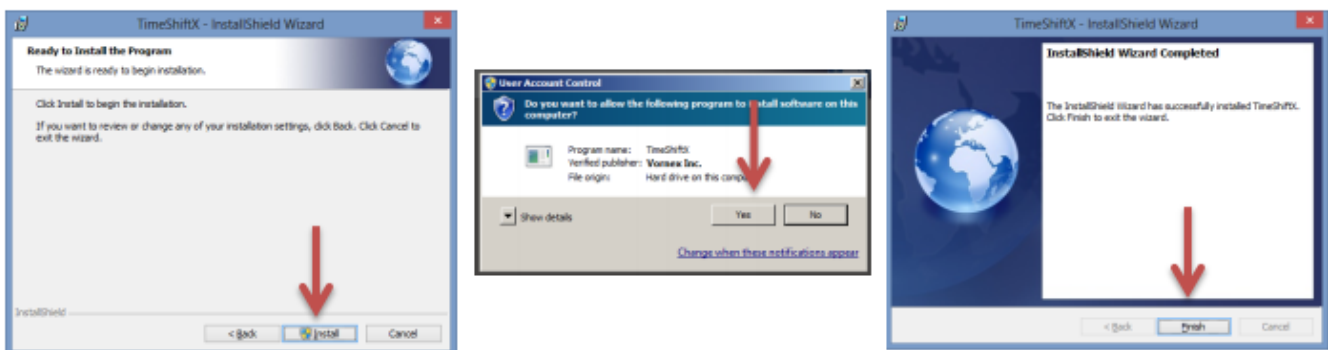
8. Click Yes if a "User Access Control" dialogue appears

9. Click Finish

Install complete. Note: An OS restart is not needed.

6.5.2.2. Windows License – TimeShiftX

1. Click Start -> Program Files -> TimeShiftX -> activate
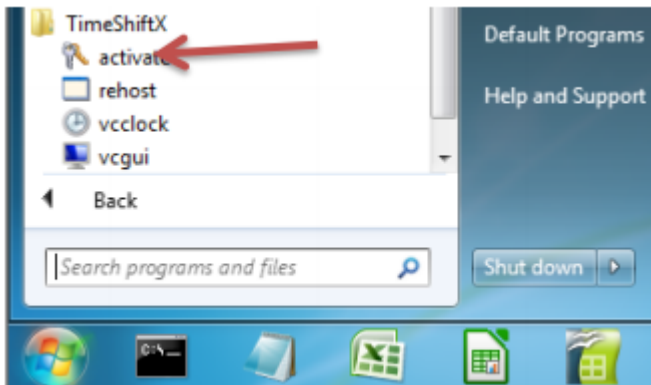
2. Type Y then press Enter
3. Type your 16-digit key then press Enter
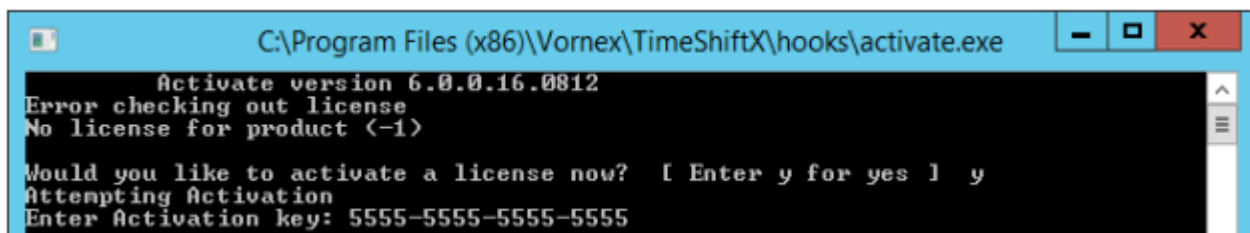
4. If successful, you will see "Activation Successful". Press Enter to finish.

a. If behind a firewall, open port 80 and retry key.

b. If unsuccessful, send the server output of ipconfig /all to support@vornexinc.com
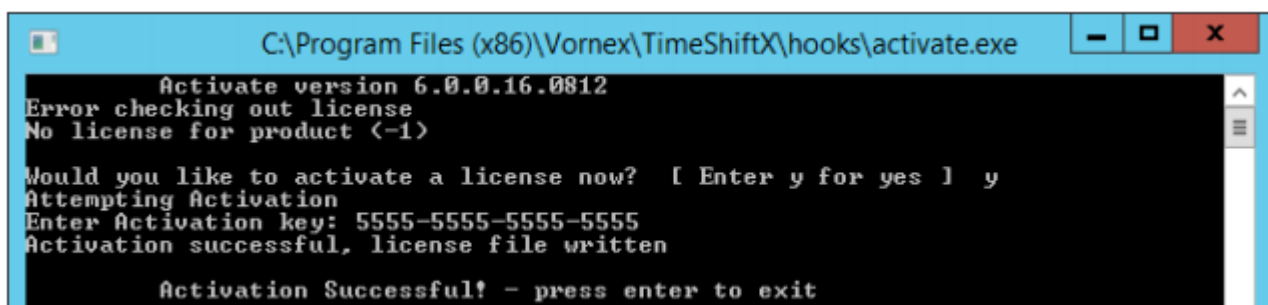
Note: Do not change the OS system clock as it will break the license.

Licensing complete. Now see the section Windows Switch On – TimeShiftX.

6.5.2.3. Windows Switch On – TimeShiftX

1) Click Start -> Type Run -> Press Enter -> Type services.msc -> Click OK
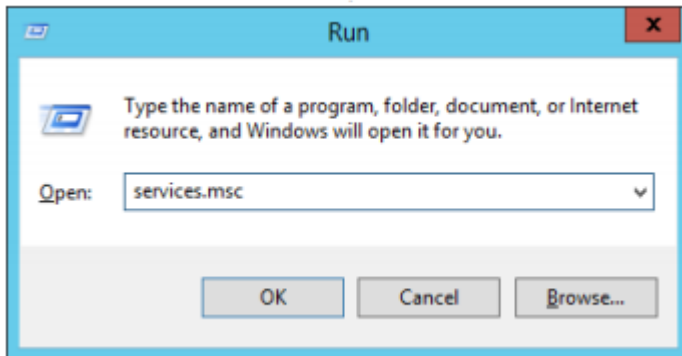
2) Click Vornex TimeShiftX

3) Click Start

a. If "Start" is missing, open services.msc with admin privileges and try again.
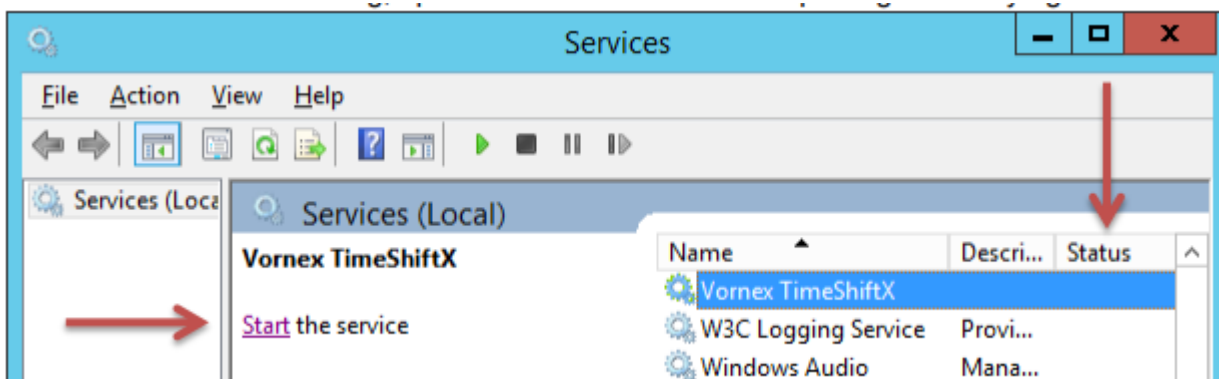
4) After, it will show Running or Started in the Status column.

a. If service fails to start, re-run "activate" and send screenshot to support@vornexinc.com

b. TSX can take up to 15 seconds to fully initialize.
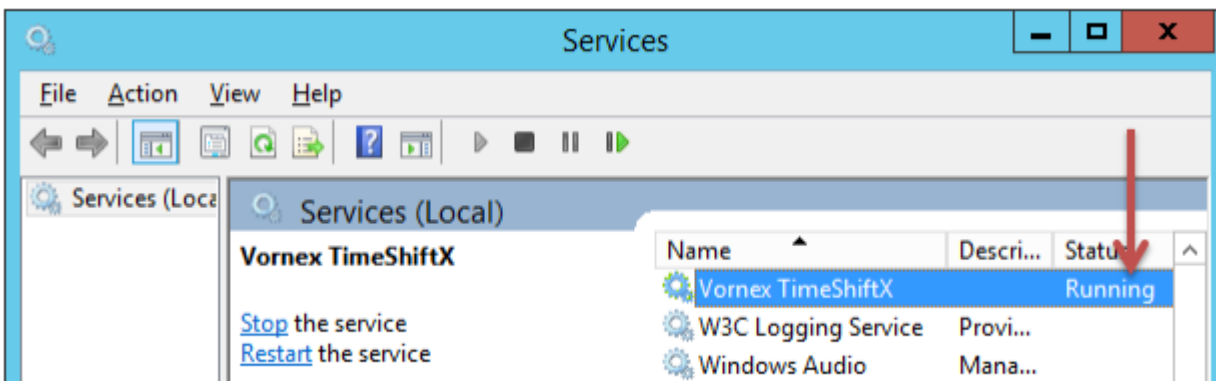
Now please check the installation with a smoke test.

6.5.3. Linux Setup – TimeShiftX

To setup TimeShiftX on a Linux OS note you will need the correct TimeShiftX software for the Linux version then please go follow through the sections below:

- Linux Install
- Linux License – TimeShiftX

The sections above provide a guide to installing and licensing TimeShiftX. The link to the full Vornex Manuals for TimeShiftX are found here.

6.5.3.1. Linux Install – TimeShiftX

1. Untar the tsx build and as root, run our install script in the untarred tsx folder.

```
$ tar -xvf tsx-<version>.tar
$ cd tsx-<version #>
$ su -
# ./install.sh
```

2. Install complete! Now restart any current running apps one time to initially load the TSX library.

Note: You may need to close & reopen your terminal to see the TSX virtual time.

Install complete.

To license the TimeSHiftX software go to the [Linux License](#) section.
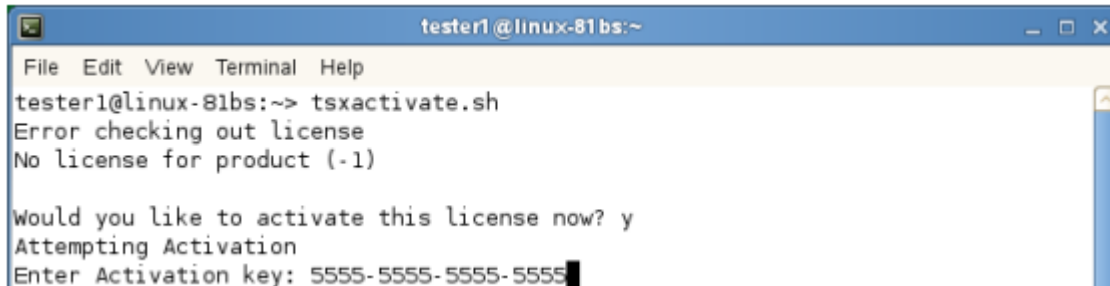
6.5.3.2. Linux License – TimeShiftX

1. As a regular non-root user, run the license utility

`$ tsxactivate.sh`

2. Type Y then press Enter

3. Paste your 16-digit key then press Enter
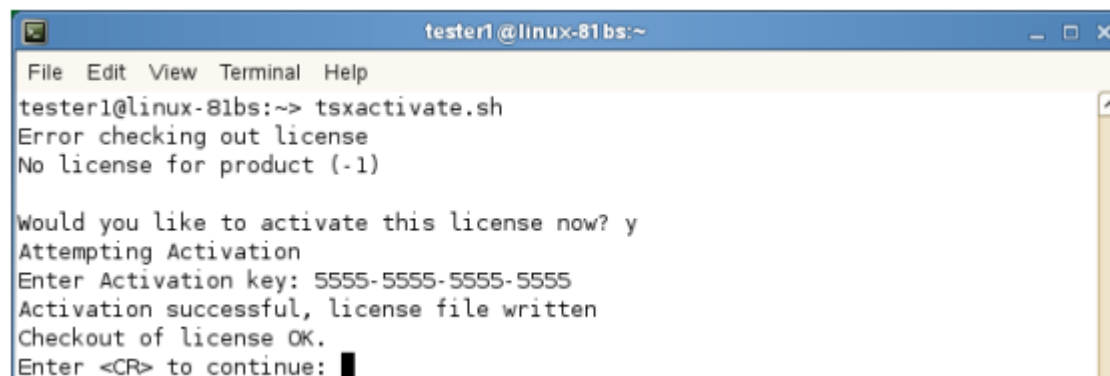
4. If successful, you will see "Activation Successful". Press Enter to finish.

a. If behind a firewall, open port 80 and retry key.

b. If unsuccessful, send the server output of the below to support@vornexinc.com

For Linux: `# ifconfig -a`

5. Run `$ tsx list` You should see " 0 Virtual Clocks set "

a. If you get an error, fix license permissions via the below, then rerun `$ tsx list`

`$ sudo chmod 644 /etc/tsx/license/a0.lic`

Note: Do not change the OS system clock as it will break the license.

Now please check the installation with a [smoke test.](#)

6.5.4. TimeShiftX Smoke Test

After installation & licensing, run the below smoke test to ensure TSX is properly setup.

If operating SAP HANA 2.0 SP04 or above please check the details [here](#) first.

Identify all the OS user accounts that run the SAP system, the DB, and any OS-level users that facilitate the operation of the system, such as SIDADM, SAPserviceSID, SMDAgent, etc . Time travel will need to be activated for these accounts later in the process.

Shutdown both the SAP system app servers and the Database.

Note: replace sidadm with the OS User accounts identified as running the SAP system.

```
# su - <sid>adm
$ tsx set -u <sid>adm -d  -1
$ date
```

The time and date should be one day in the past.

```
$ tsx reset
$ date
```

The present time and date should be displayed.

If the above shows time travel on / off, TSX is working!

If the above fails, try the below.

a) Open a new shell / connection and re-try smoke test

b) If on Linux, run the below to fix file permissions and re-try smoke test.

```
$ sudo chmod a+r /etc/ld.so.preload
```

If after a) & b) the smoke test still fails, email support@vornexinc.com

Otherwise your Smoke Test is complete. TSX is fully setup. Begin time travelling!

6.5.5. Checking time travel on SAP

The standard SAP program RSDBTIME can be run via SE38 to verify the system time and date on the different components that make up the SAP system.

This program should be run before and after time travelling to firstly verify there are no time mismatches on the system before time traveling and secondly after time traveling is started to ensure that the time travelling is working on all parts of the system.

```
List    Edit    Goto    System    Help

Time diagnosis


R/3 Time Diagnostic Program on BTI3219


Universal Time Coordinated UTC....: 1583409088

Date and time of database.........: 05.03.2020 11:51:28

Date and Time of R/3-Kernel.......: 05.03.2020 11:51:28

Date and Time of ABAP-Processor...: 05.03.2020 11:51:28
ABAP Timezone Setup ..............:      0

Date and Time / localtime ........: 05.03.2020 11:51:28

No Time Inconsistencies detected !

Checking GET RUN TIME from 11:51:29 to 11:51:34 during 00:00:05
GET RUN TIME result ..............:  4,991,809  us

GET RUN TIME time measurement accuracy ok !
```

6.5.6. TSX Startup Procedure & Sequence

> ! This topic is relevant to Target systems of SAP HANA 2.0 SP04 and above.

1: Switch to the OS time mode:

Start the system with the environment variable "HDB_TIMER=system"

In case that the systems are running in the cloud for SAP HANA 2.0 SP04 set the following parameters using HANA Studio->SQL Console SAP HANA System Database (Multi Tenant or Single Tenant configuration)

```
ALTER SYSTEM ALTER CONFIGURATION ('nameserver.ini', 'SYSTEM' ) SET ('delta',
'preallocated_nodebuffers') = '1' WITH RECONFIGURE
```

```
ALTER SYSTEM ALTER CONFIGURATION ('indexserver.ini', 'SYSTEM' ) SET ('delta',
'preallocated_nodebuffers') = '1' WITH RECONFIGURE
```

SAP HANA on each Tenant Database

```
ALTER SYSTEM ALTER CONFIGURATION ('indexserver.ini', 'SYSTEM' ) SET ('delta',
'preallocated_nodebuffers') = '1' WITH RECONFIGURE
```

2: Startup the SAP HANA Database and Application server using the current time (normal operation)

If applicable: Set the snc/enable = 0 (default) SAP parameter (i.e.tcode RZ11) The Testimony RFC connection should have SNC set to innactive (under the Logon & Security tabel) In the SAP GUI -> Connections -> Edit -> Network Activate the Secure Network Communication -> tick box SNC logon with user/password (no Single Sign On) -> tick box

3: Shutdown both the SAP Application Server and the HANA Database Server

4: Shift time for SIDADM (for the two OS users responsible for the Database Server and the Application Server)

Ensure this is carried out on both SAP Application Server and the Database Server

5: Start the SAP HANA database

Check that the HANA DB services are running (HANA Studio > Landscape and HANA Studio > Performance or unix: #pd -ef | grep hdb) Check for errors (HANA Studio -> Alerts & HANA Studio -> Diagnosis Files)

6: Start the SAP Application Server Check for errors (Transactions: ST22,

SM21)

7 Adjust parameters (if applicable) BDLS – Execute conversion of logical system names Check/adjust parameters

6.5.7. TimeShiftX Troubleshooting

Most frequent TimeShiftX issues

Below are the most frequent issues seen with operating TimeShiftX with SAP, however, please find further troubleshooting for TimeShiftX from the Vornex documentation <u>here.</u>

1. SAP HANA Database does not start after a time shift

Possible Causes:
The HDB_TIMER parameter has not been set

Resolution:
Switch to the OS time mode – on the SAP HANA Database server
Set the environment variable 'HDB_TIMER=system' , i.e. in the .profile or .bash_profile for adm

Possible Causes 2:
Time travel command to a "specific clock" was used i.e.:
$ tsx set -u 02/02/2021 23:45 -l

Resolution 2:
Run the time travel command using "offset clock"
$ tsx set -u -d -2 -h 14 -m -15

2. SAP HANA Database locks bring the SAP system to a halt after time travelling

Possible Causes:
The SAP HANA Database configuration parameters have not been set for SAP HANA 2.0 SP04 or higher

Resolution:
Set the following parameters using HANA Studio->SQL Console
SAP HANA System Database (Multi Tenant or Single Tenant configuration)
ALTER SYSTEM ALTER CONFIGURATION ('nameserver.ini', 'SYSTEM') SET ('delta', 'preallocated_nodebuffers') = '1' WITH RECONFIGURE
ALTER SYSTEM ALTER CONFIGURATION ('indexserver.ini', 'SYSTEM') SET ('delta', 'preallocated_nodebuffers') = '1' WITH RECONFIGURE
SAP HANA on each Tenant Database
ALTER SYSTEM ALTER CONFIGURATION ('indexserver.ini', 'SYSTEM') SET ('delta', 'preallocated_nodebuffers') = '1' WITH RECONFIGURE

3. The SAP Application or/and SAP Database hang or are frozen after time travelling

Possible Cause:
The time shift command was run when the SAP Application or/and SAP Database were still running

Resolution;:

Make sure that both the SAP Application and the Database have been shutdown before time shifting

4. The SAP Application does not start after time travelling

Possible Cause 1:
The time shift command was not properly run.

Resolution 1:
Check the time shift command for syntay errors, i.e. the TimeShiftX VCGui command is a comma separated list with no blanks

Possible Cause 2:
If SSO (Single Sign On) is used the snc/enable must be set to 0

Resolution 2:
Change snc/enable = 1 to snc/enable = 0 in the profile file
Make a copy of the current profile file to "*\\SYS\profile\.orig"
Change parameter snc/enable =1 to snc/enable =0 and add parameter login/quiet_mode = 0
Note: The Testimony RFC connection should have SNC set to inactive (under the Logon & Security tab in SM59)

5. Short Dump ZDATE_LARGE_TIME_DIFF occurs after a time shift

Possible Cause:
Not all SAP Database and Application users/processes/services are time travelling

Resolution:
Make sure that all relevant users/processes/services have been time shifted
If not all SAP Services are running under the SAPService user. For example if the SAP Database services are running under the SYSTEM user the C:\Program Files (x86)\Vornex\TimeShiftX\HookingRules.json file will need to be adjusted accordingly.

For example in case of MaxDB (see attachment):
(1) "user": "SAPServiceTE1"}, {-> must be added to the "hook": [section
(2) Replace "sapstartsrv.exe" with "kernel.exe"
(3) Remove the {"user": "SYSTEM"}, line from the "noHook": [section
(4) C:\> tsx set -u SAPServiceSYSTEM -d 1 add SYSTEM to the tsx command

6. Where can I see the license valid to date?

Resolution:
Linux: Open and read the a0.lic file located in the i.e. /etc/tsx/license directory
Windows: Open and read the a0.lic file located in the C:\Program Files (x86)\Vornex\TimeShiftX\hooks directory

7. How to start the Vornex TimeShiftX service in MS Windows

Resolution:

Right click on the Taskbar and open the Task-Manager -> Services -> right click on Vornex TimeShiftX
-> Start or run services.msc -> Services -> right click on Vornex TimeShiftX -> Start

6.6. Root Cause Analysis

Testimony Root Cause Analysis (RCA), enables Testimony to automatically tie defects raised during a playback to transports deployed as part of the release. This enables you to more efficiently pinpoint unintended regression errors associated with the release being tested.

A brief introduction to Testimony RCA is contained in the Testimony v2.21 Release Notes here.

Testimony RCA uses functionality from Basis Technologies' ActiveControl change management product to analyse transports, and tie the objects in those transports to defects raised during the Testimony playback.

In order to use Testimony RCA, you need to install the ActiveControl software and perform some initial configuration so that the object hierarchy used by RCA is generated.

The following sections of this manual take you through the steps required to do this.

6.6.1. Installing the ActiveControl software

As mentioned previously, in order to use Testimony RCA you need to have the ActiveControl software installed. The installation process and requirements vary slightly depending on your configuration and whether or not you are an existing ActiveControl customer.

6.6.1.1. Customers without ActiveControl

If your company does not already use ActiveControl, then you will need to install the product into your Testimony Central System and your Testimony Target (Playback) System. The ActiveControl installation takes the form of a transport which is provided by Basis Technologies. Please contact your Basis Technologies Account Manager, or Basis Technologies Support, to have these transports sent to you. You will be sent the transport for the latest version of ActiveControl.

Given that your Target System is created as a copy of production as part of each Testimony recording and playback cycle, you will need install the ActiveControl transport as part of the refresh process every time you perform a recording and playback cycle.

6.6.1.2. Existing ActiveControl customers

If you are an existing ActiveControl customer, then the process of installing ActiveControl for your Testimony installation differs slightly depending on the respective architectures of your ActiveControl and Testimony landscapes.

> ❗ Testimony RCA is available with versions of ActiveControl from v7.02 onwards. If your version of ActiveControl (or its predecessor product, Transport Expresso) is older than this, then you will not be able to use Testimony RCA in your existing ActiveControl landscape without first performing an upgrade of ActiveControl. If you wish to make use of the Testimony RCA functionality then please talk to your Basis Technologies Account Manager about an upgrade of ActiveControl.

ActiveControl is already installed in your Testimony Central System and/or your Testimony Target System

If you have used the same system as both your ActiveControl Domain Controller *and* your Testimony Central System, or your Testimony Central System is under the control of ActiveControl for transports, then ActiveControl is already installed and there is no further installation effort required in the Testimony Central System. It is also likely that ActiveControl is already installed in other systems in your landscape, including your production system. Since the playback system is created as a copy of production (or other system being recorded) then there is also no need to perform any further installation.

ActiveControl is not already installed in your Testimony systems

If your Testimony Central System and your Target System do not already have ActiveControl installed, then you will need to install it in those systems.

> ✳ It is important that the version of ActiveControl being used for Testimony RCA is the same as the version being used elsewhere in your estate. You should contact your Basis Technologies Account Manager to request the installation files for the version of ActiveControl that you are currently running in the case that you need to install it in any of your Testimony systems.

7. License Keys

License keys are required on the Central system directly through Testimony and the Diffuser licenses are required in each system Central, Source and Target as per the links below:

- Central Licenses
- Diffuser Licenses
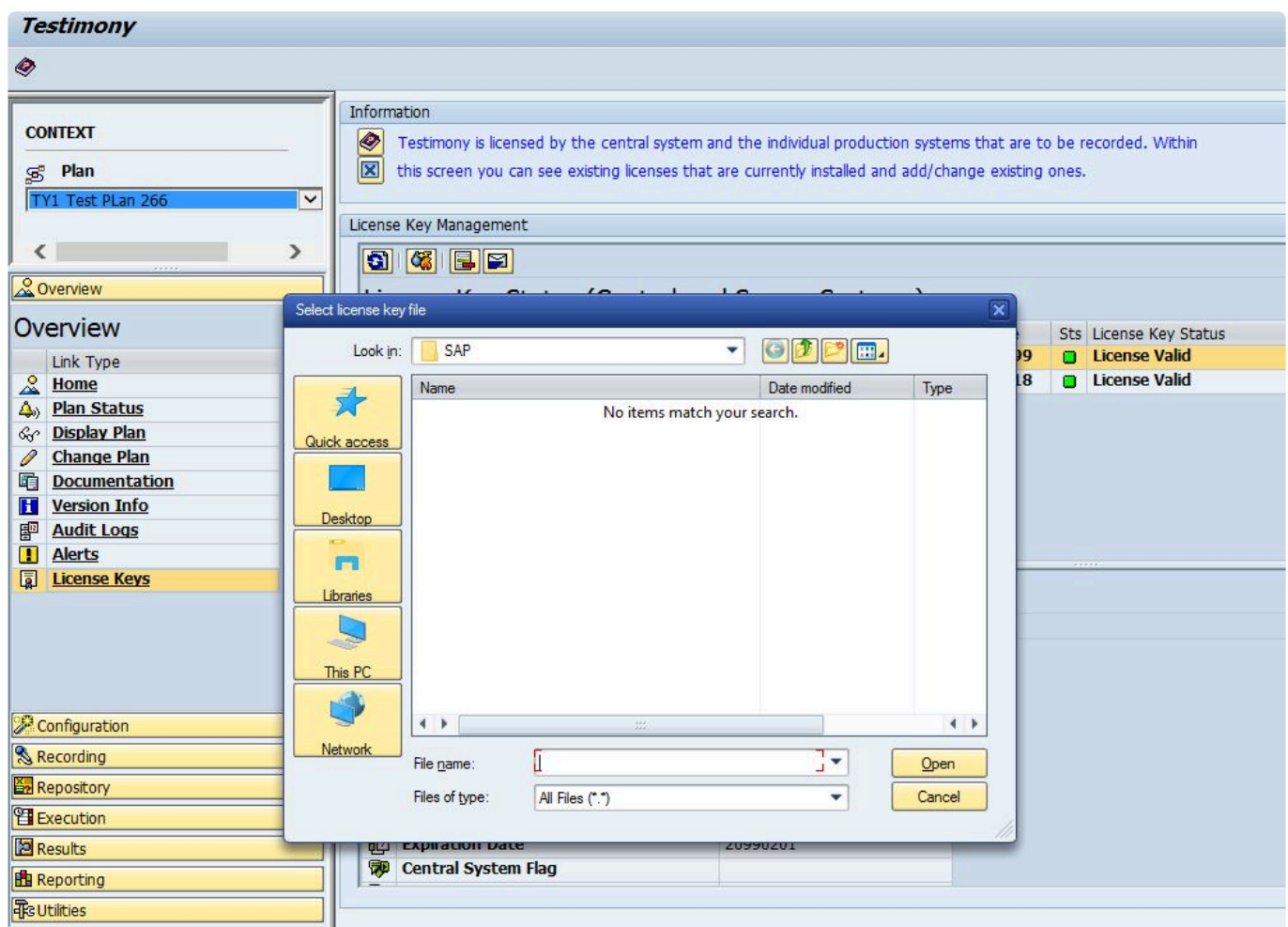
7.1. Central Licenses

Testimony is licensed by the central system and the individual source systems that are to be recorded. Within this screen users can see existing licenses that are currently installed and add/change existing ones.

Before a central license is applied or once a central license key has expired, Testimony users won't be able to use the software and all the drawer menus will be disabled. Only the **"License Keys"** menu will be operational.

Installing a License Key

Install License Key: Click this push button to install the new supplied license key. The first operation in a new system is to install the central license key,

Source system keys are installed in the same way, although note you won't see the source systems details unless is it loaded into the current plan you have selected, if no source system is currently in the plan you won't see the status of the source system key although you will still be able to install this key.

Delete a License Key

Delete License Key: Click this push button to delete an expired license key.

Request a License Key

Click on **"Request New License Key"** push button to get a detailed explanation about how to request a new license key. A window will appear providing details to be sent in an email to Basis Technologies support via email in order to request renewal license keys.

7.2. Diffuser Licenses

Testimony also requires Diffuser licenses to be installed on the central and source systems.

The Transaction /N/BTR/LICENSE is used to access the License Administration for Diffuser where the 'Testimony Listener Agent' licenses can be installed.

Diffuser License Administration can also be accessed via the MiniCube transaction /N/BTR/MINICUBE after pressing the Diffuser Mode button and selecting the license key button.
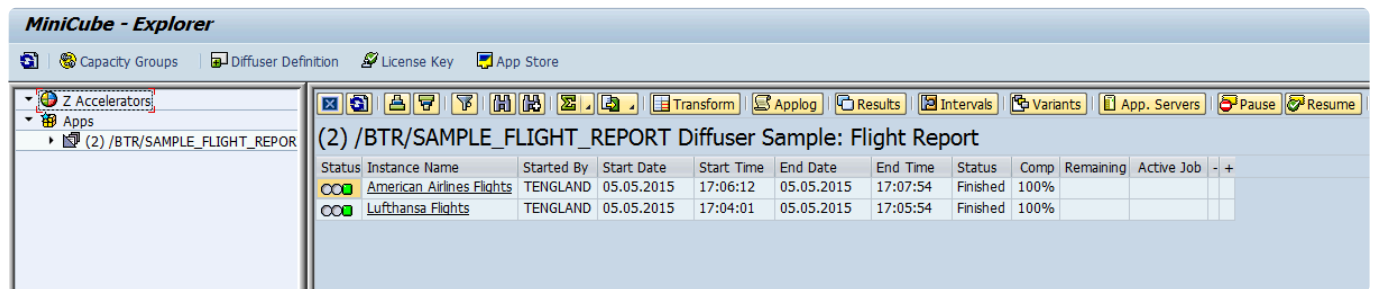
The key components to managing your license are as below.

- Installing a License
- Check installed keys

7.2.1. Installing a License

After entering the license screens through the transaction /N/BTR/LICENSE or via the button on the /N/ BTR/MINICUBE as described in Maintaining Licenses.

To install a license simply select the "Install key file" option as below and execute.
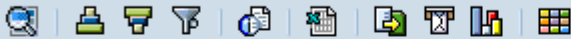
Select the file you want to install. The filename will contain a 10 digit number for the SAP installation number of the intended system.

There may also be the three character system ID and the product name.
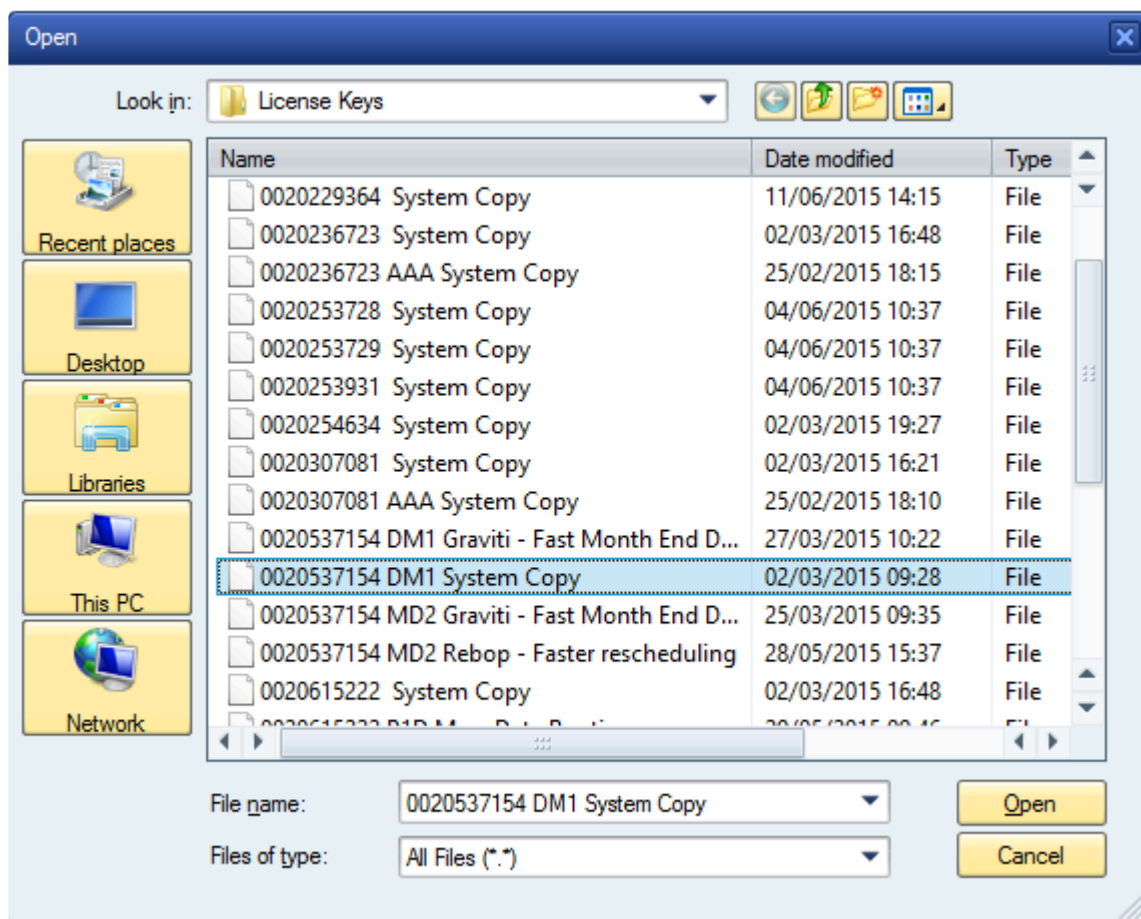
If errors are found then the problem is displayed.

7.2.2. Check installed keys

To check the products you have installed in your system, select the "List installed products" option as below and Execute.

Diffuser License Manager

- ● Check installed keys
- ○ Install key file
- ○ Test key file (no install)
- ○ Remove all licence keys
- ○ Export installed keys
- ○ List installed products

The keys installed are shown as below. Note that any red status icons indicate a problem with the key details being consistent with the system or being out of validity.

Diffuser License Manager

Prod. ID	Product Name	Consist.	Valid	Expiry Date	Sys ID	Installation	Reports
0013	0013 DevOps - Archiving of IDOCs	🟩	🟩	31.12.2016	MD2	0020537154	
RBOP	REBOP - Rescheduling\Backorder Processing	🟩	🟩	28.05.2020	MD2	0020537154	
GTSC	System copy GT	🟩	🟩	18.02.2017	MD2	0020537154	
MDR2	Diffuser	🟩	🟩	31.01.2016	MD2	0020537154	30
0001	0001 Graviti - Fast Month End Depreciation	🟩	🟩	25.03.2020	MD2	0020537154	30
0011	0011 Javelin - Joint Venture Accounting	🟩	🟩	16.03.2017	MD2	0020537154	30
TE01	TE01 Advanced dependency check	🟩	🟩	26.02.2018	MD2	0020537154	30

8. Validating the Installation

To validate the installation it is compulsory to advance the installation in the order below:

1. Complete First Recording and Playback
2. Complete QA Testing
3. Complete Production Ramp-Up

8.1. First Recording and Playback

Having completed the Technical Setup you are now ready to perform your first recording and playback.

Follow the Quick Start Guide for details on how to perform a recording and playback in Testimony. The below steps should be executed.:

1. Test Plan and System Connections

A test plan must first be created and configured prior to any recordings being performed or playbacks.

2. Performing a Recording

This is the process for activating and monitoring the recording on the source systems.

3. Review Recording/Send to Repository

Once recording is complete, you should review the scripts that have been captured and move them to the Testimony script repository.

4. Create execution queue

Transfer recorded scripts from the repository to the execution queue.

5. Performing a Playback

This is the process to prepare for, execute and monitor the playback of recorded activities on the target systems.

6. Review Playback Results

The end result of the process which highlights discrepancies between what was recorded and what was seen during the playback. Note if you play back into the same system as you recorded from, you might get failures due to different results.

With installation of Testimony confirmed QA Testing can begin or you can complete further testing in the Sandbox system.

8.2. QA Testing

Basis Technologies recommends that the Testimony setup is fully tested before operating in a production system.

When deploying to the system identified to act as the source system for QA testing ensure the source system setup is run through as defined in the technical setup here.

The QA Testing of Testimony needs to take place in a system where a good volume of system operation can be recorded, for example existing QA testing that is running. At this point a target system is required where playback can occur with no users logging on to change data after the copy is taken until the playback is completed, as users logging on and changing data could cause unexpected failures in the playback.

The QA Phase scope and approach will be based on multiple levels of testing, running Testimony recordings and playbacks with incremental complexity and volumes as per the example below. We would strongly recommend completing at least 2 high volume recordings and playbacks.

Level	Volume	Users	Filtered	Duration	No. of Bots	Dailog	Batch	RFC
1	Low	1	Yes	5 minutes	1	Yes		
2	Medium	All	No	30 minutes	2+	Yes	Yes	
3	High	All	No	3 hours	2+	Yes	Yes	Yes
4	High	All	No	10 hours+	3+	Yes	Yes	Yes

Verify a minimum of the following as a part of your testing

1. Impact on the Source system is within the KPIs agreed while recording
2. Verify the expected transactions are recorded with the correct data
3. Ensure the playback is executed correctly with minimal errors
4. Confirm that the playback completes within expected timings
5. Ensure that critical transactions are played back correctly
6. Ensure coverage analysis operates as expected
7. Check the results of the playback are as expected

8.3. Production Ramp-Up

When deploying to a production system run through the source system setup as defined in the technical setup here.

Then schedule recordings which incrementally increase the recording time and complexity as below, while the SAP Basis team closely monitors the system performance as per the user guide here.

Level	Volume	Users	Filtered	Duration	Dialog	Batch	RFC
1	Low	1	Yes	5 minutes	Yes		
2	Medium	<50	Yes	10 minutes	Yes		
3	Medium	<50	Yes	30 minutes	Yes	Yes	
4	Medium	All	No	30 minutes	Yes	Yes	
5	High	All	No	1 hour	Yes	Yes	Yes
6	High	All	No	3 hours	Yes	Yes	Yes
7	High	All	No	5 hours +	Yes	Yes	Yes
8	High	All	No	8 hours +	Yes	Yes	Yes

On successfully completing the ramp up of recordings you can then schedule a recording along side a system copy, start the recording first then copy the system restoring the system back as per the recommended steps here.. You should then prepare to start your first production playback.

9. Installing Testimony in new systems

When installing Testimony in new systems go back through the same steps for the type of system where Testimony is being installed as below:

Central System

Source System

Target System

Bot System

✱ If upgrading always ensure that the enhancements are deactivated before deploying new testimony transports

10. Upgrading Testimony

This section summarises the key considerations and the steps involved in performing such a Testimony upgrade. The information contained within this section of the guide is version-agnostic and aims to act as a record of the high-level steps of upgrading Testimony, not in configuring new functionality contained within the latest release of the product.

Please read the following sections to be aware of the upgrade process:

- Upgrade Considerations
- Upgrade Steps
- Upgrade Responsibilities

10.1. Upgrade Considerations

The following should be considered as part of an upgrade to latest version of Testimony:

1. Latest software transports will need to be applied in the Central system plus Source and Target Systems. The Bot executable will also require an upgrade.

3. Always be aware that when applying Testimony transports to Source or Target systems there should be **no or very low activity when upgrading** as there will be short dumps for active users. The **Testimony enhancements should also be deactivated** before transports are deployed.

4. Testimony is NOT backwards compatible because of the nature of some of the new functionality. This means you have to apply the new Transports in the systems and upgrade the Bot machines at the same time.

5. As Testimony is NOT backwards compatible older recordings may not be able to be successfully played back on the newer versions: you will need to check on compatibility between versions by contacting Basis Technologies Support. The best advice is always to record and playback on the same version of Testimony. Anything already executed and with results will still be stored for future reference.

6. New authorisation roles will need to be applied to all users. If copies of roles were taken previously, these will need to be updated as part of the Upgrade.

7. Existing Testimony General Parameters won't be overwritten by the upgrade, however, you should consider that the default parameters provided, may now be best practice for the operation of Testimony.

8. Please note that if you are an existing Mass Data Runtime (MDR) / Diffuser user, this will need to be carefully managed during the upgrade. Productive use of MDR / Diffuser can be negatively impacted if an Upgrade to ActiveControl is done in isolation of it.

> ✱ Always ensure that you read the release notes for the new release prior to upgrading. The release notes for Testimony v2.21 can be found here.

10.2. Upgrade Steps

The key steps to perform an upgrade of Testimony are summarised below:

Step	Activity	Other Information
01	Provision of Testimony Software	To request the latest version of Testimony, please email your Basis Technologies Account Manager
02	Verify if existing MDR/Diffuser Customer	If you are an existing MDR/Diffuser customer, please ensure you inform Basis Technologies – as upgrading to the latest version of Testimony can have detrimental impact on the existing MDR/Diffuser installation if not carefully planned.
03	Read the ReadMe	Carefully read the ReadMe file provided with the transports when upgrading.
04	Plan the impact on your current recordings	As Testimony is NOT backwards compatible older recordings may not be able to be successfully played back on the newer versions. You will need to check on compatibility between versions by contacting Basis Technologies Support. The best advice is always to record and playback on the same version of Testimony. Anything already executed and with results will still be stored for future reference.
05	Plan upgrade timing over a short period of time	Testimony is NOT backwards compatible because of the nature of some of the new functionality. This means you should plan to apply the new Transports in the systems and upgrade the Bot machines in a relatively short period of time as you may not be able to record or playback with incompatible versions
06	Plan the deployment of transports	The **enhancement transports can cause short dumps while being deployed to a Source or Target systems** therefore choose a time of ideally no activity or very low activity to deploy the transports.
07	**Deactivate Enhancements in Source and Target systems**	Deactivate Testimony enhancements before deploying transports by running the program /BTI/AUT_DEACT_ENH to deactivate enhancements directly on the Source and Target systems.
08	Deploy transport to Central system	Apply upgrade transports one by one in the order specified to Central System(s)
09	Check Central system setup	Check the Central system setup section for the version of Testimony being deployed as this may have been updated.
10	Deploy transport to Source system	Apply upgrade transports one by one in the order specified to Source Systems
11	Check Source system setup	Check the Source system setup section for the version of Testimony being deployed as this may have been updated.

12	Deploy transport to Target system	Apply upgrade transports one by one in the order specified to Target Systems
13	Check Target system setup	Check the Target system setup section for the version of Testimony being deployed as this may have been updated.
14	Deploy new Bot software	Deploy new bot software as per the ReadMe with any other steps actioned while deploying.
15	Check bot machine setup	Check the bot setup is complete as per the Bot Setup section for the version of Testimony being deployed as this may have been updated.
16	Check security roles	Check Testimony supplied roles are in place for the correct users, the upgrade may have provided extra authorisations in roles provided. These roles should be re copied if the standard Testimony roles supplied were copied into the local naming conventions
17	Consider team training	If functionality has changed or there is a change of process intended as a part ot the upgrade
18	Testimony Central System	Validate the Central system is setup as expected and check if any of the current General Parameter's should be updated with the new default settings provided.
19	Testimony Testing	Ensure test recordings and playbacks are run, this will ensure any steps missed in upgrading systems are picked up by running recording and playback tests
20	Review System Refresh Steps	Check the system refresh steps section for the version of Testimony being deployed as this may have been updated.
21	Carefully deploy Testimony to Production Environments	**1. Find a time with no or very low activity on the system** **2. Deactivate Testimony enhancements by running the program /BTI/ AUT_DEACT_ENH** **3. Apply upgrade transports one by one in the order specified**
22	Communicate Testimony Upgrade Complete	Ensure you update your team on the new version of Testimony and any differences in process.

10.3. Upgrade Responsibilities

Basis Technologies-led Upgrades

Basis Technologies strongly recommend that a Testimony upgrade is performed with assistance from one of our Solution Specialists. This not only ensures that the benefits of the newer functionality can be more efficiently reaped, it also helps ensure that any teething issues and questions encountered during the Upgrade process can be addressed in a more timely fashion since we are directly involved in the process.

If you are interested in upgrading to latest Testimony with assistance from Basis Technologies, please contact your Account Manager to discuss next steps.

Customers Self-Upgrades

For any customers that choose to upgrade Testimony themselves, remote support will be provided by Basis Technologies to our standard support terms. However if a customer self-upgrade causes any issues to the existing Testimony configuration or ongoing usage of the tool, then any Basis Technologies corrective actions will potentially be chargeable on a Time & Materials basis.

If you are wanting to upgrade to Testimony yourself, please still inform your Account Manager so that the software can be provided.

11. Uninstallation

To remove the installation of Testimony from your system there are steps to follow to ensure it is completed safely.

The tool will have been installed in Central, Source and Target systems. There are Uninstallation transports supplied for each system and they will be supplied by Basis Technologies upon request.

11.1. Uninstall Transports and Configuration

Transports

Via the Add-On Manager, you can apply the deletion Transports to remove all the objects associated with Testimony.
The transports will be provided by Basis Technologies upon request.
It is recommended that the uninstallation of any Production system objects is carried out according to your system maintenance schedule.

Note that all workbench objects will be removed via this approach and none are required to be manually handled.

Data and Configuration

Note: All Testimony-related data for recordings, playback and analysis will be removed when uninstalling.

There will be RFC connections remaining; these should be either deactivated, removed or retained if still operational for other purposes.

Security Gateway information for the bot machine and Testimony access within transaction SMGW for secinfo/reginfo will need to be removed.

System parameters, as set up in the Gameplan, can be reverted to their original settings. The parameters altered are:

- "rsdb/esm/buffersize_kb" in Source systems
- "rsdb/esm/large_object_size" in Source systems
- "rsdb/esmj/max_objects" in Source systems
- "gw/acl_mode" in Central system
- "rsdb/esm/buffersize_kb" in Central systems
- "rsdb/esm/large_object_size" in Central systems
- "rsdb/esmj/max_objects" in Central systems
- "sapgui/user_scripting" in Target system

11.2. Timing & Sequence

However since software is being removed it is best practice to conduct the removal during a planned maintenance window.

It should be noted that there is no specific order in which to uninstall the Testimony add-on as there are no inter-system dependencies between Central, Source and Target.

11.3. License Keys

Any license keys associated with your Testimony tool will become inactive at the time of uninstallation.

11.4. Dependencies

If you are operating other tools from Basis Technologies you should submit a request as per our [support process](#) before uninstalling the Diffuser Framework, as it is separate from Testimony and these installations would be compromised.

12. Software Support

After appropriate testing on your SAP test systems, you are now ready to use Testimony within your productive landscape. Remember that Testimony is dormant in your SAP system until activated for recording. You must ensure that Testimony recordings are deactivated after the required recording period in order to ensure that Testimony returns to its dormant state.

12.1. Testimony Administrators

If you have questions or issues whilst using Testimony, you should always contact your internal Testimony Administrators in the first instance.

12.2. Support from Basis Technologies

Raising Support Tickets

To request support from Basis Technologies on any issue relating to our product sets (ActiveControl, Transport Expresso, DevOps, Testimony, Diffuser, BDEx Utilities or Transformation), support can be requested from Basis Technologies by submitting a request via our support portal link here.

Submitting your request will automatically create a ticket in Zendesk, the ticketing tool used by Basis Technologies.

Require additional Information or Services?

If additional information or services relating to any of Basis Technologies product sets is required, you can contact us via the support portal link here , or alternatively by contacting your assigned Basis Technologies Account Director.