RANOREX

WEB AND MOBILE TESTING USERGUIDE

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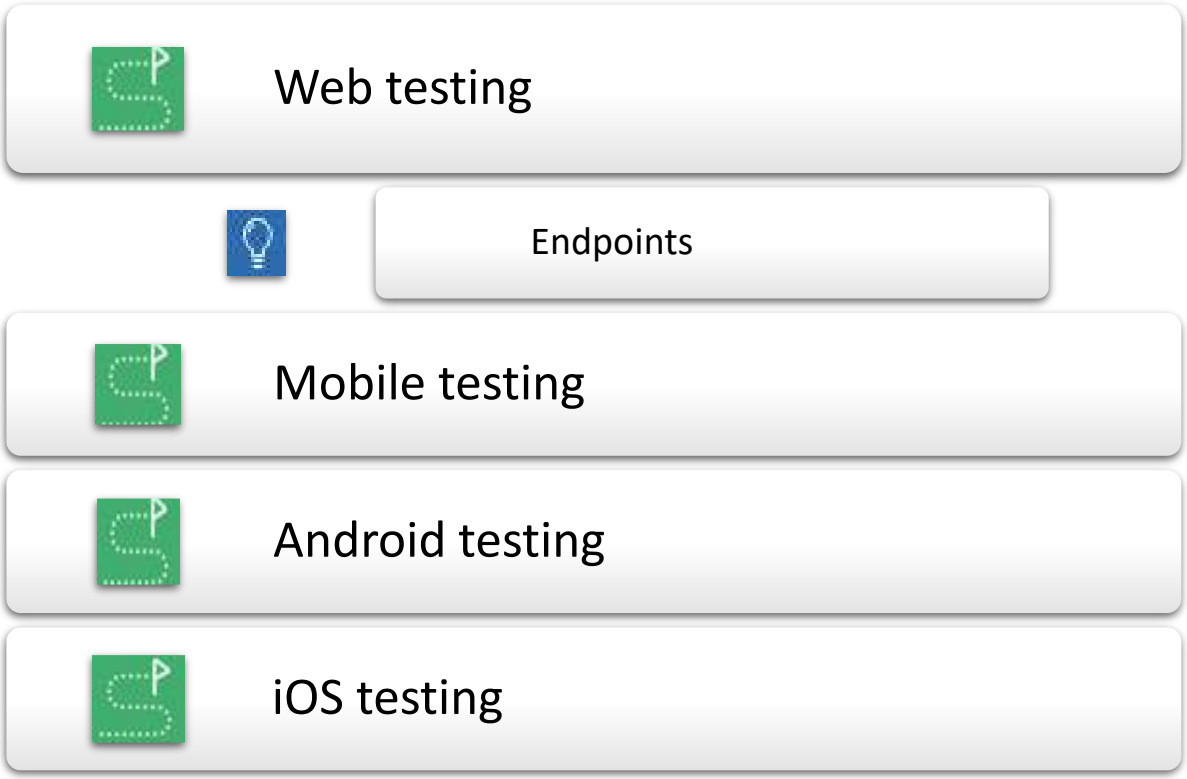
Web and mobile testing

Web testing and all different types of mobile testing represent an emerging field concerning automated software testing. Ranorex offers a wide range of tools and methods to cover as many test challenges as possible. They are all described herein.



Web testing

This chapter describes how to test web applications and web sites using Ranorex Studio. Thanks to the Ranorex plug-ins for Microsoft Internet Explorer, Mozilla Firefox, Google Chrome, and Chromium, building and running web tests is essentially the same as doing so for desktop tests. However, there are some differences and important considerations. We'll explain these in the various subchapters.

Supported browsers

Ranorex Studio supports the following browsers for test automation:

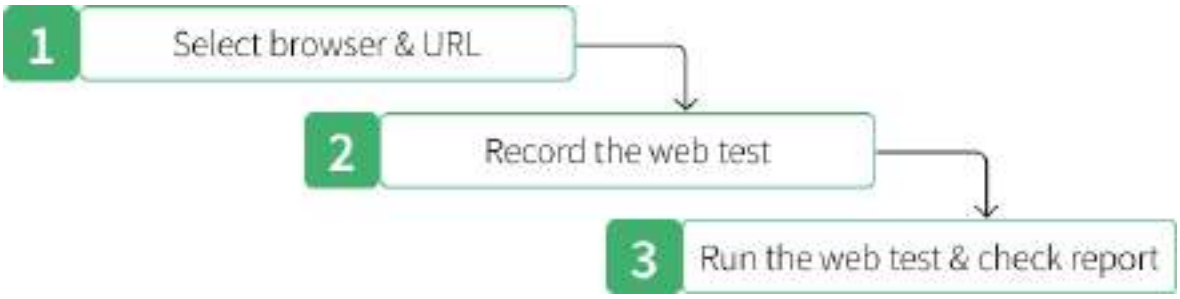
- Microsoft Internet Explorer
- Microsoft Edge (Chromium-based)
- Microsoft Edge (Legacy)
- Mozilla Firefox
- Google Chrome
- Chromium

Ranorex Studio uses special browser plug-ins to enable test automation with these browsers.

> **Note**
>
> You can test even more platform and browser combinations with our ⇢ Selenium WebDriver integration.

Web testing overview

Web testing and desktop testing in Ranorex Studio are very similar. The basic web testing process in Ranorex Studio is as follows:



Note

Web sites can have highly complex structures. This is why it may sometimes be a good idea or even necessary to extend the above process by manually tweaking the recorded test with additional code. We'll cover this in the later subchapters.

Recommended knowledge

Before you start web testing, you should be familiar with the basics of how web sites work. You should also understand the concepts covered in the following Ranorex-Studio chapters:

Ranorex Studio fundamentals

The ⇢ Ranorex Studio Fundamentals contain the chapters dealing with all the basic elements of working with Ranorex Studio, like actions, repositories, and reporting.

Ranorex Studio advanced and expert

For web testing, we recommend reading through the advanced chapters ⇢ RanoreXPath and ⇢ Ranorex Spy. Also, knowing your way around ⇢ code modules and the ⇢ user code library will be helpful when tweaking web tests with additional code.

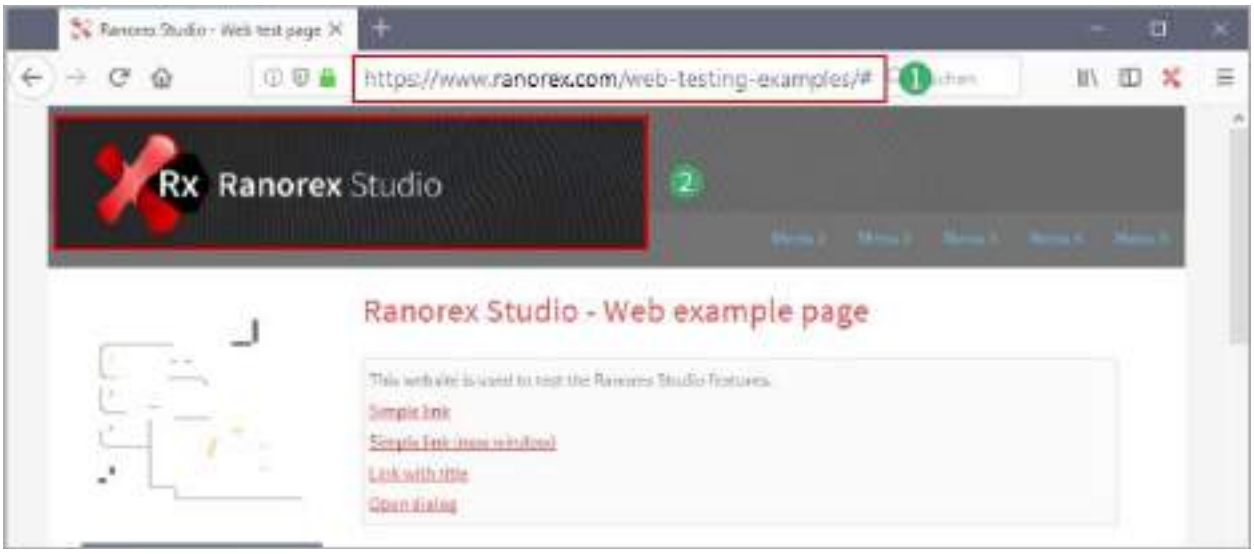
Build a web test

In this chapter, you'll learn how to build a simple web test from start to finish, including recording the test, running it, and viewing the test run report.

Test definition

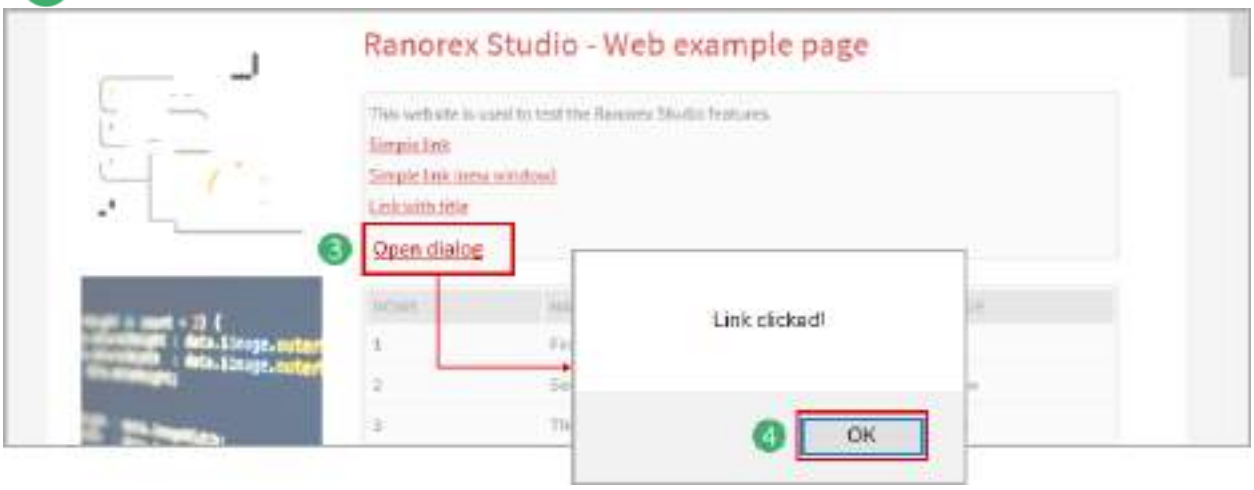
Our test will contain the following steps:

1. **Start** the browser and open the URL www.ranorex.com/web-testing-examples/
2. **Check** if the Ranorex Studio logo is displayed at the top.



3 **Click Open dialog**.

4 **Click OK** to confirm and close the dialog window.



5 **Close** the browser.

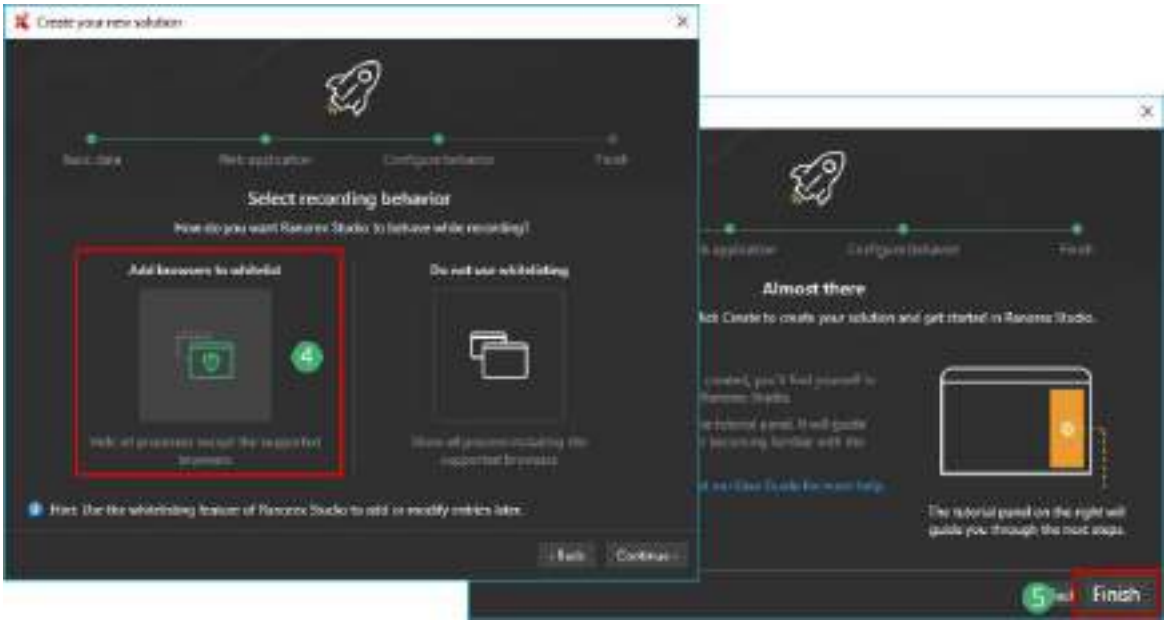
> **Note**
>
> In automated tests, using the action **Close application** is usually more robust than closing an application "manually" by clicking the X in the application window. This is why the default web test project uses this action.

Create a new web test

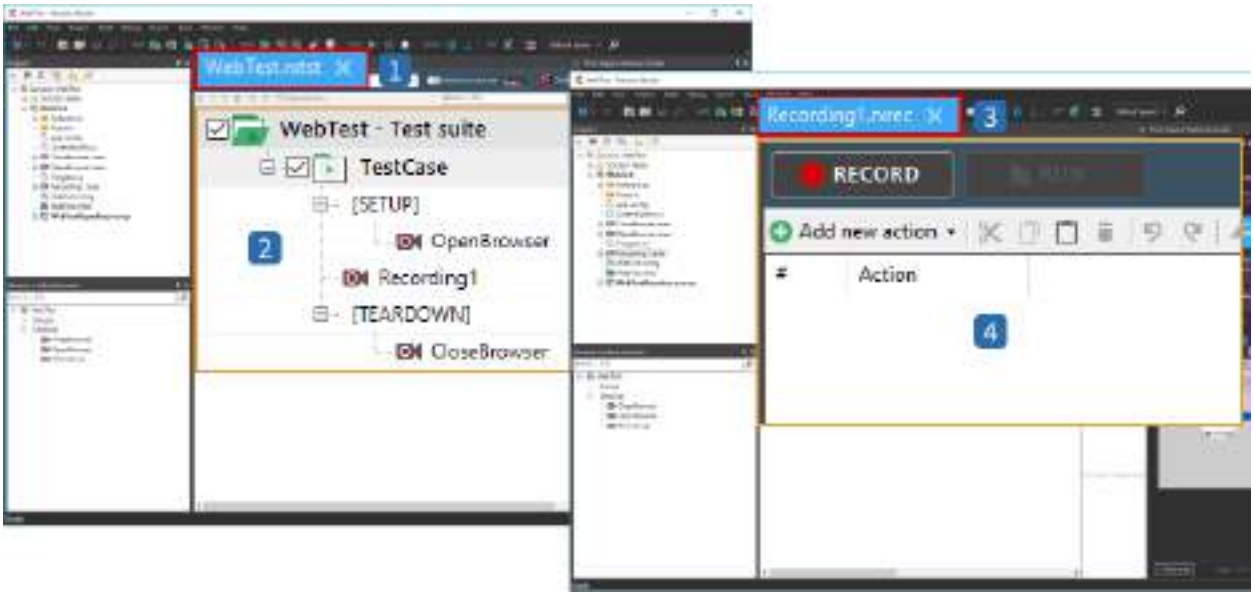
We'll create a new web test using the ⇢ RocketStart wizard.

1. On the Ranorex Studio Start Page, **click New test solution using wizard…** or **go to File > New > Solution using wizard…**
2. **Click Web.**
3. **Follow** the instructions of the wizard. Name your solution **WebTest**. When prompted, select Mozilla Firefox as your browser (make sure it's installed on your computer) and specify www.ranorex.com/web-testing-examples/ as the URL.

4. When asked to select the recording behavior, **select Add browsers to whitelist**, as our test will only cover interactions with the previously selected browser. If we were going to interact with desktop applications and wanted this in our test, we'd select **Do not use whitelisting**.
5. On the final screen, **click Finish**. Ranorex Studio will then open the prepared solution.



The prebuilt web test will look like this:



1 **Test suite view**
This is where you build and control your tests.

2 The solution comes with a test suite project that contains a simple prebuilt test suite structure. It contains a test case with three recording modules: **OpenBrowser,** which starts the browser and navigates to the URL; **Recording1,** which is empty and ready for you to record test actions; and **CloseBrowser,** which closes the browser.

3 **Recording module view**
In the recording module view of **Recording1,** you can record and manage test actions.

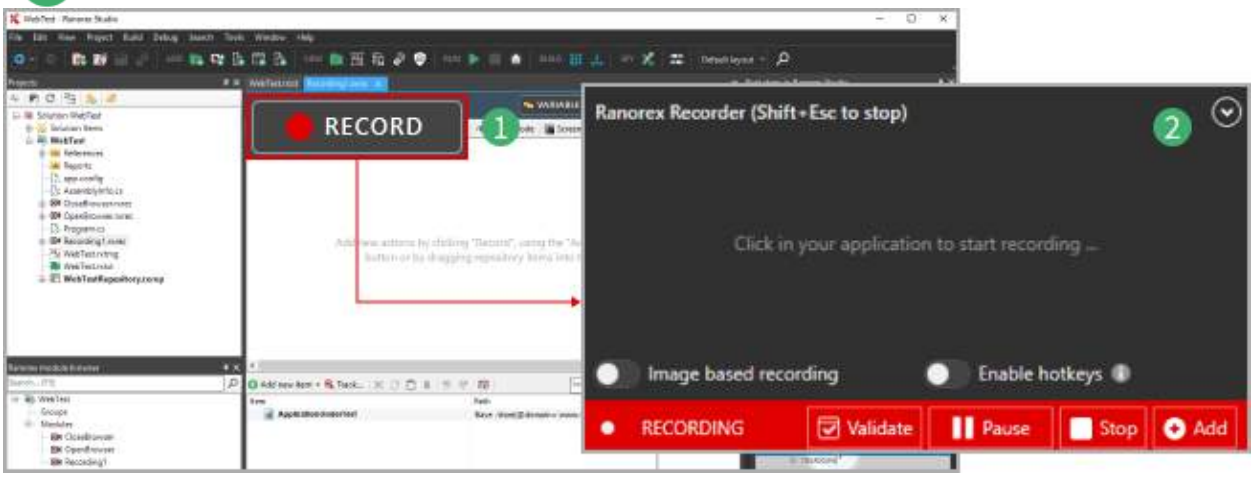
4 **Empty actions table**
This is where your recorded actions appear.

Record the test

Before you start recording, make sure Firefox is running and the URL www.ranorex.com/web-testing-examples/ is opened. Don't record these steps. They are already included in the prebuilt project.

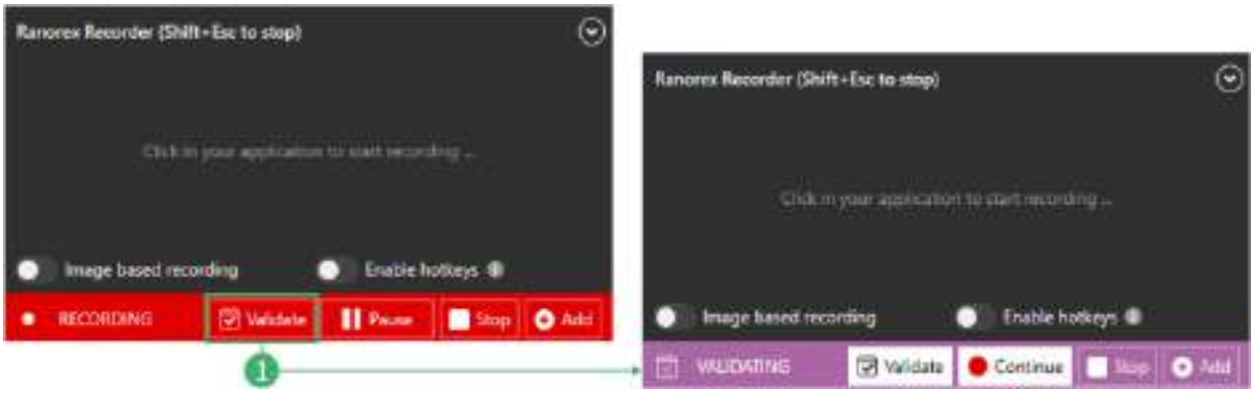
Once that's done, you can start recording.

1. In the recording module view, **Click RECORD**. Ranorex Studio is minimized.
2. The Recorder control panel appears in the bottom right.

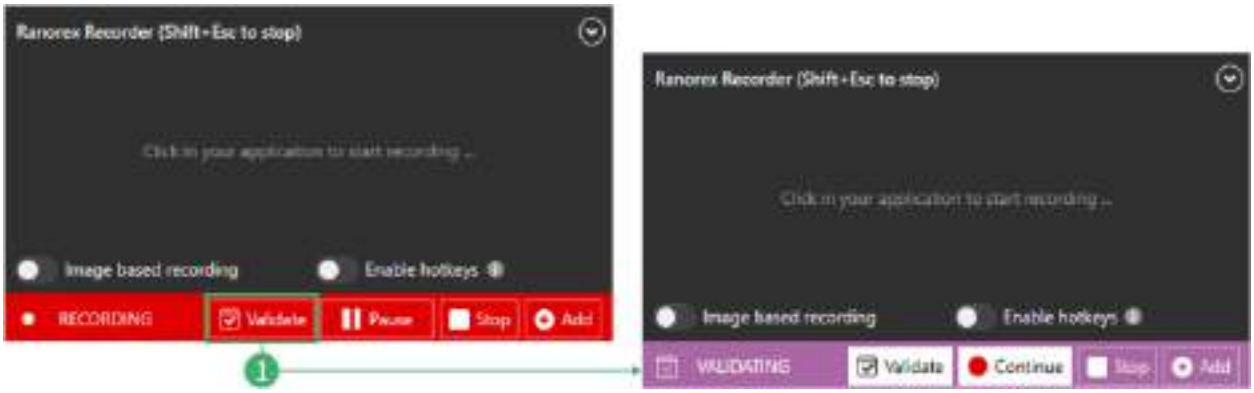


Validate the logo

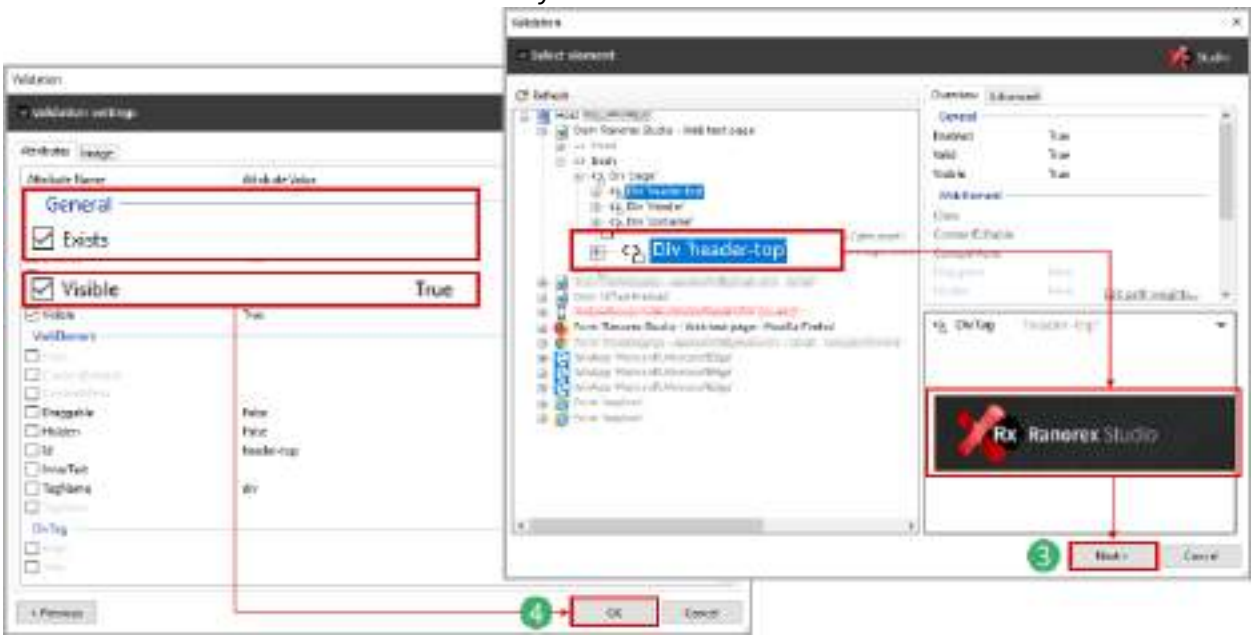
1. In the control panel, **click Validate**.



2. **Mouse over** the Ranorex Studio logo and **click** it when the purple frame surrounds it as in the screenshot.

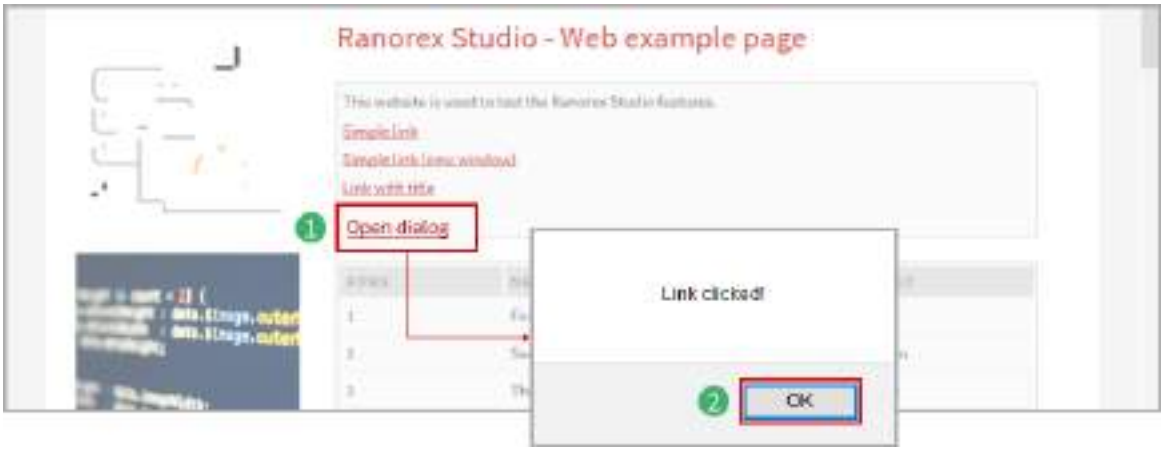


3. The **Select element** window opens. Check if the correct image has been selected and **click Next** to confirm.
4. The Validation settings open. We're checking that the logo exists and is visible. Both of these attributes should already be selected. **Click OK** to confirm.

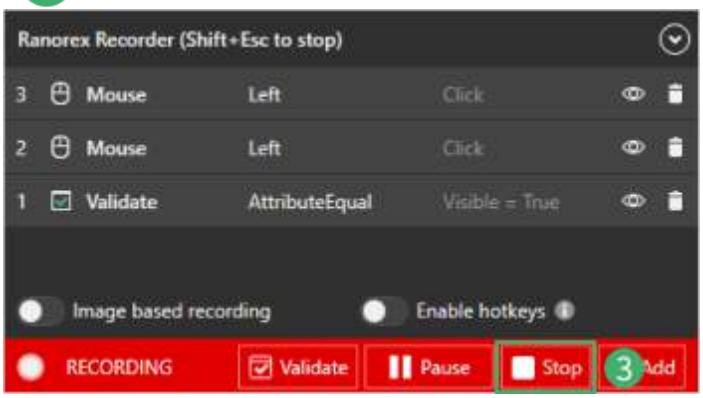


Open and confirm the dialog window

1. In the browser, **click Open dialog**. A simple dialog window opens.
2. **Click OK** to confirm and close the dialog.

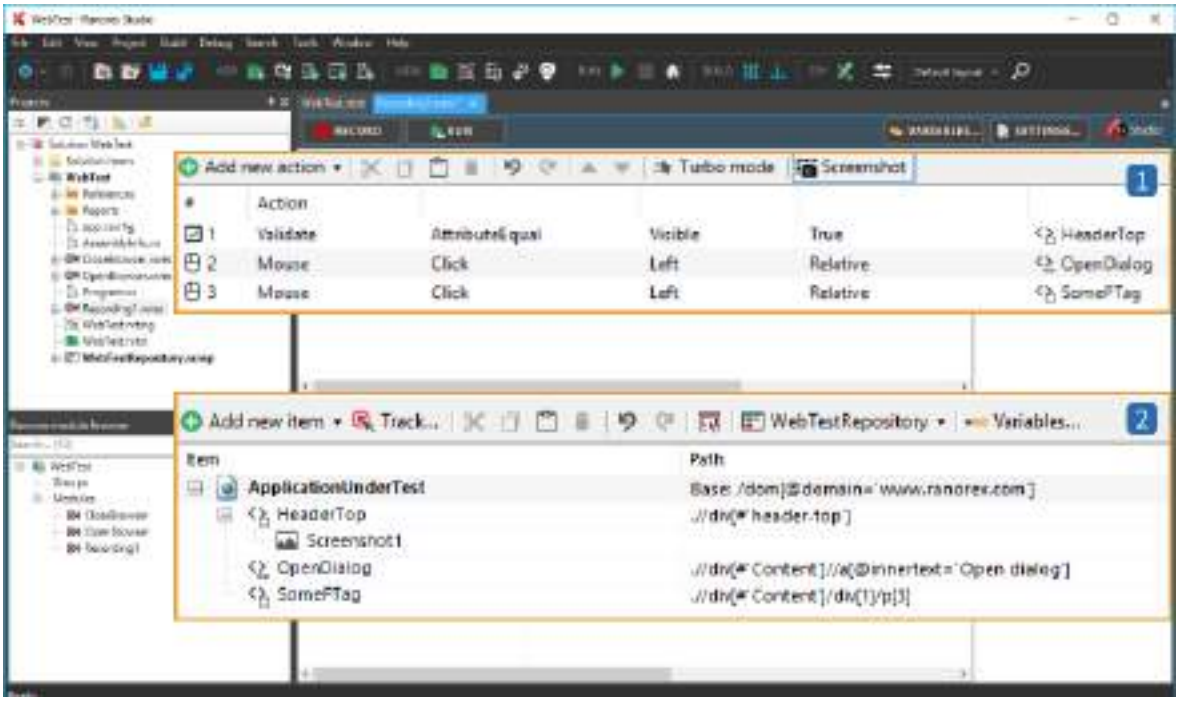


3 Finally, in the Recorder control panel, **click Stop** to finish the recording.



Results

The control panel disappears and Ranorex Studio comes back into focus, showing the following:

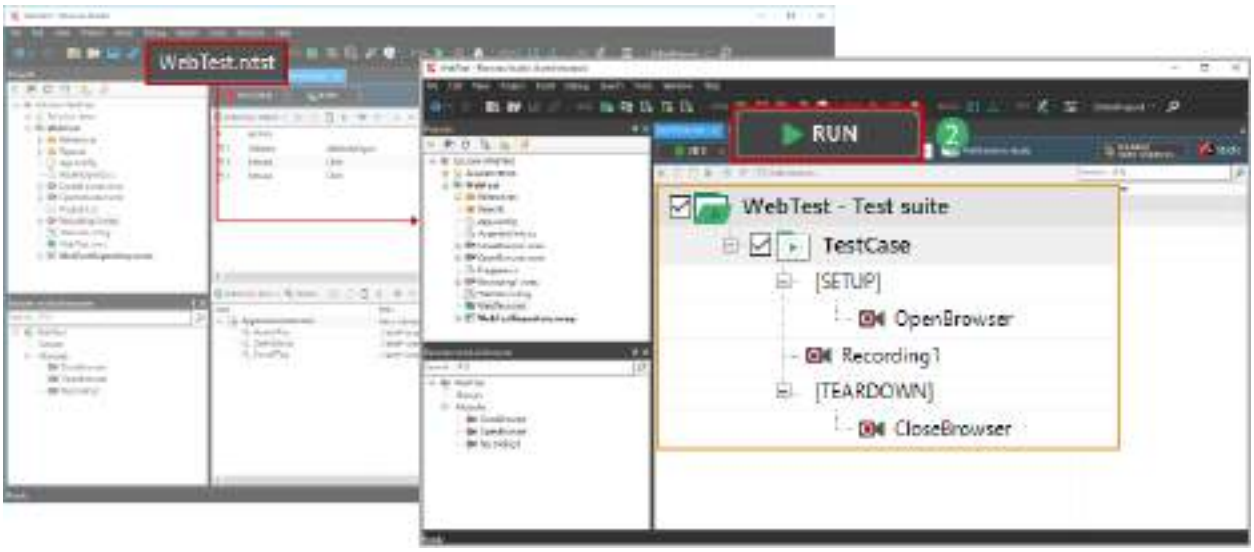


1. Action table with three recorded actions.
2. Repository with repository items referencing the three UI elements interacted with during the recording.

Run the test and review the report

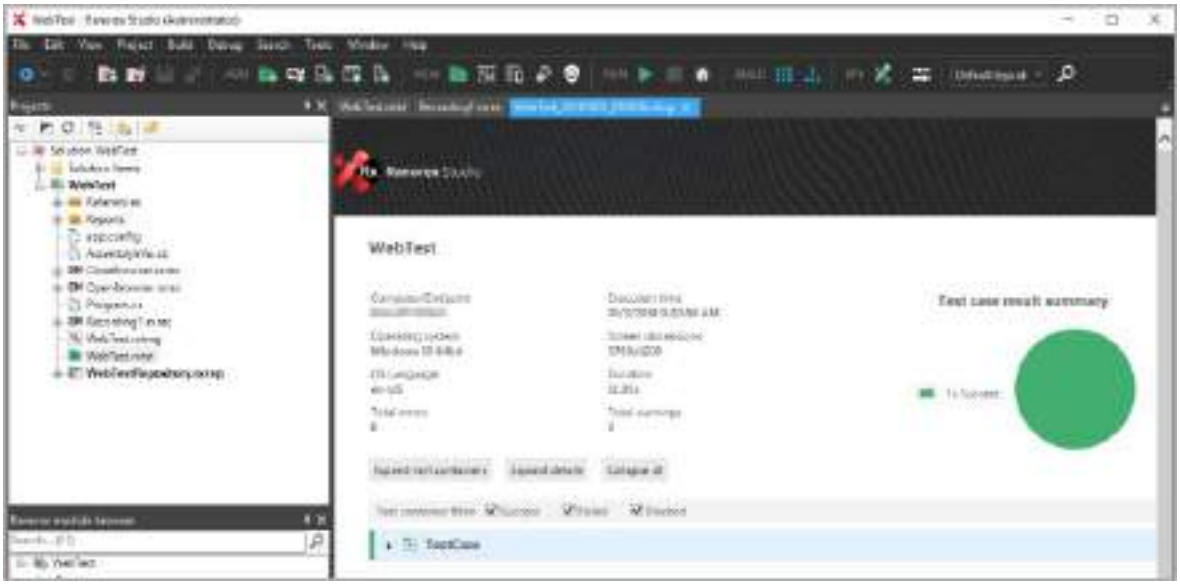
Let's run the test and review the test run report.

1. **Close** all instances of Firefox.
2. **Click** the tab **WebTest.rxtst** to switch to the test suite view and **click RUN**.

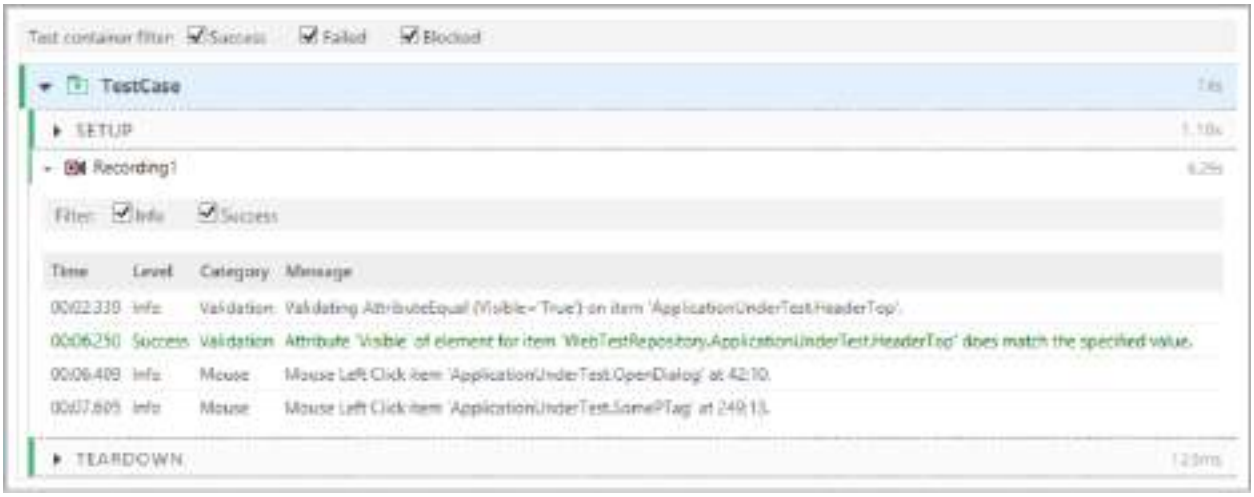


Report

Once the test run has finished, the report will appear. In our case, it should look like this:



A detailed view of the test case shows that all actions were executed successfully.



Reference

Reports are explained in Ranorex Studio fundamentals > ⇢ Reporting

Website structure in Ranorex Studio

Ranorex Studio can recognize the entire HTML architecture of a website and make it available for automated tests. Use Ranorex Spy to browse through a website's structure and see how it's represented within Ranorex Studio. Websites are organized into three basic parts in Spy. These are explained below.

Domain object model (DOM)

This is the top-level node. Each website opened in a browser has its own DOM node in Spy.

1 Browser in Spy showing five DOM nodes, each representing an individual website.

Browser-specific elements

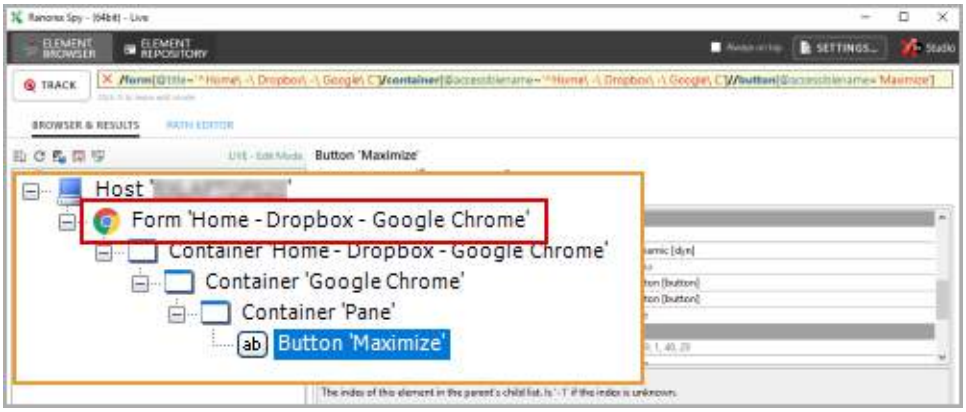
Each browser also has browser-specific elements that aren't contained in a DOM node. These relate mostly to control elements and application windows, e.g.:

- Window controls (minimize, maximize, close)
- Pop-ups
- Dialog windows

These elements are organized in browser-specific FORM nodes.

1. Tab control elements in a browser (note the website in the tab is still a DOM node).
2. Window controls in a browser.
3. Dialog window in a browser.

These elements are organized in browser-specific FORM nodes.



Note

Browser-specific elements can cause issues in cross-browser tests because naturally, different browsers have different elements. They should either be avoided or individualized in these cases.

You can handle browser-specific elements in the RanoreXPath or in code.

A RanoreXPath handling a button for two different browsers by way of their process names would look as follows:

```
/form[@processname='firefox' or
[@processname='chrome']//button[@text='OK']
```

If you want to include more process names, the following is a more economical way of doing so:

```
/form[@processname~'[iexplore|IEXPLORE|chrome|firefox]'//button[@text=
'OK']
```

The Ranorex Automation Library included in Ranorex Studio also makes it possible to differentiate between browser-specific elements by way of various variables and methods in

code. For example, the variable **BrowserName** allows distinguishing between different browsers. The following code example demonstrates this:

C#

```
// Click the OK button in popping up dialog of one of the supported browser
// If the current browser is Internet Explorer
if(webDocument.BrowserName == "IE")
{
Button okIE = "/form[@processname~'(iexplore|IEXPLORE)']//button[@text='OK']";
okIE.Click();
}
// If the current browser is Mozilla Firefox
else if(webDocument.BrowserName == "Mozilla")
{
Button okFF = "/form[@processname='firefox']//button[@text='OK']";
okFF.Click();
}
// If the current browser is Google Chrome
else if(webDocument.BrowserName == "Chrome")
{
Button okChrome = "/form[@processname='chrome']//button[@text='OK']";
okChrome.Click();
}
// If the current browser is Apple Safari
else if(webDocument.BrowserName == "Safari")
{
Button okSafari = "/form[@processname='Safari']//button[@text='OK']";
okSafari.Click();
}
```

VB.NET

C#

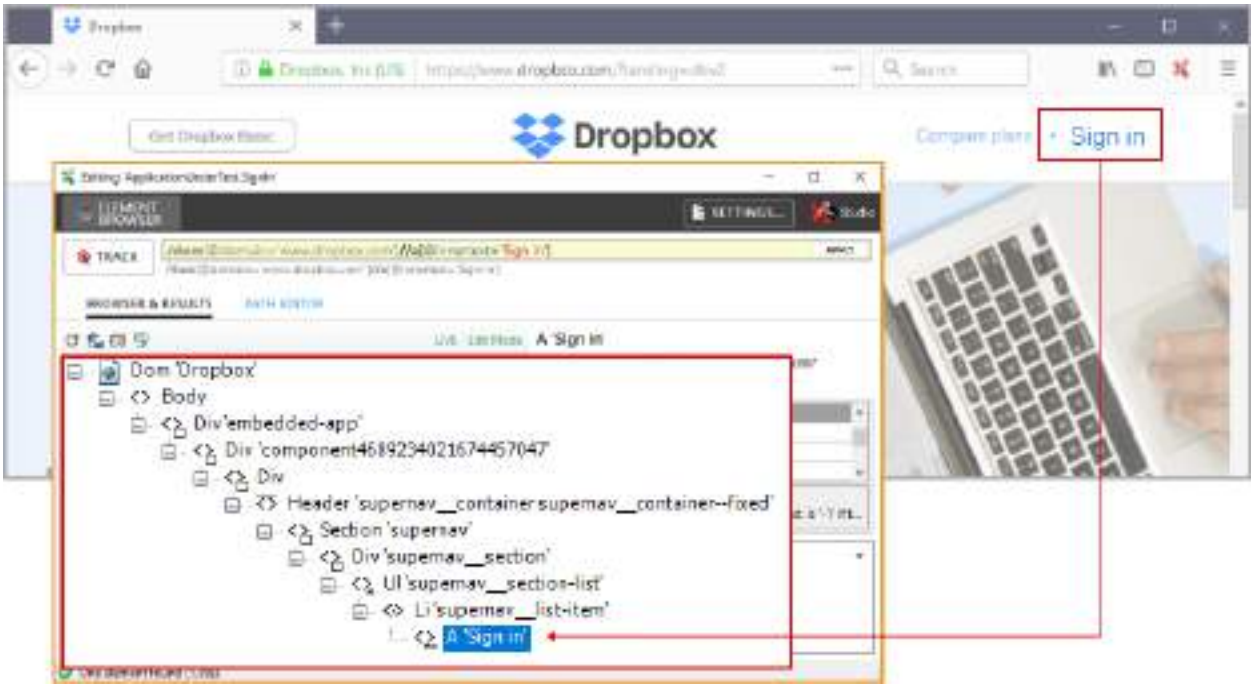
VB.NET

```
' Click the OK button in popping up dialog of one of the supported browser

' If the current browser is Internet Explorer

If webDocument.BrowserName = "IE" Then

Dim okIE As Button = "/form[@processname~'(iexplore|IEXPLORE)']//button[@text='OK
']"

okIE.Click()

' If the current browser is Mozilla Firefox

ElseIf webDocument.BrowserName = "Mozilla" Then

Dim okFF As Button = "/form[@processname='firefox']//button[@text='OK']"

okFF.Click()

End If

' If the current browser is Google Chrome

ElseIf webDocument.BrowserName = "Chrome" Then

Dim okChrome As Button = "/form[@processname='chrome']//button[@text='OK']"

okChrome.Click()

End If

' If the current browser is Apple Safari

ElseIf webDocument.BrowserName = "Safari" Then

Dim okSafari As Button = "/form[@processname='Safari']//button[@text='OK']"

okSafari.Click()

End If
```

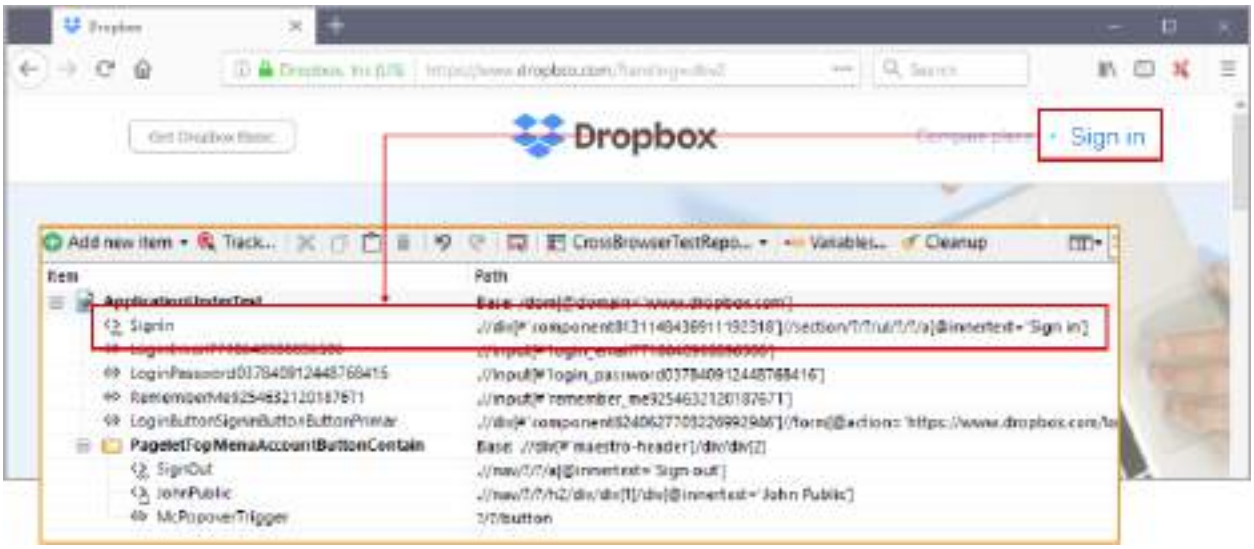
The WebDocument class and its variables and methods are described in the Ranorex API documentation under Ranorex > WebDocument.

Website elements

Website elements are targeted using ⇢ RanoreXPath, just like elements in a desktop application. The element browser in Spy displays this as follows:



In the repository, identified website elements are referenced as repository items and displayed as follows:



Advanced web testing

In this chapter, we'll cover some advanced topics regarding web testing.

Use the Wait for action to wait until an element has loaded

Loading times that take longer than usual are a common issue in web tests. They can cause tests to fail and can get quite annoying, as they are often outside of the tester's control. One way to work around these loading times is by instructing the test to wait until a certain element has loaded. In Ranorex Studio, you can easily do so with the **Wait for** action.

1. In the action table, **add** a Wait for action after an action that loads a web page and before an action that manipulates an element on the loaded page.

1. Wait for action with 10s waiting time. The action waits until the linked repository item exists. This should be the repository item that is manipulated in the following action.
2. The repository item that the action waits for to exist.

> **Note**
>
> Your test can still fail if loading takes longer than the time set in the Wait for action and the repository item doesn't exist. Choose a sensible time value that prevents failure because of insignificant loading delays and doesn't keep your test searching for an element for too long.

Note

Instead of the Wait for action, you can also use the Delay action to pause your test run.

However, the Delay action always pauses the test run for the specified time, regardless of an element existing or not. This is why you should use the Wait for action if there is a repository item you can sensibly link it to. This way, your test won't idle unnecessarily.

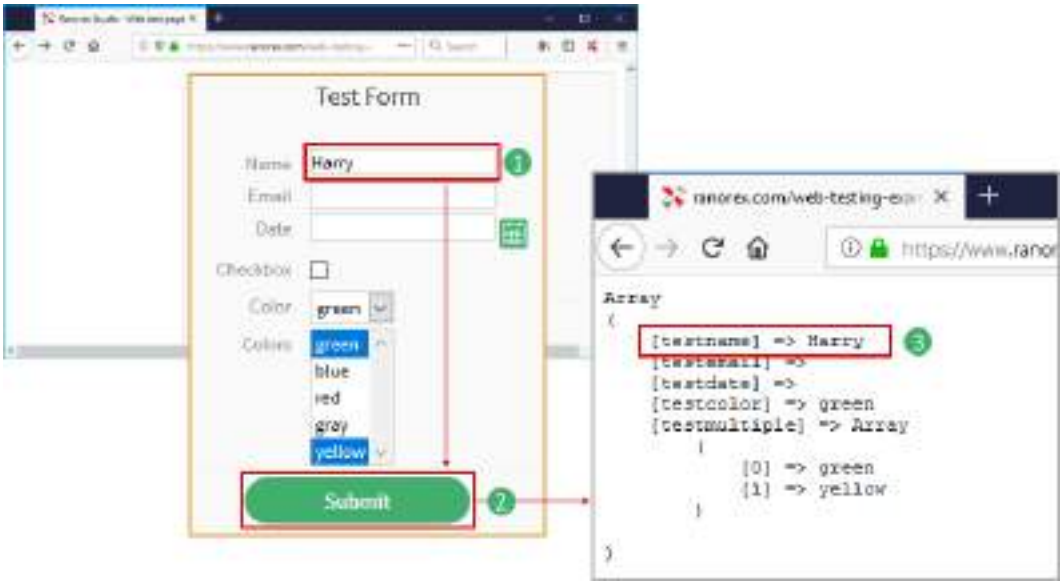
Use the Set value action to enter values more robustly

Entering values like text strings in web forms is a common scenario in web tests. This can either be accomplished by simulating the keypresses on a keyboard (Key sequence action) or by directly setting the form to a specific value. The latter is usually more robust because no mouse clicks or similar are required, so there is less potential for failure. Conversely, this can cause the test to miss certain defects because you deviate farther from a true user experience.

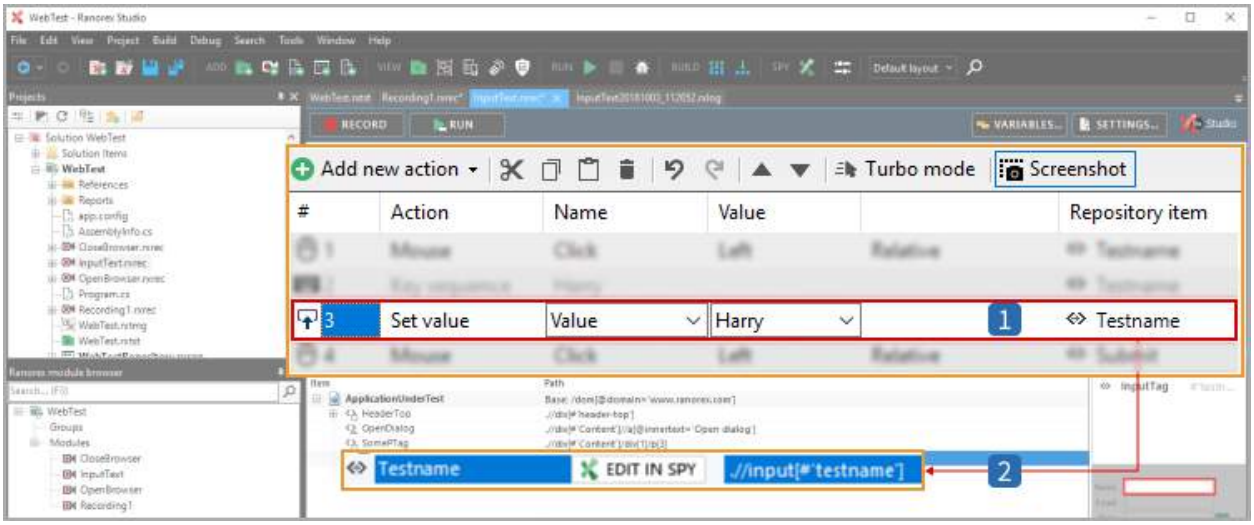
Test situation

In our example, we'll enter a name in the sample form on the Ranorex test website. The process is as follows:

1. **Enter** the name in the text field of the form.
2. **Click Submit** to submit the name.
3. The page that appears as a result.



What it looks like in the action table



1. Set value action that enters the name in the text field.
2. Repository item **Testname** that represents the text field.

Result

The value is set directly in the form without any mouse clicks or typing.

> **Reference**
>
> For more details on the Set value action, refer to Ranorex Studio fundamentals > Actions > ⇢ Action properties.

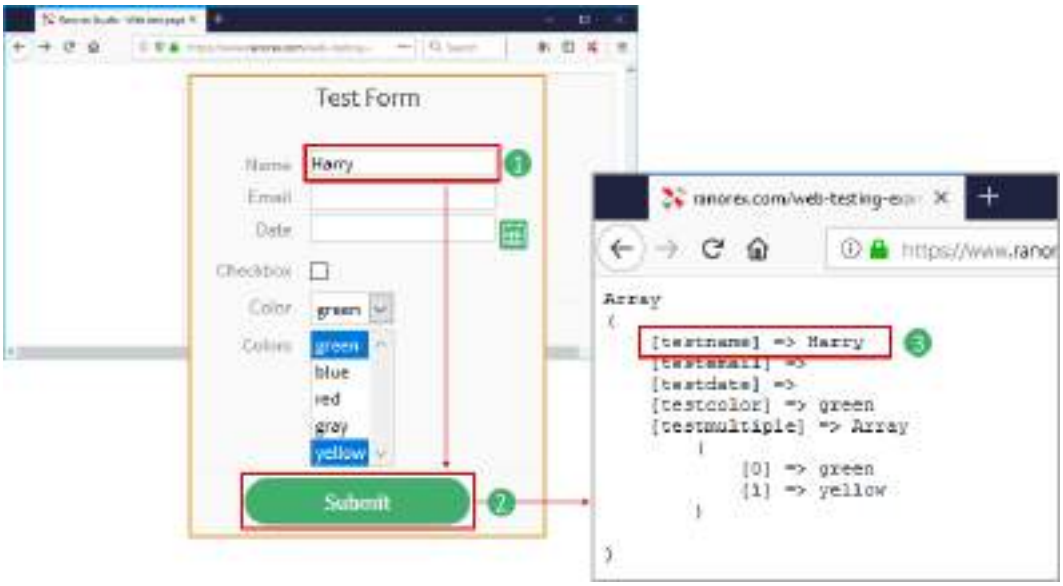
Use the Get value action to read out values for use in the test

It's often useful or necessary to read out values on websites (numbers, strings, etc.) and use them further along in the test. The simplest way to do this is with the **Get value** action.

Test situation

In our example, we'll read out a list value to reuse it in the sample form on the Ranorex test website.

With the default values selected, clicking the **Submit** button produces the following result:

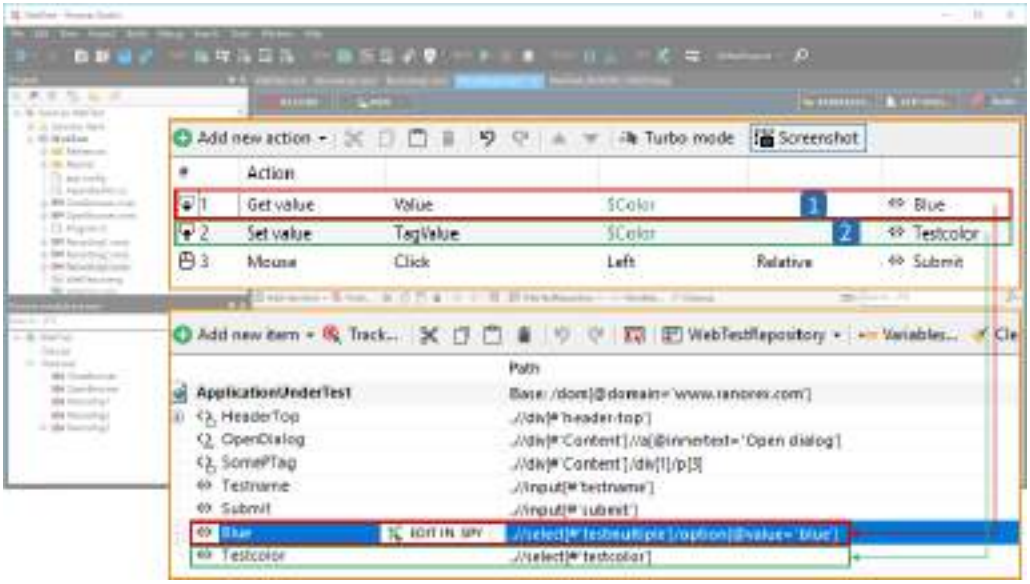


1. Color/testcolor is set to green.
2. Colors/testmultiple is set to green and yellow.

We'll now

- get the value blue from the testmultiple parameter and
- set the testcolor parameter to this read-out value.

What it looks like in the action table



1 The Get value action reads out the value blue from the Colors field and passes it to the variable $Color.

2 The Set value action uses the value of the variable $Color and sets the field Color/testcolor to it.

Result

The resulting page will look like this:

1 The field testcolor now has the value blue, as set by the Set value action.

2 The testmultiple field is still set to the default values. The Get value action only reads out the value blue.

Reference

For more details on the Get value action, refer to Ranorex Studio fundamentals > Actions > ⇢ Action properties.

WebDocument Adapter

The WebDocument Adapter creates a representation of the complete website including all tags (e.g. the header tag, body tag, etc.). Furthermore it offers useful ways to make your test scripts more effective.

The following sample shows how to use these features:

C#

```
// Identify a web document by its title
WebDocument webDocument = "/dom[@caption='Ranorex Test Page']";
// Open a website
webDocument.Navigate("http://www.ranorex.com");
// Wait until the document is loaded
webDocument.WaitForDocumentLoaded();
// Execute a javascript code
webDocument.ExecuteScript("history.back();");
```

VB.NET

```
' Identify a web document by its title
Dim webDocument As WebDocument = "/dom[@caption='Ranorex Test Page']"
' Open a website
webDocument.Navigate("http://www.ranorex.com")
```

```
' Wait until the document is loaded
webDocument.WaitForDocumentLoaded()
' Execute a javascript code
webDocument.ExecuteScript("history.back();")
```

Find or filter web elements

The Ranorex Framework offers a wide range of adapters for each HTML tag elements (e.g.: ATag adapter for <a> tags). Each adapter has specific methods and attributes; the link tag (<a>) for example has additional attributes like HREF, TARGET and REL.

C#

```
// Start IE with a specific website
System.Diagnostics.Process.Start("iexplore.exe", "/web-testing-examples");
// Identify the webdocument by its title
WebDocument webDocument = "/dom[@caption='Ranorex Test Page']";
// Find a link by its link text (innertext)
ATag link = webDocument.FindSingle(".//a[@innertext='simple link']");
link.Click();
```

VB.NET

```
' Start IE with a specific website
System.Diagnostics.Process.Start("iexplore.exe", "/web-testing-examples")
' Identify the webdocument by its title
Dim webDocument As WebDocument = "/dom[@caption='Ranorex Test Page']"
' Find a link by its link text (innertext)
Dim link As ATag = webDocument.FindSingle(".//a[@innertext='simple link']")
link.Click()
```

Repositories and the WebDocument

The following example shows how to access the methods of the WebDocument using a repository:

C#

```
// Load repository
ProjectRepository repo = ProjectRepository.Instance;
// Open a website
repo.WebPage.Self.Navigate("http://www.ranorex.com");
// Wait until the document is loaded
repo.WebPage.Self.WaitForDocumentLoaded();
```

VB.NET

```
' Load repository
Dim repo As ProjectRepository = ProjectRepository.Instance
' Open a website
repo.WebPage.Self.Navigate("http://www.ranorex.com")
' Wait until the document is loaded
repo.WebPage.Self.WaitForDocumentLoaded()
```

Cross-browser testing

Cross-browser testing involves executing one test across multiple browsers. This can save a lot of time and reduce maintenance efforts, but it comes with its own challenges. In this chapter, we'll go through a cross-browser example step by step.

Test scenario

We want to use Ranorex Studio to test a specific scenario on three different browsers: Microsoft Internet Explorer, Google Chrome, and Mozilla Firefox. We want to accomplish this with only one test that works for all these browsers.

To demonstrate our cross-browser example, we'll use a free Dropbox account. **Dropbox** is a registered trademark of Dropbox, Inc. and Dropbox International Unlimited Company. Their terms of services and privacy policy apply. Ranorex GmbH, Ranorex, Inc. and Dropbox, Inc. are not affiliated in any way.

> **Note**
>
> You will need to create your own free Dropbox account for this example.

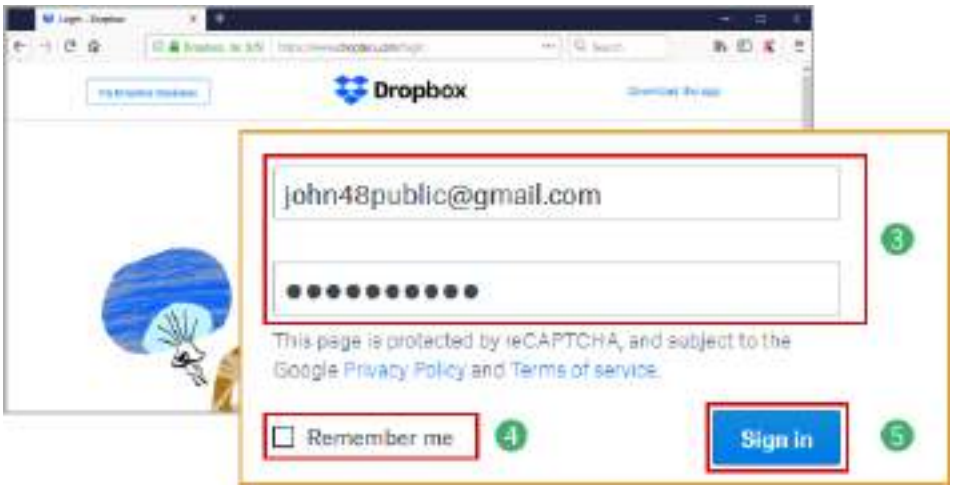
Our test will go through four steps that are defined as follows:

Start

1. Start the browser and go to the URL www.dropbox.com
2. Click Sign in to reach the sign-in page.

Sign-in

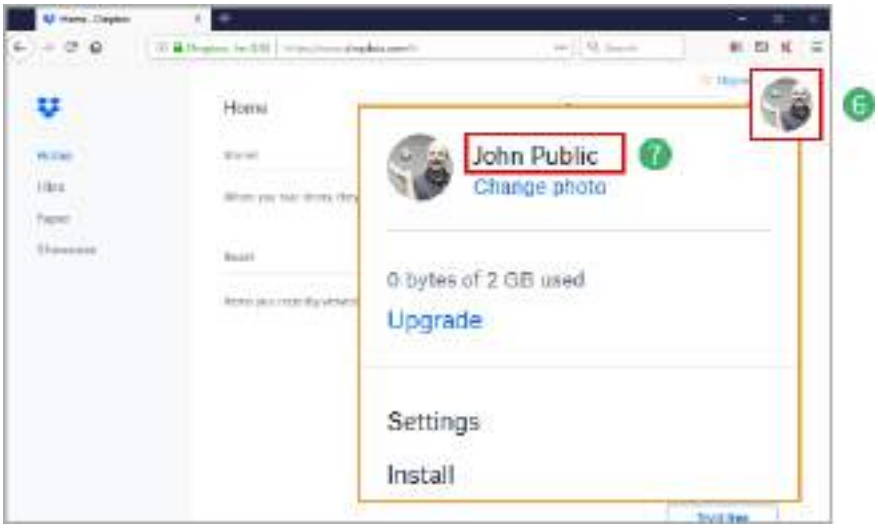
3. Enter e-mail address and password.
4. Uncheck the option **Remember me**.
5. Click **Sign in**.



Check account

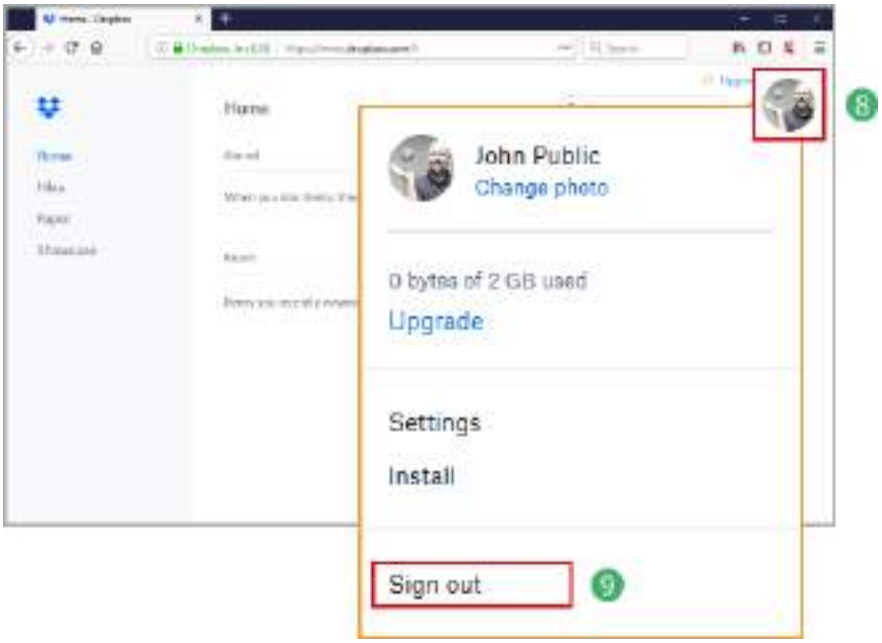
Here, we'll check if we're signed in to the correct account. There are different ways to do this. In our example, we'll click our account picture and validate the account name.

6. Click the account picture to open the account menu.
7. Check if the displayed account name is the same as that of our fictional person (John Public, in our case).



Sign out

8. Click the account picture to open the account menu (if it isn't still open).
9. **Click Sign out.**



Create a new web test

To get started, first create a new web test as explained in ⇢ Build a web test and keep the following in mind:

- Give your solution a meaningful name (e.g. CrossBrowserTest).
- Enter www.dropbox.com when asked for the URL.
- You'll only be able to select one browser in the wizard. This is fine, choose Firefox. We'll extend the test to the other browsers later.
- When asked to select the recording behavior, select **Add browsers to whitelist**.
- Click **Finish**. The new test solution appears.

Before recording

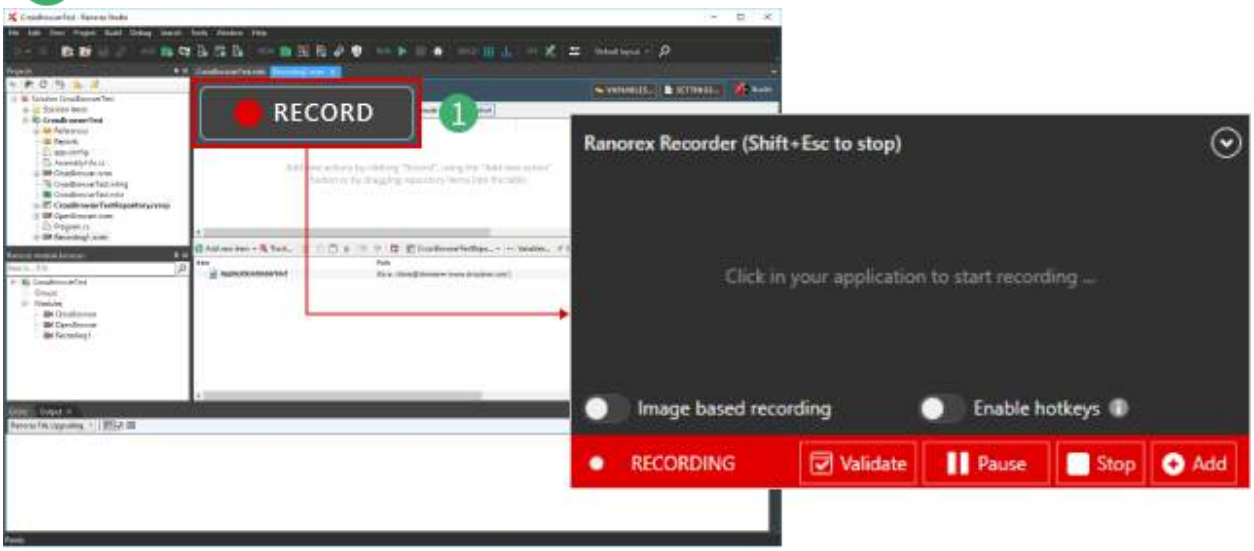
We'll first record our web test on a single browser. Later, we'll adapt it to work across multiple browsers.

Before we start recording, we'll need to make the following preparations (if you've instructed the wizard to start the browsers automatically, you can skip this).

1. **Start** Firefox.
2. **Go** to www.dropbox.com

Record the test

1. **Open the Recording1 module. Click RECORD**.

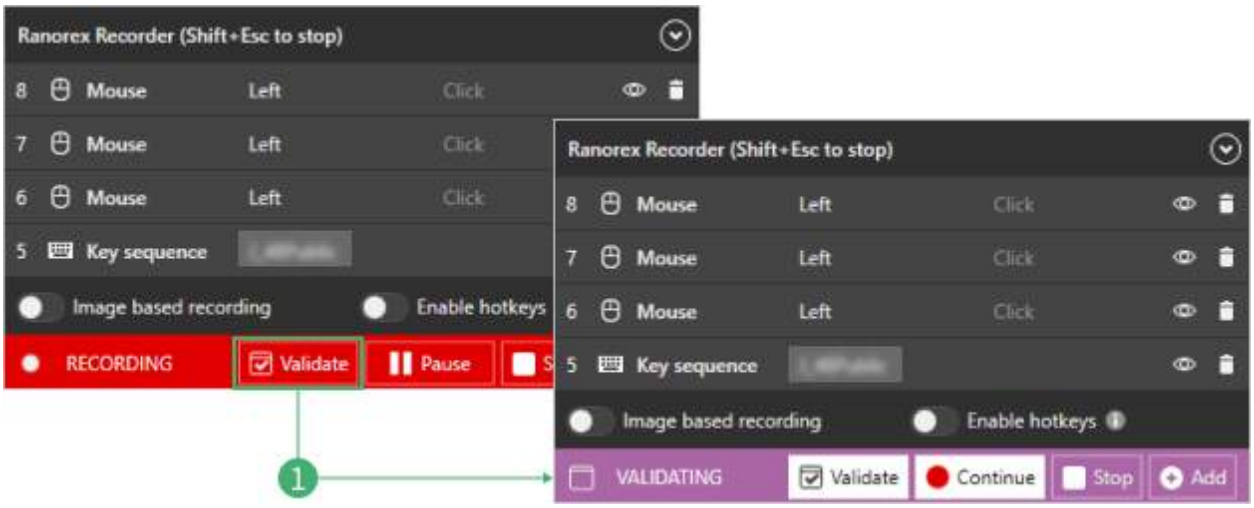


2. **Click Sign in**.
3. **Enter** your e-mail address and password.
4. **Uncheck Remember me.**
5. **Click Sign in.**
6. **Wait** until the page has loaded and **click** the account picture.

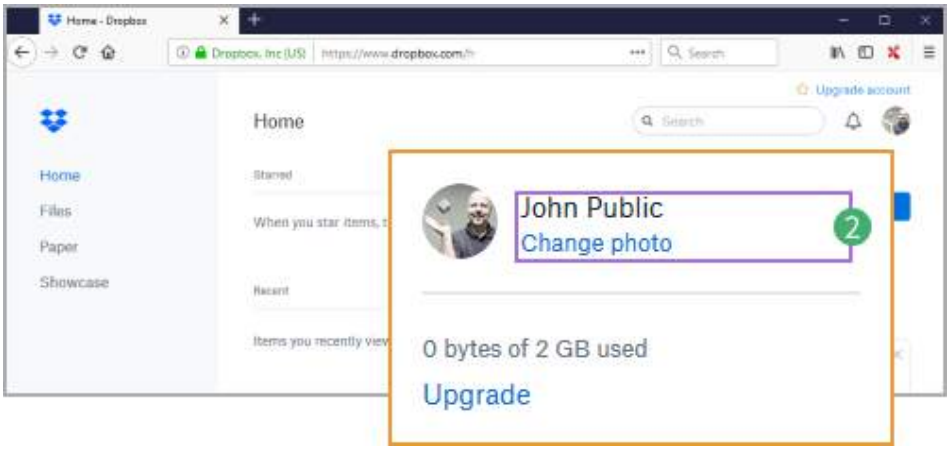
Validation

Here we'll insert a ⇢ validation to check whether we're logged in to the right account. We'll do this by validating the account name, John Public in our case.

1. In the Recorder control panel, **click Validate.**

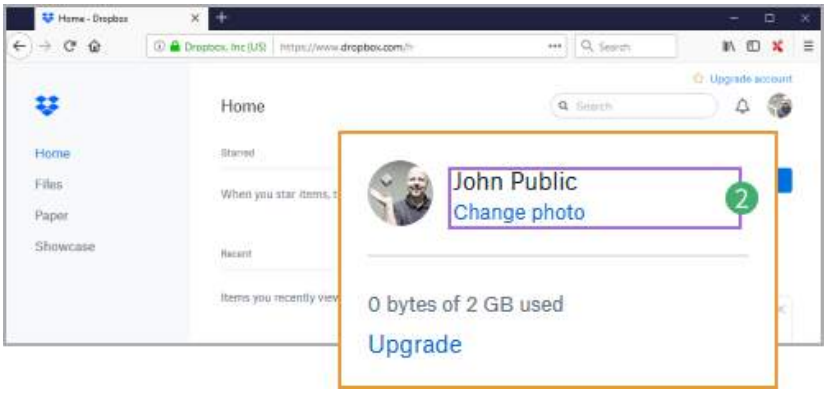


2 **Mouse over** the account name in the account menu. A purple frame will indicate which element is currently selected. **Click** to confirm the selection.



3 In the window that opens, **check** if the correct element has been selected. If not, correct the selection. **Click Next** to confirm.

4 **Make sure** the attributes **Exists** and **InnerText** with the account name are checked. **Click OK** to confirm.



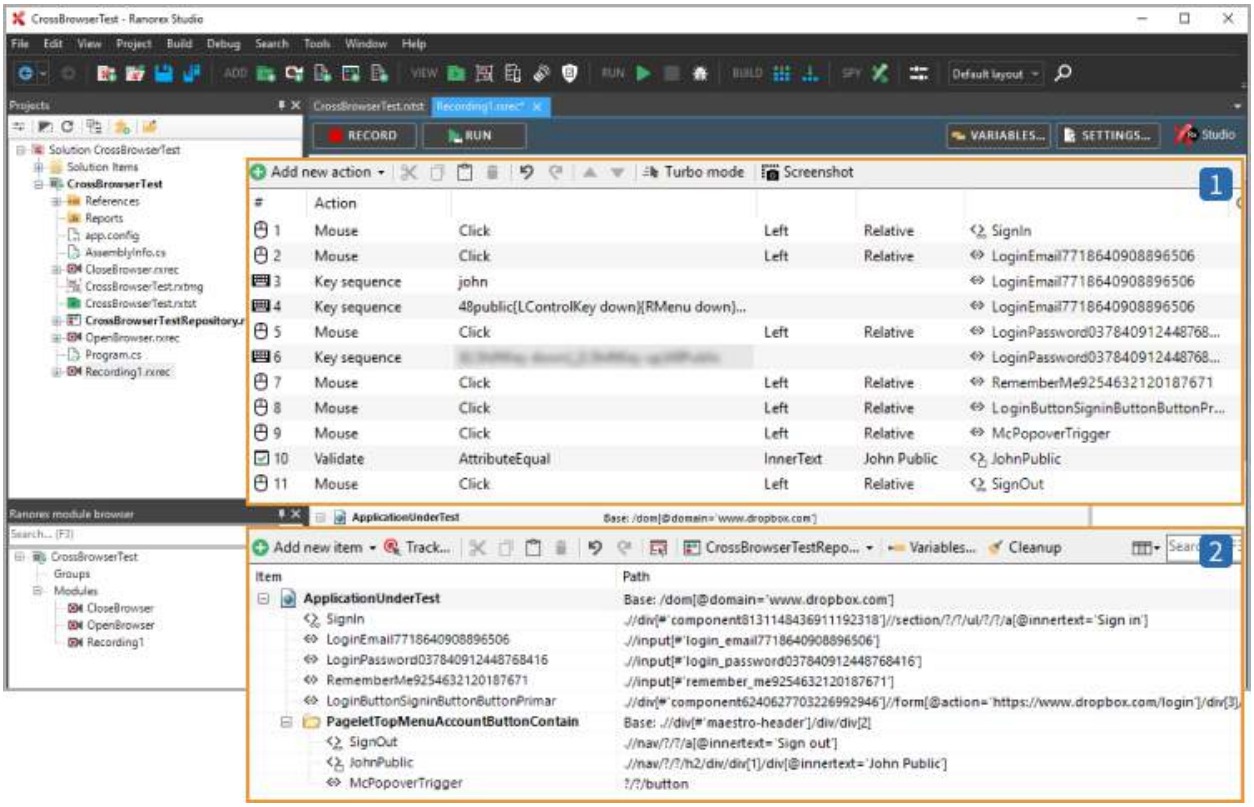
Finish the recording

After the validation is configured, Ranorex Studio will continue recording. It's time to finish the recording.

1. In the opened account menu, **click Sign out**.
2. **Click Stop** in the Recorder control panel to finish the recording.

Result

After stopping the recording, you'll be returned to Ranorex Studio, with the resulting recording being displayed. Let's take a look at this initial version of our cross-browser test.



1. Action table showing 11 actions (your recording may differ slightly in the amount of actions).
2. Repository with 8 repository items organized into two folders.

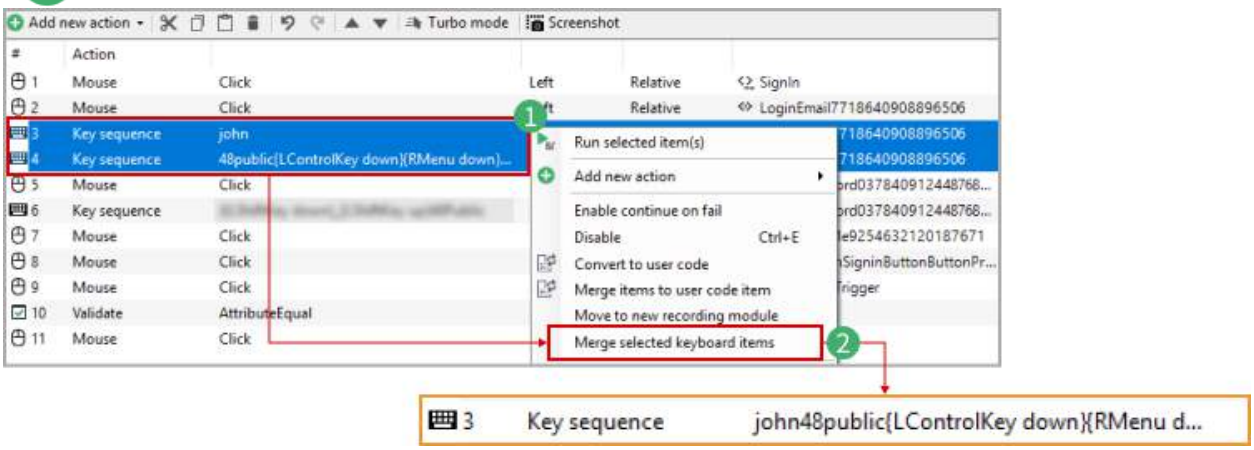
Optimize test for cross-browser adaptation

Before we start turning the test into a cross-browser test, we should optimize it.

Combine key sequences

Sometimes Ranorex Studio will split key sequences. This can happen because the sequence wasn't entered fast enough, for example. You should combine key sequences wherever it makes sense.

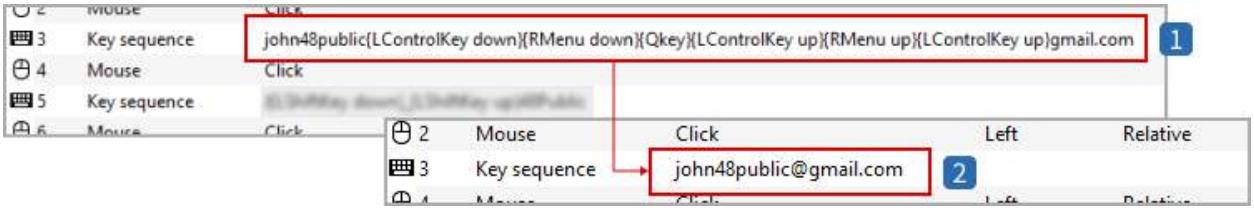
1. **Select** the key sequences you want to combine and open the context menu.
2. **Click Merge selected keyboard items**.



Optimize key sequence content

Sometimes, entering special characters can result in unnecessarily complex strings. Simply correct them manually in the action table.

In the example below, we simply replaced the superfluous keypresses with @.



1. Unoptimized
2. Optimized

Find and replace dynamic identifiers

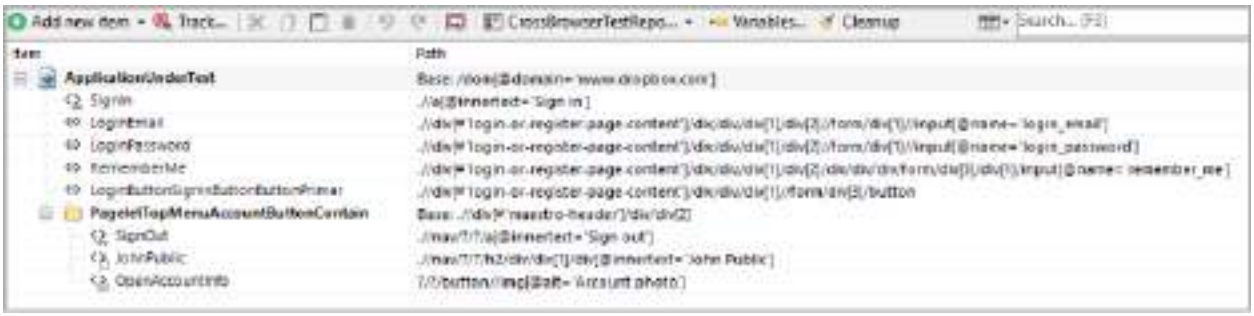
Many applications contain so-called dynamic UI elements. These changes whenever a particular event happens, e.g. when you reload a web page. It's often harder for automated testing tools to find these UI elements reliably. This is because identifiers that are robust for static UI elements (like the element ID) change all the time for dynamic UI elements. This is why you need to fall back on other identifiers for dynamic UI elements.

For web elements, Ranorex Studio uses an **intelligent algorithm** that recognizes when a UI element is dynamic. It ignores dynamic identifiers and uses a robust, static identifier instead. This means you should normally not need to find and replace dynamic identifiers from your repository items. However, in some cases a dynamic identifier may be missed and you'll have to replace it by hand.

Dynamic identifiers usually appear in the RanoreXPath with a name prefix and a long character string that changes whenever the element is loaded (see paths marked in red in image).

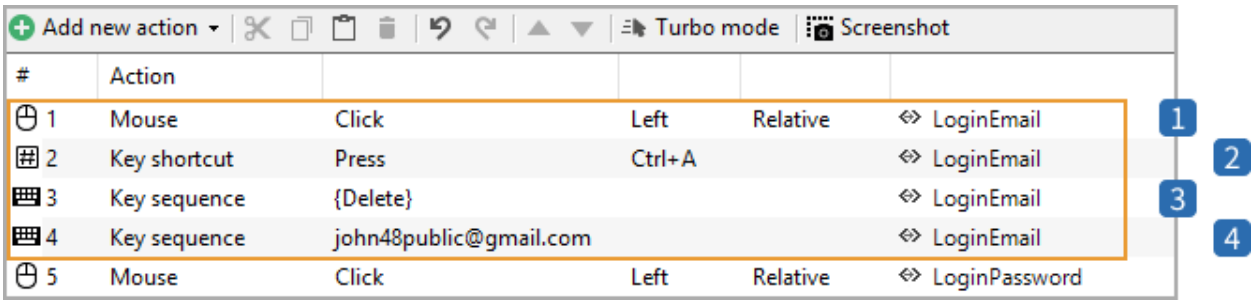
> **Reference**
>
> Replacing dynamic identifiers with more robust ones is explained in Ranorex Studio expert > ⇢ Mapping dynamic UI-Elements.

In our example, the improved repository looks like this:



Empty text fields

In automated testing, it's a good idea to make sure text fields are empty before something is entered in them.



The four actions in the image represent entering the e-mail address into the text field represented by the repository item **LoginEmail**.

1. Click into the text field.
2. Press Ctrl + A to select any existing text in the field.
3. Press Delete to delete the text.
4. Enter the e-mail address.

If the text field is already empty, actions 2 and 3 won't have any effect. The test will continue without issue. Alternatively, you can also use the Set value action to replace all of these four actions or just the actions for emptying the text field.

Structure your test

Your tests should always be well structured. This is why you should organize your actions into various recording modules and structure them in the test suite.

Reference

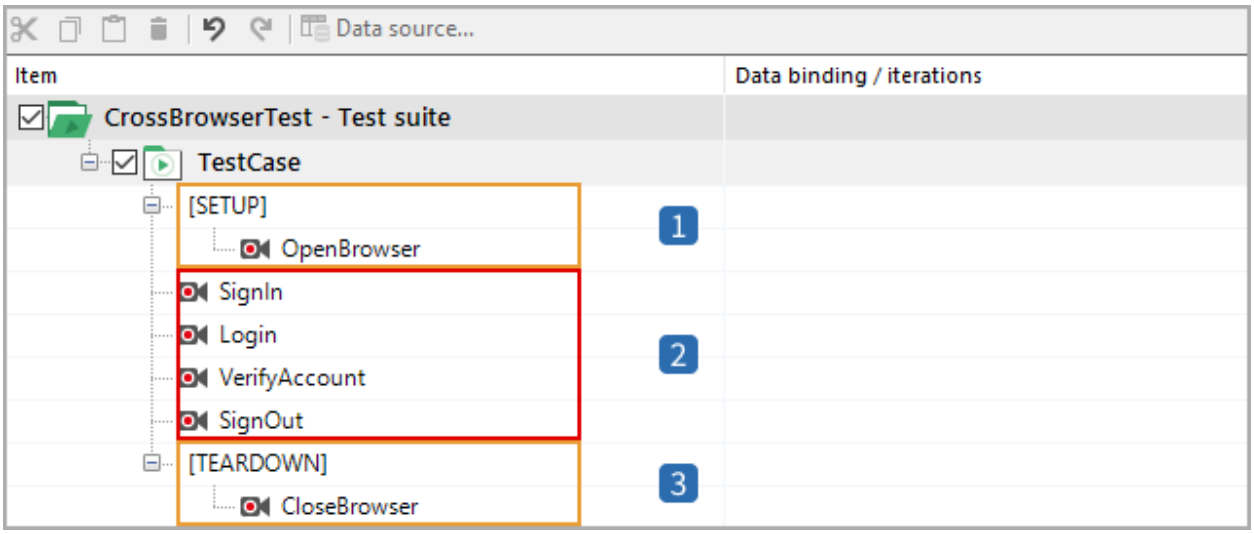
Organizing recording modules is described in

Ranorex Studio fundamentals > Ranorex Recorder > ⇢ Manage recording modules.

Structuring test suites is explained in

Ranorex Studio fundamentals > Test suite > ⇢ Test suite structure.

In our example, we've organized the recorded actions into the following modules and structured the test suite as seen below:



1. Setup region containing the module for starting the browser and opening the URL.
2. Four recording modules to go to the sign in page, sign into Dropbox, check the account, and log out.
3. Teardown region containing the module for closing the browser.

Cross-browser functionality

Now that we've optimized the test, we can implement the cross-browser functionality.

Cross-browser testing is based on data-driven testing and variables.

Reference

These topics are described in

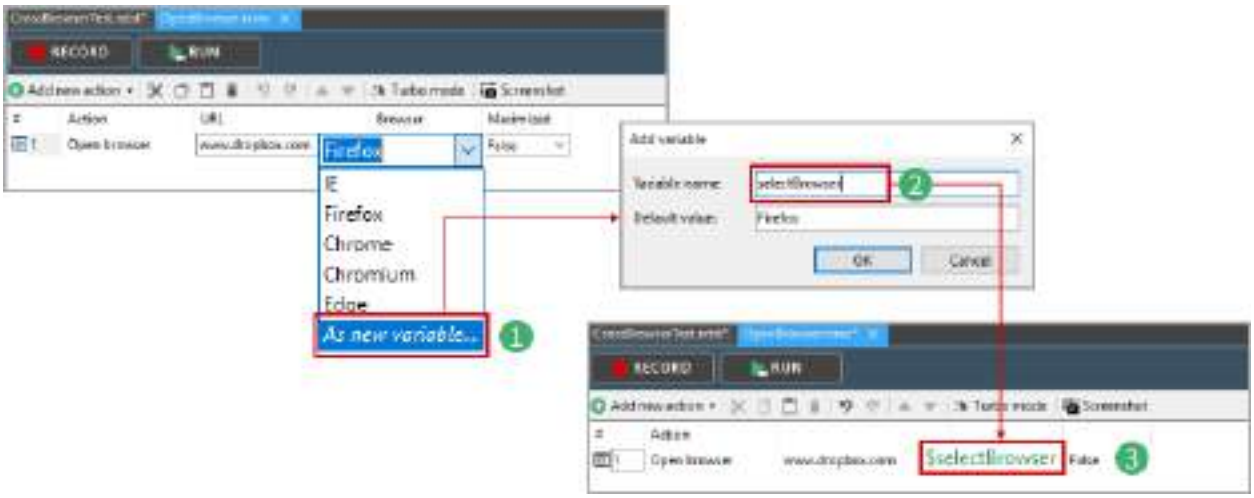
Ranorex Studio advanced > ⇢ Data-driven testing

Ranorex Studio advanced > ⇢ Variables and parameters.

Make the browser type a variable

As a first step, we need to replace the fixed browser in our OpenBrowser.rxrec module with a variable. This variable will take on the different browsers as value during the test run.

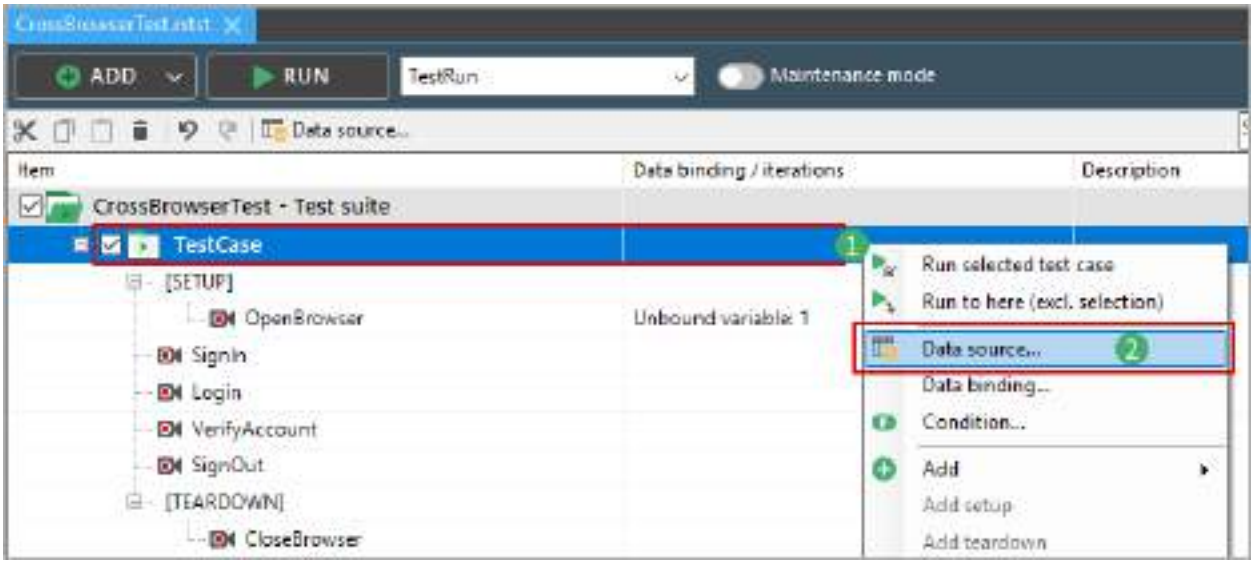
1. **Open** the drop-down menu for the **Browser** property and **click As new variable…**
2. **Enter** a name for the variable, e.g. **selectBrowser**, and **click OK.**
3. The browser type is now a variable in the actions table.



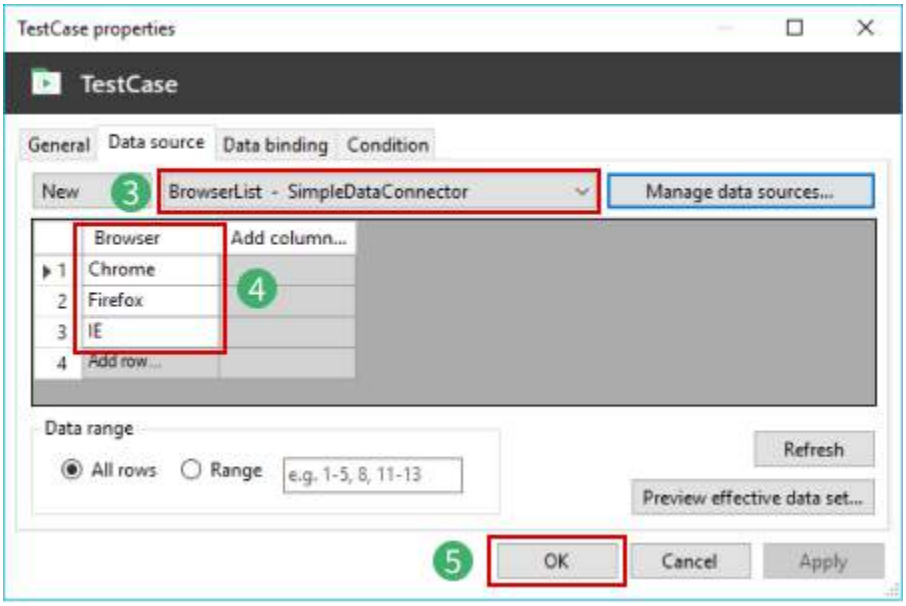
Create the data source containing the browsers

In this step, we'll create a data source to provide values to the browser type variable.

1. **Open** the context menu of the test case in the test suite view.
2. **Click Data source…**



3. **Click New > Simple data table** and **enter** a name for the table, e.g. **BrowserList**.
4. **Use** the **Add column…** and **Add row…** buttons to create the table and **fill** it with the values in the image below.
5. **Click OK**.



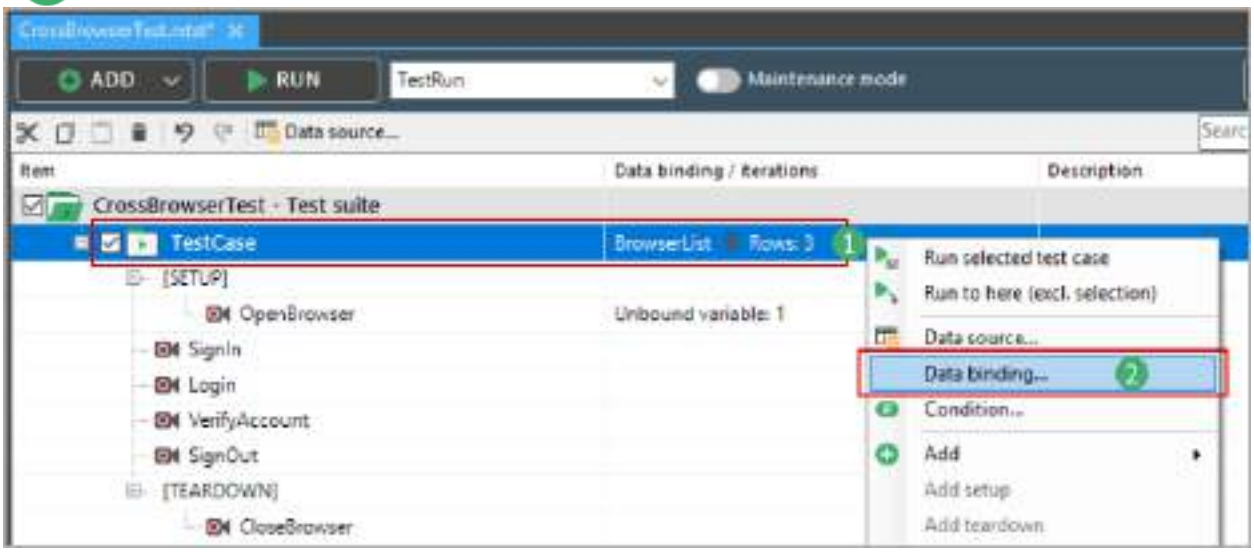
Reference

Creating data sources is explained in

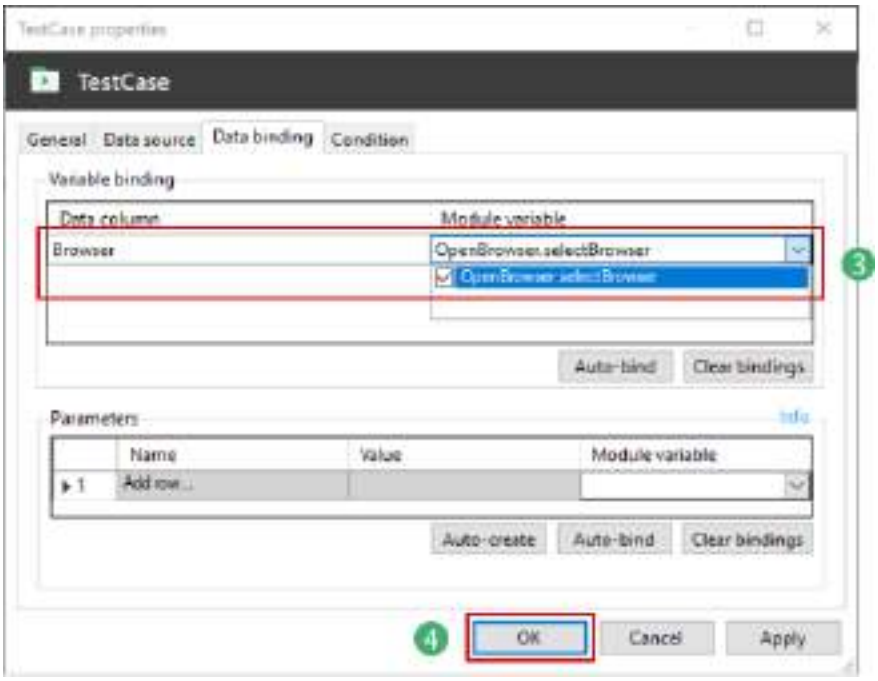
Ranorex Studio advanced > Data-driven testing > ⇢ Data and data management.

Binding the data to the variable

1. **Open** the context menu of the test case in the test suite view.
2. **Click Data binding...**



3. Under **Variable binding > Module variable**, **select** the variable **OpenBrowser.selectBrowser** from the drop-down menu to bind it to the **Browser** column of the data source.
4. **Click OK.**

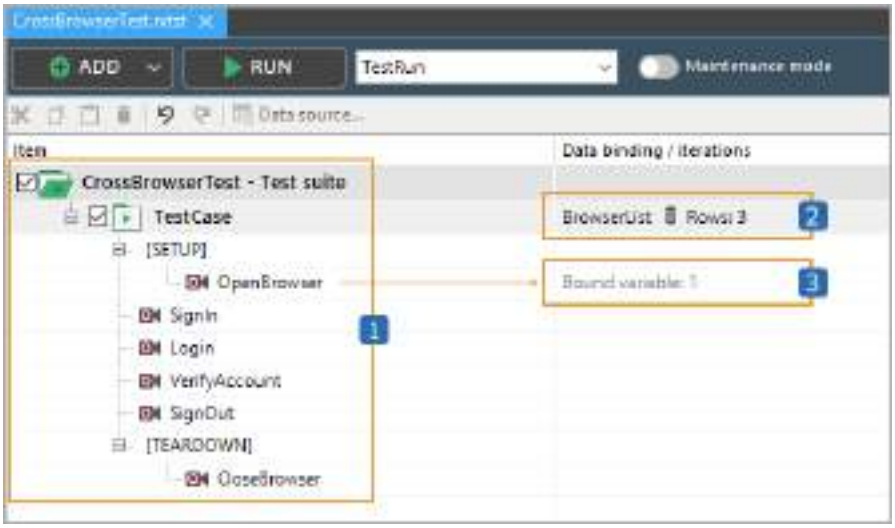


Reference

Data binding is described in Ranorex Studio advanced > Data-driven testing > ⇢ Data binding.

Run the cross-browser test

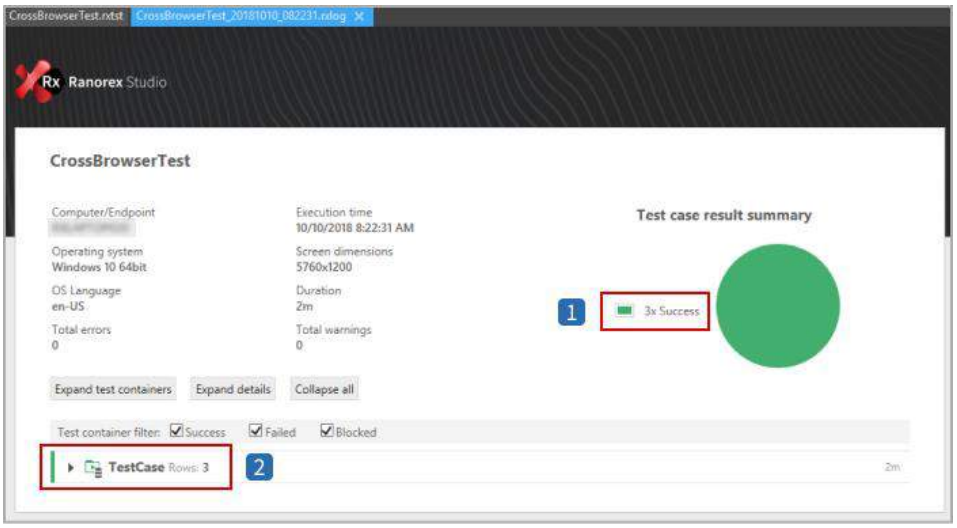
The final cross-browser tests should look as follows in the test suite:



1. Test suite structure with a test case containing setup/teardown regions and modules.
2. The test case contains a data source called **BrowserList** with 3 rows of data.
3. The module **OpenBrowser** contains one variable that is bound to a data source.

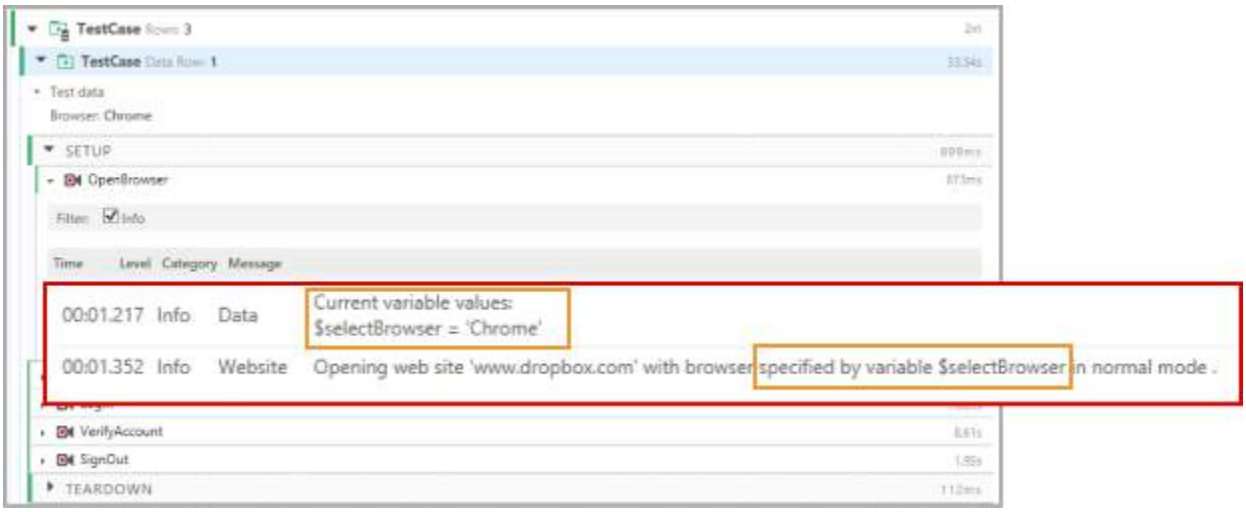
Results

After the test run, the report should look as follows:



1. Three test cases were completed successfully.
2. Our single test case was iterated three times, once for each row in the data source, i.e. once for each browser. Hence, three successful test cases.

Bringing up the details of the **OpenBrowser** module for an iteration shows the value passed to the variable:



Reference

Reports are explained in Ranorex Studio fundamentals > ⇢ Reporting.

Download the sample solution

You can download the completed sample solution file from the link below:

Sample Cross Browser Test

Attention
The recording module Login.rxrec **does not contain any login data**. **Fill in your own** Dropbox account data. You will also need to **change** the content of the **Validation attribute InnerText** to your own account name in the recording module VerifyAccount.rxrec.

Install the sample solution:

1. **Unzip** to any folder on your computer.
2. **Start** Ranorex Studio and **open** the solution file `CrossBrowserTest.rxsln`

Hint

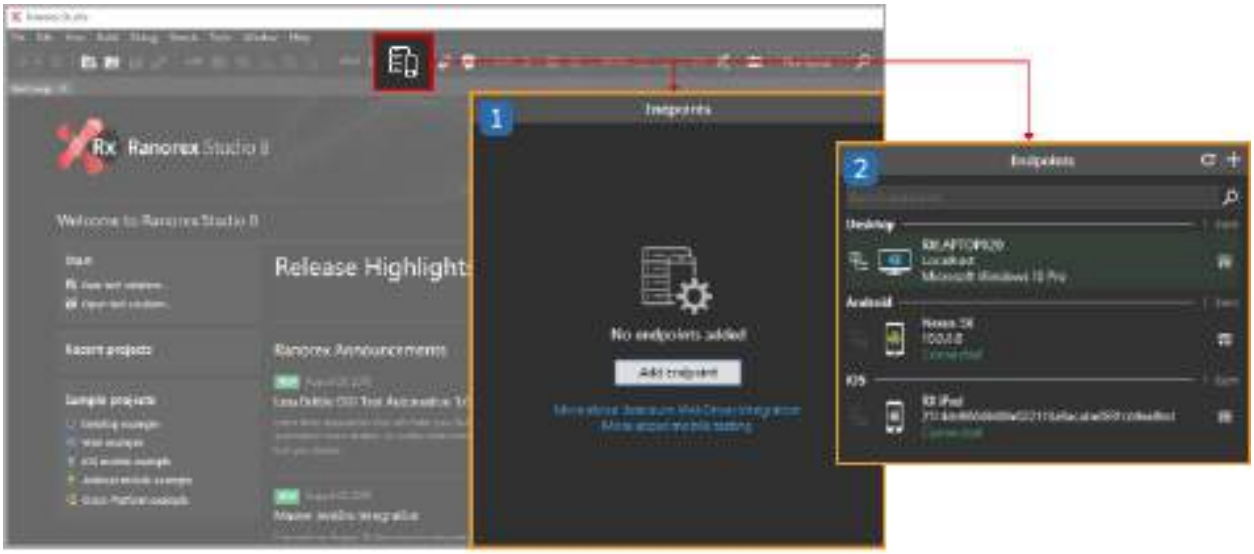
The sample solution is available for Ranorex versions 8.3 or higher. You must agree to the automatic solution upgrade for later versions.

Endpoints

Endpoints are the gateways through which a locally executed test exchanges data with an external AUT. In simpler words, they allow you to test an external application or system as if it were on your machine.

Manage endpoints

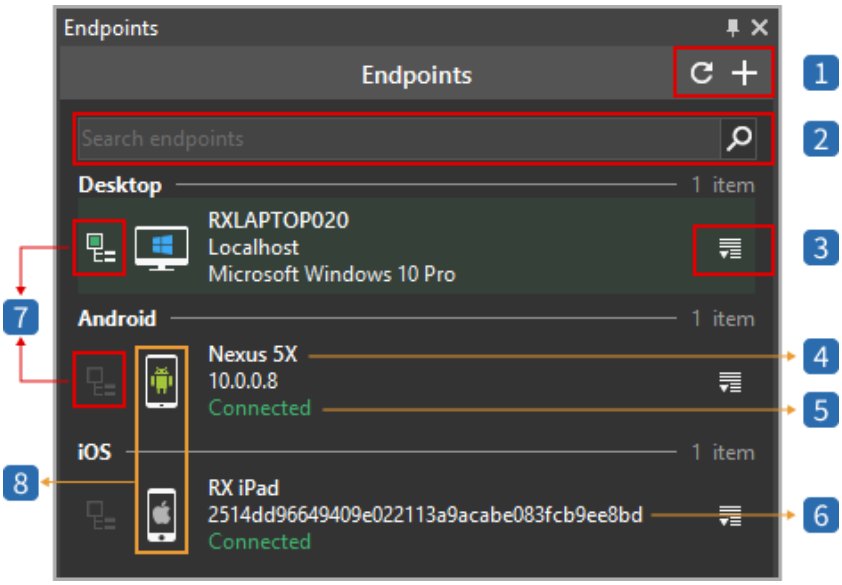
Endpoints that have been added to Ranorex Studio are displayed and managed in the Endpoints pad. Click the endpoints symbol in the menu bar to bring up the Endpoints pad. By default, it appears on the right edge of the screen.



1. Empty Endpoints pad.
2. Endpoints pad displaying the endpoint list with three endpoints.

Endpoint list

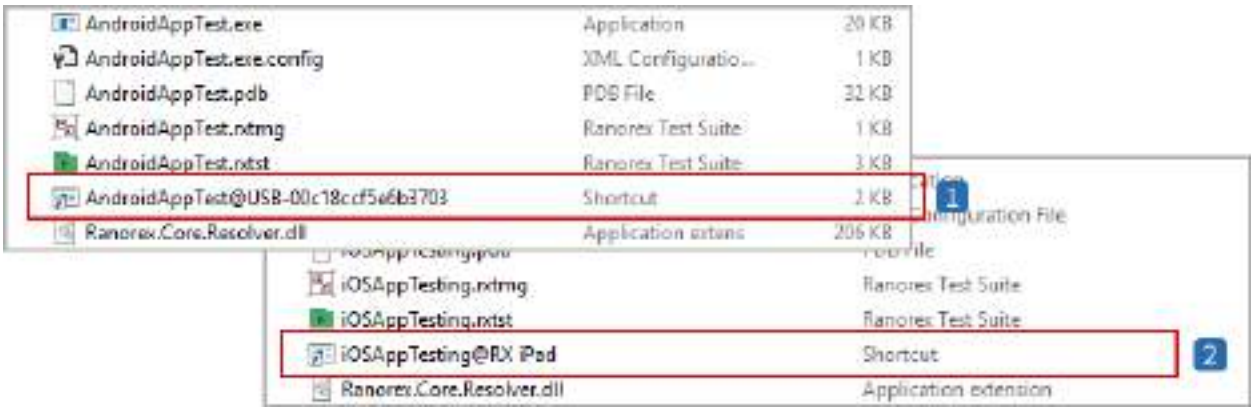
If your endpoint list is empty, you'll see a corresponding message and a button to add an endpoint. If you've already added at least one endpoint, the endpoint list will appear as follows:



1. Refresh and Add endpoint buttons.
2. Search field for endpoints.
3. Click to access this endpoint's settings.
4. Endpoint name
5. Connection status (Connected/Error/Connecting…)
6. Endpoint ID: IP number for network connections, ID for USB connections.
7. Automation root status symbol (explained in ⇢ Endpoint settings)
8. Endpoint type (Android, iOS, WebDriver)

Shortcuts and command line execution

Aside from the usual test executable, the /output/ folder also contains shortcuts for each endpoint. These shortcuts allow you to execute the test directly on a specific endpoint. The endpoint is represented in the shortcut's file name as `@<endpoint>`.



1 Shortcut for an Android endpoint.

2 Shortcut for an iOS endpoint.

Reference

You can also manually trigger test runs on endpoints through the command line. The required arguments are listed in Ranorex Studio fundamentals > Test suite > ⇢ Run tests without Ranorex Studio.

Endpoint settings

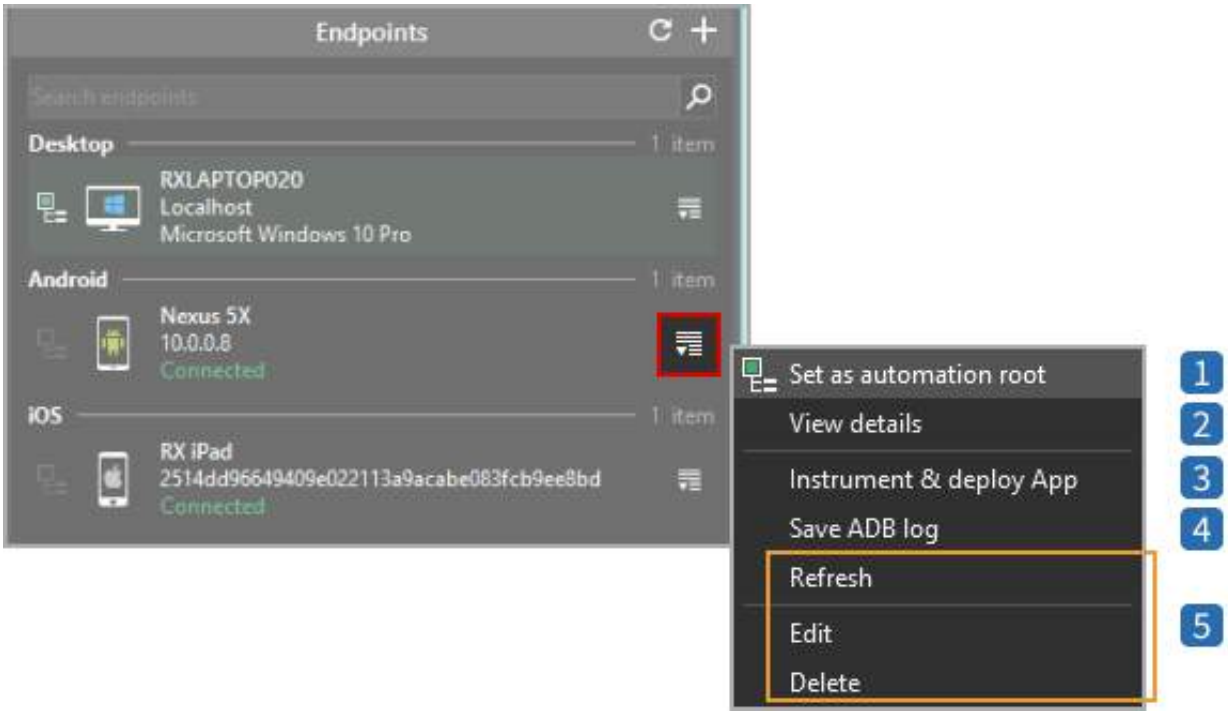
In this chapter, we'll explain the available settings for endpoints.

Note

Most of the settings explained here are valid for Android, iOS, and WebDriver endpoints. WebDriver endpoints have some additional, more complex settings that we explain separately in ⇢ Add a WebDriver endpoint.

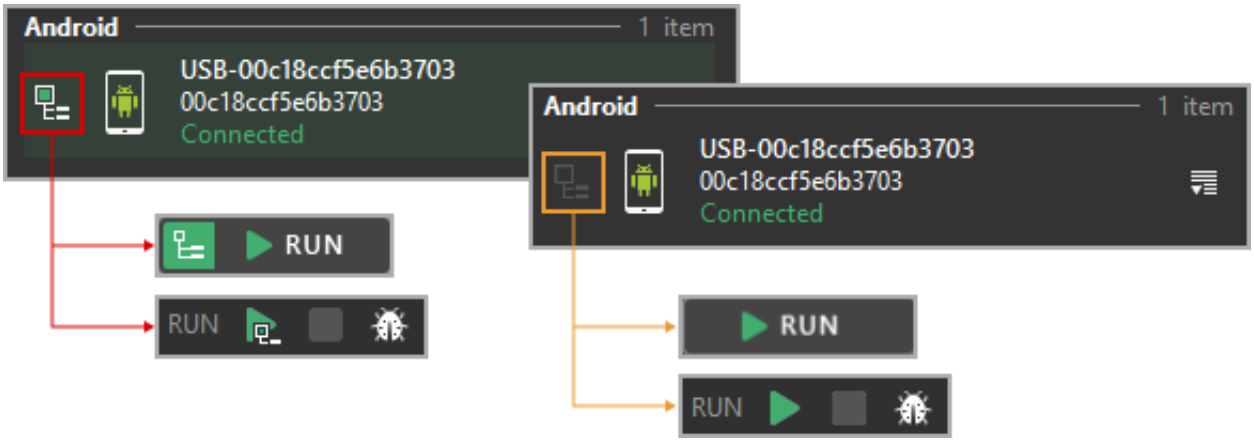
Endpoint settings

Click the button to the right of an endpoint to bring up its settings.



1 Set as automation root

- Click to set an endpoint as the automation root.
- This means that tests will only be able to interact with this endpoint and will receive and send all data for test execution through this endpoint.
- To reflect this, the run buttons in the Ranorex Studio toolbar and the test suite/recorder view will change accordingly. You can also set an endpoint as the automation root by clicking the symbol to its left in the endpoint list.



2 View details – Displays a detailed view of the endpoint's properties:

- Connection status and type

- Endpoint name
- Ranorex Service (version of the Ranorex Service App)
- OS of the mobile device (Android/iOS only)
- Address
- Instrumented apps (Android/iOS only. Click the symbol next to an app to start it on the device. Click the rocket button to ⇢ instrument and deploy an app to the device).

3 **Instrument and deploy app** (Android/iOS only)

- Click to ⇢ instrument and deploy an app to the mobile device.
- Opens the ⇢ Ranorex Instrumentation Wizard.

4 ***Save ADB log (Android only)***

- Saves the log file of the Android debug bridge.

Refresh/Edit/Delete – self-explanatory

> **Attention**
>
> Be careful when editing the endpoint's address. A wrong address will result in a connection error and test failure.

Add an Android/iOS endpoint

In this chapter, you'll learn how to add an Android or iOS endpoint.

⇢ Adding a WebDriver endpoint is explained separately.

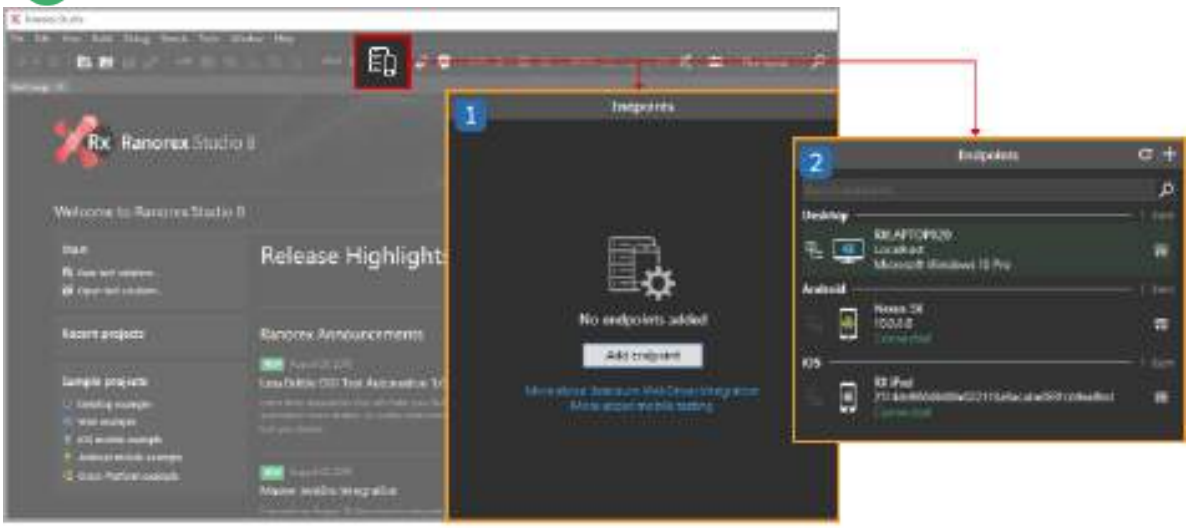
Preparation

> **Note**
>
> Make sure you have applied the required ⇢ device settings to your mobile device.

1. **Turn on** your mobile device and **connect** it to a power source.
2. **Start** the Ranorex Service App.
3. **Connect** the device to your computer via USB (recommended) or WiFi (same network as computer).

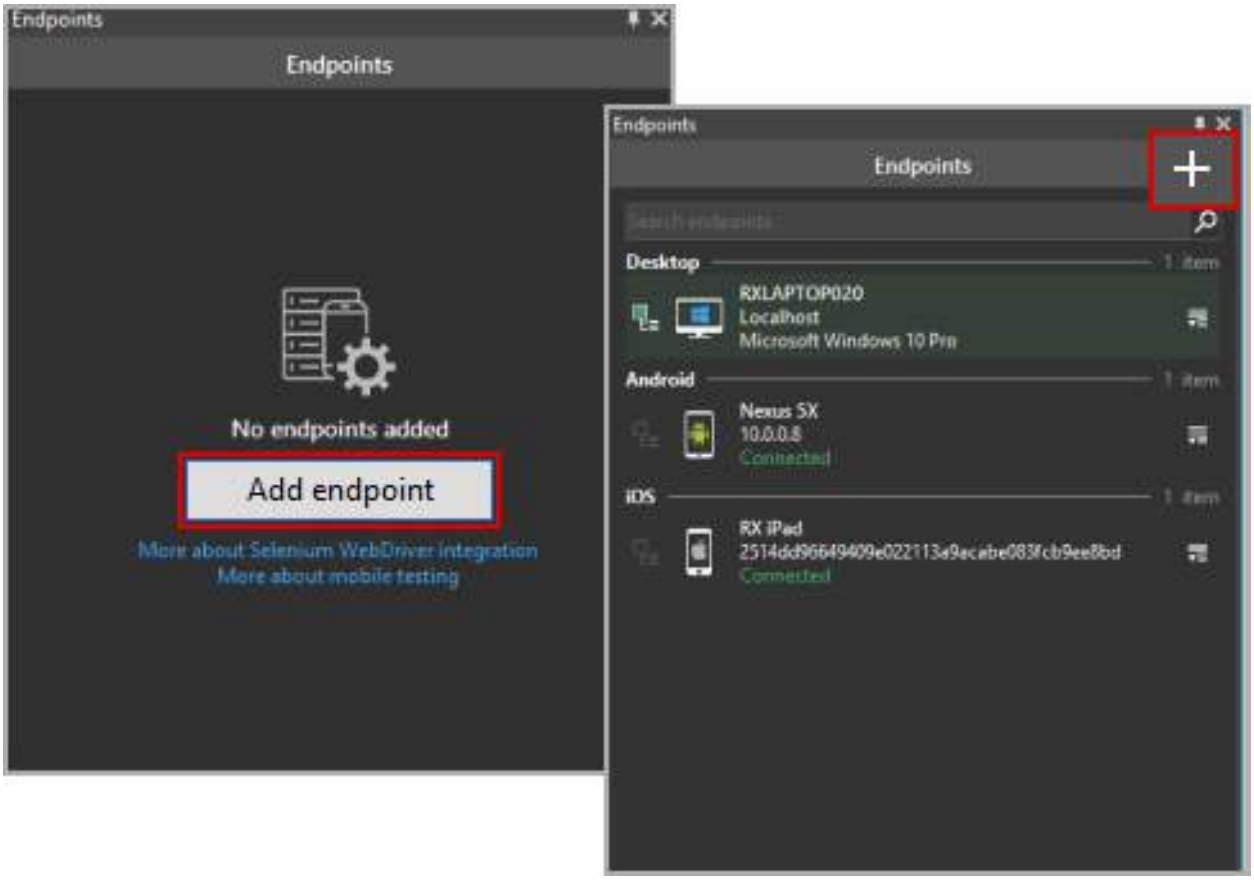
Add endpoint

1. **Open** the endpoint list.



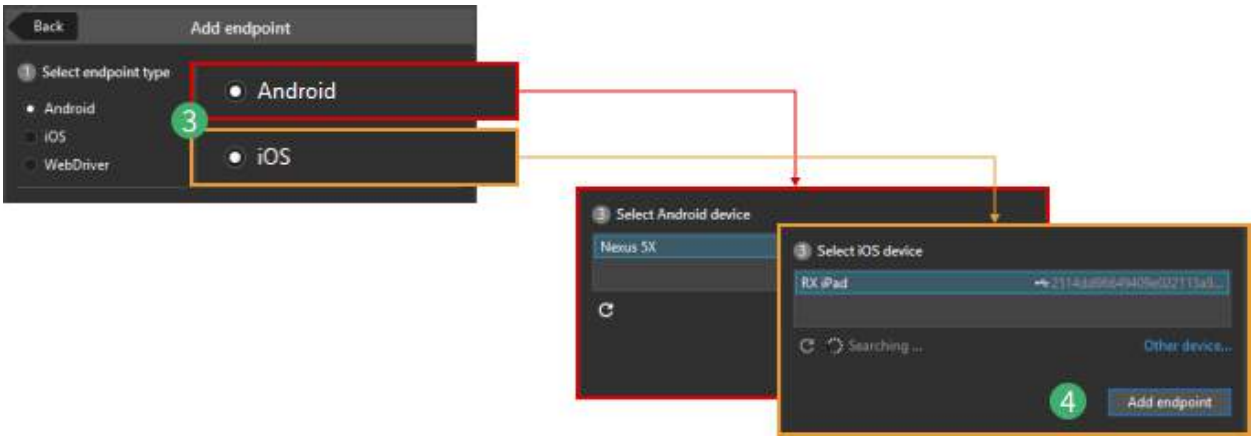
1. An empty endpoint list.
2. Endpoint list with Localhost (the computer) and two endpoints added.

2. In an empty endpoint list, **click Add endpoint**. Or, in a list of existing endpoints, **click +**.



3 **Select** the OS of your mobile device and then **select** your device from the list below. You can also enter the device's address manually by clicking **Other device…**

4 **Click Add endpoint**.



> **Note**
>
> If your device doesn't appear in the list, refresh it and make sure all required ⇢ device settings have been applied.

5 **Click Complete setup** to return to the endpoint list or **Add another endpoint**. In either case, the newly-added endpoint appears in the endpoint list.

Add a WebDriver endpoint

In this chapter, you'll learn how to add and configure WebDriver endpoints.

Preparation

Set up a WebDriver infrastructure, start the server, and note its address.

Ranorex Studio supports Selenium and Appium through WebDriver endpoints.

Selenium WebDriver

- Setting up a Selenium infrastructure is covered in ⇢ Selenium WebDriver integration.

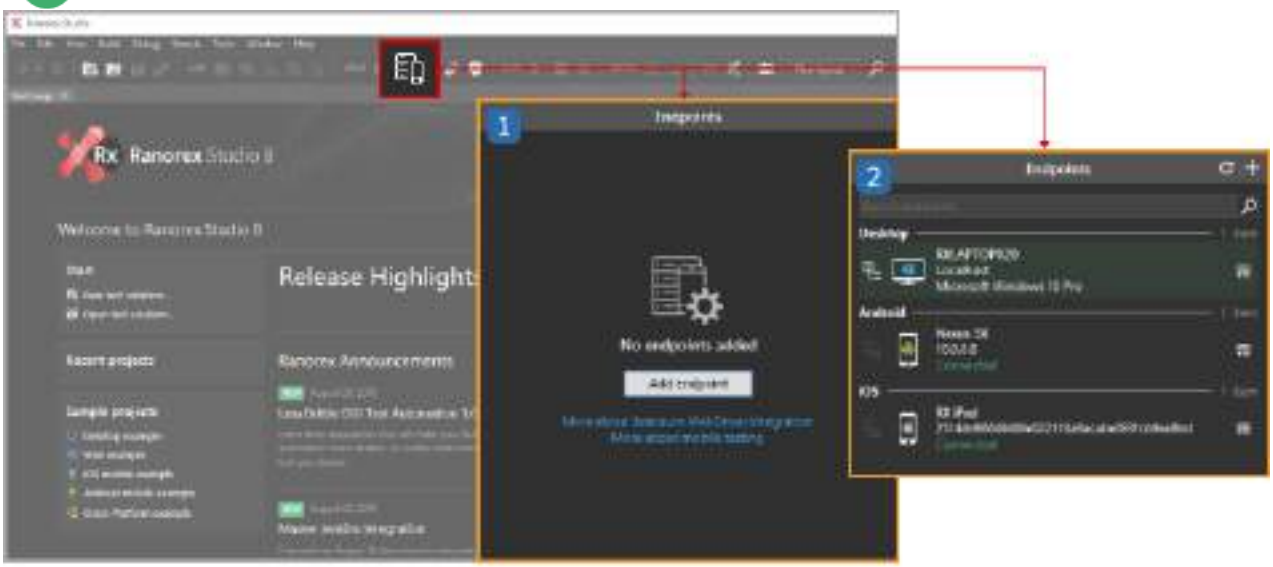
Appium WebDriver

- On Appium, Ranorex Studio currently supports only mobile web tests.

- For help with setting up an Appium infrastructure, please refer to the official Appium documentation.
- Also, make sure you set the **command timeout to at least 30 seconds** in the ⇢ plugin settings for WebDriver.

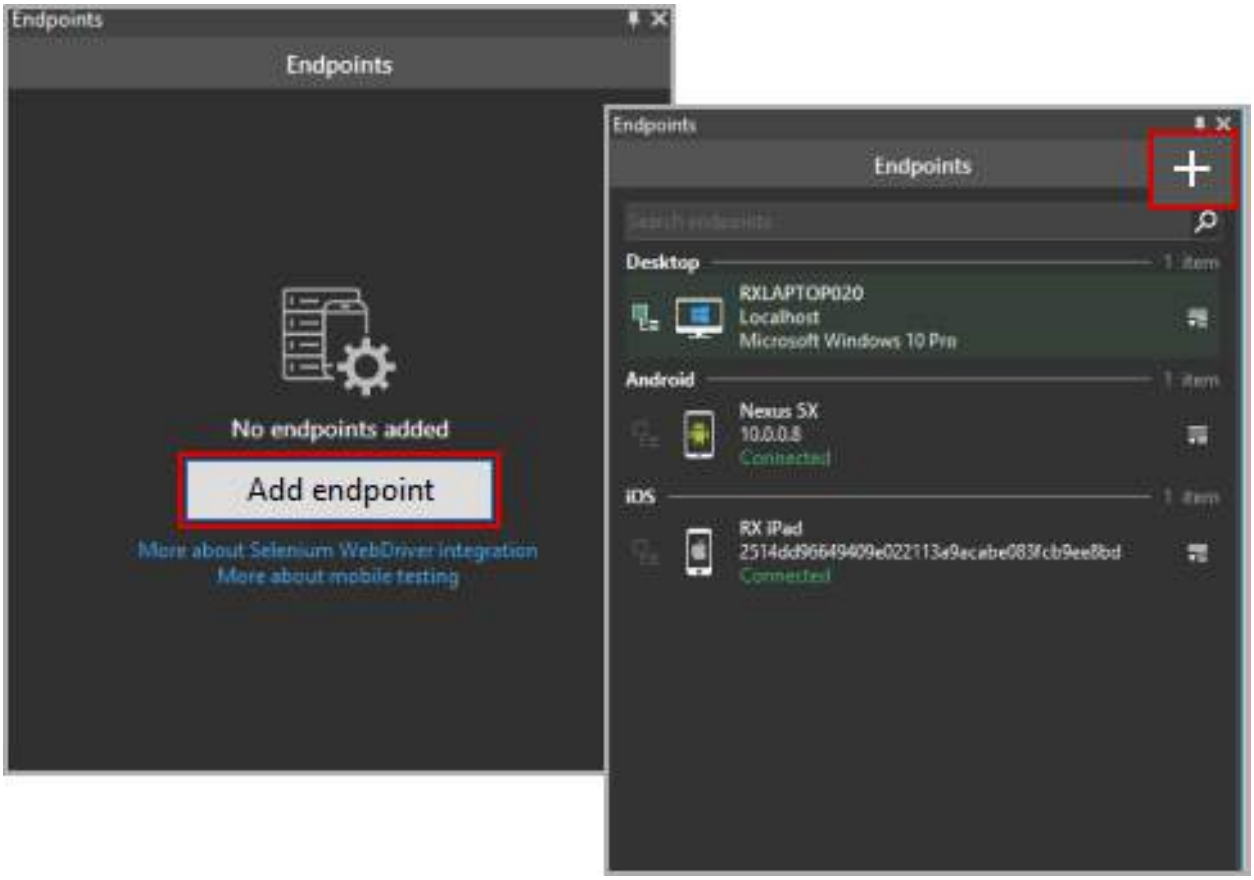
Add an endpoint for WebDriver

1. **Open** the endpoint list.



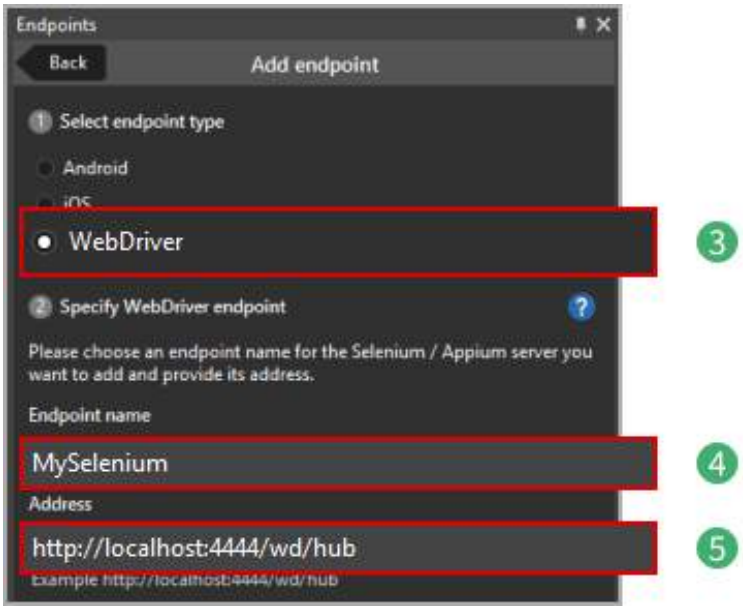
1. An empty endpoint list.
2. Endpoint list with Localhost (the computer) and two additional endpoints.

2. In an empty endpoint list, **click Add endpoint**. Or, in list that is not empty, **click +**.



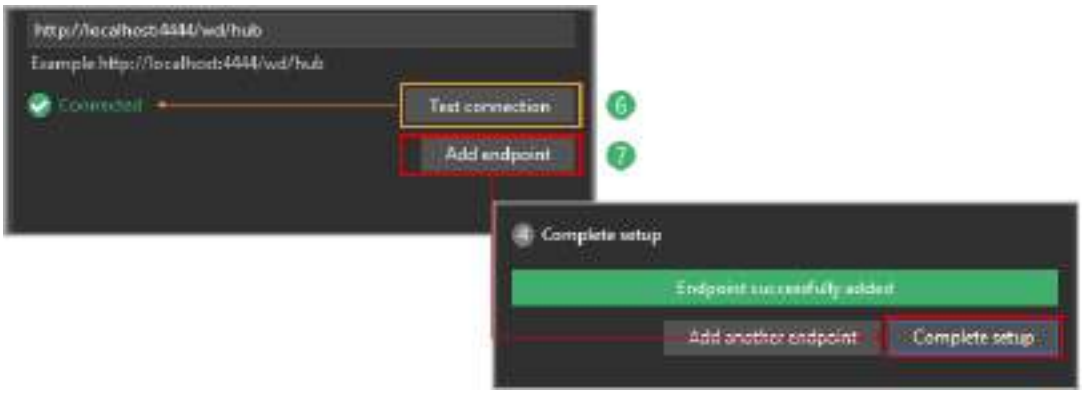
4. **Select WebDriver**.
5. **Enter** a name for this endpoint.
6. **Enter** the server address.

> **Note**
>
> In a default Selenium environment, you must add /wd/hub to the URL or IP address of your Selenium server. Only change or omit this path if you have set up your Selenium infrastructure differently.

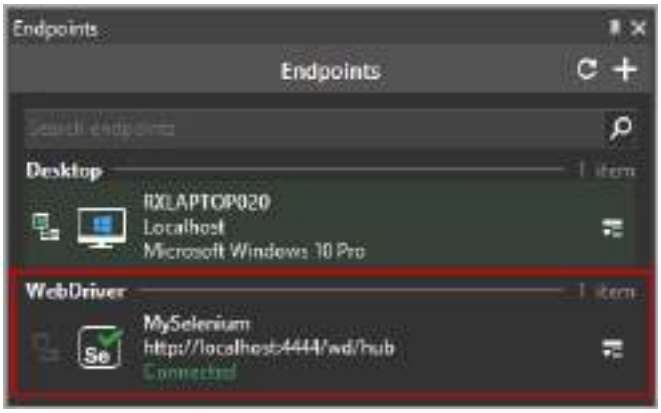


6 **Click Test connection** to see if a connection can be established. If the test fails, **check** that your server address is correct and that the server is running.

7 **Click Add endpoint** and **Complete setup**.



8 The new WebDriver endpoint appears in the endpoint list.



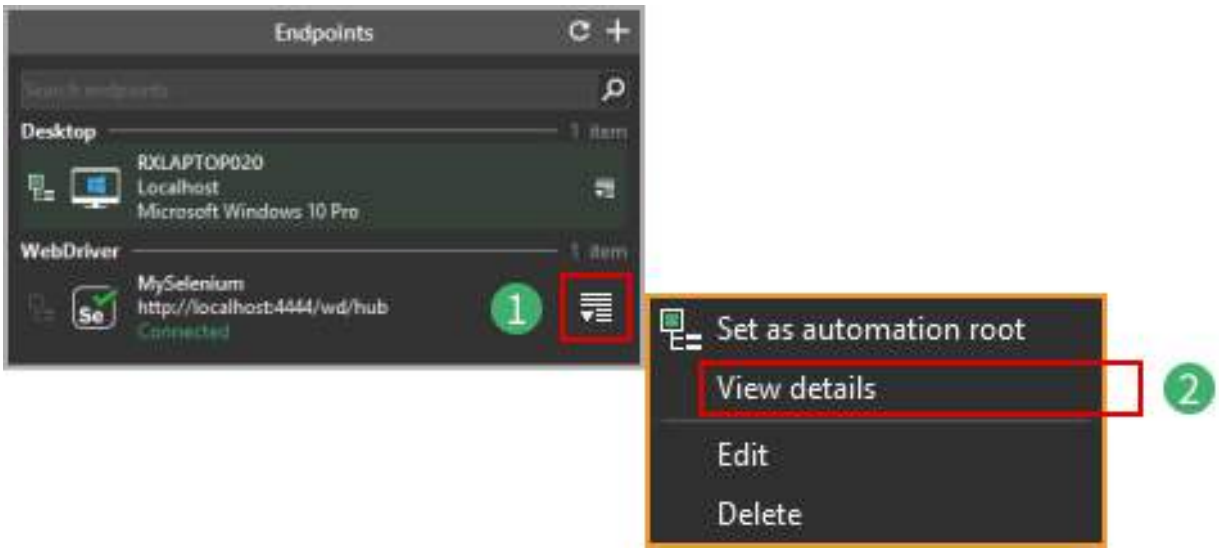
Add an endpoint configuration to a WebDriver endpoint

Endpoint configurations allow you to tell a Selenium WebDriver endpoint how to behave during test execution. Selenium calls these characteristics of an endpoint capabilities. Most commonly, they define what OS, browser, and browser version the WebDriver endpoint simulates. In Ranorex, the sum of all capabilities defined for an endpoint is called an endpoint configuration.

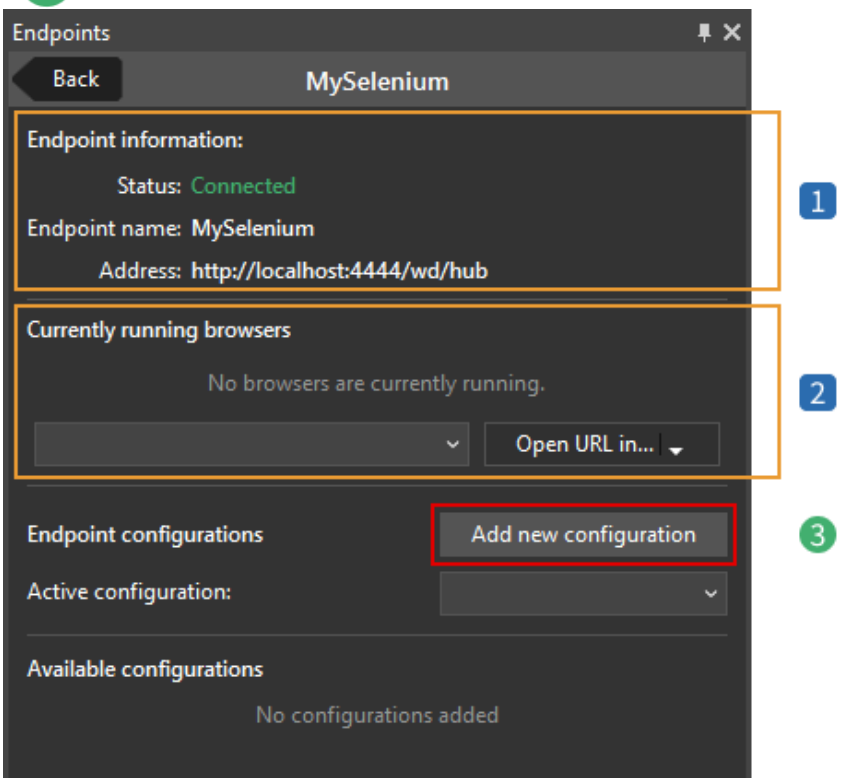
Endpoint configurations make it possible to easily execute tests in a Selenium grid on multiple different system configurations without actually needing to have any of these systems present.

To add a configuration to an endpoint:

1. **Click** the symbol to the right of a Selenium WebDriver endpoint.
2. **Click View details**.



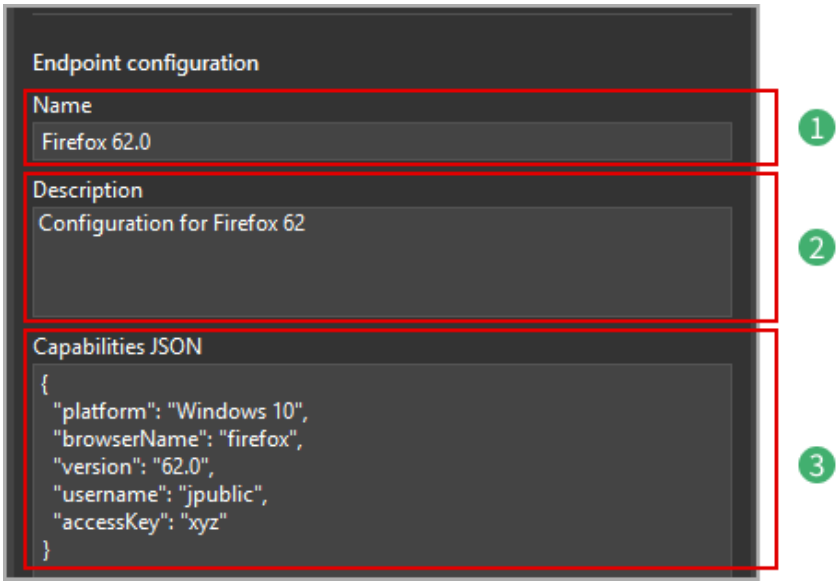
3. **Click Add new configuration**.



1. Endpoint information showing name, connection status, and server address.
2. List of currently running browsers with browser name and URL.

Specify the endpoint configuration

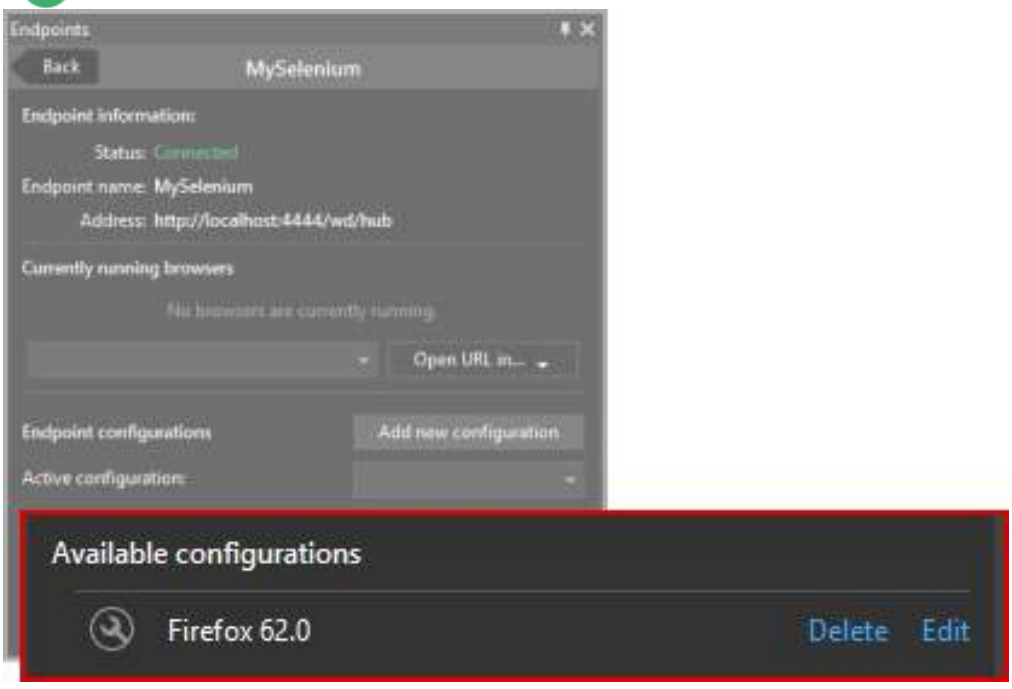
1. **Enter** a name.
2. **Enter** a description (optional).
3. **Enter** the configuration, i.e. the capabilities definition, as JSON.
   Make sure it conforms to the requirements of your Selenium Grid provider. Selenium provides a list of capabilities. In the screenshot, the capabilities JSON conforms to the requirements for Sauce Labs.



Note

If you are unfamiliar with JSON, use the Ranorex Studio ⇢ capabilities configurator. Simply select your capabilities and provider and let the configurator put together the JSON. Then, just paste the JSON into the Capabilities JSON box of the endpoint.

4 **Click Save** to confirm. The configuration appears in the endpoint details.



Capabilities configurator

The capabilities configurator lets you generate your capabilities as a JSON in an easy and straightforward way.

Simply select your desired options in the fields below. If you want to connect to a service like SauceLabs, select the appropriate option and then replace the placeholders in the JSON with your credentials.

Finally, copy the generated JSON and paste it into the ‘Capabilities JSON’ text box of your configuration in Ranorex Studio.

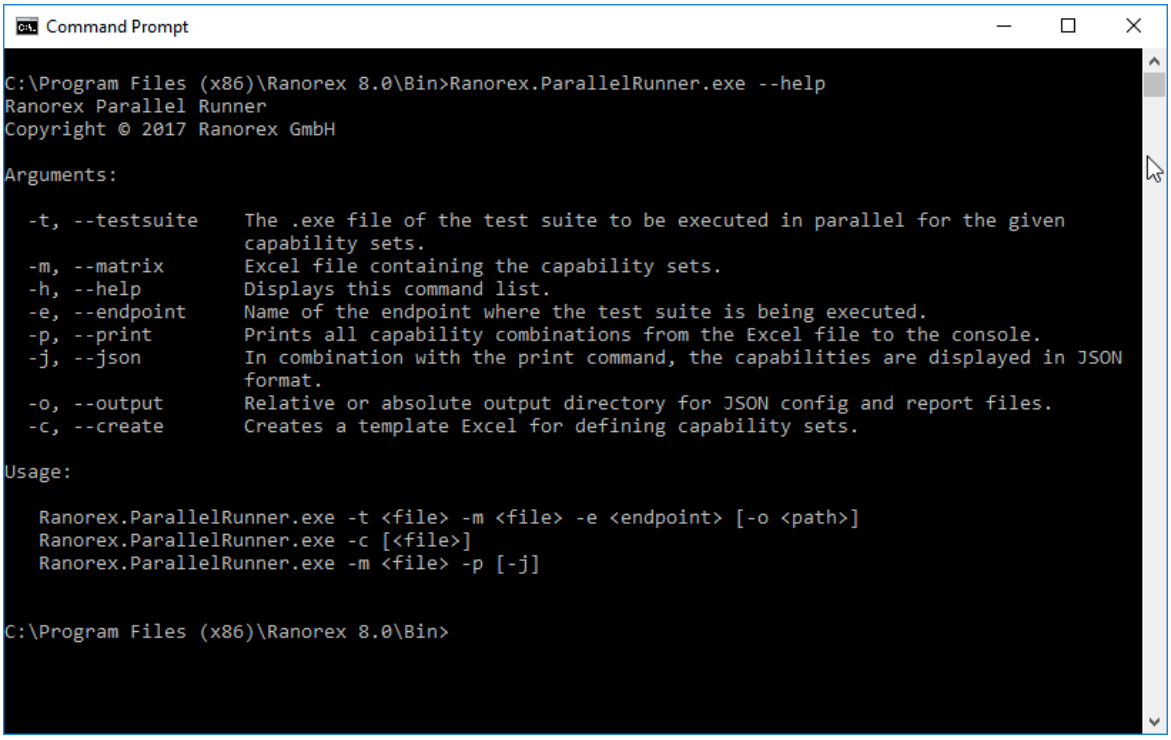
Ranorex Parallel Runner

Ranorex Parallel Runner is a command-line tool that allows you to run a test across multiple capability sets on a Selenium Grid through a WebDriver endpoint in parallel. The tool reads the capability sets from an Excel template file.

Using Ranorex Parallel Runner

This tool is located in the **Bin** folder of your Ranorex installation. By default, this is C:\Program Files (x86)\Ranorex\Bin\Ranorex.ParallelRunner.exe

It's a good idea to run the tool with **–help** for the first time to display all available arguments:



Under the **Usage:** header, the three different use cases for the tool and the required arguments are listed.

```
Ranorex.ParallelRunner.exe -c []
```

To get started, you'll need to specify a set of capabilities. To do so, use this argument to create the required Excel template. You can specify a location and filename if desired. By default, the file will be created in the **Bin** folder and called **CapabilitiesMatrix.xlsx**. Follow the instructions in the Excel file and define your capabilities.

```
Ranorex.ParallelRunner.exe -t  -m  -e  [-o ]
```

Use this argument pattern to run your test with the defined capability sets on the specified WebDriver endpoint in parallel. The –o argument is optional. If you don't specify a path, the Parallel Runner will generate a folder called **parallelRuns** in the folder where the test suite executable is located.

```
Ranorex.ParallelRunner.exe -m  -p [-j]
```

Use this argument pattern to permutate an Excel template file and display all the configurations resulting from the capability sets defined in the Excel file. The -j argument is optional and transforms the output into JSON which can be entered in the **Capabilities JSON** text box of a ···›WebDriver endpoint's configuration in Ranorex Studio.

Mobile Testing

In this chapter, you'll learn how to test apps and websites on mobile devices including smartphones and tablets. You'll learn how to connect devices to Ranorex Studio, instrument apps, and create and run automated mobile tests.

System requirements

Supported devices

Ranorex Studio supports Android and iOS mobile devices.

Connection

Mobile testing requires that you connect your device to the computer that Ranorex Studio is installed on. You can do so by USB (recommended) or WiFi.

> **Note**
>
> Ranorex iOS implementation requires that ports 31000 TCP and 31000 UDP must be open on your computer.
>
> Additionally, Ranorex Android requires other ports above 31000 TCP; therefore, enable ports up to 31020.
>
> On some Android devices, such as Huawei, ports 31000 – 31900 are already used. However, the RxService application chooses the next available ports, which are detailed in a message after the RxServices installation. Make sure to open these ports on your computer and correctly configured the Endpoints in Ranorex Studio for Discovery and Device port fields.

Use the correct automation libraries for mobile testing

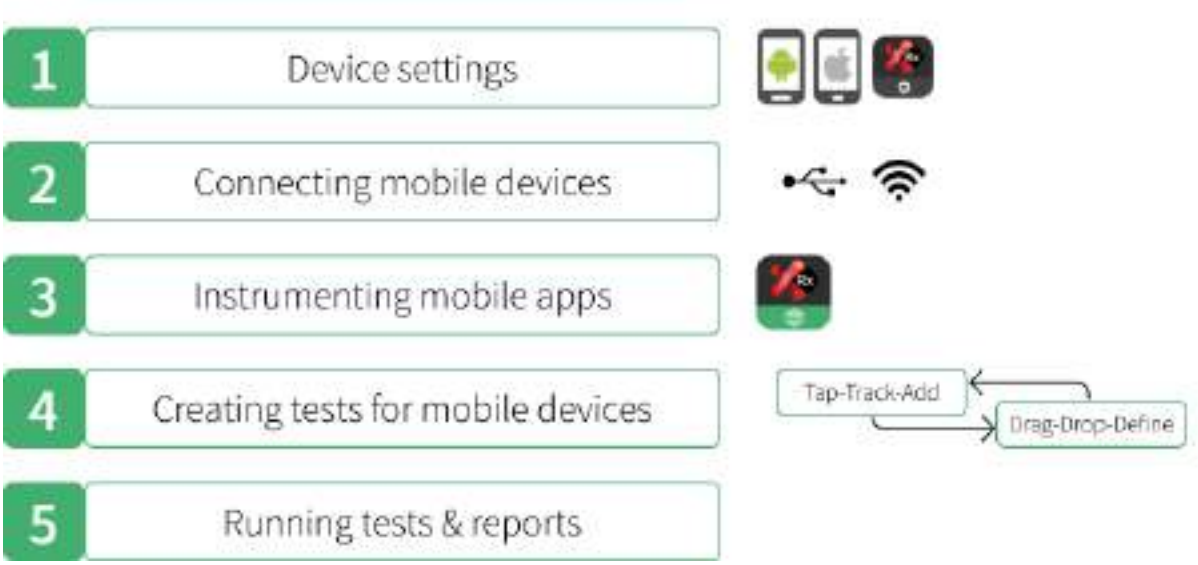
Test automation of Android/iOS apps is based on the Ranorex automation libraries for mobile testing. To ensure automation works smoothly, always use the automation libraries that correspond to your currently installed version of Ranorex Studio. Otherwise, you will receive technology limitation warnings or even errors.

You can download the automation libraries for the different Ranorex Studio versions from the mobile download archive.

If you absolutely must use earlier automation libraries, you can do so as long as they only produce warnings, but this is not recommended. In this case, simply close the technology limitation warning.

The basic procedure of mobile testing

Mobile tests in Ranorex Studio always follow the same basic procedure, regardless of the type of device. The mobile OS and the type of test (app test or mobile web test) then determine the specific actions and settings in the steps this basic procedure entails.



Prepare your device

- Enter the recommended device settings for Android and iOS
- Install the Ranorex Service App

Connect your device

- Choose a connection type
- Add the device as an endpoint in Ranorex Studio

Instrument apps

- Pre-instrumented Ranorex web browser (Android, iOS)
- Instrument Android apps
- Instrument iOS apps
- Pre-instrumented iOS sample app

Create a mobile test

- Create a solution for mobile testing
- Choose technology and test type
- Create the mobile test

Run a mobile test and get the report

The following chapters explain each of these steps in detail.

Prepare your device

Before you can connect your device to Ranorex Studio and add it as an endpoint, you need to make certain preparations.

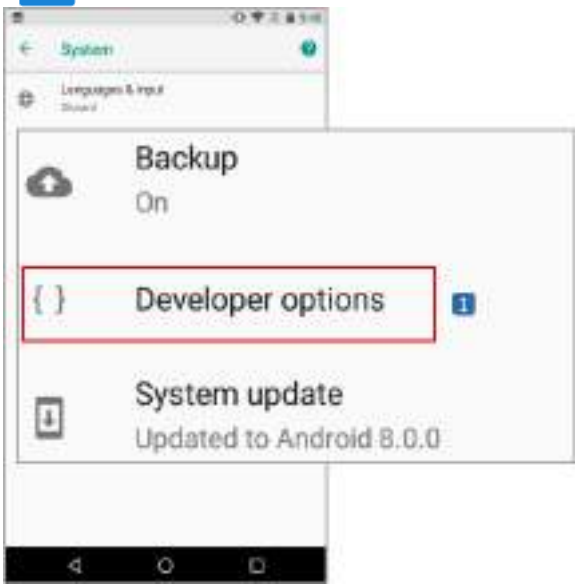
Android device settings

Activate developer mode

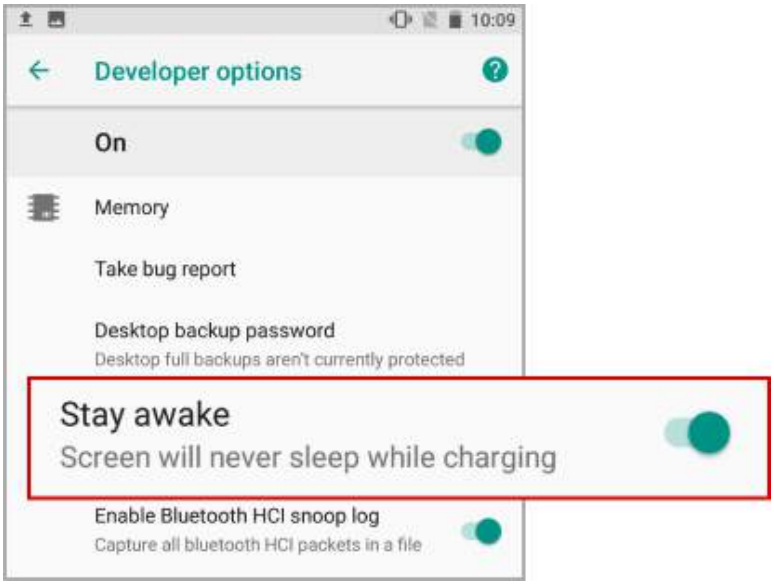
Mobile testing requires that some developer mode settings be activated. This mode is normally hidden on Android devices. To activate it:

1. **Go** to your device's settings.
2. **Find** the **Build number** entry. It's normally located in the **About** section, but the exact location may vary depending on device manufacturer and Android version. Refer to your device's documentation for more information.
3. **Tap** the **Build number** quickly seven times.
4. The notification **You are now a developer** indicates that developer mode is now active.

1. The settings should now contain an entry called **Developer options**:

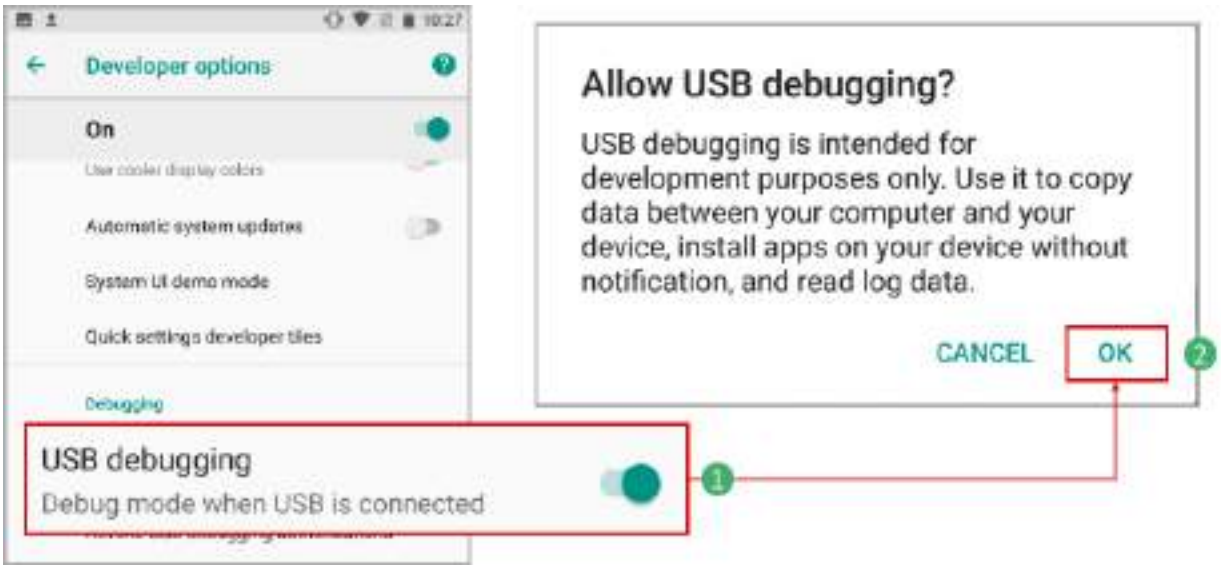


Activate Stay awake



Enable USB debugging

1. In the Developer options, **enable USB debugging**.
2. **Confirm**.



Attention

For some Android devices, USB debugging does not work with the default Windows USB driver. This makes testing with Ranorex Studio impossible. In these cases, you need to install the device manufacturer's **special developer USB drivers**.

You can normally see that this is the case if Windows recognizes your device correctly, but you can't add it as an endpoint in Ranorex Studio.

Connect your device to a power source

Regardless of the connection type (USB/WiFi), make sure that your device is connected to a power source at all times during test creation and execution.

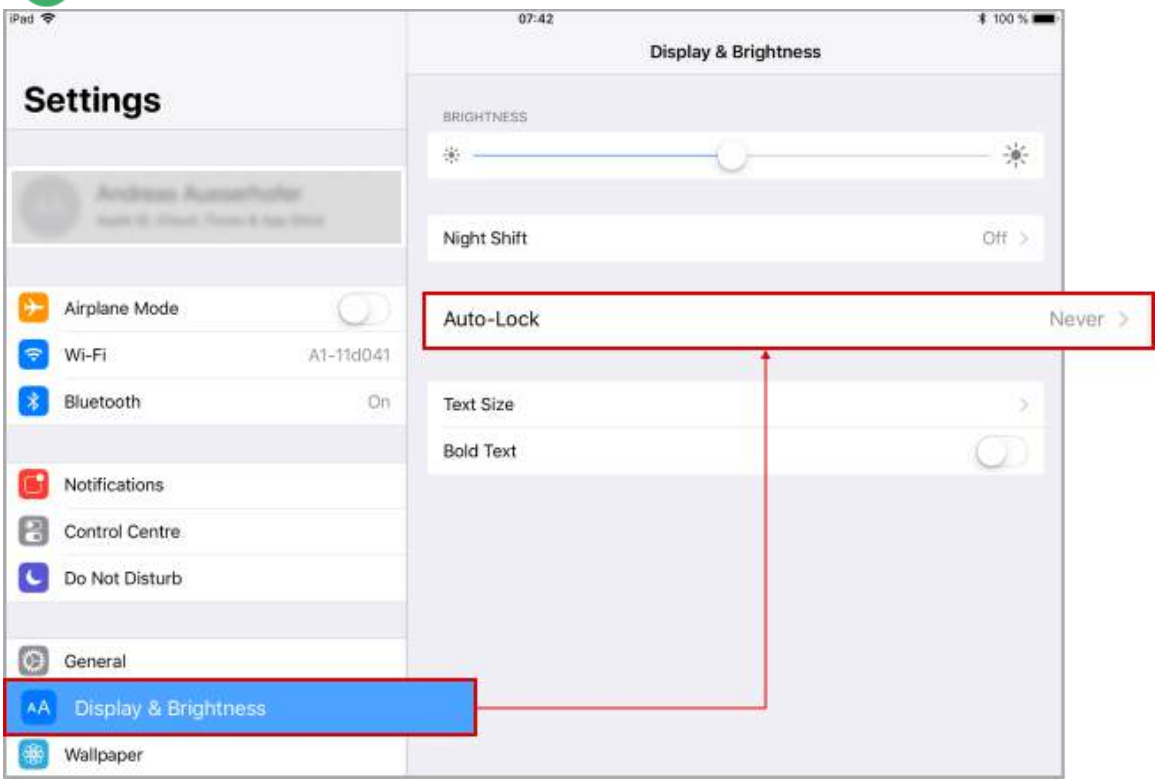
This ensures that everything runs as intended and is particularly important for WiFi connections, as it deactivates power saving.

iOS device settings

Deactivate Auto-Lock

1. **Go** to your device's settings.

2. **Select Display & Brightness**.
3. **Set Auto-Lock** to **Never**.



Connect your device to a power source

Regardless of the connection type (USB/WiFi), make sure that your device is connected to a power source at all times during test creation and execution.

This ensures that everything runs as intended and is particularly important for WiFi connections, as it deactivates power saving.

Install the Ranorex Service App

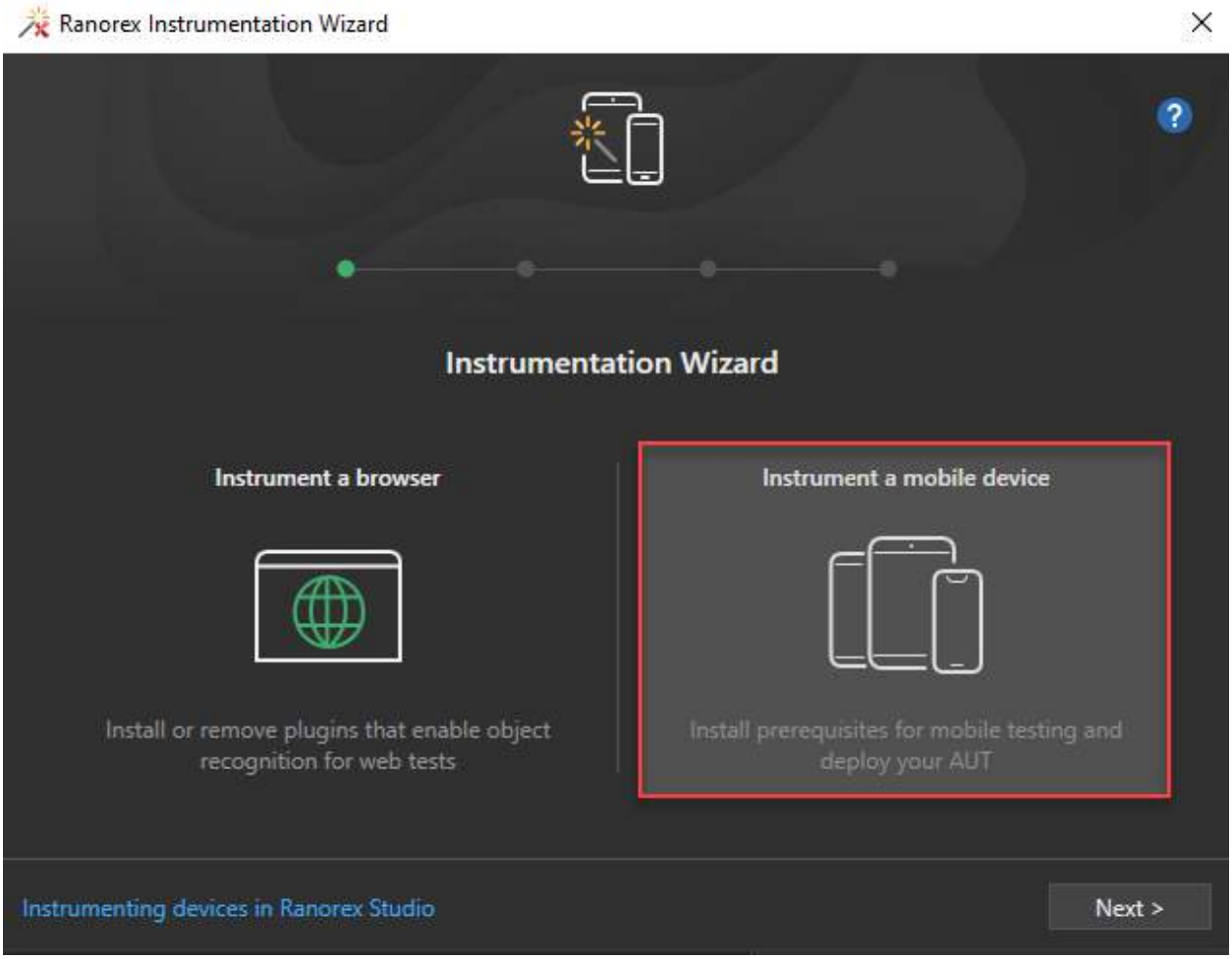
To create and run mobile tests on your mobile device, you need to install the Ranorex Service App on your device.

You can install it on your device by running the Instrumentation Wizard or by downloading the app.

Update Service Instrumentation Wizard

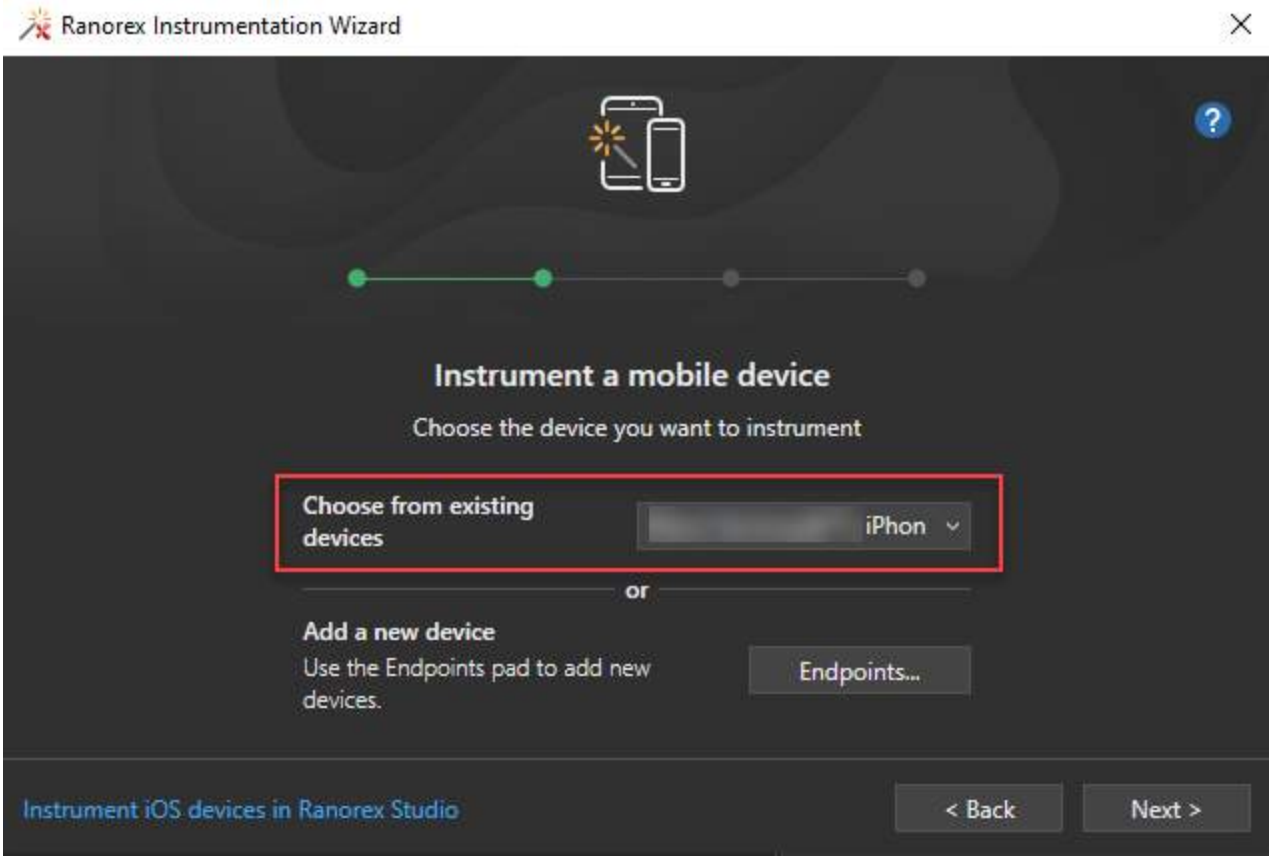
After you have added your Android device as an Endpoint, run the Instrumentation Wizard.

1. **Select Instrument a mobile device** and **click Next.**

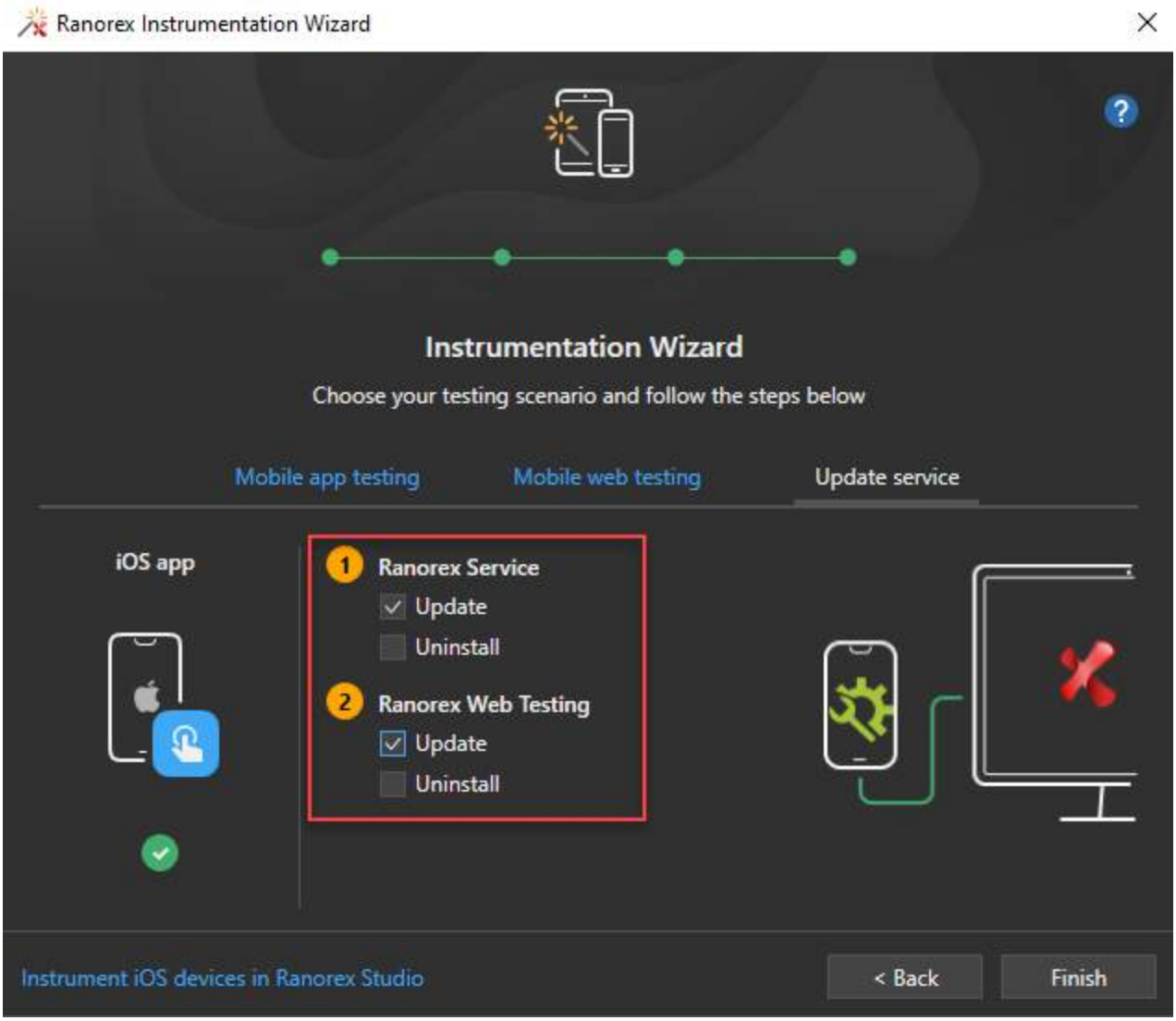


2. **Choose between iOS** and **Android then click Next**

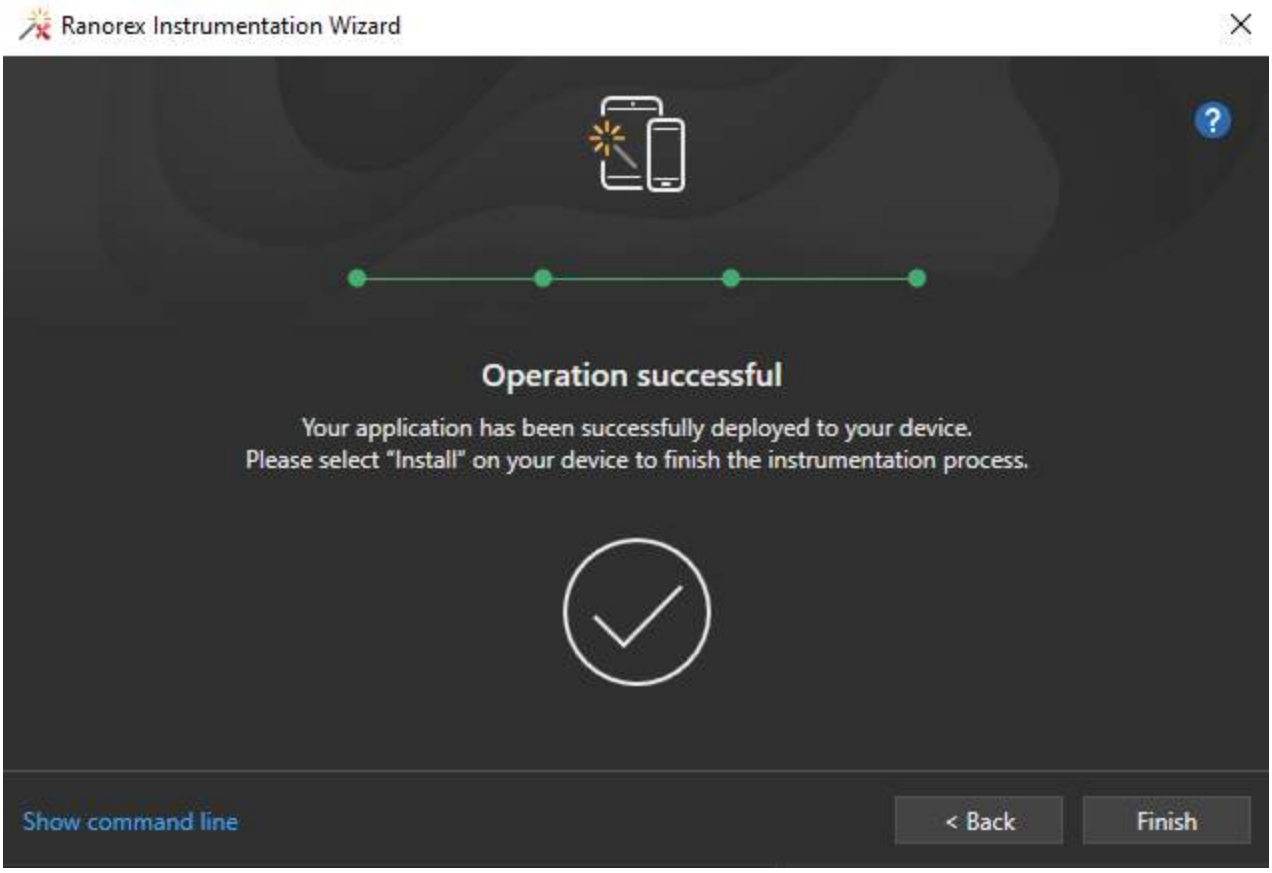
3. Under the Instrument a mobile device screen, select a device from the drop-down list, and **click Next**.



4. When the Ranorex Service is not installed on your device, the Instrumentation Wizard opens the **Update Service** tab. **Select** the **Update checkboxes** for **Ranorex Service** and **Ranorex Web Testing** and **click Finish**.



5. Once the **Operation successful** message displays, **click Finish**.

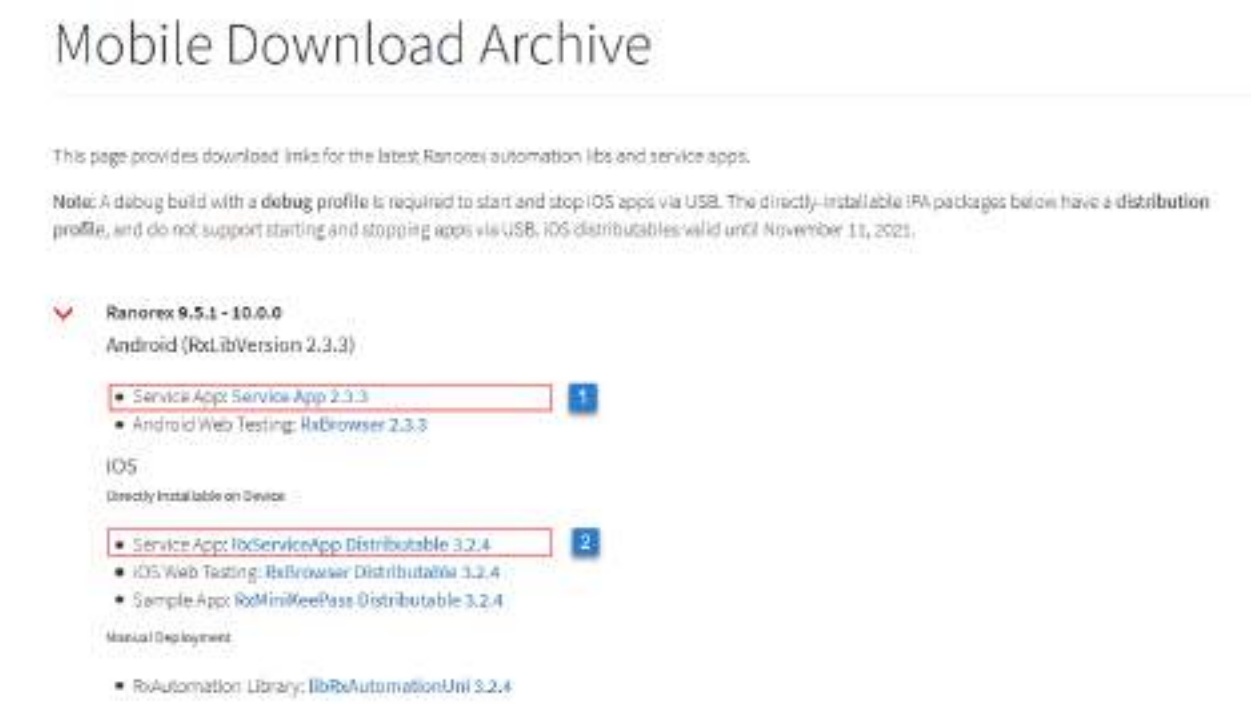


Download Ranorex Service App

Scan the QR code below or go to https://www.ranorex.com/rxApp to download the Ranorex Service App.

Mobile download archive

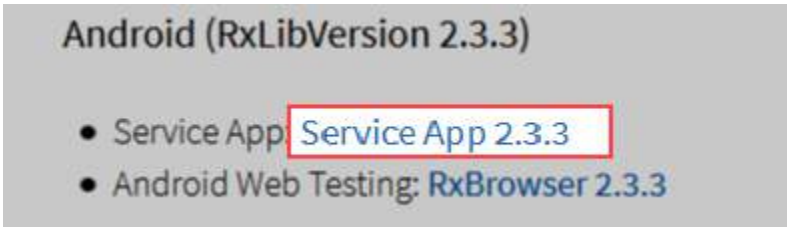
The mobile download archive is categorized according to Ranorex Studio versions and mobile OS. Simply download the correct Ranorex Service App.



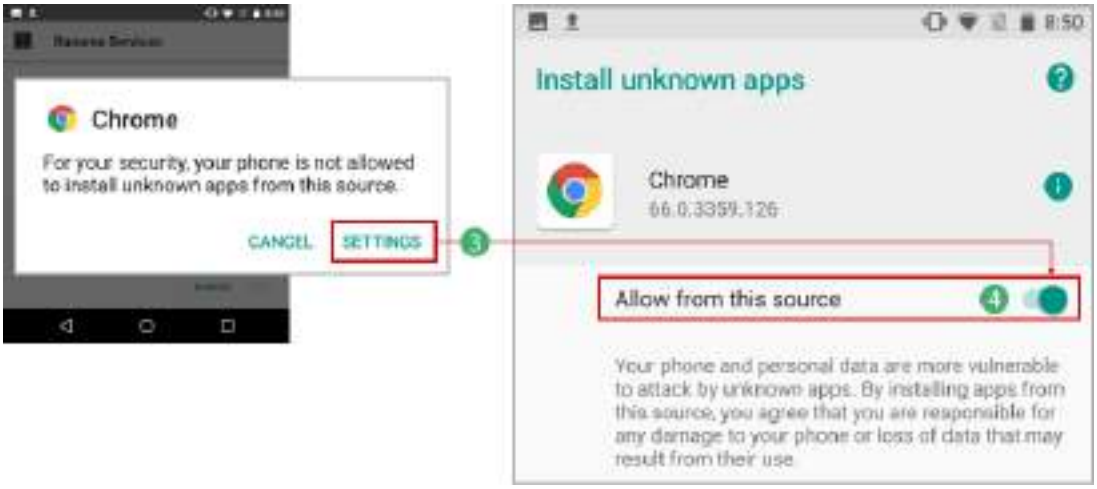
1. Ranorex Service App for Android
2. Ranorex Service App for iOS

Install the Ranorex Service App on Android

1. **Tap** the download link.
2. **Confirm** the security dialog.



3. **Tap Settings** in the following dialog.
4. **Enable Allow from this source.**



5 **Confirm** the access dialog.

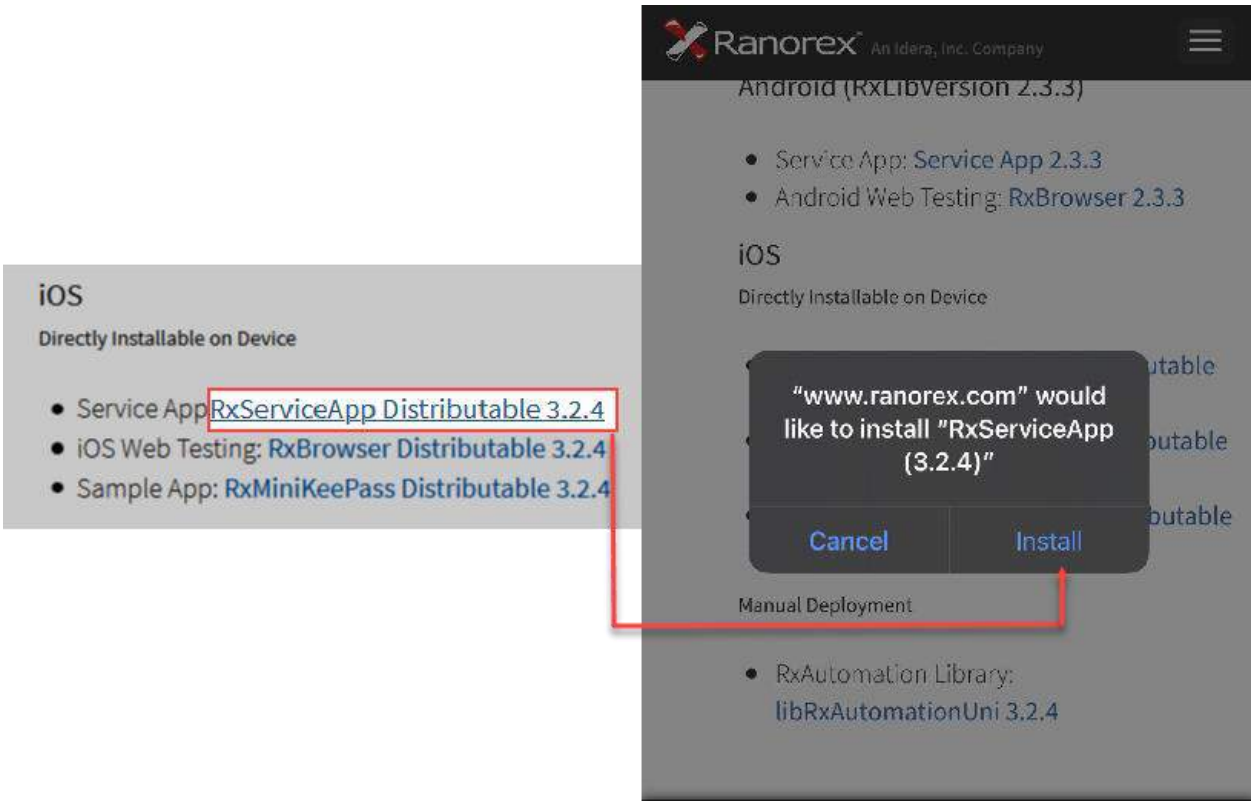
6 The Ranorex Service App has been installed successfully.

Your Android device is now ready to be ⇢ connected to Ranorex Studio.

Install the Ranorex Service App on iOS

1 **Tap** the download link.

2 **Confirm** the security dialog.

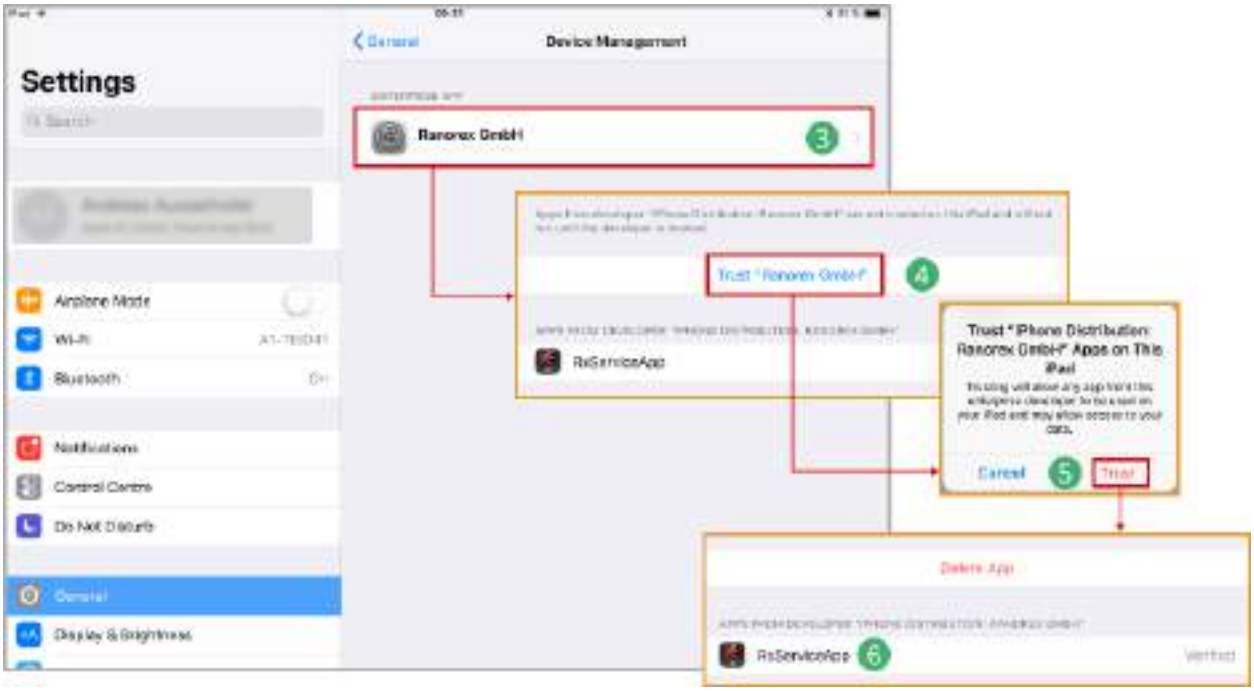


3. The Ranorex Service App appears on the home screen.
4. iOS considers the Ranorex Service App "untrusted" because it wasn't downloaded from the App Store. **Close** the dialog.

Confirm Ranorex Service App as trusted

Before you can use the Service App, it needs to be trusted.

1. **Go** to **Settings > General**.
2. **Go** to **Device Management**.



3. **Tap Ranorex GmbH**.
4. **Tap Trust “Ranorex GmbH”**.
5. **Tap Trust**.
6. The Ranorex Service App is now trusted.

Your iOS device is now ready to be connected to Ranorex Studio.

Connect mobile devices

Before you can create and run tests on your mobile device, you need to connect it to your computer and to Ranorex Studio. This requires adding your device as an endpoint in Ranorex Studio.

Connection types

You can connect your device to the computer that Ranorex Studio is installed on via USB or WiFi. The following tables illustrate the differences between these connection types for Android and iOS. **We recommend using a USB connection**, as this has no restrictions in terms of functionality and is generally more reliable.

> **Note**
>
> Ports 31000 TCP and 31000 UDP must be open on your computer.

	Android		iOS	
	USB	Wi-Fi	USB	Wi-Fi
Create tests	✓	✓	✓	✓
Run tests	✓	✓	✓	✓
Start/stop app	✓	✓	✓	✓
Install APK	✓	✓		
Install IPA			✓	✗
Deploy (unattended)	✓	✗	✓	✗
Automate system apps	✓	✗		

Connection requirements

Android USB connection

For some Android devices, USB debugging does not work with the default Windows USB driver. This makes testing with Ranorex Studio impossible. In these cases, you need to install the device manufacturer's **special developer USB drivers**.

You can normally see that this is the case if Windows recognizes your devices correctly, but you can't add it as an endpoint in Ranorex Studio.

iOS USB connection

You must install iTunes to connect your iOS device to your computer via USB. It provides the required drivers.

General network requirements and recommendations
Connect device to a power source

Regardless of the connection type (USB/WiFi), make sure that your device is connected to a power source at all times during test creation and execution.

WiFi network

When connecting via WiFi, the mobile device must be in the same network as the computer.

USB hubs

When connecting via USB, avoid USB hubs. Always use your computers integrated USB ports if possible.

Connect a device and add it as an endpoint

> **Note**
>
> In this example, the device is connected via USB. The process is basically the same when connected via WiFi.

Connect the device to your computer via USB

For Android devices, a short sound will normally indicate that the device has been recognized.

For iOS devices, iTunes will automatically open if the device is recognized.

The device also appears in your Windows settings if connected properly.

Add the device as an endpoint in Ranorex Studio

Reference

Adding a mobile device as an endpoint is explained in

Web and mobile testing > Endpoints > ⇢ Add an Android/iOS endpoint

Instrument apps

Before you can use test automation with a mobile app, you must instrument the app. Instrumenting an app means configuring the app so that Ranorex Studio can access the GUI and functions of the app for the purpose of creating and running an automated test.

Instrumenting apps works differently for Android and iOS, which is why the procedures are explained separately in this chapter.

Attention

Whenever you update Ranorex Studio (i.e. use newer automation libraries/Ranorex Service App), **reinstrument your apps**. Otherwise, automation may not work as intended.

Attention

For iOS developers: As part of the instrumentation process, the app will be compiled with the Ranorex automation library. This library adds additional functions and permissions to your IPA.

Do NOT publish instrumented apps to the App Store.

Instrumented apps **do not work** with TestFlight.

Preinstrumented Ranorex Web Browser for Android

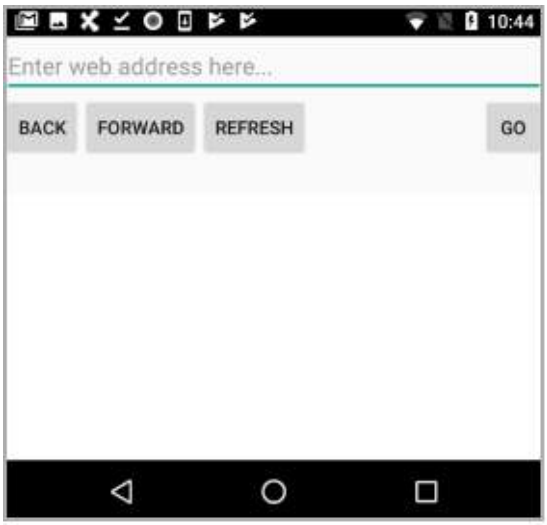
For web tests on Android devices, the preinstrumented Ranorex web browser for Android is required.

Download and install the Ranorex Web Browser

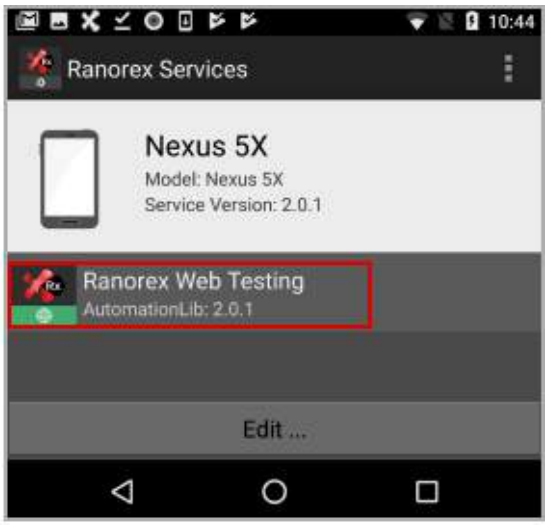
1. **Scan** the QR code below or **go** to https://www.ranorex.com/rxApp to download the Ranorex Web Browser for Android.

2. **Select** the preinstrumented browser in the mobile download archive:

3. **Install** it as you would any other app on your mobile device.



1



2

1. Opened Ranorex Web Browser.
2. The app is also listed in the Ranorex Service App, which indicates that it has been instrumented correctly.

Preinstrumented Ranorex Web Browser for iOS

For web tests on iOS devices, the preinstrumented Ranorex web browser for iOS is required.

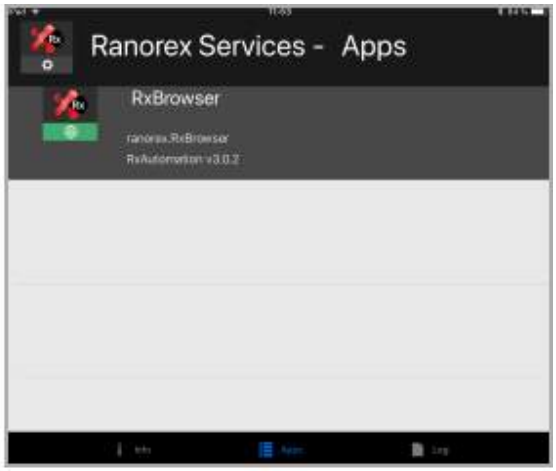
Download and install the Ranorex web browser

1. **Scan** the QR code below or **go** to https://www.ranorex.com/rxApp to download the Ranorex Web Browser for iOS.

2. **Select** the preinstrumented browser in the mobile download archive:

3 **Install** it as you would any other app on your mobile device.

1



2

1 Opened Ranorex Web Browser.

2 The app is also listed in the Ranorex Service App, which indicates that it has been instrumented correctly.

Instrument an Android app

You need to instrument Android apps before you can use them for mobile tests with Ranorex Studio.

Note

It’s not possible to instrument apps that have been downloaded from Google Play.

Reference

Instrumenting Android apps is explained in the following chapter:

Interfaces and connectivity > Ranorex Instrumentation Wizard > ⇢ Android apps.

Instrument an iOS app

You need to instrument iOS apps before you can use them for mobile tests with Ranorex Studio.

Attention

Instrumenting iOS apps is challenging and not self-explanatory. It’s best done by **experienced iOS developers**. To allow you to evaluate iOS testing with Ranorex Studio without the hassle of instrumenting your own app, we provide the **preinstrumented KeePass app** for your use.

Attention

For iOS developers: As part of the instrumentation process, the app will be compiled with the Ranorex automation library. This library adds additional functions and permissions to your IPA.

Do NOT publish instrumented apps to the App Store.

Instrumented apps **do not work** with TestFlight.

Note

It's not possible to instrument apps that have been downloaded from the App Store, as they are subject to DRM restrictions.

Instrumenting an iOS app means integrating a special Ranorex library (Ranorex libs) into the source code of the app and then compiling it. Afterwards, the app needs to be signed with a P12 certificate and the proper provisioning profile.

For more information on iOS development and release procedures, please refer to the official Apple documentation.

There are two ways to instrument iOS apps:

- With the Ranorex Instrumentation Wizard (recommended)

Reference

Instrumenting iOS apps using the Instrumentation Wizard is explained in:

Interfaces and connectivity > Ranorex Instrumentation Wizard > ⇢ iOS apps

- Manual instrumentation of the source code in iOS with Xcode
  iOS developers can integrate the Ranorex library, compile it, and sign the app manually using Xcode.

Reference

Manual instrumentation is explained in the following chapter:

Web and mobile testing > Advanced mobile testing > ⇢ iOS source-code instrumentation

Attention

After instrumenting and deploying the iOS app for the first time, **start the app manually once!** Otherwise, it will not be visible within the Ranorex Service App.

Preinstrumented iOS sample app

Ranorex provides a preinstrumented iOS sample app for evaluation and learning purposes. The app is **KeyPass for iOS**, distributed under the GNU General Publice License. For information regarding the copyright holder and the license agreement, go to https://keepass.info/help/v1/license.html.

Download and install the sample app

1. **Scan** the QR code below or **go to** https://www.ranorex.com/rxApp.

2. The mobile download archive is categorized according to Ranorex Studio versions and mobile OS. **Download** the RxMiniKeePass app for iOS devices for your Ranorex Studio version.
3. Next, **install** the sample app as you would any other app on your device.

1. The RxMiniKeypass app appears on your home screen.
2. Since the app is already instrumented, it also automatically appears in the Ranorex Service App.

Create a mobile test

In this chapter, you'll learn about the basics of creating a mobile test in Ranorex Studio.

Prerequisites

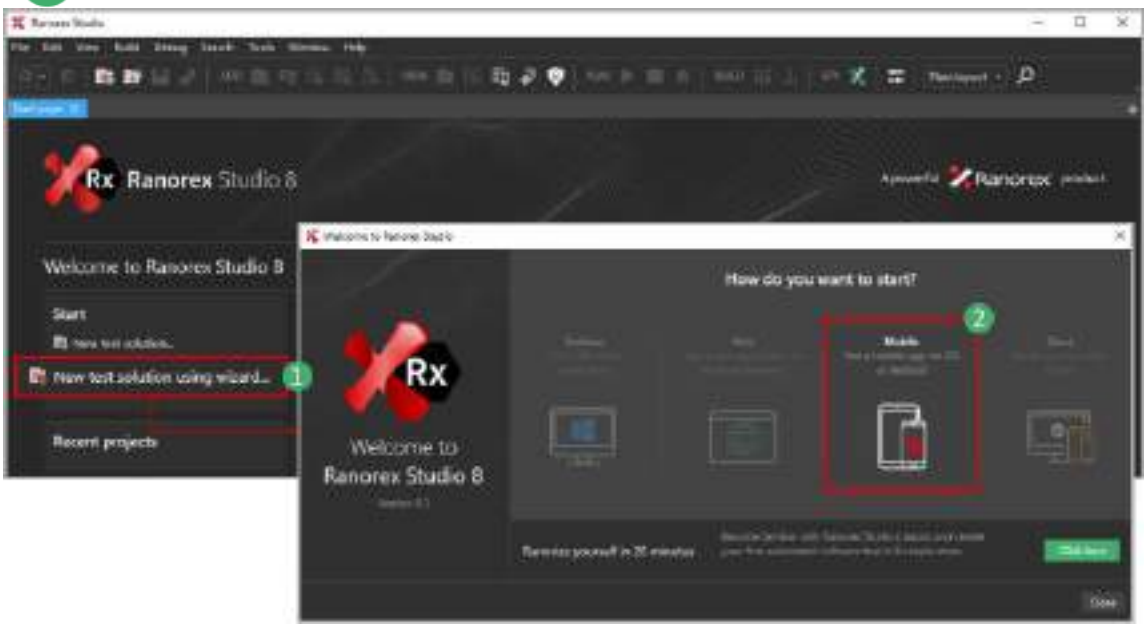
Before creating a mobile test, make sure you've completed all the necessary preparations:

1. **Apply** the necessary ⇢ device settings to your device and **install** the Ranorex Service App.
2. ⇢ Connect your device to the computer and ⇢ add it as an endpoint in Ranorex Studio.
3. Finally:
   a. If you want to test a mobile app, ⇢ instrument the app.
   b. If you want to carry out a web test on your device, ⇢ install the preinstrumented Ranorex Web Browser for Android (recommended) and/or iOS (required).

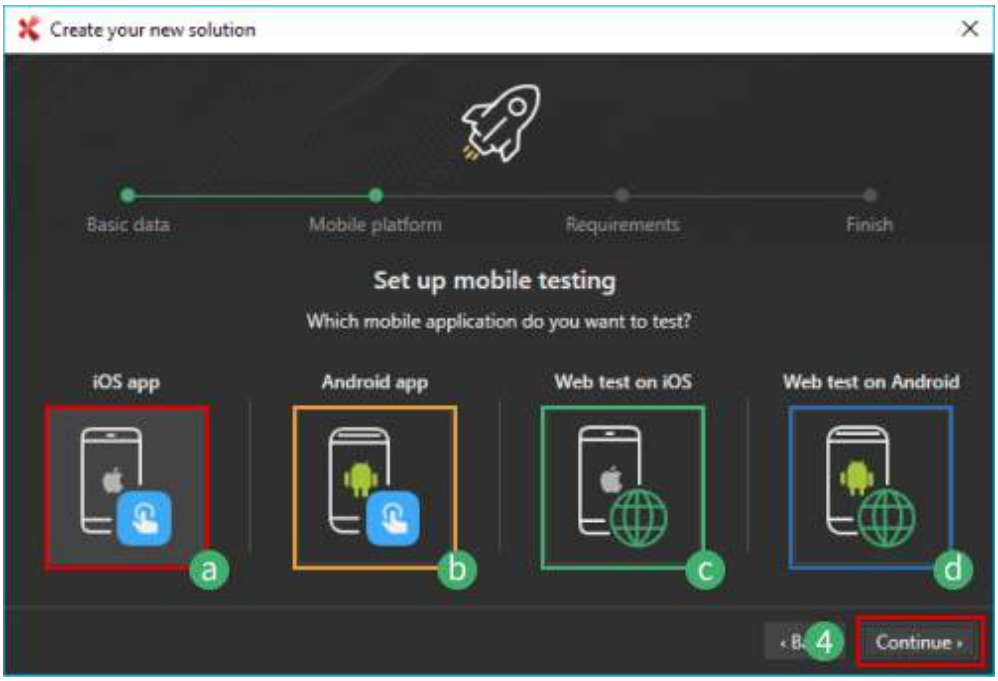
Create a solution for mobile testing

To create a mobile test, you must use the RocketStart Wizard.

1. On the Ranorex Studio start page, **click New solution using wizard…** or **click File > New > New solution using wizard…**
2. **Click Mobile**.

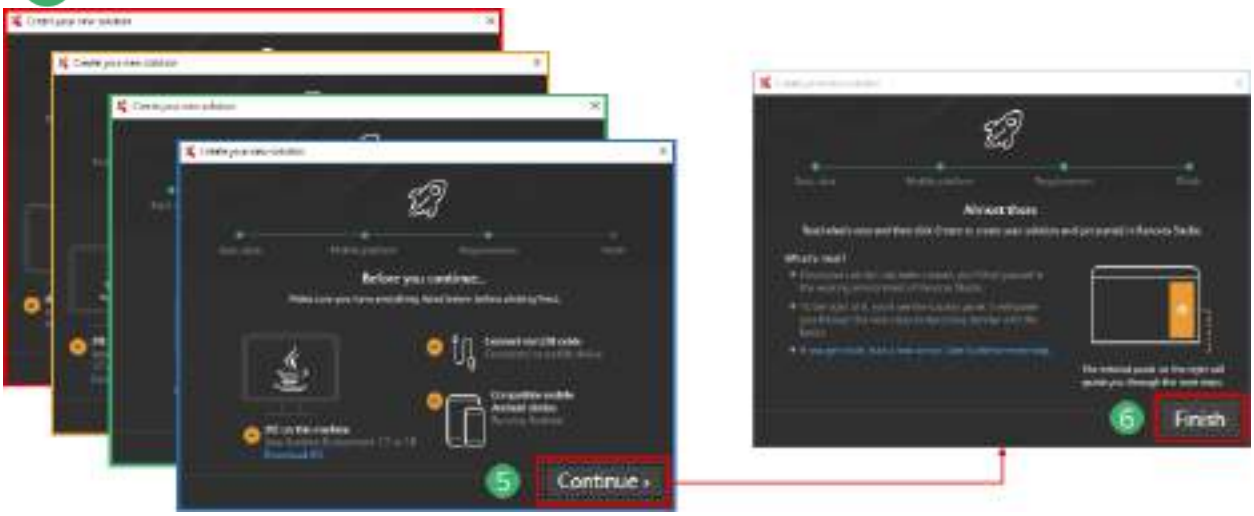


3. **Follow** the instructions of the wizard.
4. When you get to the screen below, **choose** which kind of mobile test you want to create and **click Continue**.
   a. Mobile iOS app test
   b. Mobile Android app test
   c. Mobile iOS web test
   d. Mobile Android web test

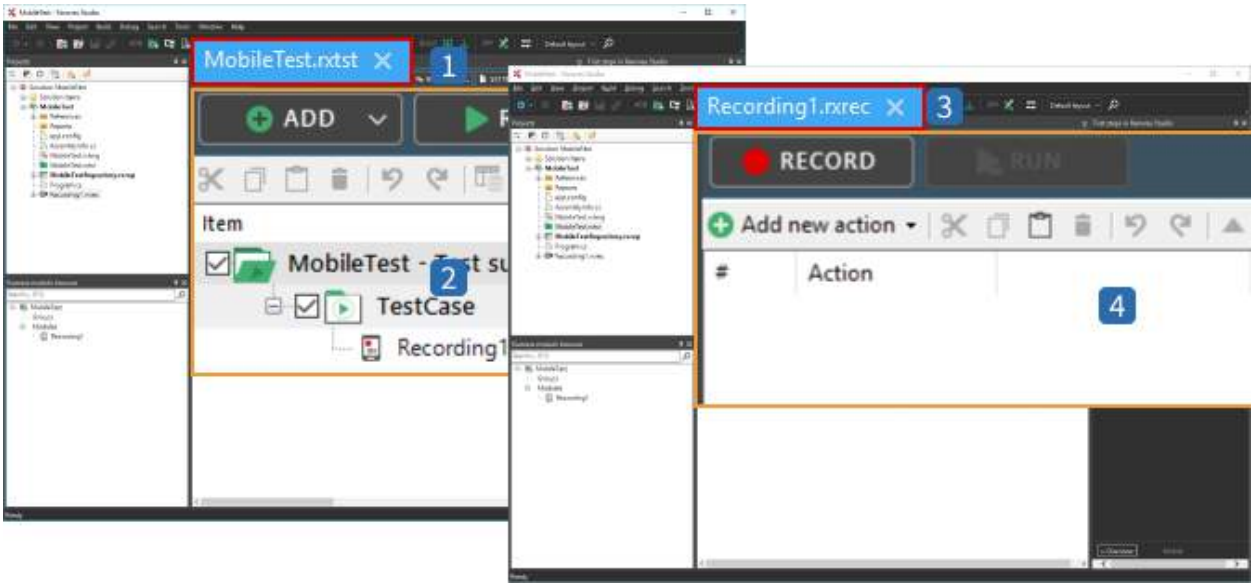


5 Depending on your choice, the wizard will show you a checklist of necessary preparations. If you followed our instructions under Prerequisites, you should already have completed all of them. **Click Continue**.

6 **Click Finish.**



The prebuilt web test will look like this:



1 **Test suite view**
This is where you build and control your tests.

2 The test suite contains a test case with the empty recording module **Recording1.**

> **Note**
>
> The recording module has a different symbol than usual. This indicates that it's a **mobile recording module**, suitable only for building mobile tests. Standard recording functionality is disabled for them.
>
> All recording modules you create in this project are mobile recording modules.

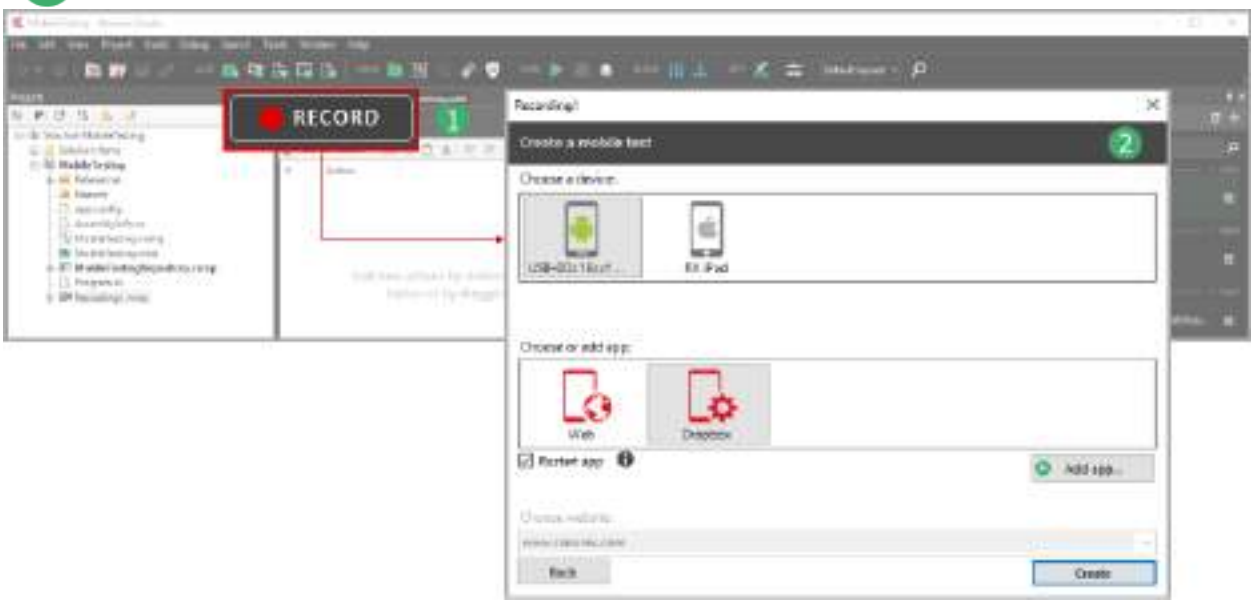
3 **Recording module view**
In the recording module view of **Recording1,** you can start creating your mobile test by adding actions.

4 **Empty actions table**
This is where your actions appear.

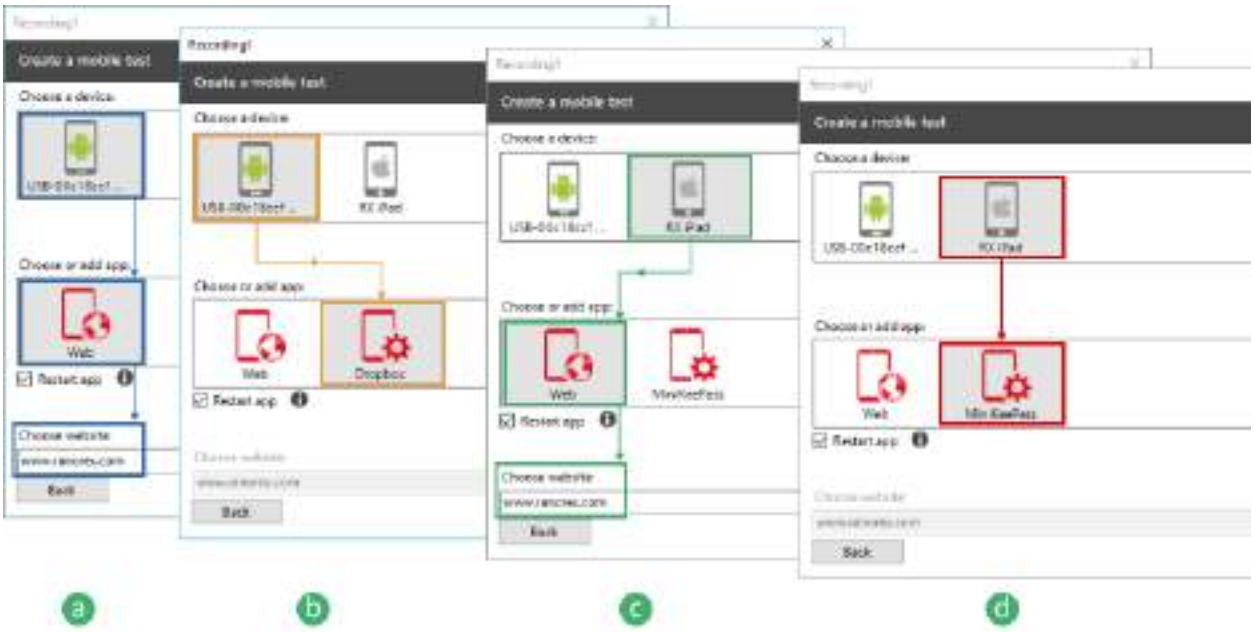
Create a mobile test

Now that we have our solution, we can start creating the actual mobile test. The procedure is different from that for creating desktop or web tests, but it's not complicated.

1. **Click RECORD.**
2. The dialog for selecting the mobile device and instrumented app appears.



3. **Select** your device and app. If you select the Ranorex Web Browser, also **specify** the URL for the mobile web test.



Depending on your choice, different test types result. In our example:

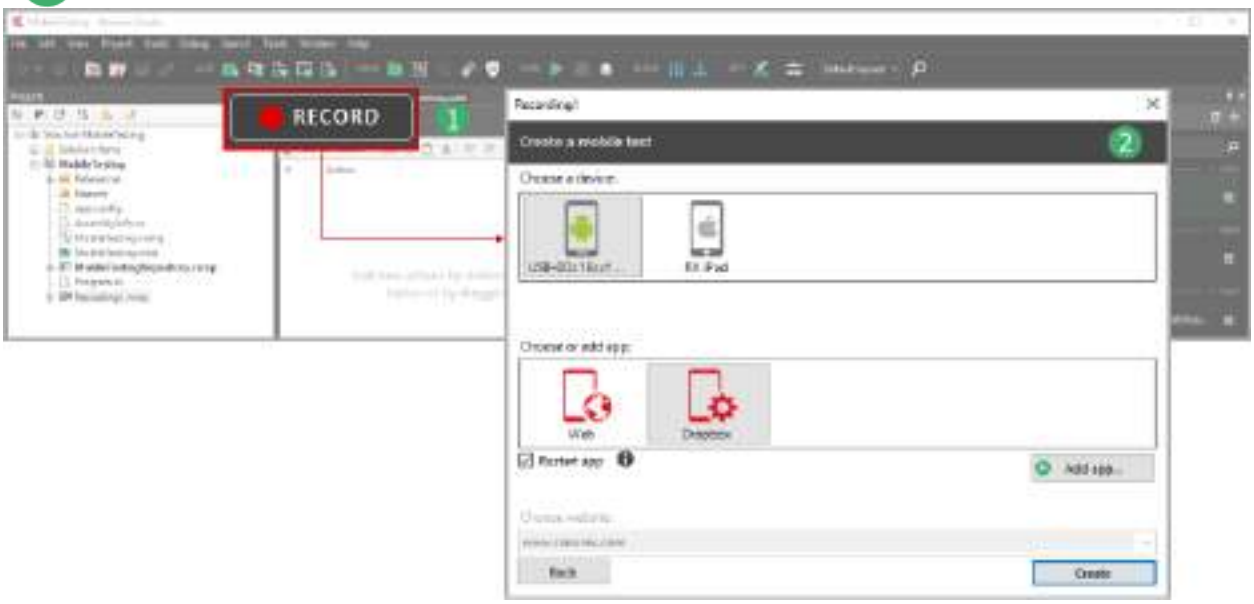
a. Mobile Android web tests using the preinstrumented Ranorex Web Browser

b. Mobile Android app test using the instrumented Dropbox app
c. Mobile iOS web tests using the preinstrumented Ranorex Web Browser
d. Mobile iOS app test using the instrumented MiniKeePass app

> **Note**
>
> If your app doesn't appear for selection, make sure that you've instrumented it correctly.

Setup mobile test building

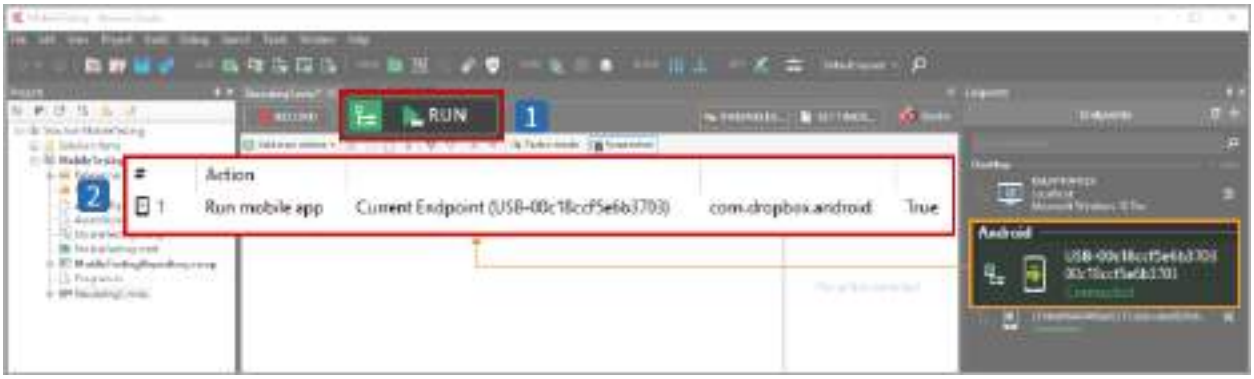
1. **Click Create** to start the setup process for mobile test creation.



Ranorex Studio will automatically carry out the following processes to set up mobile test building:

In Ranorex Studio

Ranorex Studio starts the selected app on your mobile device and adds the respective action in the action table.



1 The RUN button changes to reflect that it now runs the test on the current automation root, i.e. the active endpoint/mobile devices, not the computer.

2 An action that starts the app on the mobile device has been added to the action table.

On the mobile device

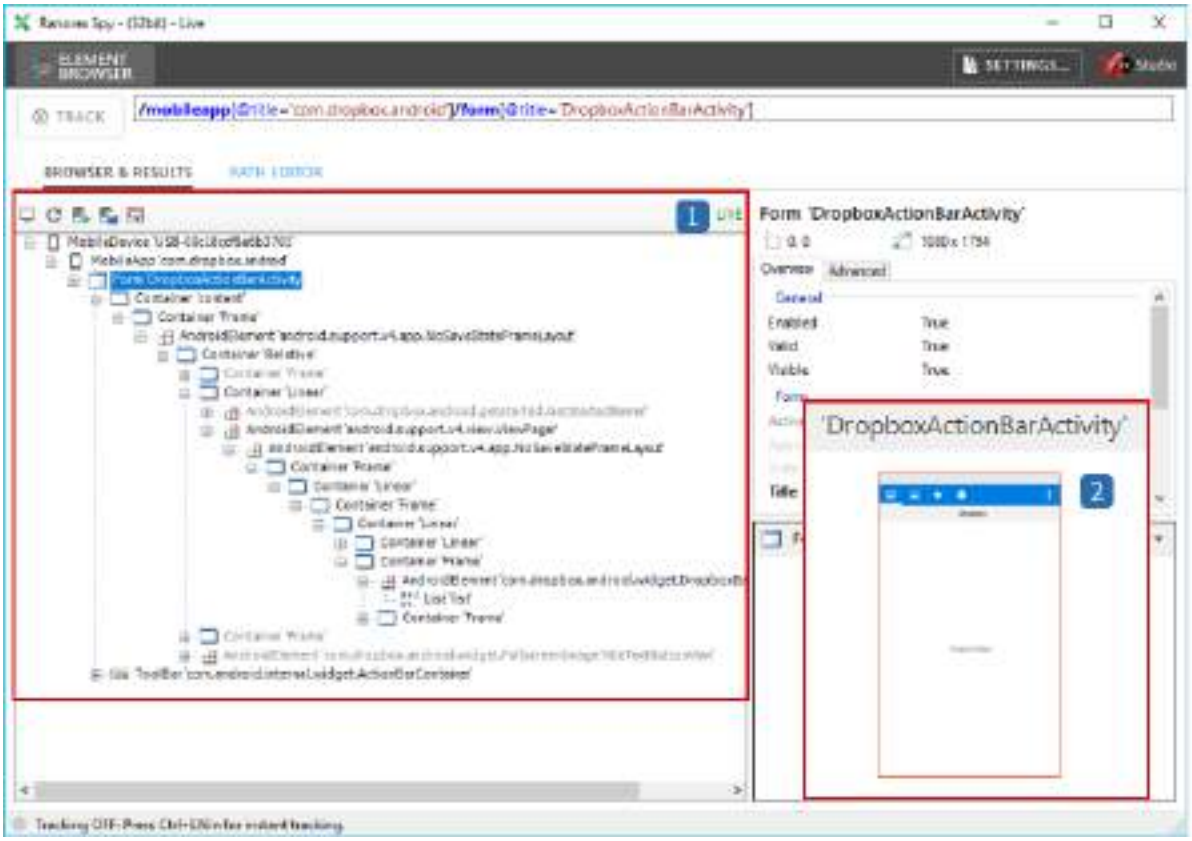
The instrumented device starts on the mobile device. In our case, this is the Dropbox mobile app.

Attention

Regarding mobile iOS applications, **it is necessary that the Ranorex Service Application is running and active** on the mobile device. Ensure that it is not running in the background as this may prevent you from using the start/stop functionality for the mobile application.

Ranorex Spy

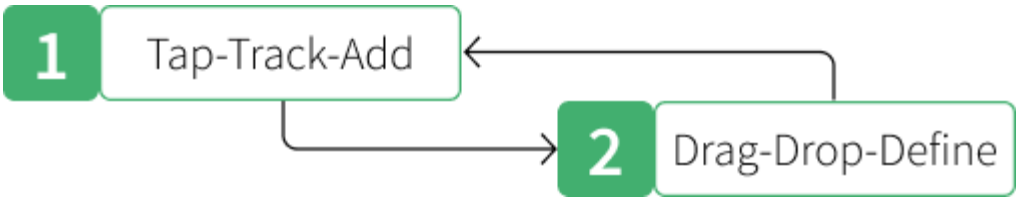
Ranorex Spy starts in live tracking mode for all UI elements of the instrumented mobile app.



1. Element browser in Spy showing all the UI elements of the instrumented app.
2. Live view of the instrumented app on the mobile device

Build the test

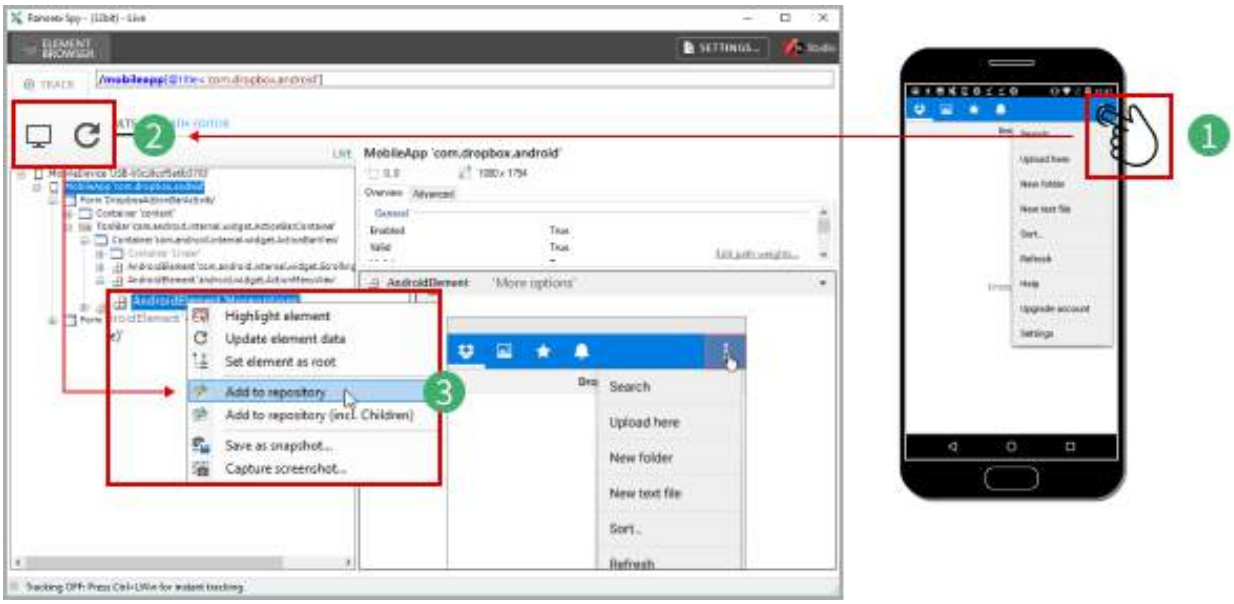
Building a mobile test consists of two consecutive, iterated steps:



Step 1: Tap, Track, and Add

In this step, you add a UI element as a repository item to Ranorex Studio to make it available for use in actions.

1. **Tap: Make** the element visible in the app, e.g. by tapping it.
2. **Track: Update** the live tracking in Spy by clicking **Browse endpoint** or **Refresh**.
3. **Add: Select** the element in the element tree, **right-click** it, and **add** it to the repository. Alternatively, **drag and drop** it in the repository.

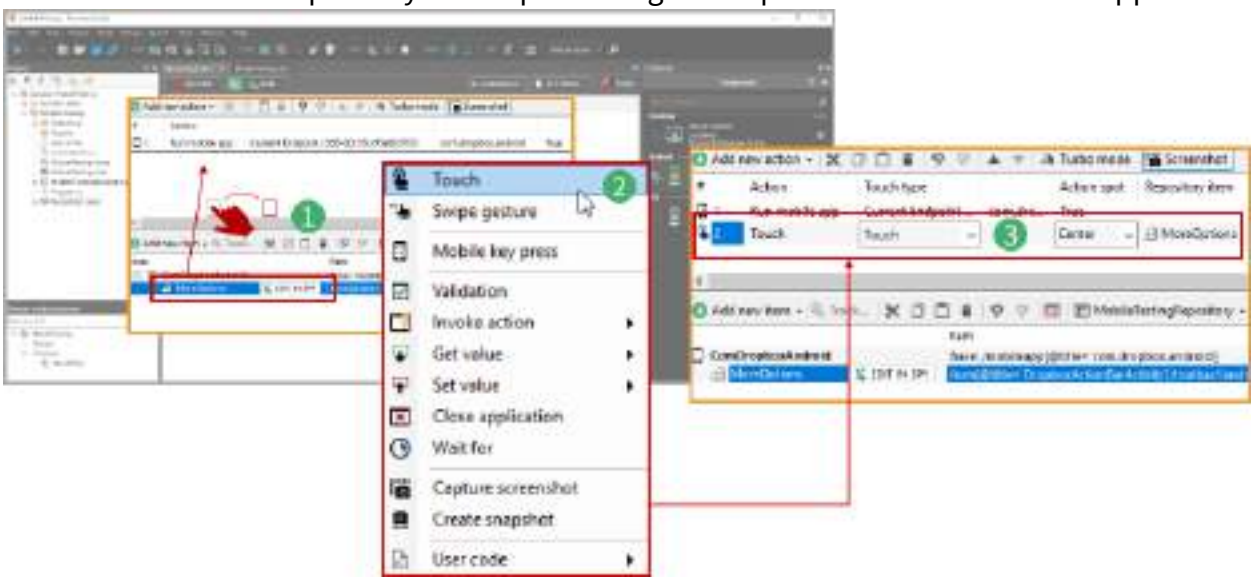


Step 2: Drag, Drop, and Define

In the second step, you “process” the UI element, i.e. you use it in an action.

1. **Drag:** From the repository, **drag** the repository item to the desired position in the action table.
2. **Drop: Drop** it by releasing the left mouse button. The context menu opens. **Select** the desired action.

3 **Define: Make** any necessary configurations to the action, e.g. setting timeouts, content of key sequences, etc. The finished action is shown in the action table, linked to the repository item representing the respective UI element in the app.



Note

You can shorten the procedure by directly dragging a UI element from Spy to the action table.

Reference

You can find step-by-step instructions for creating mobile tests in

Web and mobile testing -> Mobile testing > ⇢ Android app testing example / ⇢ Android mobile web test example

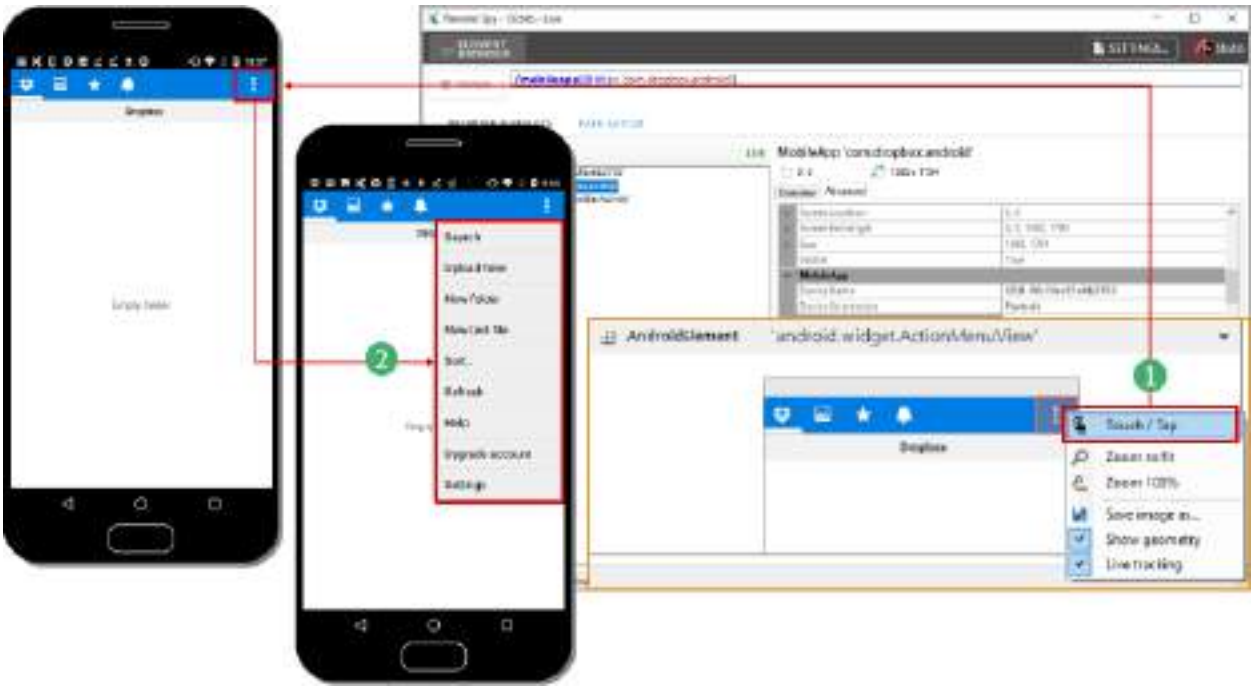
Web and mobile testing -> Mobile testing > ⇢ iOS app testing example / ⇢ iOS mobile web test example

Tips for efficient test building

Remote control your app from Spy

You can remote control your app through Spy. This way, you won't have to carry out all the actions to bring up menus and different screens in the app on the actual mobile device.

1. In the live view of Spy, **right-click** a UI element and **click Touch/Tap.**
2. The action is executed on your mobile device as if you actually touched the screen.



Enter text in Spy instead

You can also enter text in a similar way.

1. In Spy, with a UI element selected, **click** the **Advanced** tab.
2. **Find** the **Text** attribute, **enter** your text, and **confirm** with **Enter**.
3. The text appears in the mobile app as if you typed it in using the screen keyboard.

Run a mobile test

For the most part, running mobile tests works the same as for any other test. There are just a few preparations required.

Preparation

To execute a test on a mobile device, you need to make the following preparations:

- The device must be set as automation root in the endpoints pad. Alternatively, you can specify an endpoint in the **Run mobile app** action. It will then override the automation root.
- The Ranorex Service App must be installed on the mobile device.

Run the test

With the above preparations made, you can run the test like any other.

1. In the test suite view, **click RUN**. The test will be started and run on the mobile device.

Attention

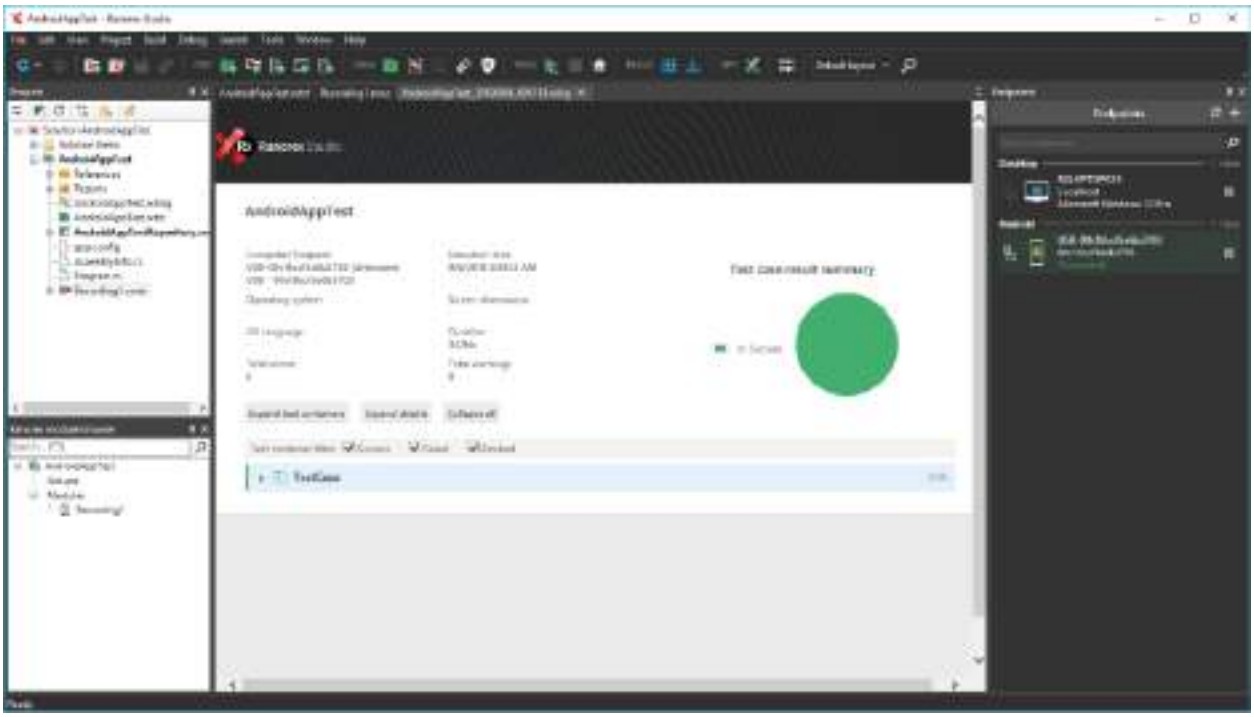
Do not touch the screen or any buttons on the mobile device while the test is running. This would result in a test failure.

Note

The various available options for test runs are also the same as for other tests. For more information, refer to ⇢ Execute a test suite.

Report

Once the test run has finished, the report appears.



The report for mobile tests does not differ from that for other tests.

> **Reference**
>
> Reports are explained in Ranorex Studio fundamentals > Reports > ⇢ Introduction

Android app testing example

In this chapter, we'll go through an Android app test step by step.

Test scenario

We'll test the freely available Dropbox mobile app. Our test contains the following steps:

1. Start the Dropbox app on the Android device.
2. Check if the Dropbox is empty.
3. Create a new folder called MyDocuments.
4. Create a screenshot of the Dropbox desktop with the folder in it.
5. Delete the folder.
6. Check if the Dropbox is empty.

7. Close the app.

Preparations

Device settings

- Apply the required ⇢ device settings to your Android device and install the Ranorex Service App.

Connect mobile device

- ⇢ Connect your mobile device to your computer, preferably via USB, and ⇢ add it as an endpoint in Ranorex Studio.

Instrument the app

- Download the Dropbox APK from the Dropbox website and ⇢ instrument it.

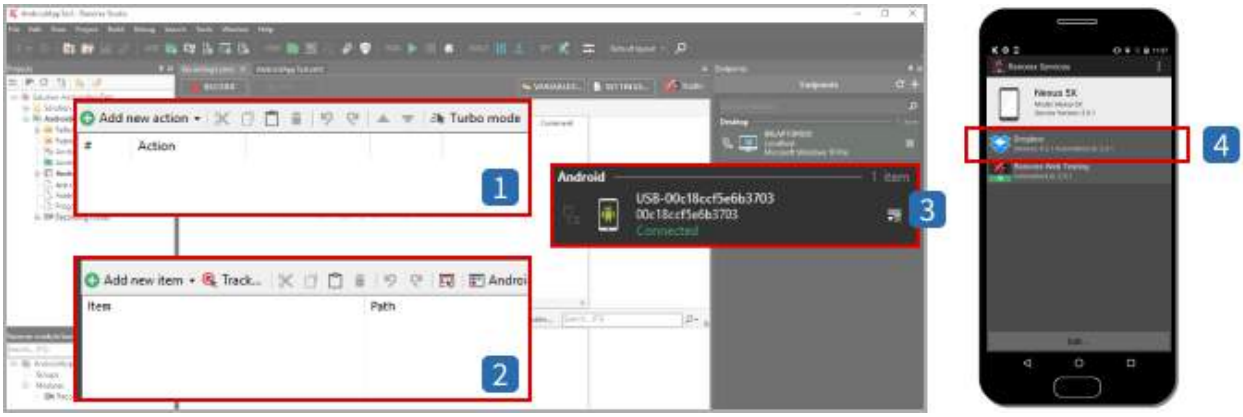
Create a Dropbox account

- You'll need a free Dropbox account. Create one at www.dropbox.com.

Create a solution for mobile testing

1. ⇢ Create a new solution for mobile testing using the RocketStart wizard.
2. **Open** the Endpoints pad.
3. **Open** the recording module **Recording1.rxrec**.

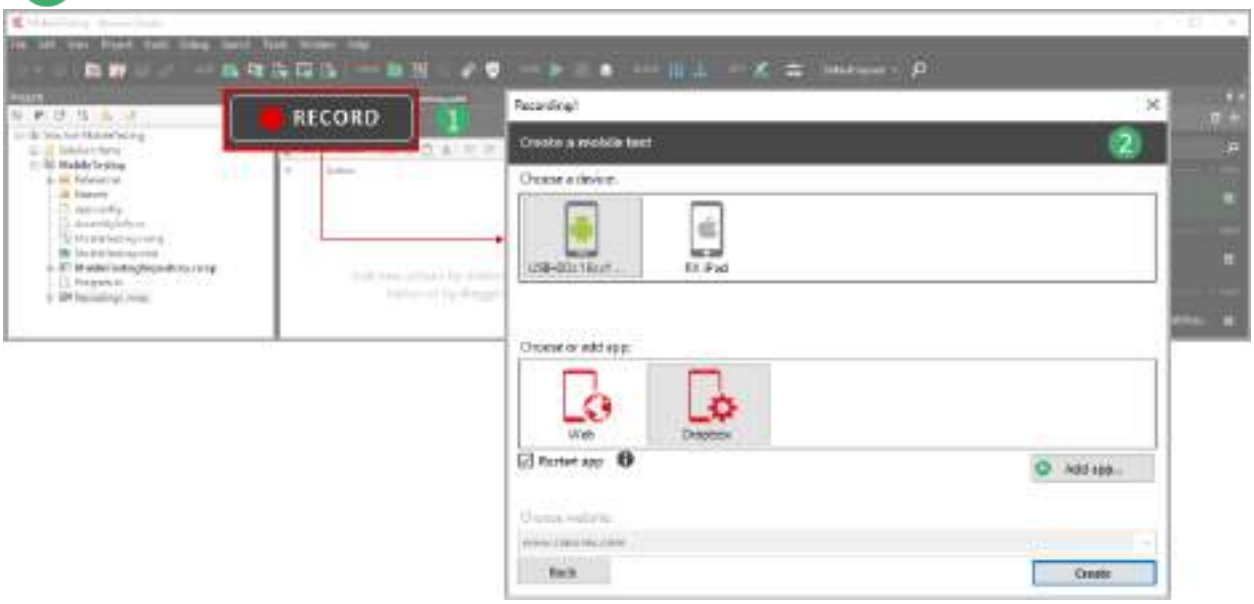
Ranorex Studio should now look as follows:



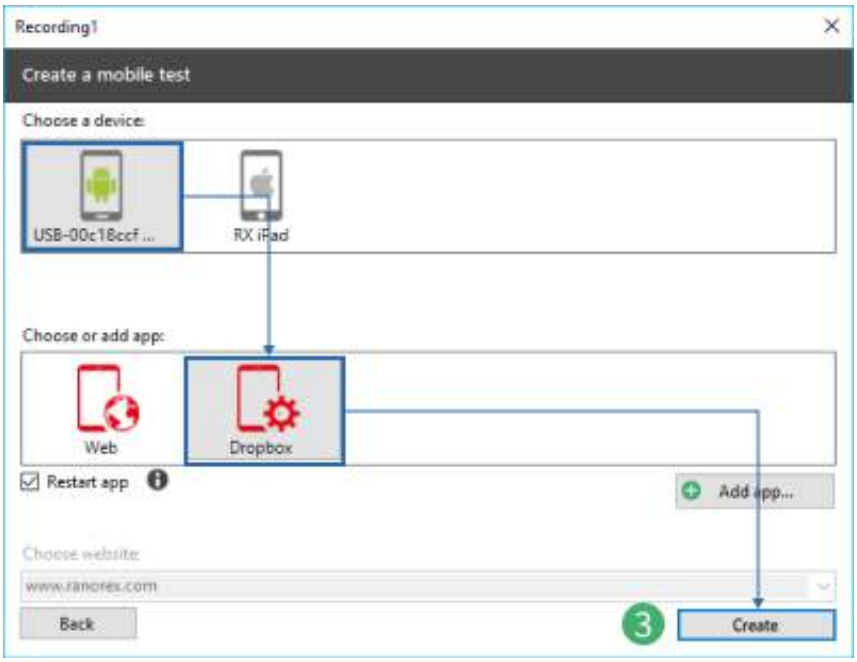
1. Empty action table in the recording module
2. Empty repository
3. Your device in the Endpoints pad.
4. Ranorex Service App running on the mobile device, showing the Dropbox app as instrumented.

Create the test

1. **Click RECORD**.
2. The dialog for selecting the mobile device and instrumented app appears.



3. **Select** your Android device and app (the Dropbox app) and **click Create**.

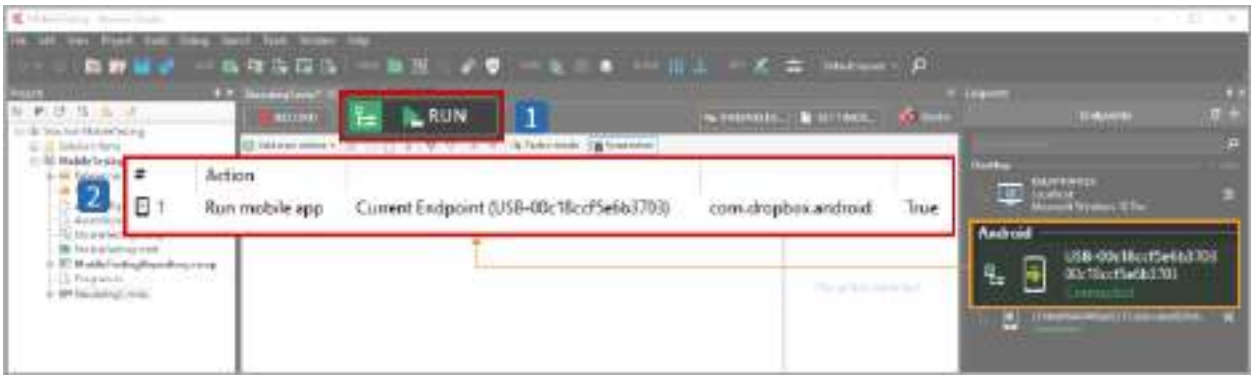


Setup

Ranorex Studio now executes the following processes to set up mobile test building.

In Ranorex Studio

Ranorex Studio starts the selected app on your mobile device and adds the respective action in the action table.



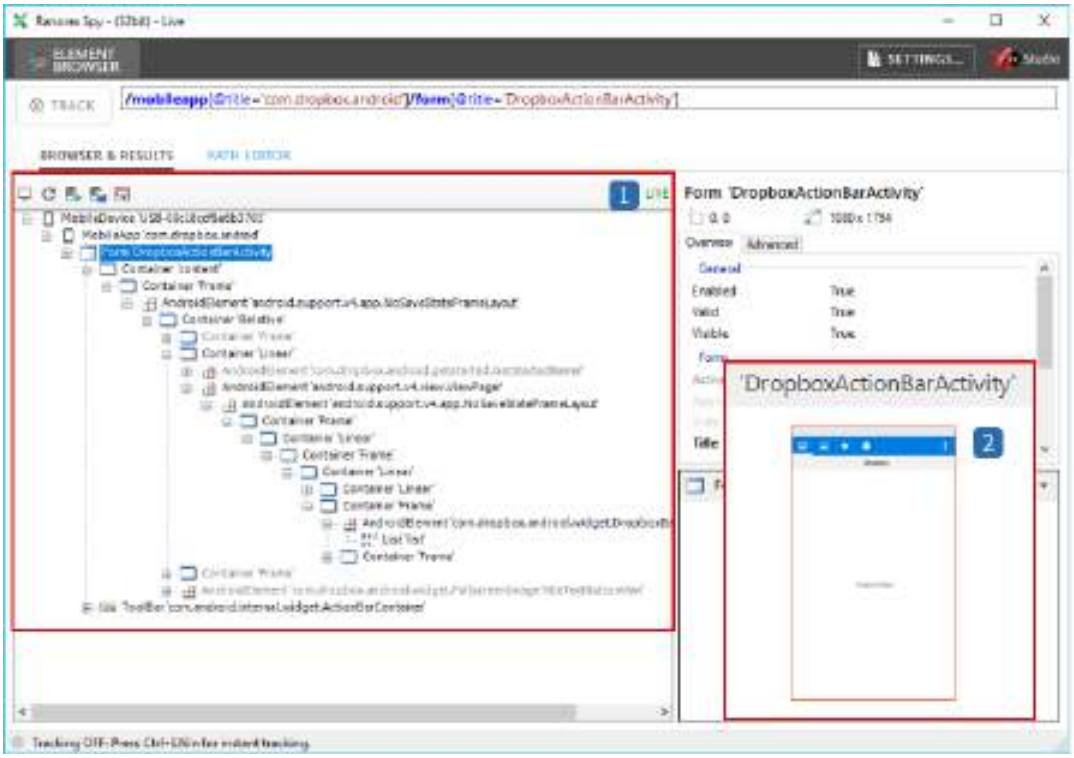
1. The RUN button changes to reflect that it now runs the test on the current automation root, i.e. the active endpoint/mobile devices, not the computer.
2. An action that starts the app on the mobile device has been added to the action table.

On the mobile device

The instrumented app starts on the mobile device. In our case, this is the Dropbox mobile app.

Ranorex Spy

Ranorex Spy starts in live tracking mode for all UI elements of the instrumented mobile app.



1. Element browser in Spy showing all the UI elements of the instrumented app.
2. Live view of the instrumented app on the mobile device.

Build the recording module

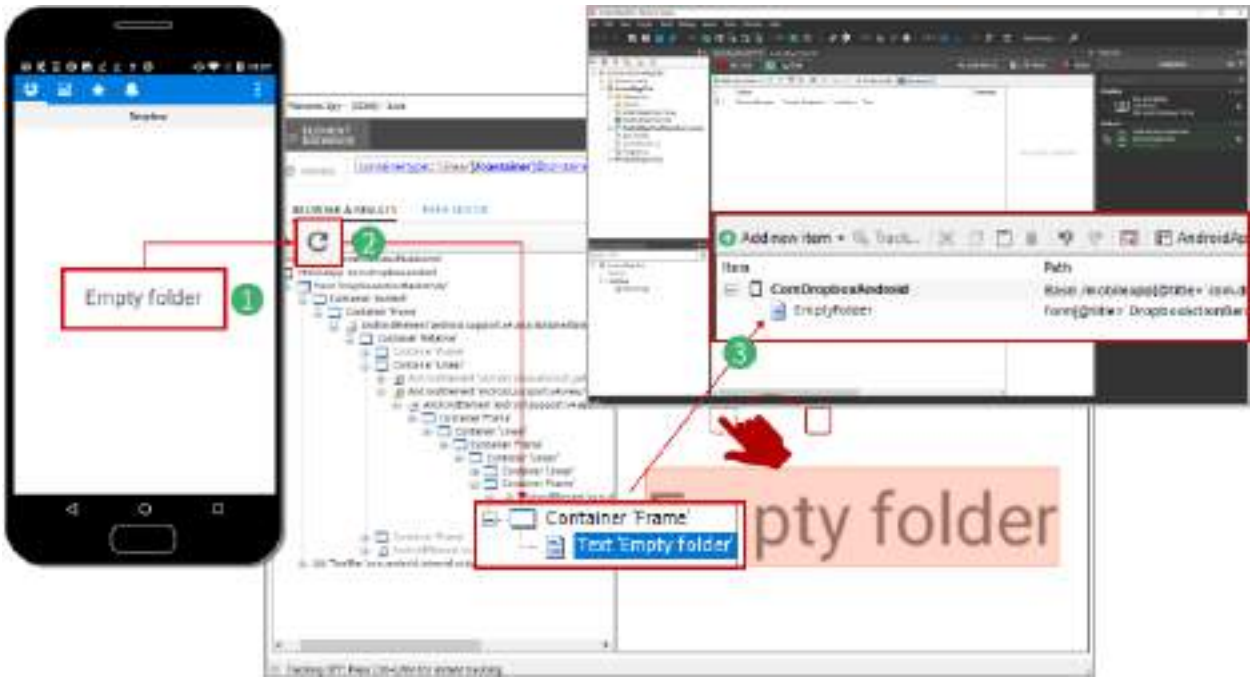
Now we can start filling our recording module with actions.

We'll do this using the two-step test-building procedure for mobile tests as explained in detail in ⇢ Create a mobile test.

Validate that the Dropbox is empty

Step 1: Identify validation text

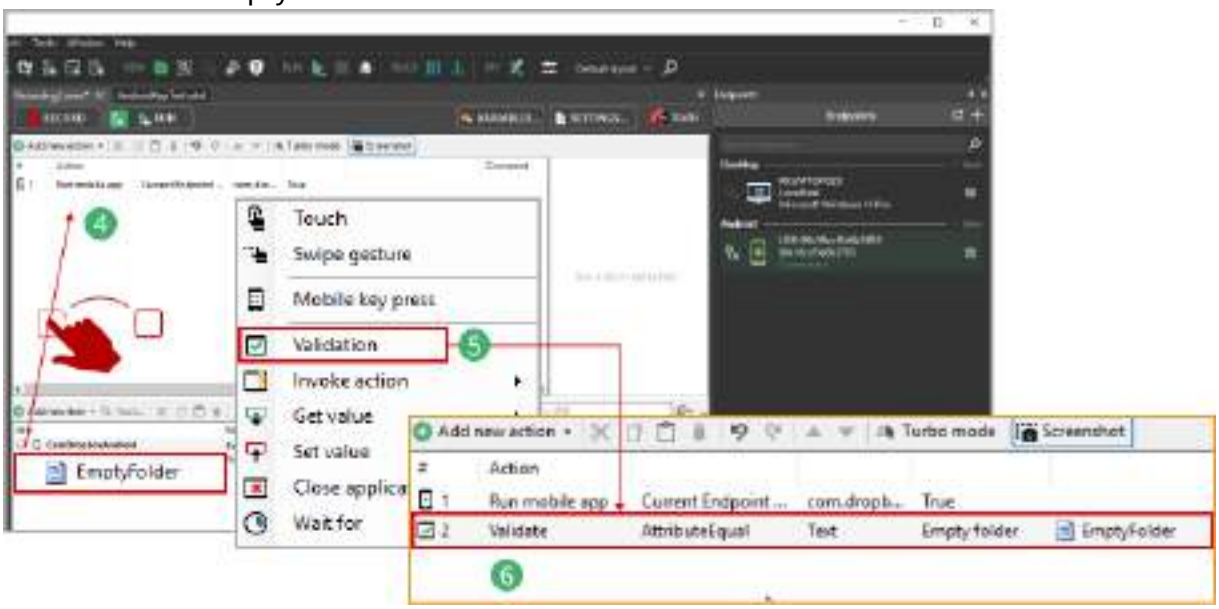
1. **Ensure** that the validation text **Empty folder** is visible on the mobile device.
2. **Click Refresh** in Spy.
3. **Drag** the UI element for **Empty folder** from Spy to the repository in Ranorex Studio.



Step 2: Define validation

1. **Drag** the new repository item to last position in the action table.
2. In the context menu that opens, **click Validation**.

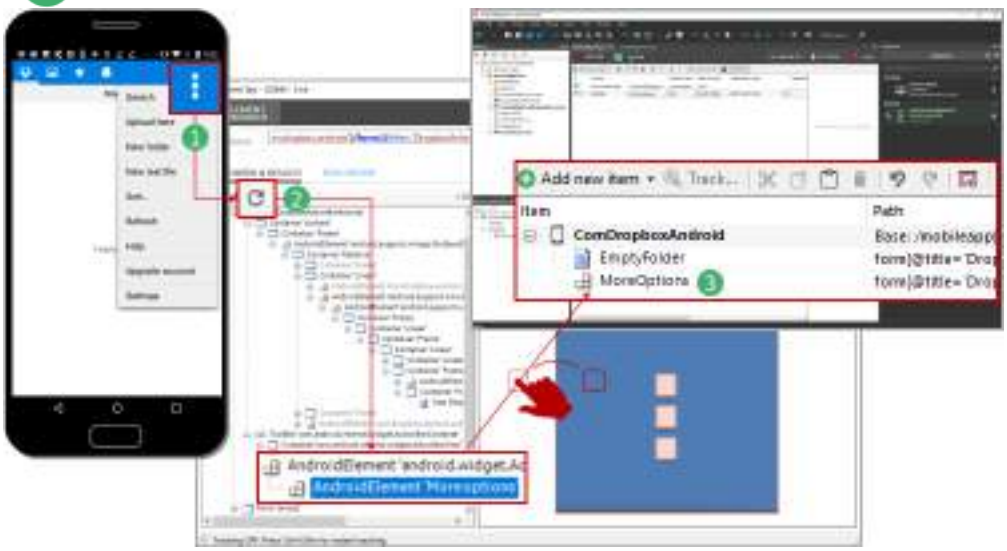
3. **Define** the Validation action: For **Match-Name**, **select Text** and for **Match-Value**, **enter** “Empty folder”.



Open the menu

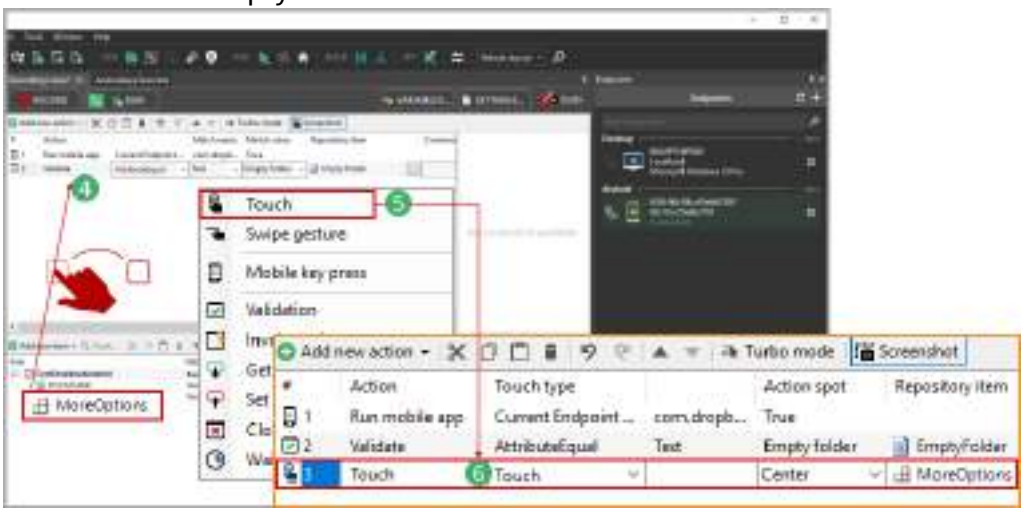
Step 1: Identify UI element

1. **Ensure** that the button for opening the menu is visible on the mobile device.
2. **Click Refresh** in Spy.
3. **Drag** the UI element for the button from Spy to the repository in Ranorex Studio.



Step 2: Define action

1. **Drag** the new repository item to last position in the action table.
2. In the context menu that opens, **click Validation**.
3. **Define** the Validation action: For **Match-Name**, **select Text** and for **Match-Value**, **enter** “Empty folder”.

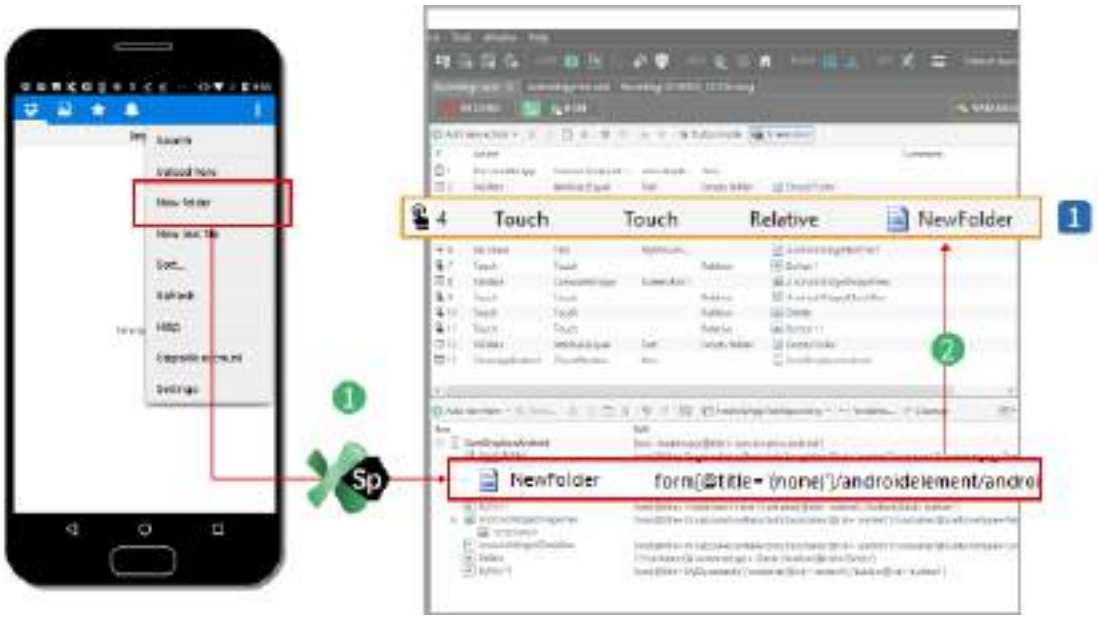


> **Note**
>
> Creating these first two actions illustrates the 2-step procedure, which remains the same for the following actions. Therefore, the following instructions don’t describe the procedure in quite as much detail.

Create a new folder

The option to create a new folder is located in the breadcrumb menu of the Dropbox app.

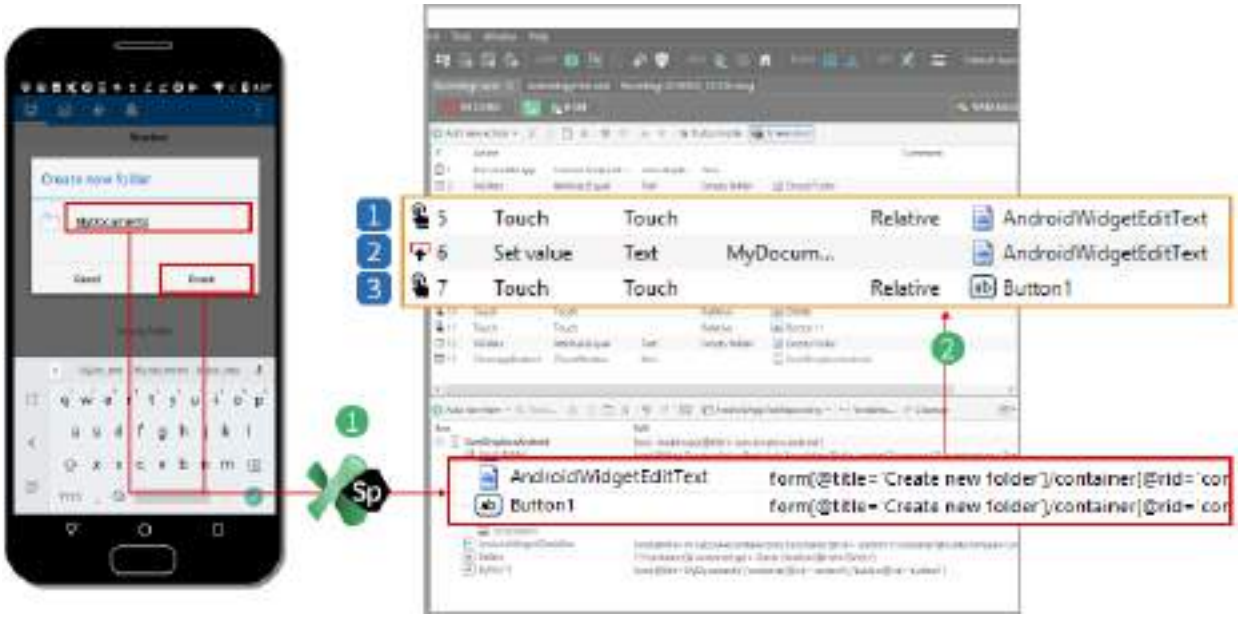
1. **Add** the UI element for the menu option **New folder** to your repository with Spy.
2. **Create** a Touch action with this repository item.



1 Touch action linked to the repository item for the menu option **New folder**.

Enter folder name and create folder

1. **Add** the UI elements for the **Folder name** text field and the **Create** button to your repository with Spy.
2. **Create** the following three actions with these repository items:



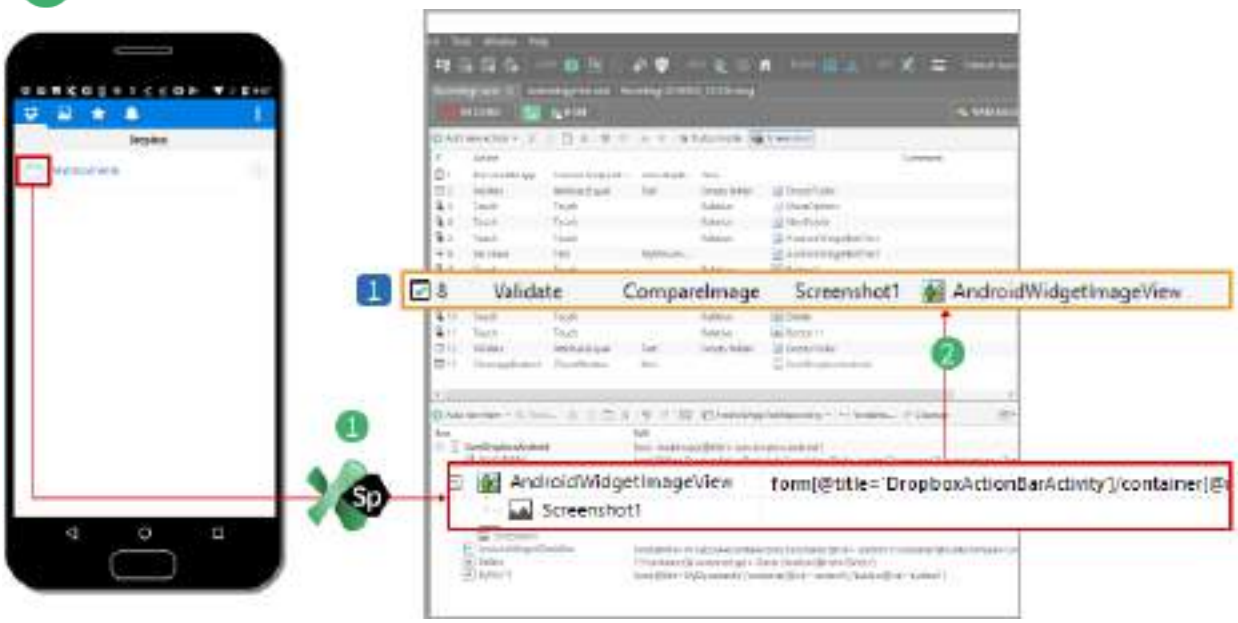
1. Touch action to place the cursor in the text field.
2. Set value action to enter the folder name.
3. Touch action tapping **Create** to create the folder.

> **Hint**
>
> If you want to test the functionality of the on-screen keyboard, you can also automate entering the name by a series of touch actions on the keys.

Validate folder

Now we'll validate that the folder exists. We'll use image-based validation for this purpose.

1. **Add** the folder image to your repository with Spy.
2. **Create** the following action with this repository item.



1. Validation action that uses image-based validation.

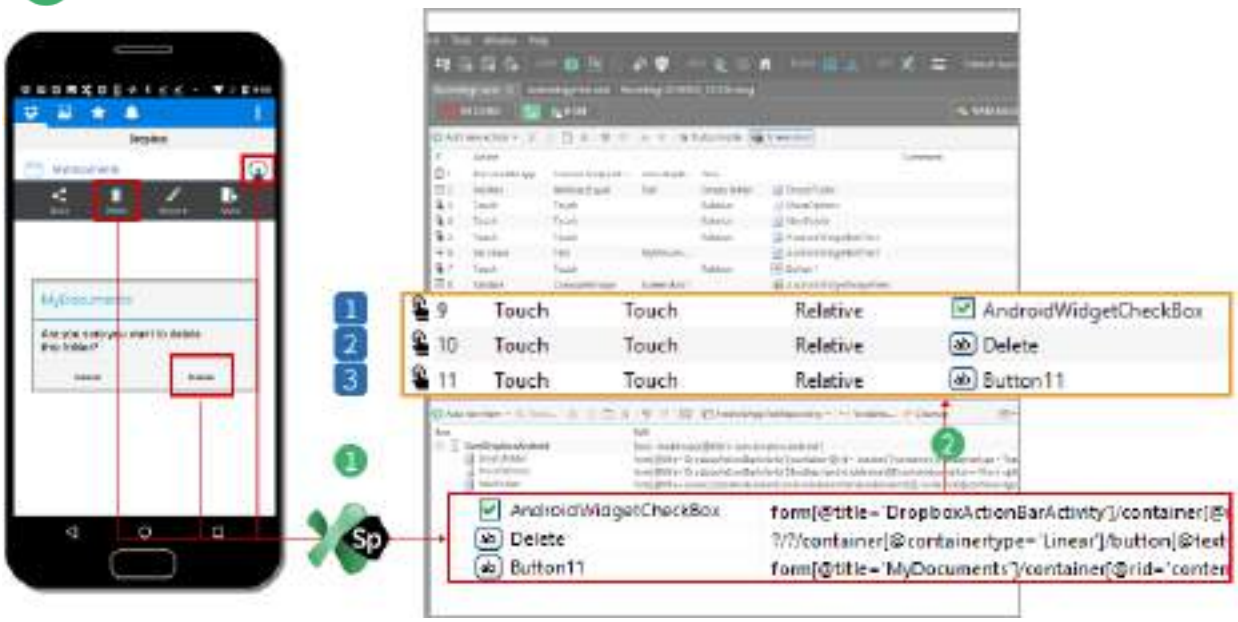
Reference

Image-based validation is explained in Ranorex Studio fundamentals > Validation > ⇢ Image-based validation

Delete folder

Deleting the folder requires that we open a menu, tap the first **Delete** button, and then tap the second **Delete** button.

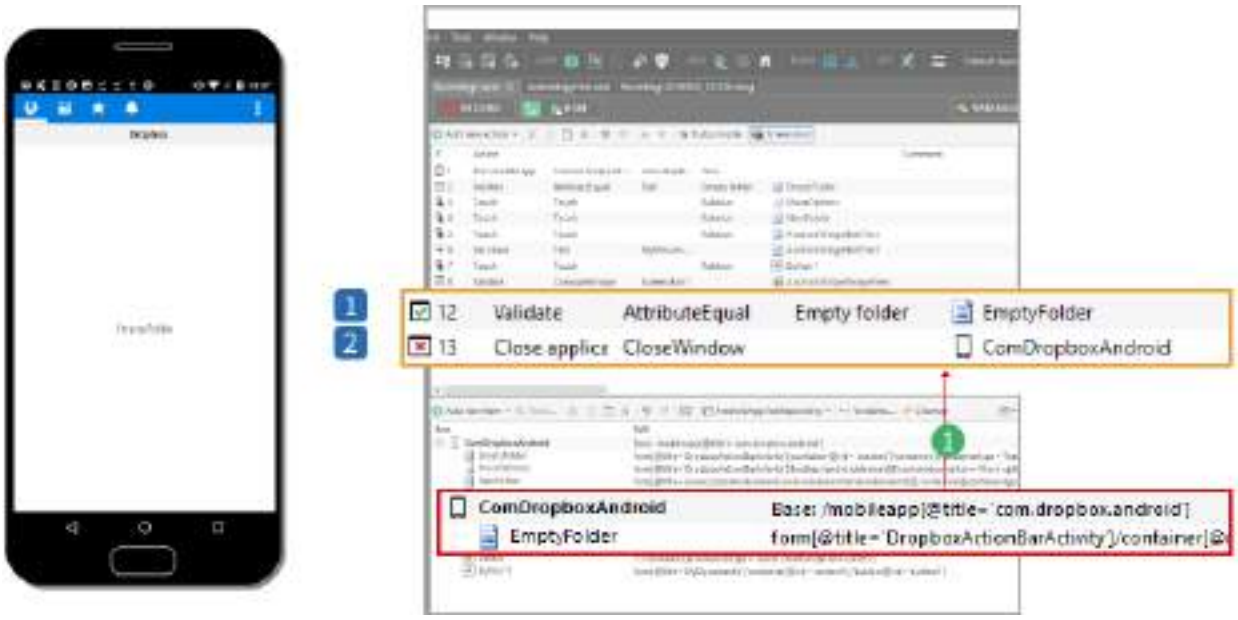
1. **Add** the three required UI elements to your repository with Spy.
2. **Create** the following actions with this repository item.



1. Opens the folder menu by tapping the respective symbol.
2. Taps the first **Delete** button.
3. Taps the second **Delete** button.

Validate that the folder has been deleted and close app

1. The repository items that we need already exist. Use them to create the following two actions.

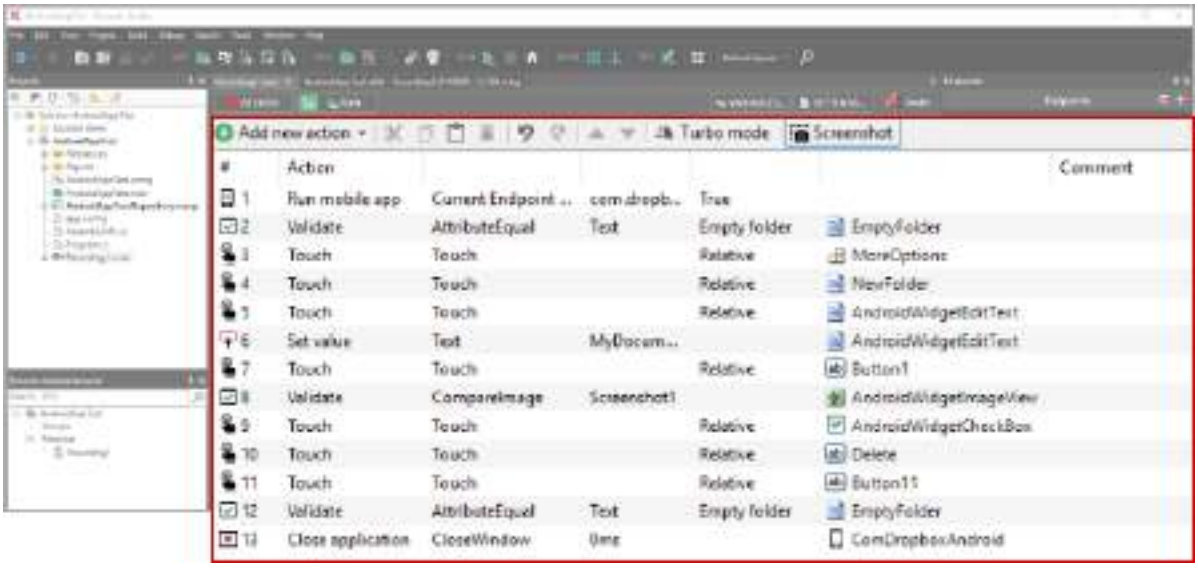


1 Validates that the Dropbox home screen is empty (a simple copy of action #2).

2 Closes the app.

Completed recording module

If you followed our instructions, your completed recording should look like this:



You can now switch to the test suite view and run the test. However, in a real-life scenario, the test wouldn't be quite finished here. The next step would be to modularize the recording and structure the test suite.

The concepts of modularizing and structuring apply to all recording modules and test suites, whether for desktop, web, or mobile tests.

> **Reference**
>
> Managing recording modules is explained in:
>
> Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Manage recording modules
>
> Structuring a test suite is explained in:
> Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Test suite structure
>
> A step-by-step example of building a full test suite is available in:
> Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Build a test

Android mobile web test example

In this chapter, we'll cover the initial steps of a mobile web test on an Android device. After these initial steps, test creation follows the same principles as in the ⇢ Android app test example and ⇢ general web test creation.

Preparations

To create a mobile web test, you need to make the following preparations:

Device settings

- Apply the required ⇢ device settings to your Android device and install the Ranorex Service App.

Connect mobile device

- ⇢ Connect your mobile device to your computer, preferably via USB, and ⇢ add it as an endpoint in Ranorex Studio.

Install the Ranorex Web Browser app for Android

- Ranorex provides a ⇢ preinstrumented web browser that is required for creating and executing Android web tests.

Choose a mobile browser

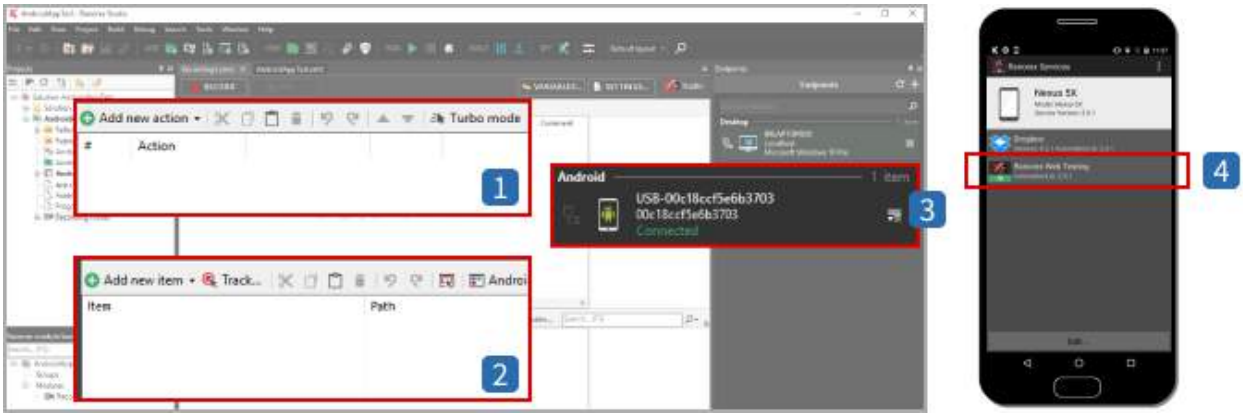
Ranorex provides a preinstrumented web browser. You need to use this browser to automate Android web tests.

> **Reference**
>
> Installing this app is explained in Web and mobile testing > Mobile testing > ⇢ Instrument apps

Create a solution for mobile testing

1. ⇢ Create a new solution for mobile testing using the RocketStart wizard.
2. Open the Endpoints pad.
3. Open the recording module Recording1.rxrec.

Ranorex Studio should now look as follows:



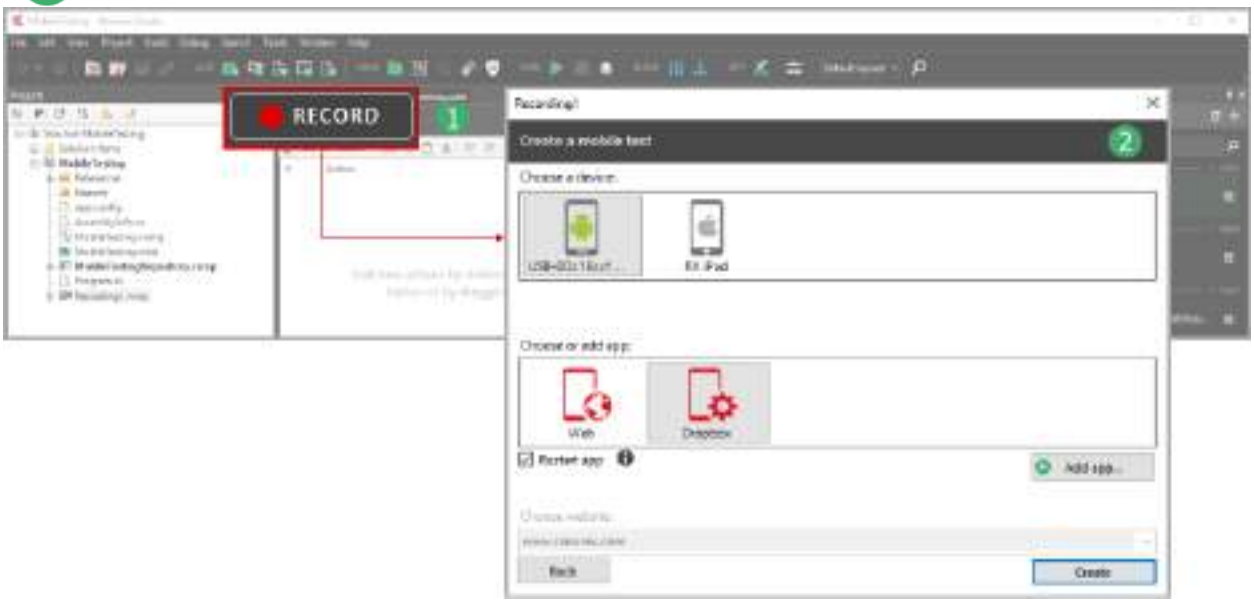
1. Empty action table in the recording module
2. Empty repository
3. Your device in the endpoints pad

4 Ranorex Service App running on the mobile device, showing the preinstrumented web browser app. If you chose a different web browser and instrumented it correctly, it will also appear here.

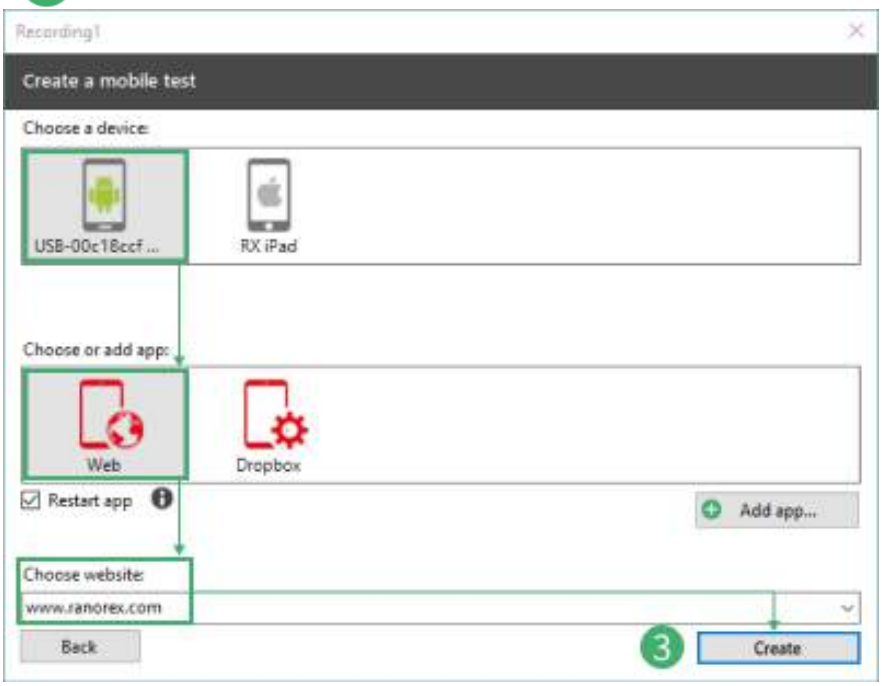
Create the test

1 **Click RECORD**.

2 The dialog for selecting the mobile device and instrumented app appears.



3 **Select** your Android device app (web browser), **specify** the URL, and **click Create**.

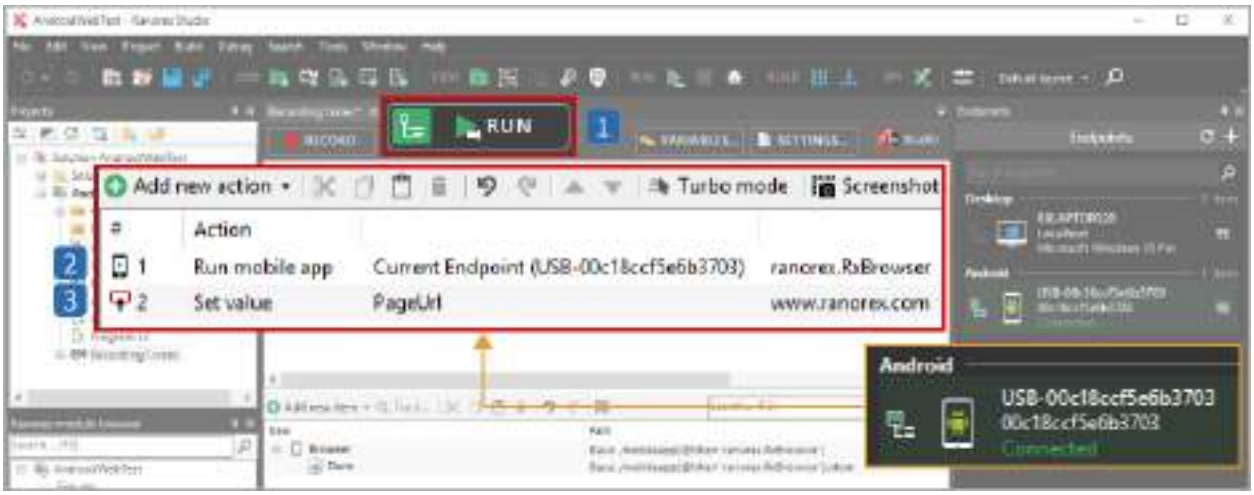


Setup

Ranorex Studio now executes the following processes to set up mobile test building:

In Ranorex Studio

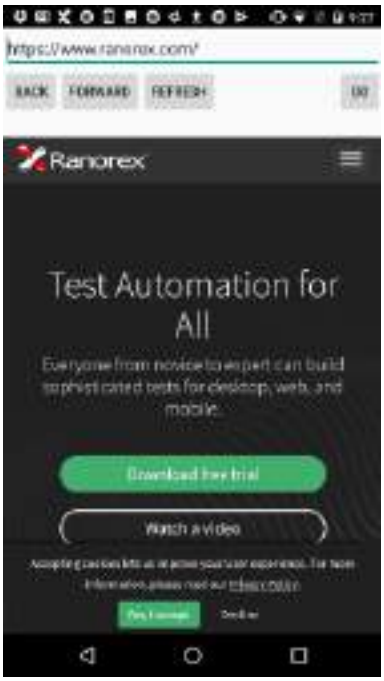
Ranorex Studio starts the selected app on your mobile device and adds the respective actions in the action table.



1. The RUN button changes to reflect that it now runs the test on the current automation root, i.e. the active endpoint/mobile devices, not the computer.
2. An action that starts the app on the mobile device has been added to the action table.
3. An action that navigates to the specified URL in the selected browser app has also been added.

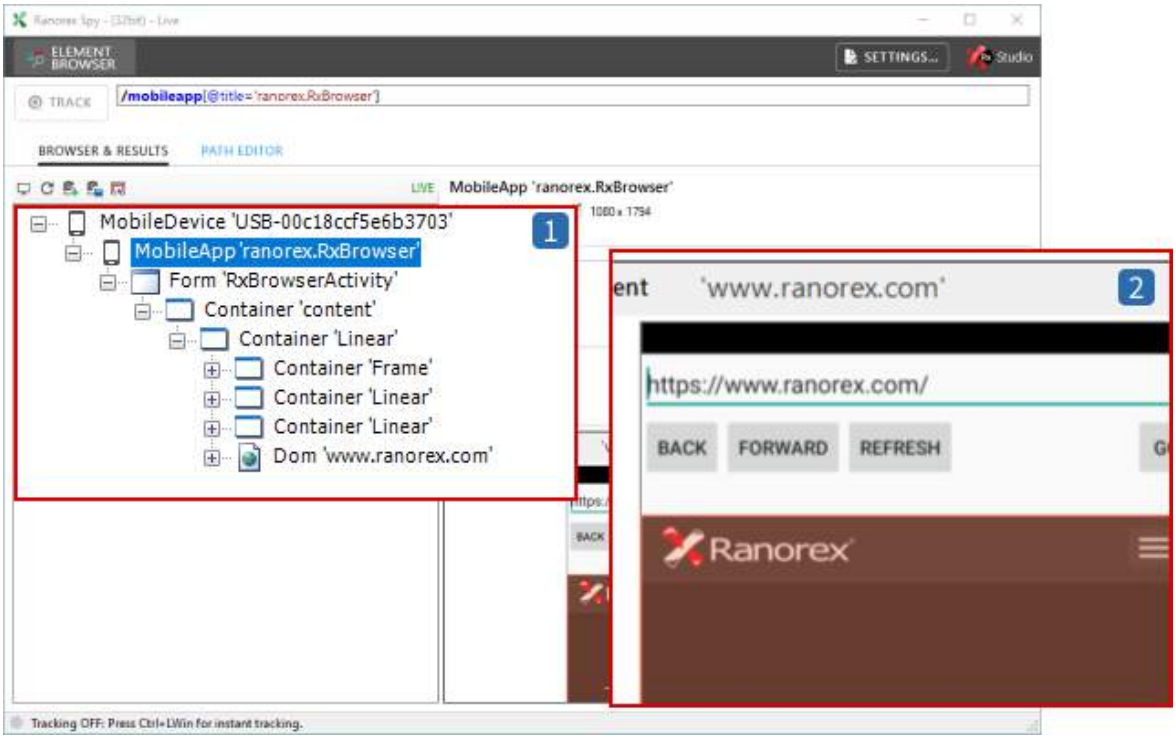
On the mobile device

Ranorex Studio starts the selected browser and navigates to the specified URL on the mobile device.



Ranorex Spy

Ranorex Spy starts in live tracking mode for all UI elements of the instrumented mobile app.



1 Element browser in Spy showing all the UI elements of the instrumented app.

2 Live view of the instrumented app on the mobile device.

Build the test

From this point forward, test building follows the same principles as in the ⇢ Android app test example and ⇢ general web test creation.

iOS app testing example

In this chapter, we'll go through an iOS app test step by step.

Test scenario

We'll test the preinstrumented iOS KeyPass mobile app that you can download from the Ranorex website. Our test contains the following steps:

1. Start the app on the iOS device.
2. Create a new password database.
3. Name it MyPasswords.
4. Give it the password 1234.
5. Check if the category General exists.
6. Exit the app.

Preparations

Device settings

- Apply the required ⇢ device settings to your iOS device and install the Ranorex Service App.

Connect mobile device

- ⇢ Connect your mobile device to your computer, preferably via USB, and ⇢ add it as an endpoint in Ranorex Studio.

Instrument the app

- Download the ⇢ preinstrumented KeyPass app from our mobile download archive and install it on your device.

Create a solution for mobile testing

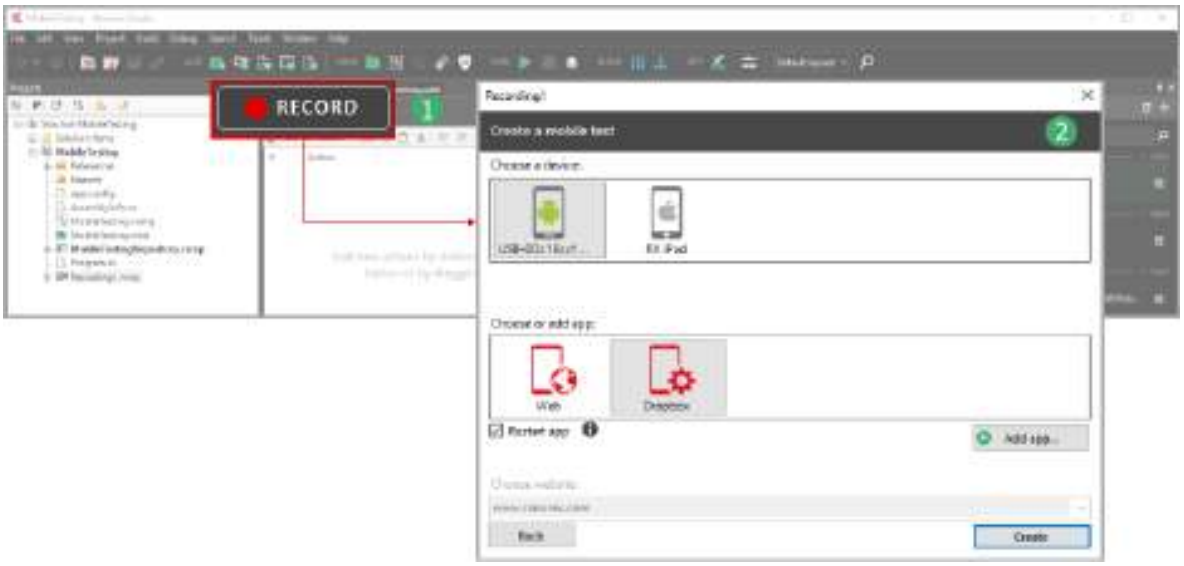
1. ⇢ Create a new solution for mobile testing using the RocketStart wizard.
2. Open the Endpoints pad.
3. Open the recording module Recording1.rxrec.

Ranorex Studio should now look as follows:

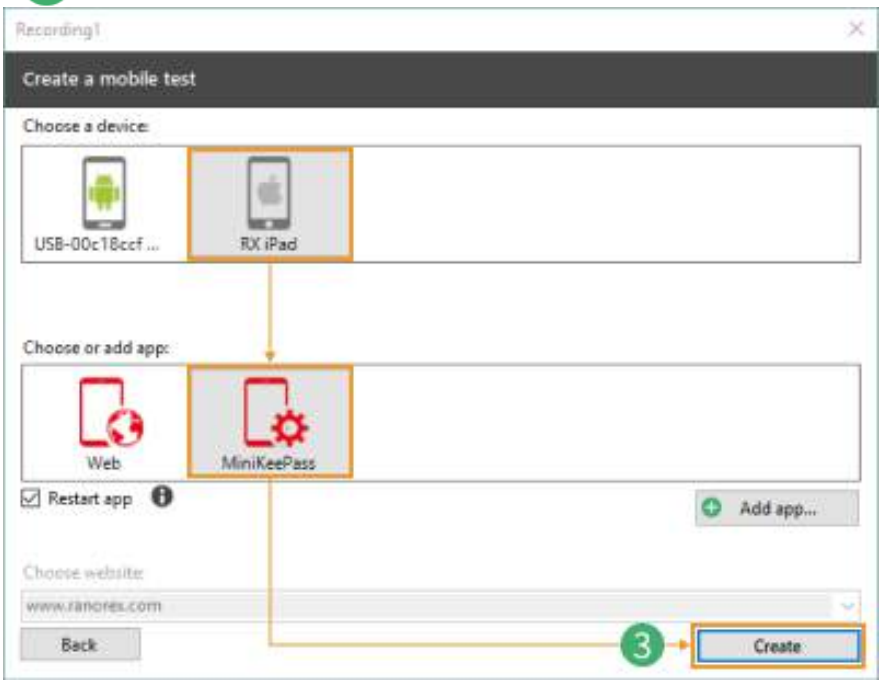
1. Empty action table in the recording module
2. Empty repository
3. Your device in the Endpoints pad.
4. Ranorex Service App running on the mobile device, showing the KeyPass app as instrumented.

Create the test

1. **Click RECORD**.
2. The dialog for selecting the mobile device and instrumented app appears.



3 **Select** your iOS device and app (KeyPass app) and **click Create.**

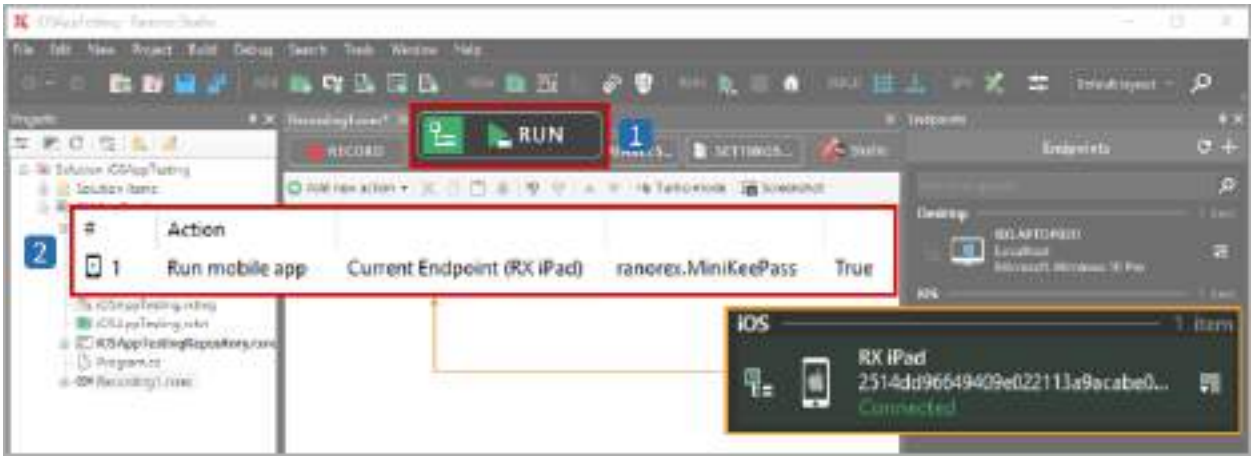


Setup

Ranorex Studio now executes the following processes to set up mobile test building.

In Ranorex Studio

Ranorex Studio starts the selected app on your mobile device and adds the respective action in the action table.



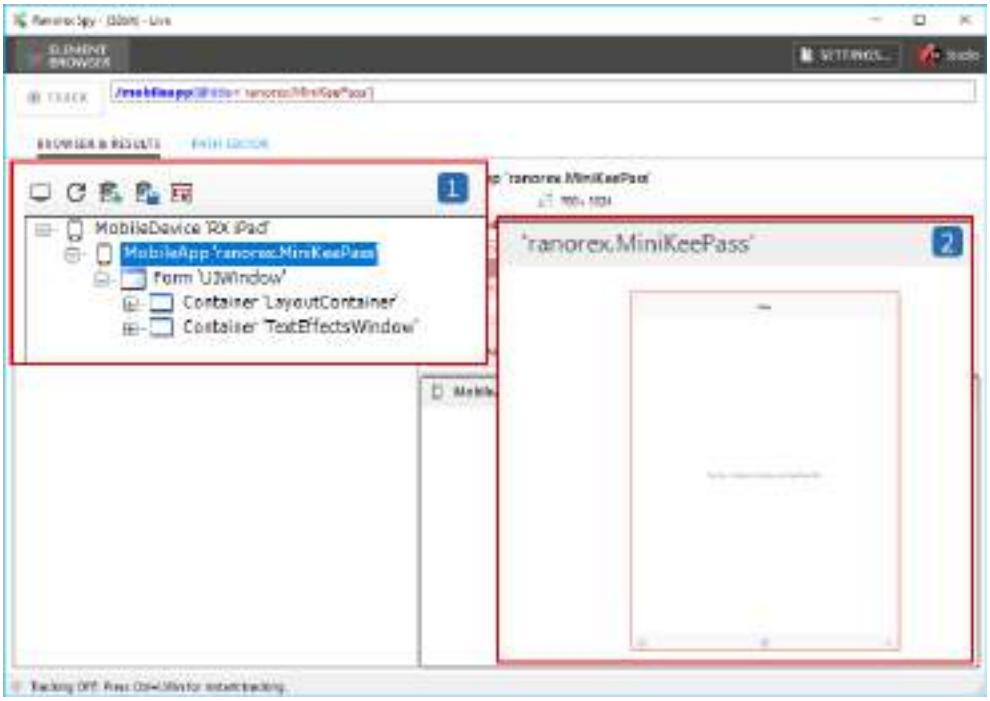
1. The RUN button changes to reflect that it now runs the test on the current automation root, i.e. the active endpoint/mobile devices, not the computer.
2. An action that starts the app on the mobile device has been added to the action table.

On the mobile device

The instrumented app starts on the mobile device. In our case, this is the KeyPass mobile app.

Ranorex Spy

Ranorex Spy starts in live tracking mode for all UI elements of the instrumented mobile app.



1. Element browser in Spy showing all the UI elements of the instrumented 100app.
2. Live view of the instrumented app on the mobile device.

Build the recording module

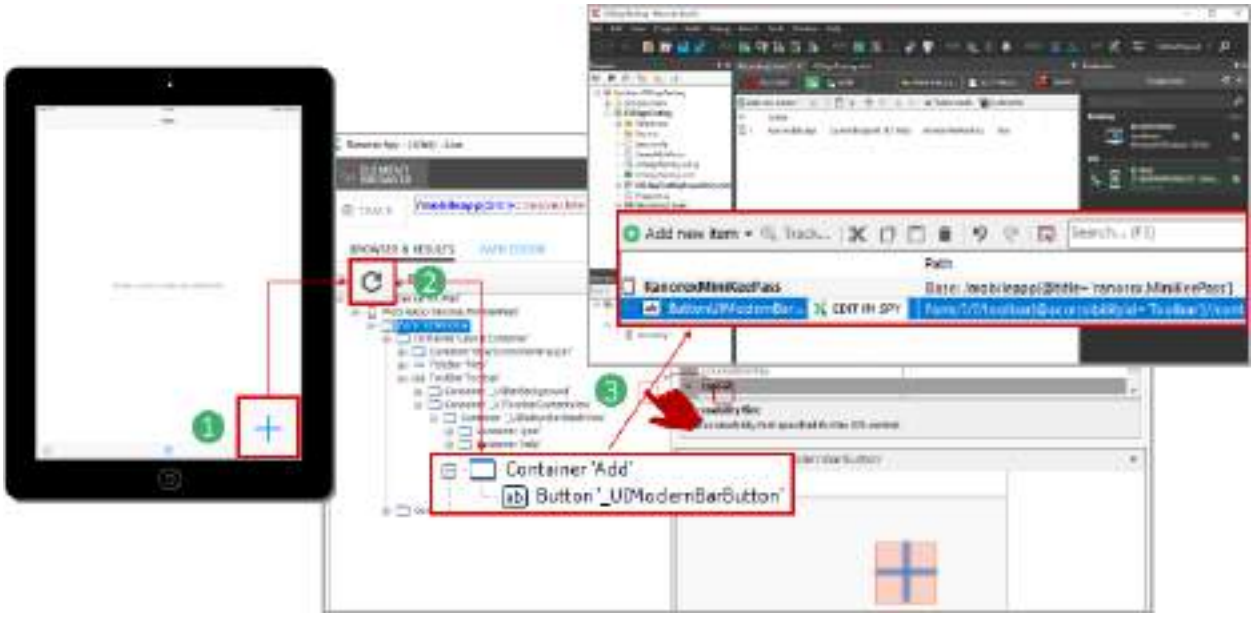
Now we can start filling our recording module with actions.

We'll do this using the two-step test-building procedure for mobile tests as explained in detail in ⇢ Create a mobile test.

Create new password database

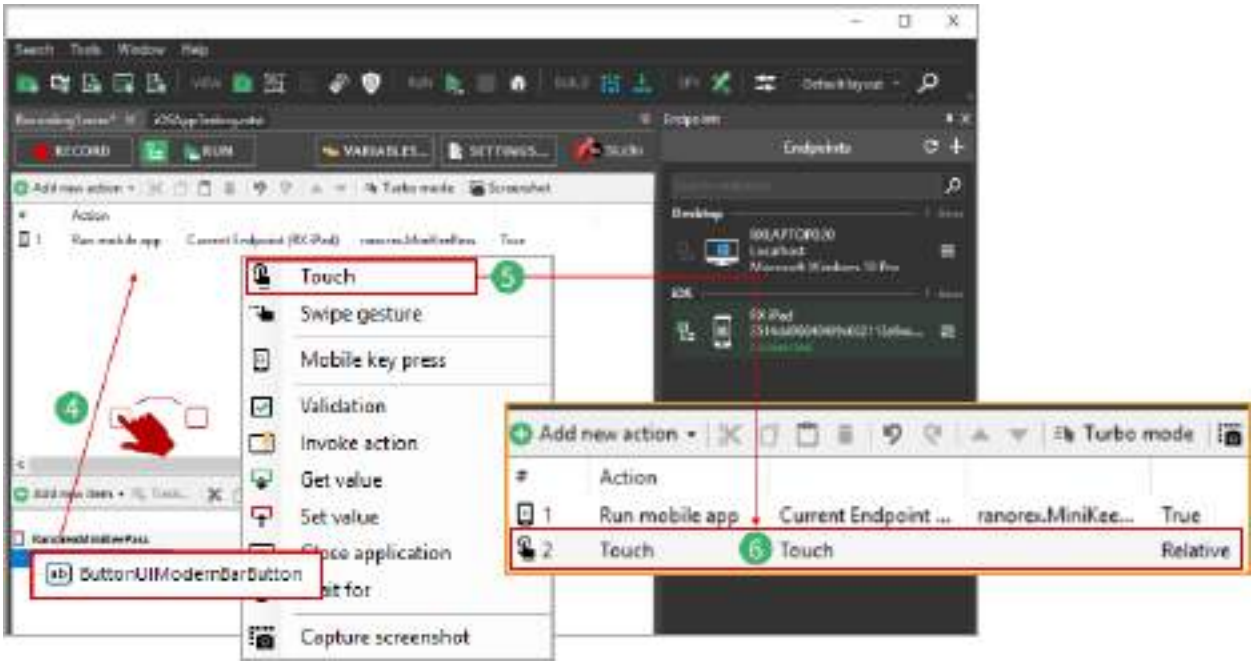
Step 1: Identify UI element and add to repository

1. **Ensure** that the **+** button is visible on the mobile device.
2. **Click Refresh** in Spy.
3. **Drag** the UI element for **Empty folder** from Spy to the repository in Ranorex Studio.



Step 2: Define action

4. **Drag** the new repository item to last position in the action table.
5. In the context menu that opens, **click Touch**.
6. The Touch action needs no further definition and is complete.



> **Note**
>
> Creating this action illustrates the 2-step procedure. It remains the same for the following actions. Therefore, the following instructions don't describe the procedure in quite as much detail.

Enter the database name

After tapping the + button, a dialog opens asking for a name and a password for the new database. To enter the name, we'll need to create two actions.

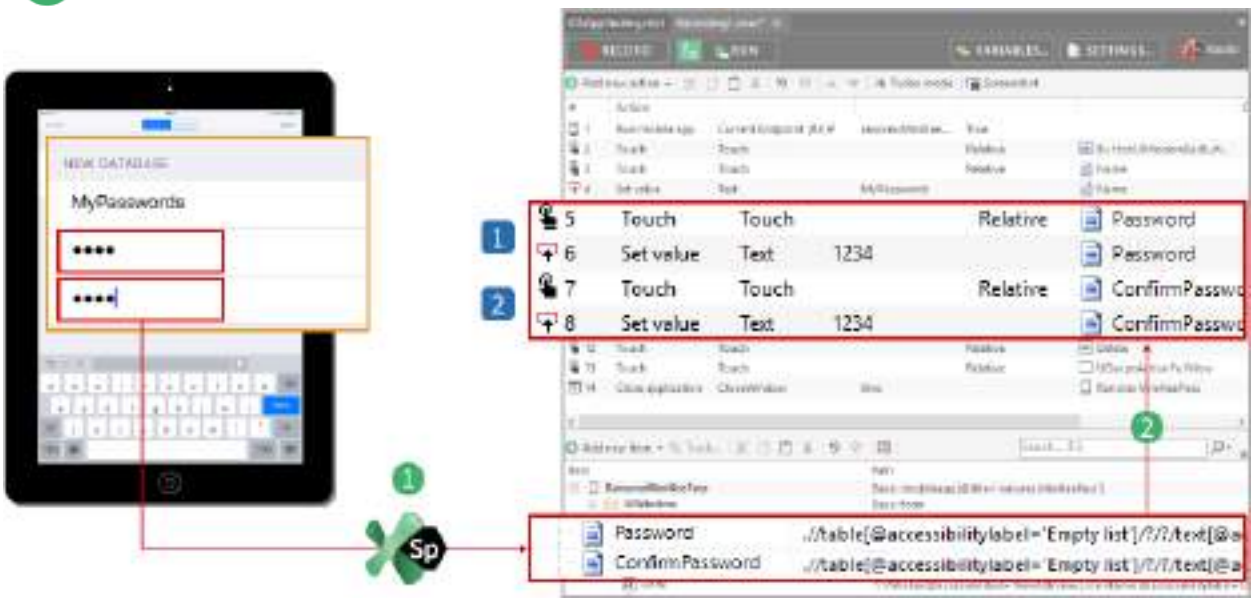
1. **Add t**he name text field to your repository with Spy.
2. **Create** the following two actions with this repository item:

1. Touch action that places the cursor in the text field.
2. Set value action that enters the name.

> **Hint**
>
> If you want to test the functionality of the on-screen keyboard, you can also implement entering the name by a series of touch actions on the keys.

Enter and confirm the database password

1. **Add** the two text fields for the password and its confirmation to your repository with Spy.
2. **Create** the following four actions with these repository items:



1. Touch action and Set value action to place the cursor in the text field and enter the password.
2. Touch action and Set value action to place the cursor in the text field and repeat the password.

Confirm database creation

1. **Add** the **Done** button to your repository with Spy.
2. **Create** the following action with this repository item:

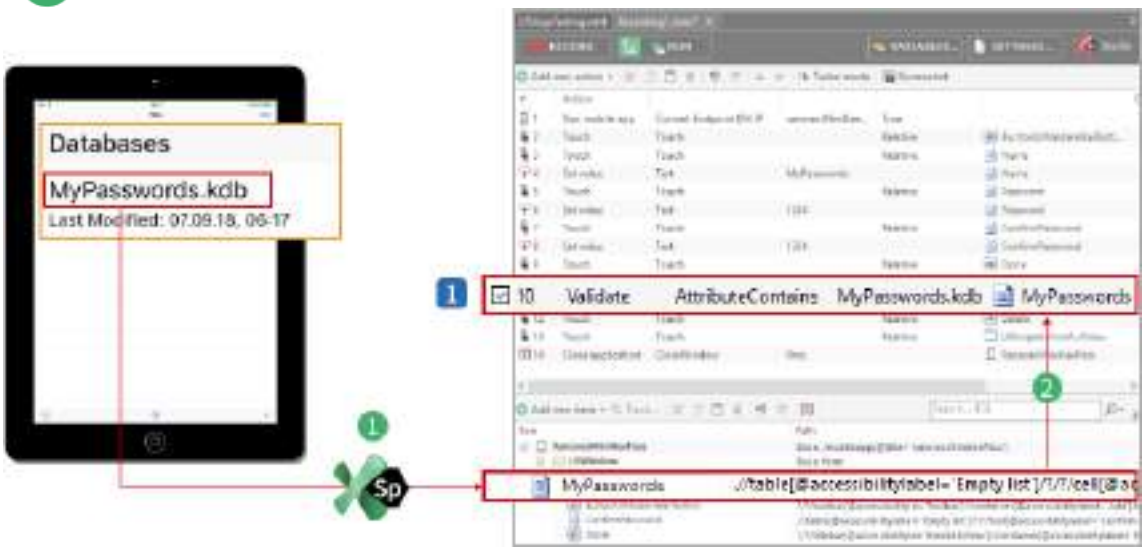
1 Touch action that taps the Done button to confirm database creation.

Validate database file

Now we'll validate whether the database was created correctly.

1 **Add** the file name to your repository with Spy.

2 **Create** the following action with this repository item:

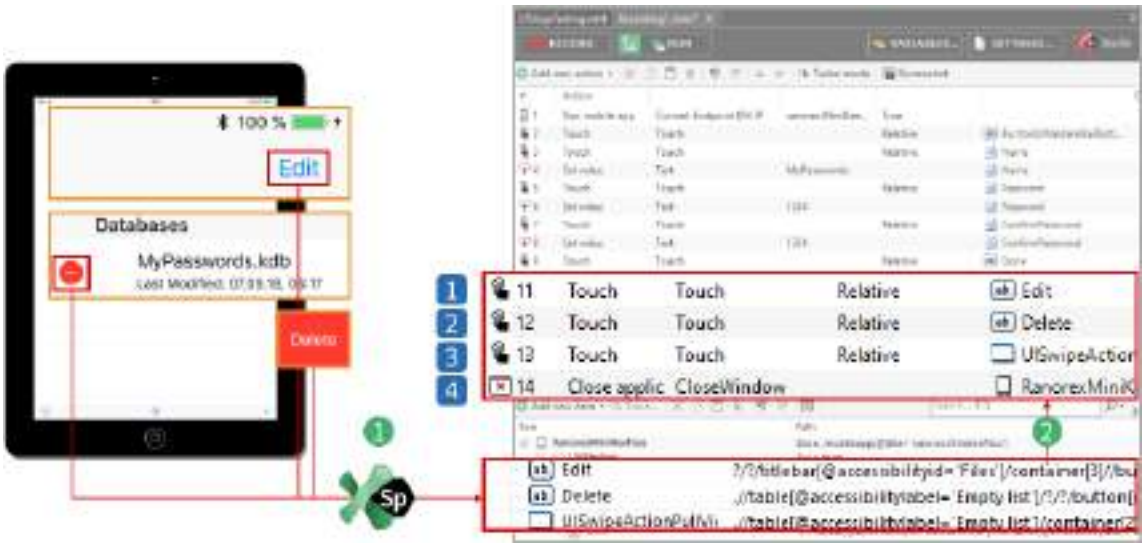


1 Validates that the displayed file name is the same as the one entered during database creation.

Delete database and close app

1 **Add** the **Edit**, **(-)** and **Delete** buttons to to your repository with Spy.

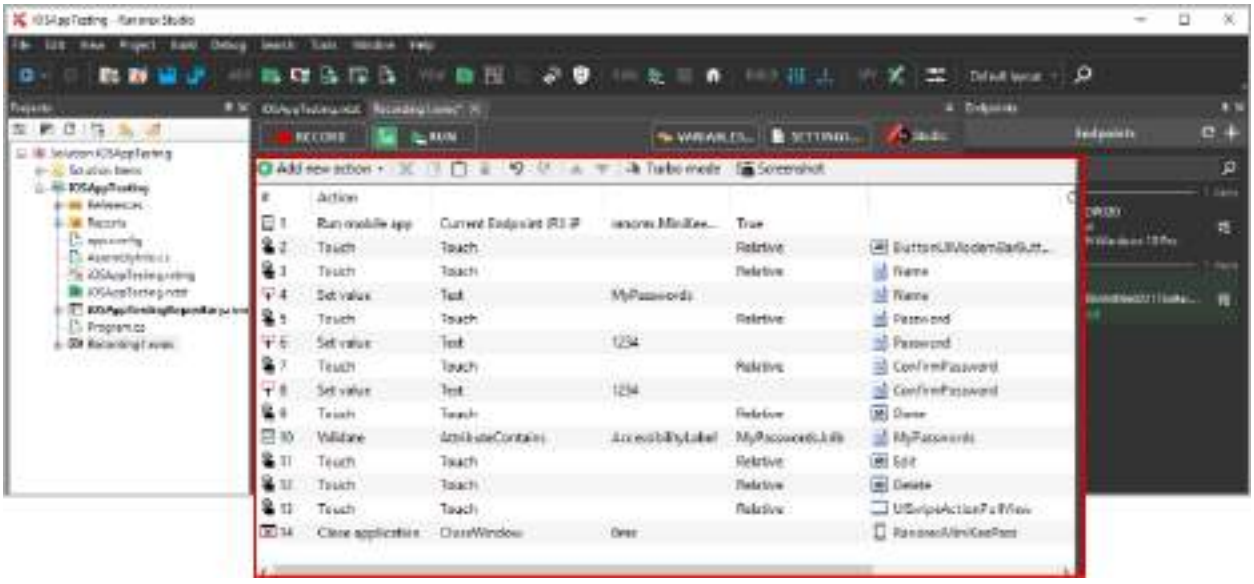
2 **Create** the following actions with these repository items:



1. Touch action that taps **Edit**.
2. Touch action that taps (-).
3. Touch action that taps **Delete** to confirm deletion.
4. Closes the app.

Completed recording module

If you followed our instructions, your completed recording should look like this:



You can now switch to the test suite view and run the test. However, in a real-life scenario, the test wouldn't be quite finished here. The next step would be to modularize the recording and structure the test suite.

The concepts of modularizing and structuring apply to all recording modules and test suites regardless of desktop, web, or mobile tests.

> **Reference**
>
> Managing recording modules is explained in:
> Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Manage recording modules
>
> Structuring a test suite is explained in:
> Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Test suite structure
>
> A step-by-step example of building a full test suite is available in:
> Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Build a test

iOS mobile web test example

In this chapter, we'll cover the initial steps of a mobile web test. After these initial steps, test creation follows the same principles as in the ⇢ iOS app test example and ⇢ general web test creation.

Preparations

To create a mobile web test, make the following preparations:

Device settings

- Apply the required ⇢ device settings to your iOS device and install the Ranorex Service App.

Connect mobile device

- ⇢ Connect your mobile device to your computer, preferably via USB, and ⇢ add it as an endpoint in Ranorex Studio.

Install the Ranorex Web Browser app for iOS

- Ranorex provides a ⇢ preinstrumented web browser that is required for creating and executing iOS web tests.

Create a solution for mobile testing

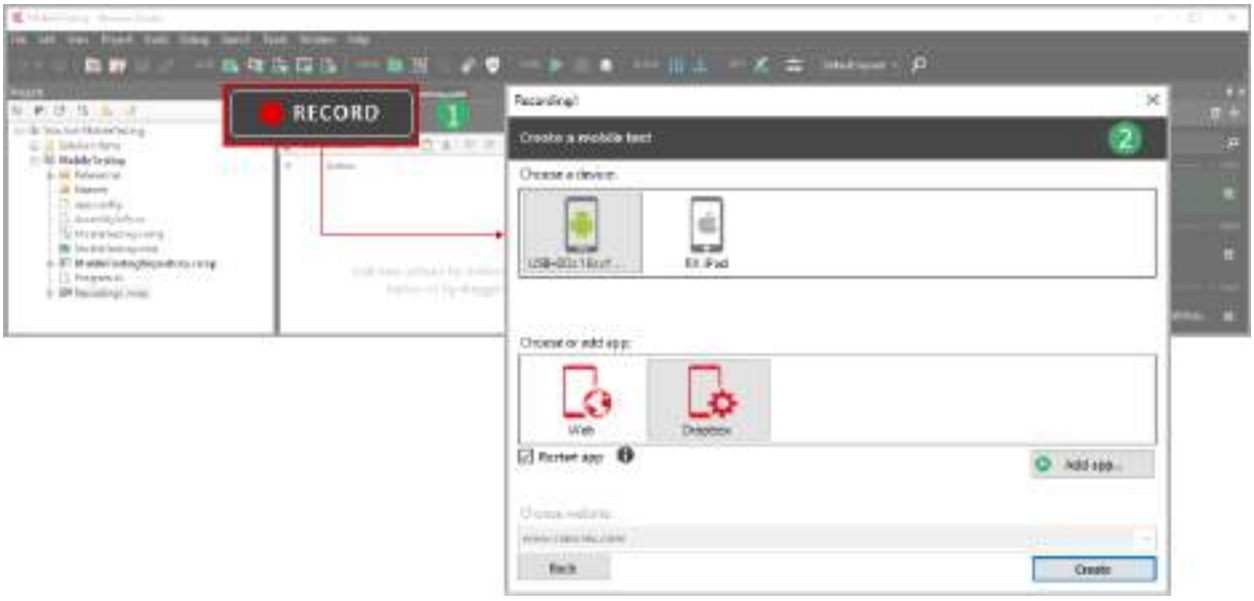
1. ⇢ Create a new solution for mobile testing using the RocketStart wizard.
2. Open the Endpoints pad.
3. Open the recording module **Recording1.rxrec**.

Ranorex Studio should now look as follows:

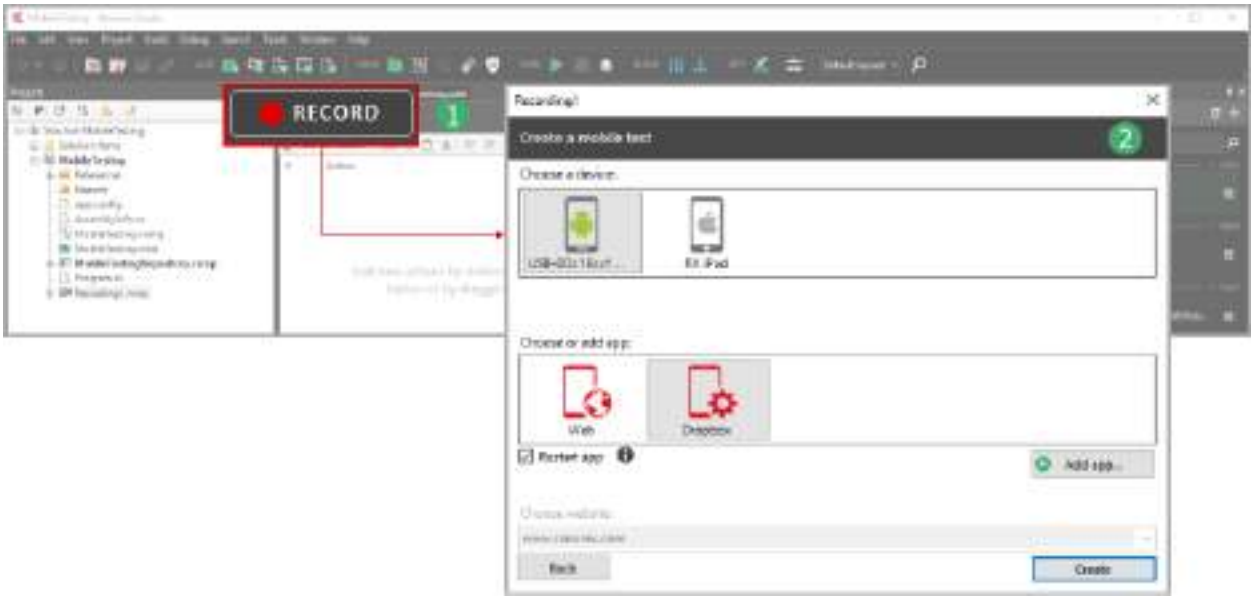
1. Empty action table in the recording module
2. Empty repository
3. Your device in the Endpoints pad
4. Ranorex Service App running on the mobile device, showing the preinstrumented web browser app.

Create the test

1. **Click RECORD**.
2. The dialog for selecting the mobile device and instrumented app appears.



3 **Select** your iOS device, **select** the app (Ranorex Web Browser), **specify** the URL, and **click Create**.

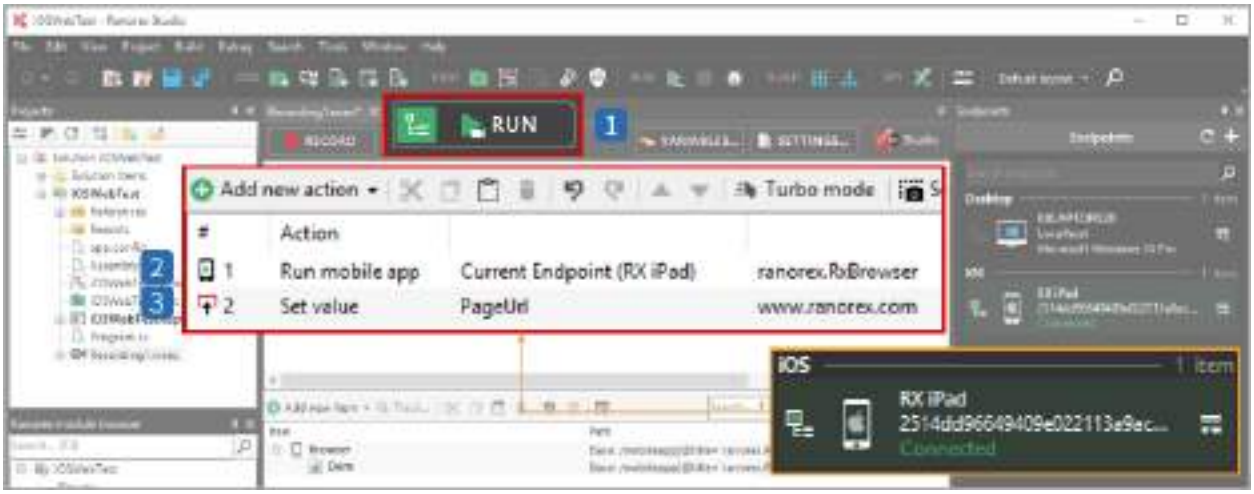


Setup

Ranorex Studio now executes the following processes to set up mobile test building:

In Ranorex Studio

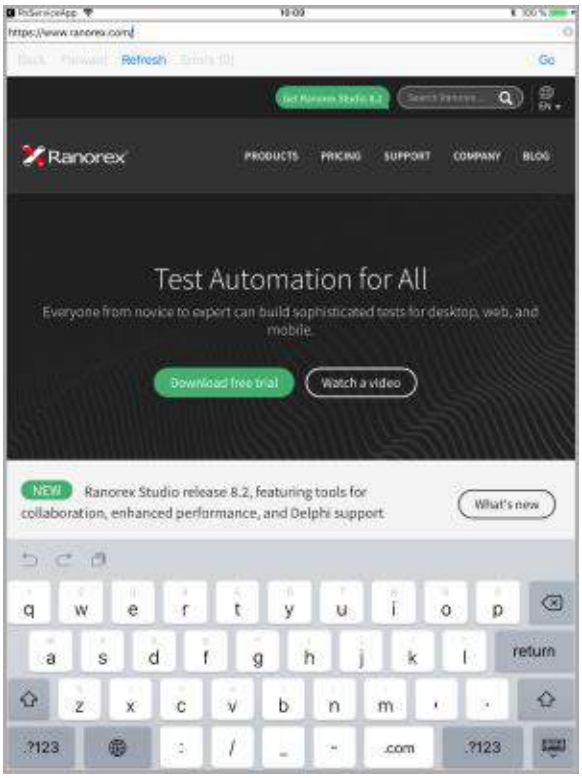
Ranorex Studio starts the selected app on your mobile device and adds the respective actions in the action table.



1. The RUN button changes to reflect that it now runs the test on the current automation root, i.e. the active endpoint/mobile devices, not the computer.
2. An action that starts the app on the mobile device has been added to the action table.
3. An action that navigates to the specified URL in the web browser app has also been added.

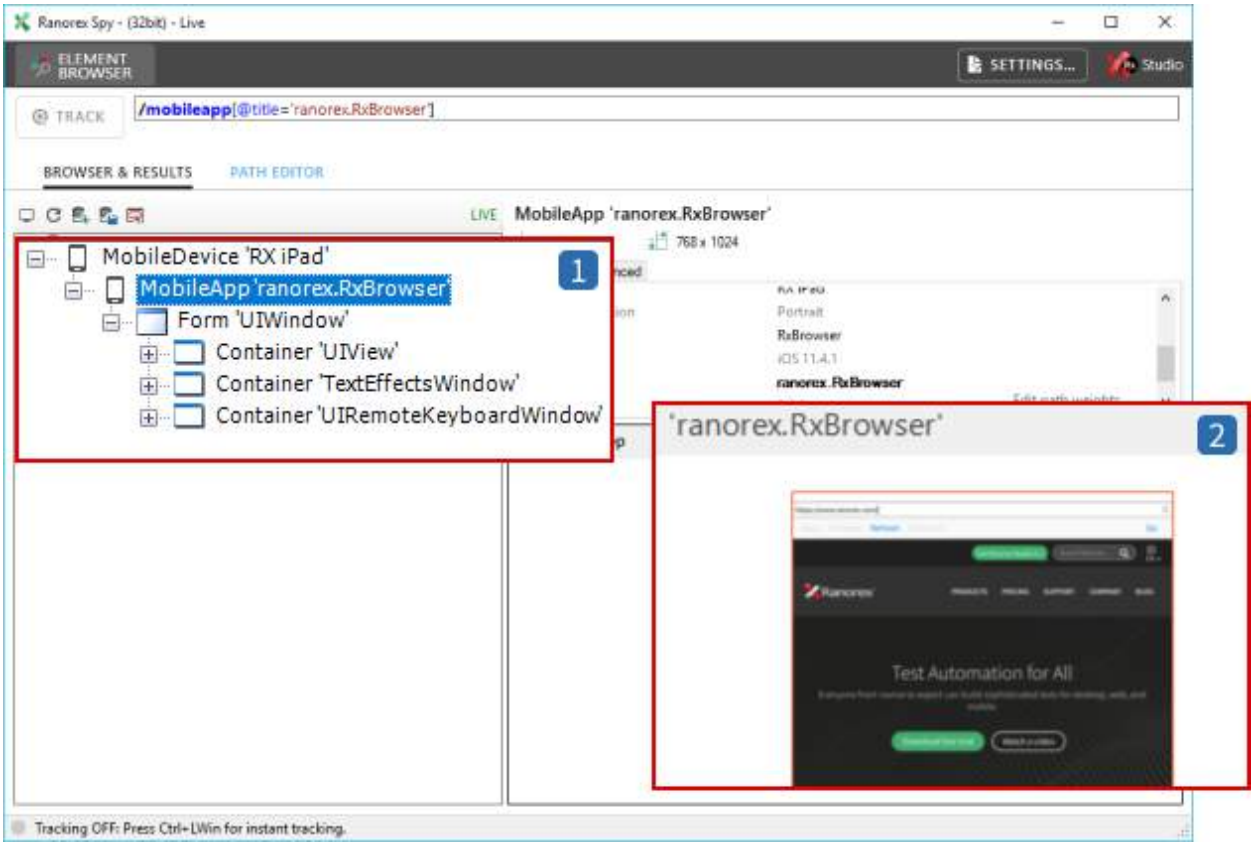
On the mobile device

Ranorex Studio starts the preinstrumented web browser and navigates to the specified URL on the mobile device.



Ranorex Spy

Ranorex Spy starts in live tracking mode for all UI elements of the instrumented mobile app.



1. Element browser in Spy showing all the UI elements of the instrumented app.
2. Live view of the instrumented app on the mobile device.

Build the test

From here on out, test building follows the same principles as in the ⇢ iOS app test example and ⇢ general web test creation.

Advanced mobile testing

iOS Service App

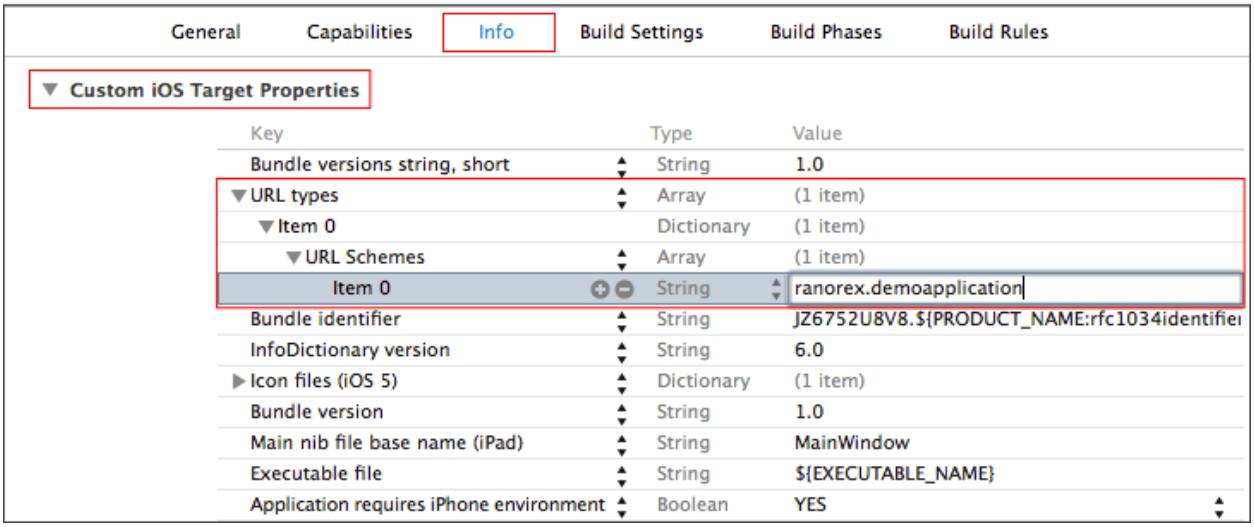
This quick starting guide will show you, how to properly use the new iOS RxServiceApp to create automated tests and how to prepare your iOS project so that start/stop app functionality can be used.

Prepare Your iOS Project to Enable Start/Stop Functionality

The following step by step instructions are based on Xcode 6.

If the app will be instrumented manually, please do the following steps to register the custom URL scheme so that the starting and stopping will work correctly:

- Open your project in Xcode 6.x
- Follow the instructions in the section: Instrumentation with source code on iOS
- In Xcode choose the “Info” tab
- Under Custome iOS Target Properties add URL types key
- Expand URL types key with Item0
- Expand Item0 with URL schemes
- Expand URL schemes with Item0 and write the app activity name as value



Note

- If no URL scheme is set, the app under test cannot be launched and you will get an error message when you try to start the app with Ranorex. In the app list of the iOS RxServiceApp there will be also a warning message “Can’t launch”.
- After Instrumenting and deploying the app for the first time, start the app manually once.
- The newly instrumented and deployed app, needs to be started manually for the first time, so that it gets registered at the RxServiceApp.
- If the app is instrumented with Ranorex Studio on the Windows machine, the correct URL scheme will be set automatically.
- Due to restriction in Apple API it may occur that the instrumented IPA is not able to run from with Ranorex Studio, while RxServices application is in the background mode. It is recommended to perform any test while the instrumented IPA is in the foreground

Proper use of the iOS Service App

To use the new start/stop functionality via USB or WiFi, make sure that the RxServiceApp is running and is active on the device. You can either use the instrumentation wizard to deploy the service app as described in ⇢ Instrumentation Wizard – iOS, or download and install the service app on your device from our mobile download archive by scanning the following QR Code or the using the following short URL:

Use the QR Code above or the url https://bitly.com/mArchive to directly access the download archive on your mobile device.

Note

Start/Stop functionality can not be used from the home screen of the device, even if the RxServiceApp is running in the background.

You can still create automated tests without the iOS RxServiceApp. Please note that without the RxServiceApp the start/stop functionality won't work.

To add a device without the service app, make sure that an instrumented app is running and active on the device.

Note

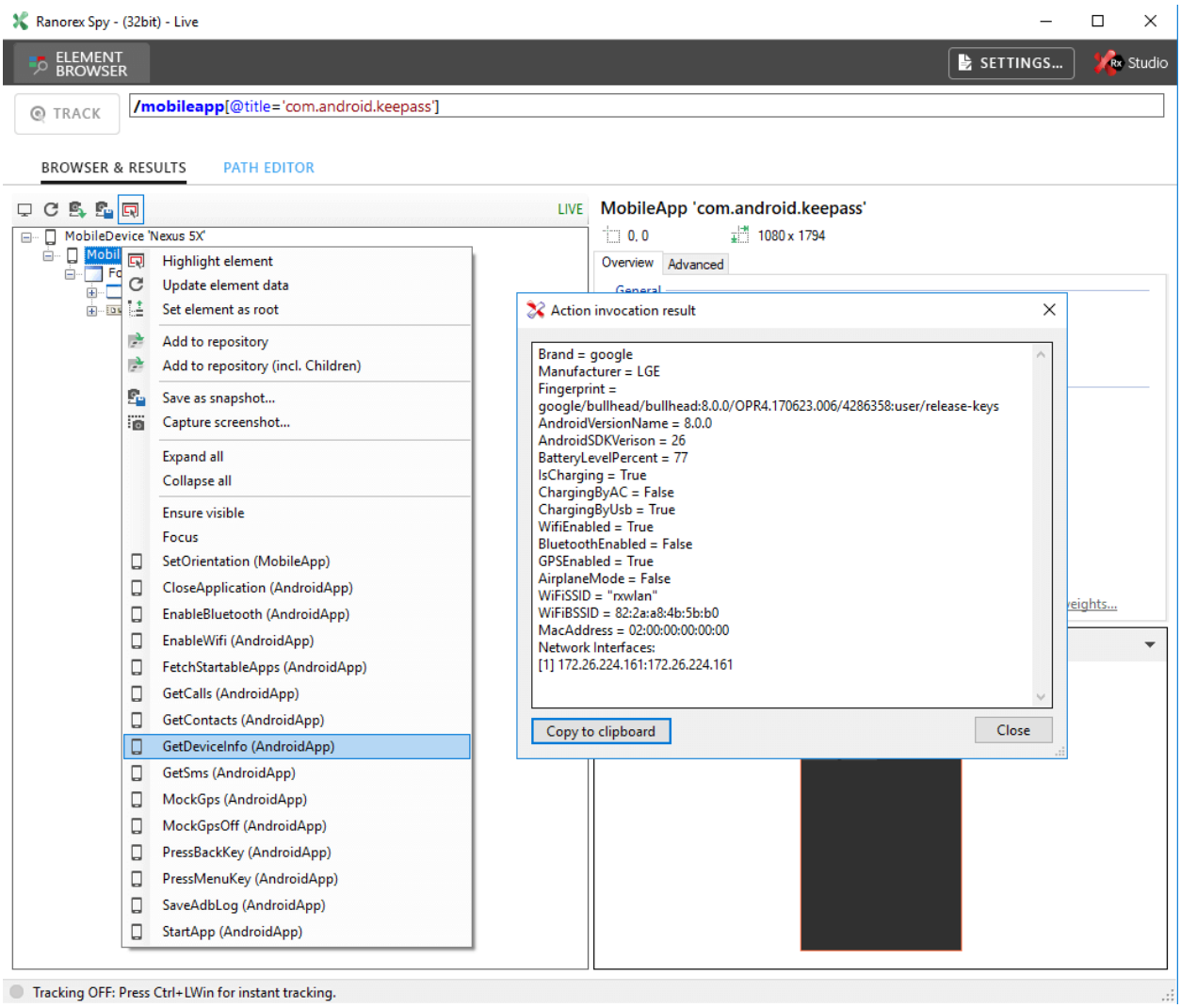
- When using the start functionality, the app under test will be launched multiple times, because it needs to be reseted into initial state.
- If you want to create automated test on an instrumented app that has no URL Scheme, please make sure, that the RxServiceApp is not installed on the device and that the testing app is active on the device.

Non-UI Testing

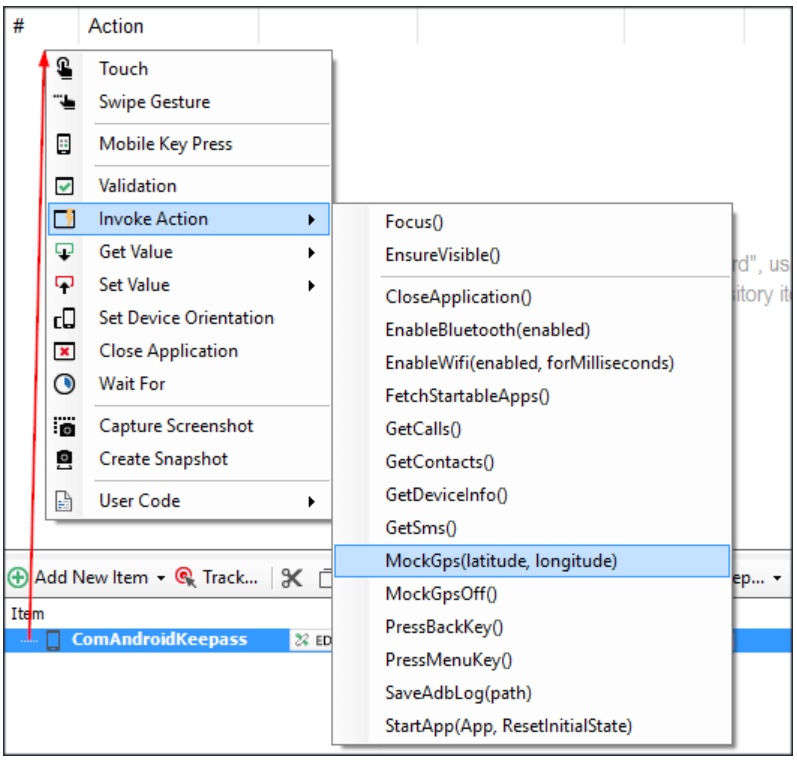
Next to automate testing of the user interface of mobile applications it's also possible to perform non-UI tests invoking technology dependent actions (see ⇢Detailed list of actions). This feature allows you to get information about the devices hardware, the operating system etc.

Non-UI testing on Android

You are able to get the device info of your Android device directly by right-clicking the mobile device in Ranorex Spy.



You can access the non-UI testing methods in the action table by adding an invoke action on the mobile app.



You can also access the non-UI testing methods within User Code Actions as well as Code Modules.

The code should look something like the following:

C#

```
var app = repo.AndroidApp.Self.As<AndroidApp>();
// get an AndroidDeviceInfo object holding all available device info
var info = app.GetDeviceInfo();
// get a list of SMS from the device
var sms = app.GetSms();
// get a list of calls from the device
var calls = app.GetCalls();
// report the manufacturer of the device
Report.Info("Manufacturer: " + info.Manufacturer);
// report the manufacturer of the device
Report.Info("SMS: " + sms.ToString());
```

```
// report the manufacturer of the device
Report.Info("Calls: " + calls.ToString());
```

VB.NET

```
Dim app = repo.AndroidApp.Self.[As](Of AndroidApp)()
' get an AndroidDeviceInfo object holding all available device info
Dim info = app.GetDeviceInfo()
' get a list of SMS from the device
Dim sms = app.GetSms()
' get a list of calls from the device
Dim calls = app.GetCalls()
' report the manufacturer of the device
Report.Info("Manufacturer: " & info.Manufacturer)
' report the manufacturer of the device
Report.Info("SMS: " & sms.ToString())
' report the manufacturer of the device
Report.Info("Calls: " & calls.ToString())
```

Reference

For further information about code modules and user code actions please have a look at the chapters ⇢Code modules and ⇢User code actions.

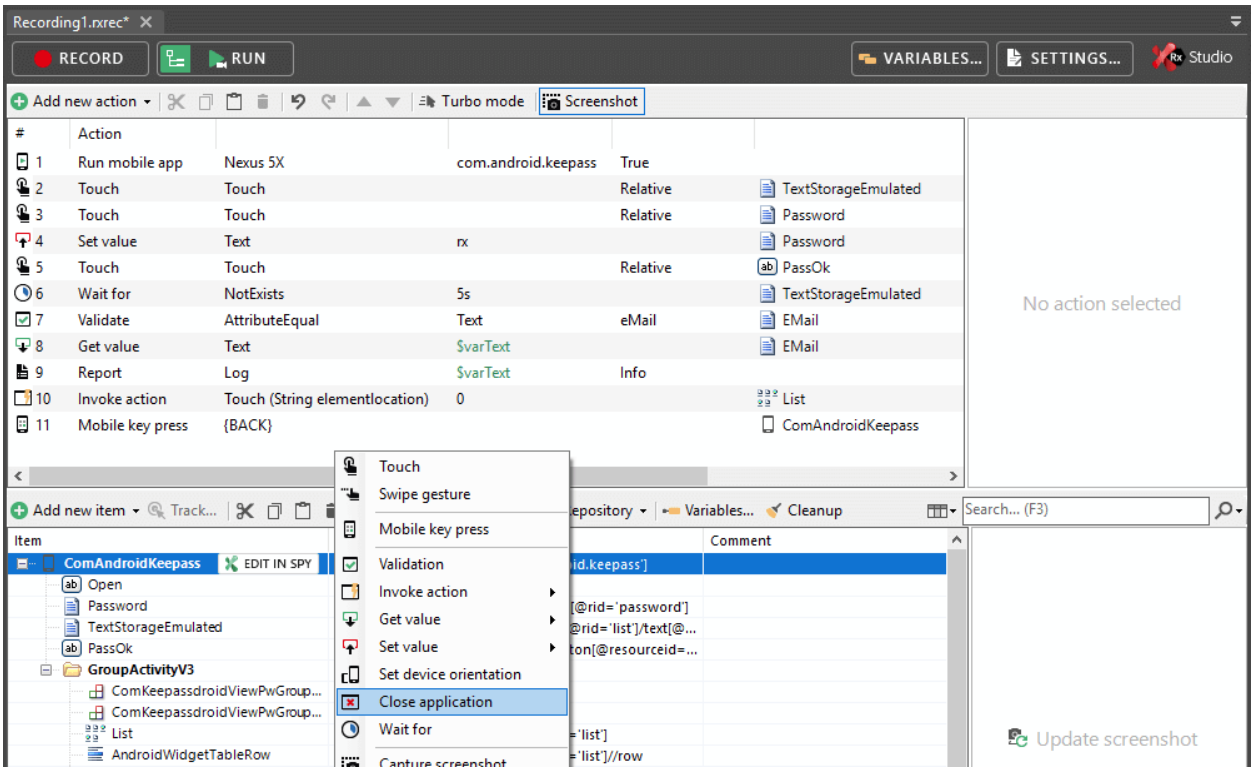
Cross-device mobile tests

In this chapter, we'll show you how you can configure one test to run on several different devices of the **same mobile OS (Android OR iOS)** consecutively and even in parallel.

The configuration is based on data-driven testing and is **the same for both Android and iOS**. For the sake of simplicity, the screenshots refer to Android only.

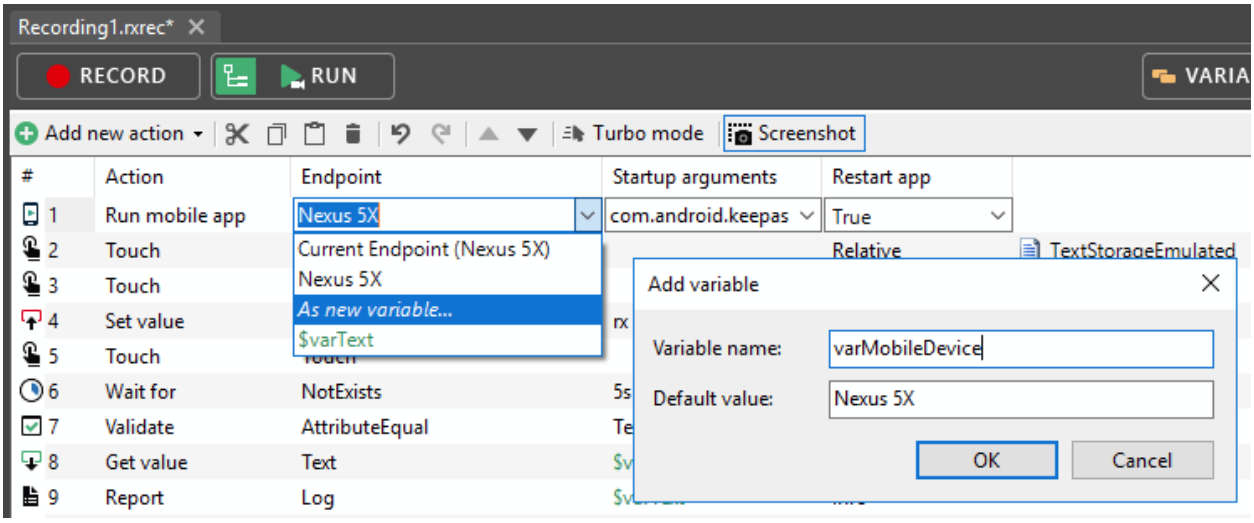
Note

Make sure to add a Close application action when running your test on different devices. Otherwise, the tests may run in a different order or be skipped for some devices.



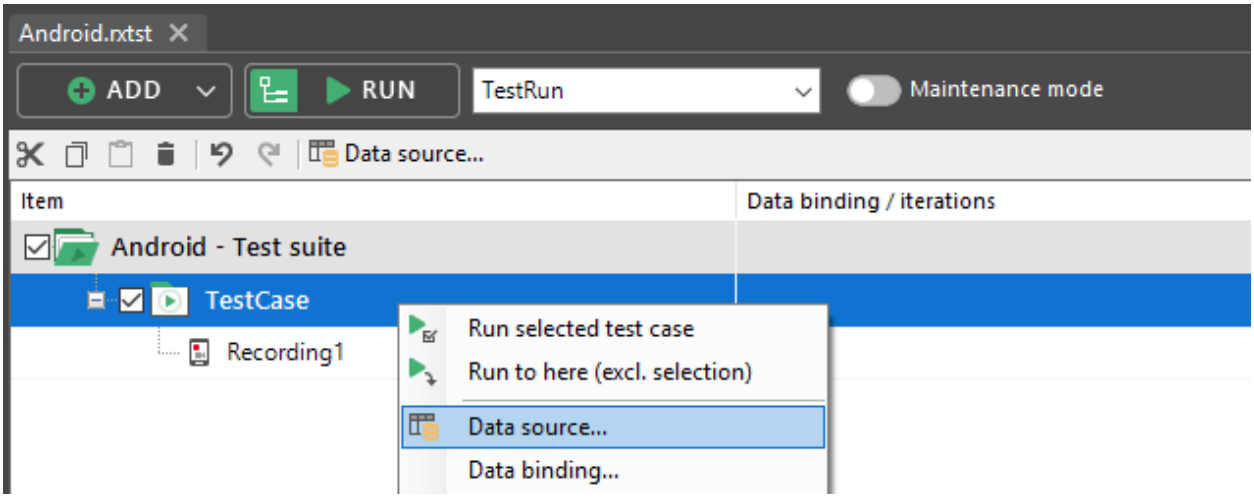
Configure a consecutive cross-device test

1. **Open** the first recording module in your test. It should contain the Run mobile app action.
2. **Click** the **Endpoint** property and **click As new variable...**
3. **Name** the variable **varMobileDevice**. This variable will control which device the test app will be started on, and therefore where the test will be run.

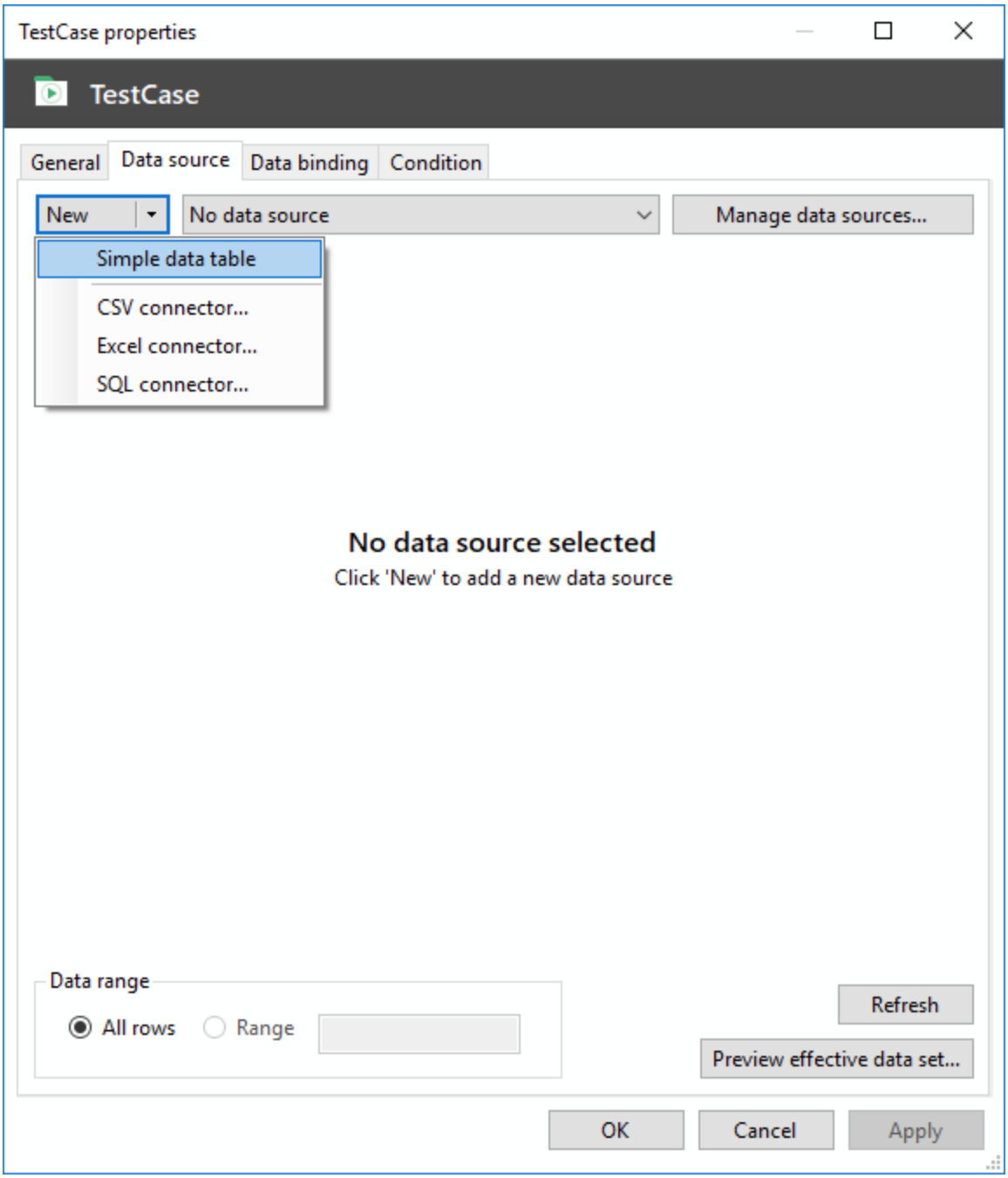


4 **Switch** to the test suite view.

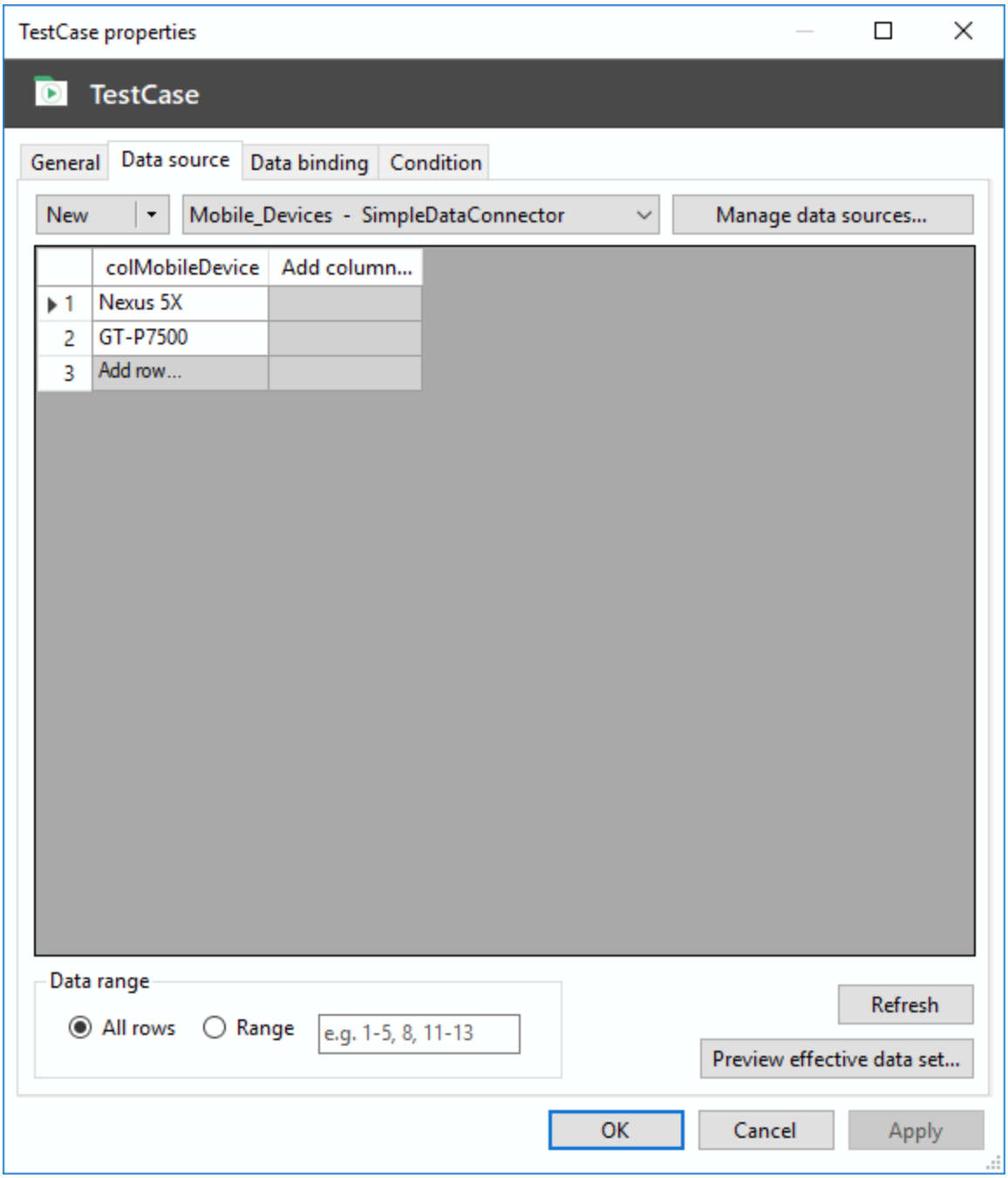
5 **Right-click** the test suite that contains the recording with the Run mobile app action and **click Data source…**



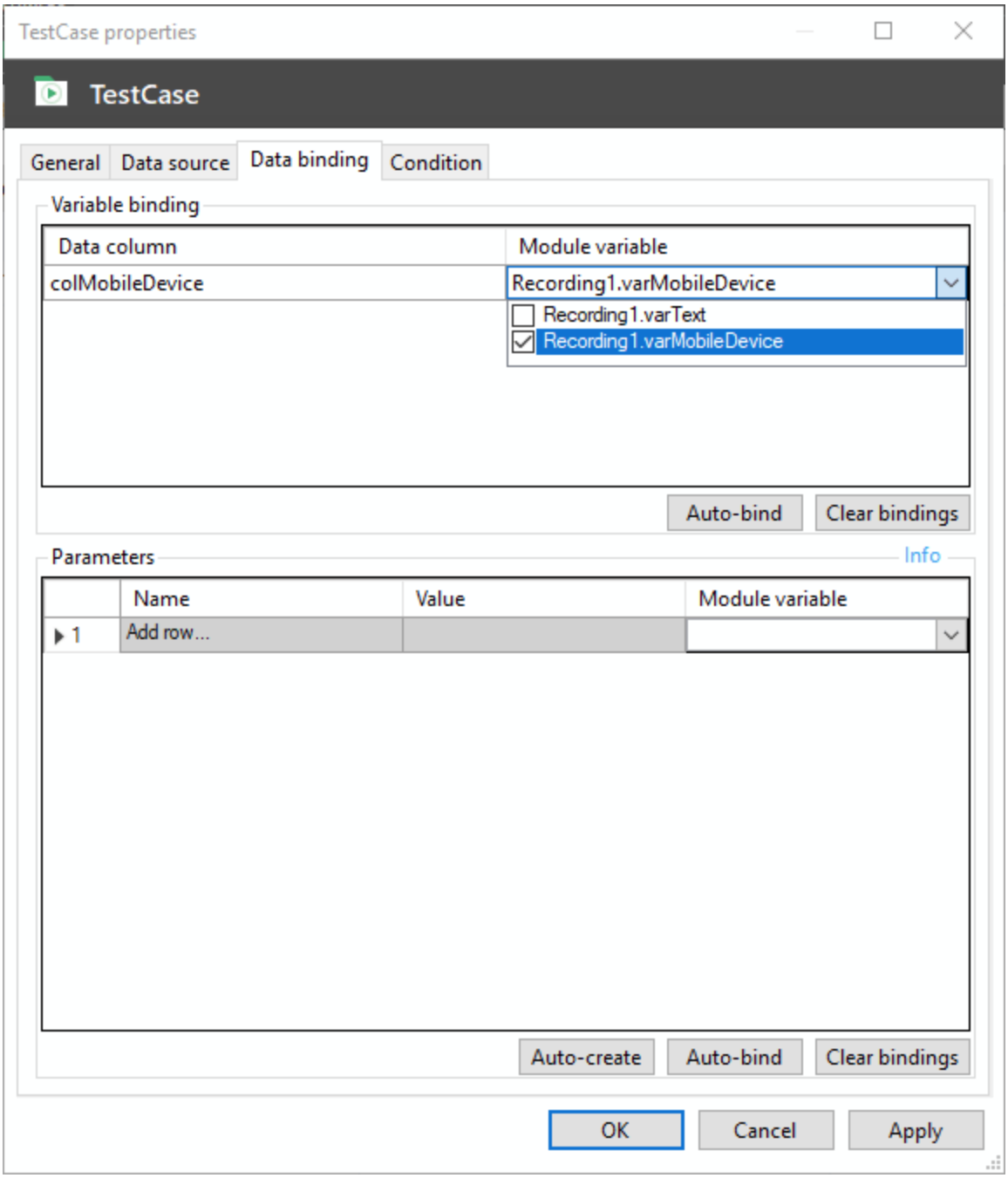
6 In the dialog that opens, **click New > Simple data table**.



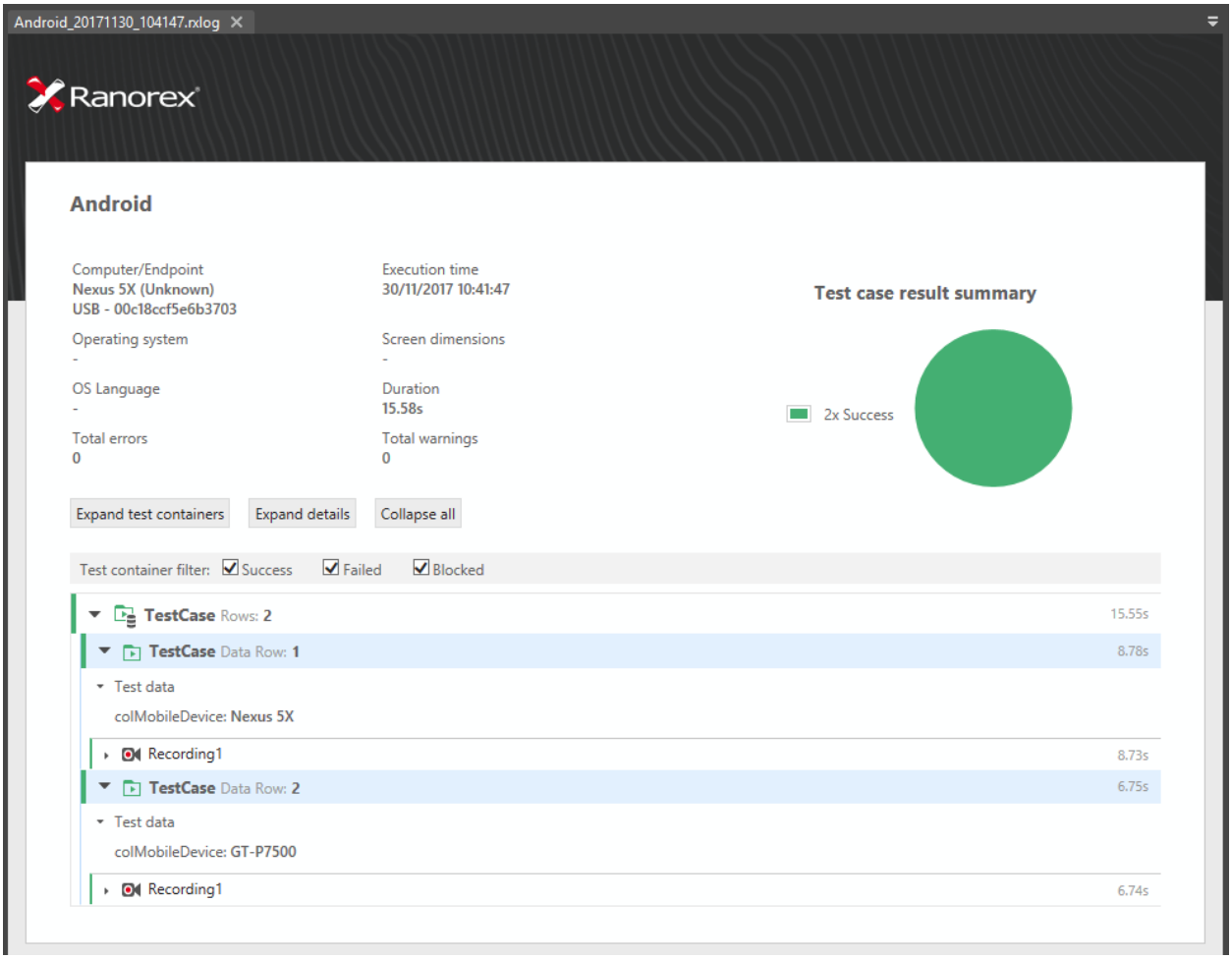
7 Fill the data table with the names of the desired devices as they appear in the endpoints pad.



8 **Click Data binding** and under **Module variable**, **bind** the data column with the device names to the device variable **varMobileDevice**.



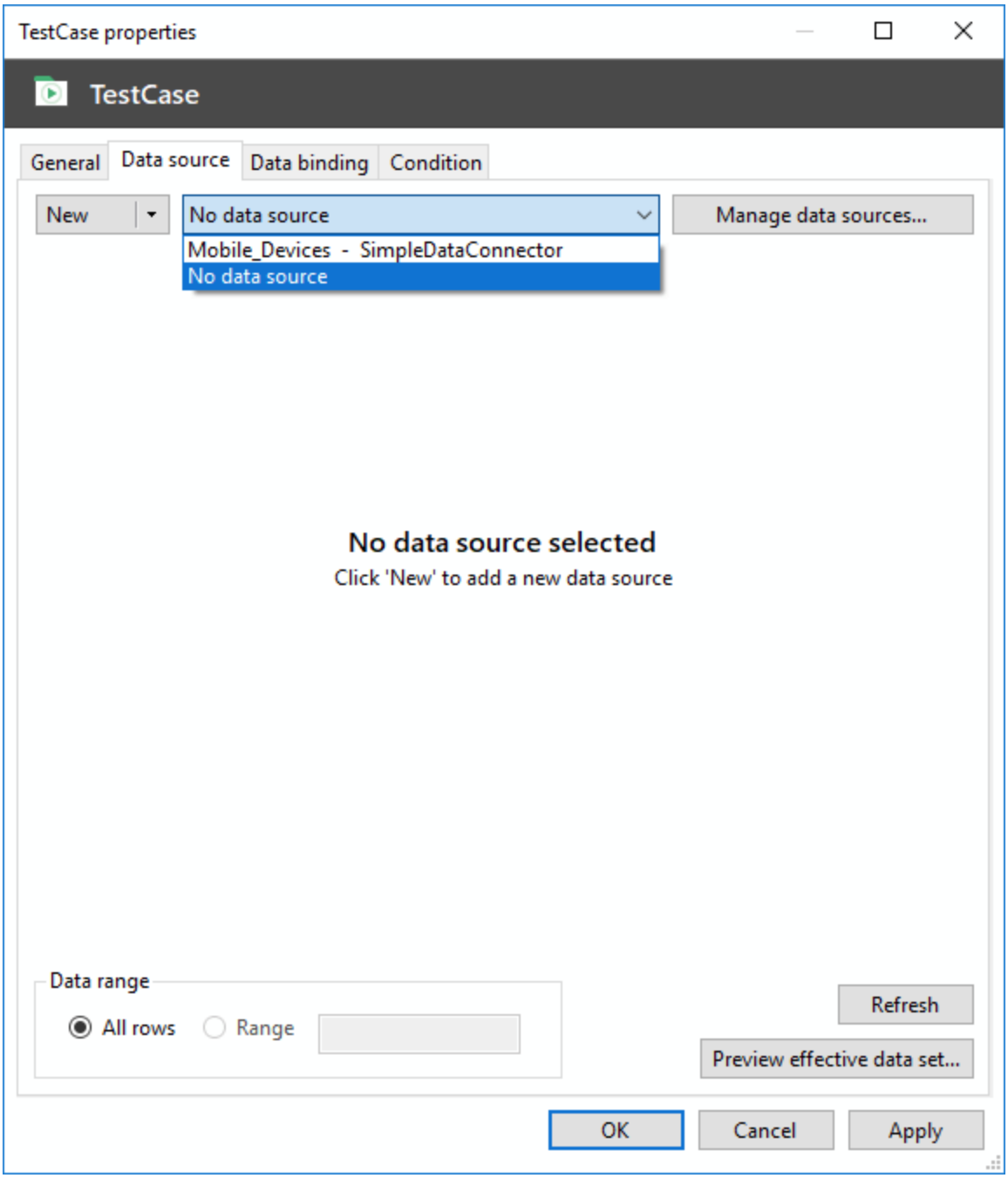
9 The test will now be iterated for each device in your data source. This will also be reflected in your report.



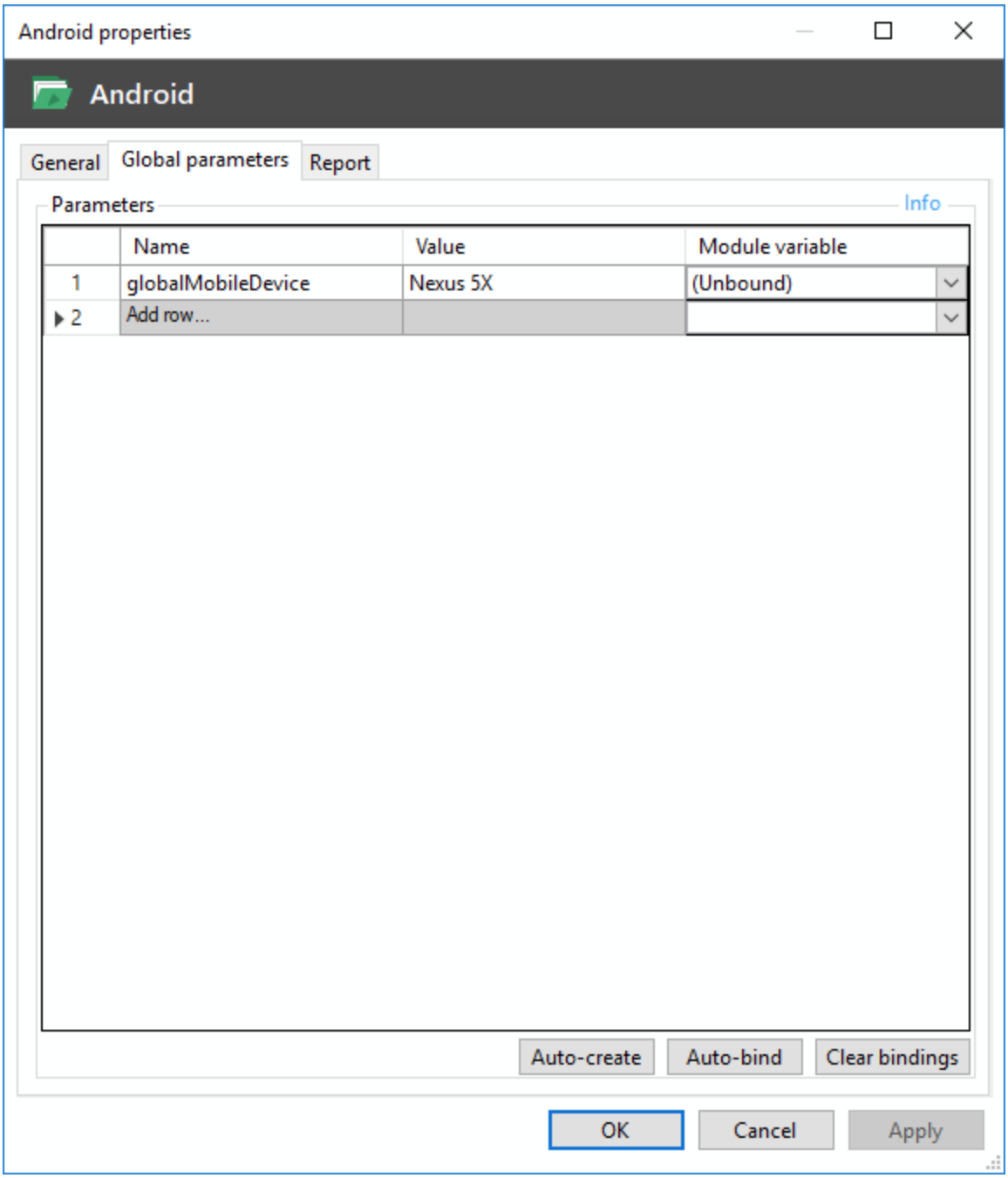
Configure a parallel cross-device test

It's also possible to run one test on multiple devices at the same time.

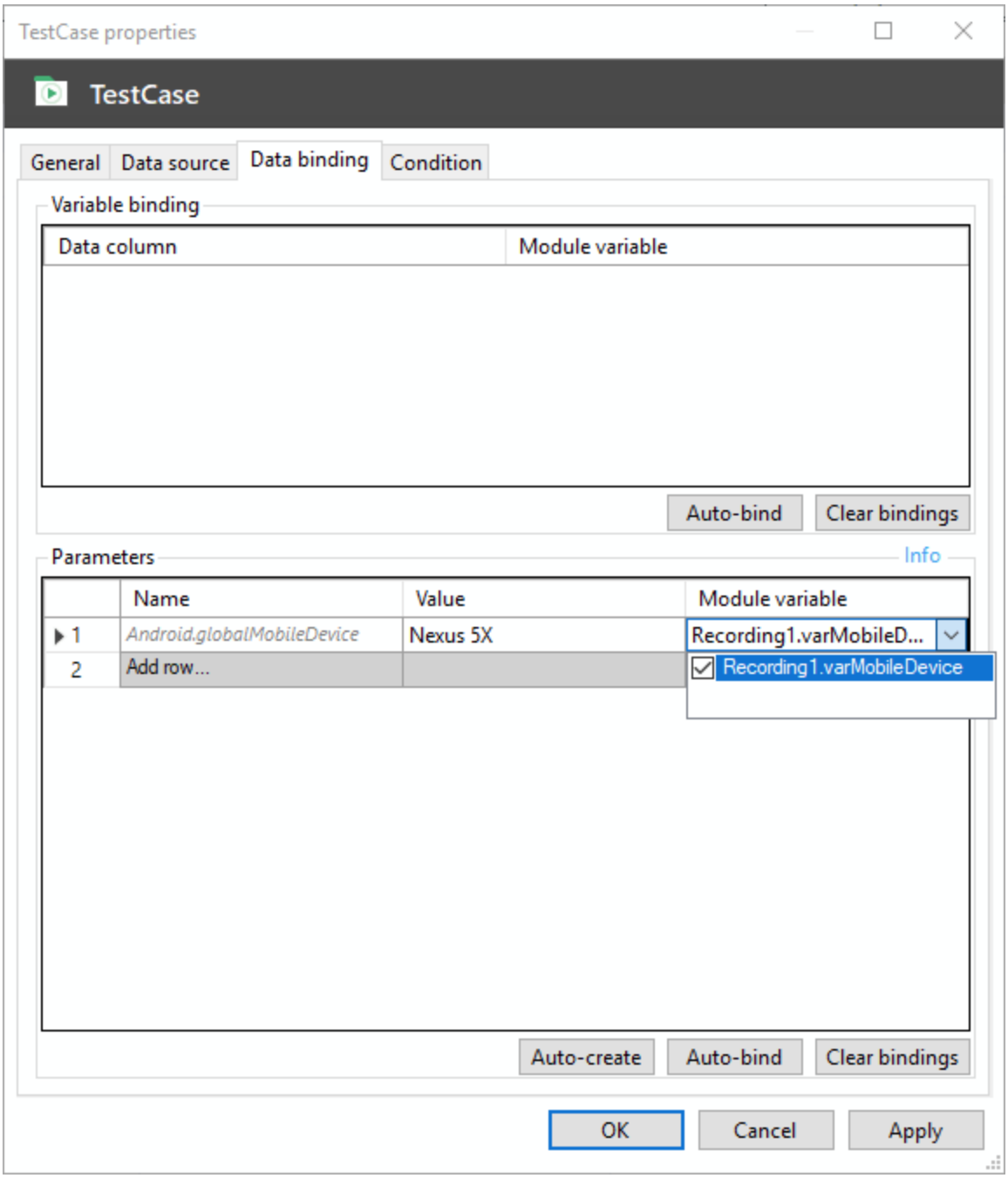
1. First:
   a. **Configure** a variable as in steps 1-3 in the instructions for a consecutive cross-device test above.
   b. Or simply **disable** the existing data source if you're working with the test from the instructions for a consecutive cross-device test above.



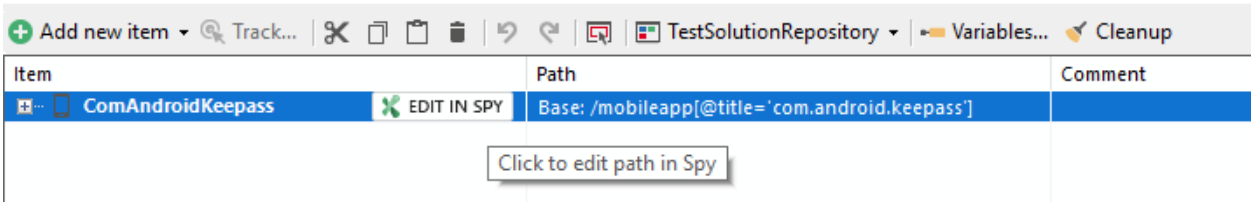
2. In the test suite view, **right-click** the test suite node and **click Global parameters…**
3. **Add** a global parameter called **globalMobileDevice**.



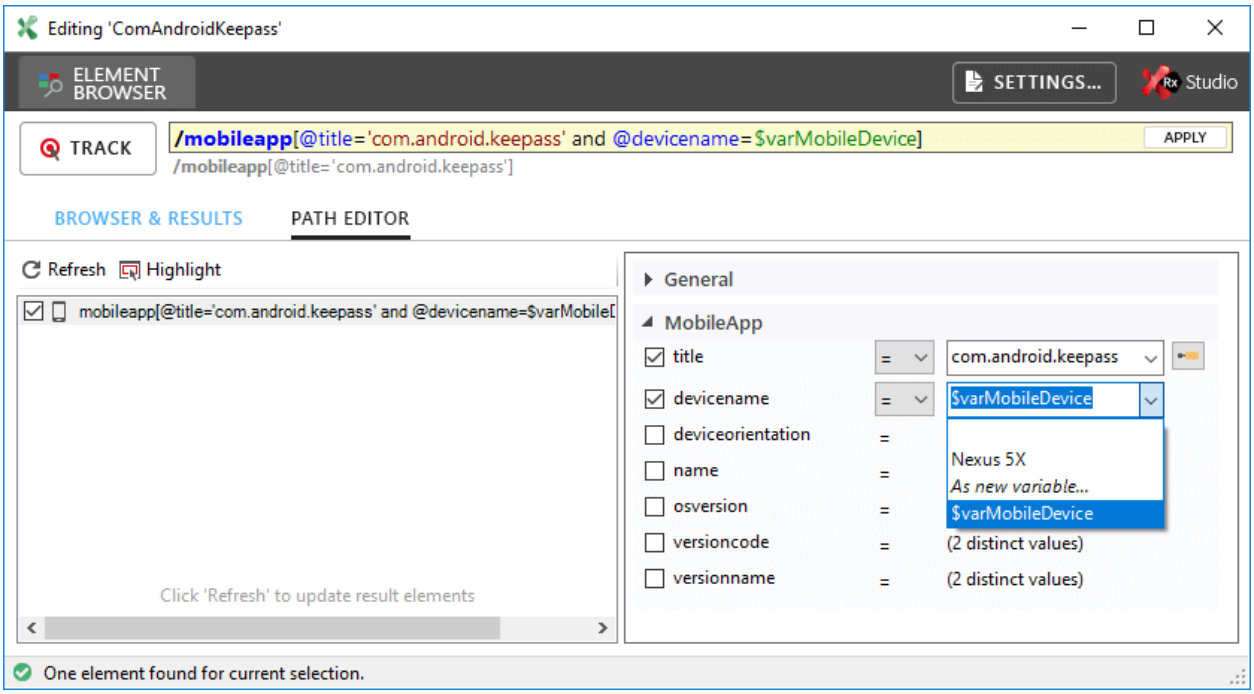
4. **Right-click** the test case that contains the recording where you specified the variable and **click Data binding...**
5. Under **Parameters > Module variable, bind** the variable to the global parameter.



6 In the repository, **find** the app folder for your mobile app and **click EDIT IN SPY**.



7 **Modify** the path as in the screenshot below and ensure the attribute **devicename** has the value **$varMobileDevice**, i.e. the device variable specified earlier.



8 To run your test in parallel, start it from a command line environment with the following arguments:

```
start MobileTest.exe /pa:globalMobileDevice="Galaxy Nexus"
start MobileTest.exe /pa:globalMobileDevice="GT-P7500"
```

> **Reference**
>
> Running tests from the command line is explained in Ranorex Studio fundamentals > Ranorex Studio Overview > ⇢ Run tests without Ranorex Studio

Automate Android system apps

When automating an Android App it might sometimes be necessary to leave the application under test. For example, you want to:

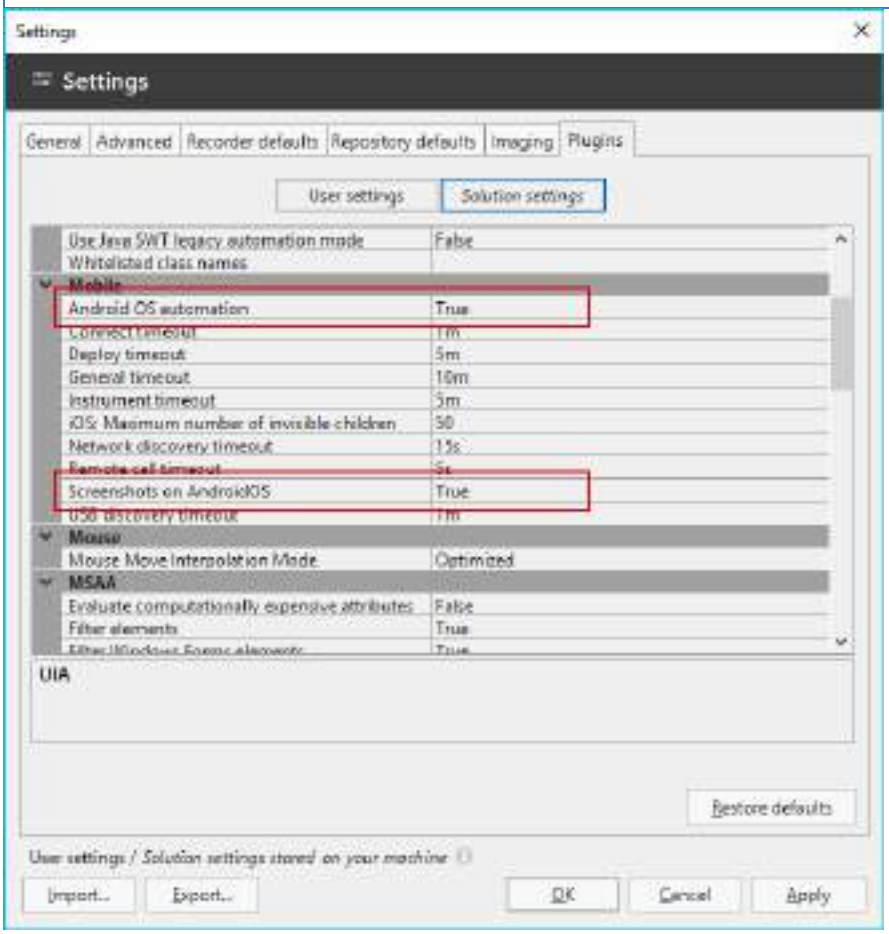
- check if an issued notification has been received

- share something on a social network
- change the system settings
- …

To automate these tasks, you need to automate the Android OS. This comes with certain special requirements and restrictions that are explained in this chapter.

Note

- To automate system apps the setting ‘Android OS Automation’ has to be enabled. The setting can be found in the mobile section of the plugin specific settings in ⇢settings dialog.
- To speed up the test execution of system app automation you can disable the generation of screenshots for android. The setting can be found in the mobile section of the plugin specific settings in ⇢settings dialog.



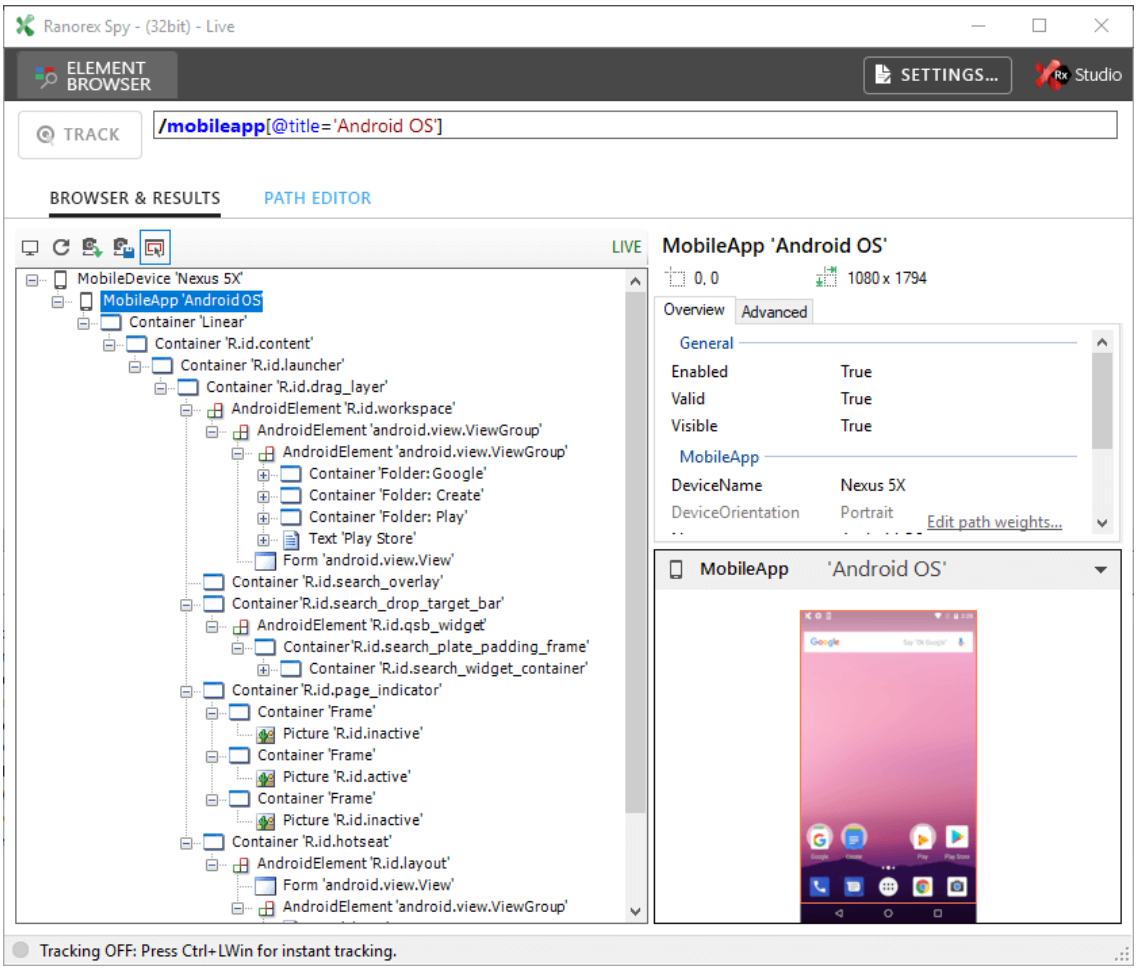
Restrictions

- To automate system apps a USB connection has to be established.
- Highlighting on the device does not work for system apps

Validate an Issued Notification

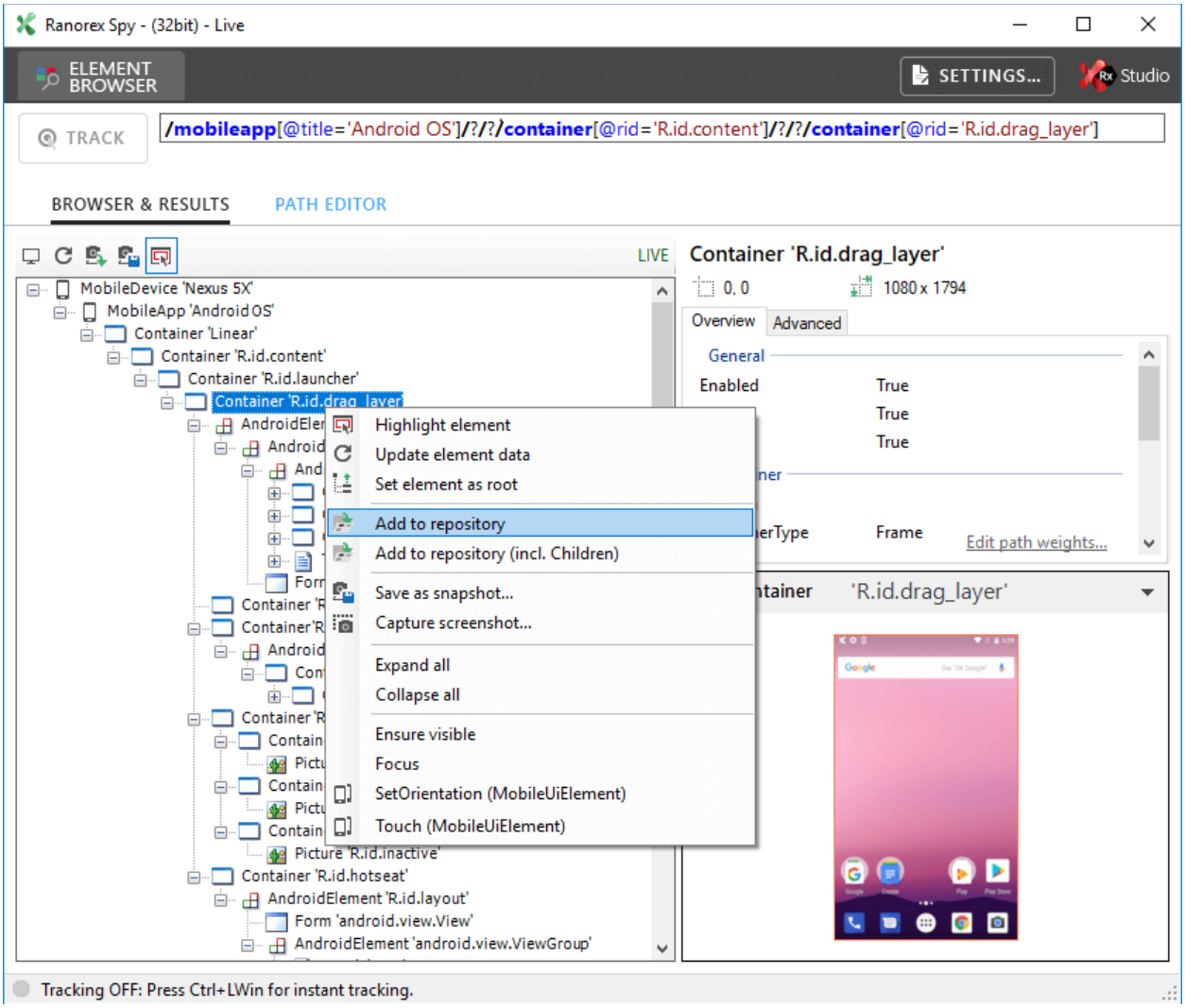
The following example will show how to validate a text in a received notification.

Create a new recording and select the mobile option as usual. Ranorex Spy will open and you will notice a node labeled ‘MobileApp AndroidOS’ at the application level in the object tree.

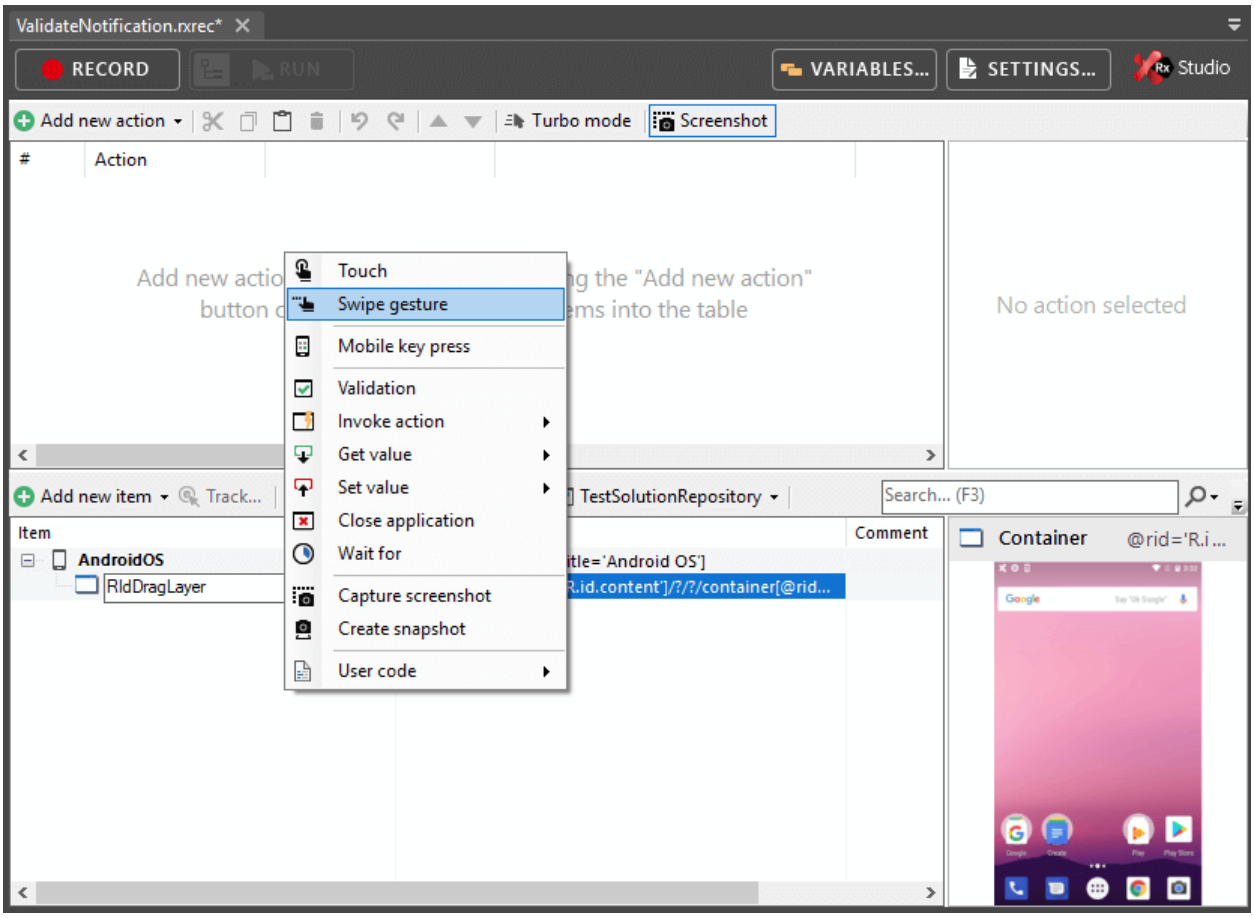


To navigate through the element tree you can either use the tree view. Another way to navigate is to use the image navigator which can be found at the bottom of the Overview/Advanced tab. Clicking a UI element selects it, double-clicking outside the selected element selects the parent.

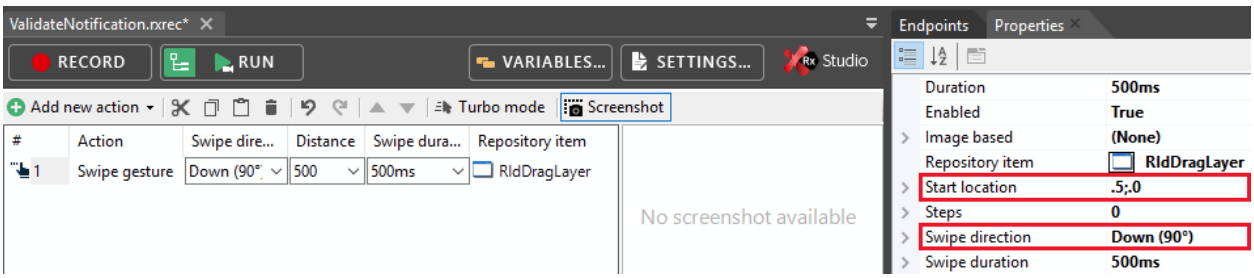
To open the notification bar, a swipe action from the top of the screen has to be performed. Navigate to a tree element including the navigation bar in the representing screenshot and add this element to the repository using the context menu.



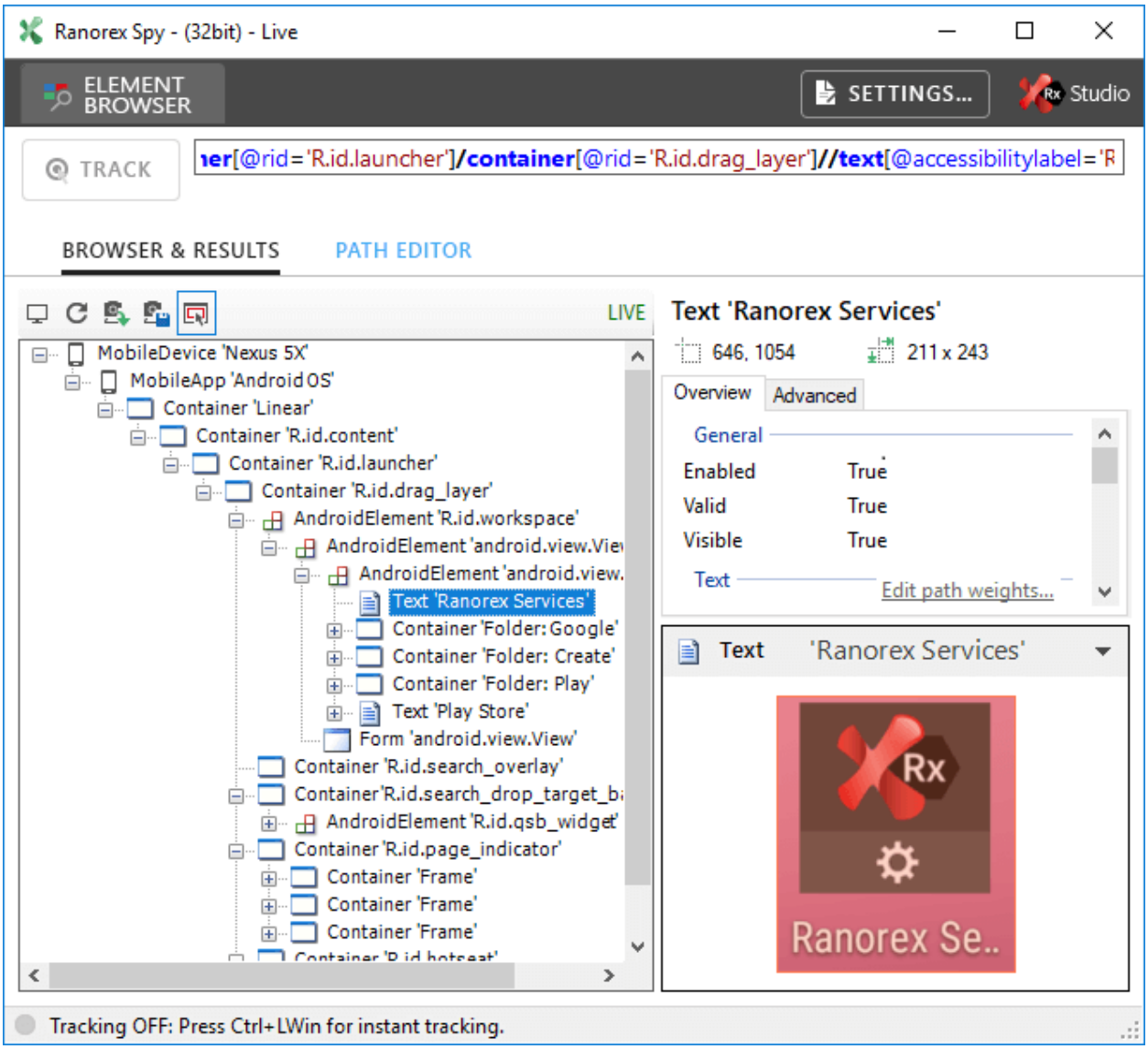
Add a swipe action by dragging/dropping the newly created repository item to the actions table and choosing ‘Swipe Action’ as action type from the context menu.



In the properties pane set the swipe direction to ’90°’ and the start location to ‘0.5;0.0’ which is the top center of the element.



Manually open the notification bar on your device and switch back to Ranorex Spy. Navigate through the element tree until you’ll find the element you want to validate.



Add the specific element to the repository and add a validation action on the repository item as described before.

Additionally, add a key press on the back button to return to the initial situation.

After adding these three actions, the recording is ready to be executed.

Test Android Wear apps

Following the instructions below you can easily create automated tests on compatible Android Wear apps directly on real or emulated devices.

Prerequisites

- **Install adb**:
  The Android Debug Bridge (adb) is a versatile command line tool that lets you communicate with an emulator instance or connected Android device.
  You can find it at BinRxEnvAndroidtools.
- **Connect with the phone:**
  Download the Android Wear app on your phone and pair the watch with your phone.
  You can find detailed information on how to do so
  here: https://support.google.com/androidwear#topic=6056405
- **Enable the debug mode:**
  On the smartphone go to “Developer Options” and enable “USB Debugging”.
  On the watch got to “Developer Options” and enable “ADB Debugging” as well as “Debug over Bluetooth”.
- Finally, open the Android Wear app on your smartphone, press the Settings button on the top right and check the “Debugging over Bluetooth”. The target should be shown as connected.

> **Note**
>
> If the target is still disconnected, try to restart both the smartphone and the watch.

Getting Started

Connect the device via USB to your computer and call adb via command line by typing “adb devices”.

It should print something like this:

```
List of devices attached
08937p69d0518aac device
```

This means you have successfully connected your phone to your computer. Now we need to connect the watch too. Type the following commands:

```
adb forward tcp:6666 localabstract:/adb-hub
adb connect localhost:6666
```

> **Note**
>
> You need to accept the connection on your watch.

Type once again “adb devices”. You should now see a new device called localhost:6666:

```
08937p69d0518aac device
localhost:6666 device
```

In your Android Wear App, Host and Target should now show up as connected.

> **Note**
>
> Connecting host and target does not always work at first go. Try restarting both devices in different order and be patient.

Now you can connect your devices, instrument your apps, and create your test.

Automate on an Emulated Device

The following instructions explain how to connect a Genymotion emulated smartphone with a Google emulated watch.

First, download Genymotion setup and start any Genymotion emulator with Android 4.3 or later. For Google’s emulated watch you need the AVD Manager.

Start the Android Studio, go to Tools -> Android -> AVD Manager. Create a new Virtual Wear device and start it.

Next, install Google Apps or Gapps on the Genymotion smartphone. With Gapps, also the Play Store will be installed, which is needed for downloading the Wear App.

Go to https://opengapps.org/#downloadsection and download the correct Gapps for your emulator. To install Gapps on Genymotion, please follow these instructions.

Note

Gapps may sometimes be unstable when running on Genymotion emulators.

Follow the steps explained in ⇢Prerequisites and list your devices via adb as described in ⇢Getting started.

It should print something like this:

```
List of devices attached
192.168.154.102:5555 device
```

This means you have successfully connected your emulated phone to your computer. Now you need to connect the watch too. Type the following command into the command line:

```
adb -s {genimotion_ip}:{genimotion_port} -d forward tcp:5601 tcp:5601
```

Type once again the “adb devices” command. You should see a new device called emulator-5600.

Now you can connect your devices, instrument your apps, and create your test.

Instrumentation with source code on iOS

In this chapter, we’ll show you how to instrument your app using source code on iOS. Simply follow the instructions below. Alternatively, there are also many video tutorials on YouTube that detail this process.

Attention

We recommend you only instrument with source code if you are an experienced iOS developer.

Attention

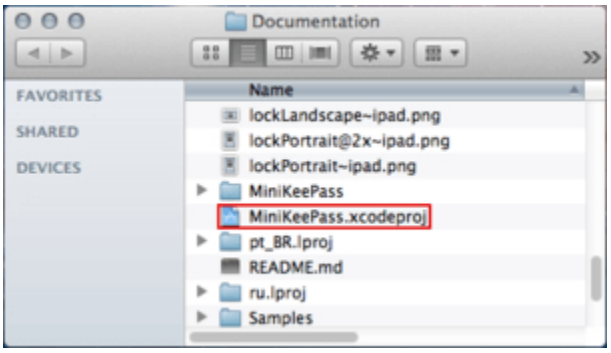
Whenever you update Ranorex Studio (i.e. use newer automation libraries/Ranorex Service App), **reinstrument your apps**. Otherwise, automation may not work as intended.

1. **Download** the automation lib from the **Mobile Download Archive** on your Mac.

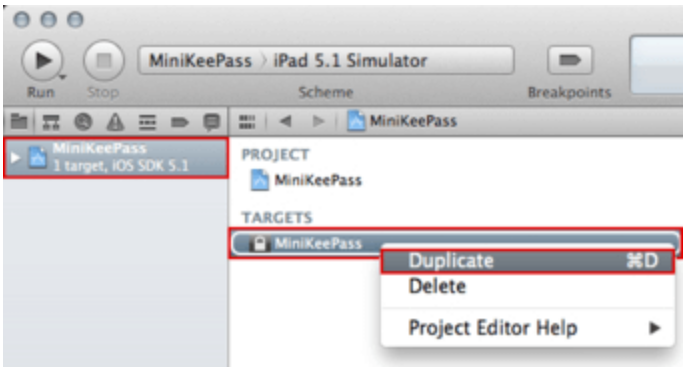
Note

The file size of Ranorex Automation Library is about 30 megabytes. This does not automatically make your app 30 megabytes bigger since it is a universal library and only the parts essential for your app will dynamically be added when compiling it.

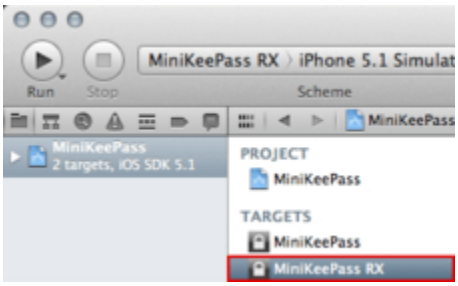
2. Open the XCode project of your application under test.



3. To avoid shipping an instrumented app to your customers it is recommended to create a separate target for your app under test. You should select the project file and duplicate the existing target.



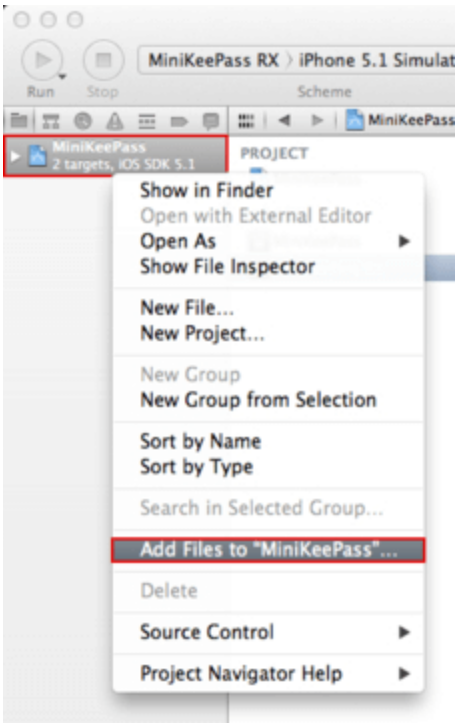
4 Rename the newly created target.

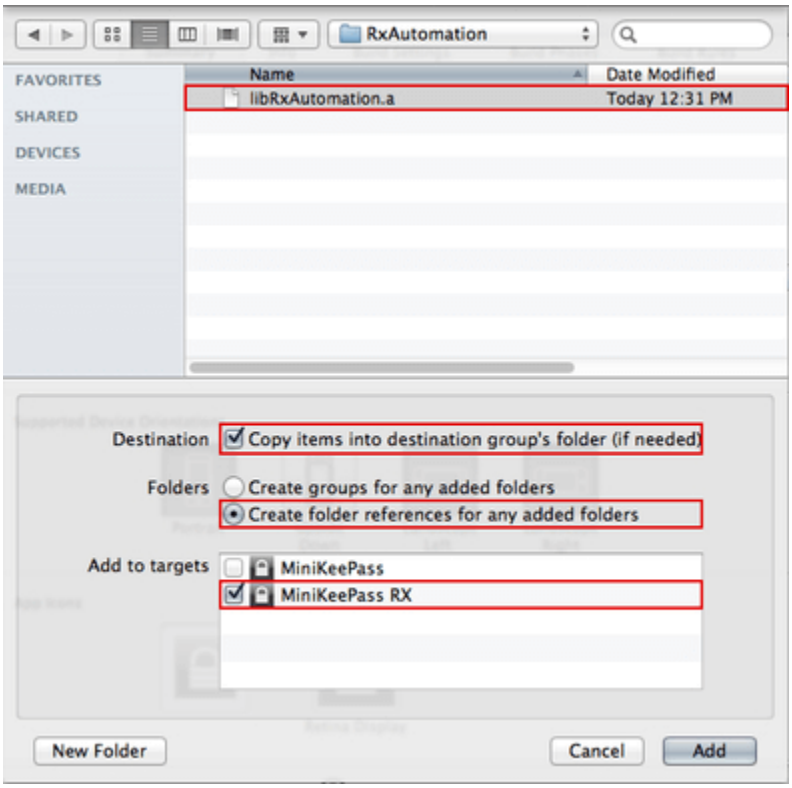


Note

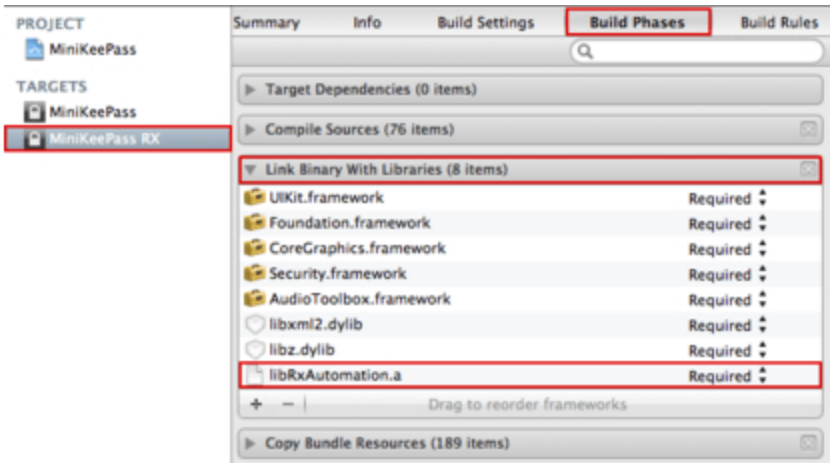
As XCode does not automatically update all necessary files, you have to rename them manually. You will have to alter the target itself, the targets .plist file (in the workspace as well as in Build Settings -> Packaging), the targets' project name (Build Settings -> Packaging) and the schemes name (Product -> Manage Schemes).

5 Add the previously downloaded automation lib to your newly created target.

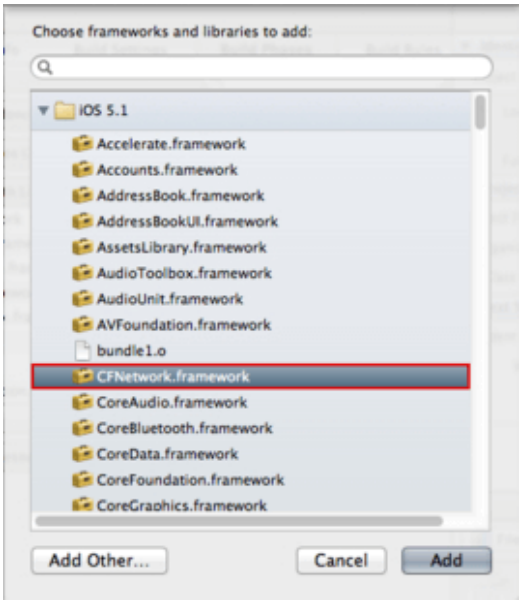


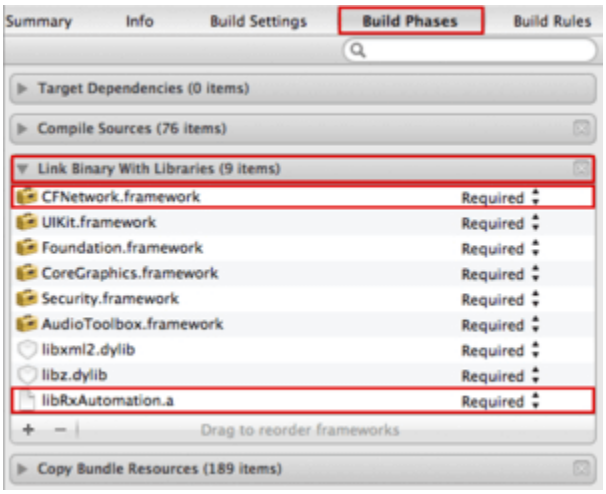


6 After doing this, the automation lib will be listed in the ‘Linked Binary With Libraries’ list in the ‘Build Phases’ pane of the test target.



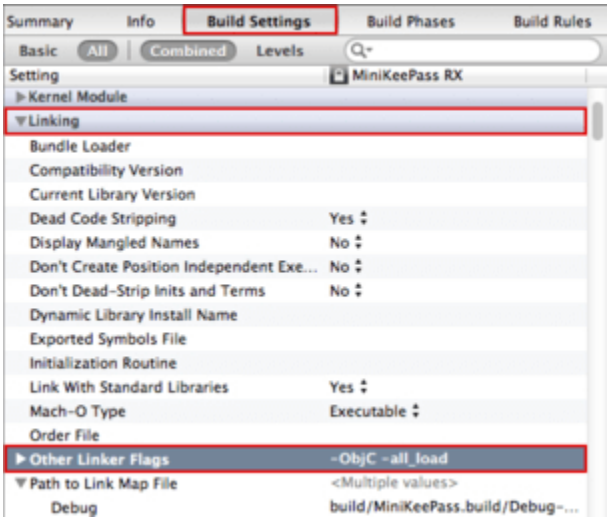
7 Add the CFNetwork framework to the list.





> **Note**
>
> Additionally, with iOS 8.3 add the IOKit.framework.

8. In the **Build Settings** pane of the test, add the switches '-ObjC -all_load' to the option **Other Linker Flags**.



9. Under the **Info** tab, **add** a **Bundle display name** key (**CFBundleDisplayName**).
10. Insert the URL schema in the application settings to open the instrumented IPA from RxServices or Ranorex Studio, for more information review the iOS Service App page. Below, an example of a schema:

```
<key>CFBundleURLTypes</key>
 <array>
       <dict>
   <key>CFBundleTypeRole</key>
     <string>Editor</string>
   <key>CFBundleURLName</key>
     <string>ranorex.your.application.name</string>
   <key>CFBundleURLSchemes</key>
     <array>
           <string>ranorex.your.application.name</string>
     </array>
       </dict>
 </array>
```

Attention

If a designer implements the existing Apple API, which restricts any schema from running the application, the instrumented IPA does not run within RxServices and Ranorex Studio.

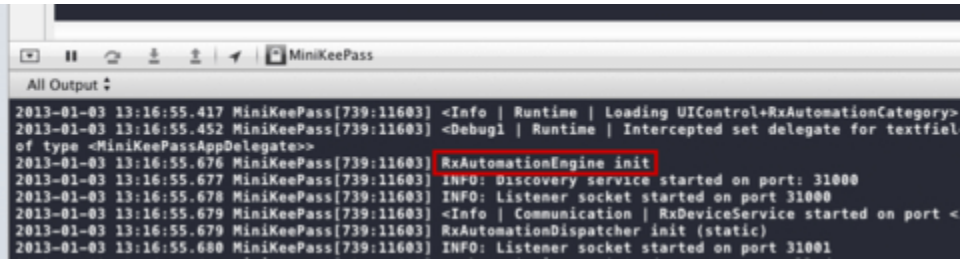
11 **Run** the RxServices IPA, put it into the background, and next, **run** the instrumented IPA and put it in the background as well. This makes the application recognizable by the RxServices IPA.

The new IPAs should display in the list of available IPAs in the RxServices application and in Ranorex Studio.

After performing these steps, your project can be built using the newly created target and scheme for your iOS devices as well as simulators.

Note

If you see the debug output '**RxAutomationEngine init**' in the console pane, your app has been instrumented successfully.



Note

- Because the Ranorex automation lib uses non-public APIs, make sure that you ***do not submit a Ranorex instrumented app to the app store*** as your app might be rejected and you might be banned from submitting apps to the app store for a period of time.
- To add your device via Wi-Fi, it's necessary that the application under test is started on your iOS device or simulator.
- The development provisioning profile should be used for testing your app and not the distribution provisioning profile.
- To improve the object recognition of your app under test set the accessibility label attribute of your controls.
- Due to restriction in Apple API it may occur that the instrumented IPA is not able to run from with Ranorex Studio, while RxServices application is in the background mode. It is recommended to perform any test while the instrumented IPA is in the foreground.