GeneXus™
by Globant

Creating the UI testing capability

GeneXus by Globant

Benefits of UI Testing

Immediate feedback
End-to-end tests
Regression testing
User Acceptance testing

GeneXus developers and/or testers need to do interface testing after the application deployment, sometimes these regression tests need to be executed in many environments (i.e. QA, pre-production, and others).

The UI tests make it possible to provide immediate feedback after each deployment, allowing us to catch bugs and fix them quickly.

UI tests allows the creation of end-to-end tests: for example, if my application was Amazon, an end-to-end test could be the login into the application, searching for an item, adding it to the shopping cart, adding the delivery address, paying for the purchase, and logging out. These tests verify the integration between different application modules.

So, these kinds of tests are valuable for integration tests and user acceptance tests.

These tests are not only ran after each deployment but also after GeneXus upgrade migration, database new versions, and server changes.

UI testing in GeneXus

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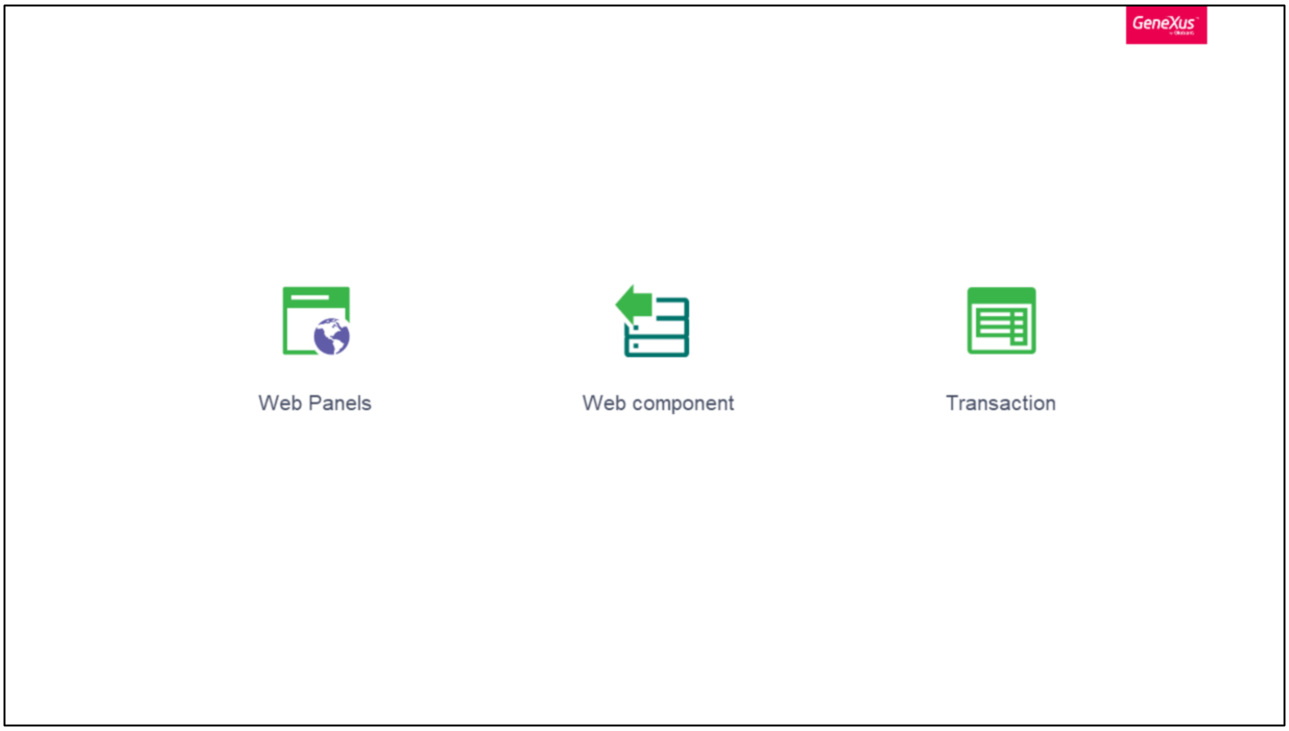
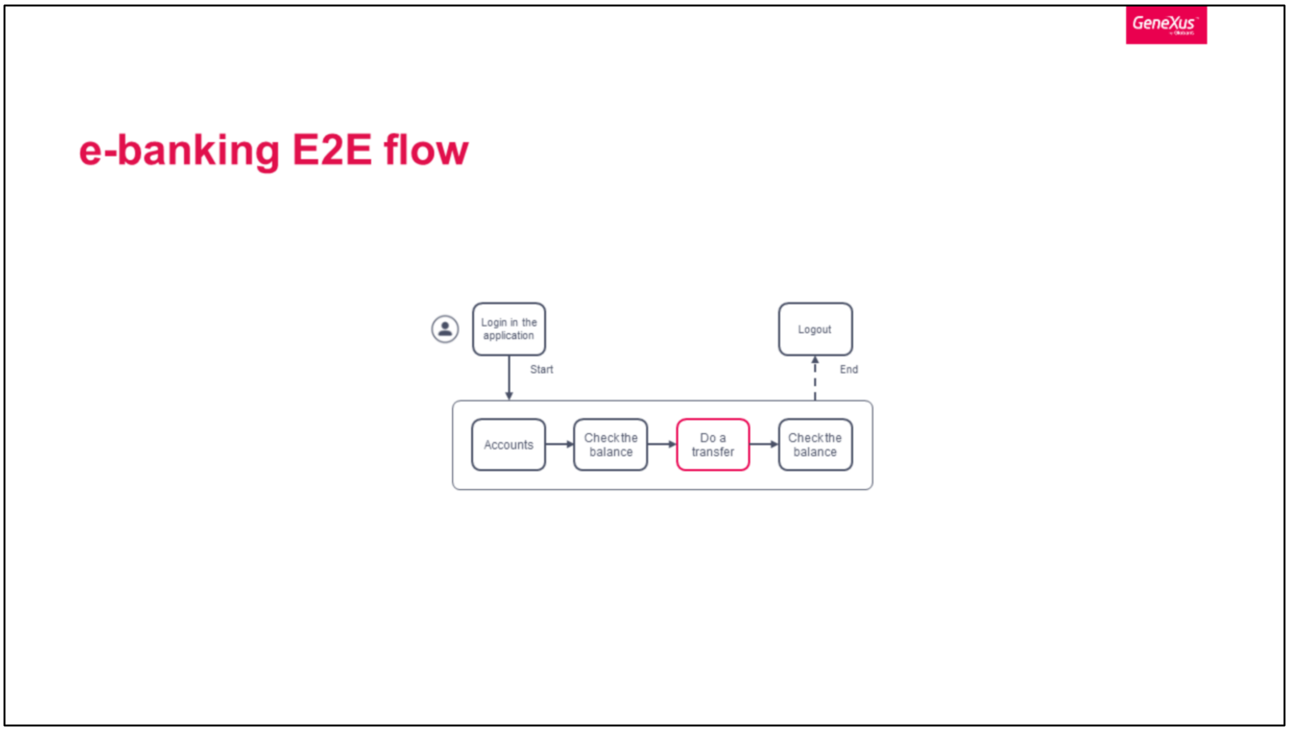
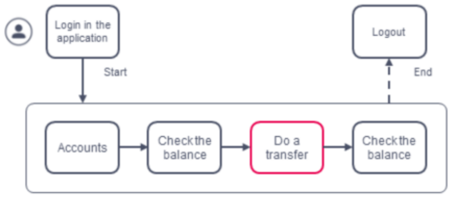


In GeneXus, the User Interface objects will be tested with the *Web UI tests*. These objects will be tested while the application is running in the browser, so, they need the application to be deployed in order to execute the test.

UI testing approach enables the simulation of user interactions over the running application, the goal is to implement automatic interface validations and include THEM? as regression tests.



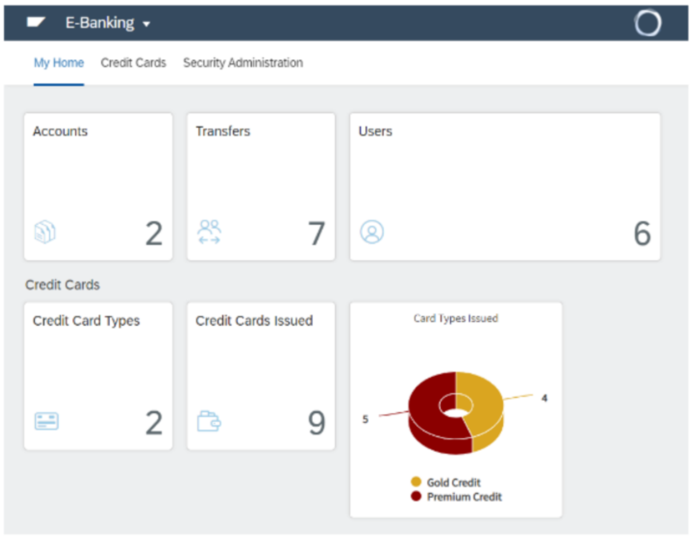
e-banking E2E flow



The strategy is to automate the most critical end-to-end flows of the application, which means risky flows for the business. Also, automate flows where bugs appear frequently and flows that should work well when releasing a new version to the customer.

In the e-banking example application, a critical end-to-end flow is:
Log in to the application
Check the account balance
Do a transfer
Check the final balance
Logout

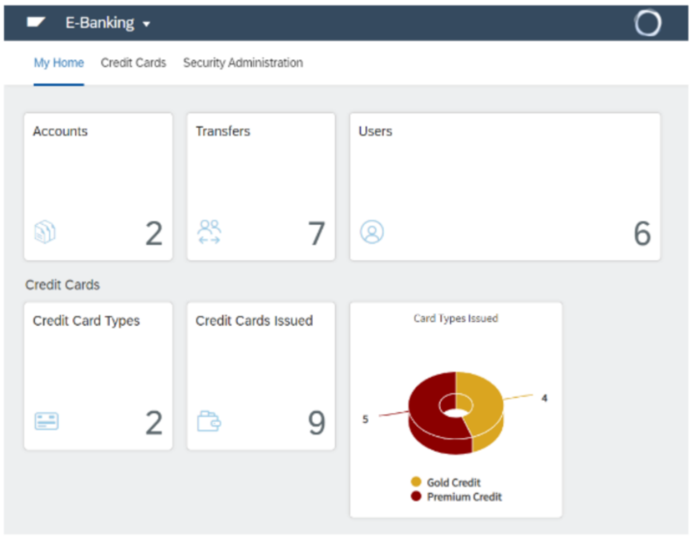
Creating the first UI test



GX Server: http://samples.genexusserver.com/v17 | KB Name: DemoEbankingGXtest

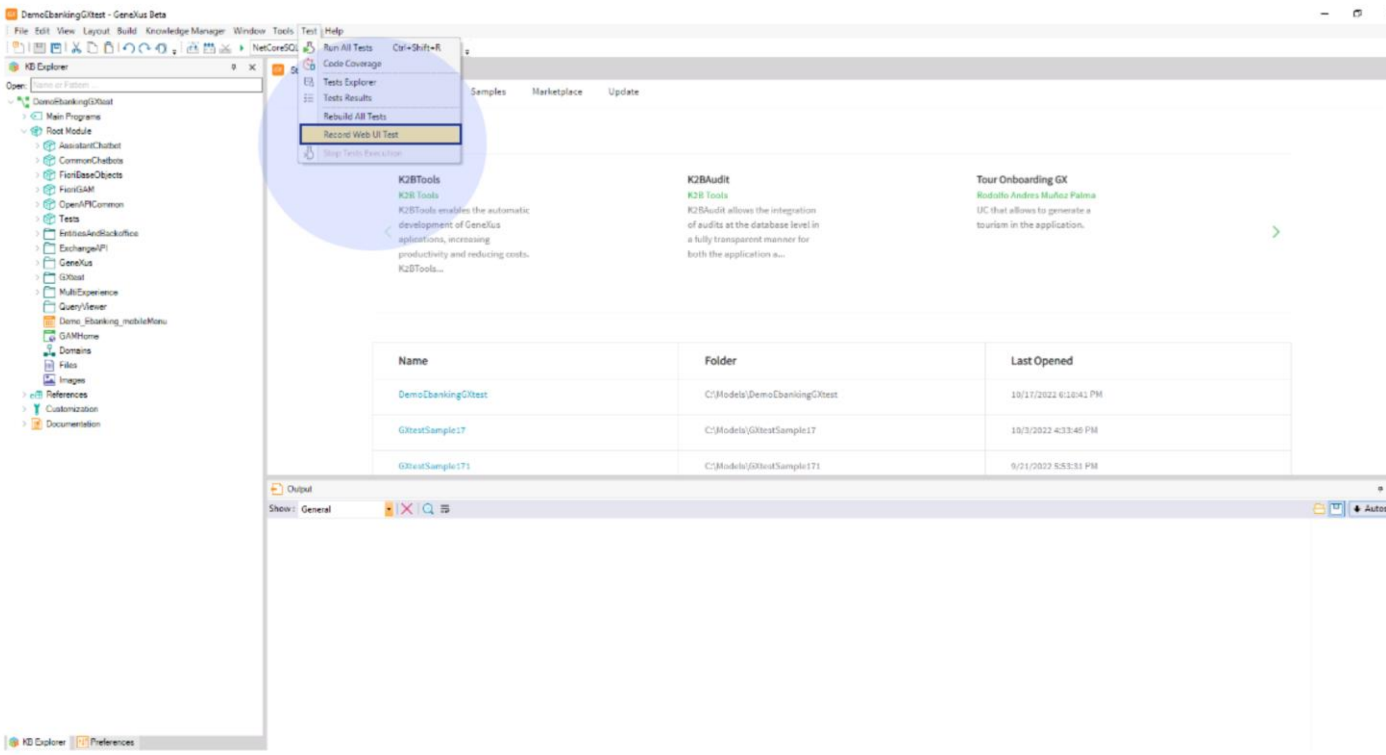
So, we are working on the same e-banking application. As you remember, it manages accounts, transfers, and credit cards, and we need to automate the most critical functions of our business that would be included in the regression tests.

In this case the risk flow is an end-to-end test with the following steps: login, perform a new transfer, and check the balances of the accounts involved.



GX Server: http://samples.genexusserver.com/v17 | KB Name: DemoEbankingGXtest

We will create a new *Web UI test* object, by which we can control the browser, performing actions and adding user interface validations. There is a wide set of different actions available.



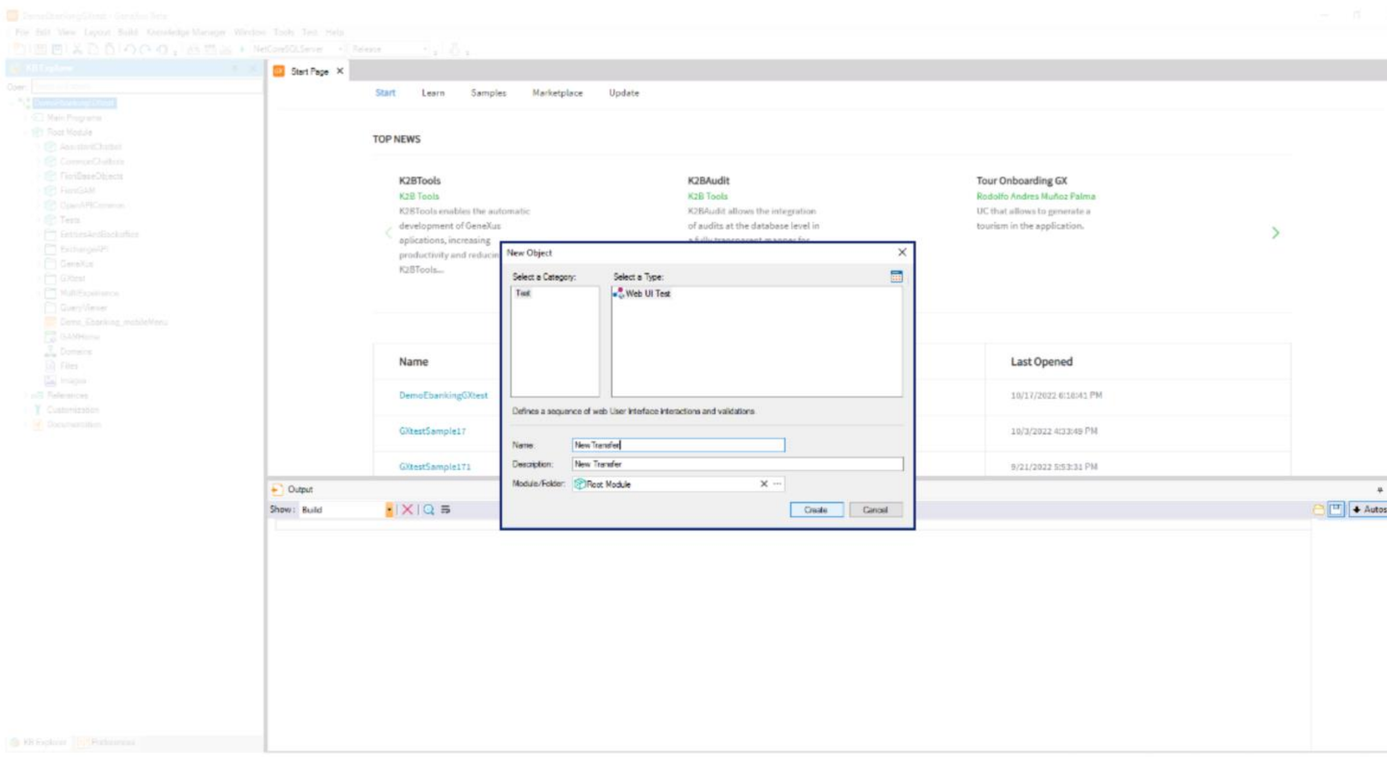
K2BTools
K2B Tools
K2BTools enables the automatic development of GeneXus aplications, increasing productivity and reducing costs. K2BTools...

K2BAudit
K2B Tools
K2BAudit allows the integration of audits at the database level in a fully transparent manner for both the application a...

Tour Onboarding GX
Rodolfo Andres Muñoz Palma
UC that allows to generate a tourism in the application.

Name	Folder	Last Opened
DemoEbankingGXtest	C:\Models\DemoEbankingGXtest	10/17/2022 6:18:41 PM
GXtestSample17	C:\Models\GXtestSample17	10/3/2022 4:33:46 PM
GXtestSample171	C:\Models\GXtestSample171	9/21/2022 5:53:31 PM

To create the *Web UI test* object click on the *Record Web UI Test* option


New Object

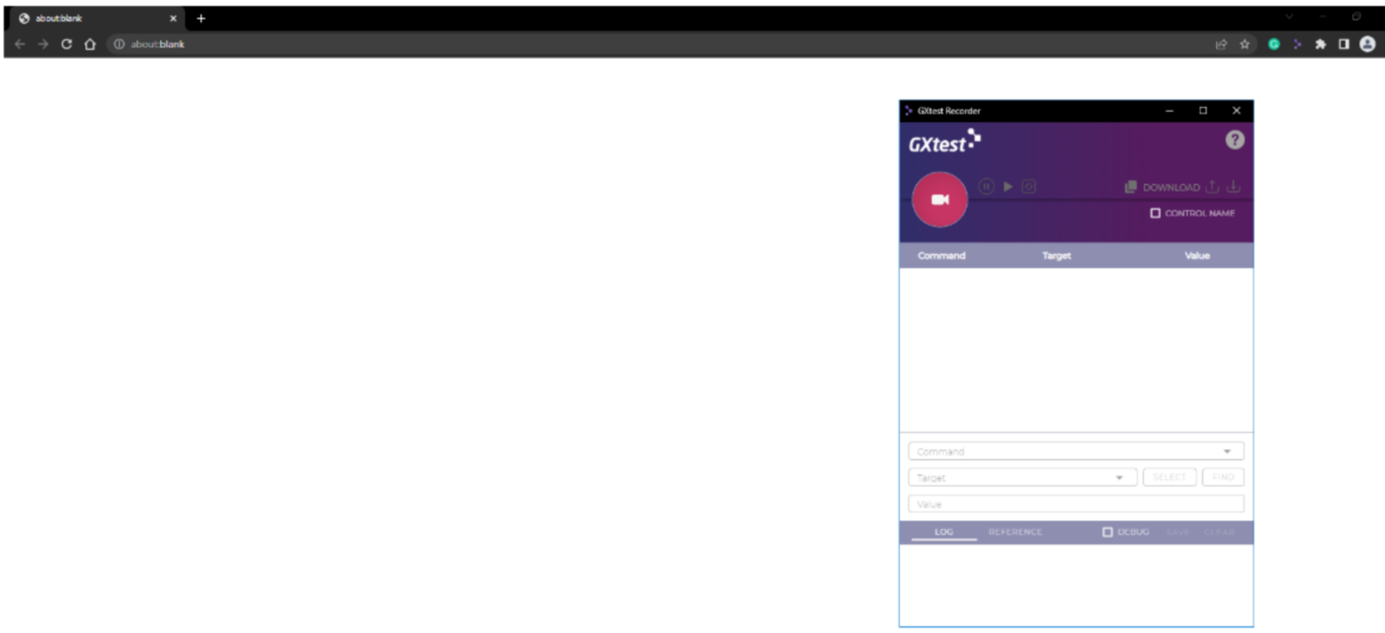
Select a Category: Test

Select a Type: Web UI Test

Defines a sequence of web User Interface interactions and validations

Name:	NewTransfer
Description:	New Transfer
Module/Folder:	Root Module

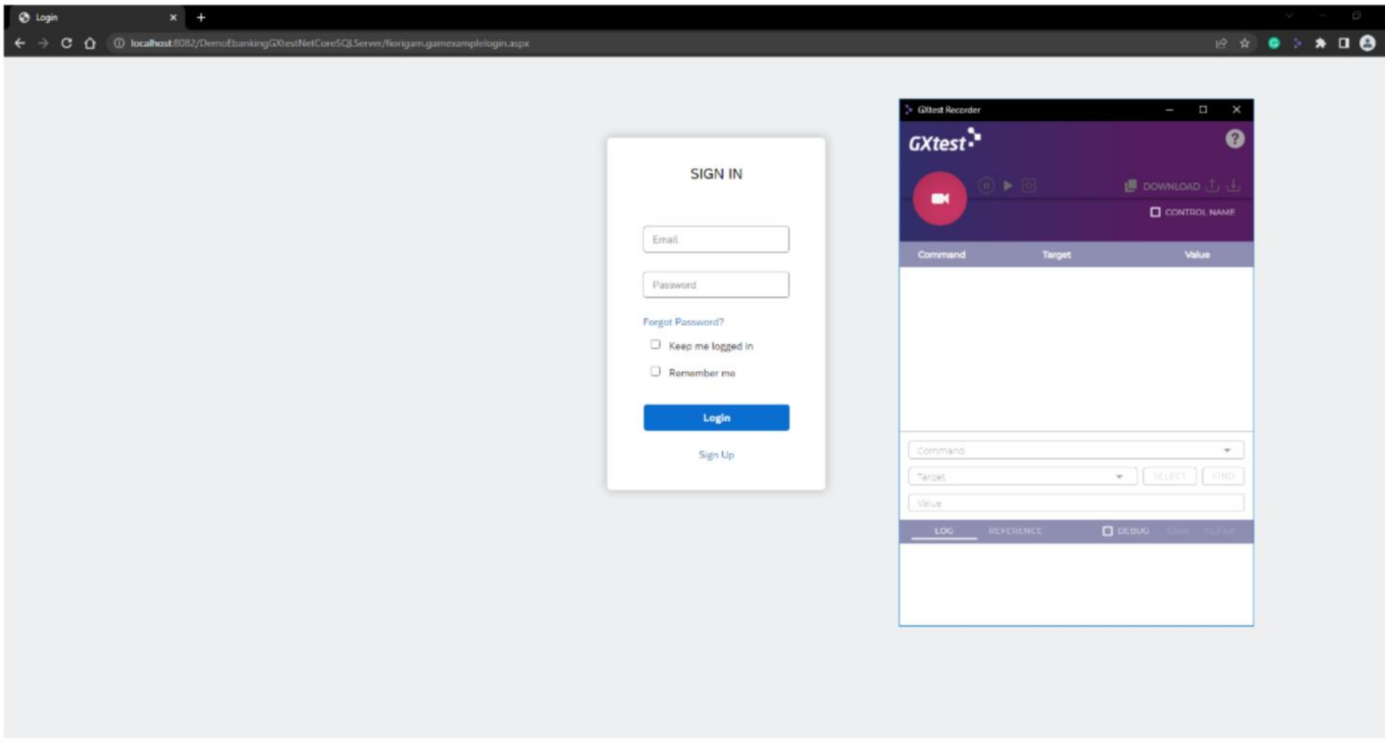
Fill the test name and click Create, in this case the object is called "NewTransfer". A new *Web UI Test* will be created.



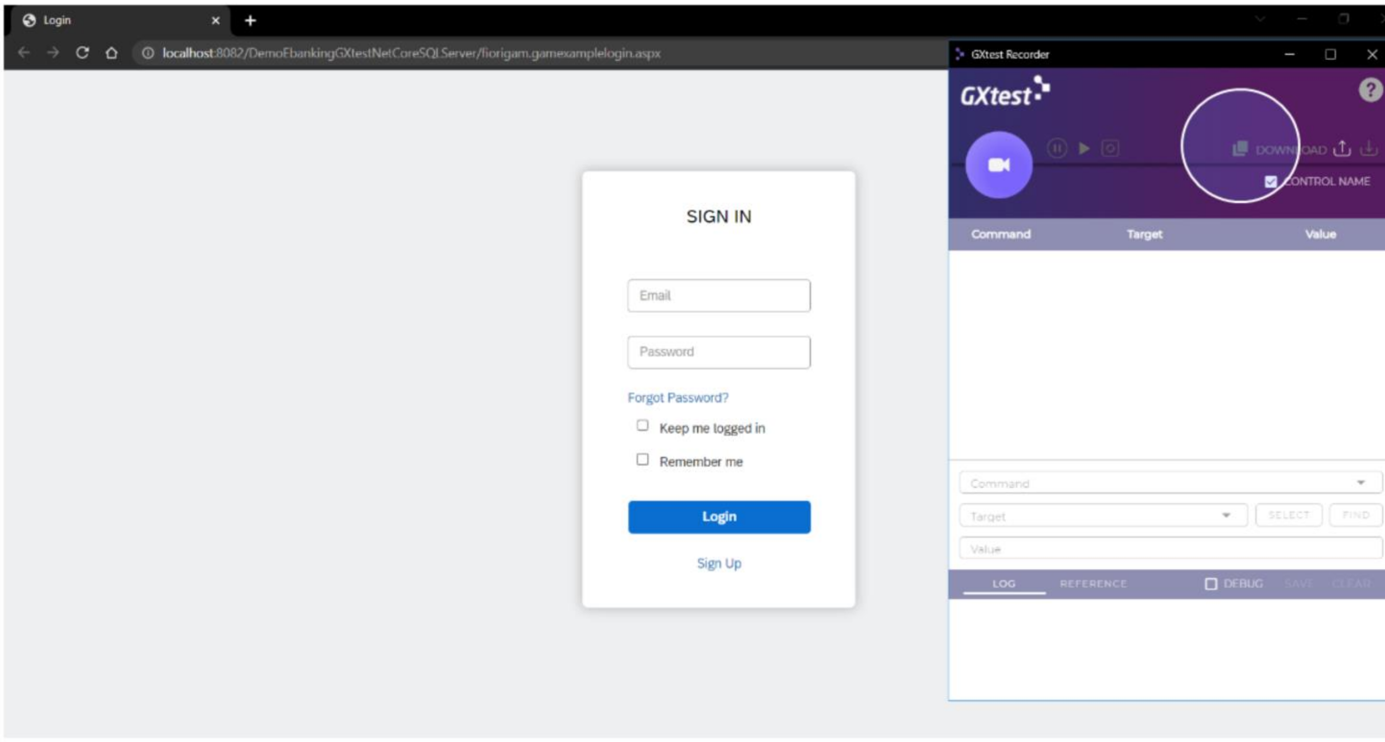
When you select Create, the Chrome browser will be automatically opened, in which you must write the application home page URL.

Also, the GXtest Recorder extension is automatically opened and recording. GXtest Recorder is a Chrome extension that saves the actions done by the user (dev or tester) over the application.

The user just executes the workflow over the application and GXtest Recorder generates the GeneXus code to include quickly in the *Web UI test* in the KB.

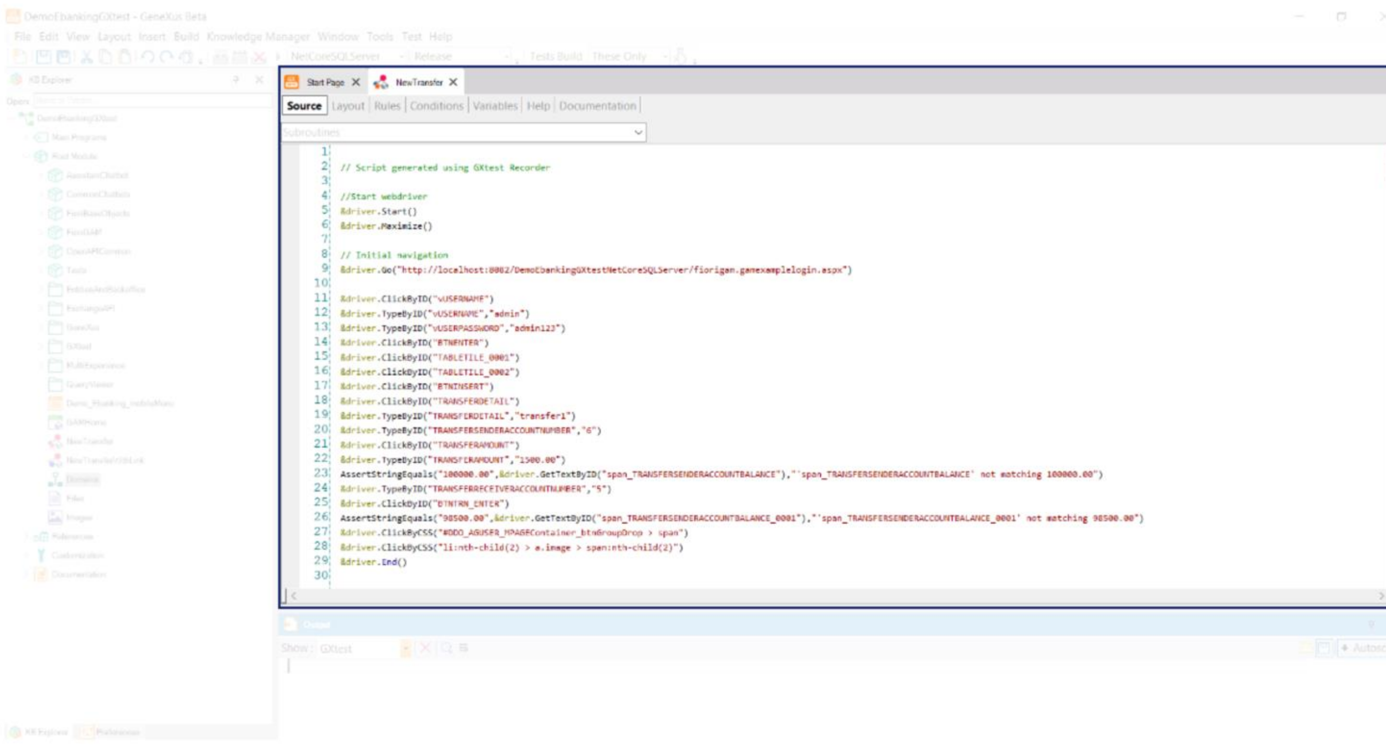


In this case I pasted the e-banking application URL, pressed Enter, and started to execute the workflow to automate.



After recording the workflow, the actions will be saved by GXtest Recorder like commands with html references. Note that the commands are recorder with html references, that means that references to controls are made by id, name, css and xpath.

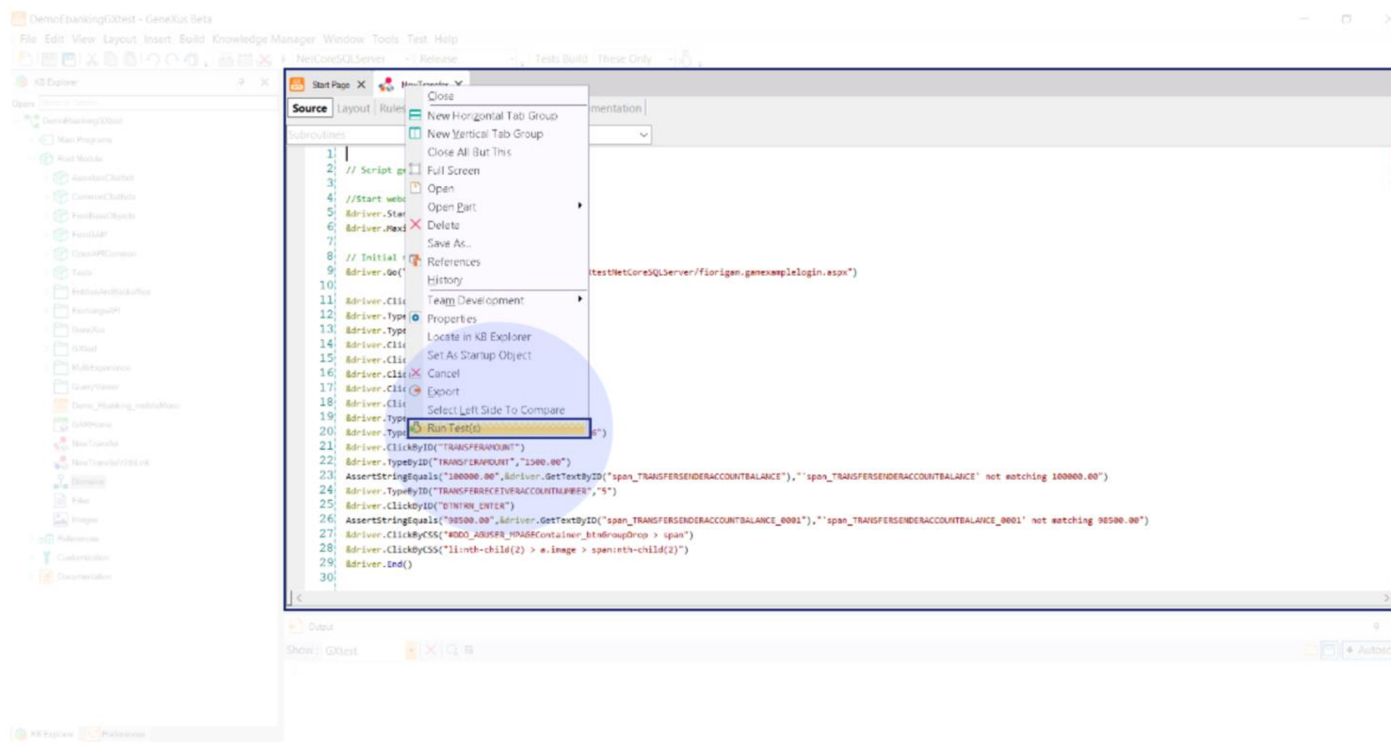
Then, clicking copy to clipboard and going to the new object in GX IDE, the GeneXus code of the Web UI test will be paste automatically.



```

// Script generated using GXtest Recorder

//Start webdriver
&driver.Start()
&driver.Maximize()

// Initial navigation
&driver.Go("http://localhost:8082/DemoEbankingGXtestNetCoreSQLServer/fiorigam.gamexamplelogin.aspx")

&driver.ClickByID("vUSERNAME")
&driver.TypeByID("vUSERNAME","admin")
&driver.TypeByID("vUSERPASSWORD","admin123")
&driver.ClickByID("BTNENTER")
&driver.ClickByID("TABLETILE_0001")
&driver.ClickByID("TABLETILE_0002")
&driver.ClickByID("BTNINSERT")
&driver.ClickByID("TRANSFERDETAIL")
&driver.TypeByID("TRANSFERDETAIL","transfer1")
&driver.TypeByID("TRANSFERSENDERACCOUNTNUMBER","6")
&driver.ClickByID("TRANSFERAMOUNT")
&driver.TypeByID("TRANSFERAMOUNT","1500.00")
AssertStringEquals("100000.00",&driver.GetTextByID("span_TRANSFERSENDERACCOUNTBALANCE"),"'span_TRANSFERSENDERACCOUNTBALANCE' not matching 100000.00")
&driver.TypeByID("TRANSFERRECEIVERACCOUNTNUMBER","5")
&driver.ClickByID("BTNTRN_ENTER")
AssertStringEquals("98500.00",&driver.GetTextByID("span_TRANSFERSENDERACCOUNTBALANCE_0001"),"'span_TRANSFERSENDERACCOUNTBALANCE_0001' not matching 98500.00")
&driver.ClickByCSS("#DDO_AGUSER_MPAGEContainer_btnGroupDrop > span")
&driver.ClickByCSS("li:nth-child(2) > a.image > span:nth-child(2)")
&driver.End()

```

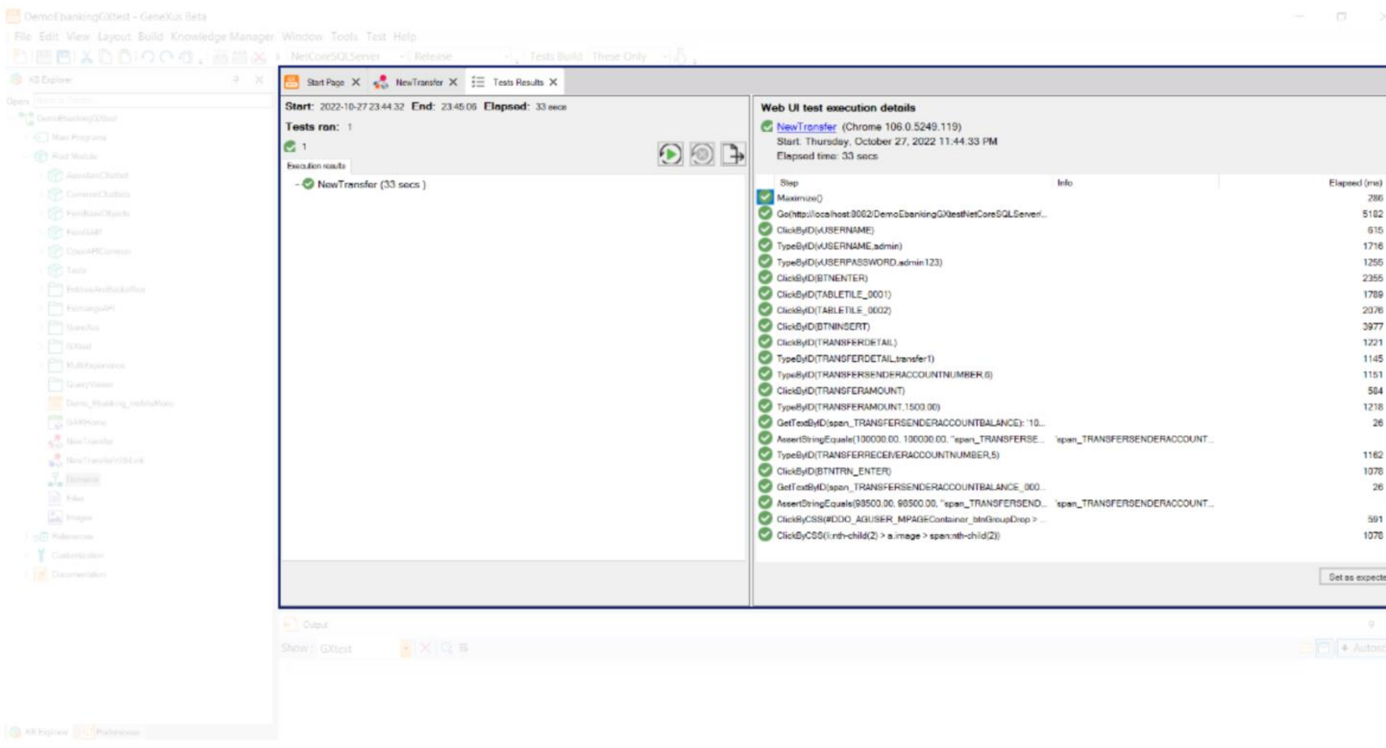
As you can see in the code, the *Web UI test* object has a driver variable by which the actions are executed in the browser, in that case, the application components are referenced by html.

Now, we have the *Web UI test* ready to execute in the GeneXus IDE and pipeline.



```
// Script g
//Start web
&driver.Sta
&driver.Max
// Initial
&driver.Go("                                    testNetCoreSQLServer/fiorigam.gamexamplelogin.aspx")
&driver.Cli
&driver.Type
&driver.Type
&driver.Cli
&driver.Cli
&driver.Cli
&driver.Cli
&driver.Cli
&driver.Type
&driver.Type                                    6")
&driver.ClickByID("TRANSFERAMOUNT")
&driver.TypeByID("TRANSFERAMOUNT","1500.00")
AssertStringEquals("100000.00",&driver.GetTextByID("span_TRANSFERSENDERACCOUNTBALANCE"),"'span_TRANSFERSENDERACCOUNTBALANCE' not matching 100000.00")
&driver.TypeByID("TRANSFERRECEIVERACCOUNTNUMBER","5")
&driver.ClickByID("BTNTRN_ENTER")
AssertStringEquals("98500.00",&driver.GetTextByID("span_TRANSFERSENDERACCOUNTBALANCE_0001"),"'span_TRANSFERSENDERACCOUNTBALANCE_0001' not matching 98500.00")
&driver.ClickByCSS("#DDO_ADUSER_MPAGEContainer_btnGroupDrop > span")
&driver.ClickByCSS("li:nth-child(2) > a.image > span:nth-child(2)")
&driver.End()
```

For running this tests, we just to select the “Run Test(s)” option.



Start: 2022-10-27 23:44:32 End: 23:45:06 Elapsed: 33 secs

Tests ran: 1

✓ 1

Execution results

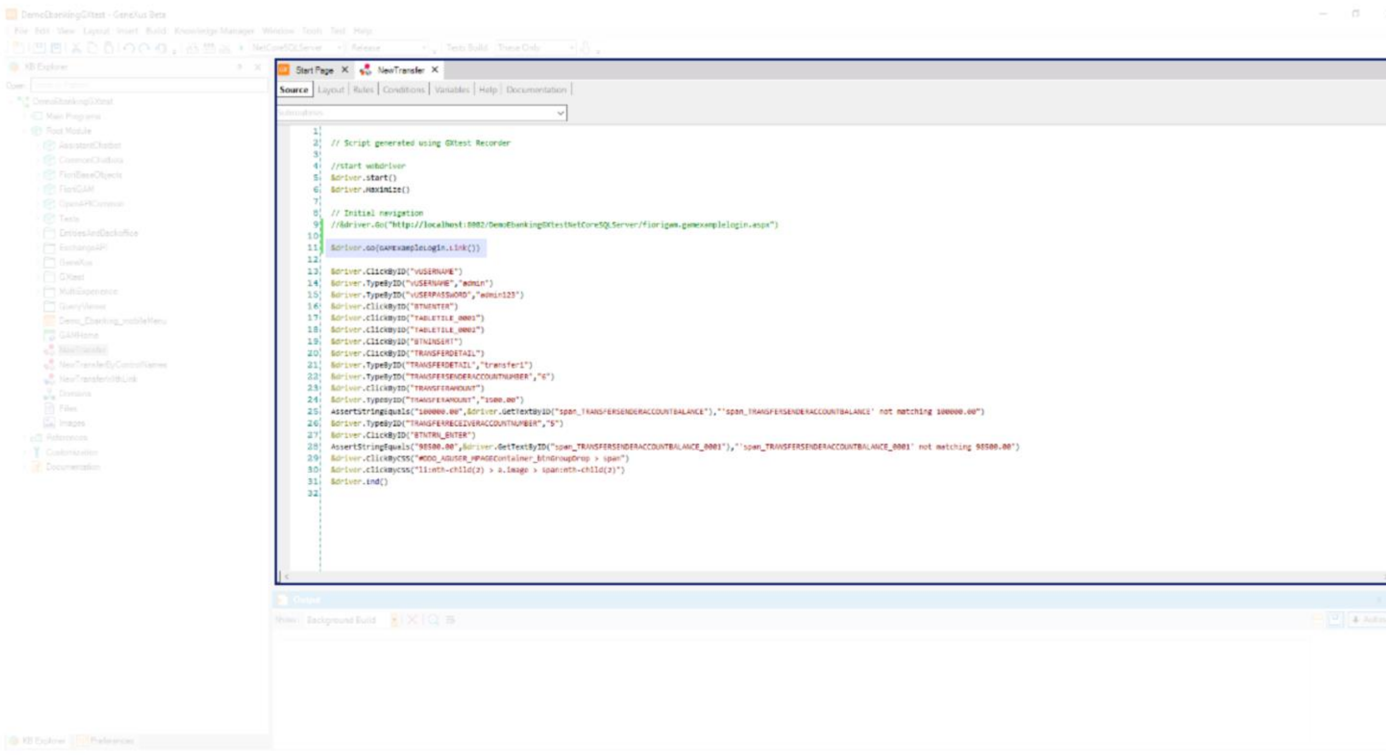
- NewTransfer (33 secs)

Web UI test execution details

NewTransfer (Chrome 106.0.5249.119)
Start: Thursday, October 27, 2022 11:44:33 PM
Elapsed time: 33 secs

	Step	Info	Elapsed (ms)
✓	Maximize()		286
✓	Go(http://localhost:8082/DemoEbankingGXtestNetCoreSQLServer/...		5182
✓	ClickByID(vUSERNAME)		615
✓	TypeByID(vUSERNAME,admin)		1716
✓	TypeByID(vUSERPASSWORD,admin123)		1255
✓	ClickByID(BTNENTER)		2355
✓	ClickByID(TABLETILE_0001)		1789
✓	ClickByID(TABLETILE_0002)		2076
✓	ClickByID(BTNINSERT)		3977
✓	ClickByID(TRANSFERDETAIL)		1221
✓	TypeByID(TRANSFERDETAIL,transfer1)		1145
✓	TypeByID(TRANSFERSENDERACCOUNTNUMBER,6)		1151
✓	ClickByID(TRANSFERAMOUNT)		584
✓	TypeByID(TRANSFERAMOUNT,1500.00)		1218
✓	GetTextByID(span_TRANSFERSENDERACCOUNTBALANCE): '10...		26
✓	AssertStringEquals(100000.00, 100000.00, "span_TRANSFERSE...	'span_TRANSFERSENDERACCOUNT...	
✓	TypeByID(TRANSFERRECEIVERACCOUNTNUMBER,5)		1162
✓	ClickByID(BTNTRN_ENTER)		1078
✓	GetTextByID(span_TRANSFERSENDERACCOUNTBALANCE_000...		26
✓	AssertStringEquals(98500.00, 98500.00, "span_TRANSFERSEND...	'span_TRANSFERSENDERACCOUNT...	
✓	ClickByCSS(#DDO_AGUSER_MPAGEContainer_btnGroupDrop > ...		591
✓	ClickByCSS(li:nth-child(2) > a.image > span:nth-child(2))		1078

After execution, you can see information about execution date time, speed and browser in the Test Result panel. Also, you can see the command detail, you can visualize the expected versus the obtained values for each test case.



```
// Script generated using GXtest Recorder

//start webdriver
&driver.start()
&driver.Maximize()

// Initial navigation
//&driver.Go("http://localhost:8082/DemoEbankingGXtestNetCoreSQLServer/fiorigam.gamexamplelogin.aspx")

&driver.Go(GAMExampleLogin.Link())

&driver.ClickByID("vUSERNAME")
&driver.TypeByID("vUSERNAME","admin")
&driver.TypeByID("vUSERPASSWORD","admin123")
&driver.ClickByID("BTNENTER")
&driver.clickByID("TABLETILE_0001")
&driver.clickByID("TABLETILE_0002")
&driver.ClickByID("BTNINSERT")
&driver.ClickByID("TRANSFERDETAIL")
&driver.TypeByID("TRANSFERDETAIL","transfer1")
&driver.TypeByID("TRANSFERSENDERACCOUNTNUMBER","6")
&driver.clickByID("TRANSFERAMOUNT")
&driver.TypeByID("TRANSFERAMOUNT","1500.00")
AssertStringEquals("100000.00",&driver.GetTextByID("span_TRANSFERSENDERACCOUNTBALANCE"),"'span_TRANSFERSENDERACCOUNTBALANCE' not matching 100000.00")
&driver.TypeByID("TRANSFERRECEIVERACCOUNTNUMBER","5")
&driver.ClickByID("BTNTRN_ENTER")
AssertStringEquals("98500.00",&driver.GetTextByID("span_TRANSFERSENDERACCOUNTBALANCE_0001"),"'span_TRANSFERSENDERACCOUNTBALANCE_0001' not matching 98500.00")
&driver.ClickByCSS("#DDO_AGUSER_MPAGEContainer_btnGroupDrop > span")
&driver.clickByCSS("li:nth-child(2) > a.image > span:nth-child(2)")
&driver.End()
```

It is a good practice to change the application home URL by WebPanel.Link() function to execute this test in different environments.

Commands by control name

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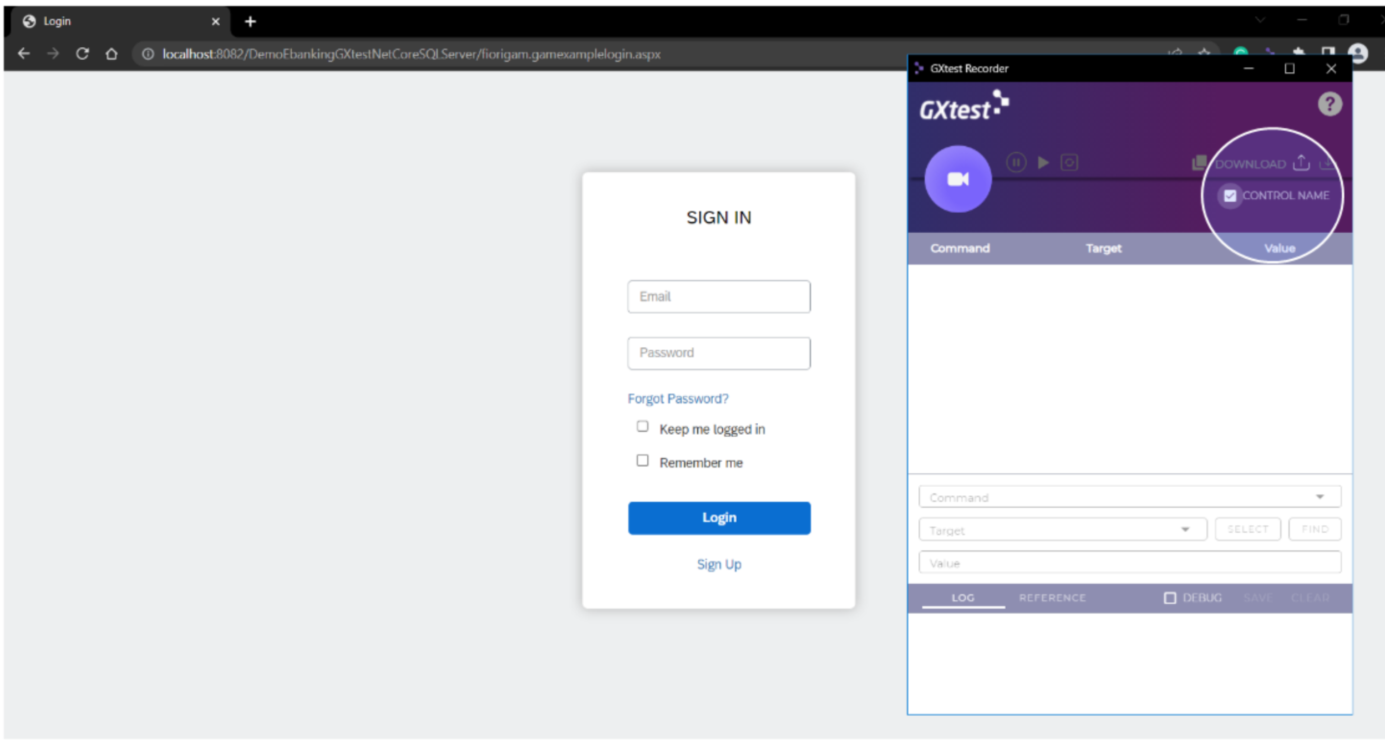
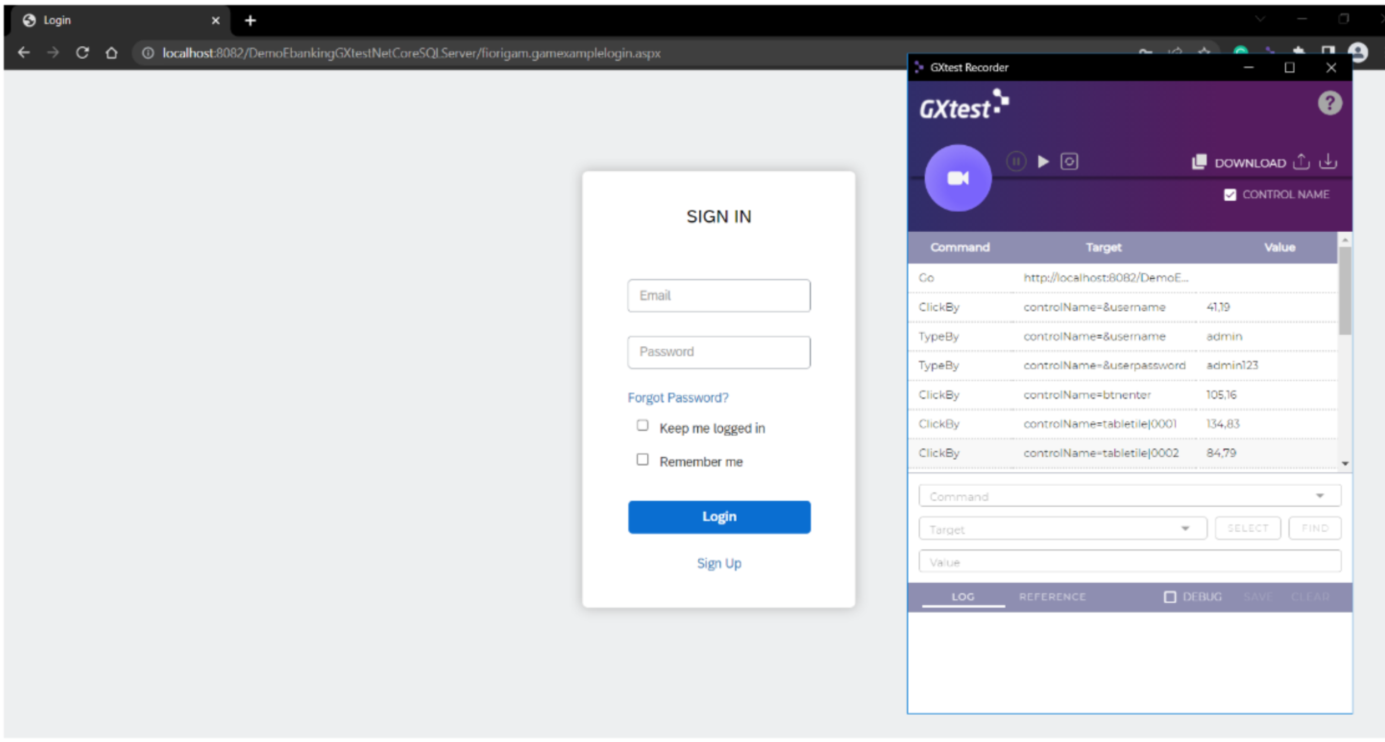
To have a higher level of abstraction of your recordings and create more robust tests, we have developed the functionality of creating tests with references by control name.

Propiedades de la KB



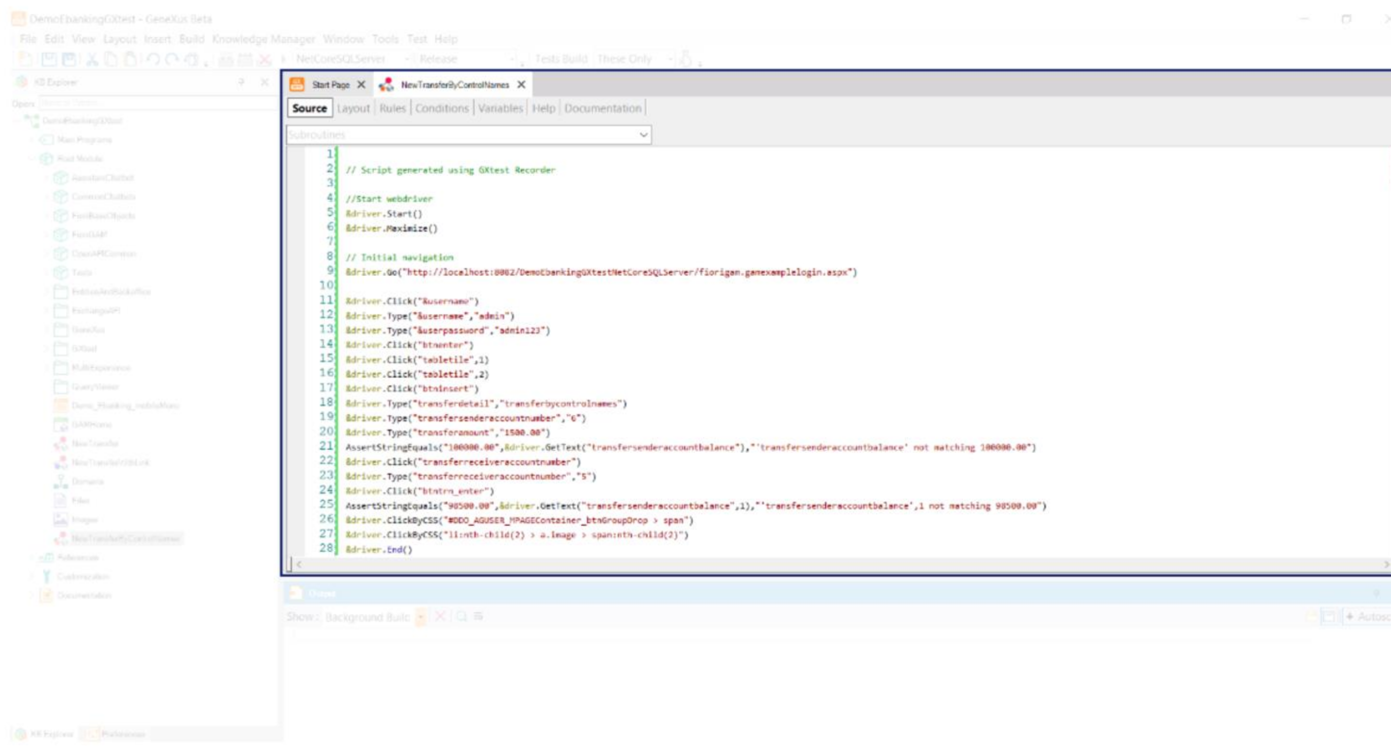
It is possible recorded by control name references selecting the checkbox “Control name”



Command	Target	Value
Go	http://localhost:8082/DemoE...	
ClickBy	controlName=&username	41,19
TypeBy	controlName=&username	admin
TypeBy	controlName=&userpassword	admin123
ClickBy	controlName=btnenter	105,16
ClickBy	controlName=tabletile|0001	134,83
ClickBy	controlName=tabletile|0002	84,79

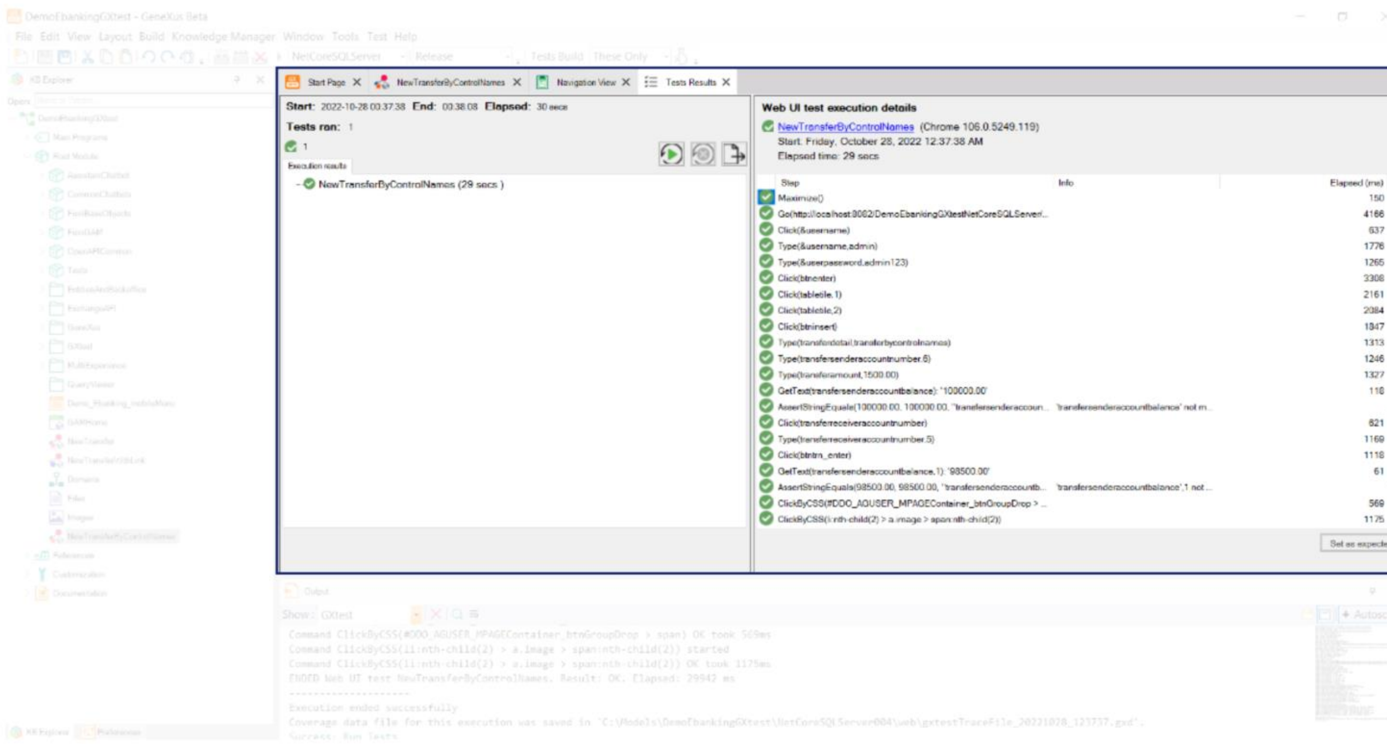
In this recording, the GXtest Recorder saves the same actions as commands, but instead of saving the element selectors by HTML, it saves them by GeneXus Control Name selector.

You can see the **controlName** selector for each element in each recorded action.



```

// Script generated using GXtest Recorder

//Start webdriver
&driver.Start()
&driver.Maximize()

// Initial navigation
&driver.Go("http://localhost:8082/DemoEbankingGXtestNetCoreSQLServer/fiorigam.gamexamplelogin.aspx")

&driver.Click("&username")
&driver.Type("&username","admin")
&driver.Type("&userpassword","admin123")
&driver.Click("btnenter")
&driver.Click("tabletile",1)
&driver.Click("tabletile",2)
&driver.Click("btninsert")
&driver.Type("transferdetail","transferbycontrolnames")
&driver.Type("transfersenderaccountnumber","6")
&driver.Type("transferamount","1500.00")
AssertStringEquals("100000.00",&driver.GetText("transfersenderaccountbalance"),"'transfersenderaccountbalance' not matching 100000.00")
&driver.Click("transferreceiveraccountnumber")
&driver.Type("transferreceiveraccountnumber","5")
&driver.Click("btntrn_enter")
AssertStringEquals("98500.00",&driver.GetText("transfersenderaccountbalance",1),"'transfersenderaccountbalance',1 not matching 98500.00")
&driver.ClickByCSS("#DDO_AGUSER_MPAGEContainer_btnGroupDrop > span")
&driver.ClickByCSS("li:nth-child(2) > a.image > span:nth-child(2)")
&driver.End()
```

In GeneXus code, you can find the commands by control name references, these are the commands “Click” and “Type” in this case. In the same workflow, if some element doesn’t have a control name it is recorded by HTML reference, like the last commands “ClickByCSS”.


Start: 2022-10-28 00:37:38 End: 00:38:08 Elapsed: 30 secs

Tests ran: 1

✓ 1

Execution results

- ✓ NewTransferByControlNames (29 secs)

Web UI test execution details

✓ NewTransferByControlNames (Chrome 106.0.5249.119)
Start: Friday, October 28, 2022 12:37:38 AM
Elapsed time: 29 secs

	Step	Info	Elapsed (ms)
✓	Maximize()		150
✓	Go(http://localhost:8082/DemoEbankingGXtestNetCoreSQLServer/...		4166
✓	Click(&username)		637
✓	Type(&username,admin)		1776
✓	Type(&userpassword,admin123)		1265
✓	Click(btnenter)		3308
✓	Click(tabletile,1)		2161
✓	Click(tabletile,2)		2084
✓	Click(btninsert)		1847
✓	Type(transferdetail,transferbycontrolnames)		1313
✓	Type(transfersenderaccountnumber,6)		1246
✓	Type(transferamount,1500.00)		1327
✓	GetText(transfersenderaccountbalance): '100000.00'		118
✓	AssertStringEquals(100000.00, 100000.00, "transfersenderaccoun...	'transfersenderaccountbalance' not m...	
✓	Click(transferreceiveraccountnumber)		821
✓	Type(transferreceiveraccountnumber,5)		1169
✓	Click(btntrn_enter)		1118
✓	GetText(transfersenderaccountbalance,1): '98500.00'		61
✓	AssertStringEquals(98500.00, 98500.00, "transfersenderaccountb...	'transfersenderaccountbalance',1 not ...	
✓	ClickByCSS(#DDO_AGUSER_MPAGEContainer_btnGroupDrop > ...		569
✓	ClickByCSS(li:nth-child(2) > a.image > span:nth-child(2))		1175

```
Command ClickByCSS(#DDO_AGUSER_MPAGEContainer_btnGroupDrop > span) OK took 569ms
Command ClickByCSS(li:nth-child(2) > a.image > span:nth-child(2)) started
Command ClickByCSS(li:nth-child(2) > a.image > span:nth-child(2)) OK took 1175ms
ENDED Web UI test NewTransferByControlNames. Result: OK. Elapsed: 29942 ms
--------------------
Execution ended successfully
Coverage data file for this execution was saved in 'C:\Models\DemoEbankingGXtest\NetCoreSQLServer004\web\gxtestTraceFile_20221028_123737.gxd'.
Success: Run tests
```

After the execution of the test, you can see the result detail in the Tests Results window.

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