Rapise® | Packaged Application Testing

Testing Microsoft® Dynamics® Applications with Rapise

Last Updated: March 2nd, 2018

Contents

Introduction

Rapise® is a next generation software test automation tool that leverages the power of open architecture to improve application quality and reduce time to market.

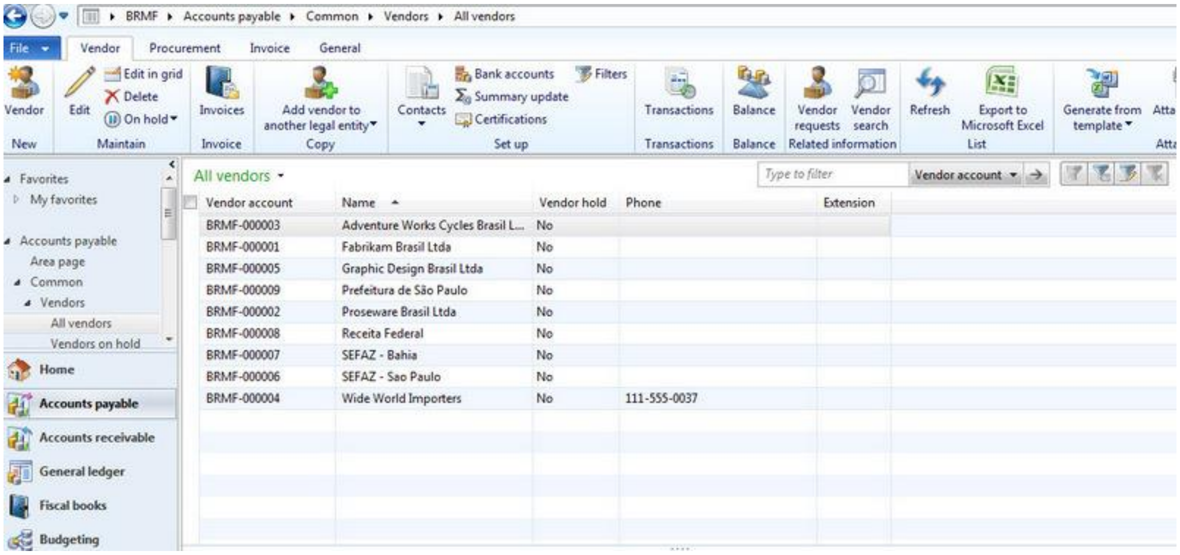
Microsoft Dynamics is a line of **enterprise resource planning (ERP)** and **customer relationship management (CRM)** software applications from Microsoft. The Microsoft Dynamics focus industries are retail, service, manufacturing, financial services, and the public sector. Microsoft Dynamics offers support for small, medium, and large businesses.

Rapise has special extensions included out of the box that allow it **easily test and validate Microsoft Dynamics** implementations, reducing the time to regression test customizations and configurations. Rapise includes include out of the box support for testing Dynamics AX, Dynamics CRM, and Dynamics 365.

For information on using Rapise itself, please refer to the *Rapise User Guide*.

1. Testing Dynamics AX

Microsoft Dynamics AX (formerly Axapta) - multi-language, multi-currency enterprise resource planning (ERP) business software with global business management features for financial, human resources, and operations management as well as additional industry capabilities for retailers, professional service industries, financial service businesses, manufacturers, and public-sector organizations



Vendor account	Name	Vendor hold	Phone	Extension
BRMF-000003	Adventure Works Cycles Brasil L...	No		
BRMF-000001	Fabrikam Brasil Ltda	No		
BRMF-000005	Graphic Design Brasil Ltda	No		
BRMF-000009	Prefeitura de São Paulo	No		
BRMF-000002	Proseware Brasil Ltda	No		
BRMF-000008	Receita Federal	No		
BRMF-000007	SEFAZ - Bahia	No		
BRMF-000006	SEFAZ - Sao Paulo	No		
BRMF-000004	Wide World Importers	No	111-555-0037	

Rapise includes specialized libraries for testing Dynamics AX applications that are built-upon the standard Microsoft Windows **UIAutomation** library with special extensions for handling unique AX controls such as treeviews, the navigation explorer and the various grids used to edit data. In addition Rapise can test the following extensions to Dynamics AX:

- Dynamics AX Management Reporter - Rapise can test this extension using its Generic Windows library
- Dynamics AX Web Portals - Rapise can test the various web portals using its web browser libraries.

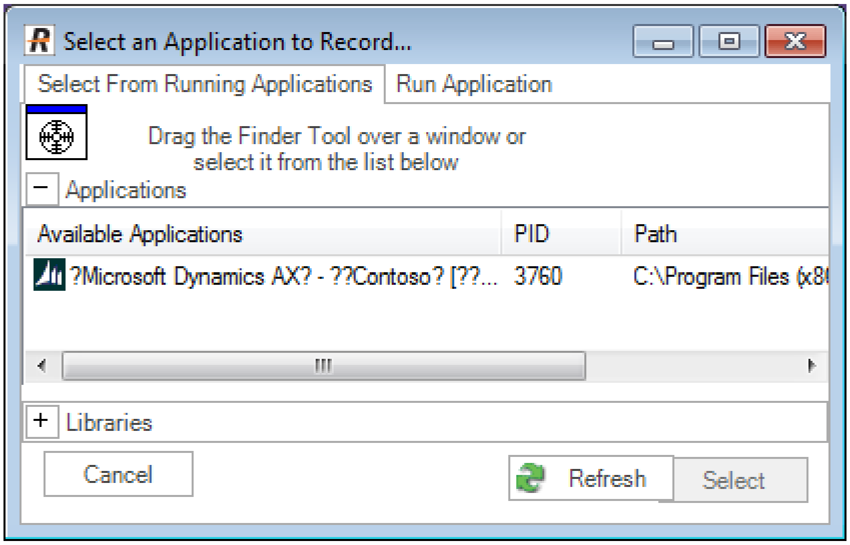
1.1. Overview

In this section, we describe how to master tests for Dynamics AX application using Rapise.

- **Rapise** provides a complete automated testing solution that can handle all of your technologies in one environment. With support for web, mobile and desktop applications and a wide variety of third-party component libraries.
- **Microsoft Dynamics AX 2012** is an ERP system for mid-size to large enterprises. It is the most robust, scalable, and functionally rich enterprise resource planning system in the Microsoft Dynamics family of products. The system was originally known as Axapta, owned by the Danish software company Damgaard.

1.2. Start Recording a New Test

First you need to create a new Basic test and start recording session. Choose Dynamics AX from the list of applications:


Select an Application to Record...
Select From Running Applications
Run Application
Drag the Finder Tool over a window or select it from the list below
Applications
Available Applications
PID
Path
?Microsoft Dynamics AX? - ??Contoso? [??...
3760
C:\Program Files (x8
Libraries
Cancel
Refresh
Select

Then press `Select` button to start recording. Rapise will automatically plug the UIAutomation and DynamicsAX libraries.

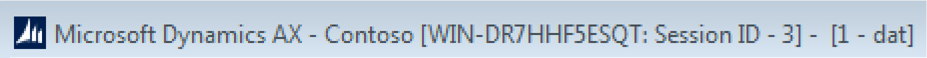
- **Microsoft UI Automation** is the new accessibility framework for Microsoft Windows, available on all operating systems that support Windows Presentation Foundation (WPF). UI Automation provides programmatic access to most user interface (UI) elements on the desktop, enabling assistive technology products such as screen readers to provide information about the UI to end users and to manipulate the UI by means other than standard input. UI Automation also allows automated test scripts to interact with the UI.
- **DynamicsAX** library supports set of controls specific to Microsoft Dynamics AX 2012 application.

When recording is completed you can see attached libraries in the code of `test.js` file:

```
g_load_libraries=["UIAutomation", "DynamicsAX"];
```

1.3. Automatic Adjustment of `Window Title` Object Property

Main window title of Dynamics AX is dynamic by nature.

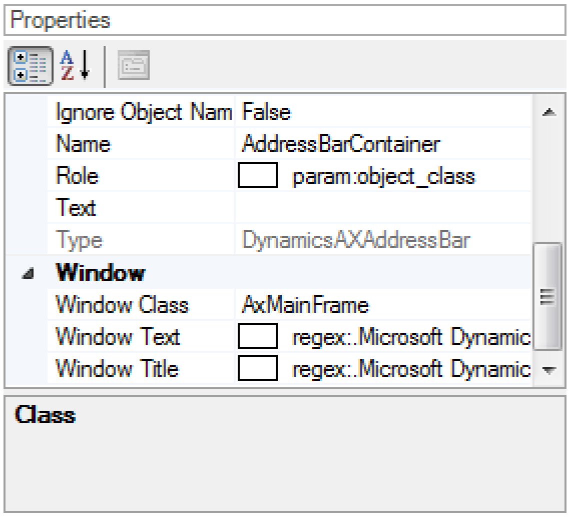


Microsoft Dynamics AX - Contoso [WIN-DR7HHF5ESQT: Session ID - 3] - [1 - dat]

It contains not only application name but also domain and AOS information and session Id. So it can be different at the time of test recording and test playback. To cope with this problem Rapise automatically replaces actual window title with a regular expression in object properties. Here it is:

```
    regex:.Microsoft Dynamics AX.*
```

So recorded object properties automatically adjusted as

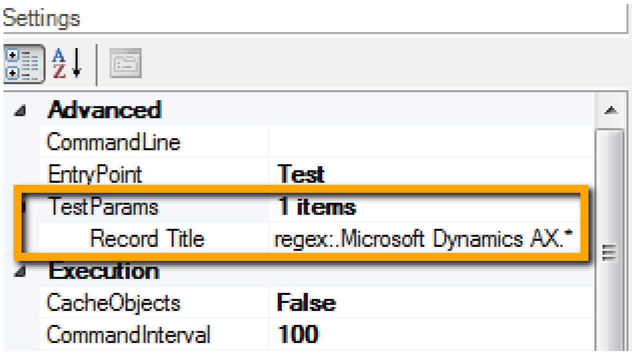


Properties

Ignore Object Nam	False
Name	AddressBarContainer
Role	□ param:object_class
Text	
Type	DynamicsAXAddressBar
Window	
Window Class	AxMainFrame
Window Text	□ regex:.Microsoft Dynamic
Window Title	□ regex:.Microsoft Dynamic

Class

Also Rapise automatically sets `Record Title` in test settings to the same regular expression so you do not need to choose the Dynamics AX main window during subsequent recording sessions.



Settings

Advanced	
CommandLine	
EntryPoint	**Test**
TestParams	**1 items**
Record Title	regex:.Microsoft Dynamics AX.*
Execution	
CacheObjects	**False**
CommandInterval	**100**

1.4. Titles of Child Windows

Child windows of Dynamics AX also may have dynamic titles. Rapise does not know all the available patterns, so for child windows you need to write regular expressions yourself. But the good news is you need to do this for one object only in every such window. For further learned objects Rapise will change the `window title` property automatically. In other words when Rapise learns a new object and it's `window title` is matched by a regular expression of a previously learned object then the title property is automatically replaced by this regular expression.

1.5. Object Location

Object location property has the form of

```
    id1/id2/id3...
```

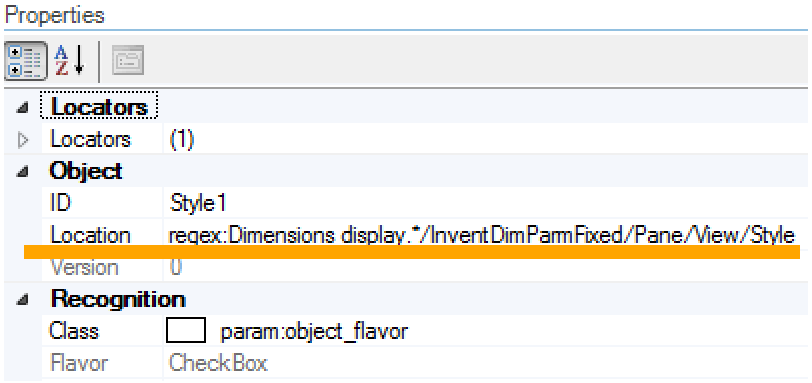
where ids refer to parent objects along the path to the top window object. Sometimes such ids also can be dynamic, e.g.:

```
    Dimensions display (1 - k13) - Sales order: S30014323, CE15P, Sales
order: S30014323/InventDimParmFixed/Pane/View/Style
```

In this case change dynamic parts by corresponding regular expressions. In the above example updated location looks like:

```
    regex:Dimensions display.*/InventDimParmFixed/Pane/View/Style
```

Here is updated location in the property grid:



Locators	
Locators	(1)
Object	
ID	Style1
Location	regex:Dimensions display.*/InventDimParmFixed/Pane/View/Style
Version	0
Recognition	
Class	param:object_flavor
Flavor	CheckBox

1.6. How to Launch Dynamics AX Client

If in your test you want to check that Dynamics AX application is installed and running use the code:

var fso = new ActiveXObject("Scripting.FileSystemObject");

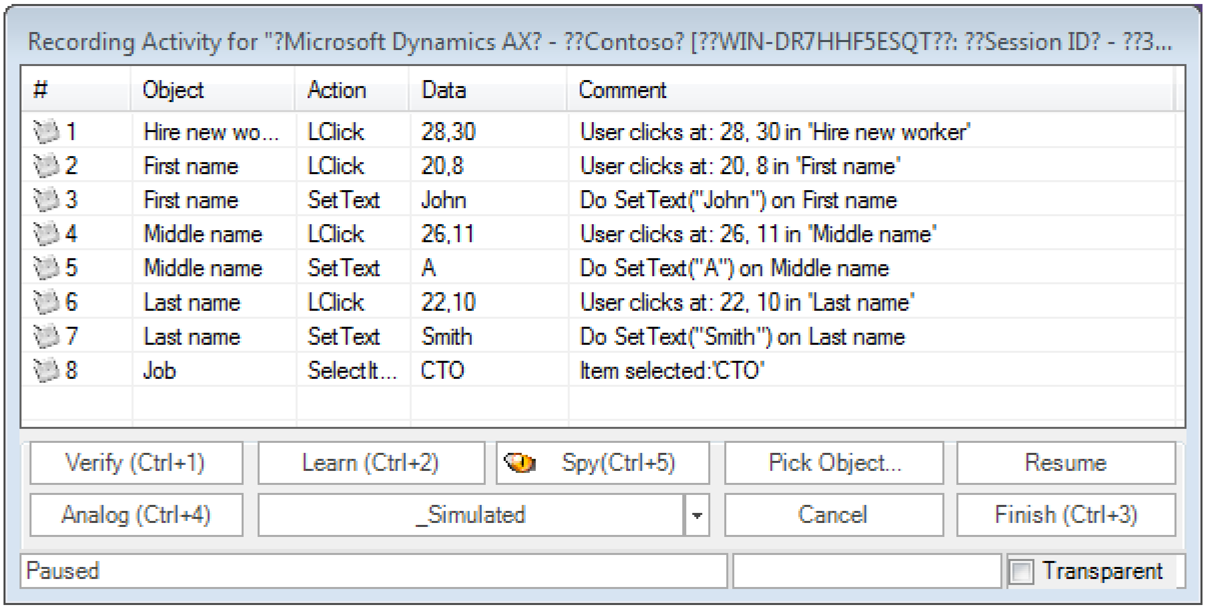
```
var pfFolder = Global.GetSpecialFolderPath("ProgramFilesX86");
var dynamicsPath = pfFolder + "\\Microsoft Dynamics
AX\\60\\Client\\Bin\\Ax32.exe"
if(!fso.FileExists(dynamicsPath))
{
    Tester.Message("Dynamics AX Client is not installed on this computer");
    return;
}

var windows = g_util.FindWindows("regex:.Microsoft Dynamics AX.*",
"AxMainFrame");
if (windows.length == 0)
{
    Tester.Message("Dynamics AX Client is not started. Please start it
manually and re-run the test.");
    return;
}
```

To start the application use

```
Global.DoLaunch(dynamicsPath);
```

1.7. Recording Actions and Learning Objects

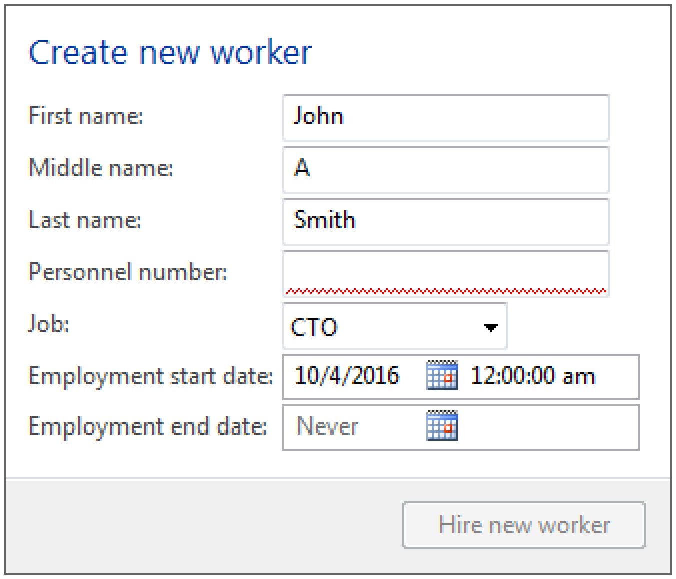
During recording while you interact with Dynamics AX controls Rapise captures actions and displays them in the recording dialog.



Recording Activity for "?Microsoft Dynamics AX? - ??Contoso? [??WIN-DR7HHF5ESQT??: ??Session ID? - ??3...

#	Object	Action	Data	Comment
1	Hire new wo...	LClick	28,30	User clicks at: 28, 30 in 'Hire new worker'
2	First name	LClick	20,8	User clicks at: 20, 8 in 'First name'
3	First name	SetText	John	Do SetText("John") on First name
4	Middle name	LClick	26,11	User clicks at: 26, 11 in 'Middle name'
5	Middle name	SetText	A	Do SetText("A") on Middle name
6	Last name	LClick	22,10	User clicks at: 22, 10 in 'Last name'
7	Last name	SetText	Smith	Do SetText("Smith") on Last name
8	Job	SelectIt...	CTO	Item selected:'CTO'

After this recording session corresponding UI area looks as follows:



Create new worker

First name: John

Middle name: A

Last name: Smith

Personnel number:

Job: CTO

Employment start date: 10/4/2016 12:00:00 am

Employment end date: Never

When recording is finished Rapise automatically generates the test code:

```
function Test()
{
    //User clicks at: 28, 30 in 'Hire new worker'
    SeS('Hire_new_worker').DoLClick(28, 30);
    //User clicks at: 20, 8 in 'First name'
    SeS('First_name').DoLClick(20, 8);
    //Do SetText("John") on First name
    SeS('First_name').DoSetText("John");
    //User clicks at: 26, 11 in 'Middle name'
    SeS('Middle_name').DoLClick(26, 11);
    //Do SetText("A") on Middle name
    SeS('Middle_name').DoSetText("A");
    //User clicks at: 22, 10 in 'Last name'
    SeS('Last_name').DoLClick(22, 10);
```

```
          //Do SetText("Smith") on Last name
          SeS('Last_name').DoSetText("Smith");
          //Item selected:'CTO'
          SeS('Job').DoSelectItem("CTO");
        }
```

If Rapise does not capture any interaction or captures it wrongly then try to learn the object. In this case Rapise will add it to the object tree but will not capture the action and you'll add the code to the test manually later. To learn an object during recording session place mouse cursor over it and press `Ctrl-2` shortcut. It makes sense to pause recording before learning objects. This will prevent Rapise from intersecting mouse and keyboard and attempting to record interactions you do. `Pause/Resume` button is located at the right side of the Recording dialog.

1.7. Tips for Interacting with Objects

Text Box

To allow Rapise to capture the entered text interact with a text box in two steps: 1. Click into the edit box 2. Type text using keyboard

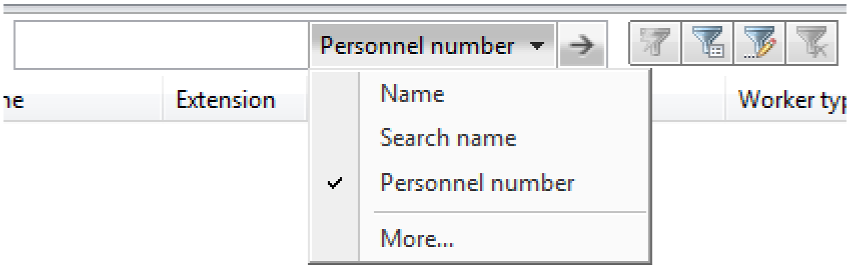
ComboBox

Dynamics AX has several types of combo boxes.

- **Standard combo box** like `Job` in the `Hire New Worker` example above. Rapise treats such combo boxes as atomic objects. To set a value in such a combo use the `DoSelectItem` action:

  ```
  SeS('Job').DoSelectItem("CTO");
  ```

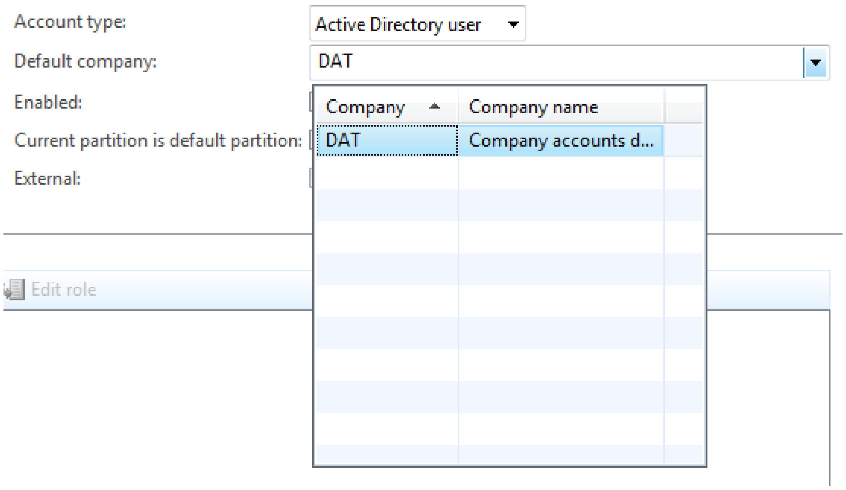
- **Table filter combo** is recognized as a pair of objects: `MenuItem` and `DropDown`. The `MenuItem` is used to open the `DropDown`.



Here is the code generated on recording:

```
//User clicks at: 115, 7 in 'Scope'
SeS('Scope').DoLClick(115, 7);
//DropDown item selected:'Personnel number'
SeS('DropDown').DoSelectItem("Personnel number");
```

  - **Lookup field** consists of an edit box, open button and a dropdown table. This is the case when Rapise can record edit box interaction only. To make a choice from the table learn open button and then learn the table.



Account type: Active Directory user

Default company: DAT

Enabled:

Current partition is default partition:

External:

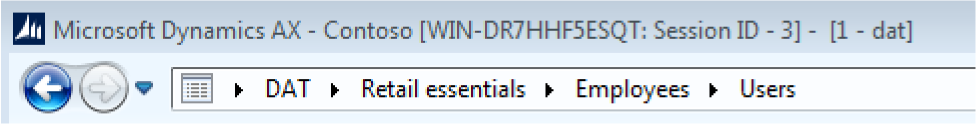
Company	Company name
DAT	Company accounts d...

This is the code to lookup a value:

```
// Press open button
SeS('Default_company_lookup_button').DoClick();
// In the first column select a cell with value 'DAT'
SeS('Grid').DoClickCell("DAT", 0);

// Or alternatively select the first row in the first column
SeS('Grid').DoClickCell(0, 0);```
```

Address Bar

Learn the address bar control using `Ctrl-2` shortcut.



Microsoft Dynamics AX - Contoso [WIN-DR7HHF5ESQT: Session ID - 3] - [1 - dat]

DAT ▸ Retail essentials ▸ Employees ▸ Users

Set the path using `DoSetText` action in your code:

```
SeS('AddressBarContainer').DoSetText('DAT/Retail
essentials/Employees/Users');
```

Menu

Rapise supports both recording and learning of the main menu. When recording make sure you click on every component along the path. E.g. you want to navigate to `File > View > Modules > General ledger`. During recording click on `File`, `View`, `Modules` and`General ledger`. Generated code looks like:

```
//Menu item selected:'General ledger'
SeS('File').DoMenu("File;View;Modules;General ledger");
```

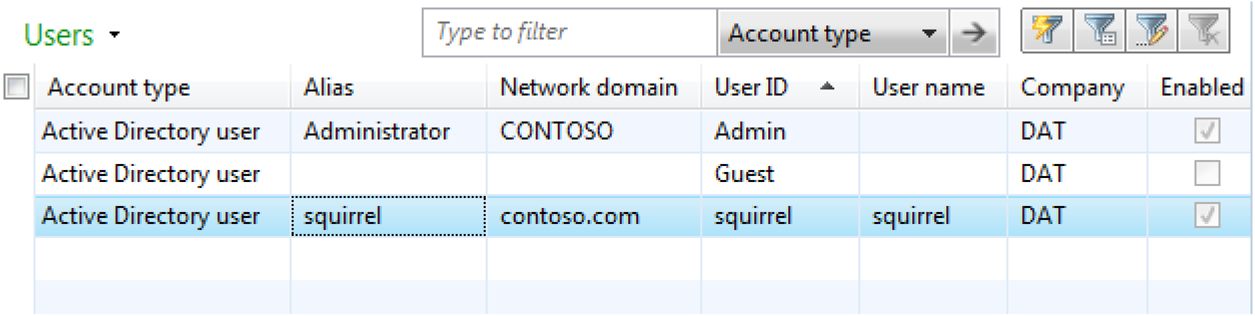
Rapise captures menu as top level object (`File` in the example above). Notice that menu path components are separated with `;`.

If you want for example to open the menu `File > Tools > Telephone list` then write:

```
SeS('File').DoMenu("File;Tools;Telephone list");
```

Table

To work with a table/grid learn it first and then write the code.



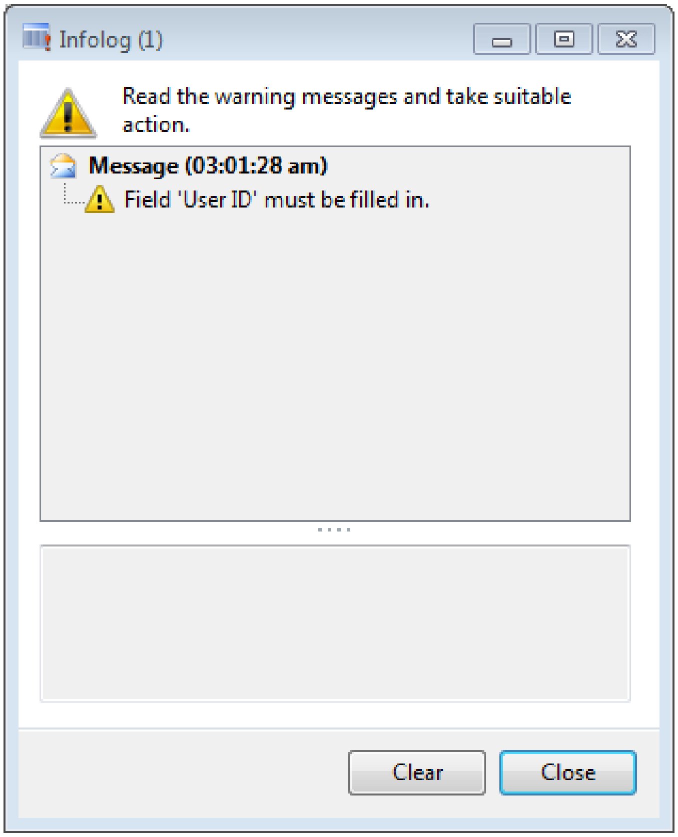
☐ Account type	Alias	Network domain	User ID	User name	Company	Enabled
Active Directory user	Administrator	CONTOSO	Admin		DAT	☑
Active Directory user			Guest		DAT	☐
Active Directory user	squirrel	contoso.com	squirrel	squirrel	DAT	☑

```
// To click on the cell at first column and first row
// First column contains checkboxes. First row is 'Administrator' record.
SeS('Grid').DoClickCell(0, 0);
```

```
// To click on 'contoso.com' in 'Network domain' column
SeS('Grid').DoClickCell("contoso.com", "Network domain");

// Get column name by index (returns 'Network domain')
var columnName = SeS('Grid').GetColumnName(3);

// Click on column header (clicks on the checkbox to select all rows in the
table)
SeS('Grid').DoClickColumn(0);
```

Infolog

In some case Dynamics AX can report an error using Infolog window.



Read the warning messages and take suitable action.

Message (03:01:28 am)

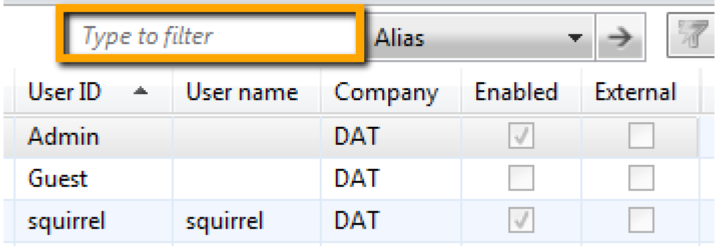
Field 'User ID' must be filled in.

To obtain text of the messages in this window learn the Tree object - place cursor over the error text and press `Ctrl-2` shortcut. In the case of infolog tree - all tree nodes are immediate children of the root. So in the example shown on the image above the tree contains two child nodes of the tree node.

```
// Get the number of messages in the infolog.
// For the presented example it returns 2.
var messageCount = SeS('Tree').GetChildrenCount();
// Get second message text, returns "Field 'User ID' must be filled in."
var messageText = SeS('Tree').GetNodeText(1);
```

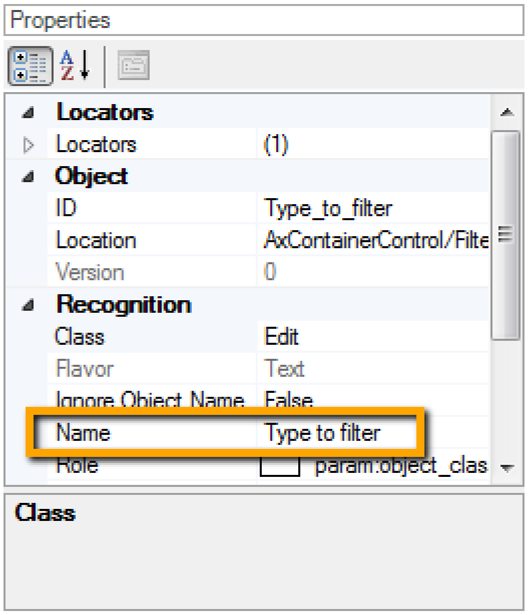
Type to filter Field

Almost each standard grid in Dynamics AX has a text field for filterring grid data.



User ID	User name	Company	Enabled	External
Admin		DAT	☑	□
Guest		DAT	□	□
squirrel	squirrel	DAT	☑	□

When you learn this field it has a name `Type to filter`.

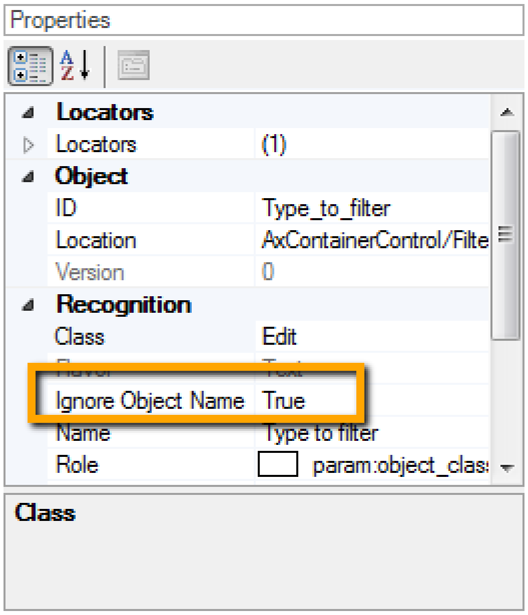


Properties

Locators	
Locators	(1)
Object	
ID	Type_to_filter
Location	AxContainerControl/Filte
Version	0
Recognition	
Class	Edit
Flavor	Text
Ignore Object Name	False
Name	Type to filter
Role	param:object_clas

Class

However when this field gets focus it's name changes to `Text box`. To enable Rapise to find this field during playback set `Ignore Object Name` property of the object to `True`.



Properties

Locators	
Locators	(1)
Object	
ID	Type_to_filter
Location	AxContainerControl/Filte
Version	0
Recognition	
Class	Edit
Flavor	Text
Ignore Object Name	True
Name	Type to filter
Role	param:object_clas:

Class

1.8. Dynamics AX Useful Tips & Tricks

Maximize/Minimize/Restore Window

You can maximize a window using any object inside it as a starting point.

```
SeS('AddressBarContainer').getDesktopWindow().Maximized = true;
```

To minimize use

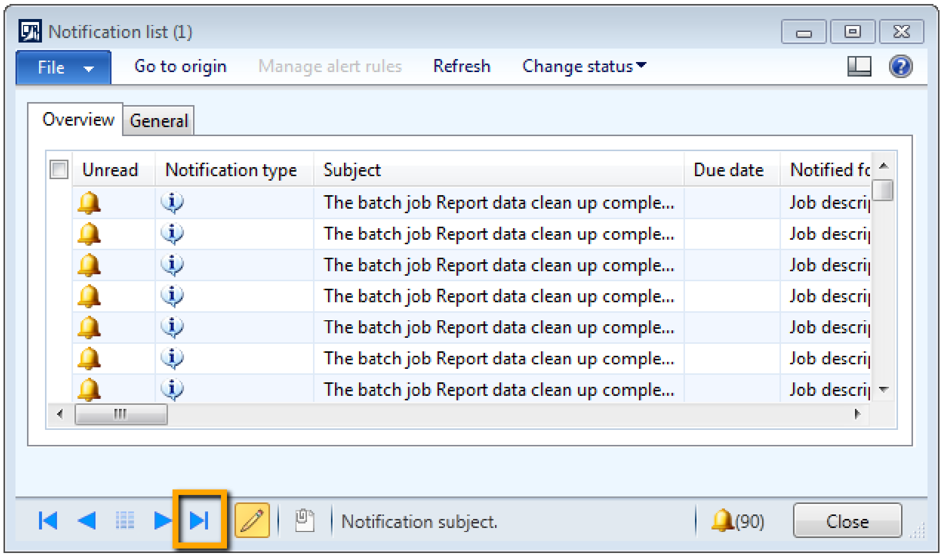
```
SeS('AddressBarContainer').getDesktopWindow().Maximized = false;
// or
SeS('AddressBarContainer').getDesktopWindow().Iconic = true;
```

For restoring (to go back to a smaller window from maximized or minimized state) use

```
SeS('AddressBarContainer').getDesktopWindow().Iconic = false;
```

Scroll to the Bottom of a Grid

If your grid looks like this and you want to scroll to the last record of it learn the `Last Record` button and click on it during test playback:

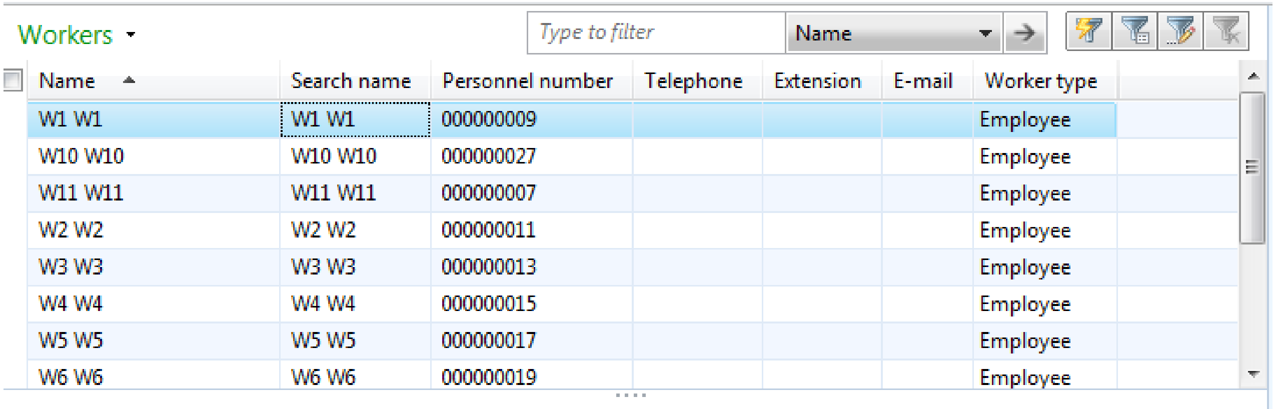


□ Unread	Notification type	Subject	Due date	Notified fc
🔔	ℹ	The batch job Report data clean up comple...		Job descri
🔔	ℹ	The batch job Report data clean up comple...		Job descri
🔔	ℹ	The batch job Report data clean up comple...		Job descri
🔔	ℹ	The batch job Report data clean up comple...		Job descri
🔔	ℹ	The batch job Report data clean up comple...		Job descri
🔔	ℹ	The batch job Report data clean up comple...		Job descri
🔔	ℹ	The batch job Report data clean up comple...		Job descri

```
SeS('Last_Record').DoAction();
// or
SeS('Last_Record').DoClick();
```

Scroll and Click on a Cell in a Grid

If you know the value of a cell in a grid then Rapise will automatically scroll the grid before clicking:



□ Name	Search name	Personnel number	Telephone	Extension	E-mail	Worker type
W1 W1	W1 W1	000000009				Employee
W10 W10	W10 W10	000000027				Employee
W11 W11	W11 W11	000000007				Employee
W2 W2	W2 W2	000000011				Employee
W3 W3	W3 W3	000000013				Employee
W4 W4	W4 W4	000000015				Employee
W5 W5	W5 W5	000000017				Employee
W6 W6	W6 W6	000000019				Employee

Let's assume that you want to click on a cell with value `W9 W9` in a column `Search name`. This cell is not visible on the picture and requires scrolling to show up. The following code performs the click:

```
SeS('Grid').DoClickCell("W9 W9", "Search name");
```

If you do not know the value of a cell you can get it this way:

```
var cellValue = SeS('Grid').GetCell(9, "Search name");
```

Where 9 is row number.

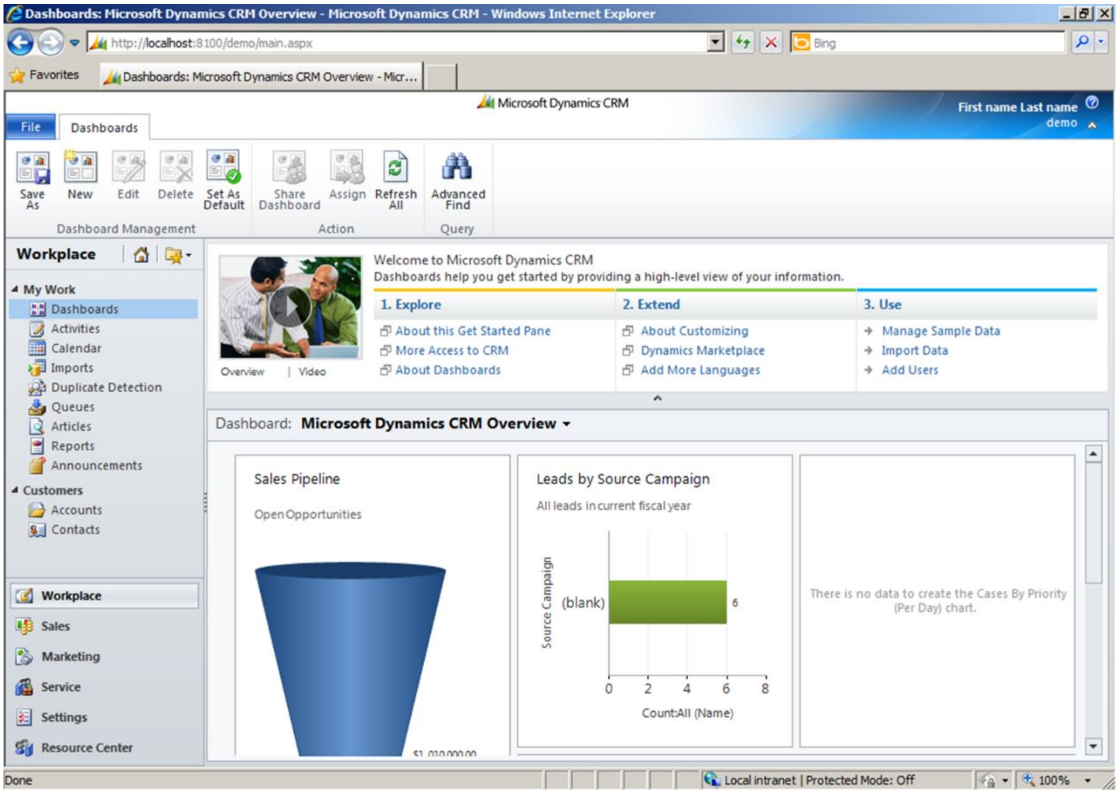
1.9. References

1. Rapise home page: https://www.inflectra.com/Rapise/
2. Contact Inflectra: https://www.inflectra.com/Company/Contact-Us.aspx

2. Testing Dynamics CRM

Microsoft Dynamics CRM is a customer relationship management application from Microsoft, that provides sales, service, and marketing capabilities. Microsoft sells Microsoft Dynamics CRM separately from the ERP products. CRM is available either as on-premises software or as a software-as-a-service offering called "Microsoft Dynamics CRM Online".

Rapise can be used to test installations of Dynamics CRM both on premise and cloud hosted.



Dashboards: Microsoft Dynamics CRM Overview - Microsoft Dynamics CRM - Windows Internet Explorer

http://localhost:8100/demo/main.aspx

Welcome to Microsoft Dynamics CRM

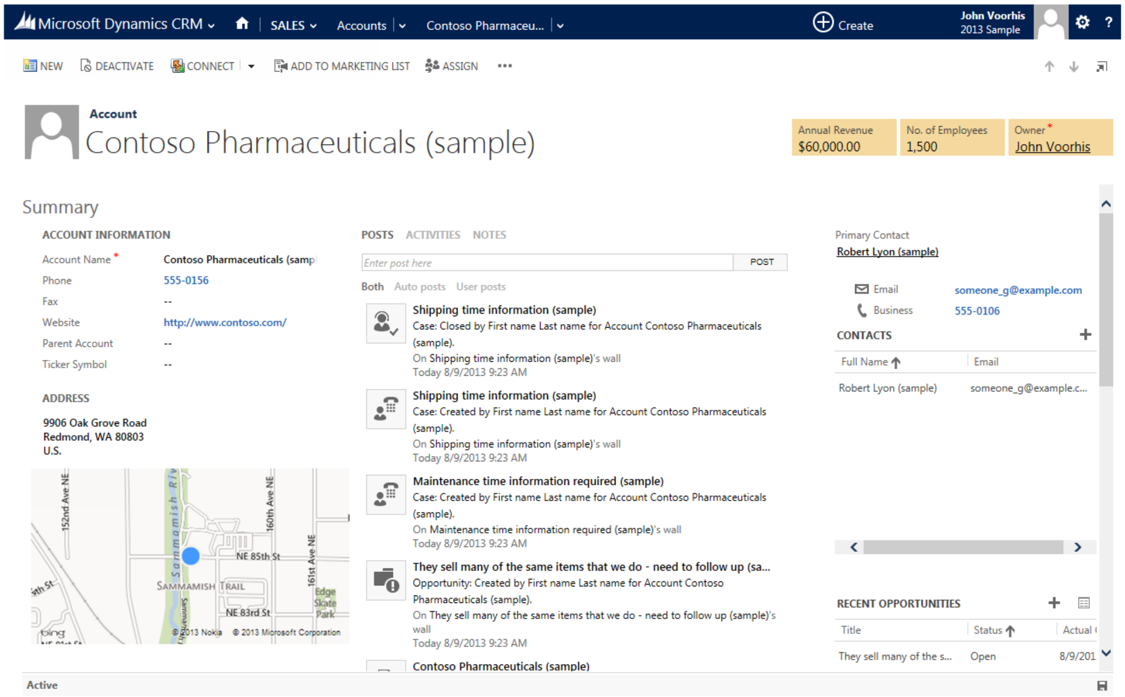
Dashboards help you get started by providing a high-level view of your information.

Dashboard: Microsoft Dynamics CRM Overview

There is no data to create the Cases By Priority (Per Day) chart.

Both versions of Dynamics CRM (server and online) are completely web-based and use a web browser to access the user interface. Therefore when recording a test using Rapise, you use the same web browser libraries that you use to record other web tests:

- Most of the Dynamics CRM user interface will be tested using the standard browser library for your web browser of choice (e.g. Internet Explorer HTML, Firefox HTML, and Chrome HTML).



Contoso Pharmaceuticals (sample)

Annual Revenue	No. of Employees	Owner*
$60,000.00	1,500	John Voorhis

Summary

ACCOUNT INFORMATION

Account Name*	Contoso Pharmaceuticals (samp
Phone	555-0156
Fax	--
Website	http://www.contoso.com/
Parent Account	--
Ticker Symbol	--

ADDRESS

9906 Oak Grove Road
Redmond, WA 80803
U.S.

Shipping time information (sample)
Case: Closed by First name Last name for Account Contoso Pharmaceuticals (sample).
On Shipping time information (sample)'s wall
Today 8/9/2013 9:23 AM

Shipping time information (sample)
Case: Created by First name Last name for Account Contoso Pharmaceuticals (sample).
On Shipping time information (sample)'s wall
Today 8/9/2013 9:23 AM

Maintenance time information required (sample)
Case: Created by First name Last name for Account Contoso Pharmaceuticals (sample).
On Maintenance time information required (sample)'s wall
Today 8/9/2013 9:23 AM

They sell many of the same items that we do - need to follow up (sa...
Opportunity: Created by First name Last name for Account Contoso Pharmaceuticals (sample).
On They sell many of the same items that we do - need to follow up (sample)'s wall
Today 8/9/2013 9:23 AM

Contoso Pharmaceuticals (sample)

Primary Contact
Robert Lyon (sample)

Email	someone_g@example.com
Business	555-0106

CONTACTS

Full Name	Email
Robert Lyon (sample)	someone_g@example.c...

RECENT OPPORTUNITIES

Title	Status	Actual
They sell many of the s...	Open	8/9/201

Active

In addition, there are special controls inside CRM that Rapise has specialized support for. For that reason, you'll also see the DomDynamicsCrm library added to your test as well as the browser one. This **DomDynamicsCrm** library adds additional rules that identify certain CRM objects to make testing easier.

2.1. Recording a Dynamics CRM Test

Both versions of Dynamics CRM (server and online) are completely web-based and use a web browser to access the user interface. Therefore when recording a test using Rapise, you use the same web browser libraries that you use to record other web tests:

- Most of the Dynamics CRM user interface will be tested using the **standard browser library** for your web browser of choice (e.g. Internet Explorer HTML, Firefox HTML, and Chrome HTML).
- In addition, there are special controls inside CRM that Rapise has specialized support for. For that reason you'll also see the `DomDynamicsCrm` library added to your test as well as the browser one. This **DomDynamicsCrm** library adds additional rules that identify certain CRM objects to make testing easier.

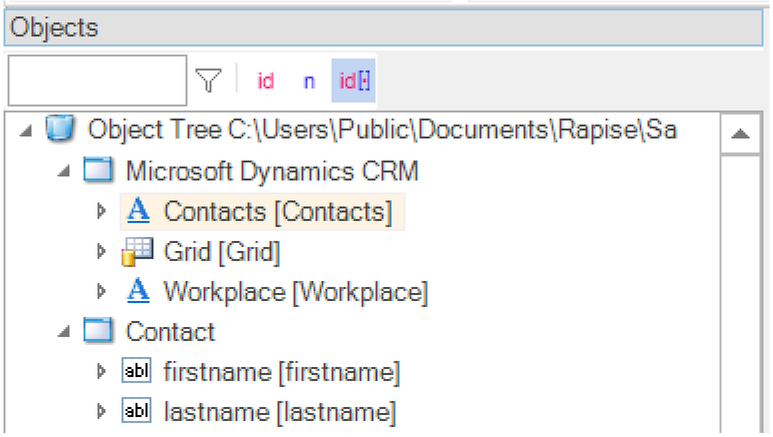
When you record your first test, you'll see the following library selection code generated automatically by Rapise:

```
g_load_libraries=["%g_browserLibrary:Internet Explorer HTML%",
"DomDynamicsCrm"];
```

If you don't see the **DomDynamicsCrm** library listed in your test, then you will need to manually add it.

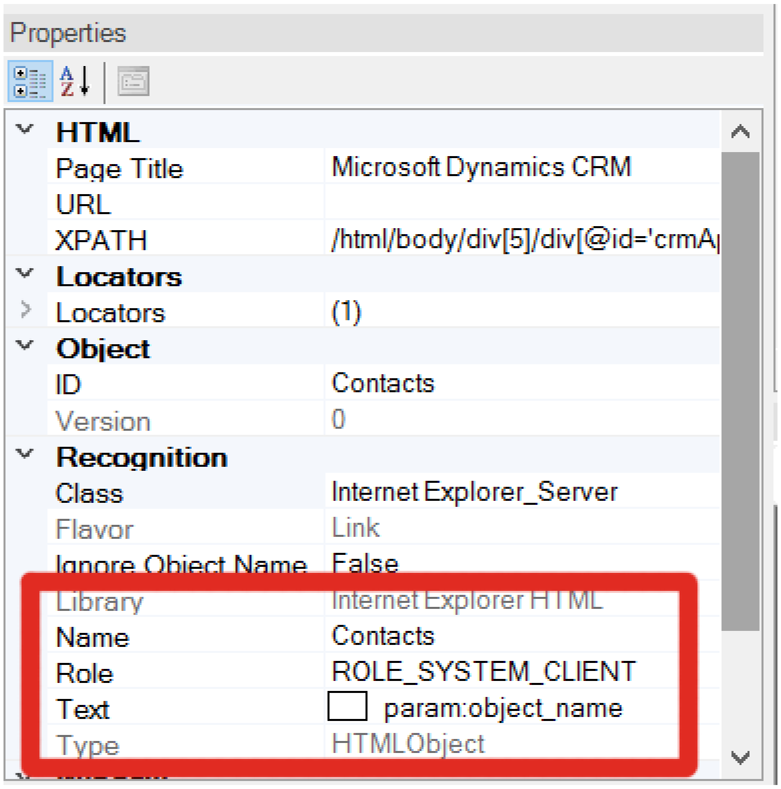
2.2. Recording and Learning Objects

During recording while you interact with Dynamics CRM, Rapise captures actions and displays them in the recording dialog:



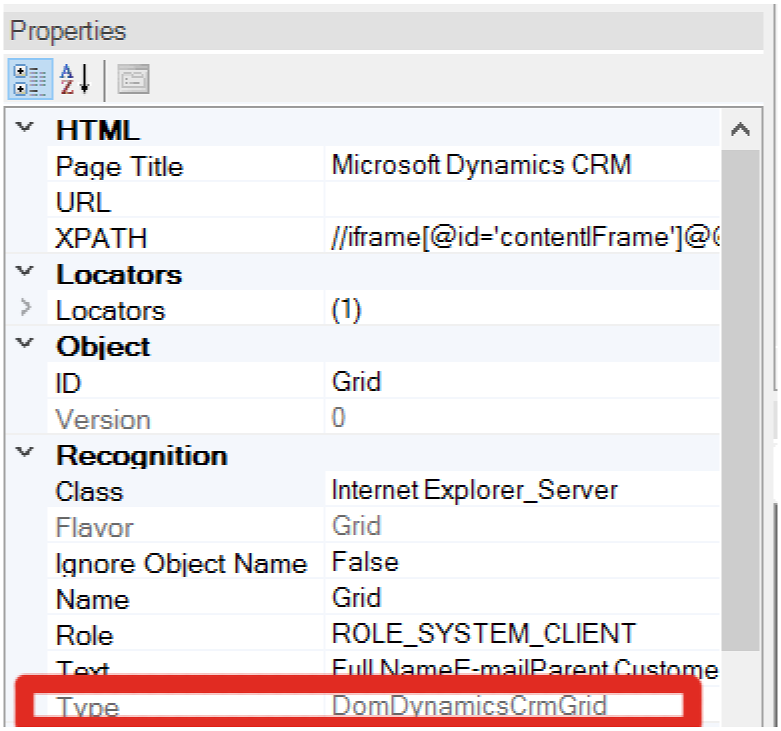
- Object Tree C:\Users\Public\Documents\Rapise\Sa
  - Microsoft Dynamics CRM
    - Contacts [Contacts]
    - Grid [Grid]
    - Workplace [Workplace]
  - Contact
    - firstname [firstname]
    - lastname [lastname]

Some of these objects will be standard HTML DOM objects (e.g. hyperlink):



HTML	
Page Title	Microsoft Dynamics CRM
URL	
XPATH	/html/body/div[5]/div[@id='crmA
Locators	
Locators	(1)
Object	
ID	Contacts
Version	0
Recognition	
Class	Internet Explorer_Server
Flavor	Link
Ignore Object Name	False
Library	Internet Explorer HTML
Name	Contacts
Role	ROLE_SYSTEM_CLIENT
Text	□ param:object_name
Type	HTMLObject

and others will be specific to Dynamics CRM:



Properties

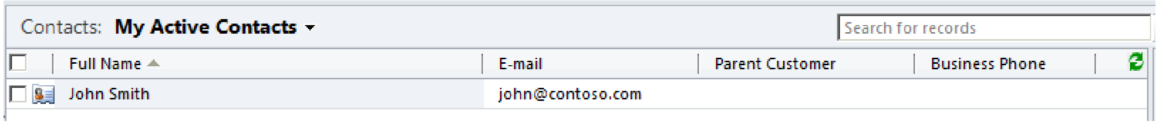
HTML	
Page Title	Microsoft Dynamics CRM
URL	
XPATH	//iframe[@id='contentIFrame']@(
Locators	
Locators	(1)
Object	
ID	Grid
Version	0
Recognition	
Class	Internet Explorer_Server
Flavor	Grid
Ignore Object Name	False
Name	Grid
Role	ROLE_SYSTEM_CLIENT
Text	Full NameE-mailParent Custome
Type	DomDynamicsCrmGrid

2.3. Tips for Interacting with Objects

The following unique objects are available within Dynamics CRM that Rapise has special support for:

Dynamics CRM Grid

One of the most important UI elements inside Dynamics CRM is the sortable, filterable grid:



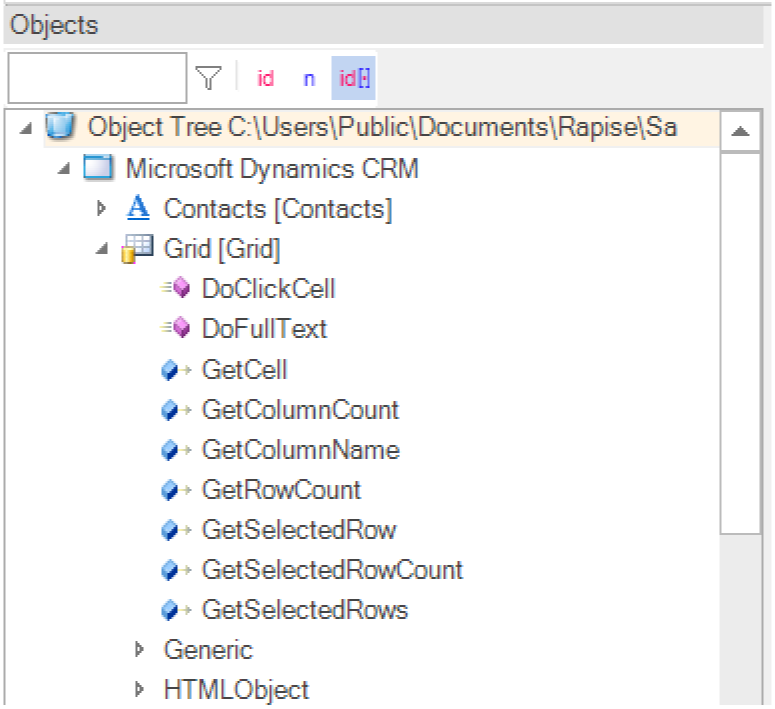
Contacts: **My Active Contacts**

Search for records

□	Full Name	E-mail	Parent Customer	Business Phone
□	John Smith	john@contoso.com		

The Dynamics CRM Grid is used in lots of different screens inside Dynamics CRM (e.g. Contacts, Accounts, etc.) and it is very common to need to interact with it in test scripts.

When you record operations on such a grid or simply learn the entire grid using **CTRL+2** you will learn the DynamicsCrmGrid object:



Objects

id n id[]

- Object Tree C:\Users\Public\Documents\Rapise\Sa
  - Microsoft Dynamics CRM
    - Contacts [Contacts]
    - Grid [Grid]
      - DoClickCell
      - DoFullText
      - GetCell
      - GetColumnCount
      - GetColumnName
      - GetRowCount
      - GetSelectedRow
      - GetSelectedRowCount
      - GetSelectedRows
    - Generic
    - HTMLObject

In additional to the standard HTML object methods and properties, you have the following special functions that you can perform on the grid:

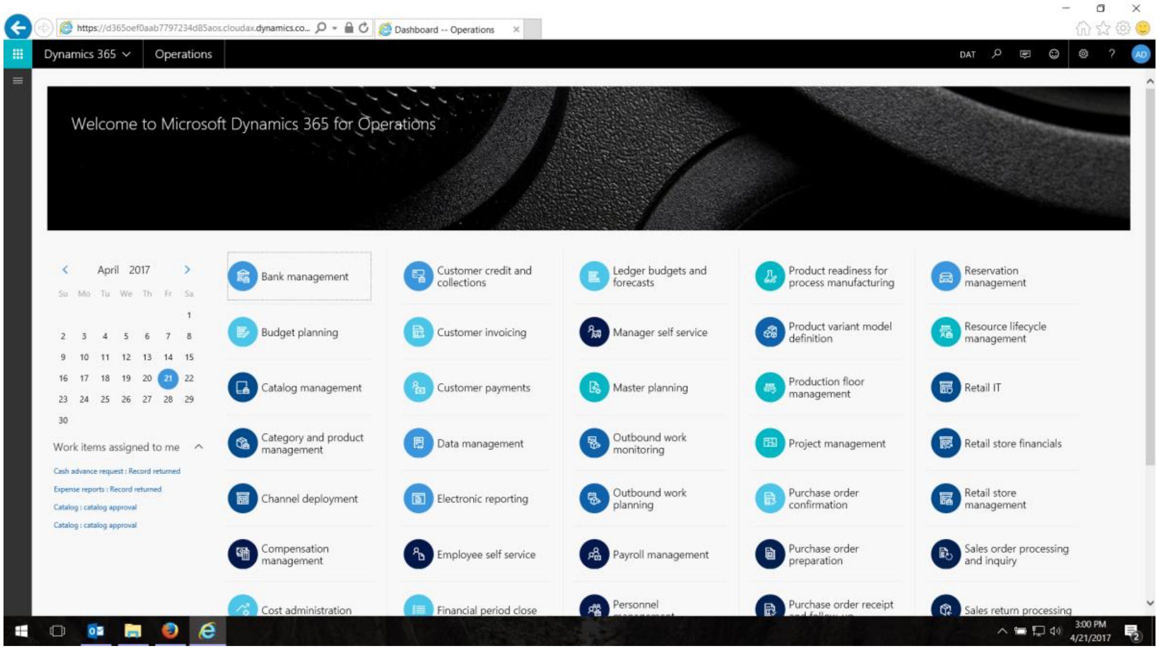
- **DoClickCell()** - Clicks the specified cell when you specify the x-index, y-index, the type of click (left-click, right-click, etc.)
- **DoFullText()** - Returns the textual representation of the entire table
- **GetCell** - Gets the text of the specified cell.
- **GetColumnCount** - Gets the number of columns in grid
- **GetColumnName** - Gets the caption of a column.
- **GetRowCount** - Gets the number of rows in grid
- **GetSelectedRow** - Gets the index of the selected row.
- **GetSelectedRowCount** - Gets the number of selected rows.
- **GetSelectedRows** - Gets the selected rows.

3. Testing Dynamics 365

Microsoft has created a new cloud-based SaaS-only combined ERP/CRM solution called **Microsoft Dynamics 365**. This provides a new web-based version of Dynamics AX (renamed Dynamics 365 for Operations), combined with a new web based version of Dynamics NAV (called Dynamics 365 for Financials) and an updated Microsoft Dynamics CRM Online.

This new integrated, ERP/CRM is provided solely through Microsoft Azure and is completely web-based. There are two main modules that Rapise has specialized support for:

1. **Dynamics 365 for Operations** – this is the subject of this section, please read on if you are testing these modules.
2. **Dynamics 365 for Sales** – this is a rebrand of Dynamics CRM and is covered in section 2 above.


https://d365oef0aab7797234d85aos.cloudax.dynamics.co...
Dashboard -- Operations
Dynamics 365
Operations
DAT
Welcome to Microsoft Dynamics 365 for Operations
April 2017
Su Mo Tu We Th Fr Sa
Work items assigned to me
Cash advance request : Record returned
Expense reports : Record returned
Catalog : catalog approval
Catalog : catalog approval
Bank management
Budget planning
Catalog management
Category and product management
Channel deployment
Compensation management
Cost administration
Customer credit and collections
Customer invoicing
Customer payments
Data management
Electronic reporting
Employee self service
Financial period close
Ledger budgets and forecasts
Manager self service
Master planning
Outbound work monitoring
Outbound work planning
Payroll management
Personnel management
Product readiness for process manufacturing
Product variant model definition
Production floor management
Project management
Purchase order confirmation
Purchase order preparation
Purchase order receipt and follow-up
Reservation management
Resource lifecycle management
Retail IT
Retail store financials
Retail store management
Sales order processing and inquiry
Sales return processing
3:00 PM
4/21/2017

3.1. Recording a Dynamics 365 for Operations Test

Dynamics 365 for Operations is completely web-based (unlike Dynamics AX) and you use a web browser to access the user interface. Therefore when recording a test using Rapise, you use the same web browser libraries that you use to record other web tests:

- Most of the Dynamics 365 user interface will be tested using the **standard browser library** for your web browser of choice (e.g. Internet Explorer HTML, Firefox HTML, and Chrome HTML).
- In addition, there are special controls inside Dynamics 365 that Rapise has specialized support for. For that reason you'll also see the `DomDynamicsAx` library added to your test as well as the browser one. This **DomDynamicsAx** library adds additional rules that identify certain Dynamics 365 objects to make testing easier.

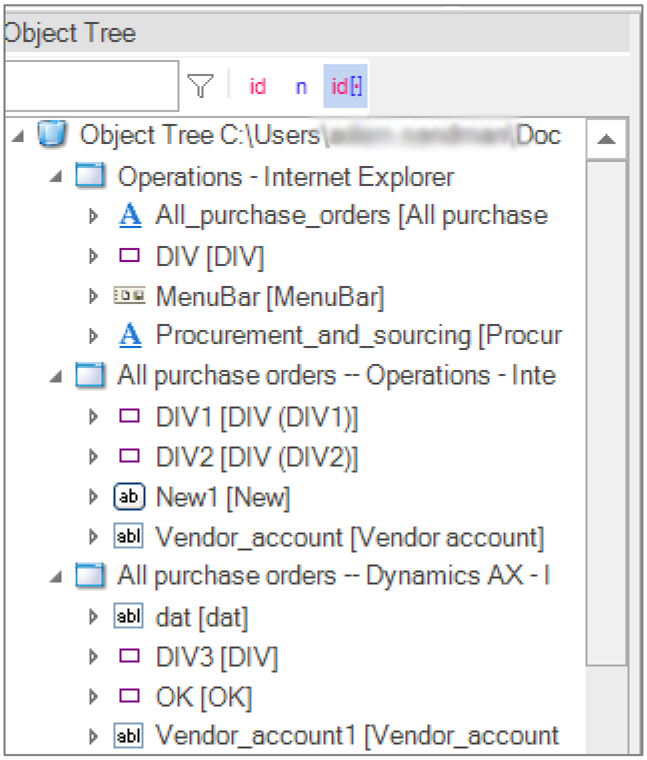
When you record your first test, you'll see the following library selection code generated automatically by Rapise:

```
g_load_libraries=["%g_browserLibrary:Internet Explorer HTML%",
"DomDynamicsAx"];
```

If you don't see the **DomDynamicsAx** library listed in your test, then you will need to manually add it.

3.2. Recording and Learning Objects

During recording while you interact with Dynamics 365, Rapise captures actions and displays them in the recording dialog:

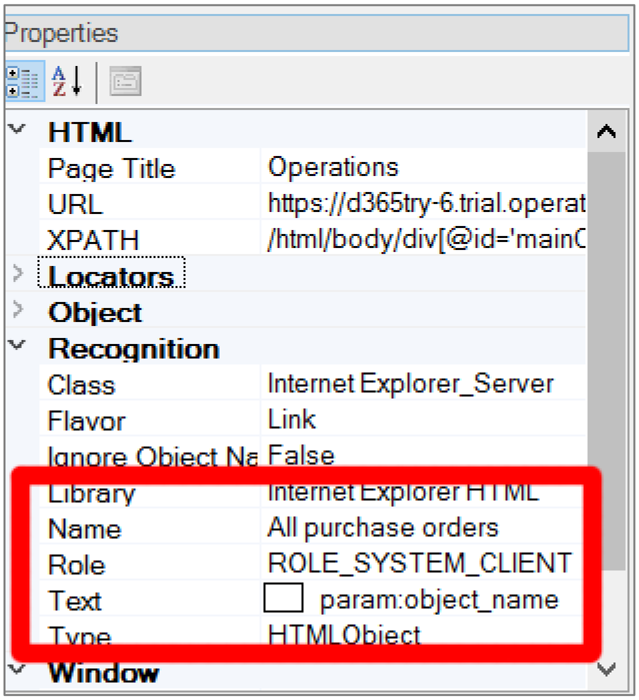


Object Tree

id n id[]

- Object Tree C:\Users\[redacted]\Doc
  - Operations - Internet Explorer
    - All_purchase_orders [All purchase
    - DIV [DIV]
    - MenuBar [MenuBar]
    - Procurement_and_sourcing [Procur
  - All purchase orders -- Operations - Inte
    - DIV1 [DIV (DIV1)]
    - DIV2 [DIV (DIV2)]
    - New1 [New]
    - Vendor_account [Vendor account]
  - All purchase orders -- Dynamics AX - I
    - dat [dat]
    - DIV3 [DIV]
    - OK [OK]
    - Vendor_account1 [Vendor_account

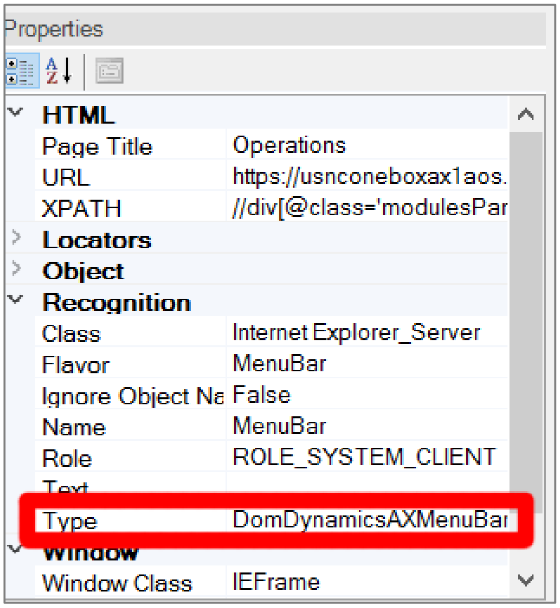
Some of these objects will be standard HTML DOM objects (e.g. hyperlink):



Properties

HTML	
Page Title	Operations
URL	https://d365try-6.trial.operat
XPATH	/html/body/div[@id='mainC
Locators	
Object	
Recognition	
Class	Internet Explorer_Server
Flavor	Link
Ignore Object Na	False
Library	Internet Explorer HTML
Name	All purchase orders
Role	ROLE_SYSTEM_CLIENT
Text	□ param:object_name
Type	HTMLObject
Window	

and others will be specific to Dynamics 365:

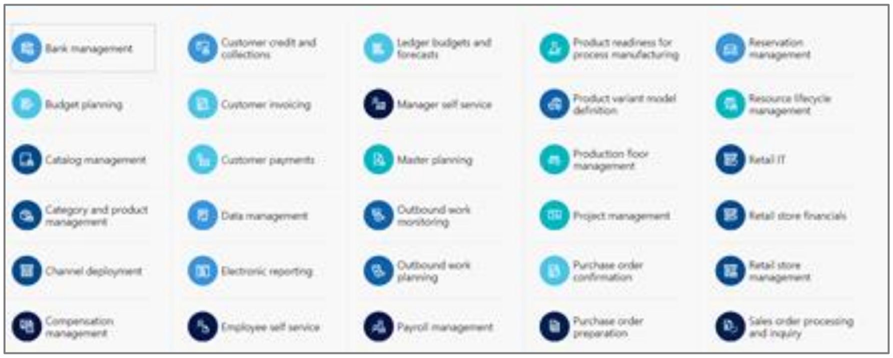


Properties

HTML	
Page Title	Operations
URL	https://usnconeboxax1aos.
XPATH	//div[@class='modulesPar
Locators	
Object	
Recognition	
Class	Internet Explorer_Server
Flavor	MenuBar
Ignore Object Na	False
Name	MenuBar
Role	ROLE_SYSTEM_CLIENT
Text	
Type	DomDynamicsAXMenuBar
Window	
Window Class	IEFrame

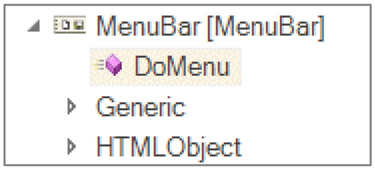
3.3. Tips for Interacting with Objects

One of the most important UI elements inside Dynamics 365 is the multi-level menu bar:



The Dynamics 365 menu bar is used to quickly and easily navigate between different parts of the application and it is very common to need to interact with it in test scripts.

When you click on entries in the menu bar or simply learn the entire menu using **CTRL+2** you will learn the **DomDynamicsAXMenuBar** object:



In additional to the standard HTML object methods and properties, you have the following special functions that you can perform on the grid:

- **DoMenu(path, separator)** – selects the menu entries in specified path, using the specified separator (or semicolon if none specified).

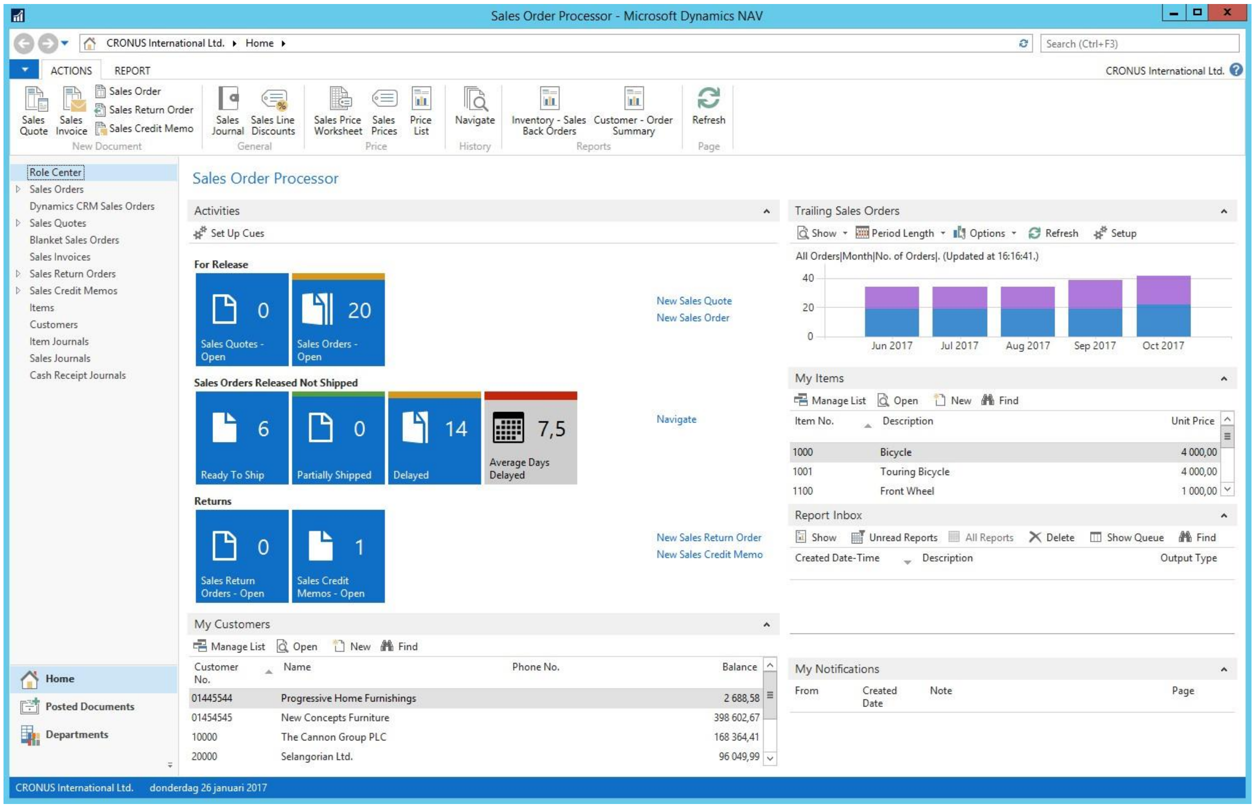
Here is a sample test that was recorded using Dynamics 365 for Operations and Rapise:

```
function Test()
{
      //Get the sample data from the database
      var conn = 'Provider=Microsoft.ACE.OLEDB.12.0;Data
Source=SampleData.accdb';
      var sql = 'SELECT TEST_VALUE FROM TEST_DATA';
      Database.DoAttach(conn, sql);
      do
      {
            var testValue = Database.GetValue('TEST_VALUE');
            if (testValue)
            {
                  SeS('MenuBar').DoMenu("Modules;Procurement and
sourcing;Purchase orders;All purchase orders");
                  StartNewPurchaseOrder();
                  FillPurchaseOrderForm(testValue);
      SeS('MenuBar').DoMenu('', '');
            }
      }
      while (Database.DoSequential())
 }

g_load_libraries=["%g_browserLibrary:Internet Explorer HTML%",
"DomDynamicsAX"];


/** @scenario StartNewPurchaseOrder*/
function StartNewPurchaseOrder()
{
      Global.DoWaitFor('New1');
      SeS('New1').DoClick();
}

/** @scenario FillPurchaseOrderForm*/
function FillPurchaseOrderForm(data)
{
      Global.DoWaitFor('DIV1');
      SeS('DIV1').DoClick();
      SeS('DIV2').DoClick();

      //Click on DIV
      SeS('DIV3').DoClick();
      //Learned Vendor account
      SeS('Vendor_account1').DoClick( );
      //Set Text datss in datss
      SeS('dat').DoSetText(data);
      SeS('OK').DoClick();
}
```

4. Testing Dynamics NAV

4.1. Overview

Microsoft Dynamics NAV (formerly Navision) is an enterprise resource planning (ERP) software suite for midsize organizations. The system offers specialized functionality for manufacturing, distribution, government, retail, and other industries. Microsoft Dynamics NAV offers applications for financial management, human resources management, manufacturing, multiple and international sites, project management, sales and marketing, service management, supply chain management and business intelligence. The functionality is particularly designed for manufacturing and distribution sector.



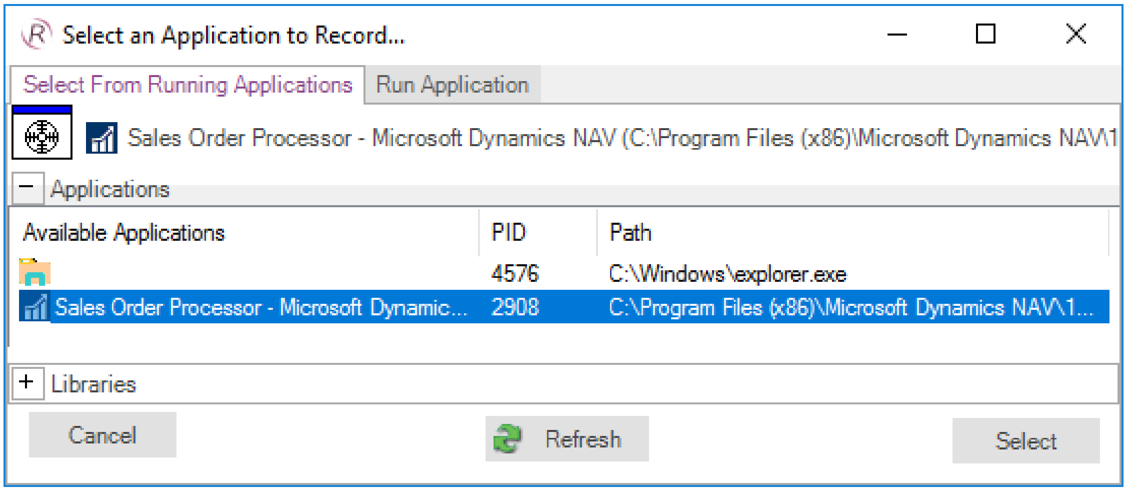
Customer No.	Name	Phone No.	Balance
01445544	Progressive Home Furnishings		2 688,58
01454545	New Concepts Furniture		398 602,67
10000	The Cannon Group PLC		168 364,41
20000	Selangorian Ltd.		96 049,99

Item No.	Description	Unit Price
1000	Bicycle	4 000,00
1001	Touring Bicycle	4 000,00
1100	Front Wheel	1 000,00

Rapise includes specialized libraries for testing Dynamics NAV applications that are built-upon the standard Microsoft Windows **UIAutomation** library with special extensions added to its **DynamicsNav** library capable of handling unique NAV controls such as the various grids used to edit data.

4.2. Start Recording a New Test

First you need to create a new Basic test and start recording session. Choose Dynamics NAV from the list of applications:

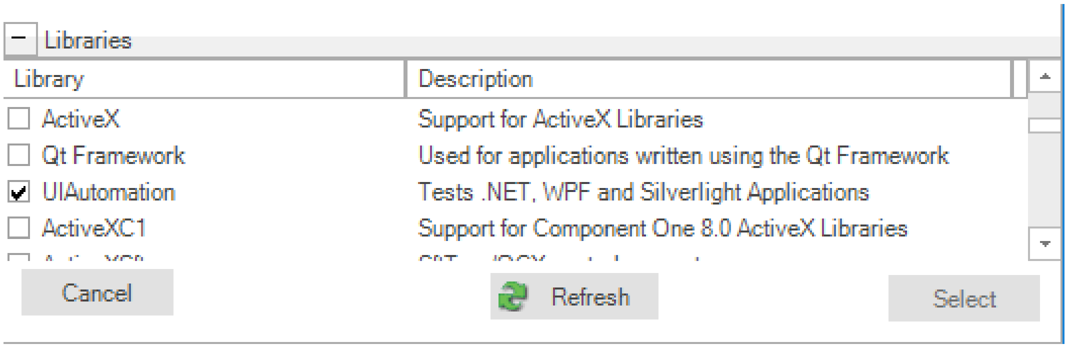

Select an Application to Record...
Select From Running Applications
Run Application
Applications
Libraries
Cancel
Refresh
Select

Sales Order Processor - Microsoft Dynamics NAV (C:\Program Files (x86)\Microsoft Dynamics NAV\1

Available Applications	PID	Path
	4576	C:\Windows\explorer.exe
Sales Order Processor - Microsoft Dynamic...	2908	C:\Program Files (x86)\Microsoft Dynamics NAV\1...

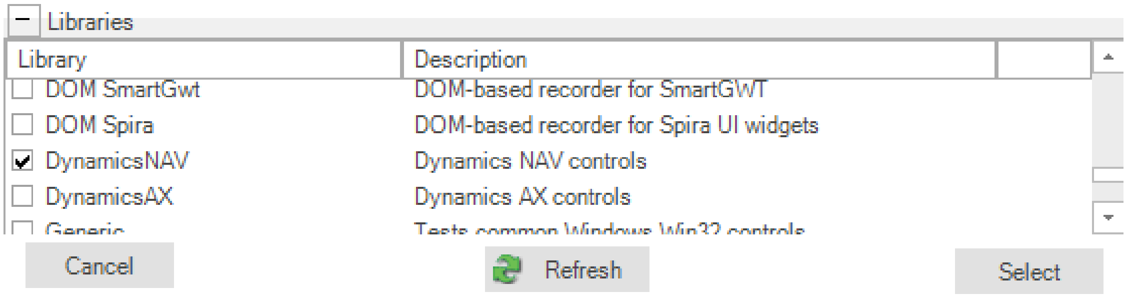
Application Chooser Dialog

Then expand the list of `libraries` and select `UIAutomation` and `DynamicsNAV` libraries.



Library	Description
☐ ActiveX	Support for ActiveX Libraries
☐ Qt Framework	Used for applications written using the Qt Framework
☑ UIAutomation	Tests .NET, WPF and Silverlight Applications
☐ ActiveXC1	Support for Component One 8.0 ActiveX Libraries

UIAutomation Library Selected



Library	Description
☐ DOM SmartGwt	DOM-based recorder for SmartGWT
☐ DOM Spira	DOM-based recorder for Spira UI widgets
☑ DynamicsNAV	Dynamics NAV controls
☐ DynamicsAX	Dynamics AX controls
☐ Generic	Tests common Windows Win32 controls

DynamicsNAV Library Selected

Then press `Select` button to start recording.

- **Microsoft UI Automation** is the new accessibility framework for Microsoft Windows, available on all operating systems that support Windows Presentation Foundation (WPF). UI Automation provides programmatic access to most user interface (UI) elements on the desktop, enabling assistive technology products such as screen readers to provide information about the UI to end users and to manipulate the UI by means other than standard input. UI Automation also allows automated test scripts to interact with the UI.

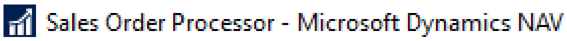
- **DynamicsNAV** library supports set of controls specific to Microsoft Dynamics NAV application.

When recording is completed you can see attached libraries in the code of `test.js` file:

```
g_load_libraries=["UIAutomation", "DynamicsNAV"];
```

4.3. Automatic Adjustment of `Window Title` Object Property

Main window title of Dynamics NAV is dynamic by nature.



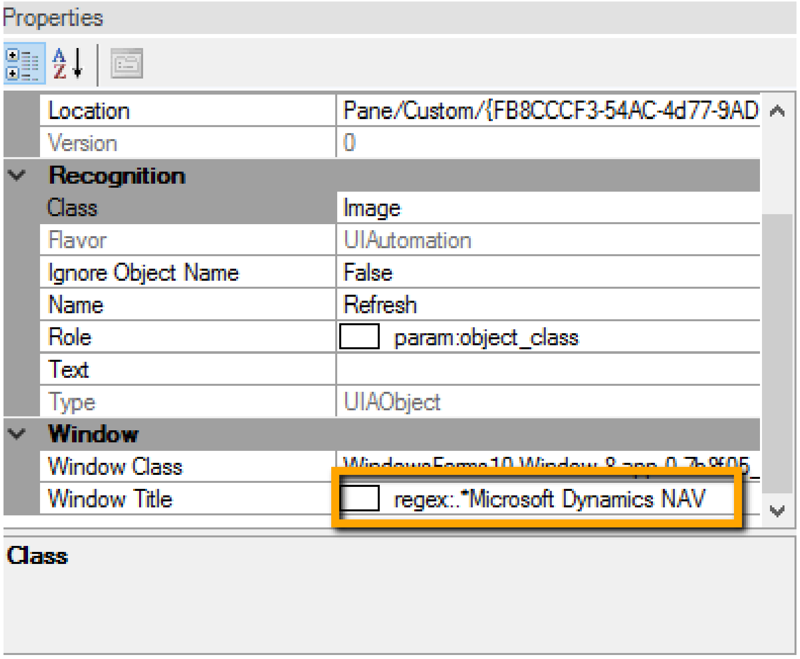
Sales Order Processor - Microsoft Dynamics NAV

DynamicsNAV Main Window Title Example

It may contain not only application name but also name of currently active page or information about currently opened record. So it can be different at the time of test recording and test playback. To cope with this problem replace actual window title with a regular expression in object properties. Here it is:

```
regex:.*Microsoft Dynamics NAV
```

So recorded object properties look like this:



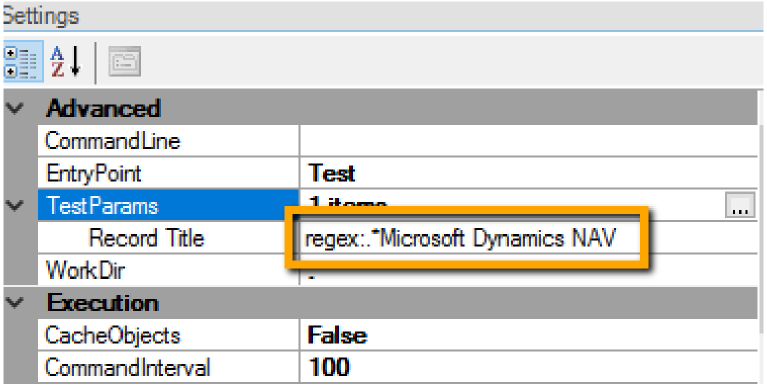
Properties

Location	Pane/Custom/{FB8CCCF3-54AC-4d77-9AD
Version	0
Recognition	
Class	Image
Flavor	UIAutomation
Ignore Object Name	False
Name	Refresh
Role	□ param:object_class
Text	
Type	UIAObject
Window	
Window Class	WindowsForms10.Window.8.app.0.7b8f05_
Window Title	□ regex:.*Microsoft Dynamics NAV

Class

Object Properties

Also adjust `Record Title` in test settings to the same regular expression so you do not need to choose the Dynamics NAV main window during subsequent recording sessions.



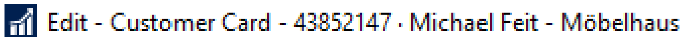
Settings

Advanced	
CommandLine	
EntryPoint	Test
TestParams	1 items
Record Title	regex:.*Microsoft Dynamics NAV
WorkDir	.
Execution	
CacheObjects	False
CommandInterval	100

Test Settings

Titles of Child Windows

Child windows of Dynamics NAV also may have dynamic titles.



Edit - Customer Card - 43852147 · Michael Feit - Möbelhaus

DynamicsNAV Window Title Example

So for child windows you need to write regular as well. But the good news is you need to do this for one object only in every such window. For further learned objects Rapise will change the `window title` property automatically. In other words when Rapise learns a new object and it's `window title` is matched by a regular expression of a previously learned object then the title property is automatically replaced by this regular expression.

4.4. How to Launch Dynamics NAV Client

If in your test you want to check that Dynamics NAV application is installed and running use the code:

```
var fso = new ActiveXObject("Scripting.FileSystemObject");

var pfFolder = Global.GetSpecialFolderPath("ProgramFilesX86");
var dynamicsPath = pfFolder + "\\Microsoft Dynamics NAV\\100\\RoleTailored Cl
ient\\Microsoft.Dynamics.Nav.Client.exe"
if(!fso.FileExists(dynamicsPath))
{
    Tester.Message("Dynamics NAV Client is not installed on this computer");
    return;
}

var windows = g_util.FindWindows("regex:.*Microsoft Dynamics NAV", "regex:Win
dowsForms10.*");
if (windows.length == 0)
{
    Tester.Message("Dynamics NAV Client is not started. Please start it manua
lly and re-run the test.");
```

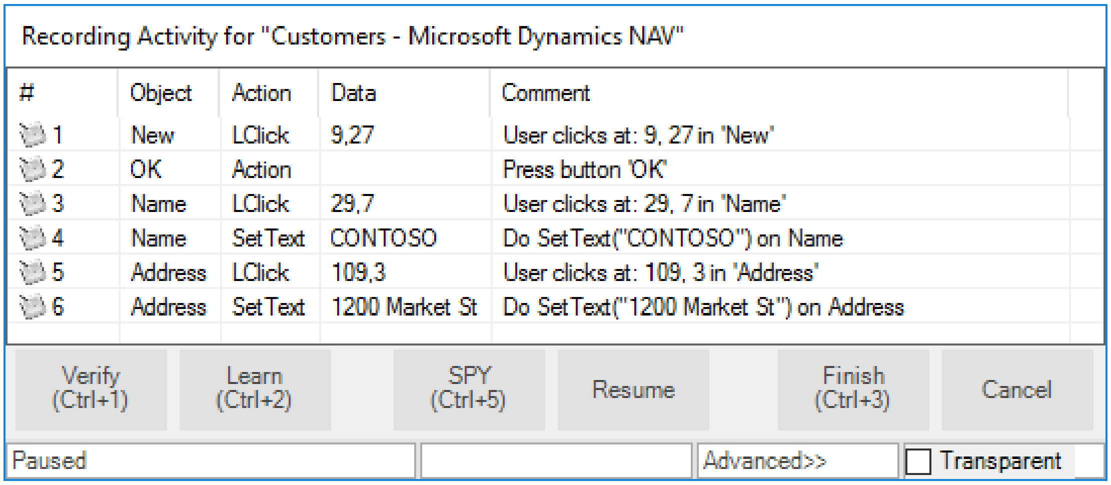
```
    return;
}
```

To start the application use

```
var pfFolder = Global.GetSpecialFolderPath("ProgramFilesX86");
var dynamicsPath = pfFolder + "\\Microsoft Dynamics NAV\\100\\RoleTailored Cl
ient\\Microsoft.Dynamics.Nav.Client.exe"

Global.DoLaunch(dynamicsPath);
```

4.5. Recording Actions and Learning Objects

During recording while you interact with Dynamics NAV controls Rapise captures actions and displays them in the recording dialog.

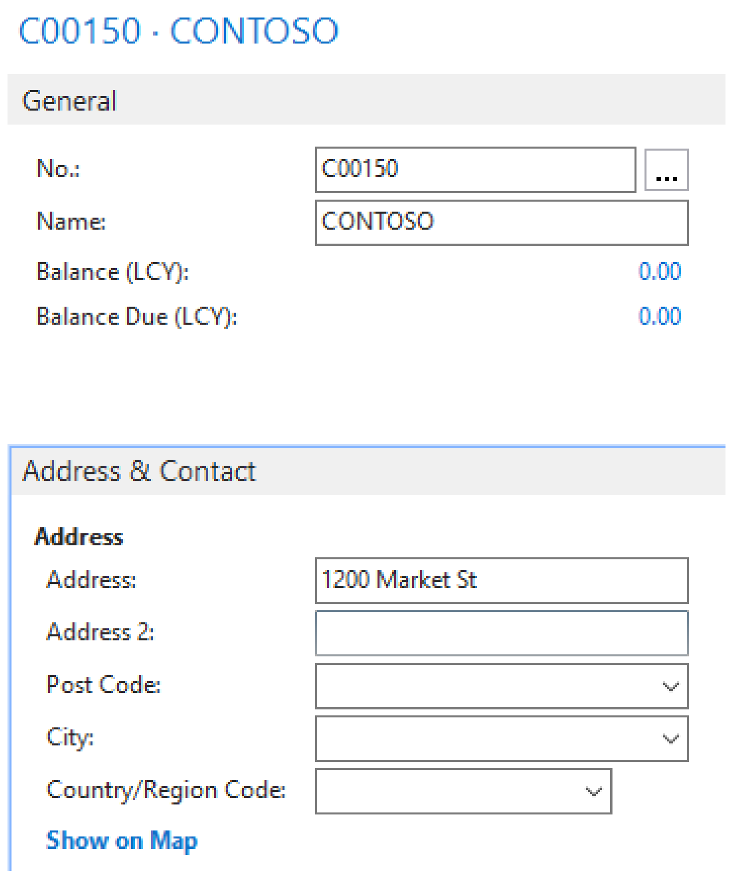


Recording Activity for "Customers - Microsoft Dynamics NAV"

#	Object	Action	Data	Comment
1	New	LClick	9,27	User clicks at: 9, 27 in 'New'
2	OK	Action		Press button 'OK'
3	Name	LClick	29,7	User clicks at: 29, 7 in 'Name'
4	Name	SetText	CONTOSO	Do SetText("CONTOSO") on Name
5	Address	LClick	109,3	User clicks at: 109, 3 in 'Address'
6	Address	SetText	1200 Market St	Do SetText("1200 Market St") on Address

Recording Dialog

After this recording session corresponding UI area looks as follows:



C00150 · CONTOSO

General

No.:	C00150
Name:	CONTOSO
Balance (LCY):	0.00
Balance Due (LCY):	0.00

Address & Contact

Address

Address:	1200 Market St
Address 2:	
Post Code:	
City:	
Country/Region Code:	

Create New Customer

When recording is finished Rapise automatically generates the test code:

```
function Test()
{
    SeS('_New').DoLClick(9, 27);
    SeS('OK').DoAction();
    SeS('Name').DoLClick(29, 7);
    SeS('Name').DoSetText("CONTOSO");
    SeS('Address').DoLClick(109, 3);
    SeS('Address').DoSetText("1200 Market St");
}
```

If Rapise does not capture any interaction or captures it wrongly then try to learn the object. In this case Rapise will add it to the object tree but will not capture the action and you'll add the code to the test manually later. To learn an object during recording session place mouse cursor over it and press `Ctrl-2` shortcut. It makes sense to pause recording before learning objects. This will prevent Rapise from intersecting mouse and keyboard and attempting to record interactions you do. `Pause/Resume` button is located at the right side of the Recording dialog.

4.6. Tips for Interacting with Objects

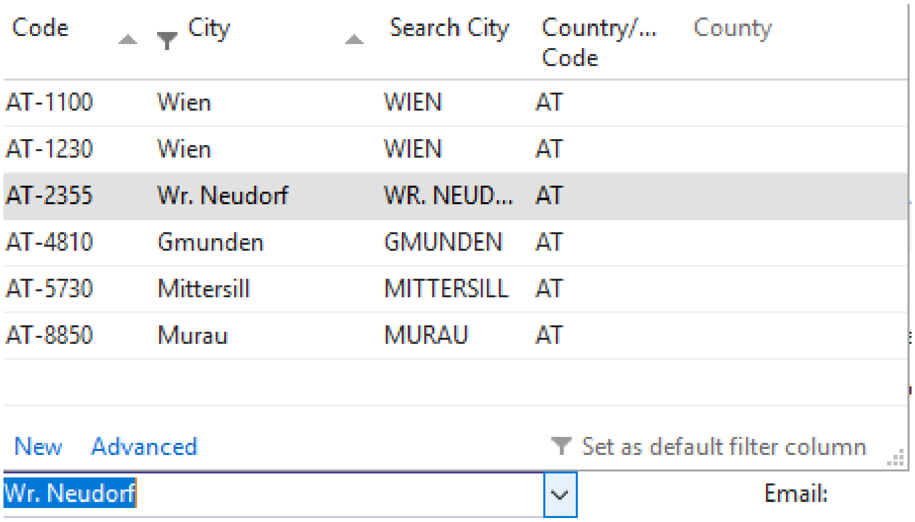
Text Box

To allow Rapise to capture the entered text interact with a text box in two steps: 1. Click into the edit box 2. Type text using keyboard

ComboBox

Dynamics NAV combo box consists of three elements:

- edit box,
- open button
- and a dropdown table.



Code	City	Search City	Country/... Code	County
AT-1100	Wien	WIEN	AT	
AT-1230	Wien	WIEN	AT	
AT-2355	Wr. Neudorf	WR. NEUD...	AT	
AT-4810	Gmunden	GMUNDEN	AT	
AT-5730	Mittersill	MITTERSILL	AT	
AT-8850	Murau	MURAU	AT	

Wr. Neudorf

Email:

Combo Box

For reliable recording of combo box interactions follow these steps:

- click on the edit box,
- click on the open button,
- click on a cell in the table.

Rapise will record this as:

```
// Click on the edit box
SeS('City').DoLClick(115, 10);
// Click on the open button
SeS('City1').DoAction();
// Select city in the table, choose "Gmunden" value in the column 1 (zero-bas
ed)
SeS('DataGridView').DoClickCell("Gmunden", 1);
```

Table

Rapise has complete support for Dynamics NAV grids/tables. It can record user clicks on cells and also provides API to get the number of rows, columns, get column name by index, etc. API reference is available in the Rapise Help file.

Here is an example of interacting with grid.

```
var grid = SeS('DataGridView');

var cell = grid.GetCell(3, "Name");
Tester.Message(cell);

var colValues = grid.GetColumnValues(2, 10);
Tester.Message(colValues.join(','));

grid.DoClickCell("Bilabankinn", "Name");
grid.DoClickColumn(1);
grid.DoClickColumn("Name");

var rowCount = grid.GetRowCount();
Tester.Message(rowCount);

var colCount = grid.GetColumnCount();
Tester.Message(colCount);
for(var i = 0; i < colCount; i++)
{
    var colName = grid.GetColumnName(i);
    Tester.Message("\"" + colName + "\"");
    var colIndex = grid.GetColumnIndex(colName);
    Tester.Message(colIndex);
}
```

4.7. Dynamics NAV Cook Book

Maximize/Minimize/Restore Window

You can maximize a window using any object inside it as a starting point.

```
    SeS('Refresh').getDesktopWindow().Maximized = true;
```

To minimize use

```
    SeS('Refresh').getDesktopWindow().Maximized = false;
    // or
    SeS('Refresh').getDesktopWindow().Iconic = true;
```

For restoring (to go back to a smaller window from maximized or minimized state) use

```
    SeS('Refresh').getDesktopWindow().Iconic = false;
```

Scroll to a Specific Row of a Grid

Generally Dynamics NAV grids do not allow accessing cells which are not currently visible on screen. Using scrolling it is possible to make a specific row of a grid visible. This is a multi-step process.

Step 1

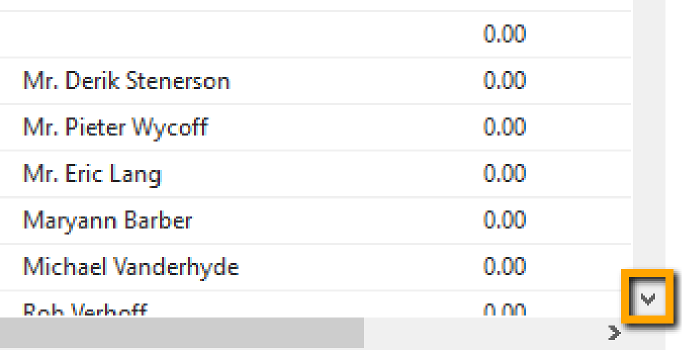
Scroll to the top of the grid.

```
    // Get a reference to the grid
    var grid = SeS('DataGridView');
    // Send Ctrl+HOME combination to scroll to the top of the grid
    grid.DoSendKeys('^{HOME}');
```

Step 2

Scroll line by line to a given row.

'Line down' scroll button is an object with dynamic location.



	0.00
Mr. Derik Stenerson	0.00
Mr. Pieter Wycoff	0.00
Mr. Eric Lang	0.00
Maryann Barber	0.00
Michael Vanderhyde	0.00
Rob Verhoff	0.00

Line Down

ilAfter each button click it's location changes. At the beginning it can be (... - means skipped part of the location which is not important for illustration):

```
.../_GridVScrollBar/No id[1]
```

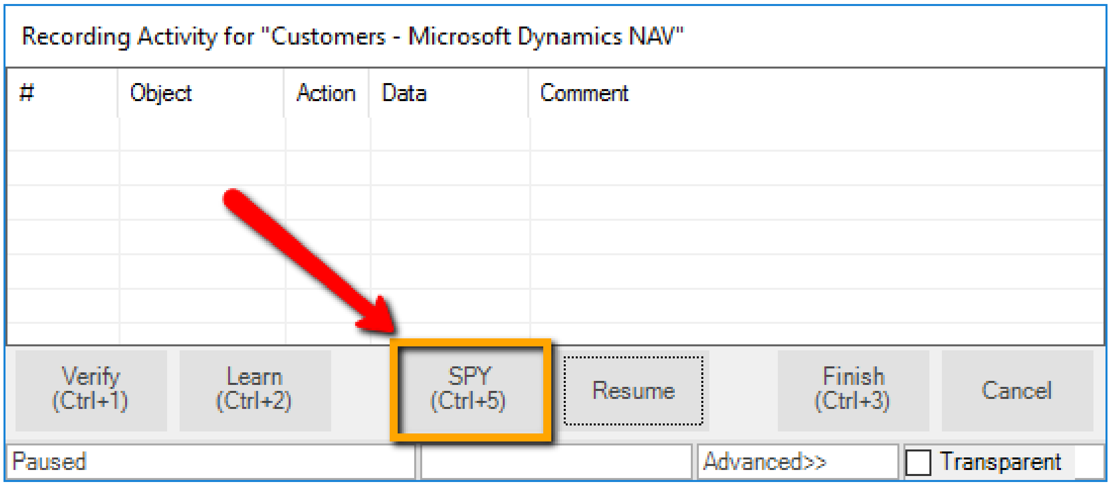
After first click it is:

```
.../_GridVScrollBar/No id[2]
```

So using this button is unreliable since it won't be found second time during test playback.

Instead we suggest to use scroll bar itself and click on it's low end. It is not possible to learn the scroll bar directly because under cursor we always get it's child parts (buttons, slider, etc.). Learn scroll bar using Spy.

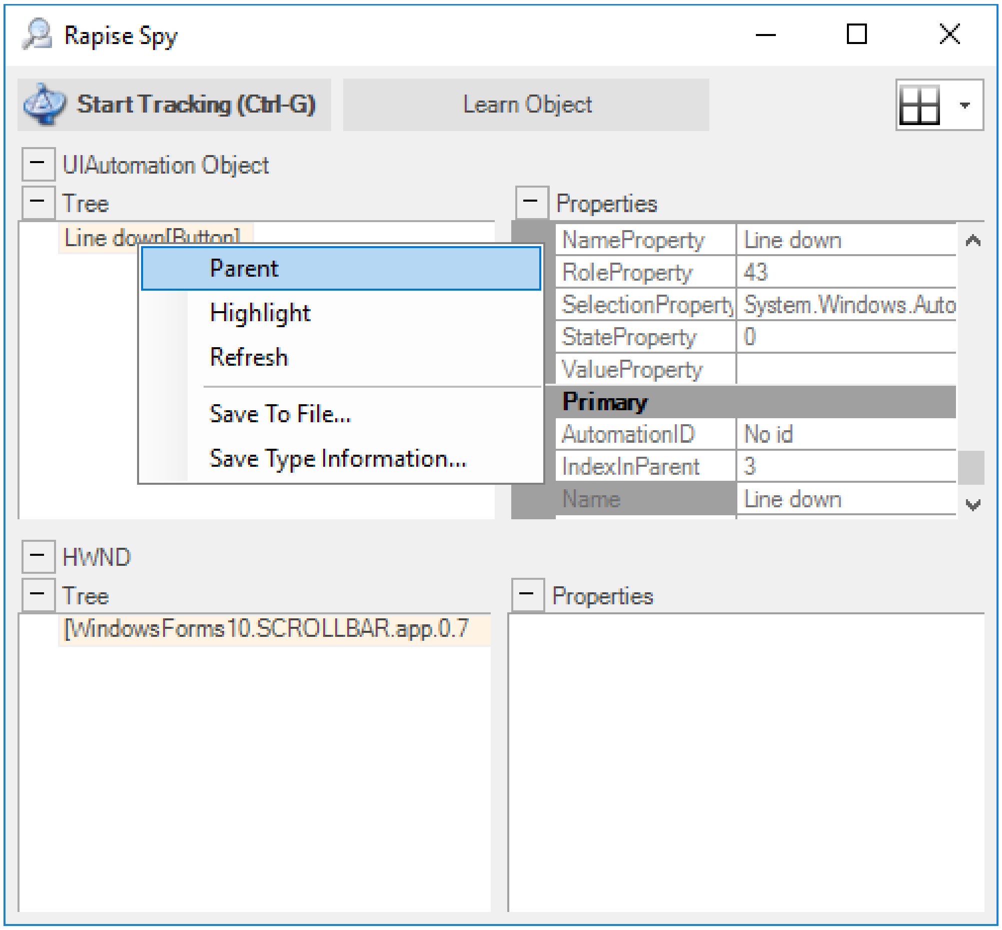
Start recording and launch Spy from `Recording Activity Dialog`.


Recording Activity for "Customers - Microsoft Dynamics NAV"

#	Object	Action	Data	Comment

Spy

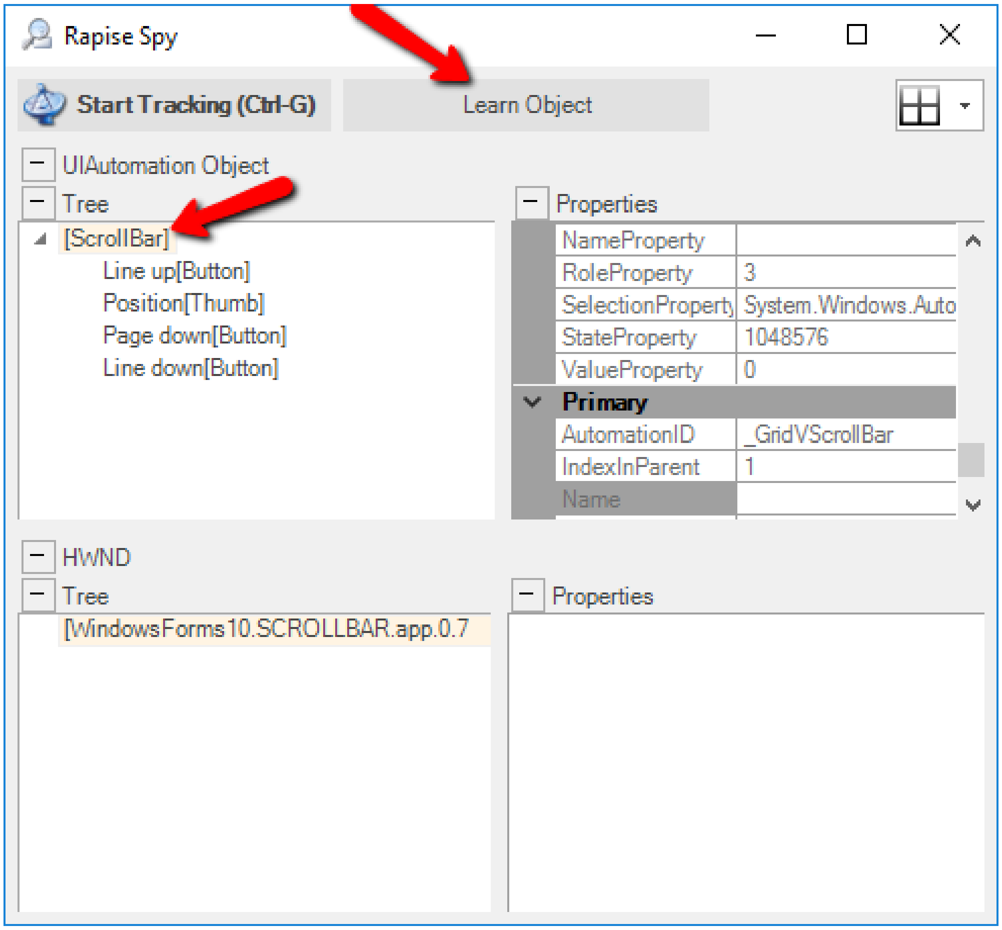
In Spy start tracking by pressing `Ctrl-G`, place mouse over `Line` down button and press `Ctrl-G` again. `Line` down object will be displayed in the UI Automation panel.



NameProperty	Line down
RoleProperty	43
SelectionPropert	System.Windows.Auto
StateProperty	0
ValueProperty	
Primary	
AutomationID	No id
IndexInParent	3
Name	Line down

Line down in Spy

Right click on it and choose `Parent`. Then click on `ScrollBar` object and press `Learn Object` button.



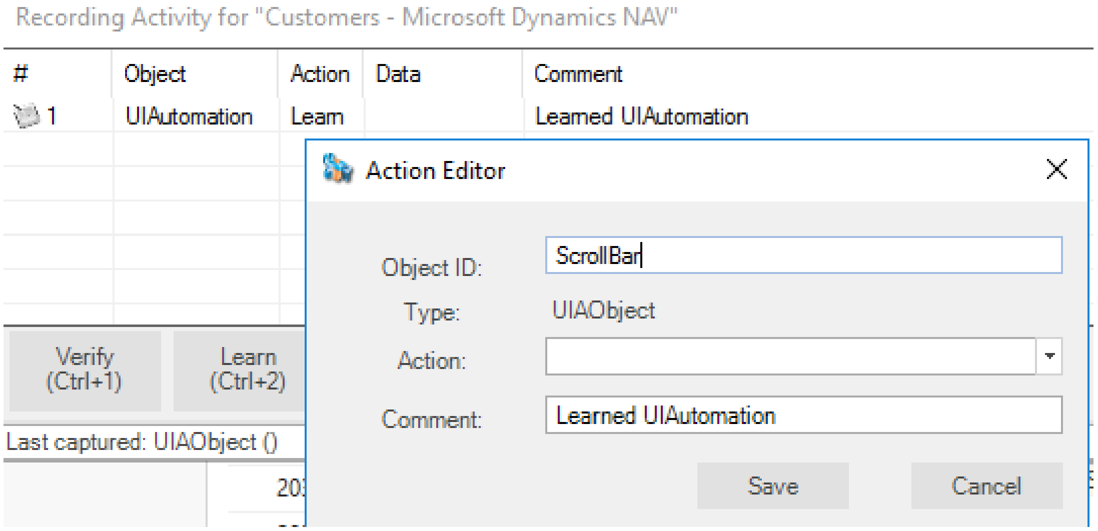
[ScrollBar]
Line up[Button]
Position[Thumb]
Page down[Button]
Line down[Button]

NameProperty	
RoleProperty	3
SelectionProperty	System.Windows.Auto
StateProperty	1048576
ValueProperty	0
Primary	
AutomationID	_GridVScrollBar
IndexInParent	1
Name	

[WindowsForms10.SCROLLBAR.app.0.7

ScrollBar in Spy

`ScrollBar` will be added to the `Recording Activity Dialog`. Default captured name of the object is `UIAutomation`. Change it to `ScrollBar`.


Recording Activity for "Customers - Microsoft Dynamics NAV"

#	Object	Action	Data	Comment
1	UIAutomation	Learn		Learned UIAutomation

Last captured: UIAObject ()

Action Editor

Object ID: ScrollBar

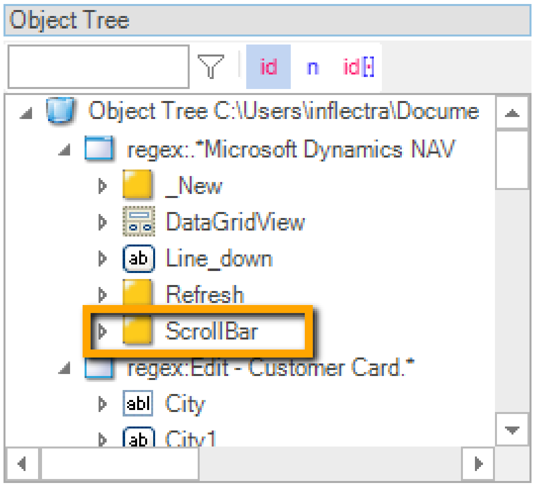
Type: UIObject

Action:

Comment: Learned UIAutomation

Object Rename

Finish recording and `ScrollBar` will be added to the object tree of the test opened in Rapise.


Object Tree

- Object Tree C:\Users\inflectra\Docume
  - regex:.*Microsoft Dynamics NAV
    - _New
    - DataGridView
    - Line_down
    - Refresh
    - ScrollBar
  - regex:Edit - Customer Card.*
    - City
    - City1

ScrollBar Object

Now we can write scrolling code.

```
var sb = SeS('ScrollBar');
// We want row 50 to be visible
var scrollToRow = 50;
for(var i = 0; i < scrollToRow; i++)
{
    // Click on the low end of the scroll bar, this is where line down button
is located
    // Use underscore in '_DoClick' to exclude this action from report
    sb._DoClick(10, sb.GetHeight() - 10);
}
```

Sometimes it is needed to scroll through all row to the bottom. Here is complete solution.

```
var grid = SeS('DataGridView');
var sb = SeS('ScrollBar');
grid.DoSendKeys('^{HOME}');
var rowCount = 1;
for(var i = 0; i < rowCount; i++)
{
    // Recalculate total number of rows since Dynamics NAV may sometimes repo
rt greater number in the beginning and then change its mind
    rowCount = grid.GetRowCount();

    // Scroll one line
    sb._DoClick(10, sb.GetHeight() - 10);
}
```

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