



# Rapise Way to Rapid Web UI Test Automation

Denis Markovtsev  
@dmarkovtsev



# Web UI Test Automation Challenges

- Cross-browser recording/playback
- Data loading delays
- DOM element identification
  - Resilient XPath generation

# Test Engineers Want It Automated

- Recorded test should work
  - Just after recording
  - When included into a test suite
  - If AUT is modified

# Typical Test Scenario

The screenshot displays the Microsoft Dynamics 365 Business Central interface for the company 'CRONUS USA, Inc.'. The top navigation bar includes 'Dynamics 365' and 'Business Central'. A secondary navigation bar lists various functional areas: Finance, Cash Management, Sales, Purchasing, Approvals, Self-Service, and Setup & Extensions. Below this, a specific navigation path is shown: Customers, Vendors, Items, Bank Accounts, and Chart of Accounts.

The main content area features a prominent insight: 'INSIGHT FROM LAST WEEK: The best-selling item was PARIS Guest Chair, black with 6 units sold'. To the right of this insight is an 'ACTIONS' menu with options like Sales Quote, Sales Order, Sales Invoice, Purchase Order, Purchase Invoice, and New, as well as Payments, Reports, Balance Sheet, Income Statement, Statement of Cash Flows, and Statement of Retained Earnings.

Below the insight, there are three key performance indicators (KPIs) under the heading 'Activities':

SALES THIS MONTH	OVERDUE SALES INVOICE AMOUNT	OVERDUE PURCH. INVOICE AMOUNT
\$6,420	\$63,890	\$49,422
<a href="#">&gt; See more</a>	<a href="#">&gt; See more</a>	<a href="#">&gt; See more</a>

At the bottom of the dashboard, there are sections for 'ONGOING SALES', 'ONGOING PURCHASES', and 'PAYMENTS', each with a corresponding bar chart and data labels like 'SALES QUOTES', 'SALES ORDERS', 'PURCHASE', 'ONGOING PUR', 'PURCH INVOI', 'UNPROCESSED', and 'AVERAGE COL'.



# Or Even Worse

Command	Target	Value
open	https://businesscentral.dynamics.com/3e0ac2f6-5ecd-41b7-aa72-d99ead5dae67	
selectFrame	index=0	
click	//form[@id='aspnetForm']/div[2]/div/div/nav/div[2]/div/div/div[2]/div/div/div/div/div/div/div/div/div/div/div/div/div/button/span/span	
click	//form[@id='aspnetForm']/div[2]/div/div/nav/div[2]/div/div[2]/div[2]/div[2]/div/div[2]/div/div/div/div/div/button/div/div/span/span	
click	//button[@id='89EF7']/span	
click	id=89F7Bee	
type	id=89F7Bee	NoName
click	//div[@id='contentBox']/div/div/div[2]/div	
click	//form[@id='aspnetForm']/div[2]/div/div/nav/div[2]/div/div[2]/div[2]/div[2]/div/div/div/div/div/i	

# Reason #1: Dynamic ID

```
//button[@id='89EF7']/span
```

## More examples:

```
<button type="button"  
id="CustFreeInvoice_3_AccountingActionsTab_btn">
```

```
<div id="appGridQueryFilter_Component8738712">
```





# Reason #3: Hidden Layers

```
<div class="spa-container">
  <div class="spa-overlay" tabindex="-1" style="display: block; z-index: 5;"></div>
  <div class="spa-view spa-normal spa-start-vi..." style="z-index: 1;" __id="6539ca77-73c0-4
  <div class="spa-view spa-normal no-animation..." style="z-index: 2;" __id="530e9f97-6827
  <div class="spa-view spa-normal no-animation..." style="z-index: 3;"></div>
  <div class="spa-view spa-normal no-animation..." style="z-index: 4;">
    <form method="post" id="aspnetForm" controlname="Sales Order List" class="ms-nav-li
  <div class="spa-view spa-normal no-animation..." style="z-index: 5;" id="2ca8e348-3c45
    <form method="post" id="aspnetForm" controlname="Business Manager Role Center" cl
      <div class="notification-panel" aria-live="polite" aria-relevant="all">...</div>
      <div class="nav-bar-area-box">
        <div class="nav-bar-content">
```

# Reason #3: Hidden Layers

## Recorded:

```
//form[@id='aspnetForm']
```

## Ways to fix:

```
//form[@controlname='Business Manager Role  
Center']
```

```
/div[contains(concat(' ', @class, ' '), ' spa-  
view ') and position()=last()]/form
```

# Give Them Tools! To

- Detect dynamic IDs
- Analyze identification power of attributes
- Analyze classes
- Identify Anchors

# Get Unique Sorted Attribute Values

The screenshot shows the Rapise Spy application interface. The top toolbar includes buttons for 'Track (Ctrl-T)', 'Save', 'Hide Invisible', 'Get Snapshot (Ctrl-G)', 'Highlighting Mode', 'Load', 'Go To Url', and 'Virtual Mode'. A search box in the 'Tools' section contains the locator 'r:attr id'. The main window displays the DOM tree for a Firefox browser, showing the root element <html dir="ltr"> and its children <head>...</head> and <body class="bifit\_signer\_firefox\_ext">. The 'Test Results' pane shows the locator 'r:attr id' with 236 found elements. A list of unique attribute values is displayed, sorted alphabetically: A3302, A3302-aria-desc, A3303, A3304, A3305, A3306, A3307, A3308, and A3309.

DOM Tree	DOM Element
1: https://businesscentral.dynamics.com	Test Results
<html dir="ltr">	Locator: r:attr id, found: 236
<head>...</head>	ErrorMessage
<body class="bifit_signer_firefox_ext">	A3302
	A3302-aria-desc
	A3303
	A3304
	A3305
	A3306
	A3307
	A3308
	A3309

# Query and Compare Multiple Documents

The screenshot displays the Rapise Spy interface. At the top, there's a toolbar with buttons for 'Track (Ctrl-T)', 'Save', 'Hide Invisible', 'Get Snapshot (Ctrl-G)', 'Highlighting Mode', 'Load', 'Go To Url', and 'Virtual Mode'. Below the toolbar, the 'Firefox' browser is active. The main area is divided into two panes: 'DOM Tree' and 'DOM Element'. The 'DOM Tree' pane shows two document instances, 'D365SalesAccounts1' and 'D365SalesAccounts2', with their respective HTML structures. The 'DOM Element' pane shows the selected element's properties, including ID, tagName, and attributes. The 'Test Results' pane shows a list of found elements for the locator '//iframe', with 14 results listed for both document instances.

DOM Tree

- 1: D365SalesAccounts1  
<html lang="en">  
 <head>...</head>  
 <body scroll="no" class="bifit\_signer">
- 2: D365SalesAccounts2  
<html lang="en">  
 <head>...</head>  
 <body scroll="no" class="bifit\_signer">

DOM Element

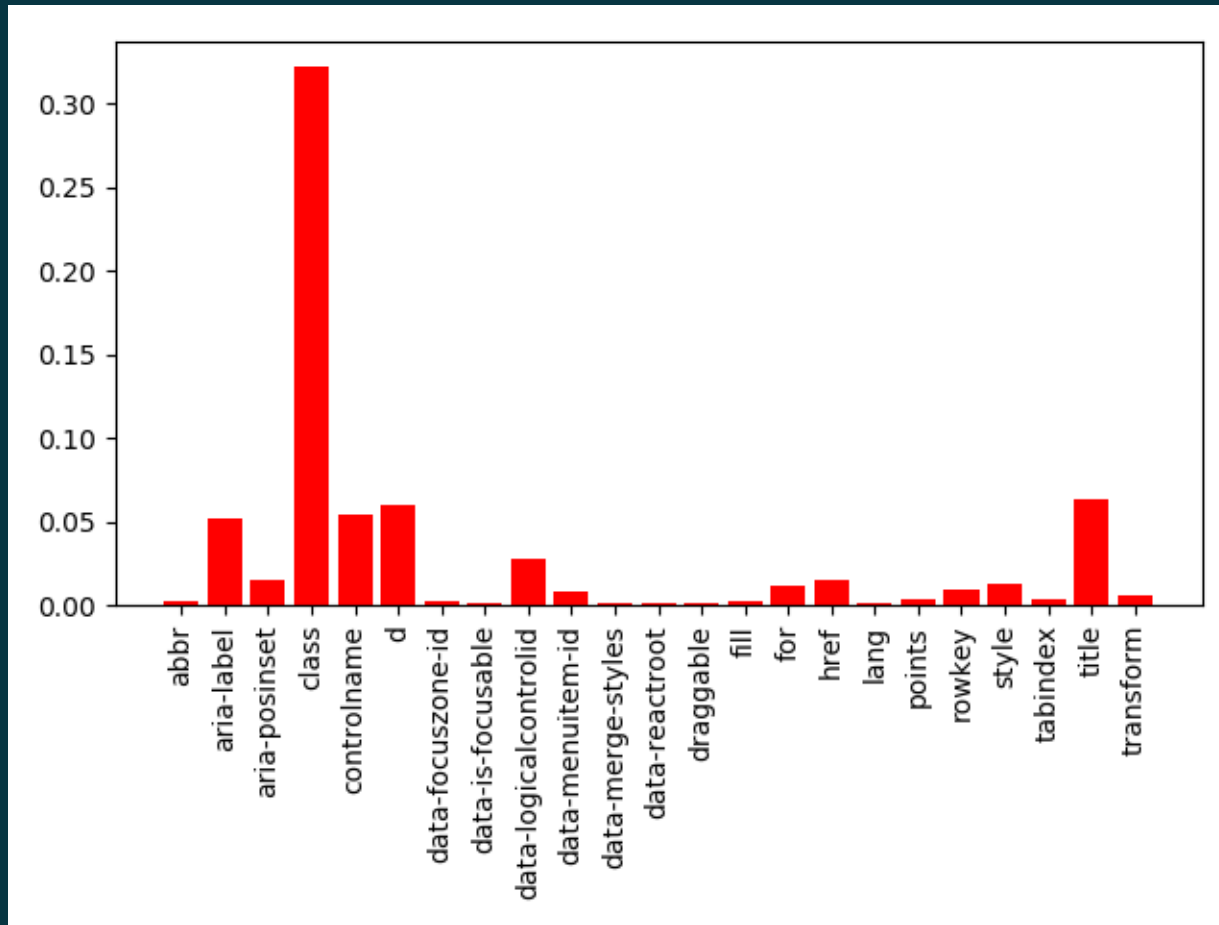
ID	edbe789c-37b9-4320-81a6-5e6517092439
tagName	iframe
Attributes	
frameborder	0
id	contentIFrame0

Test Results

Locator: //iframe, found: 14

- 1: <iframe id="contentIFrame0" name="contentIFrame0" style="b...>
- 1: <iframe id="exportFrame" name="exportFrame" style="display...>
- 1: <iframe style="background-image: url("#"); visi... src="https://...>
- 1: <iframe id="adalRenewFramehttps://inflectra3..." style="visibil...>
- 1: <iframe id="adalRenewFramehttps://learningpa..." style="visibil...>
- 1: <iframe id="adalRenewFramehttps://graph.wind..." style="visibil...>
- 1: <iframe style="display: none;" src="https://home.dynamics.com...>
- 2: <iframe id="contentIFrame0" name="contentIFrame0" style="b...>
- 2: <iframe id="exportFrame" name="exportFrame" style="display...>
- 2: <iframe style="background-image: url("#"); visi... src="https://...>
- 2: <iframe id="adalRenewFramehttps://inflectra3..." style="visibil...>
- 2: <iframe id="adalRenewFramehttps://learningpa..." style="visibil...>
- 2: <iframe id="adalRenewFramehttps://graph.wind..." style="visibil...>
- 2: <iframe style="display: none;" src="https://home.dynamics.com...>

# Calculate Identification Power of Attributes



# Define Anchors

```
//div[contains(concat(' ', @class, ' '), ' spa-view ')] and position()=last()
```

**Find nearest anchor to recorded element and include it in XPath:**

```
//div[contains(concat(' ', @class, ' '), ' spa-view ')] and position()=last()
```

```
//button[@role='menuitem']/span[@aria-label='Customers']
```

# Build Web Application Profile

```
{
  record:
  {
    attributes: [
      { name: "name" },
      { name: "title" },
      { name: "href", exclude: "javascript:" },
      { name: "role" },
      { name: "summary", notEmpty: true },
      { name: "type" },
      { name: "data-menuitem-id" },
      { name: "controlname" },
      { name: "aria-label" },
      { name: "id", notEmpty: true, exclude: "\\d|[a-z]{5}" }
    ],
    classes: [
      { name: "icon-Home" },
      { name: "spa-view" }
    ],
    anchors: [
      { xpath: "///div[contains(concat(' ', @class, ' '), ' spa-view ') and position()=last()]" }
    ]
  }
}
```



# Get A Working Test After Recording

The screenshot shows the RVL application interface. The main window displays a table with the following columns: Flow, Type, Object, Action, ParamName, ParamType, ParamValue, and H. The table is currently empty, with the first row containing headers. The interface includes a menu bar, an Object Tree on the left, and an Output pane at the bottom.

Flow	Type	Object	Action	ParamName	ParamType	ParamValue	H
1	Flow	Type	Object	Action	Param Name	Param Type	Param Value
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
*							

# Summary

- Testers need reliable recording
- They need tools for application analysis
- With proper tools they can build an application profile
- The profile can be used for automatic generation of resilient Xpath expressions

# Thank you

## Contacts:



[denis@inflectra.com](mailto:denis@inflectra.com)



[dmarkovtsev](https://twitter.com/dmarkovtsev)



[Inflectra](https://github.com/Inflectra)



[inflectra.com/ideas](https://inflectra.com/ideas)