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Building a Reusable Automated Testing Framework for UFT January 23, 2019







Vivit's Testing Quality and ALM Special Interest Group





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Today's Speakers



Brent Westwood Quality Assurance Analyst Southern Company

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House Keeping

 This "LIVE" session is being recorded Recordings are available to all Vivit members

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Questions







Building a Reusable Automated Testing Framework for UFT

Brent Westwood January 23, 2019





Agenda

- Southern Company Approach to Automated Testing
- Why We Created Our Automation Framework
- What We Created
- Demonstration
- Questions?



About Southern Company

Southern Company (NYSE: SO) is nationally recognized as a leading energy company based out of Atlanta, Georgia.

- Electric operating companies in 4 states
- Natural gas distribution companies in 7 states
- · Generation company serving wholesale customers across America
- Serving 9 million customers through its subsidiaries
- 46,000 megawatts of generating capacity
- 1,500 billion cubic feet of combined natural gas consumption
- 200,000 miles of electric transmission and distribution lines
- 80,000 miles of natural gas pipeline

Source (1/21/19): https://www.southerncompany.com/about-us/our-business.html



Our Approach to Automated Testing



Automated Testing Approach

- Assess the automated testing request
- Determine if the request seems suitable for automation
- Supply an automation framework
- Build examples to prove the automation framework will work with the AUT
- Train the application support analyst on how to use the automation framework
- Enhance the framework to provide more functionality over time

*AUT = Application Under Test



Assessing Suitability for Automation

- Tests can be repeated the output can be predicted
- The application(s) involved are not going to be retired soon
- The application(s) involved will not be modified often
- The application(s) involved are compatible with our automated testing tool, Micro Focus UFT
 - Spy the application(s) to determine if UFT can recognize the elements/controls on the screens of the application(s)
- Tests will be run many times and/or involve many transactions
 - In order to obtain a **return on investment**, there should be a need to run the automated tests many times or iterations. The more runs, the more time saved (time to run automation vs running the tests manually).



Return on Investment

Estimate the ROI (Gain from investment – Cost of the investment)

 Graphical representation of the cost to run tests manually vs automated over time is a good way to show the value of automating the tests.





Training and Help

Have a central location for:

- Help on ALM and Automated Testing (Micro Focus links)
- Automated Testing Knowledgebase
- UFT installation instructions
 and Chrome setup
- Automation Framework
 documentation

Libraries Shared Documents Related Site and Useful Links	Welcome to the Testing Methodolog This is a repository for sharing documentation on Test Methodology and Bert P Functional Testing, Performance Testing, and more.	IV and Tools Site actions for our various forms of testing: Automated Functional Testing, Manual	Testing News and Articles • Script-less Test Automation • Systematic Exploratory Testing • Test Rules to Verify Requirements
Development Stratgies and Standards Development Stratgies and Standards Yammer Application Lifecycle Management (ALM) -	Development Stratgies and Standards - QA Services Tea Release, Requirement, Test, and Defect Management using the HPE Application (specific de Management tool	m Capabilities and Services Learn how to use ALM to manage your projects and testing efforts. Learn how ALM can store all of the project antifacts, trace requirements to tests, track test runs and progress, and track and cruste detects for remediation.	
Help Center ALM Database Documentation Sprinter Help Center Unified Function Testing (UFT) - Help Center Virtual User Generator -	Automated Testing Manual Testing Assistant tools	Leam hore to use the United Aruccional Testing (UT) food to automate your functional tests. We can help with consulting versions and provide some training. I have been been been been been been been be	
Help Center LoadRunner - Help Center Performance Center - Help Center	Test Strategy Performance Testing	The Testing Services team can help you with a strategy for your testing and provide templates for Test Strategy and Test Plan documentation. We can refer you to the group that handles performance testing using HPE deformment of the service of the	
HPE / Micro Focus Support Website HPE Product Lifecycle Information Orasi Support PowerTube			
			-



Some Keys to Successful Automated Testing

- Working closely with the developer
 - Developer can add HTML ID attributes to the HTML elements which greatly increases object recognition
 - Quick turnaround on updating objects and fixing bugs (blockers)
- Well defined manual tests
 - Know exactly what to do before applying automation
- Access to the database
 - Be able to query the database to get data and verify updates made to records via actions made in the application under test are saved (adds, updates, deletes)
- Test user IDs for the application testing
 - Ability to establish test login IDs for use in testing different security roles
 - Do not have to use your personal network ID and password
 - Allows for easier testing and handoff



Automated Testing Framework





Feature	
Readable Tests	 Automated tests that are readable and easy to understand The manual tester can create the instructions for the automated test (test steps) Manual tests and automated tests can be the same set of instructions
Flexible Development	 Easy to reorder the steps and insert new steps as needed Can start at any point in the test and skip steps Easy to create similar tests such as tests that have a different order of operations but use the same fields
Less of a Learning Curve	 Tester writes test step instructions, not code Tester just needs to know how to identify and define objects (HTML elements) The code to interpret actions is already written The code for the framework is enhanced by those with the ability to code
Code Once	 Code for interacting with buttons, textboxes, hyperlinks, etc. is coded just one time Code is reusable across all web application projects One set of code to maintain as opposed to many scripts/components



Feature	
Logical Object Repository	One logical Application Object Repository that can be easily filtered and searched
Object Reuse	 UFT Repository Objects are added once per Object Class and identifying property The identifying property <u>value</u> of the shared UFT repository object is just changed (<i>.SetTOProperty</i>) per element on the screen to click or enter text
Test Set Parameters	 Ability to provide parameters at the Test Set level Parameter values can be used by all tests Parameter values and data can be dynamically created by tests
Parameter Reuse	 Parameter values can be defined in one place as opposed to having to update in every test or component Test parameters are saved and can be used at any time as opposed to only being saved in MEMORY and lost at the end of a test run Parameter data can be changed in the middle of the test (update and run from a point in the test)



Feature	
Uniform Test Design	 All tests for any applications will have the same layout Easy to support any test since they are all created in the same way
Uniform Reporting	 All steps executed by a test are explicitly reported in the run result report (reporter statements) Test run result reports are easy to understand, great for auditing, have screen shots, and are the same consistent look for all projects Reporting is as easy to increase or decrease as adding or removing rows in a spreadsheet
Error Handling	 Run report lists the Test, Test Step, and values used in the step where the error occurred All identifying properties of the object used in the step are reported as well as a screen capture at the point of the failure Easy to understand exactly what went wrong and where to fix the problem Using the SKIP step ability, one can then update the test or object identification and run the test from the failed step forward



What We Created





A Readable Automated Test

- The test is a set of readable instructions:
 - Actions -- "On Page", "On Object" "Perform Action"
 - Functions -- such as "Close All Browsers" and "Launch Browser"

A	В	C	D	E	F	G	Н
Skip_Step	Step_Label	Call_Function	On_Page	On_Object	Of_Object_Type	Perform_Action	Use_Value
		CloseAllBrowsers					
		LaunchBrowser					[BrowserType] [URL]
			Login	Username	Textbox	Enter Text	[LoginUsername]
			Login	Password	Textbox	Enter Password	[LoginUserPassword]
			Login	Login	Button	Click	
			Home	Requests for Approval	Page Header	Verify Exists	
							SCREENSHOT - Log In
							Successful Logged into CC as
							[LoginUsername] on machine
		Take Screenshot					[MACHINENAME].



The Framework is Composed of...

- Help worksheet
- Application Objects worksheet
- Variables worksheet
- Test Set worksheet
- Test worksheets



Help Worksheet

Defines each section of the framework spreadsheet:

- How to use and setup the ...
 - Application Objects worksheet
 - · Variables worksheet
 - Test Set worksheet
 - Test worksheets
- Action definitions
- Function definitions
- Object type definitions
- · Available template values that are translated at runtime





Application Object Worksheet

- Defines the objects for any test -- how they are seen to the tester/user
- Application Objects are organized by Page (Page|Object_Label|Object_Type)
- The Application Objects reference UFT Repository Objects
- The UFT Repository Objects are setup per Object Class (WebEdit, WebList, WebElement, Link, Image).
 - For example, one WebEdit object may be used to handle any Textbox control in the whole website.

Test_Driver_Help Application_Objects Variables Test_Set



Variables Worksheet

- Table to the store variable names and values which can be used by tests during a run or during later runs
- Variables can be manually created and updated
 - Such as global object wait, login IDs, database connection info
- Variables can be dynamically created by tests
 - Such as saving values extracted from the screen under test to a new variable for later use
- Variables can be updated by tests
 - Such as a test overwriting the value for preexisting variable
- Variable values exist even after all tests end (not just a value in memory)





Test Set Worksheet

- Lists the tests to run or skip
- Lists the Test Name, Description, and a column to enter notes or comments
- Lists the Last Run, Result, and any error details for the last run (failed step details)





Test Worksheet

- Lists all of the steps of the test which can be:
 - an action to take on an object such as
 - sending a click event
 - entering a value in an element on a page
 - extracting a property value from an element on a page
 - comparing a property value to an expected value
 - a function to call such as
 - executing a SQL query, launching a browser, closing browsers, creating a formatted date, etc.
- Any step can be skipped
 - · allows one to start a test in the middle of the test
 - allows one to not run steps already developed when adding new steps to the test



Building Tests Using the Automation Framework





1. Determine the Objects Needed

- Example: **Login** test define the objects needed:
 - Username, Password, and "Sign In" elements on the application's Login screen
 - · Home page image used to verify that the login in process was successful





2. Create Reusable UFT Objects

- Create UFT objects per class of object
- Sample: WebEdit object named TextboxByNameRegEx that uses the Name attribute with a regular expression

		a river. m An	Objects 💌			
Action 1	 Object Prope 	arties				
🖻 🚍 Test Objects	Name:	TextboxByNameReg	gEx			
Browser	Class: Repository:	WebEdit	WebEdit			
ImageByNameRegEx We LinkByHTMLID Wenu Link Button ButtonByHMTLID ButtonByCuterHTMLRegEx		Local				
	Test object details					
	Name	Name				
	 Description 	properties	1.00			
- 🧷 Textbox	name		Dt Usemame			
Tow Box BulliTMUD	- Visual relation	on identifier	too and with			
- / TextboxByNameRegEx	Visual rela	stion identifier settings	[None. Click to add]			
TabletemDescription	Ordinal iden	tifier				
WebElementAnchorRegEx	Type . Va	lue	None			
- WebElementDIV	Additional d	etails				
WebElementH2Header	Enable Sr	Enable Smart Identification				
WebElementH3Header	Comment					
WebbiementSPAN DropDownListBuOuterHTMLPapEx						
Google Chrome						
Checkpoint and Output Objects						



3. Add Application Object Records

- Add objects that reuse the UFT repository objects
 - the primary property value is replaced with the value from the application object
- Notice the Username and Password objects use the same UFT TextboxByNameRegEx object
- The Page|Object_Label|Object_Type values are the keys for the Application_Object record and can be referenced in any Test

А	В	С	D	E	F	G	Н
Page 🔹	Object_Label 🔄	Object_Type 🔄	Frame 💌	Object_Class 👻	UFT_Object_Name 🗸	Primary_Property -	Primary_Property_Value
Browser	Browser By Title	Browser		Browser	BrowserByTitle	title	[Parameter_Value]
Login	Username	Textbox		WebEdit	TextboxByNameRegEx	name	.*txtUsername
Login	Password	Textbox		WebEdit	TextboxByNameRegEx	name	.*txtPassword
Login	Sign In	Button		Image	ImageByNameRegEx	name	.*btnLogin
$\prec \cdots \models$	Test_	Driver_Help		Applicatio	on_Objects Variable	s Test_S	et Log_In



4. Write Tests

- Call functions like "Close All Browsers" to clean the environment (desktop) and "Launch Browser" to launch a browser to the application website using the browser of choice
- Enter the Page|Object|Object Type values with an Action to cause an event on the page element such as entering a value in textbox, clicking a button, clicking a link, getting data out of an element, verifying an element exists, selecting a value from a list, etc.

Skip_Step	Step_Label	Call_Function	On_Page	On_Object	Of_Object_Type	Perform_Actio	n Use_\	/alue			
		LaunchBrowser					[Brow	/serType] [LIMS_URL]	
			Login	Username	Textbox	EnterText	[Gene	ralAccessU	JserLogin]		
			Login	Password	Textbox	EnterPassword	[Gene	ralUserPas	sword]		
		Take Screenshot					SCREE	NSHOT - G	ieneral Us e General	er Login <mark> </mark> Lo User logs i	ogin nto LIMS.
			Login	Sign In	Button	Click					
			Tasks	Add Task	Button	If Exists Go To Step Label					
			Home	LAND Image	Image Link	Click					
Test_Dri	ver_Help	Variables App	lication_Obje	cts Test_Set	01_01 01_0	2 01_03	02_01	02_02	03_01	03_02	03_03

4. Write Tests - Continued

- Create variables on the fly using the Save_Value_To_Variable column
- Use the variables later in the same test, in other tests, or in future runs of a test/set of tests

1	Skip_Step	Step_Labe	Call_Function	On_Page	On_Object	Of_Object_Type	Perform_Action	Use_Value	Save_Value_To_Variable
11				Add Task	Add Task	Page Header	Verify Exists		
12				Add Task	Task Type	Dropdown List	Select	Master Testing	
								Auto Test 02_01 - Task No Default Group	
13				Add Task	Task Name	Textbox	Enter Text	[NOW]	TaskName_02_01
1	Skip_Step	Step_Labe	Call_Function	On_Page	On_Object	Of_Object_Type	Perform_Action	Use_Value	Save_Value_To_Variable
44				Tasks List	Task Name	Item	Ve <mark>rify Exist</mark> s	[TaskName_02_01]	
			Query						
			Application					SELECT J.JOB_ID	
			Database For					FROM-MILE PROM	
45			One Result					WHERE J.JOB_NAME = '[TaskName_02_01]' TaskID_02_01
								SCREENSHOT - New Task Saved The new	
								Tasks has been added and verified the	
			Take					record saved to the database. The new	
46			Screenshot					Task is listed on the Home page now.	
47				Home	Search	Button	Click		
48				Search	Tasks	Button	Click		
49				Search	Search	Textbox	Enter Text	[TaskID_02_01]	
50				Search	Search Button	Button	Click		
51				Search	Task Edit	Button	Verify Exists	[TaskID_02_01]	



Test Output – Run Result Report

- Every step is reported
- Filter on the reporter statements to see readable info on every step performed
- Each step maps back to the Test worksheet
- Multiple tests run from the test set are reported in <u>one</u> Run Result Report

tDriver - LIMS_Brent \ TempResults (Filtered) - Run Results Viewer	0		- 0			
View Tools Help						
BY 14 14 Q 14 14 (⇒ 1⊞ ? .						
	Result Details					
	Internet Concernation					
 02_01 Step 7 - Clicked the (Sign In) Button 	Step Name: 02_01 Step 46 - SCREENSH(OT - New Task Saved				
[a] 02_01 Step 8 - [Add Task] Button Found - Go To Step Labeled: [AfterLogin]						
 Kij 02_01 Step 10 - Clicked the [Add Task] Menu Link 	Step Passed					
[k] 02_01 Step 11 - [Add Task] Page Header Found						
Image: Selected the [Master Testing] value in the [Task Type] Dropdown (Image) and the [Task Type] Dropdown (Image) and the Image) and Image) an	Object	Details	Result Time			
 Image: State of the state of th	02_01 Step 46 - SCREENSHOT - New Ta The new Tasks has been ad	ided and verified the record saved to the database. The new T	ask is listed Passe 5/17/2018 - 23:0			
 KUU2_UT Step 14 - SCREENSHUT - Add task initialscreen KUU2_UT Step 15 - Sticked the Midd Task & Midd	sk Saved	on the Home page now.	d 6:19			
 Billoc, 01 step 15 - Clicked the plad lask sutton 						
 EIO2 01 Step 10 - [Save] button Found EIO2 01 Step 17 - SCREENSLOT - Add Task - Second Scenes 						
 E 02_01 Step 17 - SCREENSHOT - Add Mak - Second Screen E 03_01 Step 18 - Clicked the Step 8 steps 	Result Details Screen Recorder System Monitor					
 E 02 01 Step 19 - Verified the value of the ITEST DATE Textions shiert 	Contrast Data					
 A Diagonal Step 20 - Marrian Messarel Item Found 	Captured usta					
In Contract Step 21 - Marring Message I Item Found						
Q 02 01 Step 22 - SCREENSHOT - After Clicking Save - Before Enterion Required F	ields UMS 2.0 ×					
02.01 Step 23 - Clicked the [TEST_DOMAIN_TEXT] Dropdown List	4 A C B Server https://d	tart domain tart				
✓ ■ 02 01 Step 24 - SCREENSHOT - After Clicking Save - Before Entering Required F	ields	rest_oomain_text				
✓ ¥ 102 01 Step 25 - Selected the [Land Consuder Support] value in the [Group] Dependient.						
Q2_01 Step 26 - Verified the value of the [Assignee] Textbox object	"Hine Functional Testing Agent" is deougging this browser.					
Q2_01 Step 27 - Clicked the (Save) Button						
✓			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
Image: Step 29 - [Warning Message] Item Found	MANAGEMENT STSTEM 20		-			
Q2_01 Step 30 - SCREENSHOT - Entered Group - Clicked Save	*					
Image: Step 31 - Selected the [Land] value in the [TEST_DOMAIN_TEXT] Dropdov	en List					
Q2_01 Step 32 - Entered data in the [Description] Textbox						
✓	Main	Quick Views				
Image: Selected the [Email] value in the [Contact Type] Dropdown List						
 Q2_01 Step 35 - Mouse Clicked the [Requester Lookup] Textbox 	General - Search for Projects and Ta Search C	Add - E Ca Reveal Related Overia	-			
Intersection (1998) A sendKeystrokes - Keystrokes Sent	Contraint Statistical and it Statistical and it		5			
02_01 Step 37 - WaitSeconds Called	Obvious Otaria Otherational Otherania Of	the Countral Con				
 ki 02_01 Step 38 - Clicked the (Requester) Item 	Orrojecs Orasis @ My Assigned O My Group's Or	🗠 Project Related Queri	85			
02_01 Step 39 - WaitSeconds Called	a Burling (B)	*				
 ICL_01 Step 40 - [hint Name] Item Found 	* Project					
 Image: Step 41 - [Last Name] Rem Found Image: Step 42 - CORENCIATE Entered a Test Densela Desa Colonary, Base 	anter Project Master Testing	Pret				
 auve_or orep 4c - sunzervorior - entered a rest upmain - Desc - Unegory - Regional - Desc - De	Auto Test Test Project master resting > Patrick #24 P					
 E 00 01 Stan 44 - Task Namel Item Found 	Created: 5/11/2018 Started: 5/11/2018	Time and Expense				
 E 02 01 Step 45 - Query Database for One Result - One Result Pour Found - FITC 	shaweld					
 Box of the second second	4 Tank (C)					
Ill 02 01 Step 47 - Clicked the (Search) Button						
✓ € 02 01 Step 48 - Clicked the (Tasks) Button	Patrick #24	Pent Reports				
✓ € 02.01 Step 49 - Entered data in the [Search] Textbox	Auto Test 02_01 - Task No Default Group					
✓ € 02.01 Step 50 - Clicked the (Search Button) Button	5/17/2018 11:04:54 PM	Mg V Dashboard Benorts				
✓ € 02.01 Step 51 - [Task Edit] Button Found	Created: 5/17/2018	Dashboard Reports				
✓ € 02.01 Step 52 - SCREENSHOT - Searched the Task By ID						
✓ € 02_01 Step 53 - Clicked the (Close Search) Button	667163 Task Parcel Creation Patrick #24 P	Pent General Reports				
Q2_01 Step 54 - Clicked the [Logout] Menu Link	PX Parcel Creation Test 5-15-2018	AG V				
Q 02 01 Step 55 - (Username) Textbox Found			7			



Test Output – Screenshots Only

al TestDriver - LIMS_Brent \ Tempi

Marchiner - LIMS_Br
 Marchiner - LIMS_Bre
 Marchiner - LIMS_Bre
 Marchiner - LIMS_Bre

 02,01 Step 6 - 1

 02,01 Step 14

 02,01 Step 17

 02,01 Step 22

202,01 Step 34
 202,01 Step 30
 202,01 Step 42
 202,01 Step 46

File View Tools Help

- Filter by the word "SCREENSHOT" to only view reporter statements where screenshots were taken
- Quick way to review and validate the test ran as expected

ults (Filtered) - Run Results Viewer		
2 = 2		
	Result Datable	
t Summary Iteration 1 (Row 1)	Step Name: 02_01 Step 52 - SCREE	NSHOT - Searched the Task By ID
	Step Passed	
ISHOT - General User Login INSHOT - Add Task InitialScreen	Object	Details Result
NSHOT - Add Task - Second Screen NSHOT - After Clicking Save - Before Entering R NSHOT - After Clicking Save - Before Entering R	02_01 Step 52 - SCREENSHOT - Searched the Task The ne By ID	w Task was saved to the database and found by searching for the Task in LIMS by Task ID. Task 1 Passe 5/17/ D: 660095. d
NSHOT - Entered Group - Clicked Salve NSHOT - Entered a Test Domain - Desc - Catego NSHOT - New Task Salved	Result Details Screen Recorder System Monitor	
	UM5 20 *	
	← → C Secure termination and the secure	/Nome#test_domain_text
	NOS Exectional Testing Asset? In data spins the business	
	The functional record Agent is being ging this provide.	
	Search Tasks Proje	668095
	5087	
	Created Da + BY Most F	Auto Test 02_01 - Task No Default Group 5/17/2018 11:0 estors Task Master Pesting Due NA Assigned Mittick earlent Land co Add Task Test Without Default Group by bywestwo at 5/17/2018 11:85:30 PM
	FILTER	a a 🚺 a a 👔 dems per page
	Status	~
	Task Type	•
	Assignee	~
	Assigned Group	~



Demonstration





Open Discussion

Any Questions?





Thank You,

Brenton Westwood

Reach me on Linked In: https://www.linkedin.com/in/brenton-westwood-b3823b54/



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Upcoming Vivit Events

January 24, 2019 **Meeting: Discover the New and Exciting Micro Focus - Florida LUG Event** 5:30 - 7:00 PM EST (Florida) <u>https://www.vivit-worldwide.org/events/EventDetails.aspx?id=1172751&group=</u>

January 31, 2019 **Meeting: User Group Treffen "Testen & Test-Management mit Produkten von Micro Focus in München** 13:00 - 17:00 CET <u>https://www.vivit-worldwide.org/events/EventDetails.aspx?id=1180268&group=</u>







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