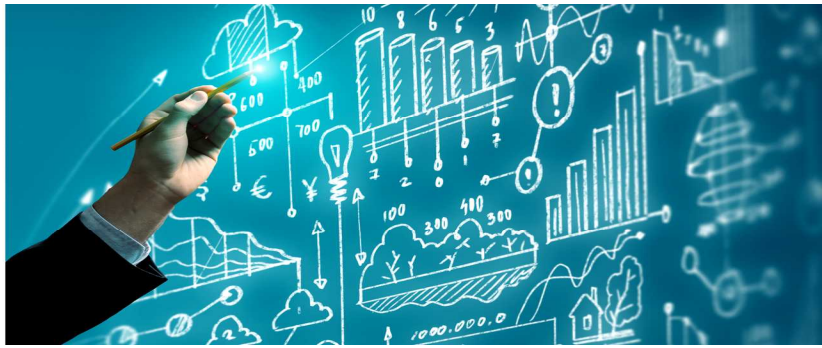
SAND2017-7648C



Evaluating Selenium for Automated Testing

Reynaldo Teodoro

Org 9351 – Engineering Solutions

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

Internship goal

Sandia National Laboratories

- Evaluate an alternative automated testing tool for a large, nuclear weapons related web application
  - Currently using SmartBear TestComplete
    - Only runs on Windows
    - Requires user to be logged into the console
    - Difficult to integrated into automated testing tools in Sandia's environment due to cyber restrictions
  - Evaluating Selenium – a popular, open source web testing tool
    - Can run without requiring a console at all (headless)
    - Can run on other operating systems such as Linux
- Chose a website template with representative UI widgets and created automated tests to demonstrate Selenium's viability for this project

Why Automated Testing?

Sandia National Laboratories

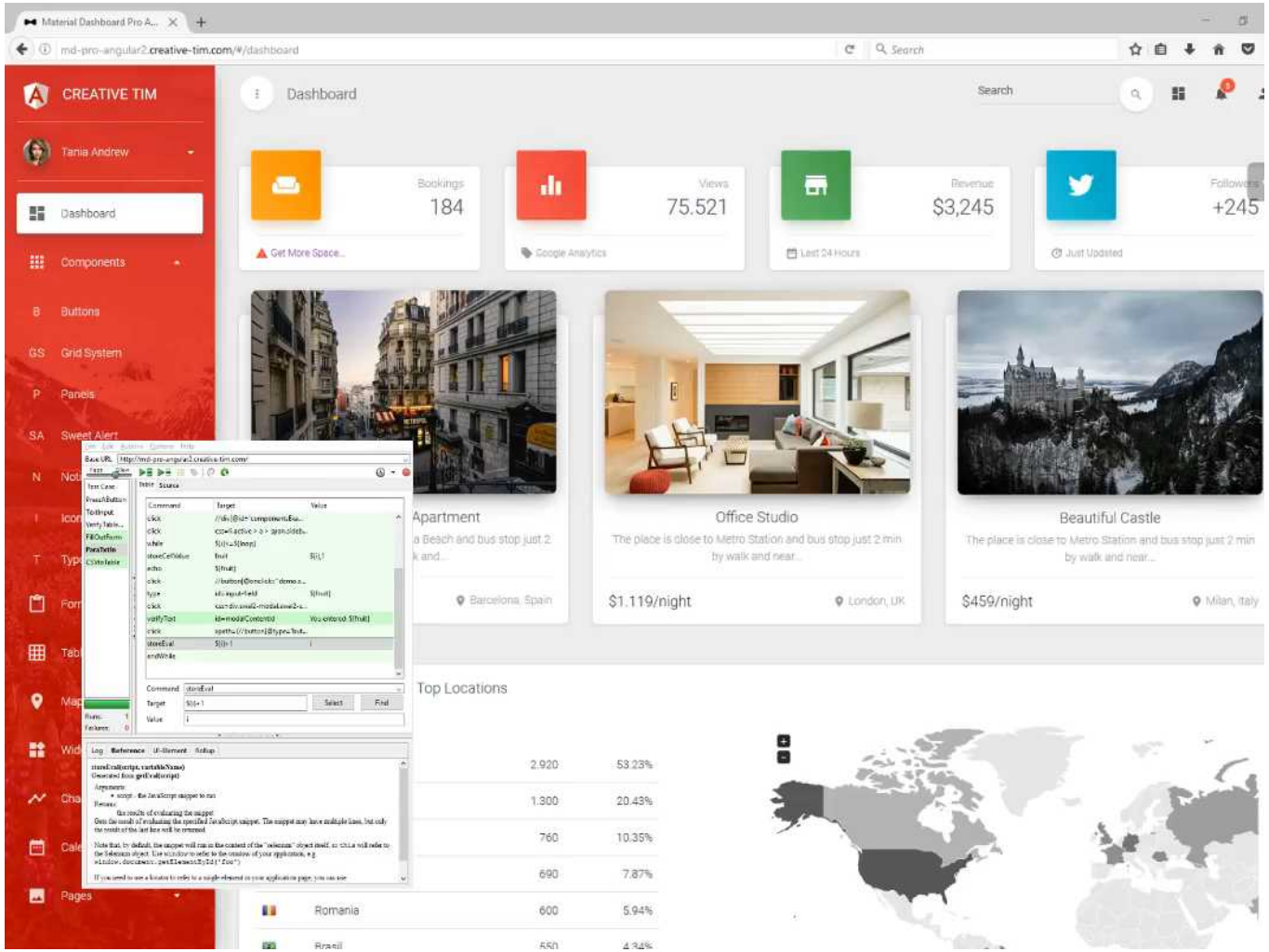
- Application requires high quality, so testing is essential
- Manually testing is difficult, time-consuming, and costly
  - Often done quickly when projects are under schedule pressure, leading to missed issues
  - Only run periodically, so issues can go undetected for a long period of time
  - Leads to increased costs as testing must be repeated when anything changes
- Automated tests can be run nightly or even whenever a developer checks in code
  - Instant feedback to the developers
  - Easy to run repeatedly whenever any change is made

Selenium Overview

Sandia National Laboratories

- Testers use the Selenium IDE to generate tests
  - Plug-in into Firefox
  - Navigate just like a user, identifying aspects to test and verify
- Can generate Java code using a standard test framework (JUnit)
  - Developers can tweak the generated code for minor changes to the system
- Java code can be added into an automated process that builds and tests the application
  - Generates a report so developers can know if anything broke

Selenium IDE

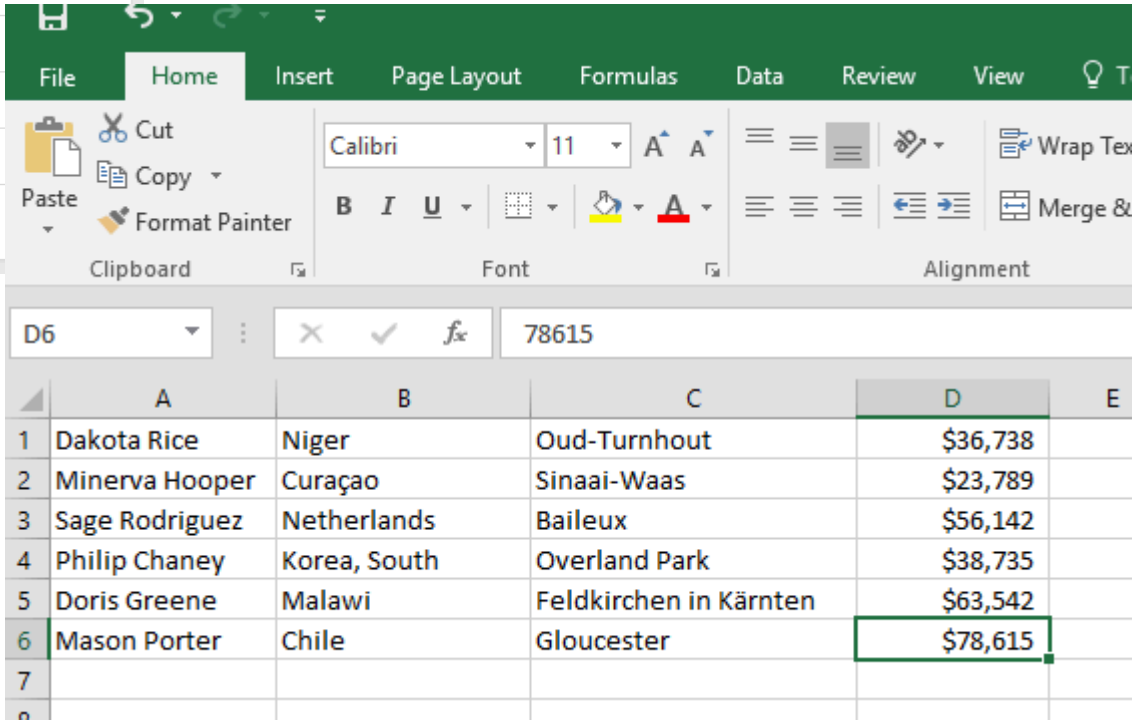


Example Application

Simple Table

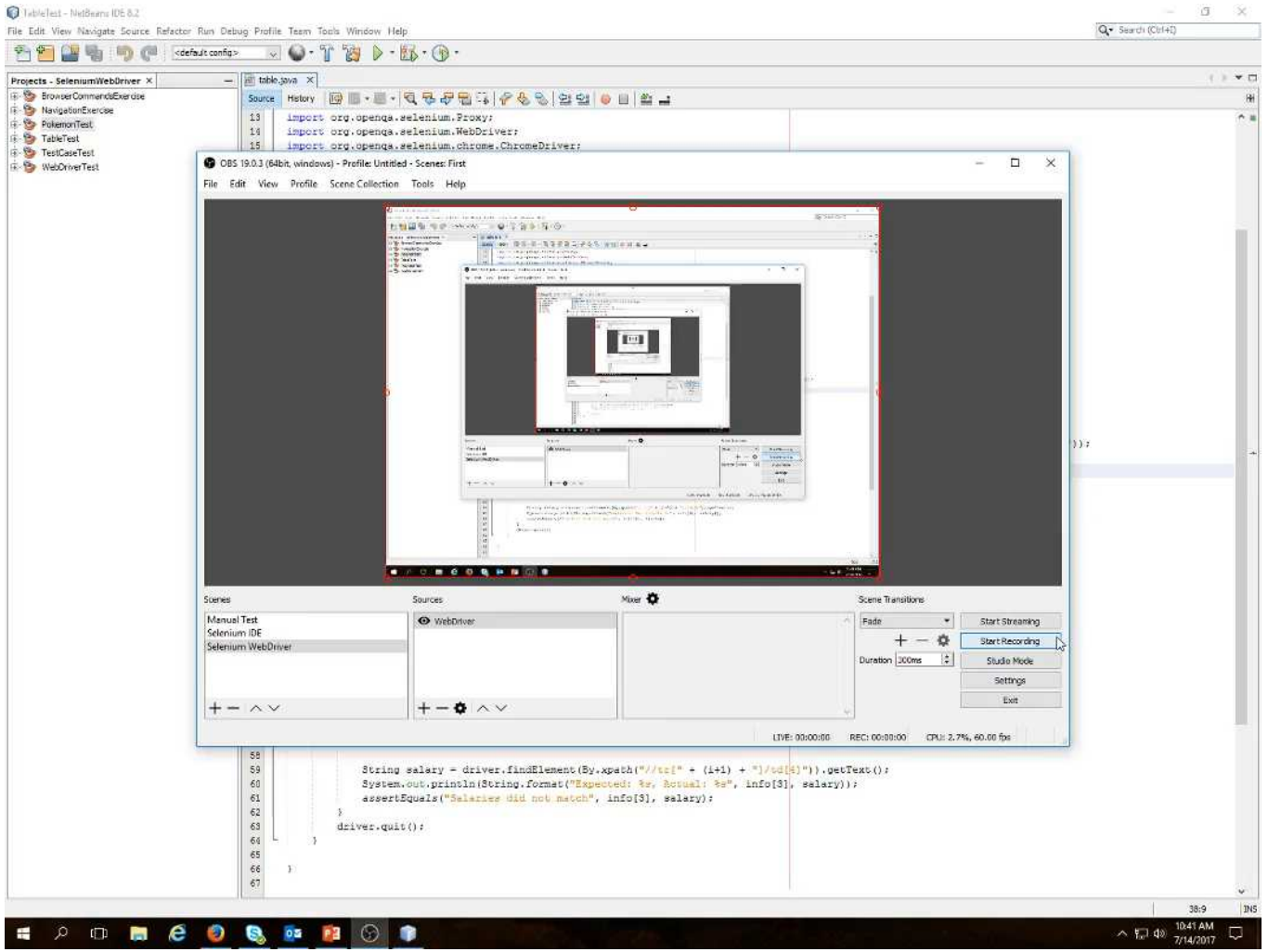
Name	Country	City	Salary
Dakota Rice	Niger	Oud-Turnhout	$36,738
Minerva Hooper	Curaçao	Sinaai-Waas	$23,789
Sage Rodriguez	Netherlands	Baileux	$56,142
Philip Chaney	Korea, South	Overland Park	$38,735
Doris Greene	Malawi	Feldkirchen in Kärnten	$63,542
Mason Porter	Chile	Gloucester	$78,615

- You can also verify values within a website by comparing them against expected values on an outside source like an excel file



	A	B	C	D	E
1	Dakota Rice	Niger	Oud-Turnhout	$36,738	
2	Minerva Hooper	Curaçao	Sinaai-Waas	$23,789	
3	Sage Rodriguez	Netherlands	Baileux	$56,142	
4	Philip Chaney	Korea, South	Overland Park	$38,735	
5	Doris Greene	Malawi	Feldkirchen in Kärnten	$63,542	
6	Mason Porter	Chile	Gloucester	$78,615	
7					

Generated Java Code



Conclusions

Sandia National Laboratories

- Selenium appears to be a viable automated testing solution
- Easy for Testers to use the Selenium IDE to generate new tests through the record feature
- Can generate Java code that can then be automated

Sandia National Laboratories

Thank you!