



Championing test automation at a new team:  
The challenges and benefits

Alan Leung @ PNSQC 2013

## About you?

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## My experience, experiences of audience, discussion

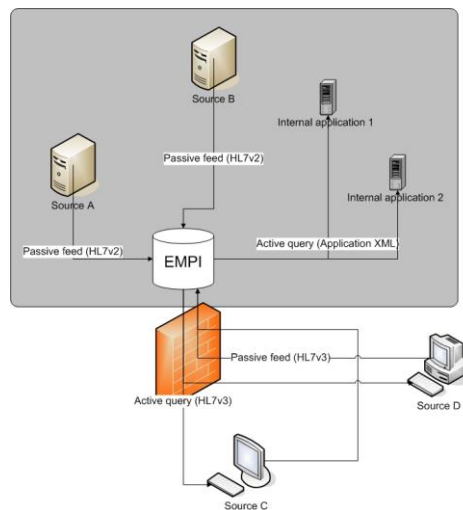
### Agenda

1. Background
2. Selecting tools
3. Custom framework within SoapUI
4. Process of introducing test automation
  - Overcoming barriers
  - “Guiding” with limited time
5. Our Results
6. Automated Testing Best Practices



## Context: Background of project

- Provincial health ministry
- Patient demographics
- EMPI
- Aggregation
- “Trusted Source”
- S2S/SOA
- Internal and external providers/consumers





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## Selecting tools

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- Better results with better tools
- Example: Building a deck



## Comparing tools

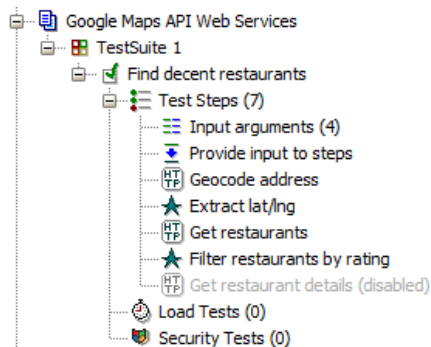
	Features	Maturity	Support	Extensibility
Drug domain test tool	Good	Good	X	OK
Project developed test tools	OK	X	OK	X
RESTClient	OK	OK	X	OK
SoapUI	Good	Good	Good	Good

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## Pilot SoapUI

### 1. Google Maps API

### 2. Active Query interface



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## Framework within SoapUI

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- Run TestCase
- Java extensions
- Event handlers



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## Process of introducing test automation

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### Overcoming barriers



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## Barriers to change, Impetus for change

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### Barriers

- Can it be automated?
- Can I trust its verification?
- How much time/effort would it take to automate?
- Will I be able to finish testing with this up-front effort that's necessary?
- Is it worth it? Cost vs. benefit?
- Can't we just do [X] manually?

### Motivations

- Testing SOA interfaces manually was not working well  
-> Open to other ideas
- Seeing working examples
- Have enthusiasm for technical solution

 Sierra Systems

## Working as a project team



### Keep in mind

- Don't step on egos
- Avoid interfering
  - E.g. Coding standards
- Don't provide solution if they just want answer to specific question



## Process of introducing test automation

### “Guiding” with limited time

- “Task” to accomplish
- How to learn/instruct

Task to accomplish	Guidance provided (if necessary)
Learning capabilities of tool	<ul style="list-style-type: none"> <li>• Working SoapUI example</li> <li>• PowerPoint slide deck</li> </ul>
Create valid web service requests	<ul style="list-style-type: none"> <li>• Existing test requests</li> <li>• Trial and error</li> <li>• Project documentation deliverables</li> <li>• HL7v3 crash course – 2 pg. Word doc and some PowerPoint slides</li> </ul>
Generate test data	<ul style="list-style-type: none"> <li>• Examples of string manipulation online</li> <li>• Likewise for use of JDBC TestStep</li> </ul>





## Interpret error messages

Web service error messages sometimes cryptic:

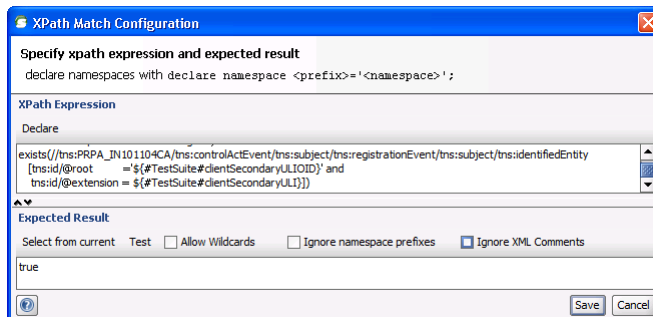
```
<v3:acknowledgementDetail typeCode="E">
  <v3:code code="SYN"/>
  <v3:text>cvc-datatype-valid.1.2.3: '' is not a valid value of union type 'uid'.</v3:text>
  <v3:location/>
</v3:acknowledgementDetail>
```

- Questions sometimes repeated
- Lesson learned: Compile FAQ



## Verify web service response

- E.g. With XPath expressions
  - Working SoapUI example
  - Online resources
  - Complex situations: Provided example case by case



## Verify web service triggered downstream processes

- Working SoapUI example
- PowerPoint slide deck explaining example

The screenshot shows the SoapUI interface with a POST request to a service endpoint. The response is an IBM Enterprise Viewer page. The search criteria is ABULI:621033539. The results table is as follows:

ID's	Score	Alberta ULI	PQE Name	PQE Address	Birth Date	Gender	Death Date
28651594 EMRMEDACCESS:G00E44L92J0KfV2CPR1	6.0	621033539	Flintstone, Ms. Fred Glory-Ann Jr.	Quarry Block A Medicine Hat, CA-AB T1B3C8 CA	1998-09-17	F	2010-09-17
28649482 EMRMEDACCESS:G50E44L92J0KfV2CPR2	6.0	621033539	Flintstone, Ms. Fred Glory-Ann Jr.	Quarry Block A Medicine Hat, CA-AB	1998-09-17	F	2010-09-17

## Logging of testing efforts

- Original Groovy script written by tester
- Converted to Java event handler

```

package ca.alberta.health.utility.testing.soapui.listener;

import java.io.FileOutputStream;

/**
 * Logs result of test case execution to a file for debugging or auditing purposes.
 * If the name of Test Suite of the test case contains "Re-usable Test Case code", the
 */
public class AfterRunResultsLogger extends TestRunListenerAdapter {

    public void afterRun(TestCaseRunner testRunner,
        TestCaseRunContext runContext) {

```

## Keys to success

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- Good technical background
- Working examples
- Available knowledge online
- Just in time training



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## Results - Better test coverage

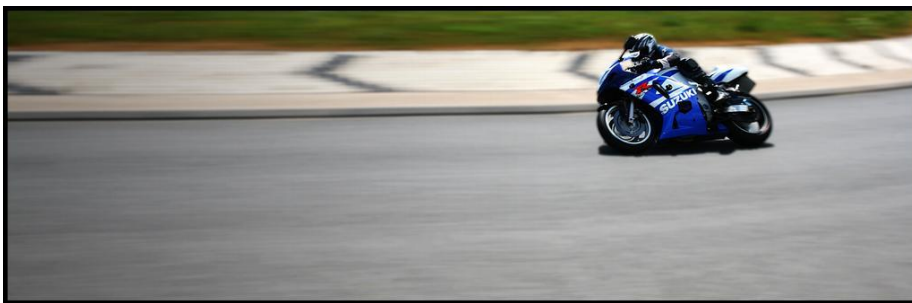
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- interface A: number of test scenarios 110 -> 480
- interface B: 88 -> 125



## Results - Faster execution of tests

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- interface A: 7 days -> 7 minutes
- interface B: 475 minutes -> 111 minutes
- Automated versus manual execution



## Results – Assistance to other teams

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- Re-usable test harnesses
  - UAT team
  - Application Maintenance Services team
- Further training done by system test team



## Results - Automated tests document application

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### How it's supposed to work

- Potentially stale documentation



### How it actually works

- Application behavior under test -> accurate
- Not subject to interpretation
- Test suite sometimes easier to locate
- Test results -> update business rules documentation



## Results - Improves overall team velocity

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- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Tester finds defect</li> <li>2. Developer changes code</li> <li>3. Developer verifies defect fixed</li> <li>4. Redeployment</li> <li>5. Tester verifies defect fixed</li> <li>6. Tester runs automated regression test suite</li> <li>7. <i>Fix introduced new defect, detected within minutes</i></li> </ol> | <p><b>Team velocity improved</b></p> <ul style="list-style-type: none"> <li>▪ Faster detection of inadvertent defects</li> <li>▪ Developer is not left “idle”</li> <li>▪ Prompts better unit testing</li> <li>▪ Fewer re-deployments -&gt; less impact to other teams</li> </ul> |
|---|--|



## Results – Re-usable Skills

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Examples of innovation by test team:

- automated logging of test execution
- parameterizing calls to Run TestCase
- calling batch file to execute external program from SoapUI
- resolving memory leak issues when looping execution with Groovy
- dynamically changing headers to reflect different security models via Groovy scripts and Properties
- checking for audit records via SQL statements/JDBC TestStep
- dynamically changing endpoints and parameters to reflect changing input records
- using Script Assertions as a reporting tool to write output to various files
- reading test or query data from flat files or database tables



## Viability of our approach elsewhere

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- Multi-year project
  - Certain that team will perform regression testing
- Releases every 6 months
  - Time to learn automated testing techniques
- “Gated” test phases
  - Able to assist downstream test teams



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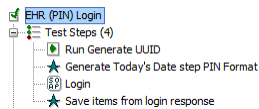


## Best practices

- Automatically log test execution
- Parameterize for uncertainty

```
<reasonCode code="{#Project#EmrMergeMessage}" codeSystem="2.16.840.1.113883.5.8"/>
```

- Eliminate duplication

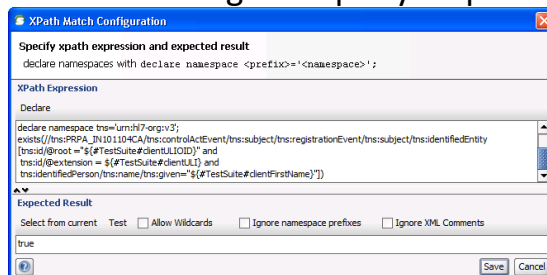


- Treat testing artifacts like application source code

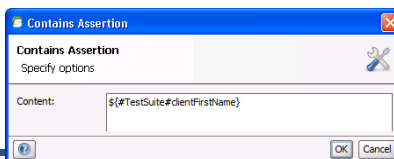


## Best practices - Verify validity of assertions

### Strict XPath Match against query response



### Versus Contains





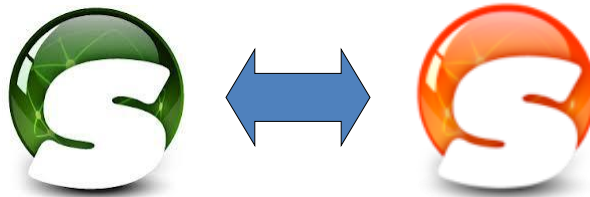
## Best practices – Pay for better tools

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- Disclosure: Not affiliated with SmartBear
- License cost versus consultant time

### SoapUI Pro

- Easier for users new to SoapUI
- Less time developing scripts
- Team support to manage shared SoapUI project file



## Conclusion

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- Good tools necessary
- Commitment
- Support
  - Management
  - “Development” team
- Benefits
  - Testing teams
  - Development teams
- Skills gained



Thank you, **Questions/Comments**  
welcome

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