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

Alan Leung @ PNSQC 2013

About you?
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
More context

- Multi-year project
- Releases every 6 months
- “Gated” test phases:
  - System Test
  - User Acceptance Testing
  - Stress and Load Testing
  - Production

Why automation? Testing S2S messaging is different from GUI testing

- XML -> HL7
- SOAP
- REST

More reasons to automate:
- New interfaces
- Not enough staff
Agenda

1. Background

2. Selecting tools
   • Better results with better tools
   • Example: Building a deck
## Comparing tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Features</th>
<th>Maturity</th>
<th>Support</th>
<th>Extensibility</th>
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<tbody>
<tr>
<td>Drug domain test tool</td>
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<td>Project developed test tools</td>
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<td>RESTClient</td>
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<tr>
<td>SoapUI</td>
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### Pilot SoapUI

1. Google Maps API
2. Active Query interface
Framework within SoapUI

- Run TestCase
- Java extensions
- Event handlers

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Process of introducing test automation

Overcoming barriers

Barriers to change, Impetus for change

**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
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

<table>
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<tr>
<th>Task to accomplish</th>
<th>Guidance provided (if necessary)</th>
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<tbody>
<tr>
<td>Learning capabilities of tool</td>
<td>• Working SoapUI example&lt;br&gt;• PowerPoint slide deck&lt;br&gt;</td>
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<tr>
<td>Create valid web service requests</td>
<td>• Existing test requests&lt;br&gt;• Trial and error&lt;br&gt;• Project documentation deliverables&lt;br&gt;• HL7v3 crash course – 2 pg. Word doc and some PowerPoint slides</td>
</tr>
<tr>
<td>Generate test data</td>
<td>• Examples of string manipulation online&lt;br&gt;• Likewise for use of JDBC TestStep</td>
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</table>
Interpret error messages

Web service error messages sometimes cryptic:

```xml
<faultstring>Wrong value: 'null' is not a valid value of union type 'uid'</faultstring>
```

- 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

Logging of testing efforts

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

```java
package ca.alsalae.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 "De-usable Test Case code", th
 **/
public class AfterRunResultCollector extends TestRunListenerAdapter {

    public void afterRun(TestCaseRunner testRunner,
                         TestCaseRunContext runContext) {

        // Log the results
    }
```
Keys to success

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

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Results - Better test coverage

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

Results - Faster execution of tests

- interface A: 7 days -> 7 minutes
- interface B: 475 minutes -> 111 minutes
- Automated versus manual execution
Results – Assistance to other teams

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

Results - Automated tests document application

**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

1. Tester finds defect
2. Developer changes code
3. Developer verifies defect fixed
4. Redeployment
5. Tester verifies defect fixed
6. Tester runs automated regression test suite
7. Fix introduced new defect, detected within minutes

Team velocity improved
- Faster detection of inadvertent defects
- Developer is not left “idle”
- Prompts better unit testing
- Fewer re-deployments -> less impact to other teams

Results – Re-usable Skills

Examples of innovation by test team:
- automated logging of test execution
- parameterizing calls to Run Test Case
- 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

- 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
- 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

- 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

- Good tools necessary
- Commitment
- Support
  - Management
  - “Development” team
- Benefits
  - Testing teams
  - Development teams
- Skills gained
Thank you, Questions/Comments welcome

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