The reliance on manual testing is the top technical challenge in app development.

World Quality Report, 2015/16

Test automation requires developers.
80% Manual testing

20% Automated testing

Higher coverage. Fewer tests. Model-based Test Coverage Design (MBT)
Present

Remaining manual tests
manual spec-driven and exploratory

Future

Higher coverage. Fewer tests.
Model-based Test Coverage Design (MBT)

Optimize

Session-Based Exploratory Testing

Explore

Progression testing

80%

20%

Manual testing

Automated testing
remaining manual tests
manual spec-driven and exploratory

80%

20%

Automated testing

Manual testing

Higher coverage. Fewer tests. Model-based Test Coverage Design (MBT)

Optimize

Test the unknown. Session-Based Exploratory Testing

Explore

Progression testing

Regression testing

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Higher coverage. Fewer tests. Model-based Test Coverage Design (MBT)

Test the unknown. Session-Based Exploratory Testing

Automating the automation framework for UI and API. Model-based Test Automation (MBTA)
Present

Future

Higher coverage. Fewer tests. Model-based Test Coverage Design (MBT)

Test the unknown. Session-Based Exploratory Testing

Automating the automation framework for UI and API. Model-based Test Automation (MBTA)

Increase the testing window. Test-Driven Service Virtualization

Provide matching test data in time. Stateful Test Data Management

Automate build to release process. Continuous Integration/Testing/Delivery (CI, CT, CD)

Distributed Execution

remaining manual tests
manual spec-driven and exploratory

automated UI tests

automated load tests
UI and API

automated API tests
Virtualize data and systems
key enabler for high automation

80%

85%

20%
$M/N =$ defect rate 

$\text{max}$ critical defects

weight

risk coverage

defect rate

test cases
Intuitive Test Design

Methodical Test Design

Achieve maximum risk coverage with a minimal number of powerful test cases.
Get a Quote

<table>
<thead>
<tr>
<th>Name</th>
<th>Instance Usage</th>
<th>StraightT...</th>
<th>&lt;75</th>
<th>125-200</th>
<th>&gt;200</th>
<th>EMPTY</th>
<th>INVALID</th>
<th>75</th>
<th>125</th>
<th>126</th>
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<tbody>
<tr>
<td>choose type of vehicle</td>
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</tr>
<tr>
<td>Truck</td>
<td>100%</td>
<td>BMW</td>
<td>BMW</td>
<td>BMW</td>
<td>BMW</td>
<td>BMW</td>
<td>BMW</td>
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</tr>
<tr>
<td>Bike</td>
<td>100%</td>
<td>75-124</td>
<td>BMW</td>
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<td>BMW</td>
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<td></td>
</tr>
<tr>
<td>Car</td>
<td>100%</td>
<td>&gt;200</td>
<td>BMW</td>
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<td>BMW</td>
<td>BMW</td>
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</tr>
</tbody>
</table>

| choose insurance cover      |                |              |     |         |      |       |         |    |     |     |
| provide vehicle details     |                |              |     |         |      |       |         |    |     |     |
| make                        | 100%           |                |     |         |      |       |         |    |     |     |
| make                        | 100%           |                |     |         |      |       |         |    |     |     |
| engine performance [kW]*    | 100%           |                |     |         |      |       |         |    |     |     |

| provide insurant details    |                |              |     |         |      |       |         |    |     |     |
| date of manufacture*        | 100%           | 01/01/...    | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... |
| number of seats*            | 100%           | 5            | 5    | 5       | 5     | 5      | 5       | 5     | 5    | 5    |
| fuel type*                  | 100%           | Petrol       | Petrol | Petrol | Petrol | Petrol | Petrol | Petrol | Petrol | Petrol |
| list price ($)              | 100%           | 50000        | 50000 | 50000   | 50000 | 50000  | 50000   | 50000 | 50000 | 50000 |
| annual mileage [mi]*        | 100%           | 10000        | 10000 | 10000   | 10000 | 10000  | 10000   | 10000 | 10000 | 10000 |
| name*                       | 100%           | Thomas       | Thomas | Thomas  | Thomas | Thomas | Thomas  | Thomas | Thomas | Thomas |
| date of birth*              | 100%           | 01/01/...    | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... |
| address*                    | 100%           | 10 Liver...   | 10 Liver... | 10 Liver... | 10 Liver... | 10 Liver... | 10 Liver... | 10 Liver... | 10 Liver... | 10 Liver... |
| occupation*                 | 100%           | Employ...    | Employ... | Employ... | Employ... | Employ... | Employ... | Employ... | Employ... | Employ... |
| start date*                 | 100%           | 01/01/...    | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... | 01/01/... |
| insurance sum*              | 100%           | 10.000       | 10.000 | 10.000   | 10.000 | 10.000  | 10.000   | 10.000 | 10.000 | 10.000 |
| merit rating*               | 100%           | Bonus 2      | Bonus 2 | Bonus 2 | Bonus 2 | Bonus 2 | Bonus 2 | Bonus 2 | Bonus 2 | Bonus 2 |
| damage insurance*           | 100%           | Full Co...   | Full Co... | Full Co... | Full Co... | Full Co... | Full Co... | Full Co... | Full Co... | Full Co... |

| price table                 | 48%            |               |     |         |      |       |         |    |     |     |
| price per year ($)          | 48%            | $500          | $400 | $600    | $500 | $600   | $500    | $700 | $550 | $700 |
| premium                     |               |               |     |         |      |       |         |    |     |     |

Auto generate…
Orthogonal Arrays
Linear Expansion
Pairwise Tests
All Combinations
Negative Tests
Boundary Tests
Test the unknown. Session-Based Exploratory Testing

Present

Future

remaining manual tests
manual spec-driven and exploratory

automated UI tests

automated load tests
UI and API

automated API tests

80% 20%

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I'm an automated test case.

→ Automation is doing, what automation does.
Risks
I’m the same test case executed manually.

I’m an automated test case.
Exploratory Branching
The art of deciding on what to test next.

Plan as you test!
- Story-Based
- Motivating
- Credible

Test Cases vs. Scenarios
- Pre-specified inputs vs. hypothetical situation

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Analyze Potential Risks
Problem vs. No Problem

Specification Based Testing

Monitor Known Risks
Pass Result vs. Fail Result

Exploratory Testing

*That's an illustration. Don't confuse it with reality.
Exploratory Testing
« Testing as performance »

Intelligent Testing
Create new test ideas based on what you have learned

Analyze Potential Risks
Focus on the things you don’t know

High Information Value
Learn something new

Low Risk Coverage
Hard to scale continuously because it relies on humans

Problem Detector

Formal Testing
« Testing as artifact creation »

Mechanical Testing
Process pre-defined data in pre-designed steps

Monitor Known Risks
Confirm what you already know (measurable things)

Low Information Value
Repeat what you have already learned

High Risk Coverage
Easy to scale because it’s parallelizable

Change Detector
Automating the automation framework for UI and API.
Model-based Test Automation (MBTA)
Start testing early, shift left test automation

Efficiency Gain

+4x Creation

+6x Maintenance

+20x Execution
Record Replay

Test Automation Framework (TAF)

Model-Based Test Automation (MBTA)

Script-Based (Coded TAF)

B and/or T change requires re-recording. Manually, coded framework.

Test Data Keywords ...

Model-Based (automated TAF)

Automating the automation framework.

Test Coverage Design (MBT)
Automating the automation framework for UI and API. Model-based Test Automation (MBTA)
Before Cloud

- 60% web pages < 50 requests/page
- 80% web pages < 200KB JS/page
- Release cycle > weeks

Cloud Age

- 60% web pages > 100 requests/page
- 80% web pages > 200KB JS/page
- Release cycle < days, minutes, sec

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Cloud economy of scale

15 + 36 + 14 & hybrid

GEOGRAPHIC REGIONS
Increase the testing window.
Test-Driven Service Virtualization
Provide matching test data in time.
Stateful Test Data Management
On average, organizations require access to 33 systems for development or testing.

Welcome to the tester’s hell.

Testing Present

18
Average # of systems with unrestricted access

96
% of testers have restricted test lab access

Enterprise system landscapes are alike disease gene networks.

*voke, market snapshot report on service virtualization - 2012
Instable or not available applications

Test Data search & preparation

(expensive) 3rd party or Cloud based services

Decoupled, outsourced Development & coordinated Deployment, multiple Vendors
Virtualising systems replicates system complexity.

Virtualising components creates inconsistencies.

Virtualisation is not a fallback plan.
Virtualisation is not a fallback plan, it’s the first line of defence.
- **Exploratory Testing**
- **Model-Based Test Design (MBT)**
- **Test-Driven Service Virtualisation**
- **Model-Based**
  - Cucumber + Framework
  - Selenium + Traditional Commercial Automation Tool

**Risk Coverage**

- **80%**
- **30%**
- **10%**

**Systems of Engagement**
**Systems of Record**
【Present】

80%

remaining manual tests
manual spec-driven and exploratory

85% +

automated UI tests
automated load tests
UI and API

【Future】

Higher coverage. Fewer tests.
Model-based Test Coverage Design (MBT)

Test the unknown.
Session-Based Exploratory Testing

Optimize

Automating the automation framework for UI and API.
Model-based Test Automation (MBTA)

Explore

Increase the testing window.
Test-Driven Service Virtualization

Automate

Provide matching test data in time.
Stateful Test Data Management

Manage

Integrate

Automate build to release process.
Continuous Integration/Testing/Delivery (CI, CT, CD)

Distributed Execution

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“It should be considered by enterprises that have struggled to make test automation work, and by those seeking to support agile continuous automation practices.”
The Tricentis Tosca X-Factor

Continuous Testing Platform

Optimize
- Risk-Based Test Management
- Model-Based Test Coverage Design

Explore
- Session-Based Exploratory Testing
- Model-Based Test Automation

Automate
- Browser-Based Load Testing
- Test-Driven Service Virtualization

End-to-End Functional & Load Testing

- **2X** Risk Coverage
- **2-3X** Release Speed
- **30-40%** Cost Reduction

**10X** Compared to other testing tools.
APAC fast-growing customer footprint
Most enterprise customers are on level M1 when they decide for Tosca.
Thomas Hadorn
Managing Director APAC at Tricentis
+61 424 282 757
t.hadorn@tricentis.com