Vision of Smarter Software Testing
Faster, more thorough and cheaper

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Overview

• Some academic chit chat?
• Manual testing is not enough.
• Automated testing, Twente style.
• Atomyste results.
Some academic chit chat?

- The universe consists of about $10^{80}$ atoms.
- Your average software system consists of at least $10^{100}$ states.
The old days
The new days
What’s different?

Old days

10

Now

10

Modern days

10

10

10

10

10

10

10

10

10

10

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Testing is like playing battleship

But the board’s a little bigger: $10^{50} \times 10^{50}$
Manual testing is not enough

Systems are too big to \textit{only} test by hand

- Humans are slow;
- Humans are not accurate enough;
- Humans are expensive.
Testing Research at Twente University

• Test theory: ioco;
• Test tooling: TorX.

We can automatically:
• Generate tests;
• Execute tests; and
• Evaluate the outcome of the test.
Automated testing with TorX

UML Promela

Model

TorX

Adapter

http corba

IUT
Atomyste: Atom splitting in Embedded System Testing

Atomyste

arcade game → enter money → enter €3

Model → TorX → Adapter

Action Refinement

* Clean Adapter
* Clean Model
* Automatic

?? €3 ??

IUT
Atomyste

abstract system specification -> abstract test suite

refined system specification -> refined test suite

system refinement

refined system specification

system implementation

executable tests

test application

verdict

formal world

congrete world

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Atomyste: Atom splitting in Embedded System Testing

Abstract

System specification

Test derivation

Refined test derivation

Test implementation

System executable

Formal world

Concrete world

Test suite

Verdict

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Atomyste: Atom splitting in Embedded System Testing

Atomyste

abstract
test
derivation

abstract
system
specification

refined
test
derivation

refined
system
specification

system
refinement

system
implementation

refined
testsuite

test
refinement

test
implementation

system
executable

application

formal world

concrete world

verdict

abstract
system
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Corion: Progress/UT spin off

Model Based System Development

• Model Driven System Development;
• Model Checking;
• Model Based Testing.
Conclusion

• Modern day systems are too big to test by hand;
• Model Based Testing enables completely automated testing;
• Atomyste enables automated model and test case refinement;
• Corion offers Model Based Testing.