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IoT Testware

Modern Automated Test Solutions for IoT Components and Systems

Ina Schieferdecker, February 22, 2018, Berlin

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- over 500 employees
- appr. 35 European projects
- appr. 100 industry partners
- appr. 220 industry projects

We actively shape the networked world and make it secure, reliable, scalable as well as trustworthy!

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Did you know that **YOUR PHONE**...

...has been **tested** using **ETSI** specifications written in **TTCN-3** ?

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THE TESTING AND TEST CONTROL NOTATION

- Internationally standardized testing language for formally defining test scenarios
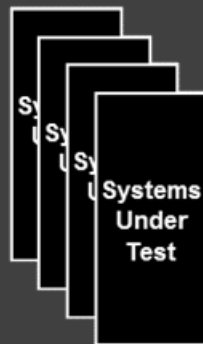- Designed specifically for testing


```
testcase Hello_Bob () {
        p.send("How do you do?");
        alt {
        []p.receive("Fine!");
                {setverdict( pass )};
        [else]
                {setverdict( inconc )}   //Bob asleep!
        }
}
```
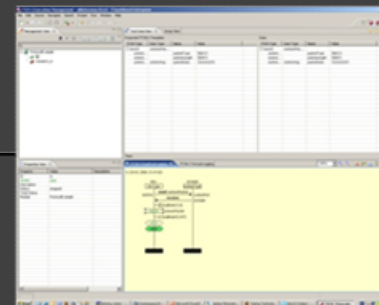
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TEST EXECUTION

Test Specification

Test System

TTCN-3
Test
Engine

+

TCI Adaptors

TRI Adaptors

TTCN-3

Systems Under Test

Communication / Invocation

Automated Test Execution and Reporting

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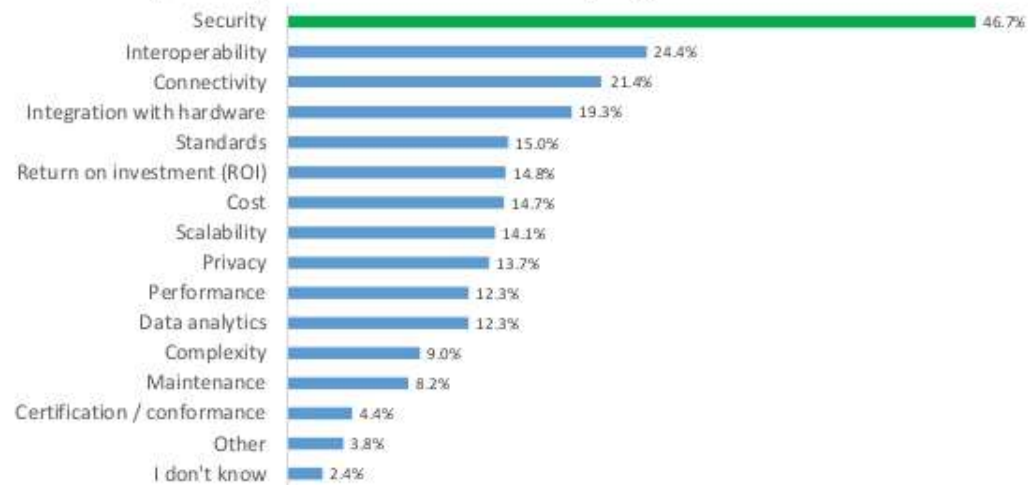detecting vulnerabilities using fuzzing

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SMART FUZZING

Risk Assessment

Security Testing

Model-based Testing

DIAMONDS

CHALLENGE IOT TESTING

TOP IoT CONCERNS

What are your top 2 concerns for developing IoT solutions?

Concern	Percentage
Security	46.7%
Interoperability	24.4%
Connectivity	21.4%
Integration with hardware	19.3%
Standards	15.0%
Return on investment (ROI)	14.8%
Cost	14.7%
Scalability	14.1%
Privacy	13.7%
Performance	12.3%
Data analytics	12.3%
Complexity	9.0%
Maintenance	8.2%
Certification / conformance	4.4%
Other	3.8%
I don't know	2.4%

IoT Developer Survey 2017 - Copyright Eclipse Foundation, Inc.

CHALLENGE IOT TESTING

Combination of various testing approaches needed

System Testing

Software Testing

Protocol Testing

Security Testing

Test Automation

Model-Based Testing

…

IOT-TESTWARE

https://github.com/eclipse/iottestware.git

THE OPEN SOURCE TEST EXECUTION TOOL

EXAMPLE: MQTT BROKER EVALUATION (AS OF JULY 2017)

Broker	Version	PASS		FAIL		INCONCLUSIVE	
		#	%	#	%	#	%
Mosquitto	1.4.14	40	88,89%	3	6,67%	2	4,44%
VerneMQ	1.1.0	39	86,67%	3	6,67%	3	6,67%
HiveMQ	broker.hivemq.org	39	86,67%	4	8,89%	2	4,44%
EMQ	2.0	36	80,00%	7	15,56%	2	4,44%
lannister	?	31	68,89%	12	26,67%	2	4,44%
ActiveMQ	5.14.5	31	68,89%	12	26,67%	2	4,44%
RSMB	?	26	57,78%	17	37,78%	2	4,44%
RabbitMQ	3.5.7	21	46,67%	24	53,33%	0	0,00%
Mosca	2.5.1	19	42,22%	24	53,33%	2	4,44%
Moquette	0.10	16	35,56%	29	64,44%	0	0,00%
HBMQTT	0.9	15	33,33%	30	66,67%	0	0,00%

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SUMMARY

✓**Advanced testing technology**

✓**(Open source) IoT-Testware (code)**

✓**Standardized IoT test purposes**

✓**Certified Professionals for IoT**

Please be invited to

use or contribute

to our IoT Testware !

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