Internet on Wheels

Workshop Testnet

10 juli 2017

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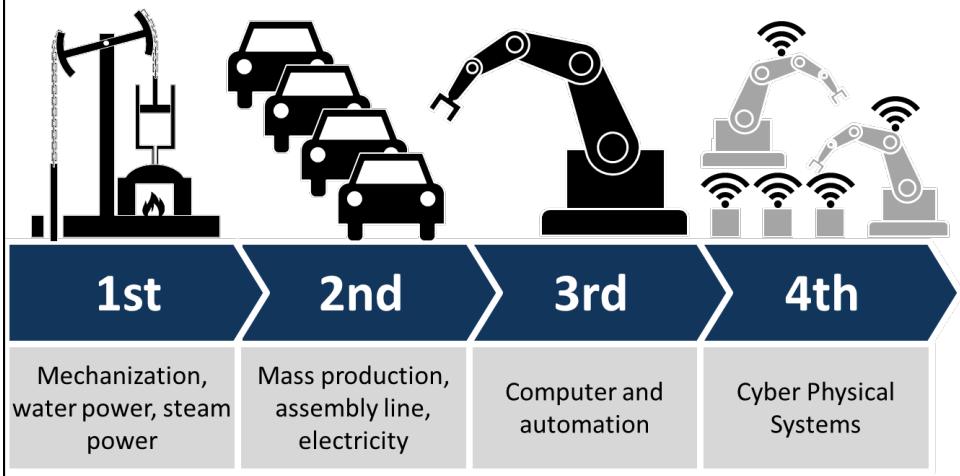
Agenda

- Introductie
  - Uitdelen USB ivm installeren software
- Internet of Things
- DASH
- Pauze:
  - Software activeren
- Aan de slag met Dash

Line-up van vandaag

- Parasoft
  - Ruben / Rix
  - Chantal / Karina
- Dash
- Amazing Maze
- SOAtest / Virtualize
  - Software installeren (gedurende introductie)
  - Licentie-sleutel (in de pauze)

4de industriële revolutie



4de industriële revolutie

- Cyber Physical Systems
  - Systems of Systems
- "Computer got out of his cage"
  - Flying and ridings drones
- "Internet of Things"
  - Belangrijk onderdeel van deze revolutie

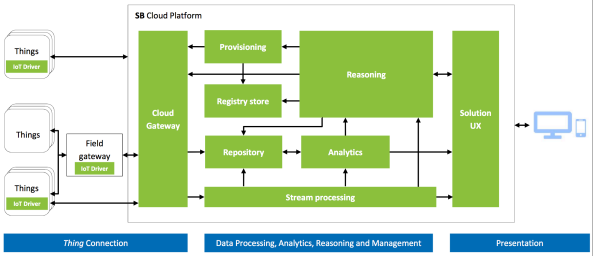
4de industriële revolutie

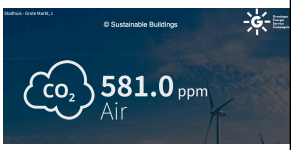
- Cyber Physical Systems
  - Systems of Systems
- "Computer got out of his cage"
  - Flying and ridings drones
- "Internet of Things"
  - Belangrijk onderdeel van deze revolutie
  - Toepassingen in de "fysieke wereld"

IoT: Connected systems

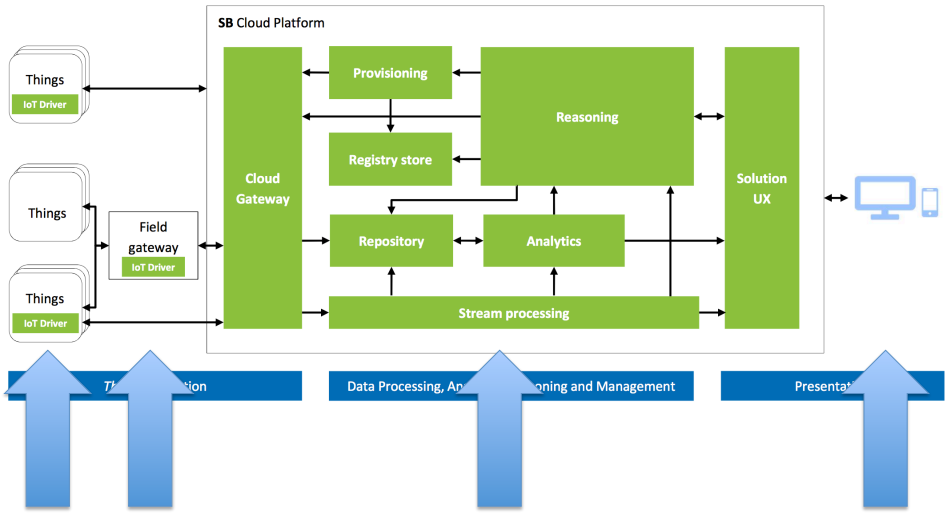
- Zr.Ms. De Ruyter (F104)
- Radar systems (SMART-L)

IoT: Sustainable Buildings (1)

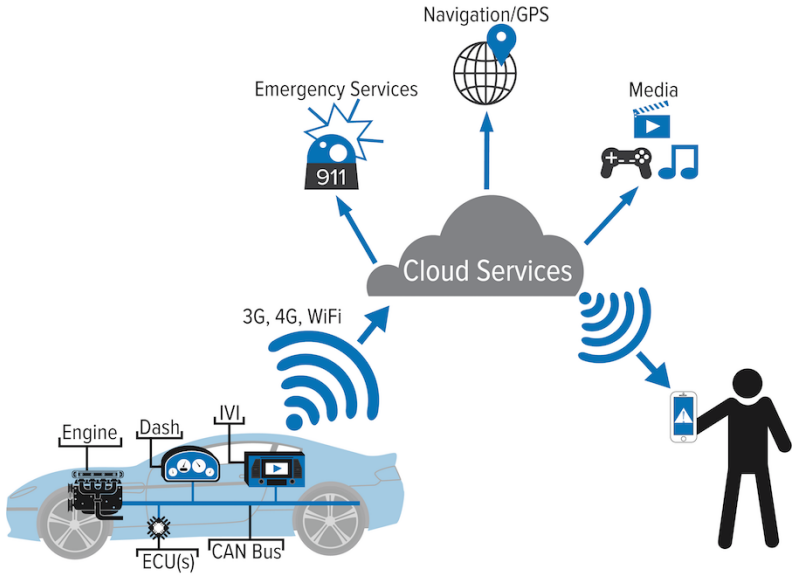




IoT: Sustainable Buildings (2)



IoT: Connected Car



IoT: Dash, onze connected car

DASH

- Educational Robot
  - Programmeren met Apps
- Sensoren:
  - Geluid, afstand, beweging
- Actuatoren:
  - Geluid, rijden, kleuren
- Communicatie:
  - Bluetooth Low Energy (BLE) protocol

DOEL: WIE-KENT-KWIS

- Caviabak uit de Wie-Kent-Kwis (vanaf min 1):
  https://www.youtube.com/watch?v=i2NIhn1gKX

DOEL: Amazing Maze

Test setup (1)

- Parasoft tooling communicatie

PARASOFT. SOAtest™

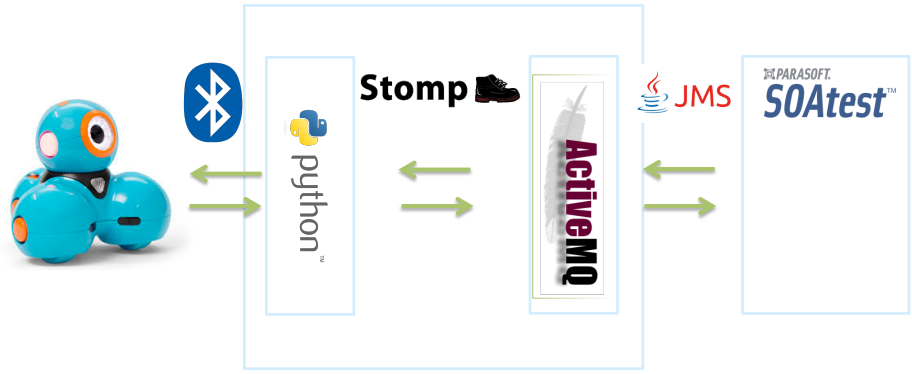
Test setup (2)

- Parasoft tooling communicatie

PARASOFT. SOAtest™

Test setup (3)

- Parasoft tooling communicatie



Connectivity

- DASH: Spreekt Bluetooth Low Energy (BLE)
- Python (Ruben.py): BLE & STOMP
  - Polling van Dash
  - Omzetten van berichten in commando's
- ActiveMQ: STOMP & JMS
  - STOMP voor interne communicatie
  - JMS voor externe communicatie

Twee soorten aansturing

1. Pro-actief / vanuit een model:
   a. Direct commando's
   b. Interactief (reageren op omgeving)
2. Reactief, vanuit sensor data (a la Cavia)
   a. Bij botsing een keuze maken

Twee soorten ontwerpen

1. Programma direct op Robot uitproberen (geen testomgeving)
2. Programma testen met gesimuleerde data (gebruik van virtualize voor testen)

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Nu de praktijk (1)

SOAtest:

- Test tool voor oa JMS communicatie
- Diverse commando's versturen, eventueel vanuit een tabel (spreadsheet)
- Call-back tool voor het ontvangen van (asynchrone) berichten, en daar op te reageren
- Extra logica via Python

Nu de praktijk (2)

Virtualize:

- Simulatie tool voor o.a. JMS communicatie
- Diverse commando's versturen, op basis van binnenkomende events
- Proxies om live-verkeer te volgen / recording

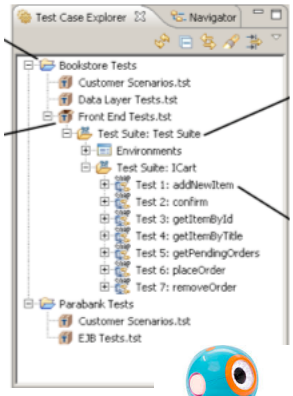
Algemeen:

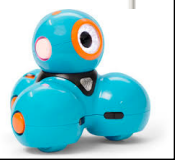
- Queue Browser om JMS-queues te volgen

Nu de praktijk (3)

Eclipse Workspace

- Eclipse Project
  - SOAtest test file: FOO.tst
    - Environments
    - Datasources
    - Properties
    - Test suites
      - SOAPclient
      - Dbtool
      - CallBack tool





Connectivity (1)

ActiveMQ (op laptop van Ruben)

- Instelling:

  tcp://192.168.1.100:61616

  org.apache.activemq.jndi.ActiveMQInitialContextFactory

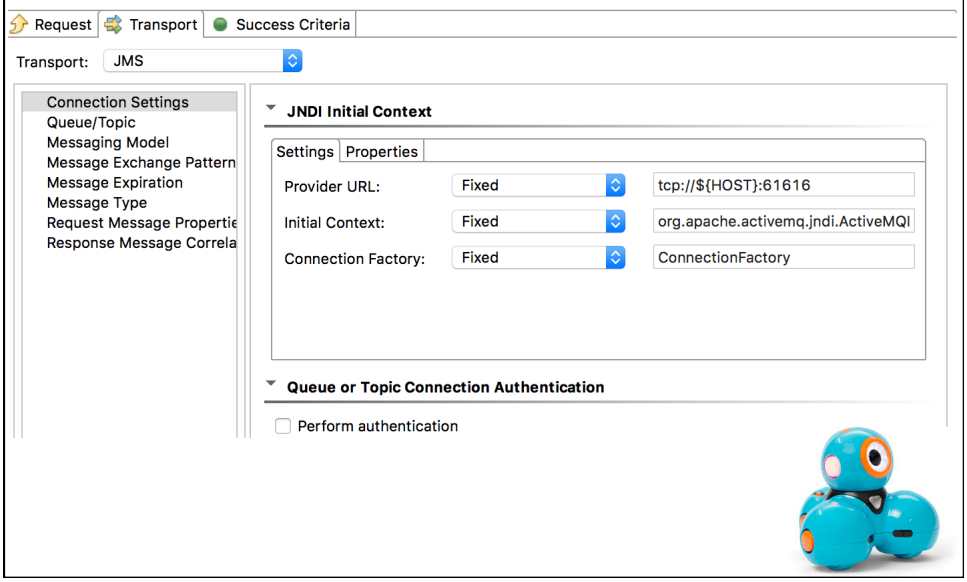
  ConnectionFactory

- Queues:

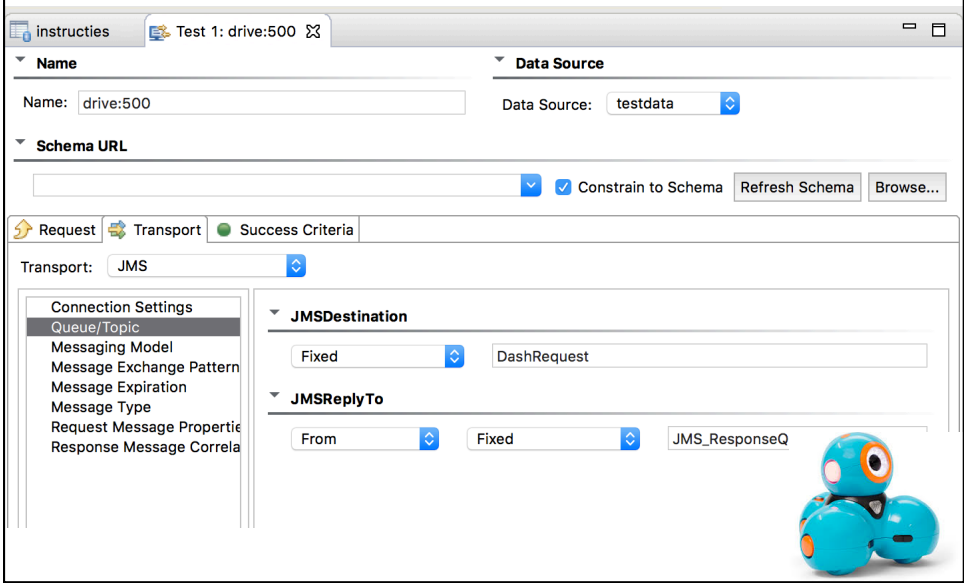
  DashRequest

  DashResponse

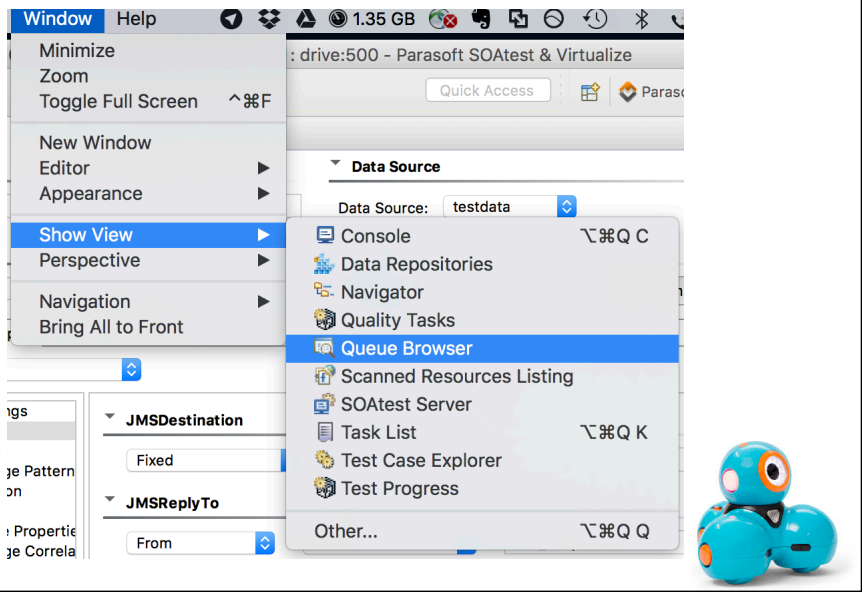
Connectivity (2)



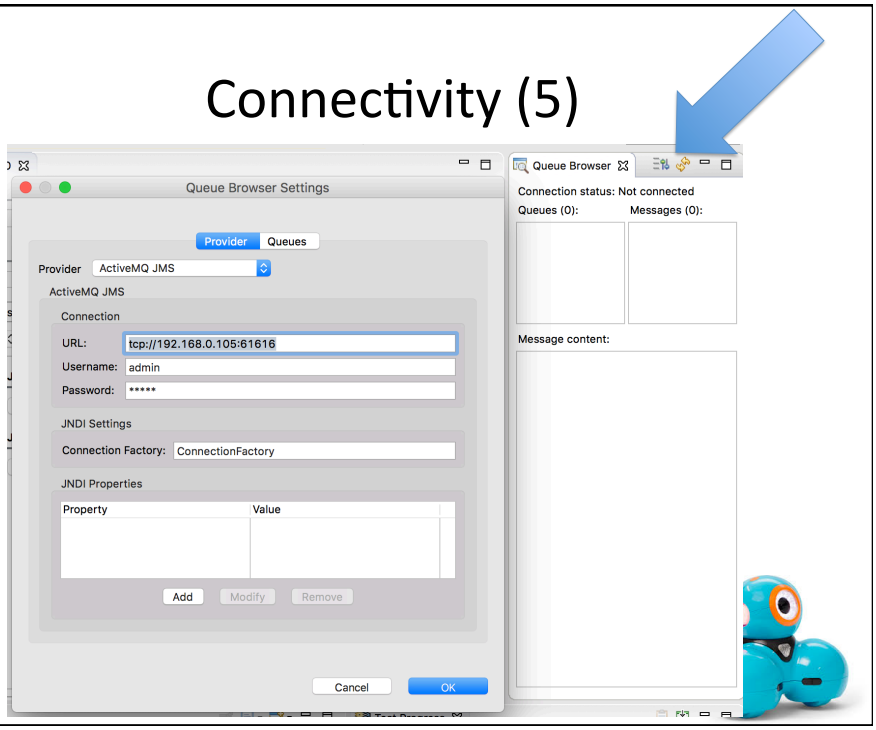
Connectivity (3)



Connectivity (4)



Connectivity (5)



Commando's (1)

- move:dist:speed
  - dist in mm
  - speed in mm/sec
- turn:degr:speed
  - degr in graden
  - speed in mm/sec
- stop
- ear_color:red,green,white,blue,orange

Commando's (2)

instructies | Test 1: drive:500

General

Name: instructies Type: Table

Rows

All Range From: 1 To: 11

Table

First row specifies column names

	A	B	C	D	E
	command	arg1	arg2	wait	
1	drive	50		5000	
2	stop				
3	turn	-90	100	1000	
4	drive	50		4000	
5	turn	90	100	1000	
6	drive	50		4000	
7	turn	90	100	1000	
8	drive	50		4000	
9	turn	-90	100	1000	
10	drive	50		5000	
11	stop				
12					

Commando's (3)

instructies | Test 1: drive:500 | Test 1: do-it

Name

Name: do-it

Data Source

Data Source: instructies

Schema URL

Constrain to Schema Refresh

Request | Transport | Success Criteria

Input Mode: Literal

Text File Data Source

MIME Type: text/xml

```
1 ${command}:${arg1}:${arg2}
```

DOEL: Amazing Maze

- 2:30 minuten voor Dash om uitgang te halen
  - https://www.youtube.com/watch?v=ECfeMl92-o8

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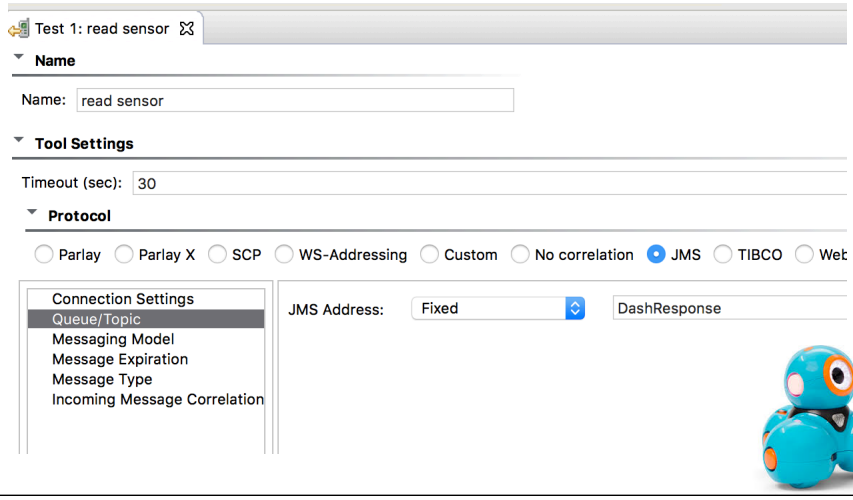
Sensor data gebruiken

Interactief reageren door sensor-data te gebruiken:

- JMS Queue: DashResponse
- Berichten als:
  - <prox_right>20</prox_right>
  - <prox_left>70</prox_left>
  - <moving>1</moving>
  - <roll>100</roll>
  - <pitch>100</pitch>
  - <acceleration>1100</acceleration>

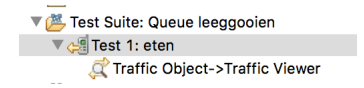
Sensor data gebruiken (1)

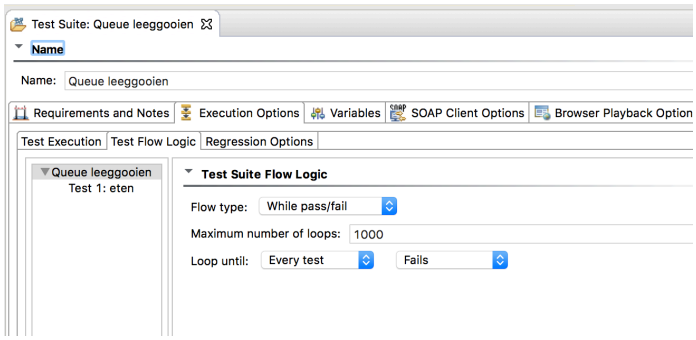
- SOAtest heeft “Call Back tool” om queues te lezen:



Initialiseren

Queues leeghalen (bij start):

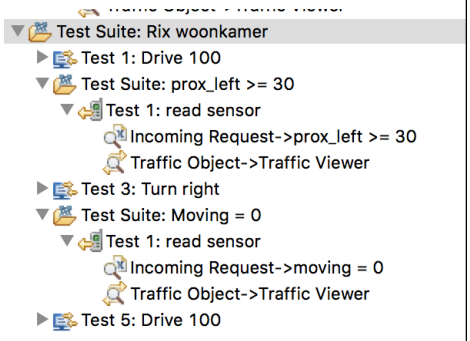




Algoritme

Standaard loopje:

- Drive
- Check afstand tot muur
- Draai
- Wacht tot je stil staat



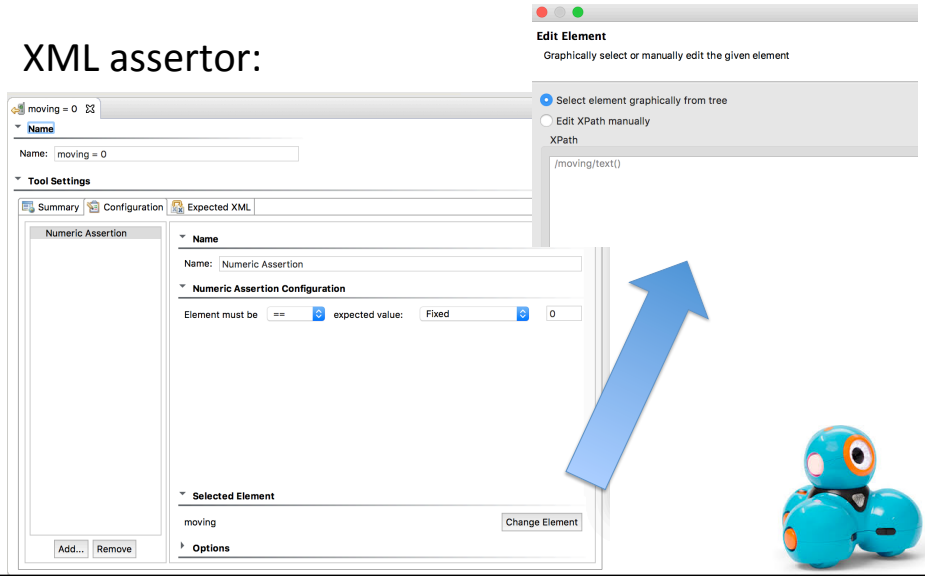
Hoe nu sensor checken

Polling sensor:

- While loop tot status is bereikt
- Lees sensor data
  - Gebruik callback tool
- Check tot bepaalde status optreed
  - Gebruik XML assertor
  - Op Xpath van bericht, bijvoorbeeld:
    - /moving/text() = 0
    - /prox_left/text() >= 30

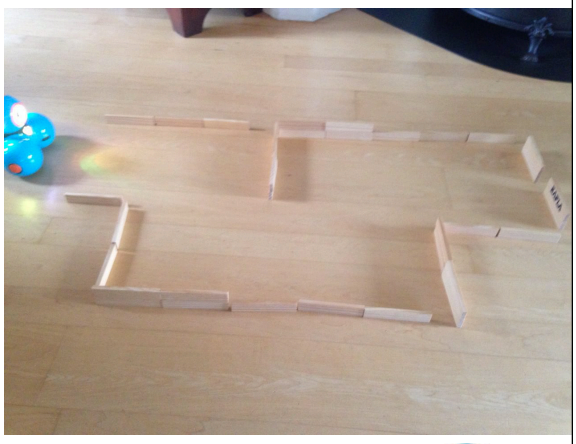
Hoe nu sensor checken

XML assertor:



Programma

- Test Suite: Test Suite
  - Environments
  - Test Suite: Queue leeggooien
  - Test Suite: Rix woonkamer
    - Test 1: Drive 100
    - Test Suite: prox_left >= 30
    - Test 3: Turn right
    - Test Suite: Moving = 0
    - Test 5: Drive 100
    - Test Suite: prox_left >= 30
    - Test 7: Turn left
    - Test 8: ear red
    - Test Suite: Moving = 0
    - Test 10: Drive 100
    - Test Suite: prox_left >= 30
    - Test 12: Turn left
    - Test Suite: Moving = 0
    - Test 14: Drive 4
    - Test Suite: prox_left >= 30
    - Test 16: Turn right 2
    - Test Suite: Moving 4
    - Test 18: Drive 100
    - Test Suite: prox_left >= 30
    - Test 20: stop



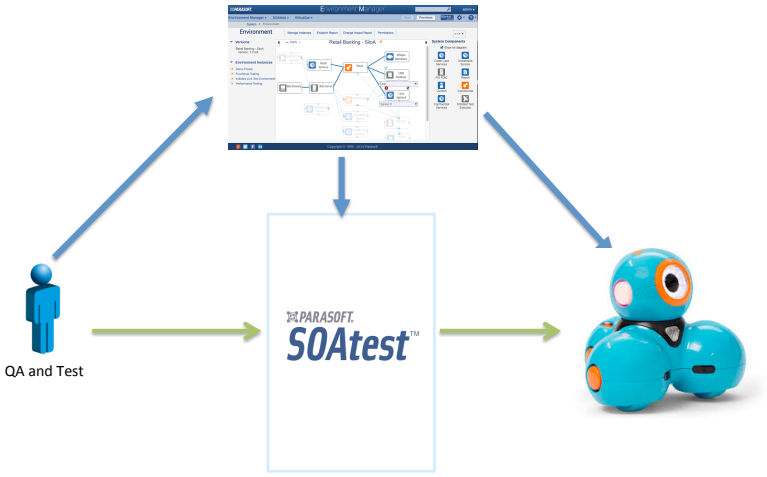
NEXT STEPS

Vervolg stappen

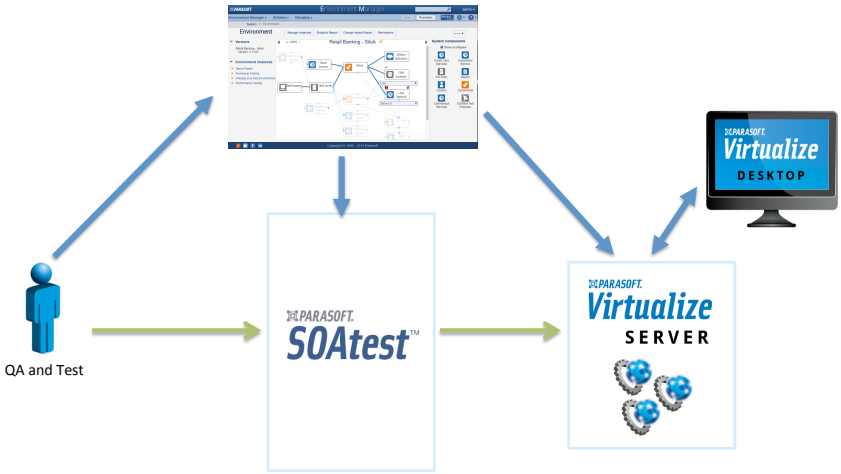
- Combinatie van 2 aanpakken:
  - "model" (XLS) en sensor data
- Simuleren van sensor data:
  - Recording van gegevens
  - Tijd-registratie
- Simuleren van complete "maze"

Test setup (1)

Test setup (2)



Test setup (3)



APPENDIX