The IoT Solutions Space:

Real-Digital World Data Interoperability in the Product-Service Lifecycle: the PSYMBIOSYS IoT Platform

IoT week 2017 - Geneva, June 8th

Uri Shani – IBM Haifa Research

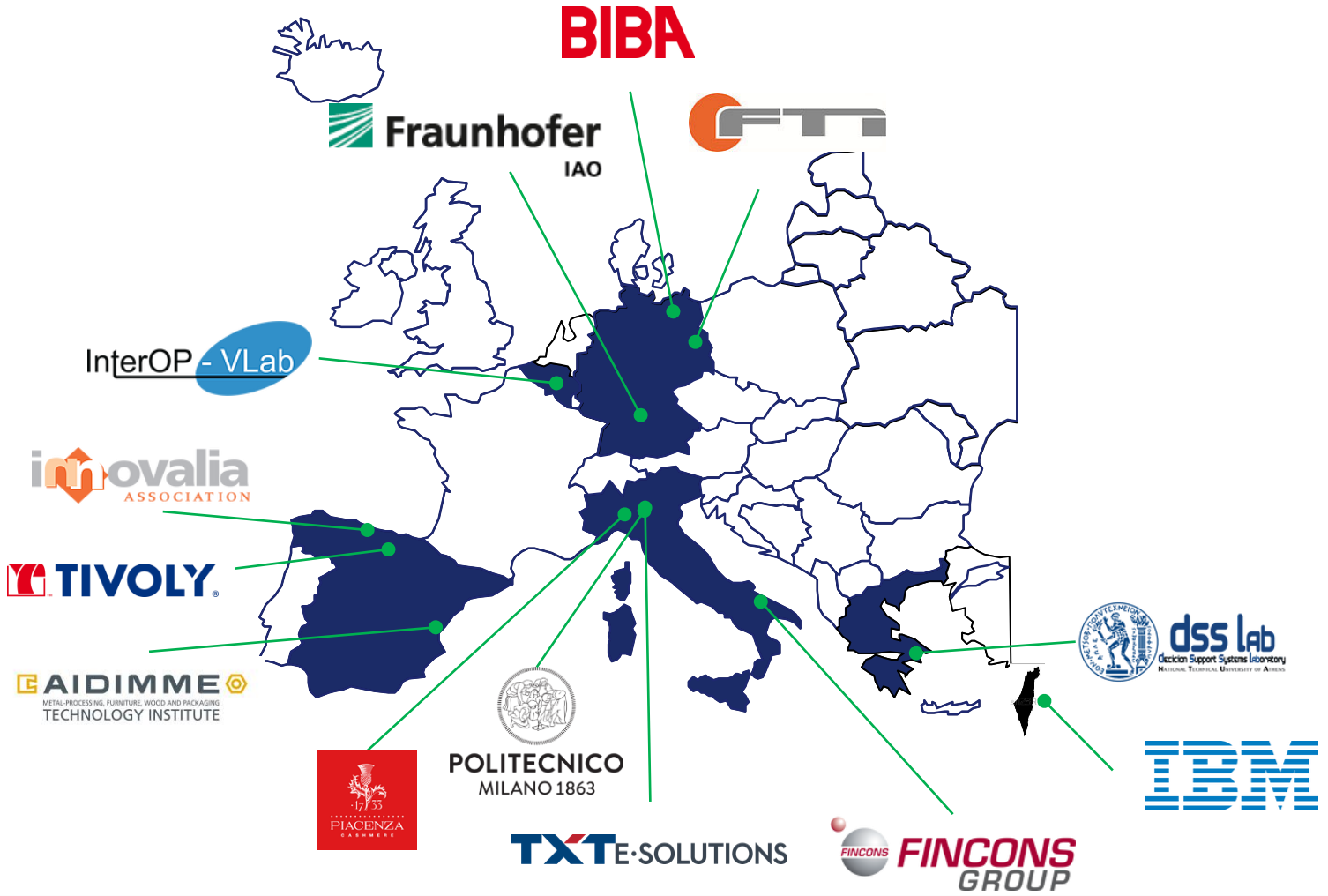
© 2017IBM Corporation

PSYMBIOSYS project

Project No:	636804
Project Full Name:	Product-Service sYMBIOtic SYStems
Duration:	36 months
Start date:	February 1st, 2015
Partnership:	13 partners, 6 countries
Strategic Objective:	FoF-05-2014: Innovative Product-Service design using manufacturing intelligence
Total Eligible Cost:	5.996.304 EURO
EC Contribution:	5.996.304 EURO

© 2017IBM Corporation

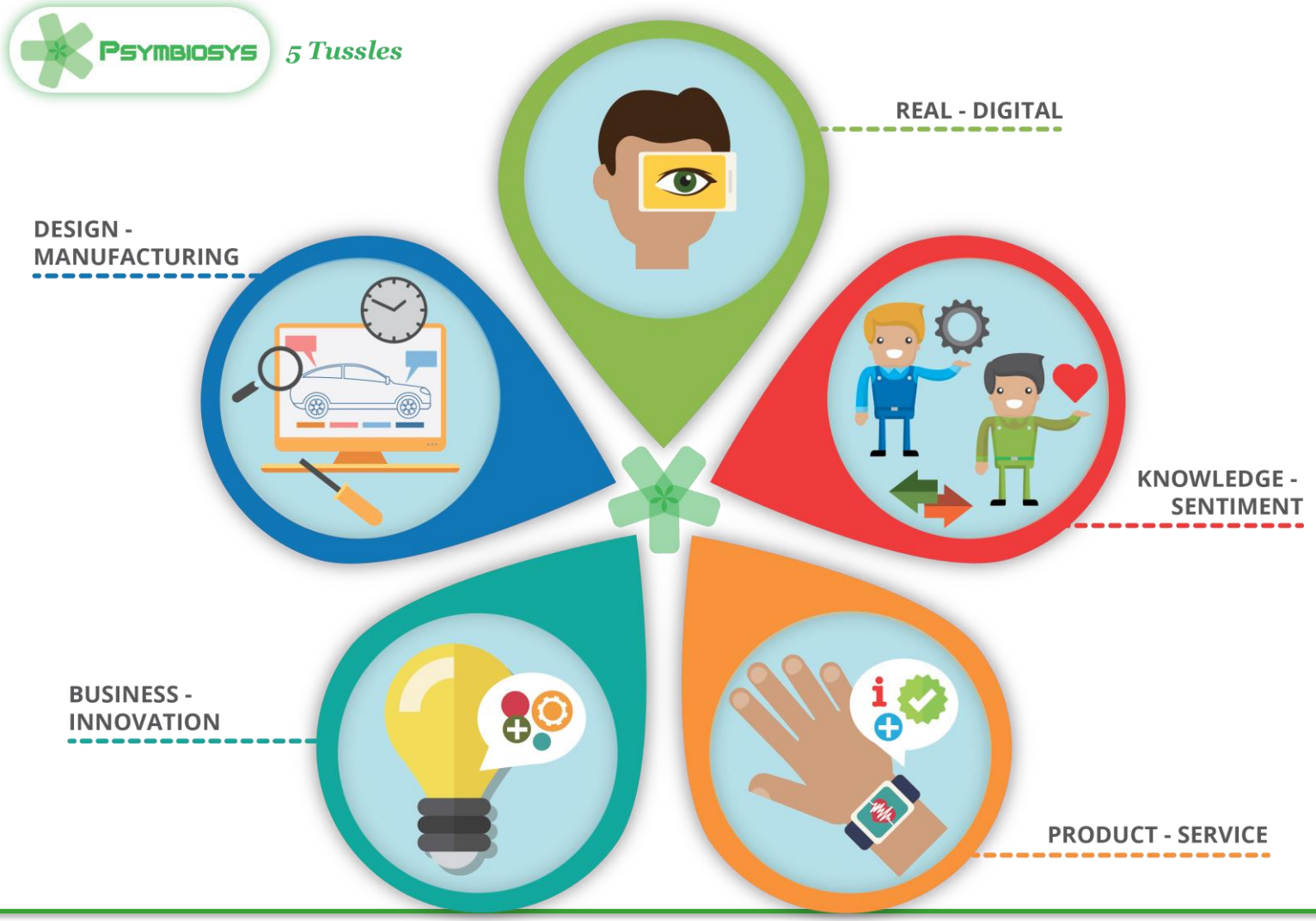
Project consortium



© 2017IBM Corporation

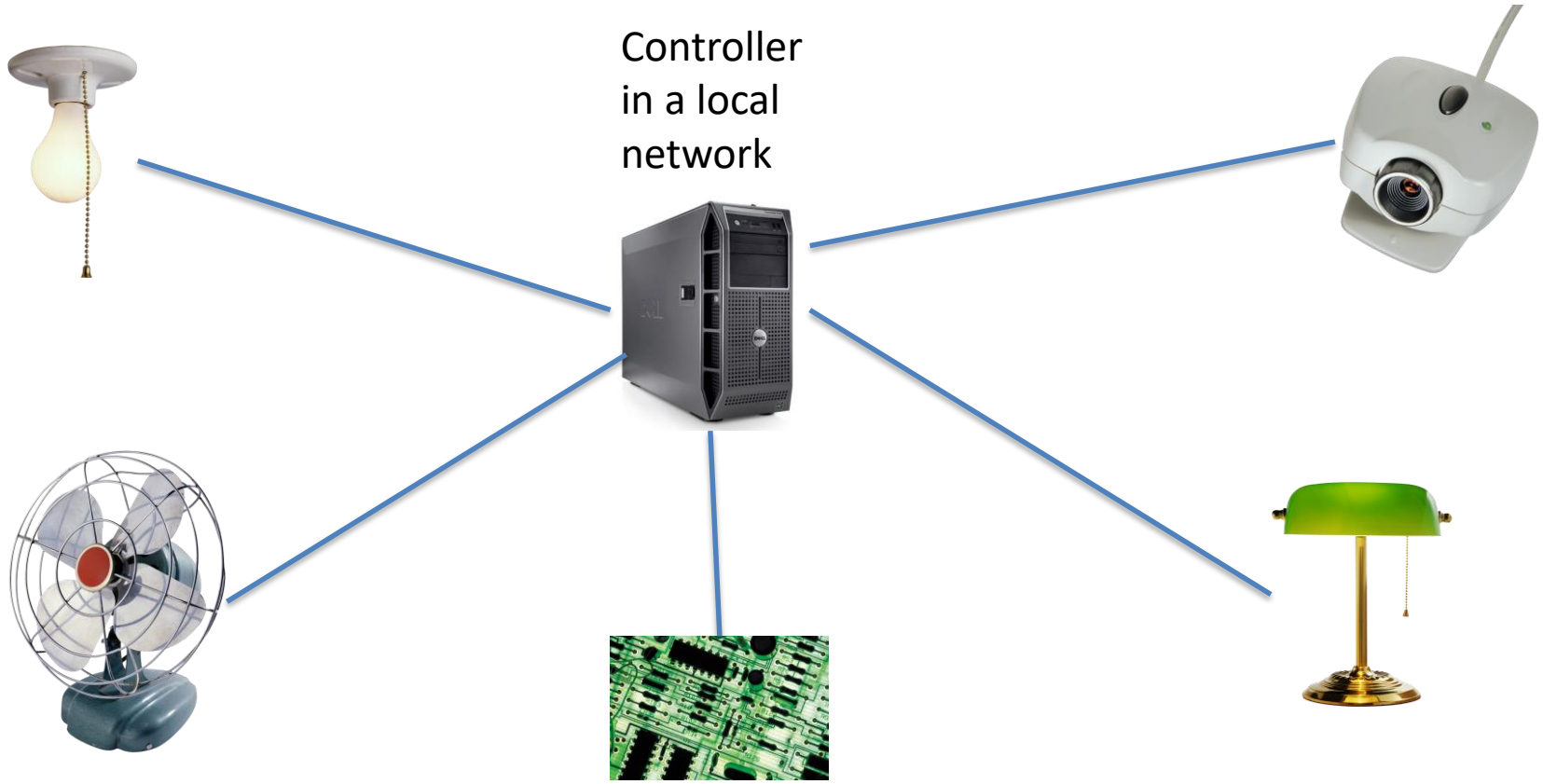
IBM Haifa Research Lab

PSYMBIOSYS 5 Tussles



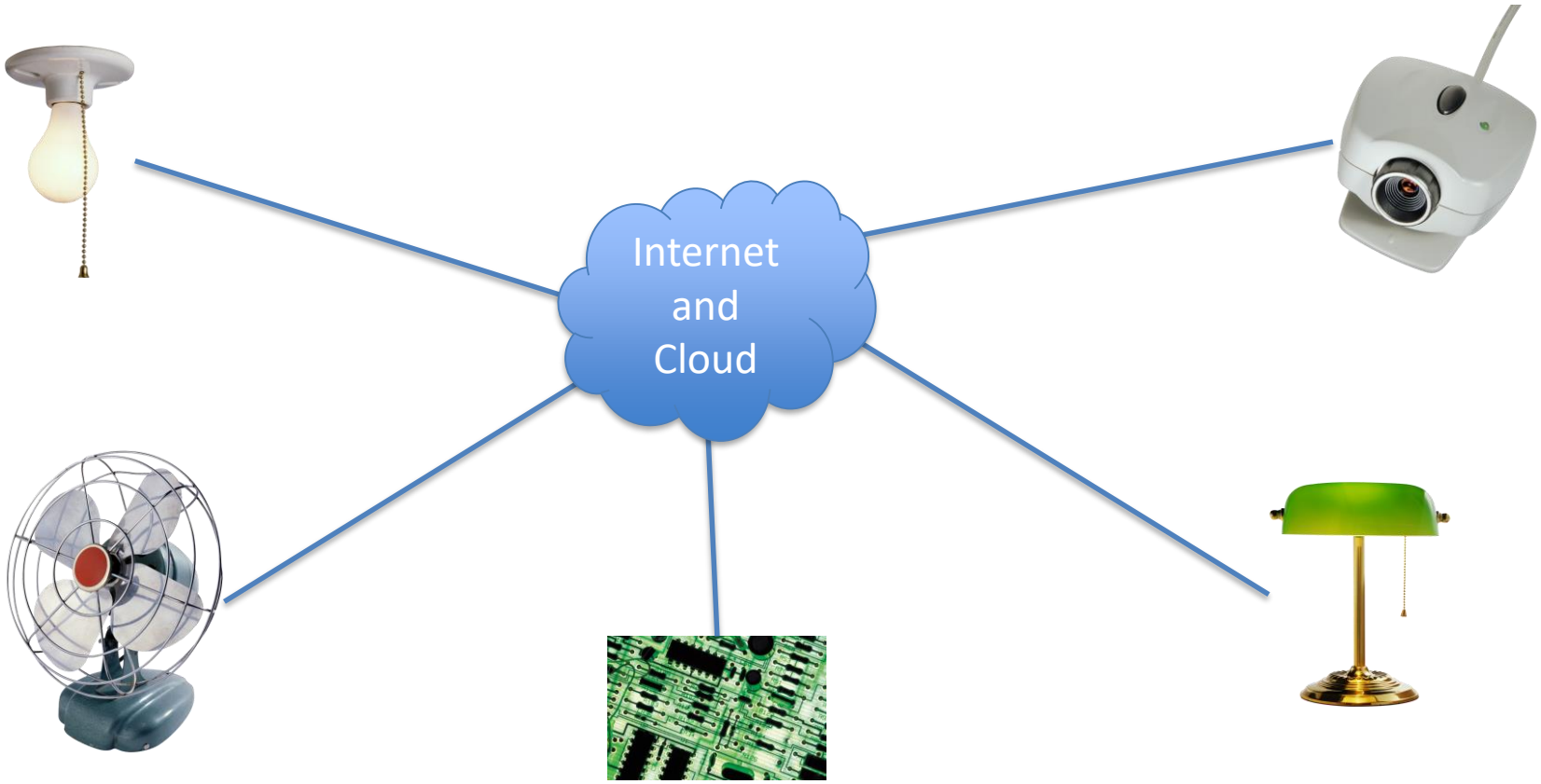
© 2017IBM Corporation

From SCADA to the Internet of Things



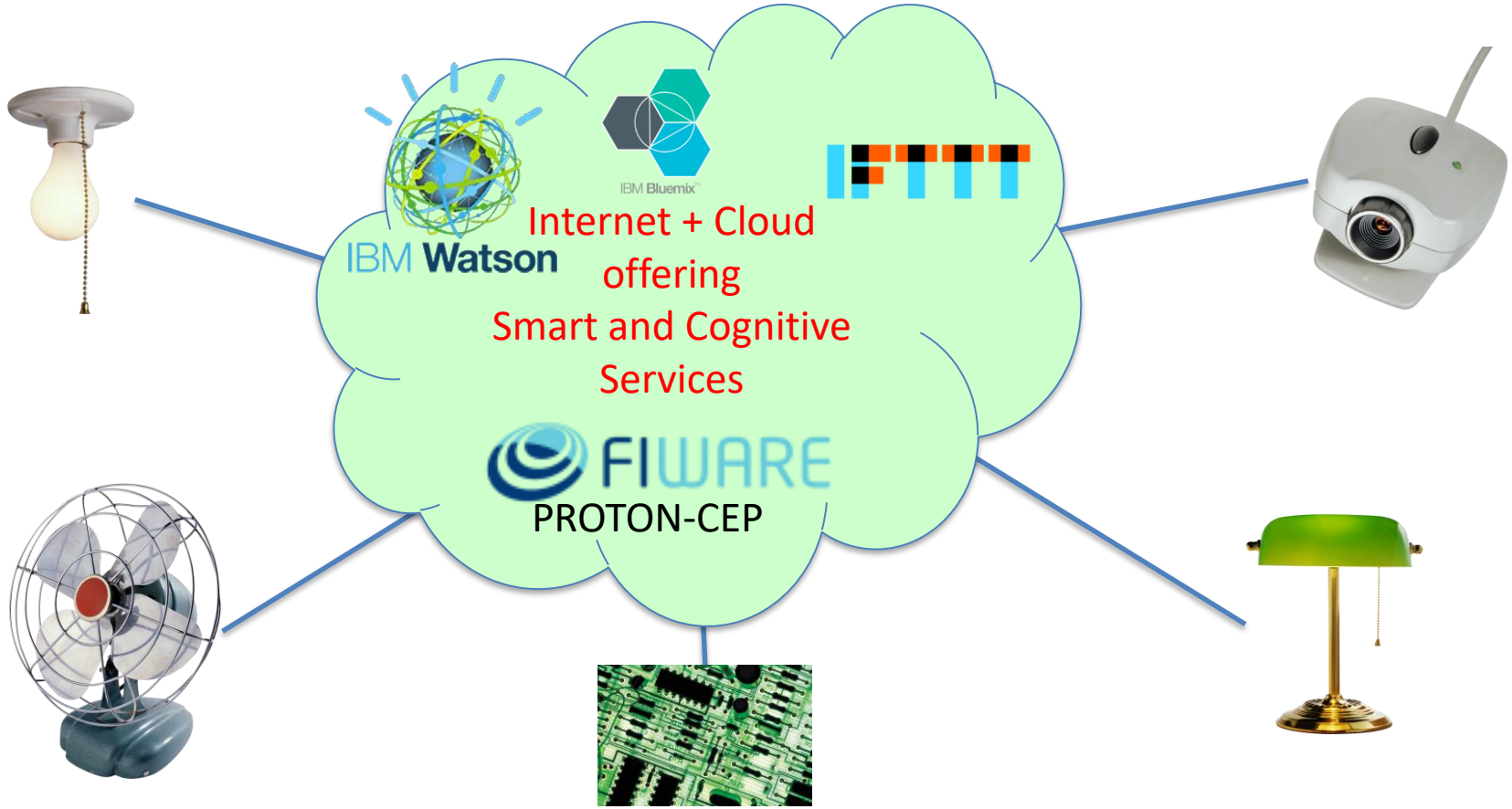
© 2017IBM Corporation

From SCADA to the Internet of Things



© 2017IBM Corporation

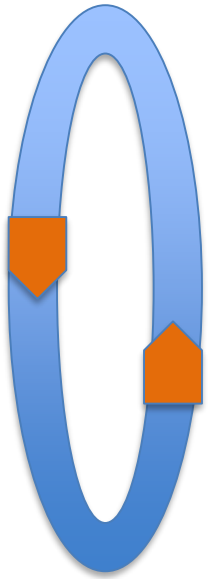
From SCADA to the Internet of Things

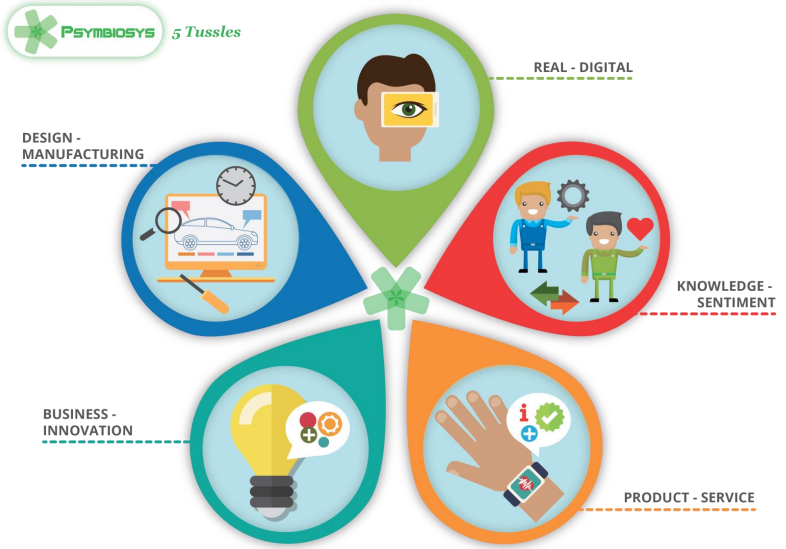


© 2017IBM Corporation

IoT in PSYMBIOSYS

- PSYMBIOSYS deals with both PLM and SLM
  - Ideation and innovation
  - Design and Manufacturing
  - Product and Services
  - Real and Digital worlds
  - Tangible and intangible
  - Sentiment analysis





© 2017IBM Corporation

AIDIMME Use Case

- AIDIMME is a Technology company
  - Metal-Mechanical, Wood, Furniture & Packaging
- Furniture use case in cooperation with an office furniture manufacturer.
- Using IoT to mediate RW events into insightful evaluation and loop it back into the innovation and design process.
  - Both RW sensing and customer feedbacks - synchronised

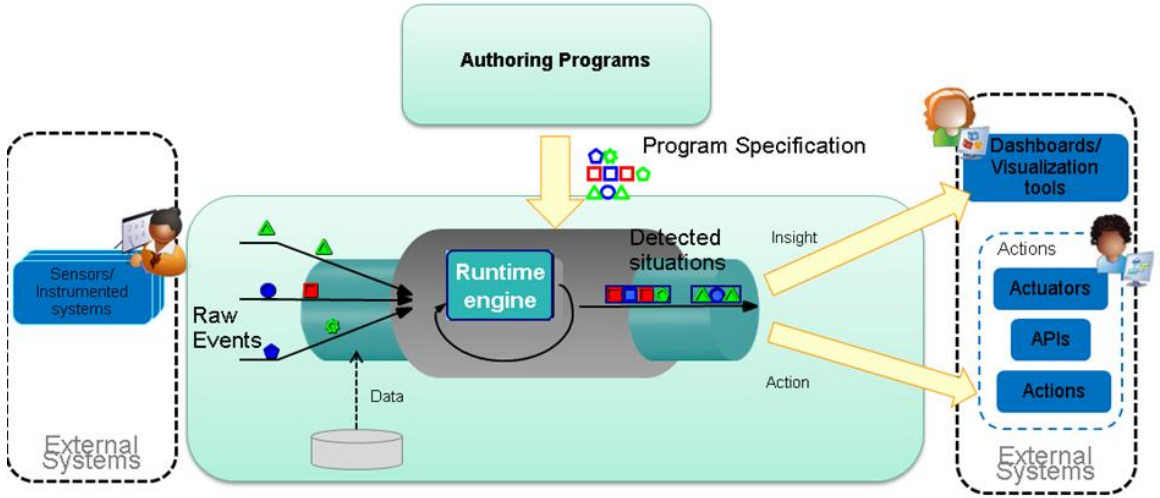
© 2017IBM Corporation

AIDIMME Use Case

© 2017IBM Corporation

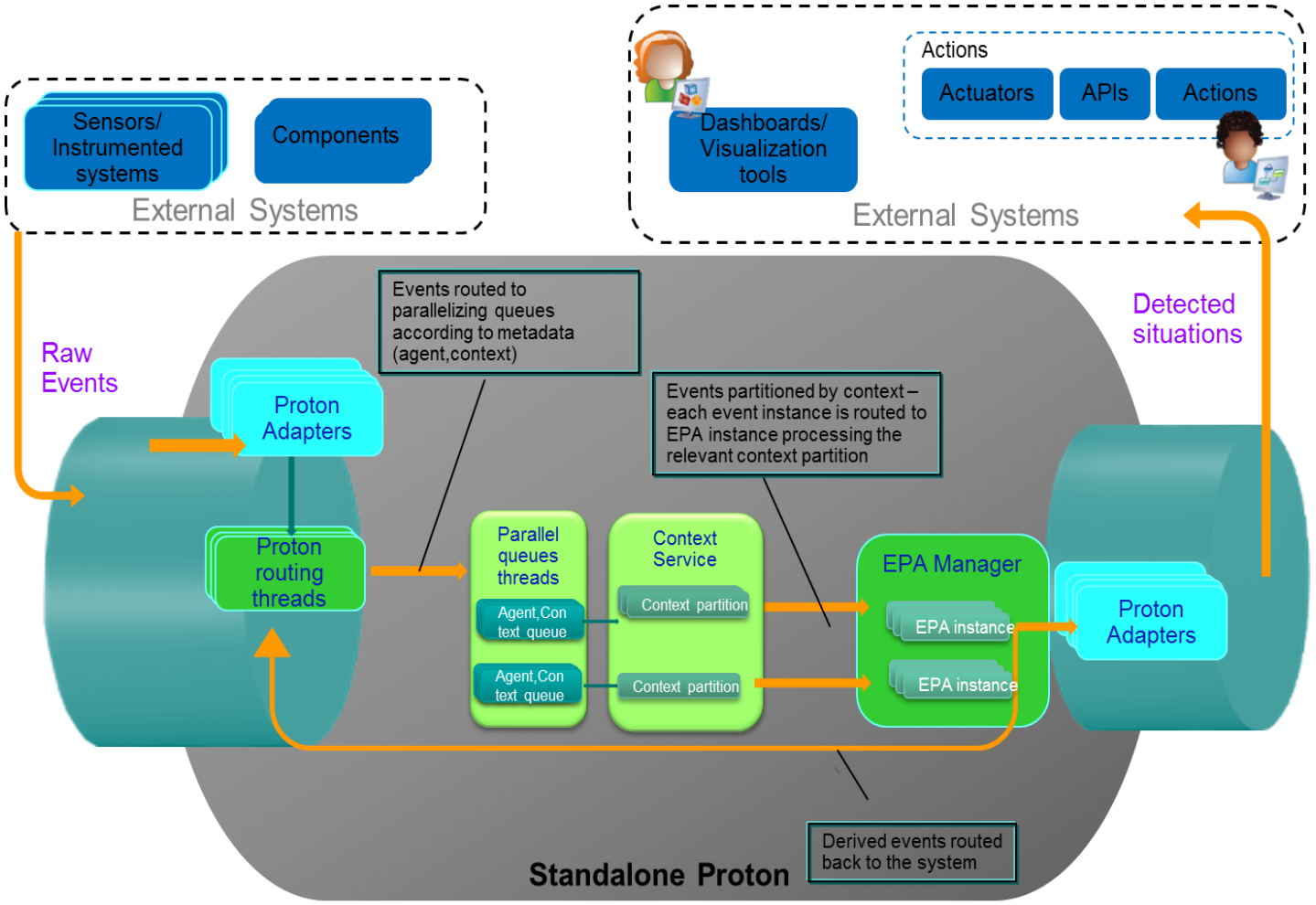
AIDIMME Use Case – RW Events

- Sensors generate events
- Complex Event Processing (CEP) is invoked in real time
- Using the IBM PROactive Technology ONline (PROTON) which is a General Enabler (GE) of the FIWARE foundation. https://github.com/ishkin/Proton



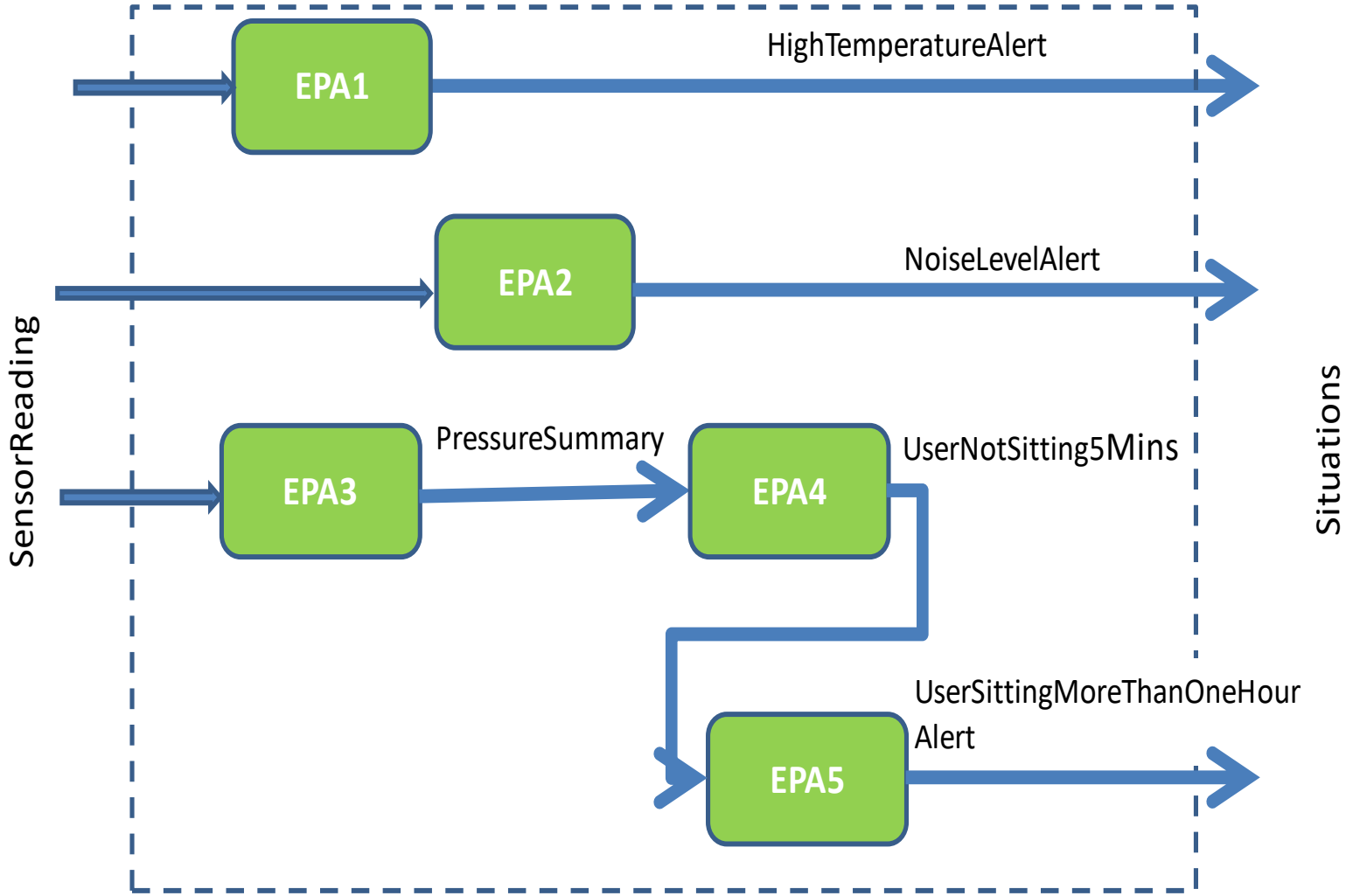
© 2017IBM Corporation

PROTON CEP Architecture



© 2017IBM Corporation

AIDIMME PROTON App



© 2017IBM Corporation

PROTON Event Example

```
POST http://cep.lab.fi-ware.eu:8089/ProtonOnWebServer/rest/events
Content-Type: application/json
Data:
{
  "subscriptionId": "51c04a21d714fb3b37d7d5a7",
  "data": [
    {
      "id": "Room1",
      "type": "Room",
      "temperature": {
        "value": 26.5,
        "type": "tempType",
        "metadata": {}
      },
      "occupancy": {
        "value": "low",
        "type": "occType",
        "metadata": {}
      }
    }
  ]
}
```


© 2017IBM Corporation

AIDIMME Raw Events

Workplace WP022

u005

TEMPERATURE
SENSOR_ID: ST01

NOISE
SENSOR_ID: NS01

PRESSURE
SENSOR_ID: PS01
PS02
PS03
PS04
PS05
PS06

Workplace WP030

u008

TEMPERATURE
SENSOR_ID: ST13

NOISE
SENSOR_ID: NS13

PRESSURE
SENSOR_ID: PS11
PS12
PS13
PS14
PS15
PS16

Workplace WP040

u014

TEMPERATURE
SENSOR_ID: ST17

NOISE
SENSOR_ID: NS17

PRESSURE
SENSOR_ID: PS31
PS32
PS33
PS34
PS35
PS36

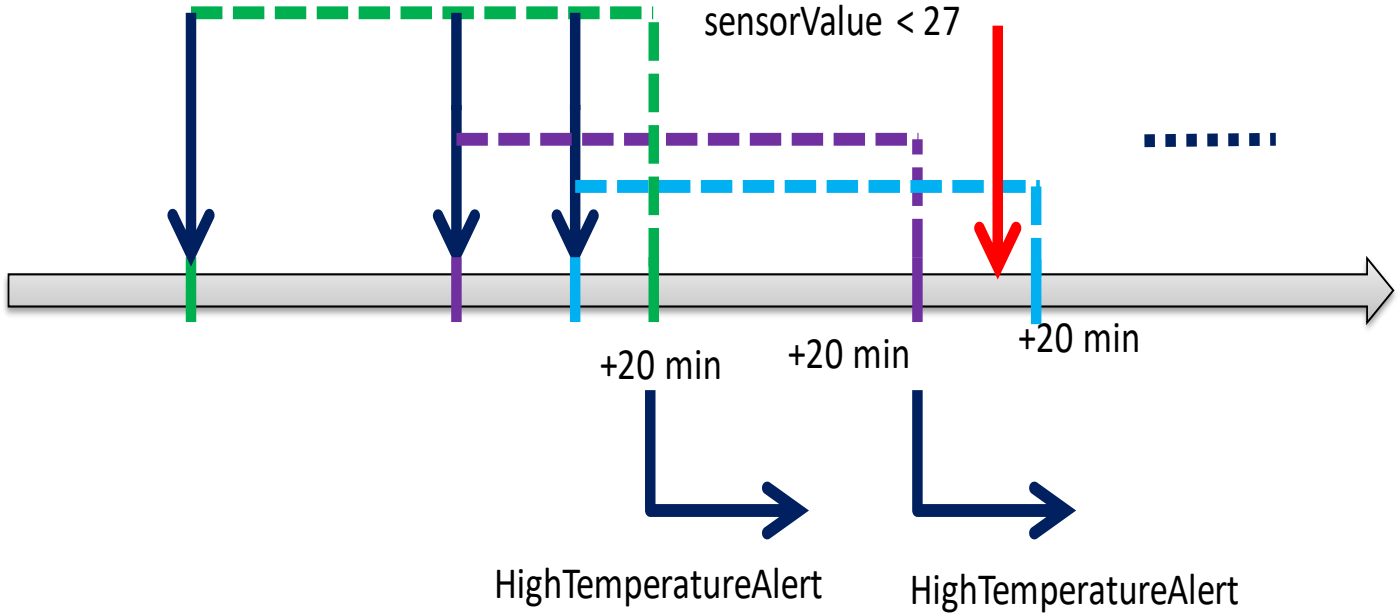
© 2017IBM Corporation

AIDIMME PROTON CEP Situations

"Temperature too high too long"

SensorReading with sensorType= 'temperature'" AND
sensorValue >= 27

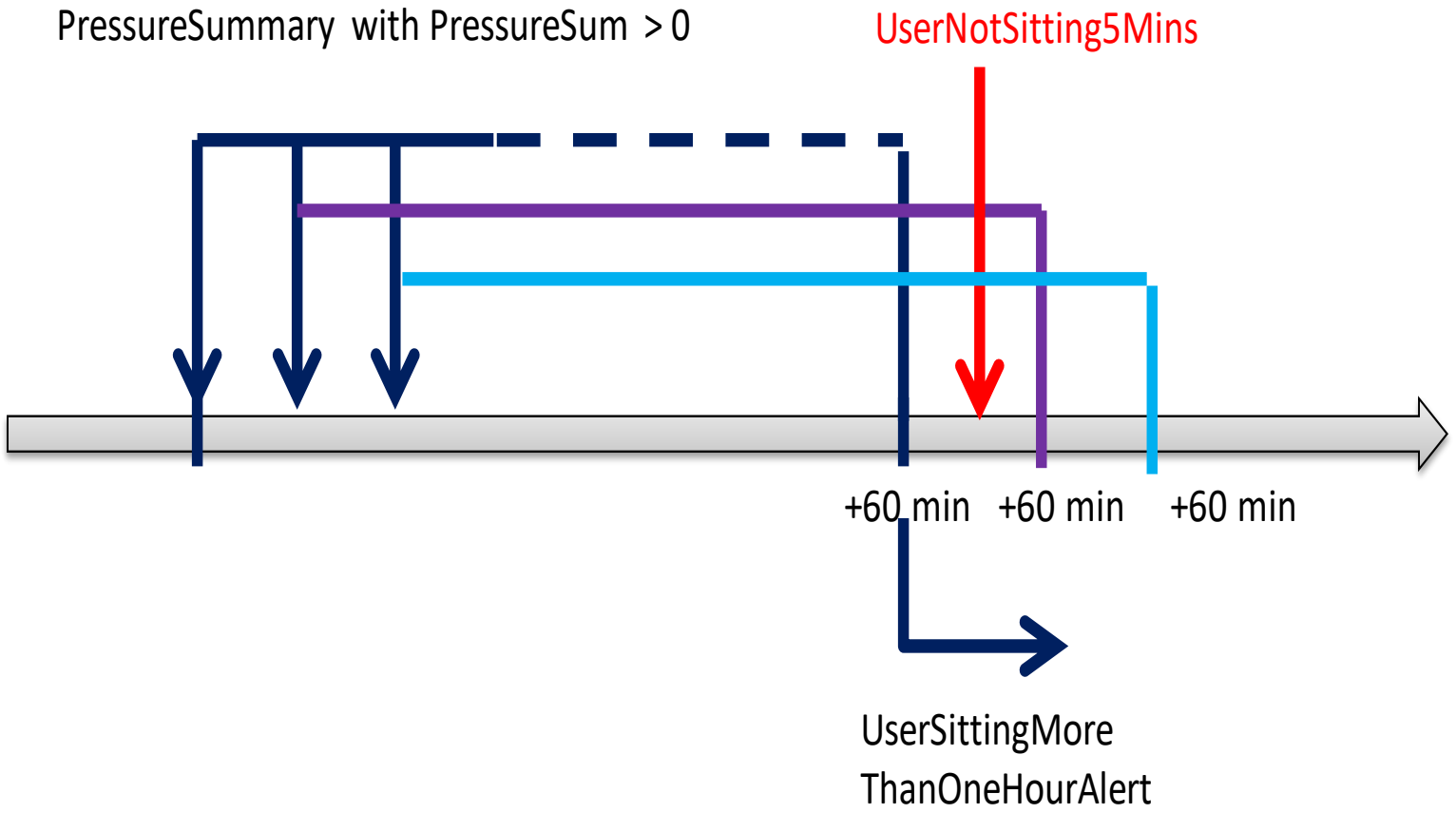
SensorReading with sensorType= 'temperature'" AND
sensorValue < 27



© 2017IBM Corporation

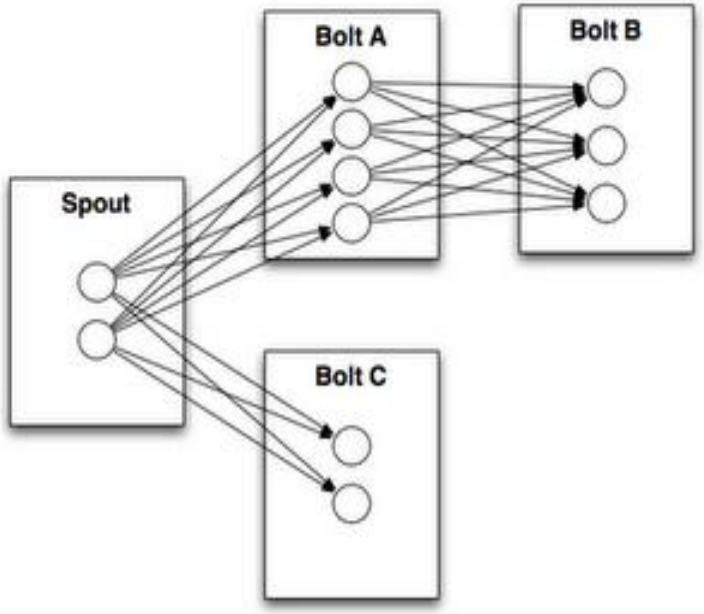
AIDIMME PROTON CEP Situations

"User not sitting 5 minutes"

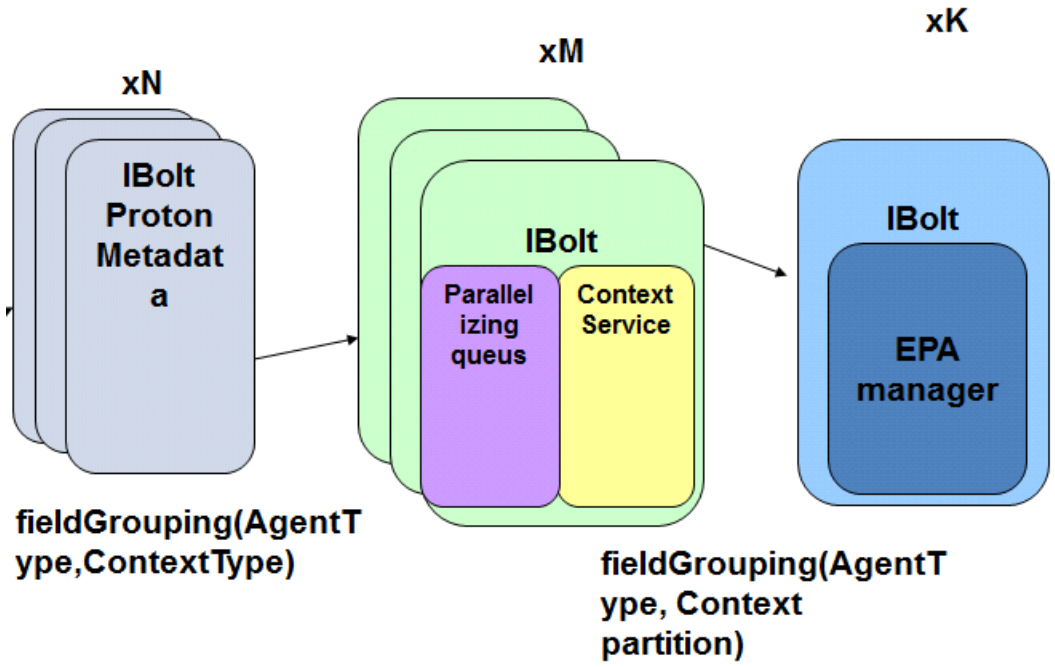


© 2017IBM Corporation

Massive CEP – PROTON on STORM



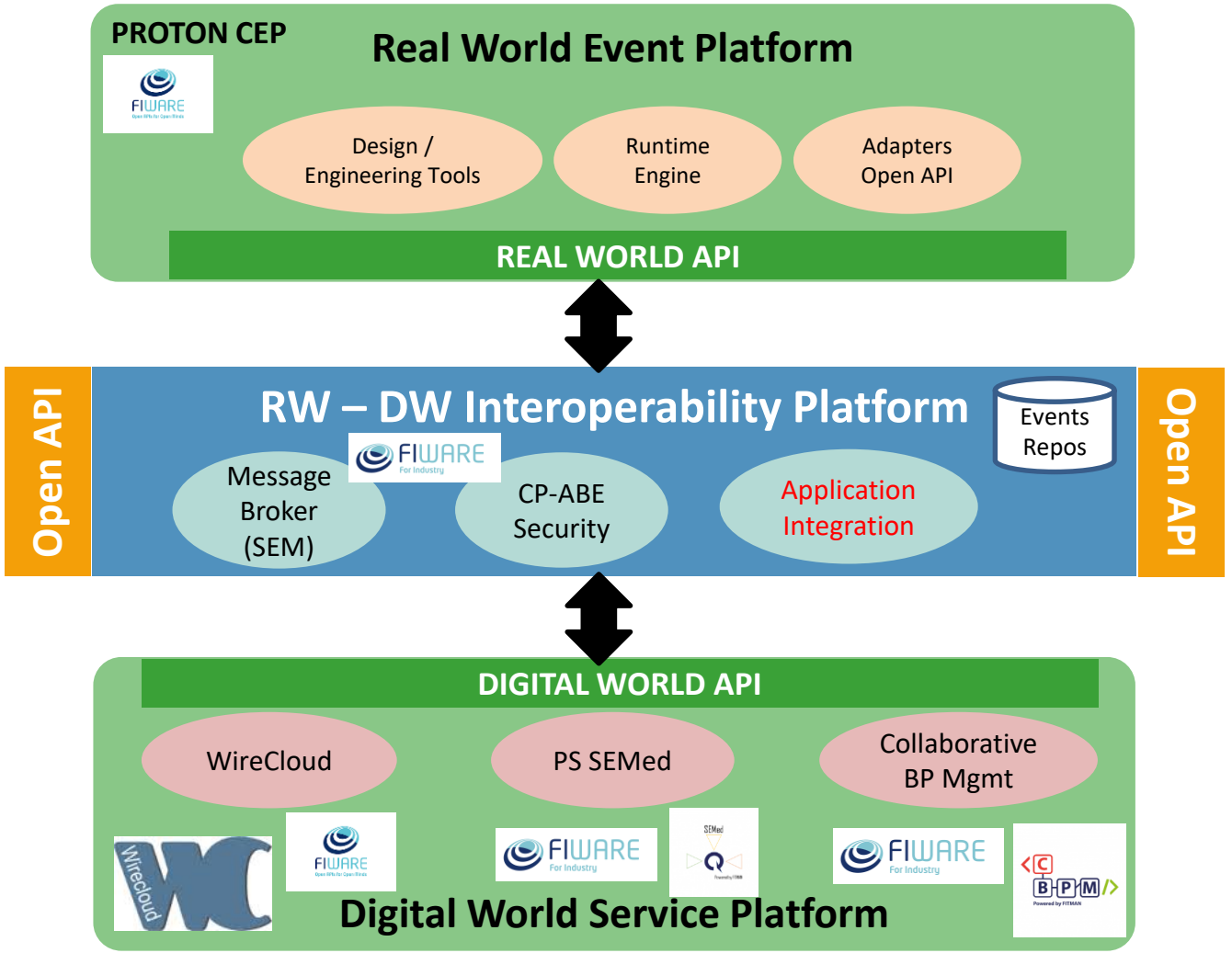
STORM Operational Model and Architecture



Embedding PROTON within the STORM Architecture

© 2017IBM Corporation

PSYMBIOSYS Real-Digital Interoperability



© 2017IBM Corporation

The PIACENZA Example

- Textile company manufacture of high class fabrics
- New designs and materials on annual badid
- Large catalogue
- Expensive interaction with customers
  - When dealing with physical real samples
  - Manufacturing cost of accepted / rejected samples
- TXT® Solution: Virtual showroom via simulation
- TXT® Solution: Immersive Reality with AR goggles.

© 2017IBM Corporation

The PIACENZA Example

PSYMBIOSYS

PIACENZA - Textile Pilot

WP10.1 & WP9.3

PIACENZA 1733 CASHMERE

TXT E-SOLUTIONS

© 2017IBM Corporation

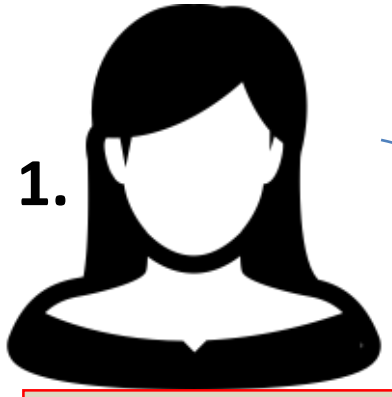
Virtuality, Immersive Reality and Augmented Reality in IoT

- With Augmented Reality – IoT can be extended to Everything
- Imagine you can talk to things
- IBM Research Lab AR for Computer Technician

© 2017IBM Corporation

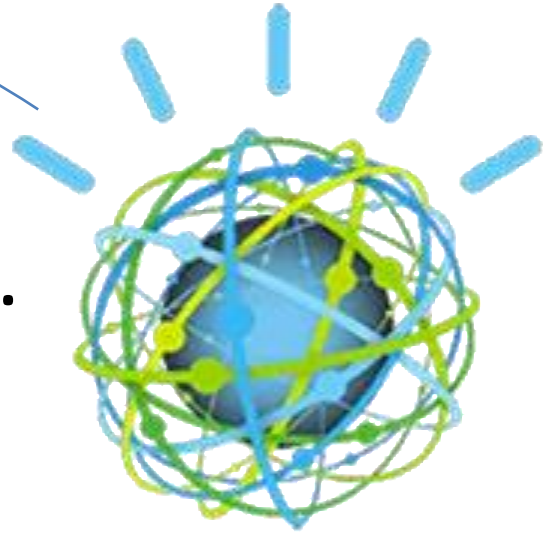
Watson® Conversation + AR + Image processing + Warehouse

1.



User Triggers Command: Speech

2.



Watson services used

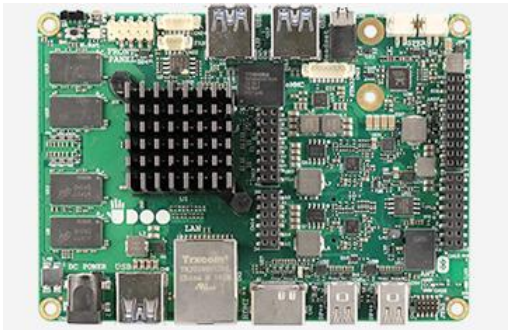
- **Speech-To-Text** interprets the audio
- **Conversation** identifies the intent and entities
- **Text-To-Speech** converts the reply back to audio

The **Intent** and **Entity** are passed to a Bluemix service to correlate with IP results

3.

Image Processing

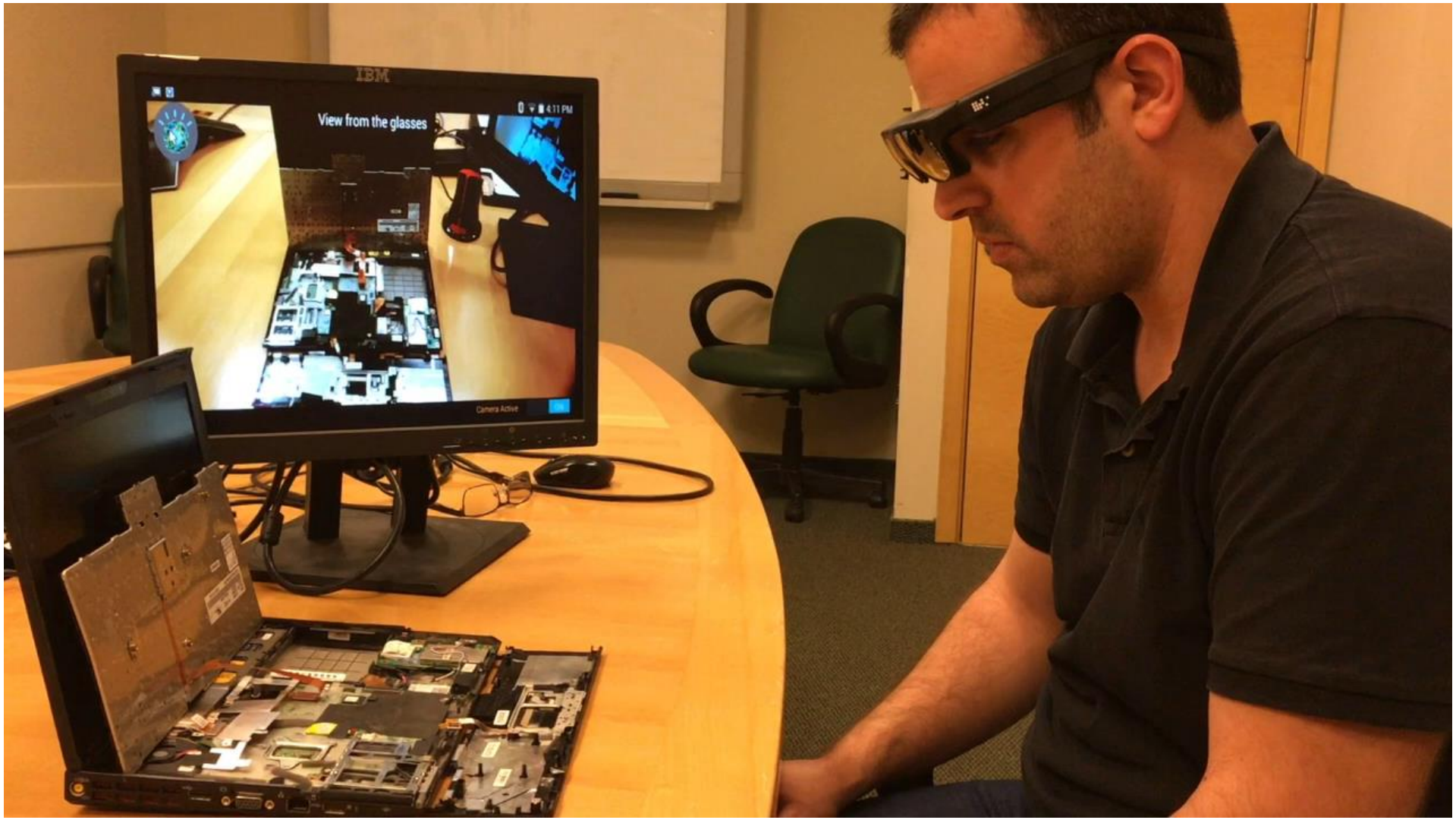
4.



5.

© 2017IBM Corporation

Watson® Conversation + AR + Image processing + Warehouse



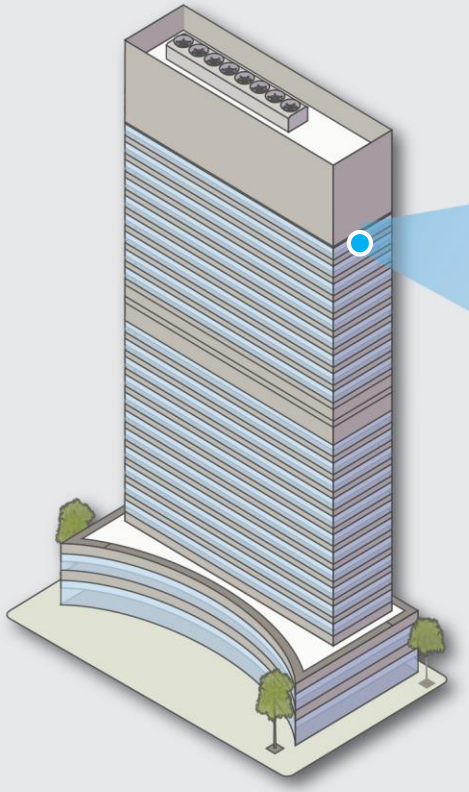
© 2017IBM Corporation

Cognitive Operation Guidance – remote expert

Technician fixes issue through real-time guidance from remote expert

© 2017IBM Corporation

Smart Spaces – Interactive hotel rooms



What is the weather tomorrow

Set A/C to 23

I need another pillow

Play something nice

Wake me up at 7:30

Turn off the lights

I'd like my shirts pressed

Switch to BBC

Book me a table for two at …

Need a taxi tomorrow at nine

© 2017IBM Corporation

Mind and Magic in business – Smart Spaces

https://youtu.be/mBhad78LBVA?t=24

© 2017IBM Corporation

Mind and Magic in Cars

https://www.youtube.com/watch?v=4XDwxvCQozg

© 2017IBM Corporation

Acknowledgements

- Fernando Gigante (AIDIMME)
- Michele Sesana (TXT)
- Fabiana Fournier (IBM)
- Inna Skarbovsky (IBM)
- Asaf Adi (IBM)
- Ethan Hadar (IBM)
- Full AIDIMME use case on Youtube: https://www.youtube.com/watch?v=Dijn-tJqTkI&t=3s
- Full PIACENZA with TXT use case on Youtube: https://www.youtube.com/watch?v=G0hrmKuQQSo&t=53s

 © 2017IBM Corporation

PSYMBIOSYS

THANK YOU!!!!

Uri Shani – IBM Haifa Research

© 2017IBM Corporation