A Language for Programming Heterogeneous Systems
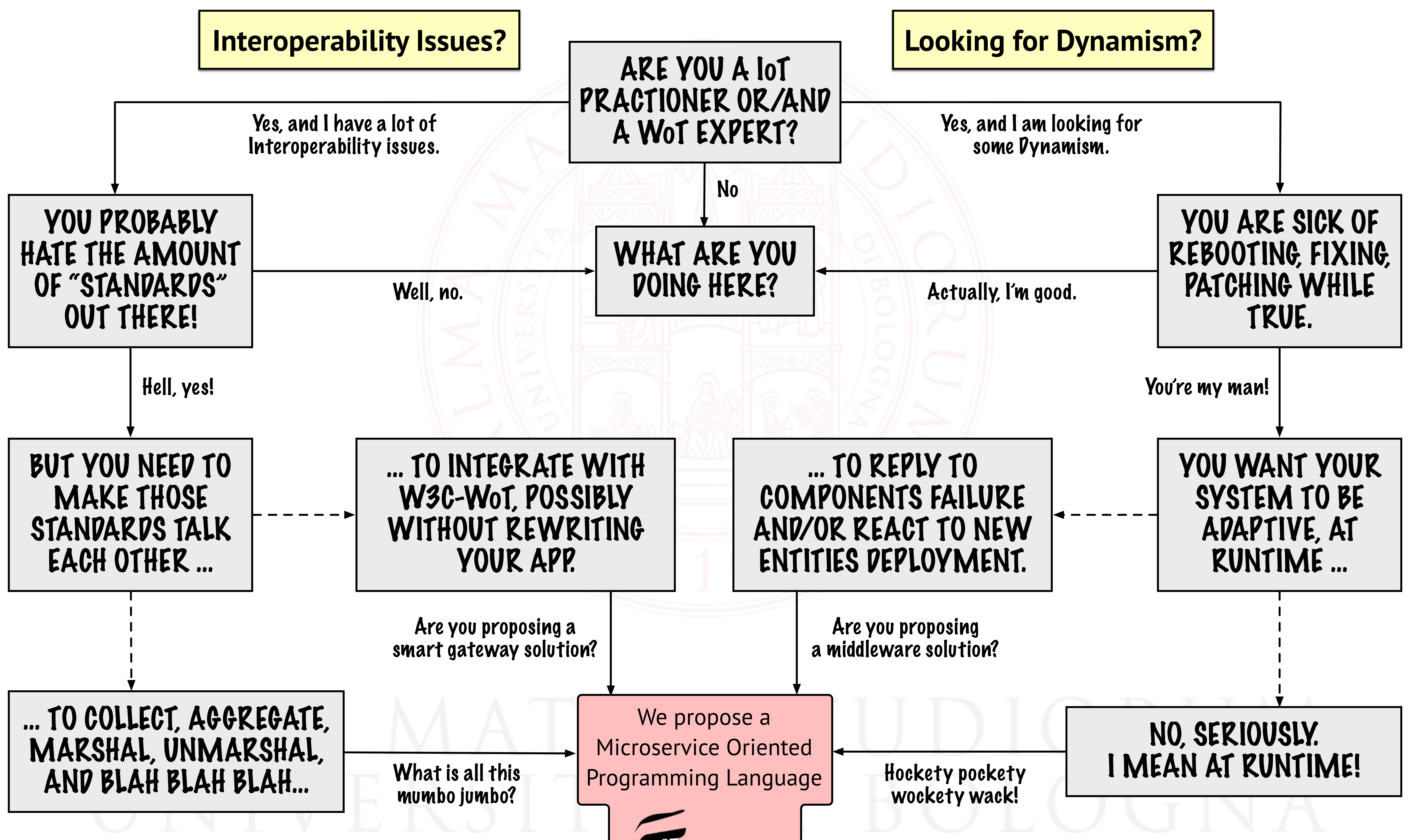
Maurizio Gabbrielli   Ivan Lanese   Saverio Giallorenzo   Stefano Pio Zingaro

Interoperability Issues?

Looking for Dynamism?

ARE YOU A IoT PRACTIONER OR/AND A WoT EXPERT?

Yes, and I have a lot of Interoperability issues.

Yes, and I am looking for some Dynamism.

No

YOU PROBABLY HATE THE AMOUNT OF "STANDARDS" OUT THERE!

WHAT ARE YOU DOING HERE?

YOU ARE SICK OF REBOOTING, FIXING, PATCHING WHILE TRUE.

Well, no.

Actually, I'm good.

Hell, yes!

You're my man!

BUT YOU NEED TO MAKE THOSE STANDARDS TALK EACH OTHER ...

... TO INTEGRATE WITH W3C-WoT, POSSIBLY WITHOUT REWRITING YOUR APP.

... TO REPLY TO COMPONENTS FAILURE AND/OR REACT TO NEW ENTITIES DEPLOYMENT.

YOU WANT YOUR SYSTEM TO BE ADAPTIVE, AT RUNTIME ...

Are you proposing a smart gateway solution?

Are you proposing a middleware solution?

... TO COLLECT, AGGREGATE, MARSHAL, UNMARSHAL, AND BLAH BLAH BLAH...

What is all this mumbo jumbo?

We propose a Microservice Oriented Programming Language

Hockety pockety wockety wack!

NO, SERIOUSLY. I MEAN AT RUNTIME!

Jolie

Features

Use different communication pattern and protocols in a uniform way and switch between them dynamically.

Unique Behaviour

```
main {
  toggle()
}
```

"some" other features for composing the interactions...

Interaction is provided with **Input** and **Output** operations that can send a message (*Outbound* communication) or receive one (*Inbound* communication). The *inbound* communications can be blocking (**Request Response**), or non-blocking (**One Way**). Dually, the *outbound* communications can be blocking (a **Solicit Response**) or non-blocking (a **Notification**). It is possible to compose statements in a sequential way using ";", or in a parallel way using "|".

Different Deployment

```
outputPort HTTP {
  Location: "socket://localhost:8080"
  Protocol: http
  OneWay: toggle()
}
```

```
outputPort CoAP {
  Location: "datagram://localhost:5683"
  Protocol: coap
  OneWay: toggle()
}
```

```
outputPort MQTT {
  Location: "socket://localhost:1883"
  Protocol: mqtt
  OneWay: toggle()
}
```

a list of supported protocols:

- TCP/IP and UDP at transport level;
- HTTP, HTTPs, SOAP, SOAPs, JSON/RPC, XML/RPC at application level;
- JSON, XML, HTML, raw, bytes as data format

Future Work (some inputs)

Bottom Up Approach

Use this Language to automatic generate binding templates from a JSON Thing Description.

Targeting the Things Layer

It would be great to have such a Language for programming Constrained Devices behaviour too...

Our IoT expert says

What do you say?

Don't go there! It is simply a mess.

[...some useful feedback...]

Cloud Services

Fog Nodes

Things

Things

Let's Keep in Touch!