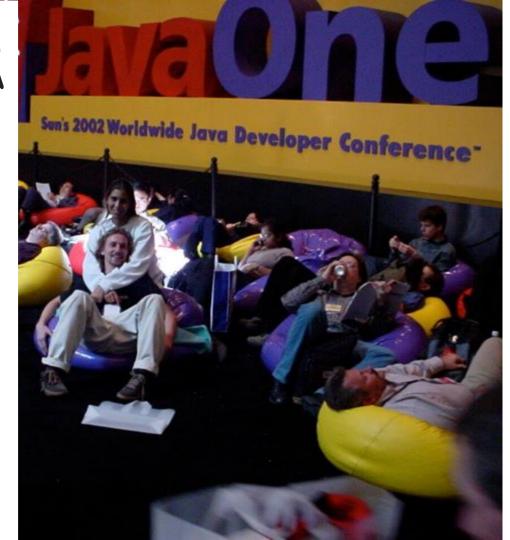
ADDING EYES, EARS AND MOUTH TO YOUR IOT PROJECTS



YARA AND VINICIUS SENGER

@YARASENGER AND **@V**SENGER

- ☐ FOUNDERS OF GLOBALCODE & THEDEVCONF
- □ BOARD OF SOUJAVA
- ☐ CREATORS OF IOT SURFBOARD
- ☐ JAVA CHAMPIONS
- DUKE CHOICE'S AWARD 2011
- ☐ JAVAONE ROCKSTAR SPEAKER
- ☐ RAFAEL & MARIA'S PARENTS



THANKS ORACLE!



https://java-champions.java.net/

SOME OF OUR EXPERIENCES...

- ☐ TELEMETRY EQUINE
- ☐ SMART SAIL BOAT SYSTEM
- ☐ COMBIKE: SMART HELMET
- ☐ SMART BUILDING JHOME AUTOMATION
- ☐ HEALTH CARE: BRAIN STRAP

(NON INVASIVE INTRACRANIAL PRESSURE MONITORING)





IOT: BASIC CONCEPTS

IOT 4 LAYERS: EDGE -> GATEWAY -> CLOUD -> CONSUMER

EDGE DEVICE

MICROCONTROLLERS
VERY LOW ENERGY
SENSORS & CONTROLLERS
MAY NOT SUPPORT TCP/IP
REAL-TIME SUPPORT

GATEWAY

MICROPROCESSOR OR SOC
LOW ENERGY
MAY SUPPORT MORE THAN TCP/IP
MANY RESPONSIBILITIES
LIMITED REAL-TIME SUPPORT

CLOUD

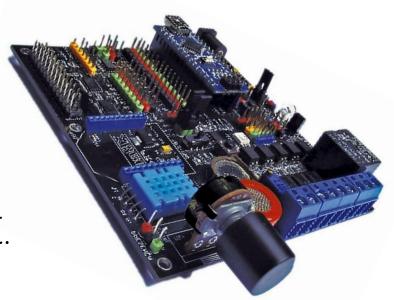
BIGDATA
INTELLIGENCE
SOCIAL NETWORK
INTEGRATION

CONSUMER

MQTT / AMQP / COAP REST / WS / API'S PHONES / TABLETS KINECT / REALSENSE

EDGE DEVICE

- ☐ SMALL, LIMITED AND DEDICATED DEVICE
- ☐ VERY LOW ENERGY CONSUMPTION
- \square MAY NOT SUPPORT TCP/IP: RF, IR, ZIGBEE, ETC.
- NOT SMART OR "ALMOST" SMART

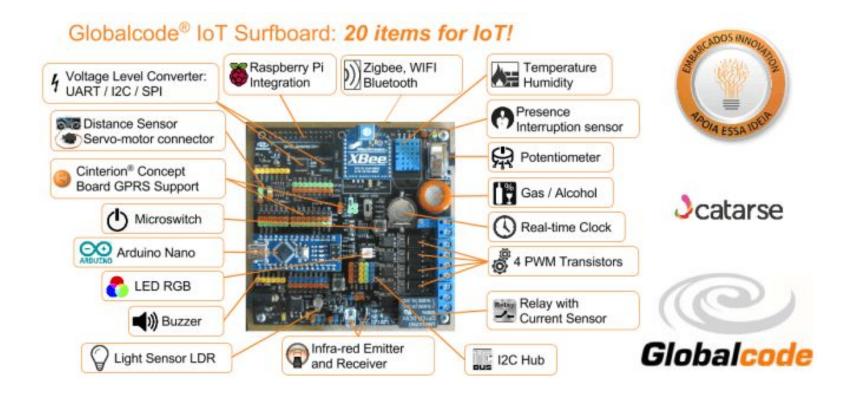


ZIGBEE: POPULAR EDGE DEVICE

- ☐ VERY LOW ENERGY CONSUMPTION
- ☐ MASHUP NETWORK
- ☐ DIGITAL AND ANALOG PINS



IOT SURFBOARD: ONE DEVICE, HUNDREDS POSSIBILITIES!



GATEWAY

☐ A NETWORK POINT THAT ACT AS AN ENTRANCE POINT TO ANOTHER NETWORK

IT BASICALLY CONNECTS THE THINGS TO THE INTERNET

IT MIGHT BE RESPONSIBLE FOR CONVERTING DATA AND PROTOCOLS



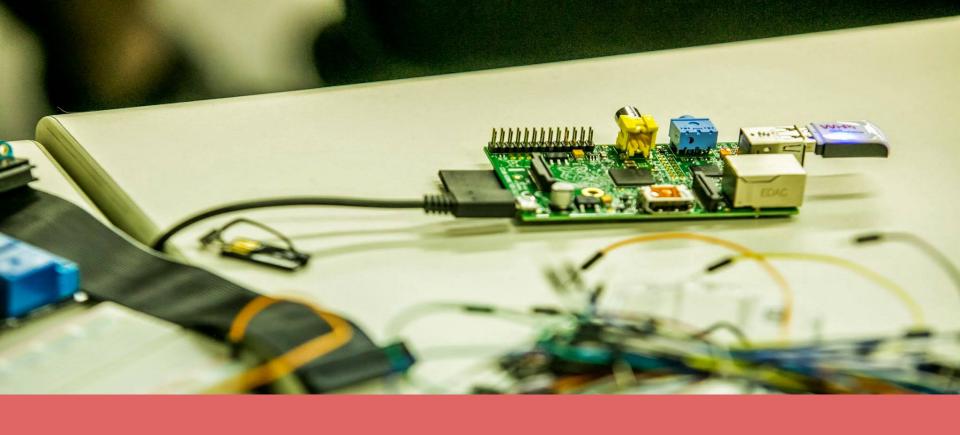


GEMALTO CONCEPT BOARD JAVA ME

- 📕 🗆 EHS6 2MB RAM
 - □ 26/36/6P5*

Our Tutorial:

https://www.youtube.com/watch?v=_ncdZAhSCNA



GATEWAY WITH RASPBERRY PI AND JAVA 8



INTEL EDISON: JAVA SE + JAVA EE + BLE + WIFI



IOTABLET

RASPBERRY PI & INTEL EDISON & WIFI & ZIGBEE & BLE

EDGE AND GATEWAY DEVICES MENU

EDGE DEVICE CONNECTION GATEWAY LAPTOP IOT SURFBOARD] USB CABLE IOT SURFBOARD2 XBEE **IOTABLET** IOT SURFBOARD3G 26 OR 36 CONCEPT BOARD IoT Surfing API 4 Arduino **IoT Surfing Service** IoT Surfing Protocol Java Microservices Kernel for IoT IoT Framework for Arduino Json based

EDGE DEVICE CODE

```
Surfboard_v1.0-ALPHA-I2CLCD § Modes SurfboardEXT_LCD
void setup() {
 board.setup();
  system.add("red",
                                     10);
                           PWM.
  system.add("green",
                           PWM.
                                     6);
  system.add("blue",
                                     5);
                           PWM.
  system.add("relay", DIGITAL, 4);
  system.add("speaker",
                           DIGITAL, 16);//A2
  system.add("alcohol",
                         ANALOG,
                                     0);
  system.add("temp", CUSTOM,
                                    temperature, true);
                                     humidity, true);
  system.add("humidity", CUSTOM,
  system.mode(1, yourMode);
  system.mode(2, alcohol);
  system.mode(3, colors);
  system.start();
```

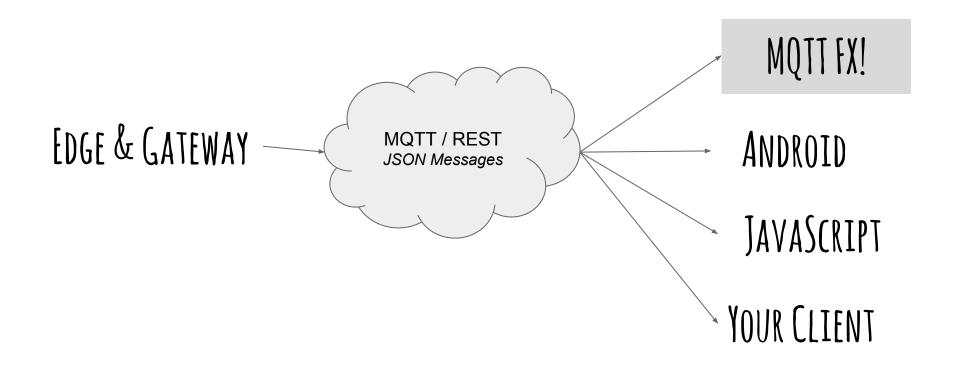
JSON PROTOCOL

```
{"name" : "alcohol","value" : "361"},
{"name" : "pot", "value" : "1021"},
{"name" : "light","value" : "138"},
{"name" : "distance","value" : "0"},
{"name" : "clock", "value" : "11/12/2015 21:48:56"},
{"name" : "temp", "value" : "22.00"},
{"name" : "humidity", "value" : "73.00"}
```

EDGE DEVICE VS. PROTOCOL

```
Surfocard_v1.0-ALPHA-I2CLCD § Modes SurfocardEXT_LCD
void setup() {
 board.setup();
 system.add("red",
                          PWM,
                                    10);
 system.add("green",
                          PWM.
                                    6):
 system.add("blue",
                         PWM.
                                    5);
 system.add("relay",
                         DIGITAL,
                                    4);
 system.add("speaker",
                         DIGITAL,
                                    16);//A2
 system.add("alcohol",
                         ANALOG.
                                    0);
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                                    temperature, true);
                          CUSTOM,
 system.add("humidity"
                         CUSTOM,
                                    humidity, true);
                                                         `{"name" : "alcohol","value" : "361"},
 system.mode(1, yourMode);
                                                         {"name" : "pot", "value" : "1021"},
 system.mode(2, alcohol);
 system.mode(3, colors);
                                                         {"name" : "light","value" : "138"},
 system.start();
                                                          {"name" : "distance","value" : "0"},
                                                          {"name" : "clock","value" : "11/12/2015 21:48:56"},
                                                          {"name" : "temp","value" : "22.00"},
                                                         `{"name" : "humidity","value" : "73.00"}
```

EDGE > GATEWAY > CLOUD > CONSUMERS



MQTT FX

☐ MQTT.FX IS A MQTT CLIENT WRITTEN IN JAVA BASED ON ECLIPSE PAHO

THANKS:

JENS DETERS @JERADY



http://mqttfx.jfx4ee.org/

LIVE DEMO



IOT SURFING SERVICE

READ AND WRITE TO THE CONNECTED SURFBOARD

■ EXPOSES DATA AND FUNCTIONALITY USING MICROSERVICES

MQTT, WEBSOCKETS, REST, APIS OR ANY OTHER PROTOCOL

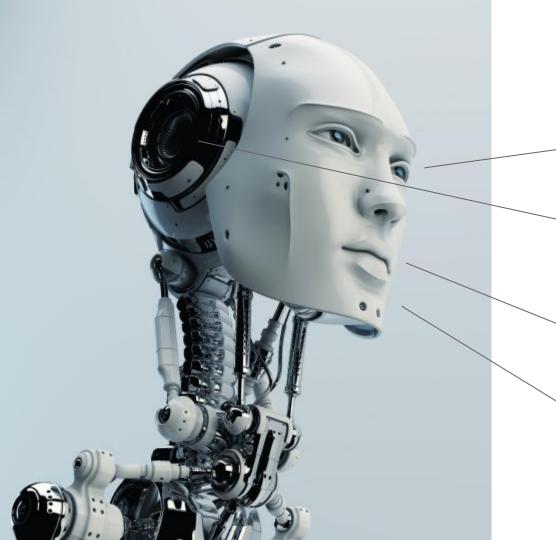


IOT SURFING SERVICE

```
myservice ×
                                                                       name=My Sensor Audio Service
@Path("/myservice")
                                                             class=org.surfing.service.sample.MyService
public class MyService extends MOTTController
                                                             interval=0
   @GET
                                                             enabled=true
   @Produces("text/html")
                                                             mqtt.queue=globalcode/things/audio
   @Path("/s1/{name}")
   public String execute(@PathParam("name") String name) {
       System.out.println("Name " + name);
       return "";
   public void processMessage(String msq) {
       for (Device device : Kernel.getInstance().getDevices()) {
           Thing t = device.getThings().get(msg);
           if(t.getName().equals(msg)) {
               AudioTTS.speak(msg + " value is " + t.getLastValue(), true);
```

LIVE DEMO





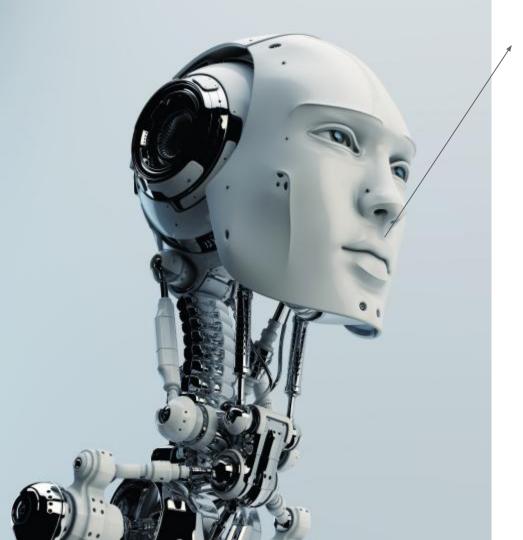
EYES, EARS, NOSE AND MOUTH

EYES: INTEL REALSENSE

EARS: ANDROID TASKER + AUTOVOICE

Nose: Sensors

MOUTH: ESPEAK



ESPEAK



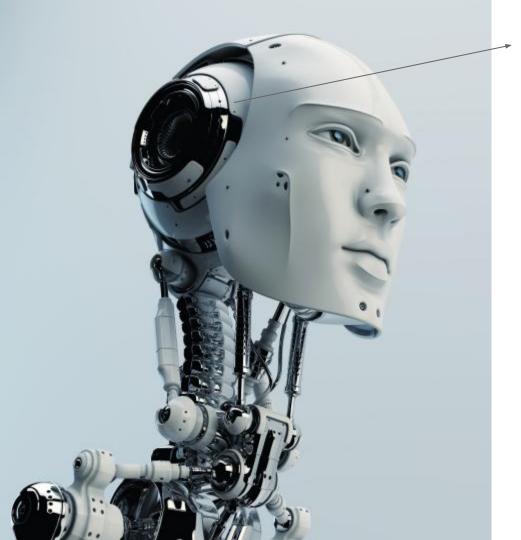
OPEN-SOURCE eSpeak WIN, MAC & LINUX SUPPORT TO DIFFERENT LANGUAGES **EXECUTED WITH SHELL COMMANDS** MQTT INTEGRATION DEMO...

LIVE DEMO





VOICE RECOGNITION:
ANDROID TASKER AND AUTO-VOICE



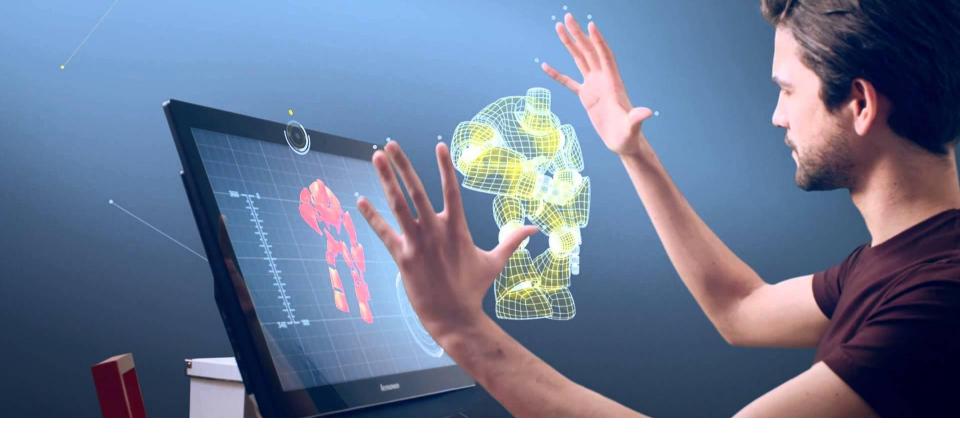
VOICE RECOGNITION

ANDROID VOICE RECOGNITION
TASKER APP(U\$ 3)
AUTO-VOICE PLUG-IN FOR TASKER
MQTT PLUG-IN FOR TASKER



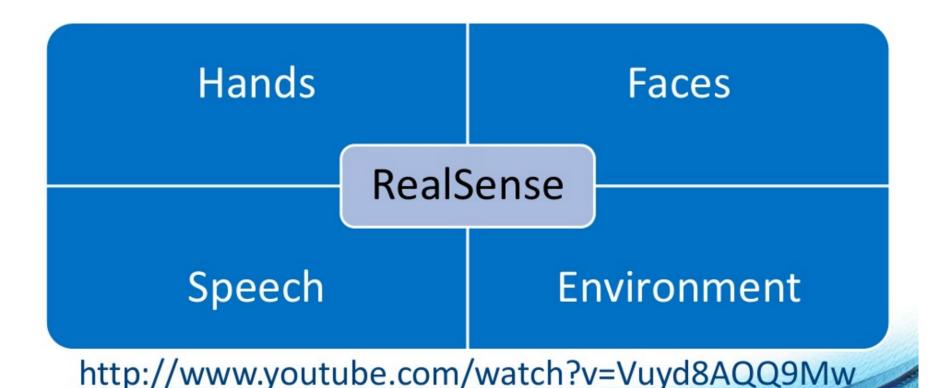
LIVE DEMO



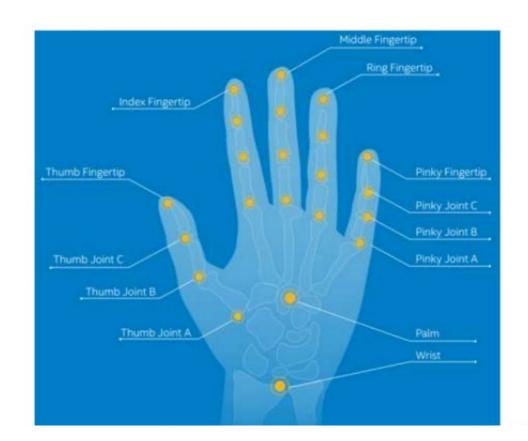


INTEL REAL SENSE: RECOGNIZING GESTURES

INTEL REALSENSE

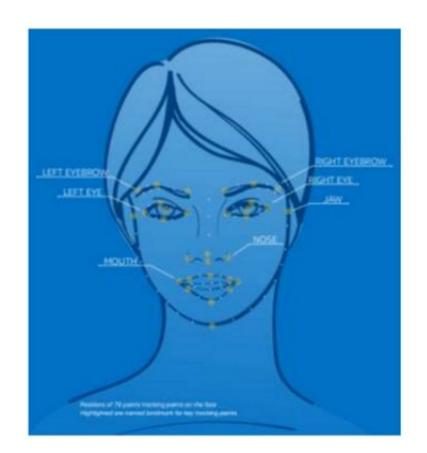


INTEL REALSENSE: HANDS!





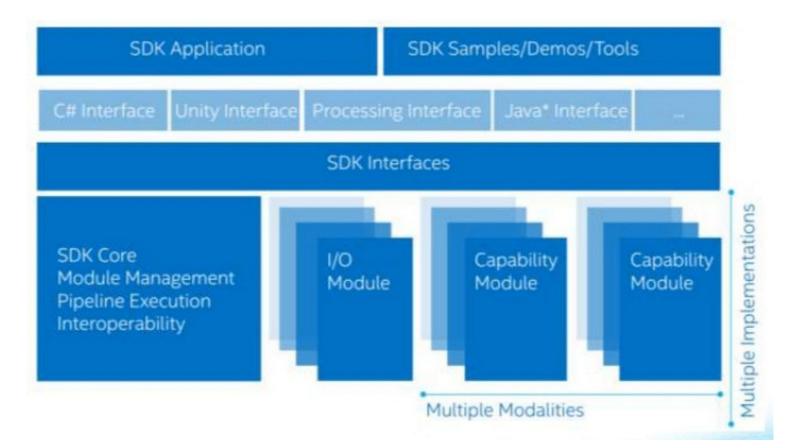
INTEL REALSENSE: FACE!





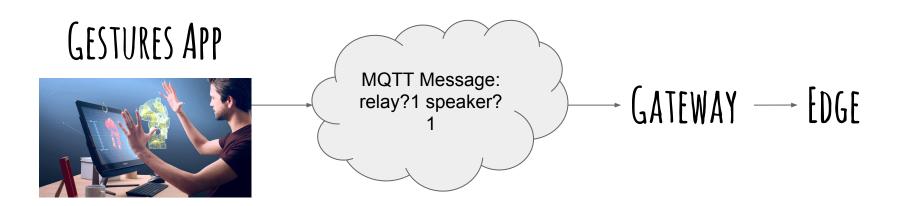


INTEL REALSENSE: SDK / DEVELOPMENT

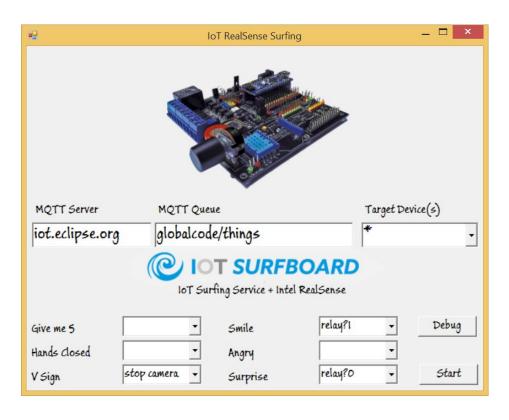




INTEL REALSENSE: GESTURES TO MQTT!



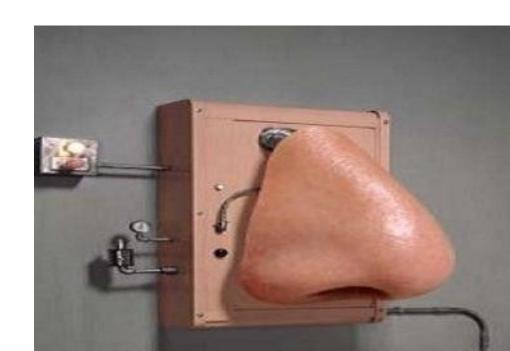
INTEL REALSENSE + SURFING SERVICE



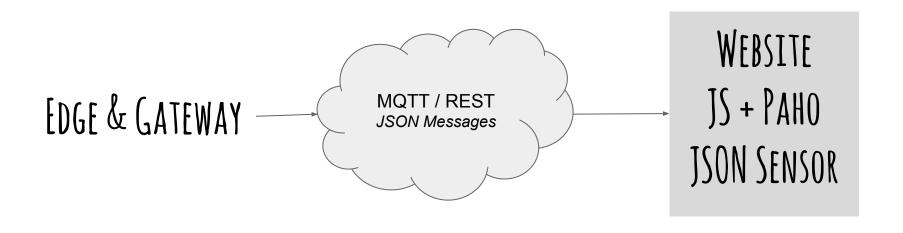
DEMO: INTEL REALSENSE + IOT SURFING SERVICE

YOUR PROJECT'S NOSE: SENSING THE REAL WORLD!

☐ ALCOHOL SENSOR



ECLIPSE PAHO FOR JAVASCRIPT



ECLIPSE PAHO FOR JAVASCRIPT

```
client = new Paho.MQTT.Client("ws://iot.eclipse.org/ws", "myClientId"
        + new Date().getTime());
client.onConnectionLost = onConnectionLost;
client.onMessageArrived = onMessageArrived;
client.connect({onSuccess: onConnect});
function onConnect() {
 console.log("onConnect");
 client.subscribe("globalcode/things/surfboard1");
```

ECLIPSE PAHO FOR JAVASCRIPT

```
function onMessageArrived(message) {
 if (message.payloadString.charAt(0)!='{')return;
 var obj = jQuery.parseJSON(message.payloadString);
 console.log(obj.name);
  console.log(obj.components);
  $.each(obj.components, function(i, v) {
    if (v.name == "alcohol") {
      if (v.value > 500) {
       alert ("Someone is drinking alcohol at @Devoxx!!!!");
     return;
```

(LAST) LIVE DEMO



OUR GITHUB...

GITHUB.COM/VSENGER

GITHUB.COM/SURFBOARD



THANK YOU!

QYARASENGER YARA@GLOBALCODE.COM.BR

QVSENGER VINICIUS@GLOBALCODE.COM.BR