A Web of Things: Welcome to the Physical World

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W3C WoT IG
Example impacts of web technology for embedded devices / IoT

Broaden developer base
LinkedIn profiles:

- Embedded developers: 3,811
- Web developers: 710,834

Enable a „Long tail“ Market

Web-grade security

Simplify integration

- Sign in with Dropbox
- Sign in with Facebook
- Sign in with GitHub
- Sign in with Google
- Sign in with Tumblr
- Sign in with Twitter
Eclipse IoT Developer Survey 2016

Top 3 Concerns of IoT

1. Security
2. Interoperability
3. Connectivity

Importance of IoT consortia

1. Eclipse
2. W3C

WWW of things:

What is the approach?

What are the deliverables?

What can I do to participate?
What is the approach?
Avoid the n+1 problem
Do not build „yet another platform“

How standards proliferate:
(See: A/C chargers, character encodings, instant messaging, etc)

Situation: There are 14 competing standards.

14?! Ridiculous!
We need to develop one universal standard that covers everyone’s use cases. Yeah!

Soon:

Situation: There are 15 competing standards.
Standardize and drive
Building blocks for a web of things

Situation

Proposal

Proceeding

- Map domain applications to “atomic use cases” and requirements
- Identify best practices
- Assemble a stack of tech recommendations
What are the deliverables?
WoT Resource Model

- WoT defines recurring patterns of resources
- Protocol-independent
Thing Description

• Reach interoperability by a semantic description language
  – based on well established JSON format
  – enables machine interoperability by using (standardized) vocabularies from given @context

• Decouples Application from lower-level Implementation specifics
TD Sample

TD Context
- minimal vocabulary set
- to be standardized by W3C WoT

```json
{
    "@context": ["http://w3c.github.io/wot/w3c-wot-td-context.jsonld"],
    "@type": "Thing",
    "name": "MyTemperatureThing",
    "uris": ["coap://www.mytemp.com:5683/"],
    "encodings": "JSON",
    "properties": [
        {
            "name": "temperature",
            "valueType": "xsd:float",
            "writable": false,
            "hrefs": ["temp"]
        }
    ]
}
```
Common runtime enables portable apps

WoT Servient Vendor A
- App Script
- Runtime Environment
  - Client API
  - Server API
- Resource Model
- Protocol Mapping(s)
  - Client Connector
  - Server Connector

WoT Servient Vendor B
- Runtime Environment
  - Client API
  - Server API
- Resource Model
- Protocol Mapping(s)
  - Client Connector
  - Server Connector
Scripting Example

// access a local thing by its name
var led = WoT.getLocalThing('basicLed');

// create a new thing
var fancy = WoT.createLocalThing('fancyLed');

// add an action with boolean parameter and void output
fancy.addAction('trafficLight','xsd:boolean');

// add an handler
fancy.onActionInvoke('trafficLight', function(mayDrive) {
  print('changing light to ' + mayDrive);
  // use other thing to implement the intended logic
  if(mayDrive) {
    led.setProperty('rgbValueGreen',255);
    led.setProperty('rgbValueRed', 0);
    led.setProperty('rgbValueBlue', 0);
  } else {
    led.setProperty('rgbValueGreen',0);
    led.setProperty('rgbValueRed',255);
    led.setProperty('rgbValueBlue', 0);
  }
});
Deliverables of W3C WoT

- **WIP Documents**: [http://w3c.github.io/wot/](http://w3c.github.io/wot/)
  - **Current practices**: Compilation of experimental specifications
  - **Architecture**: Underlying Architectural concepts of WoT
  - **Use Cases and requirements**: Use cases disseminated into „atomic“ use cases
  - **Tech Landscape**: Survey of existing IoT platforms and technology
What can I do to participate?
Open Source Projects

• Reference libraries for Things, Servers, Clients and Tools
• Javascript runtime with WoT API
• TD Parser
• Java GUI client
• Web UI client
• Angular.js module

Thingweb

https://github.com/thingweb
Plugfests and „open day“
Next F2F: July 2016, Beijing
The Interest Group

• Broad range of members

• Task forces with focus on specific aspects

Discovery  Scripting APIs  Security & Privacy  Thing Description
WWWrapping up

• We do **not** standardize a platform
• We standardize building blocks to create cross-platform, cross-domain applications
• Focus on application layer of open web standards
• Outreach to industry and open-source

• WoT WG charter is being prepared
• Looking for contributions
Dear web...

Happy anniversary, and welcome to the real world.