W3C Web of Things

POC Planning – Intel Contributions

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Proof of Concept (POC) Development: Goals

Overcome *a specific technical obstacle*

Demonstrate *business value of a new technology or standard*

Advance *engagements with key ecosystem players*

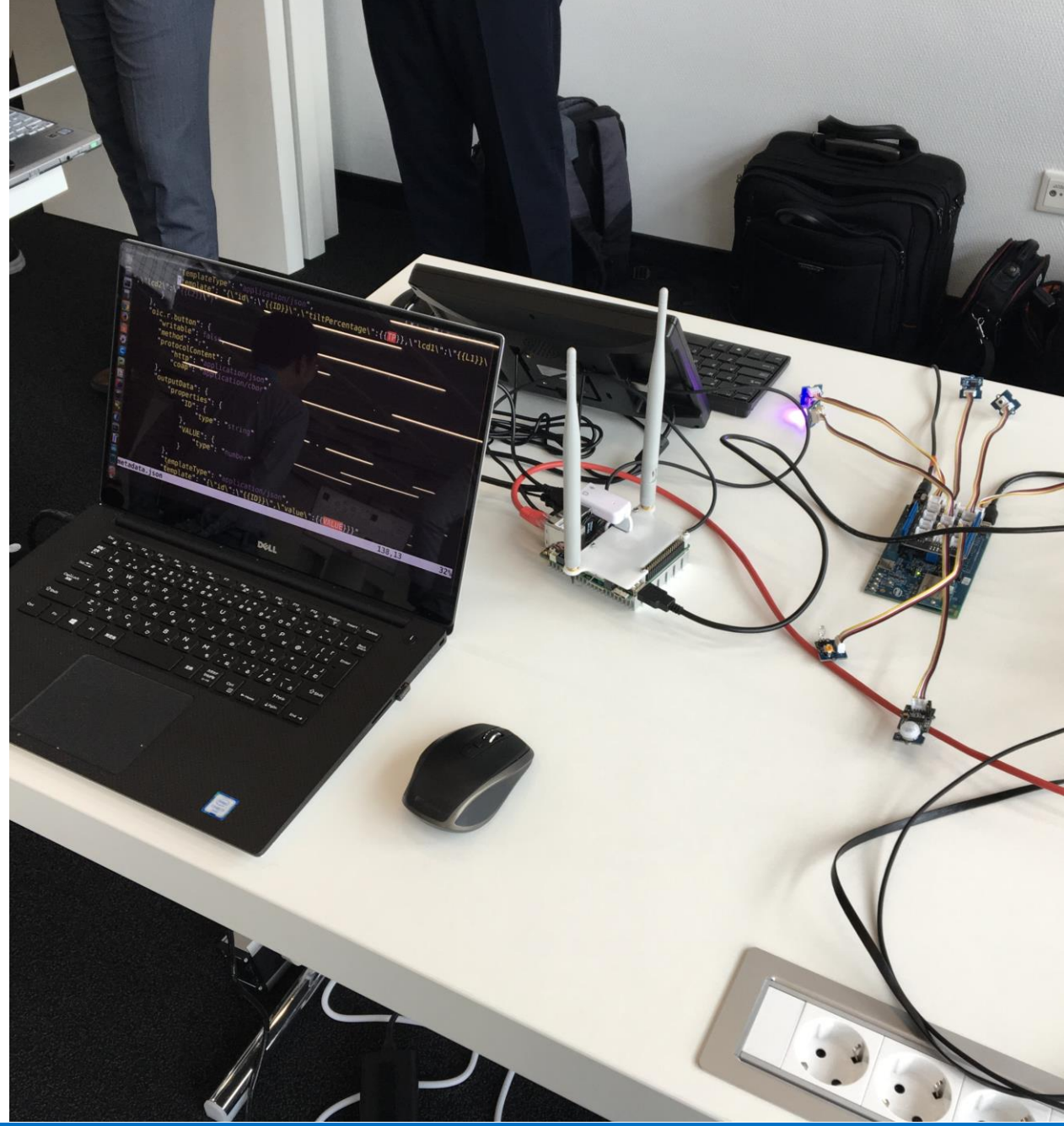
1. **Metadata bridges** (value: increase adoption and applicability)
   - Support *all* existing IoT devices from *multiple* ecosystems
2. **Voice control** (value: demonstrate utility, engage key ecosystem player)
   - Support *any* IoT device with adaptive semantic voice controls
3. **Fog Integration** (value: develop support for ubiquitous localized services)
   - Deploy using local compute resources for proxies, translators, and applications

Metadata Bridge

Goal: Increase number of devices accessible via WoT standard

- Read external metadata and translate into WoT TDs
- Infer and add extra information not available in native metadata
- Make IoT devices available to any system that can process WoT TDs
- Does *not* need specific changes to target IoT devices.

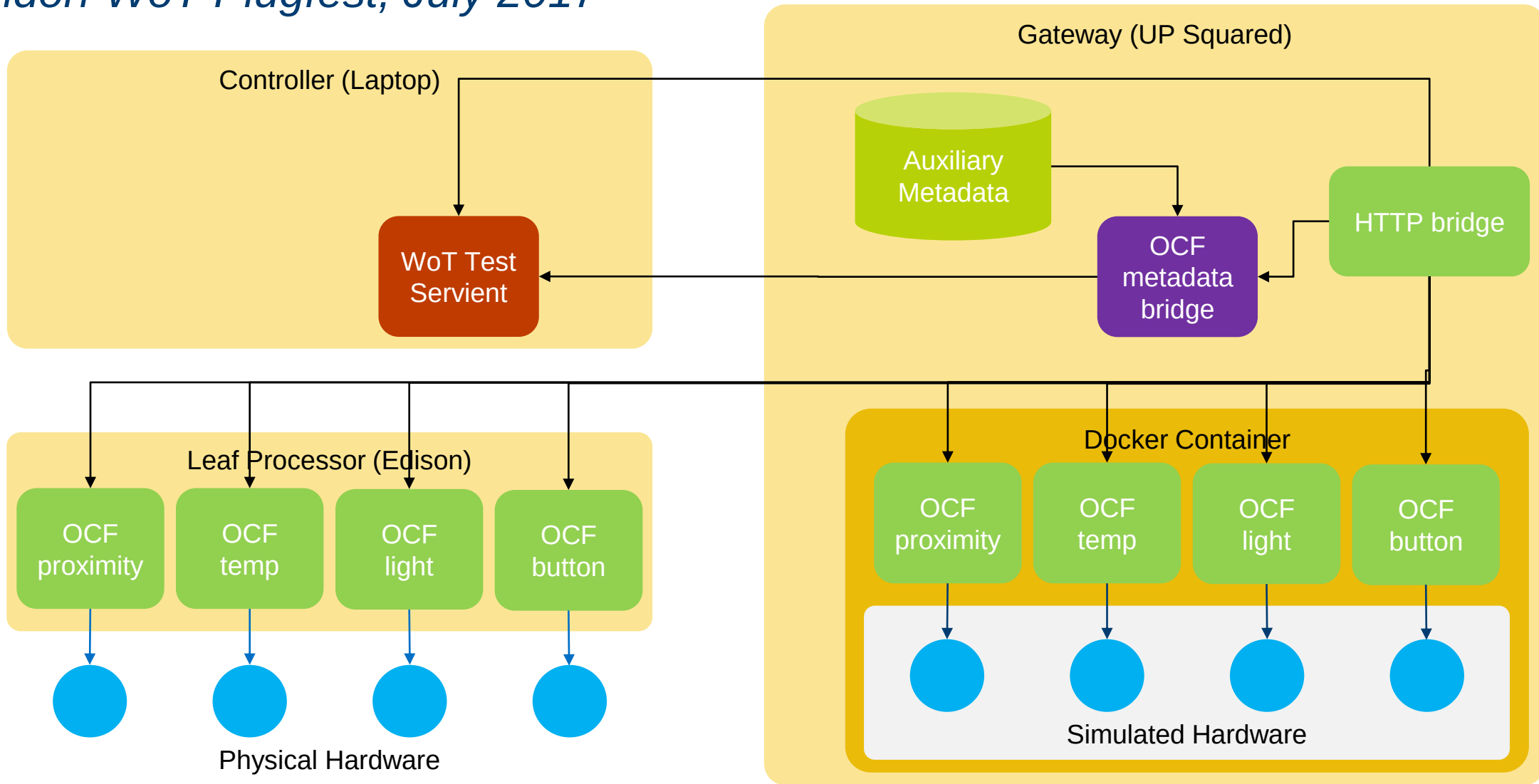
→ *Prototype built using OCF Smart Home Demo as test target.*



Metadata Bridge: Phase 1

Dusseldorf WoT Plugfest, July 2017

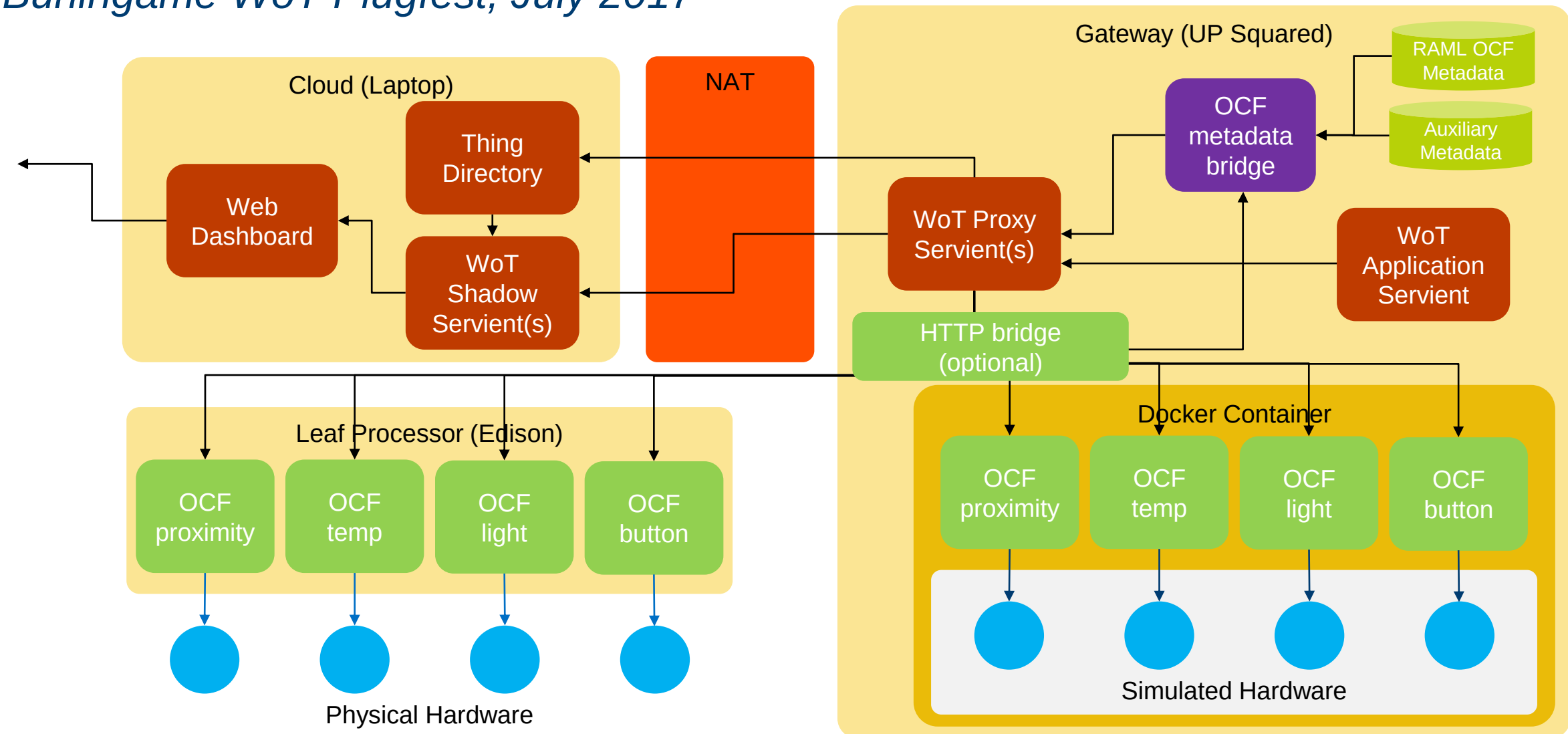
Goal: Translate OCF metadata and make it available to via WoT Thing Description



Metadata Bridge: Phase 2

Burlingame WoT Plugfest, July 2017

Add: Ingest official OCF data models, traverse NAT, use Thing Directory, CoAP



Voice Control

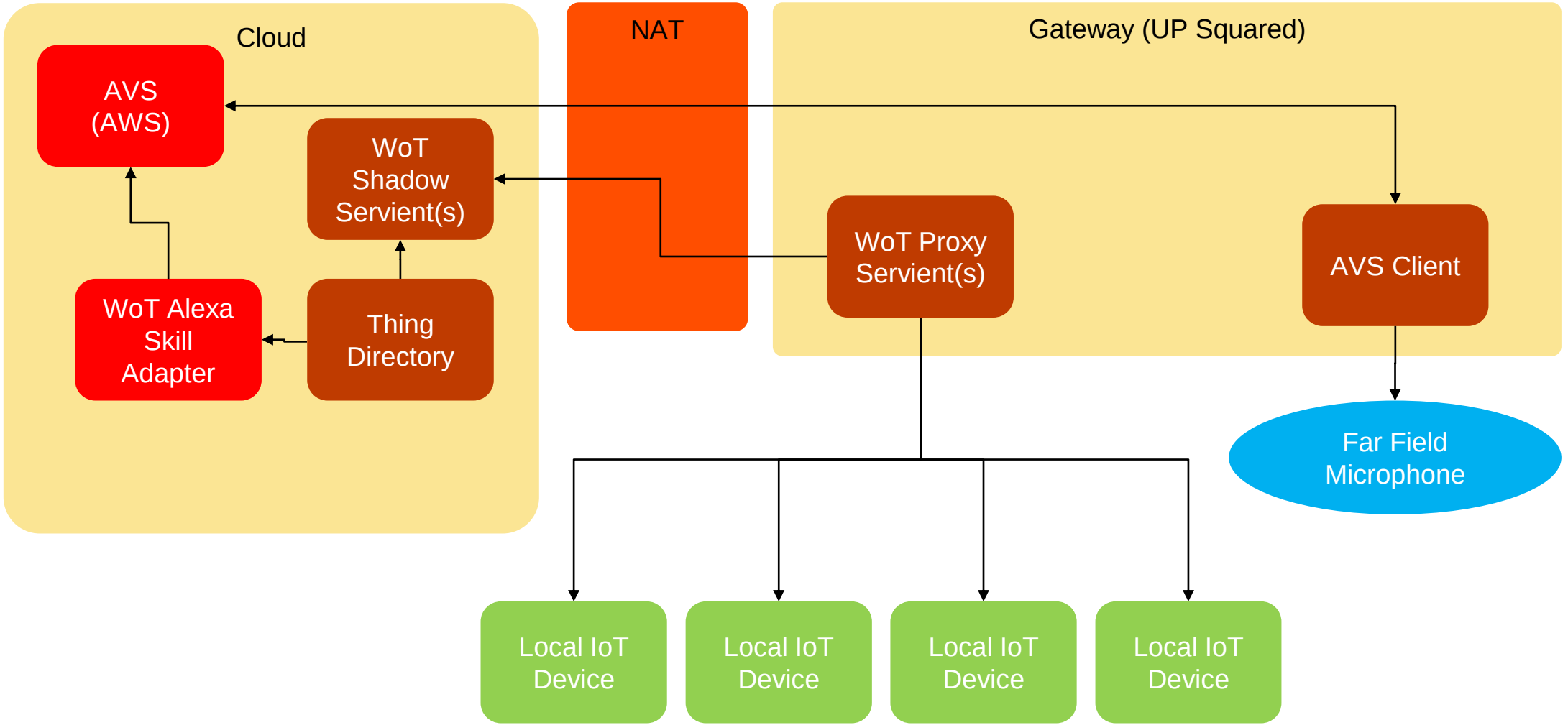
Goal: Enable *automatic* voice control of *any* WoT-enabled device

- Demonstrate use of semantic markup of Thing Description
  - Using iot.schema.org and SSNO ontologies and semantic inferencing tools
- Generate adaptive AVS Alexa skill, bridging with Alexa Home Skill
- Layer with WoT metadata bridges to control devices from multiple ecosystems (including OCF)

Voice Control

Burlingame WoT Plugfest, July 2017

Goal: Generate generic voice UI using WoT Thing Descriptions



Fog Integration

Goal: Make services discoverable and locally available using WoT combined with fog capabilities.

- Run WoT services on fog (OpenFog) software stack
  - Thing directory (WoT discovery)
  - Metadata bridges (eg to OCF)
  - Voice skill services (eg AVS)
  - Application servients (IoT services)
- Connect to computational services
  - Recognition service (eg AlexNet)

TODO: Industrial POCs

- Voice control is primarily a *home* use case
- What do we want for industrial use cases?
- What is different about industrial requirements?
  - Set of standards and their requirements are different
  - Real-time, pub-sub architectures, TSN, functional safety, central management, asset management, complex access controls, energy management…
  - Less emphasis on privacy, more on safety
- Are municipal and building use cases more like home or industrial use cases?
- What about automotive? Transportation? Retail? Medical?
  - They all have their own ecosystems…

TODO: Scenarios

Step through some specific scenarios

- Voice Control for Consumer End Users
- Service Composition for System Integrators
- Compute Services (eg person recognition) for other Service Providers

Include not only home, but also industrial and municipal

- Long tail – translation to older protocols
- Adapt to different requirements, eg real time and functional safety

→ Need to talk to industrial users about requirements

Smart Security Scenario: Person Detection

This specific scenario can be demonstrated using OCF Smart Home capabilities, combined with one or more IP cameras. This application is of use in multiple verticals (home (security system), industrial (eg for functional safety), municipal (eg subway track ingress).

Problem: Simple proximity detection systems, such as motion sensors, can be triggered by events other than human presence, leading to false alarms. However, constantly running AI-based human recognition is expensive.

Solution: Combine simple distributed motion sensors with AI-based person recognition. When a motion sensor is triggered, an image is captured in that location and sent to a person recognition service. Only if a person is detected is an alarm triggered. In addition, the AI service can be centralized so that only one recognition service is needed even if there are multiple cameras and motion sensors. As an extension, cameras could be mounted on mobile platforms (aka robots…).