Submission for IAB IoT Semantic Interoperability workshop 2016

Google and Alphabet teams have been working on IoT schemas for consumer facing IoT actors, including a formal language, methodology, and design guidelines for their respective partner bases. Google also has strong links with schema.org which has years of experience promulgating open schemas for adding semantic information to various electronic content. We are still at an early stage of identifying commonalities (requirements) and thinking about interoperability between efforts by Google/Alphabet teams. However we'd like to inform our internal conversation with insights from the IAB workshop helping us to understand why and how we might bring our efforts together and collaborate with external partners. Our goal is to work with IOT vendors and schema.org to create interoperable schemas that can be absorbed by a range of intelligent cloud services and local apps.

Another key questions that we keep running into is the "hardware abstraction layer" scheme vs. "hardware system layer" scheme. The presumption in the chip world is that the hardware system layer may change at every iteration, but that the hardware abstraction layer should be stable across multiple iterations. For IoT, this same presumption may be valuable--schemes are HAL-equivalent, defined for interoperability, and the mechanism for translating them into the actual system activation is not part of the system primitive. More generally, how can we find a good balance between usability and flexibility (complexity) e.g. in terms of nesting common elements vs. precision and size of schema without nesting.

Our goal is to come out with a better understanding of approaches and other stakeholder's efforts, to inform the ongoing effort within Google, and a proposal for exposing to the outside world.

Here are some of the relevant Alphabet product teams interested to learn from the IAB IoT Semantic Interoperability workshop:

- Google beacon platform - consisting of the open beacon format Eddystone and various client and cloud APIs, this platform allows developers to mark up the world to make your apps and devices work smarter by providing timely, contextual information.
- Physical Web - based on the Eddystone URL beacon format, the Physical Web is an approach designed to allow any smart device to interact with real world objects - a vending machine, a poster, a toy, a bus stop, a rental car - and not have to download an app first.

- **Nearby Messages API** - a publish-subscribe API that lets you pass small binary payloads between internet-connected Android and iOS devices as well as with beacons registered with Google's proximity beacon service.
- **Brillo** & **Weave** - Brillo is an Android-based embedded OS that brings the simplicity and speed of mobile software development to IoT hardware to make it cost-effective to build a secure smart device, and to keep it updated over time. Weave is an open communications and interoperability platform for IoT devices that allows for easy connections to networks, smartphones (both Android and iOS), mobile apps, cloud services, and other smart devices.
- **OnHub router** - a communication hub for the Internet of Things supporting Bluetooth® Smart Ready, 802.15.4 and 802.11a/b/g/n/ac. It also allows you to quickly create a guest network and control the devices you want to share (seeOn.Here).
- **Google Cloud Platform IoT Solutions** - tools to scale connections, gather and make sense of data, and provide the reliable customer experiences that IoT hardware devices require.
- **Chrome Boxes** & **Kiosk Apps** - provides custom full screen apps for a purpose-built Chrome device, such as a guest registration desk, a library catalog station, or a point-of-sale system in a store.
- **Vanadium** - an open-source framework designed to make it easier to develop secure, multi-device user experiences, with or without an Internet connection.