RESTful IoT Work at T2TRG

Ari Keränen
(with Michael Koster, Klaus Hartke, Matthias Kovatsch)

T2TRG @ IETF97
Seoul, South Korea
Overview

Hypermedia language for IoT

- CoRAL
  - CBOR-encoded Form Data

- HSML

Hypermedia apps

- T2T Data Hub
- CoRE Lighting

(maybe RD, pub/sub, WoT TD, ...

Guidance

- CoRE Application Descriptions

Restful Design for IoT Systems
RESTful Design for IoT Systems

• Guidance for designing IoT systems that follow the principles of the REST architectural style
• Collection of "basic" information and terminology that has been found useful
• Taking into account IoT characteristics
  – data formats, interaction patterns, and other mechanisms minimizing need for human interaction
  – enabling use of constrained devices and networks
• draft-keranen-t2trg-rest-iot
CoRE Application Descriptions

• A way to describe the APIs of constrained, RESTful, hypermedia-driven applications
  – URI schemes
  – media types
  – link relation types
  – form relation types
  – form field names

• draft-hartke-core-apps
Hypermedia Language for IoT

• How to express resources with hypermedia controls (e.g., links and forms) in constrained-thing friendly way

• "HTML for IoT"
  – But less focus on content, more on control
  – Also see work at W3C Web of Things groups: https://www.w3.org/WoT/
CoRAL: Constrained RESTful Application Language

• Efficient hypermedia representation format for links and forms
  – Compact representation with CBOR, defaults, numeric IDs. Often only few bytes needed.

• Reduce round trips with embedded representations

• Simple implementations

• draft-hartke-t2trg-coral &
  draft-hartke-t2trg-cbor-forms
HSML: Media Types for Machine Interaction

- CoRE link format + SenML => HSML Collections
  - JSON & CBOR representations
- Link annotation for application semantics
- draft-koster-t2trg-hsml
CoRAL & HSML

• Similarities
  – Collections of links and items
  – Forms to drive resource state updates
  – Interoperable data models
  – HSML can be encoded in CoRAL

• Differences
  – CoRAL: data model derived from HAL
  – HSML: CoRE Link-Format and SenML
  – CoRAL: media types to define application semantic vocabulary and data serialization
  – HSML: link annotation to embed application semantics
CoRAL & HSML: going forward

• Experimentation and evaluation through use case prototyping
• Eventually converge to single representation format and interaction model
Hypermedia Applications

• Core Lighting
  – Control smart objects in simple lighting scenario
  – Draft outdated; to be updated

• Thing-to-Thing Data Hub
  – RESTful, hypermedia driven web app
  – for publishing information to central location
  – Discover&Read Hub, CRUD+Observe & Find items
  – Evolvable API based on hypermedia
  – draft-hartke-t2trg-data-hub