Thing-to-Thing
~~proposed~~ Research Group

Thing-to-Thing RG (T2TRG)

San Jose, CA, US, 2016-03-15/-16

Chairs: Carsten Bormann, Ari Keränen

t2trg@irtf.org

Note Well

- You ~~may~~ will be recorded

- The IPR guidelines of the IETF apply:
  see **http://irtf.org/ipr** for details.

Administrivia (I)

- Pink Sheet

- Note-Takers

- Off-site (Jabber, Hangout?)

  - **xmpp:t2trg@jabber.ietf.org?join**

  - **https://plus.google.com/hangouts/_/_____**

- Mailing List: **t2trg@irtf.org** — subscribe at: **https://www.ietf.org/mailman/listinfo/t2trg**

- Repo: https://github.com/t2trg/2016-03-san-jose

Administrivia (II)

- Please keep the power plugs inside the U

- WiFi logins on pieces of paper

- Wiki: https://**github.com/t2trg**/2016-03-san-jose/wiki

  - Slides (yes, please send Ari or me your slides!)

  - This also has the pointer to tonight's restaurant

- Please return your badges at the end of the day

Tuesday morning/early afternoon talks

Presenter	Title	# minutes needed for talk and discussion	Time	
Carsten Bormann	Welcome, Agenda	10	10:00	00
Ari Keränen	RESTful IoT Design	20	10:10	10
Matthias Kovatsch	Semantic Interoperability Requires Self-describing Interaction Models	30	10:30	11
Michael Koster	Research Topics in Machine Hypermedia System Design	30	11:00	12
(coffee break)			11:30	
Carsten Bormann	YANG, CoMI, COOL: Managing IoT in a mostly RESTful way	20	12:00	13
Soumya Kusti	Horizontal IoT Application			

Round of Introductions

Thing-to-Thing Research Group (T2TRG)

- Investigate open research issues in:

  - turning a true "Internet of Things" into reality,

  - an Internet where low-resource nodes ("Things", "Constrained Nodes") can communicate among themselves and with the wider Internet, in order to partake in permissionless innovation.

- Focus: issues that touch opportunities for standardization in the IETF

  - start at the adaptation layer connecting devices to IP, and

  - end at the application layer with architectures and APIs for communicating and making data and management functions (including security functions) available.

Why a Research Group now?

- First wave of IoT standards completed by the IETF

- IoT Consortia now forming to build infrastructure and industry agreements around those

➔ New requirements for research:
  based on actual usage of the standards now available

Areas of Interest
(to be discussed in formal chartering)

- Understanding and managing the motivation for single-purpose silos and gateways; facilitating a move towards small pieces loosely joined (hence "thing-to-thing"); scaling the number of applications in a single network

- Deployment considerations; scaling considerations; cost of ownership

- Management and Operation of Things

- Lifecycle aspects (including, but not limited to, security considerations)

- Cooperation with W3C, e.g. on data formats and semantics

Areas of Interest (more explorative)

- Operating Things that have multiple masters/ stakeholders (including understanding role definitions of devices, owners, operators etc.)

- Exploring the duality of state- and event-based approaches

- Aspects of distribution (cf. "fog computing"); reliability and scalability considerations

- Containerization and other forms of mobile code

Other objectives

- Definition of "Benchmark" or Reference Environments:

  - to enable regular plugfests, and

  - as a basis for repeatable, comparable research.

- Description of practical, real world, cross domain applications of connected Things

- Taxonomy, technology survey and best practice documents

- Fostering collaboration with industry fora and other organizations on networking of things

Relationship to IETF WGs

- These objectives will be achieved making use of a close involvement between the IETF community and the T2TRG.

- For the IETF, some RG documents may simplify the generation of (or even serve as) use case documents or other informational references.

- Close contact will be maintained with the IETF's IoT-related WGs and its IoT directorate.

Relationship to IAB

- IAB workshops can be very successful in breaking ground

- 2011: Smart Object Workshop (Prague). <u>RFC 6574</u>

  - Also seminal for <u>RFC 7228</u>

- 2012: Smart Object Security (Paris). <u>RFC 7397</u>

  - Not an official IAB workshop

- Expect good cooperation with further IAB activities

Name, organization

- "Thing-to-Thing" is a homage to "end-to-end" RG

  - Not excluding device-to-cloud models

- Open membership

  - emulate DTNRG or ICNRG as a model

This meeting

- Use the proximity to IOTSI workshop

  - Semantics

  - **Information, Data, Interaction** models

- Meet with OCF, Bluetooth

Agenda

Tue
- 10:00–14:20 Overview, Talks

- 14:20–18:00 plugREST/discussion, Breakouts?   Insert dinner here

Wed
- 09:00–12:00 Special Topics (Security, Bluetooth?), Wrap-up

- Move over to Fremont

- 13:00–18:00 Joint session with OCF (née OIC)

Where are we?

- People now think they know how to **connect** the IoT

  - "IETF Stack" (IPv6, 6Lo, CoAP, DTLS, COSE)

  - (LP-WAN does need further work)

- Now what does it all **mean**?

  - Semantics of data, **interactions**, security

  - How do we design this to **evolve**?