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# Thing-to-Thing proposed Research Group

Thing-to-Thing pRG (T2TRG)

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# Administrivia (I)

- Pink Sheet
- Note-Takers
- Off-site (Jabber, Hangout?)
  - **xmpp:t2trg@ietf.org?join**
- Mailing List: **t2trg@ietf.org** — subscribe at:  
<https://www.ietf.org/mailman/listinfo/t2trg>
- Repo: **https://github.com/t2trg/2015-ietf92**

# 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

# Why a Research Group now?

- W3C is starting an IG (Interest Group) on the IoT
  - operating on long timelines, similar as a RG would in the IETF
  - A parallel activity at the IETF could ensure the common work does not stop at the traditional boundaries of the W3C but considers networking issues as well.
  - IETF WGs are more short-term than is required here

# 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.

# 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

# cf. ICNRG

- ...holds regular physical meetings at least once a year in conjunction with IETF meetings. Additional meetings are held at IETF or other venues, such as in conjunction with related academic conferences.
- ...will produce Informational and Experimental RFCs in order to document the activity of the group and to formalize the outcome of the research topics carried by the group. In addition, such documentation could become input to IETF working groups. Attention will be given to avoiding overlaps with existing IETF work while informing the work with the results of ongoing research.

# cf. DTNRG

- Regular working meetings are typically held every 4-6 weeks at locations convenient to the majority of the participants.
- Presentation-oriented status/summary meetings are to be held once a year (or more frequently, at the desire of the group) concurrent with IETF.

# cf. NWCRG

- A lot of intellectual property exists [...] Research results that are covered by intellectual property rights can of course be brought to and discussed in the NWCRG. However, the IRTF requires participants to disclose the existence of IPR in a timely manner when they bring such contributions to the NWCRG; please see <http://irtf.org/ipr> for details.
- One desired outcome ... is to transition research results ... into widely used Internet protocols and technologies. Experience has shown that this transition is much easier when research results under IPR are available without the need to obtain licenses or pay fees. This is why RFC 5743 prefers “that the most liberal terms possible be made available for specifications published as IRTF Stream documents. Terms that do not require fees or licensing are preferable. Non-discriminatory terms are strongly preferred over those which discriminate among users.” When publishing its results in RFC form, the NWCRG therefore strives to make recommendations that follow this principle.

# This meeting

- Focus of this meeting:
  - Security and Lifecycle aspects in constrained nodes
  - REST and Pubsub: Exploring the state-event duality
  - Management and Operation of networks involving constrained nodes
- Also: discuss the further operation of the nascent RG
  - Schedule (and stated focus items) for further meetings
  - Start refining focus, possibly initial milestones.

# Agenda

- 13:00–15:00 Overview, Keynotes
- 15:30–16:15 Consortia Keynotes
- 16:15–18:00 **Security**
- 09:00–10:45 Security (continued), **REST+**
- 11:15–12:45 **Management**
- 13:15–14:45 Planning, wrapup

# Administrivia (II)

- Pink Sheet. Where is the Pink Sheet?
- Evening event