Internet of Things
Semantic Interoperability

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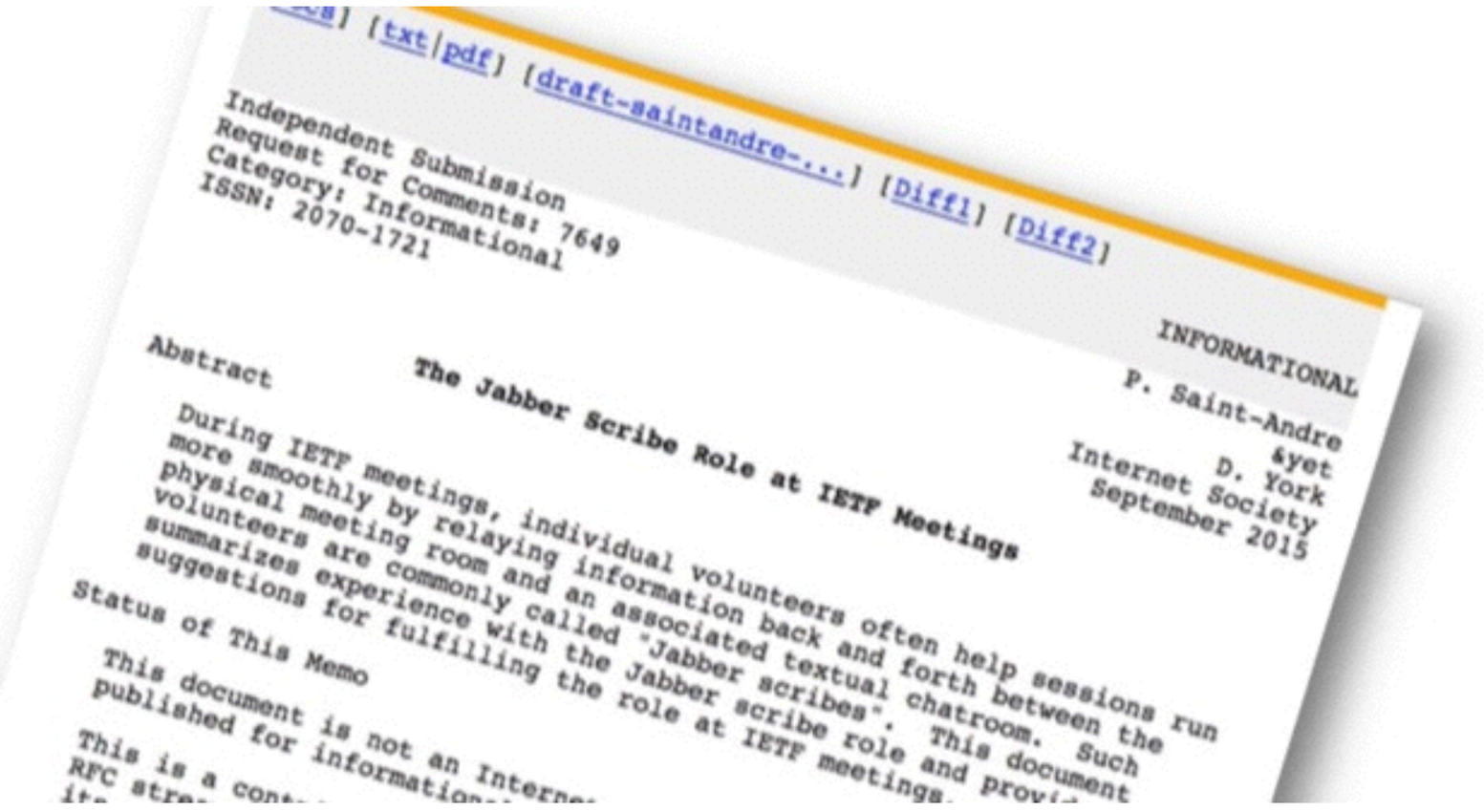
“The Internet Engineering Task Force is a loosely self-organized group of people who contribute to the engineering and evolution of Internet technologies.

It is the principal body engaged in the development of new Internet standard specifications.” (RFC 4677)

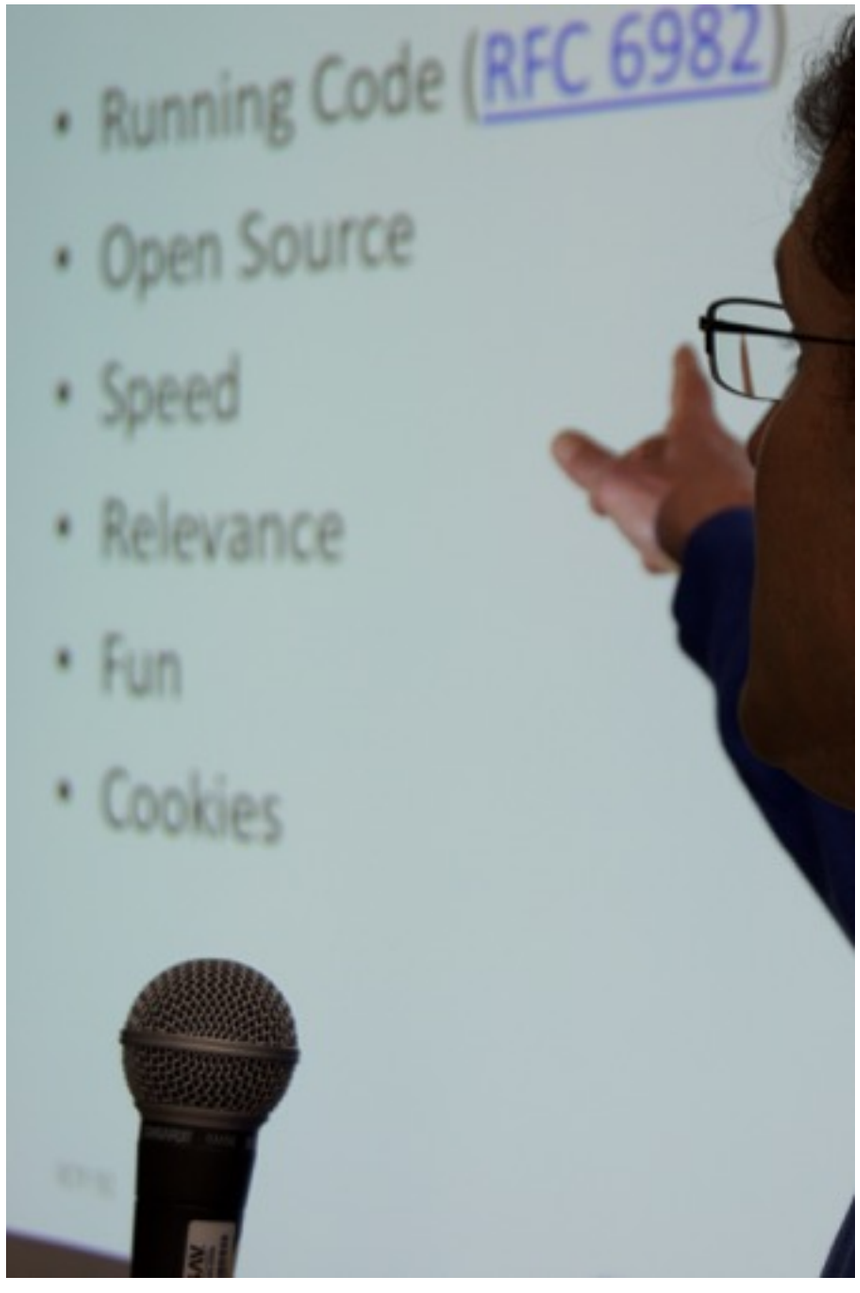


"The mission of the IETF is to make the Internet work better by producing high quality, relevant technical documents that influence the way people design, use, and manage the Internet."

(RFC 3935)

Some Recent Areas of Work

- Web protocols (HTTP2)
- Security and privacy (RFC7258, UTA, TLS1.3)
- Enabling real-time communications from browsers (WebRTC)
- Management, orchestration, virtualisation, and data-model driven networking (NVO, SFC, YANG)
- Internet of Things
- Running code and open source

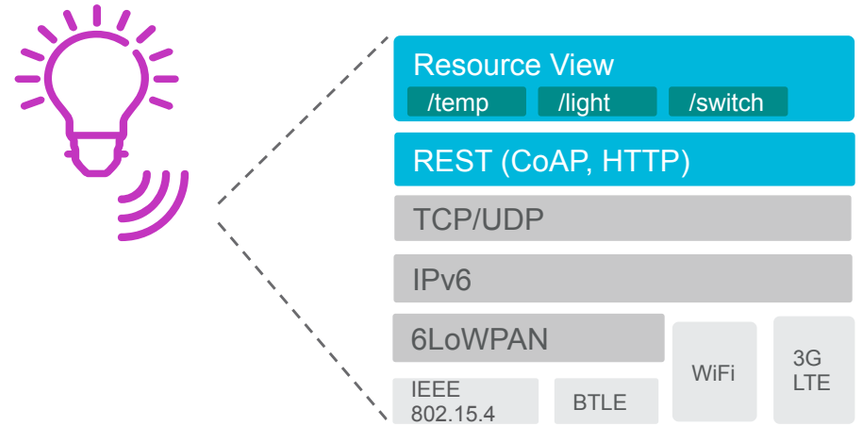


Some Observations

- A shift from closed, vertical solutions to open, general networking solutions (IP, IPv6, mobile networks, WLAN, web)

- Consolidation moving up the stack. Already happening on transfer protocols (HTTP, CoAP, MQTT).

- A shift from devices to thinking about systems, connections between systems, analytics, etc.



- Security continues to be a big challenge. Privacy is even a bigger one; can you choose what cloud a gadget sends data to?

- Device Management, interoperability, and updatability

IETF and IoT Work

- Our role: Specify the underlying, fundamental Internet technologies

- “Permissionless innovation” — others can build on top

Run <IoT transfer protocol> IP	Security for IoT
Routing for lossy & low power networks	Thing-to-Thing communication (IRTF)
Web technology for IoT (CoRE)	Architectural oversight (IAB)

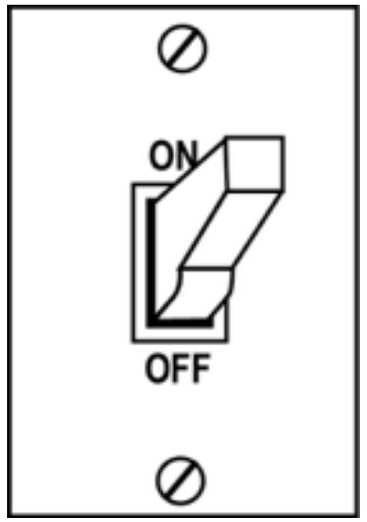
The IAB Workshop on IoT Semantic Interoperability (IoTSI)

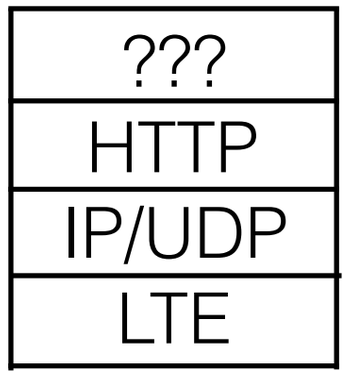
- Most systems run on standard L2, on IP, and on top of the web protocols

- Good interoperability from a network perspective

- But is there application-level interoperability?

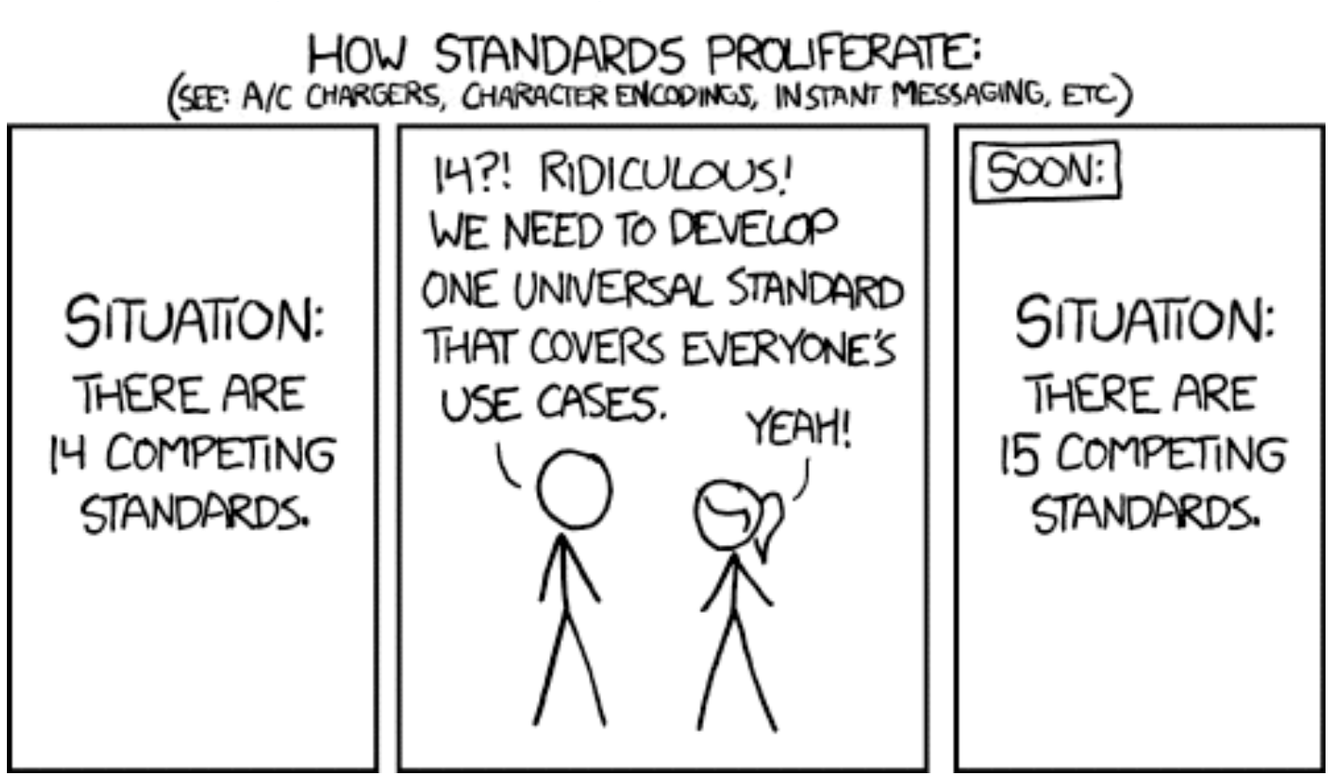
- Different applications, different data models across the industry





AllSeen	Hub OSS	IPSO	Schema.org	OpenDOF	W3C
AIOTI	IAB	IoTDB	OGC	OMA	ZigBee
ETSI	IETF/IRTF	NIST	OIC/OCF	W3C	ZWave

Goal was not to make a new standard



- Workshop goals: facilitate interaction, discuss how to interop/map, identify collaboration opportunities.

- 66 submissions (42 accepted)
  From 17 standards organisations, and vendors, operators, individuals and research organizations

- Several meetings co-located and many joint meetings

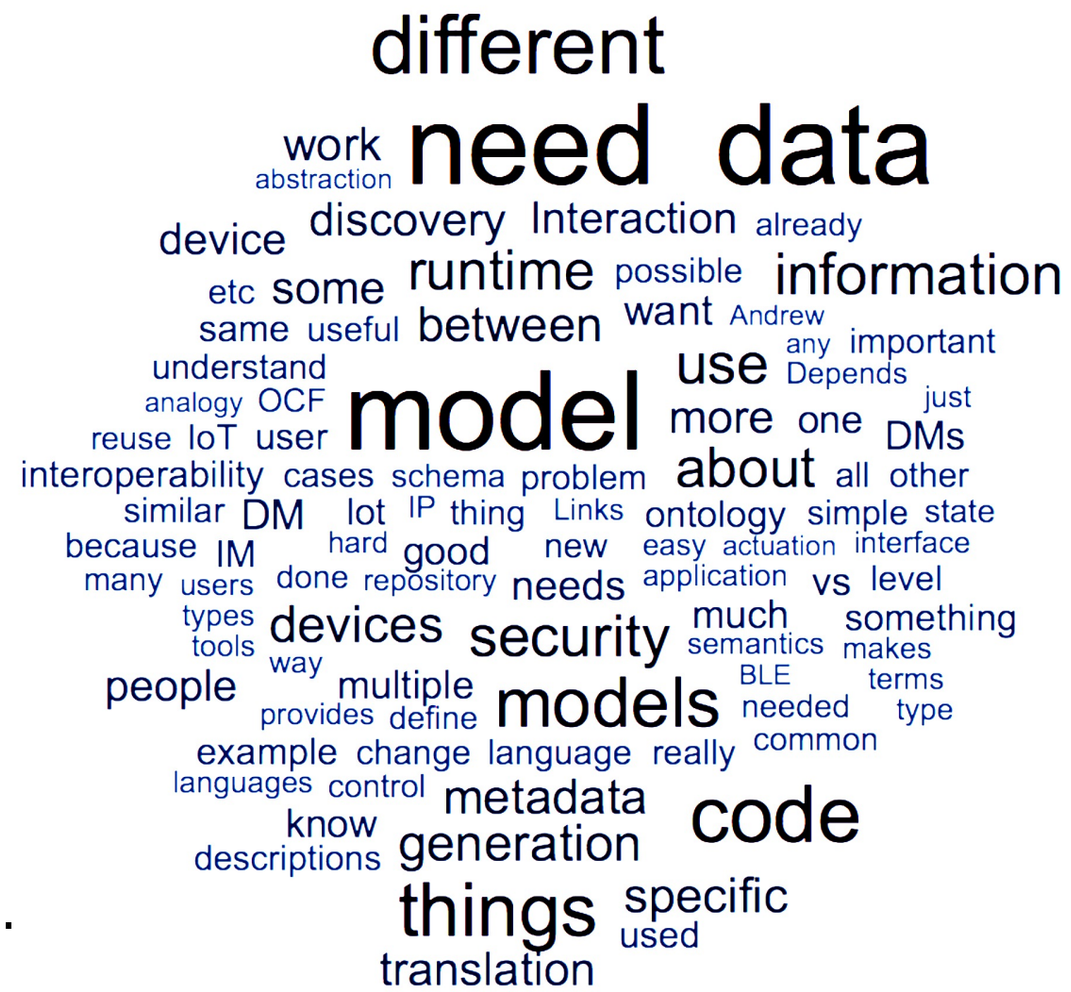
- Public mailing list open and a report in the works

Some of the topics

- Meta-models and higher abstraction layers.
- Interaction models (REST, Pub/Sub, RPC).
- Simple/general vs. specific/expressive tradeoff.
- Modularity and reuse, finding the atomic components.
- Runtime Discovery vs Predefined APIs and pushing code .
- Usefulness of code generation for developers.
- Translation: Model translation vs metadata translation / Translation Hubs.

Final Thoughts

- There is agreement on the need for interoperability on IoT.
- Translation between models will be required.
- Each org will try to converge on common representation formats and definitions.
- Co-operation and broad awareness needed in the relevant organisations.
- A global market needs global solutions.



Links

- Workshop site

  http://iab.org/activities/workshops/iotsi/

- Report (work in progress)

  http://draft-iab-iotsi-workshop-00

- Minutes

  https://docs.google.com/document/d/1cH-LiKFfD1wAN2sFDPWkvNDSwIIXzI2QTyGPLaHJcYc

- CoRE

  https://tools.ietf.org/wg/core/

Thank You

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