Smart Objects @ IETF

Jari Arkko
TAB member, IPSO
Chair, IETF
Expert, Ericsson
Hobbyist & hacker

Outline

- IETF and Smart Objects
- Primary working groups
- Supporting working groups
- Architecture work
- Potential new work
- Discussion of what should happen next – what is missing?

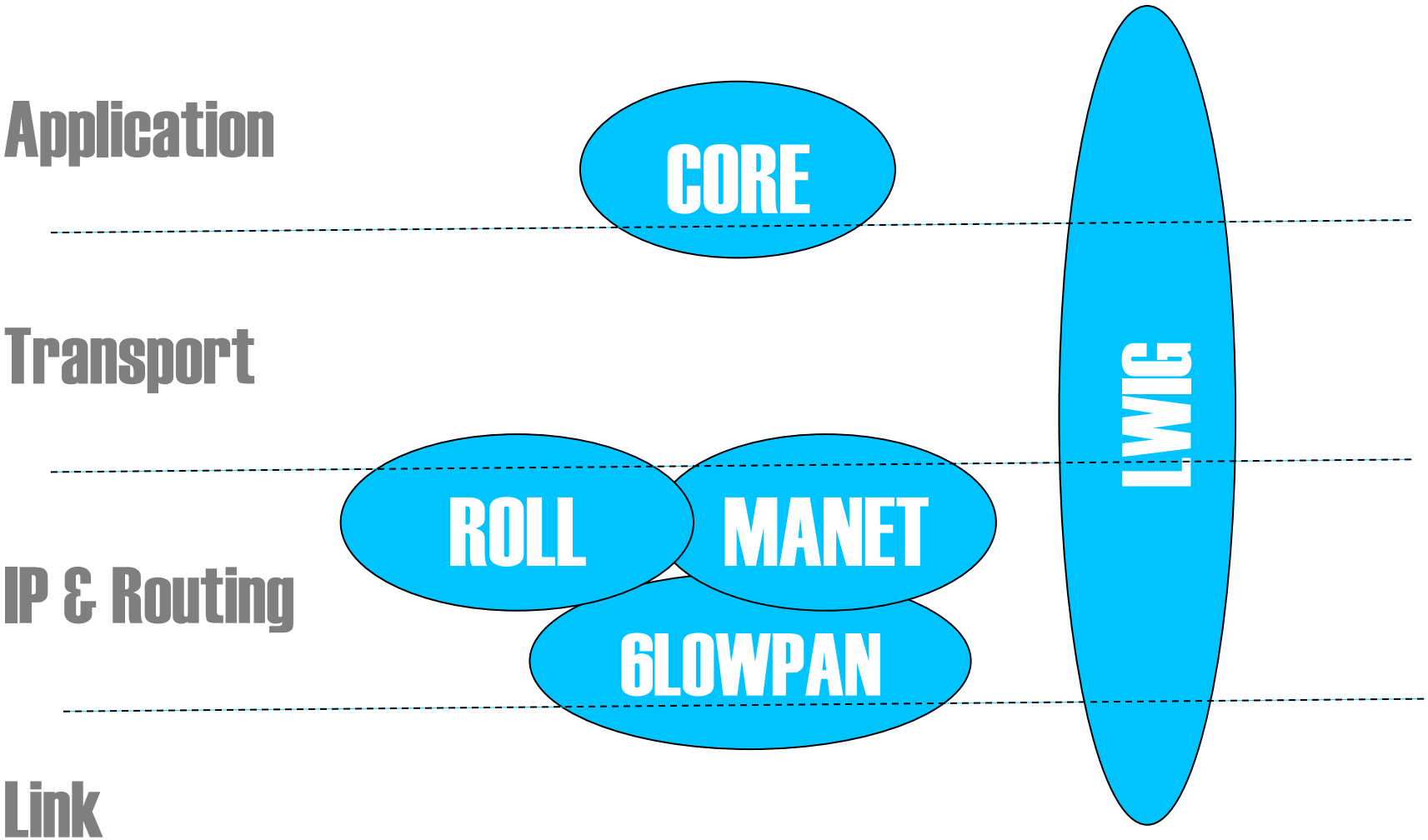
IETF and Smart Objects

- IETF usually works on generic technology
- "What do all smart objects need to communicate with each other"

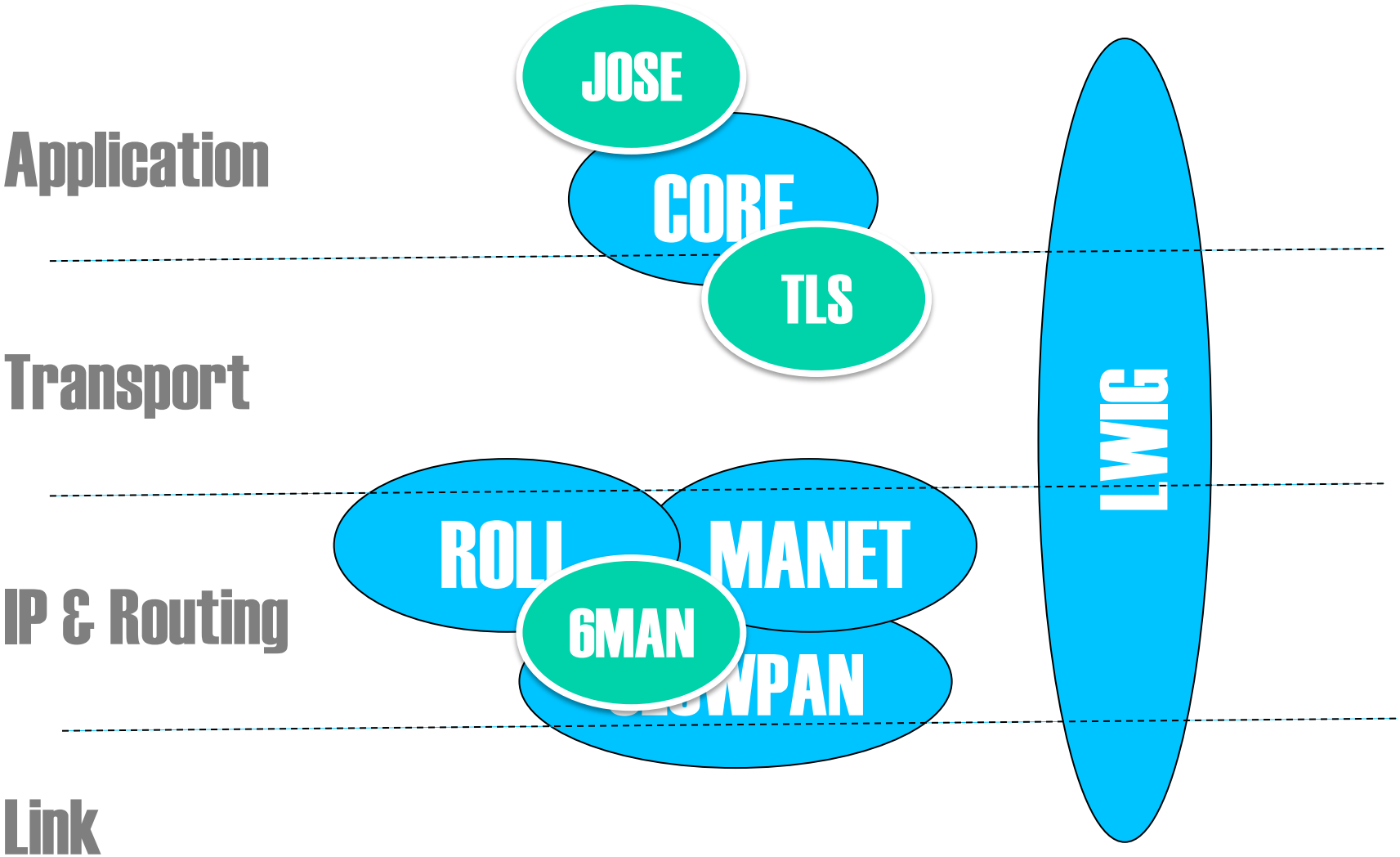
  vs.

  "The Protocol for Smart Thermostats"
- Basic IP & IPv6, routing protocols, web services, security tools, …
- Some specializations of these, but only when we can identify a big group of applications or situations that need similar treatment

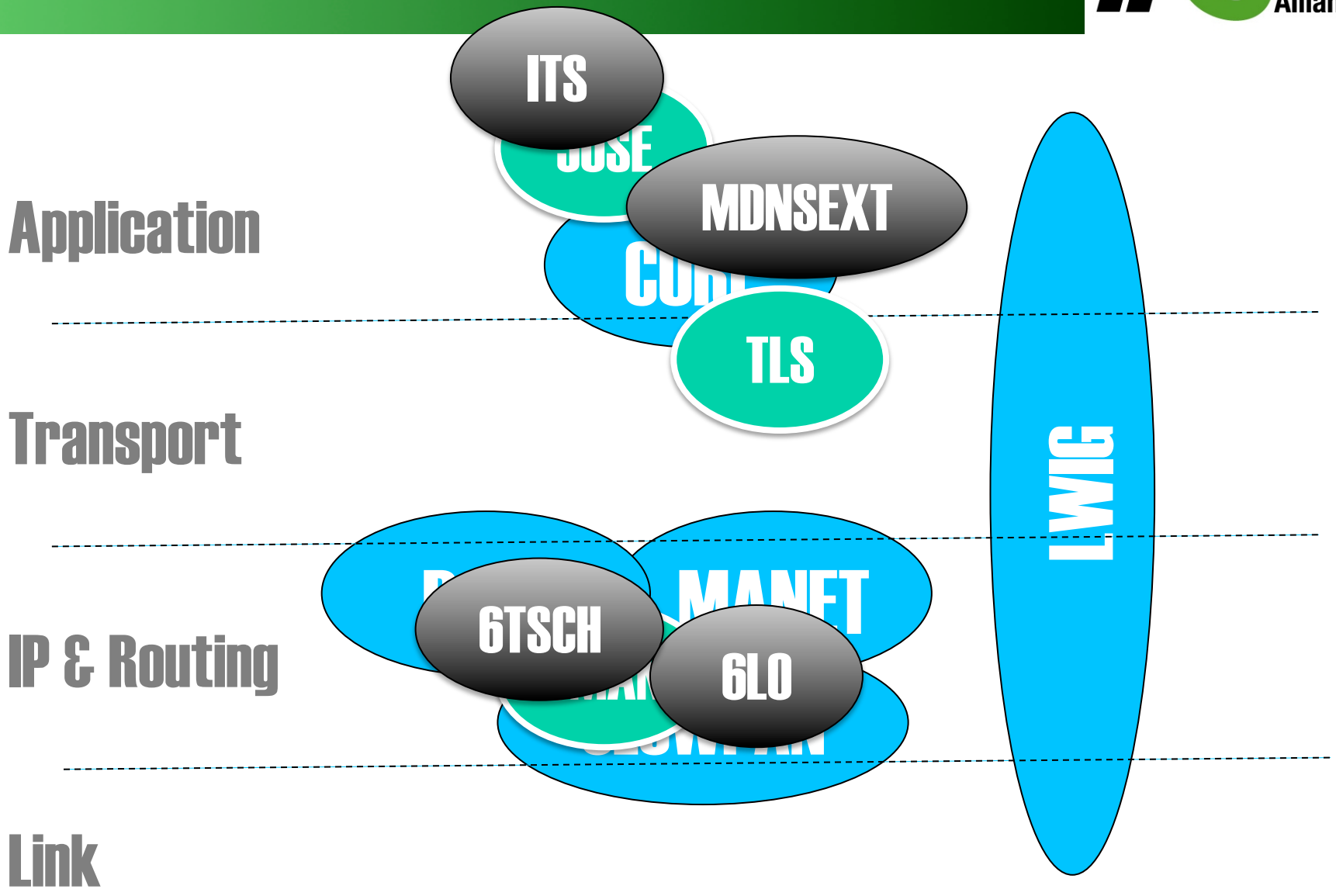
Primary Working Groups



Supporting Working Groups



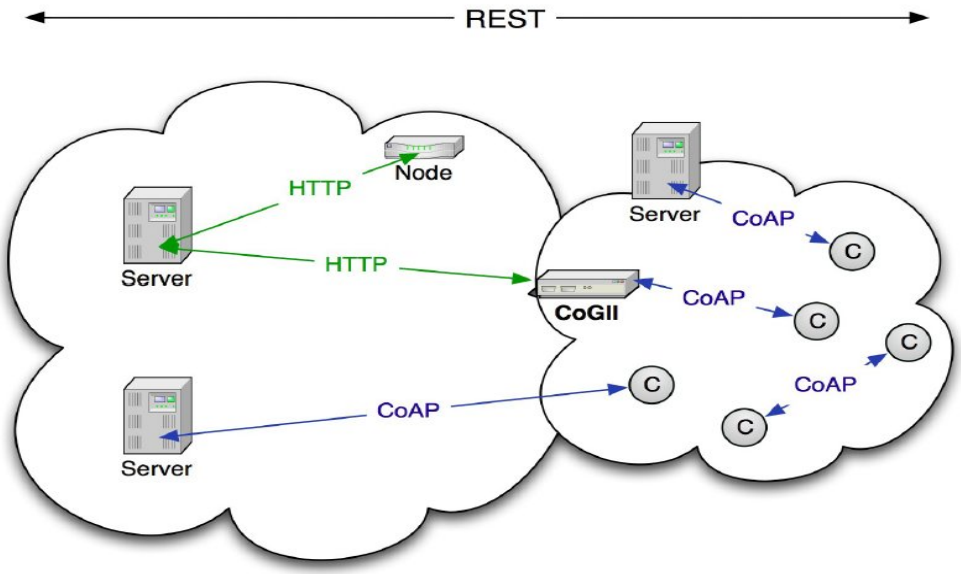
Potential New Work



CORE - CoAP

Web services and REST as a developing paradigm for smart object applications

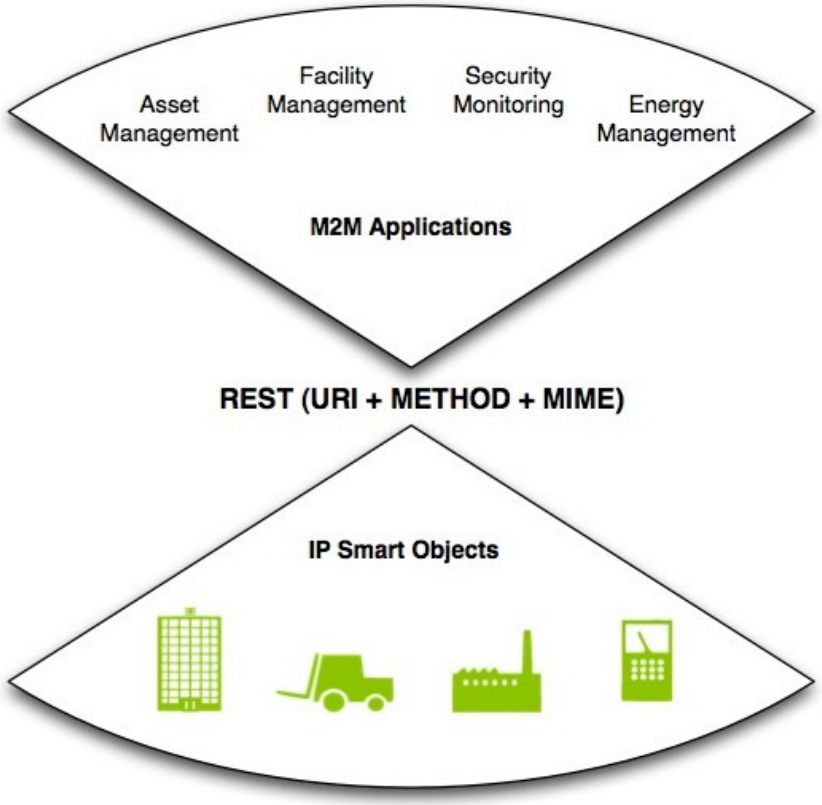
- Constrained Application Protocol
  - Similar to HTTP
  - UDP
  - Binary
- Discovery
  - .well-known/core
  - RFC 6690



Web Services for Smart Objects

This is a very attractive model for developing smart object applications

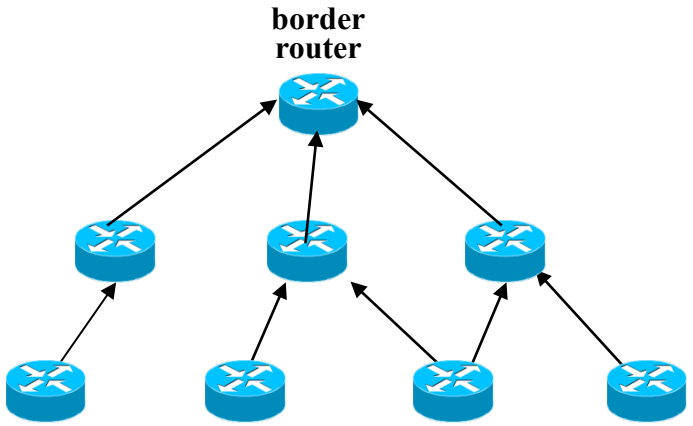
- Very successful for other applications
- Widely available tools & millions of programmers
- Simple and well-defined
- “Permissionless innovation”



Routing – ROLL & MANET

Hypothesis: enterprise / Internet routing protocols not well suited for low-power, lossy networking

- ROLL working on RPL
  - RFCs 6550-6552
  - Multicast, security, applicability
- MANET & ad hoc routing
  - OSLR, AODV, …
  - AODV v2



Implementation Guidance - LWIG

"The purpose of the LWIG working group is to collect experiences from implementors of IP stacks in constrained devices"

- Main guidance document
  - Implementation approaches
  - Guidance for IP, transport, application implementations
- Minimal IKEv2 implementations
- How to use CoAP in the best way over cellular

Supporting Work

- Security
  - DTLS – UDP-based TLS (RFC 6347, TLS WG)
  - Security for JSON objects (JOSE WG)
  - Raw keys – draft-ietf-tls-oob-pubkey (TLS WG)
- Node identifiers – RFC 6920
- 6LOBAC – IP over BACnet, MS/TP, RS-485 (6MAN)
- SenML – Profile for using JSON in smart objects (APPSAREA WG)
- Binary HTTP (HTTPBIS WG)

Architecture

Draft-iab-smart-object-architecture

- Managing complexity through layering
- Interoperability architecture models
- Design for change

Comments appreciated – IAB planning to finish the work in the near future

Possible New Work

- 6LOWPAN continuation – fragment forwarding, IP over DECT, MIBs, … (6LO BOF?)
- IPv6 ND optimizations (6MAN WG?)
- Naming and service discovery across an entire network, not just a link (MDNSEXT BOF?)
- Using 802.15.4e TSCH mode in IP LLNs (6TSCH BOF?)
- Intelligent transport systems (ITS BOF?)

What's Next? What's Missing?

You are the experts – you tell me!

- Moving CORE from protocol bits to taking full advantage of the REST & webservices model?
  - Resource directories etc.
- IP over Foo: Others beyond 6LOBAC, TSCH?
- What more do we need in terms of routing technology? Multicast? Specializations for different types of networks?
- What else?

www.ipso-alliance.org

The IPSO Alliance will extend the reach of IP into “Internet of Things”