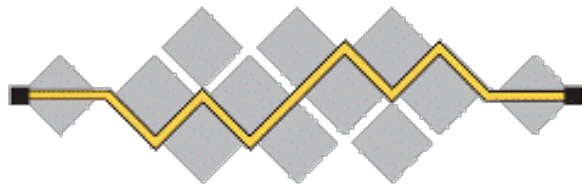




Smart Objects @ IETF



I E T F[®]

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

- 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 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

Application

CORE

Transport

LWIG

IP & Routing

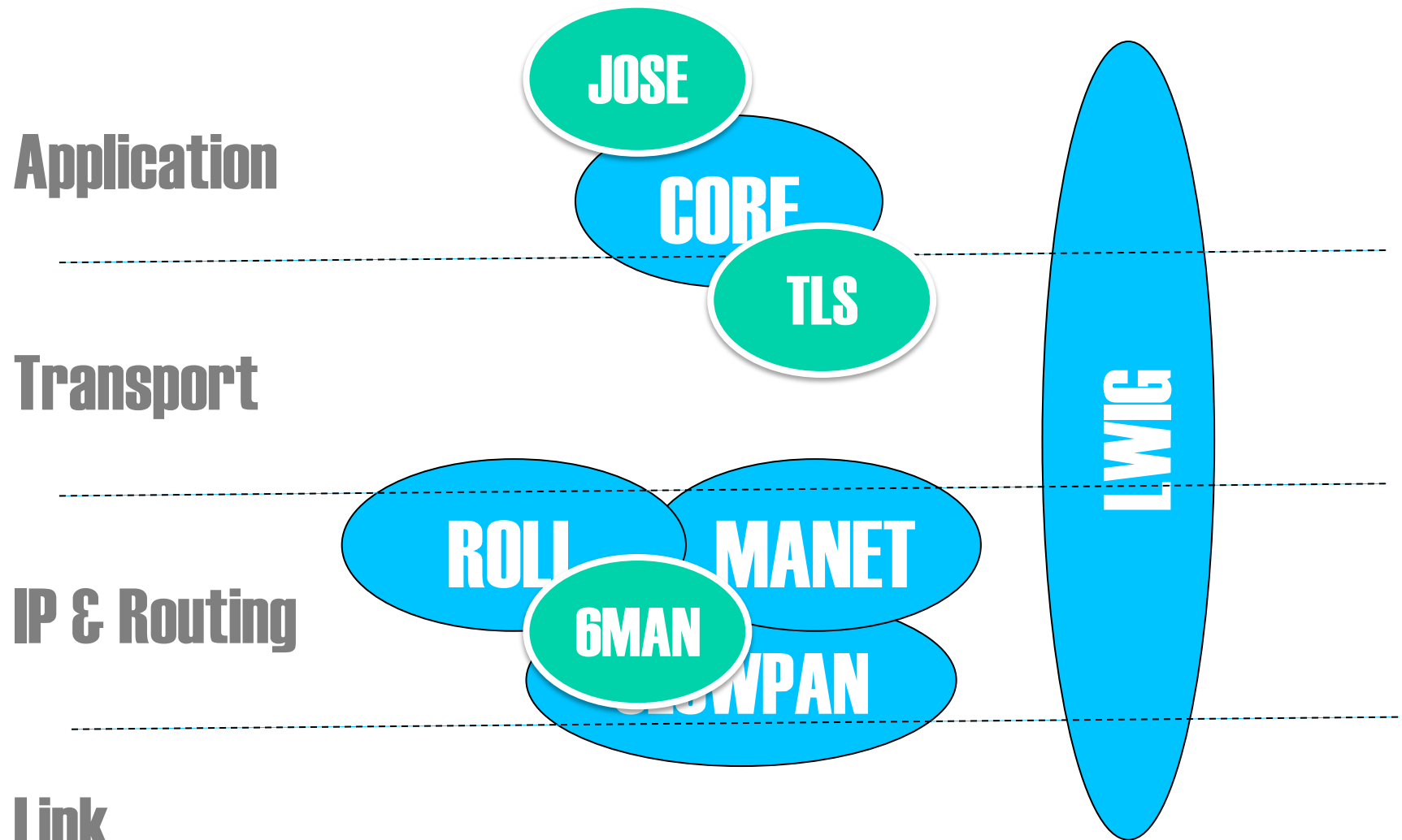
ROLL

MANET

6LOWPAN

Link

Supporting Working Groups



Potential New Work

Application

ITS

JOSE

MDNSEXT

CON

TLS

Transport

LWIG

IP & Routing

6TSCH

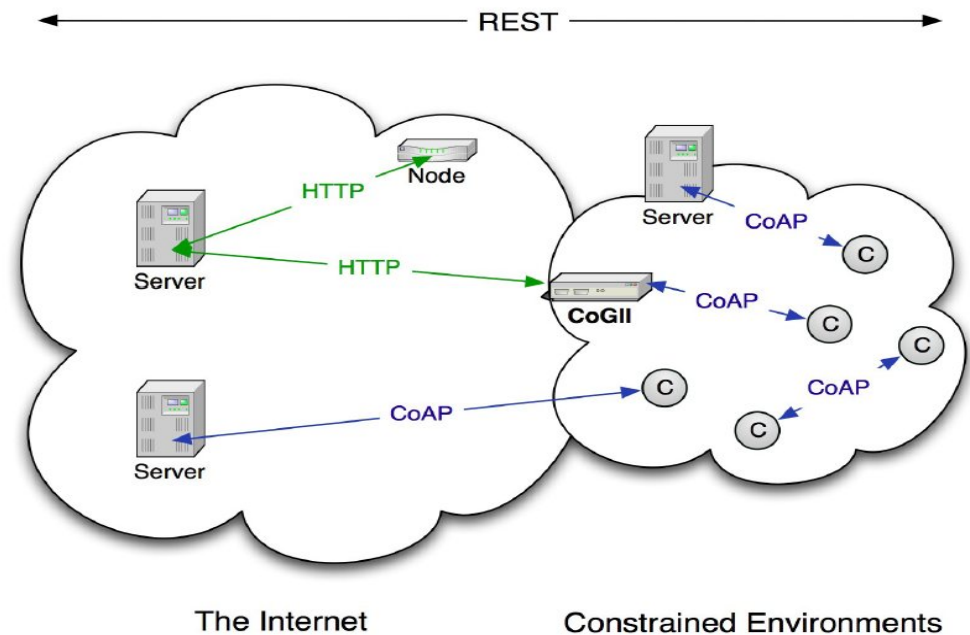
MANET

6LO

Link

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

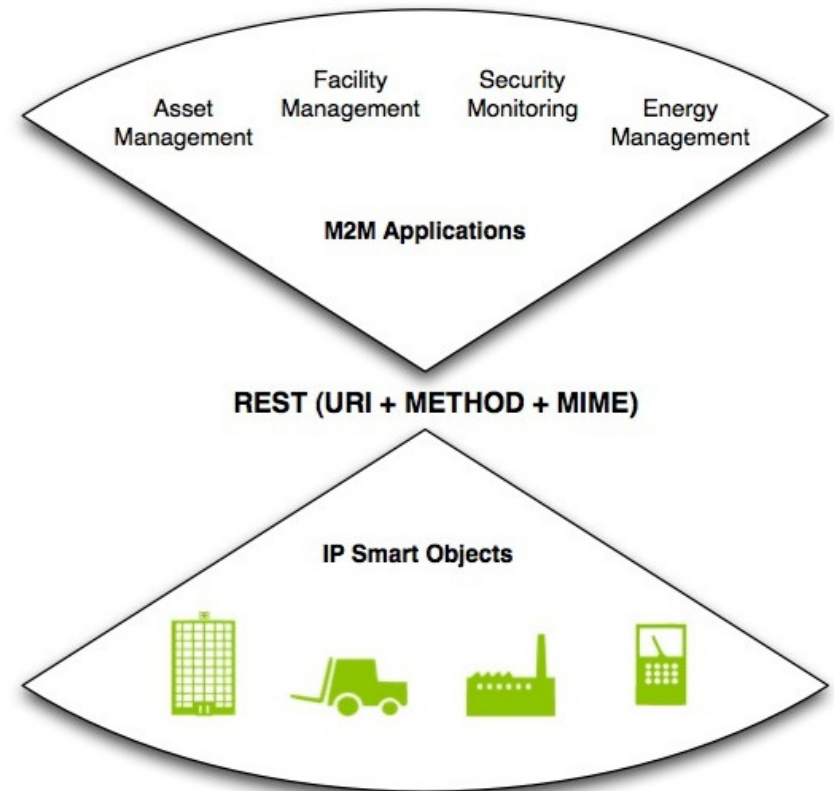


Web Services for Smart Objects



This is a very attractive model for developing smart object applications

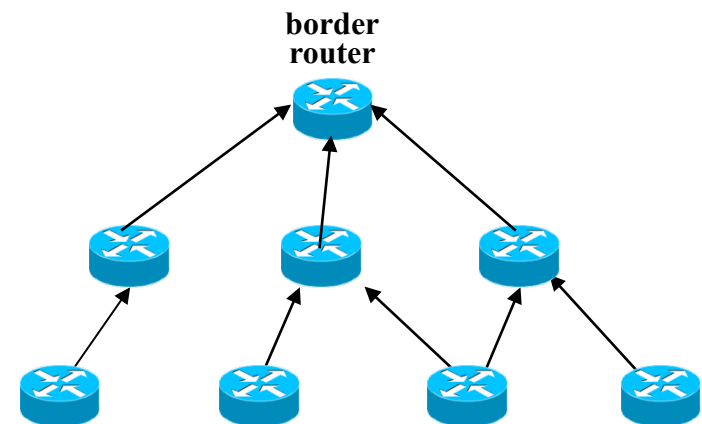
- Very successful for other applications
- Widely available tools & millions of programmers
- Simple and well-defined
- “Permissionless innovation”



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



“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

- 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)

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

- 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 & webservicess 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”