# M2M関連状況
# roll & core WG meeting in IETF86

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# センサー網におけるIP技術の主な4つの課題

- 動作条件の厳しい通信機器の存在
  - 省電力
  - 物理的サイズ（5mm～）
  - 低CPU性能（8 or 16-bit, 低クロック 8~16MHz）
  - 少ないメモリ（~128 KB）
  - スリープモード

これらの特徴を持つ機器をIETFでは“**Smart Object**”と呼んでいる

- 通信条件の厳しいネットワークの存在
  - 多数のノード（～数千ノード）
  - 低通信帯域（～250kbps）
  - 高パケット損失性
  - 技術者が直接メンテナンスできない環境

これらの特徴を持つネットワークをIETFでは
“**LLN**”（Low power and Lossy Network）
低消費電力＆高パケット損失ネットワーク
と呼んでいる

**Challenge Areas**

新しいリンクに対応する適合層の標準化

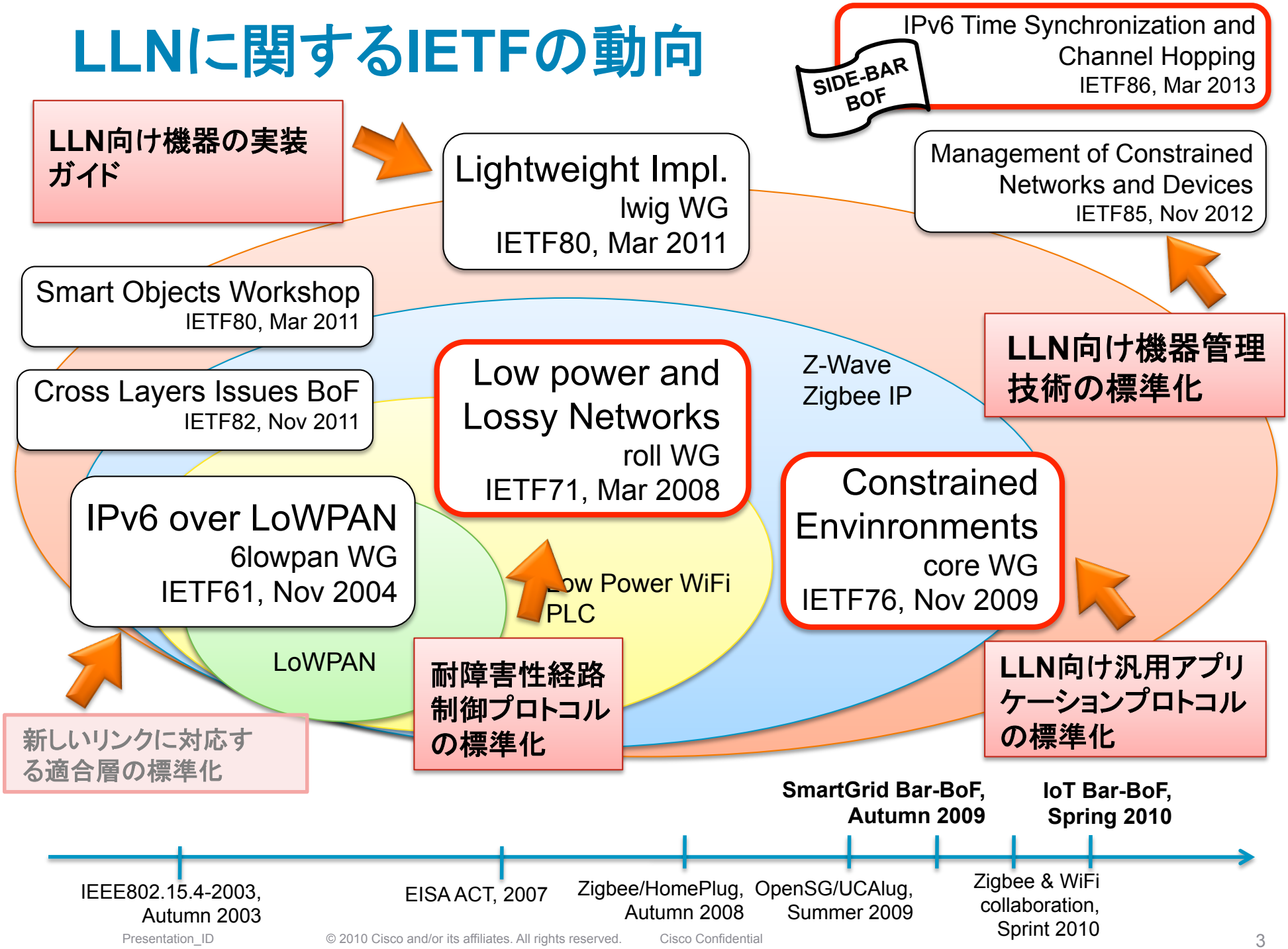
**耐障害性経路制御プロトコルの標準化**

**LLN向け汎用アプリケーションプロトコルの標準化**

**LLN向け機器の実装ガイド**

**LLN向け機器管理技術の標準化**

# LLNに関するIETFの動向



# というわけで、今日の御題

- core WG
- roll WG
- 6tsch

# What is “core” WG ?

- Constrained RESTful Environment

  Co-chairs:
  Carsten Borman (Bremen Univ)
  Andrew McGregor (Allied Telesis)

- Mission

  M2M向けのアプリケーションプロトコルの策定

- RFCs and Significant Documents

  RFC 6690: CoRE Link Format

  **CoAP Specifications**

  **Core**

  **Block**

  **Observe**

  HTTP Mapping and Proxy

  Group communication framework

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LLN向け機器の実装ガイド

# core WG: Document Status

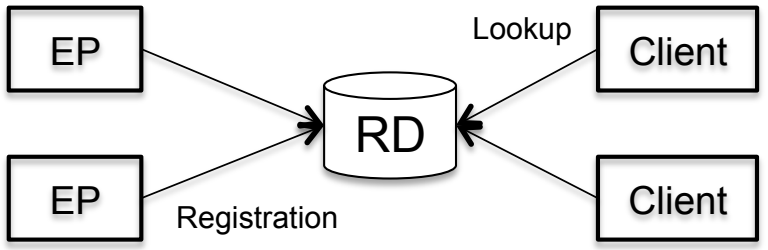
- Constrained Application Protocol
  - IETF Last Call finished.  Now in AD review.
  - draft-ietf-core-coap-15 has been published.
- Blockwise transfers in CoAP
  - Fragment/reassemble support
  - draft-ietf-core-block-11
  - Plan to submit to IESG review after core-coap published.
- Observing Resources in CoAP
  - RESTful Pub/Sub support
  - draft-ietf-core-observe-08
  - Plan to submit to IESG review after core-coap published.

# core WG meeting

- Resource directory

  draft-shelby-core-resource-directory-05

  will be adopted as a WG draft.




- CoAP profile

  /.well-known/profile provides a profile about CoAP protocol.

    e.g. supported options or content-format, block size.

- Groupcomm

  Solution for configuring group membership.

    RD or DNS

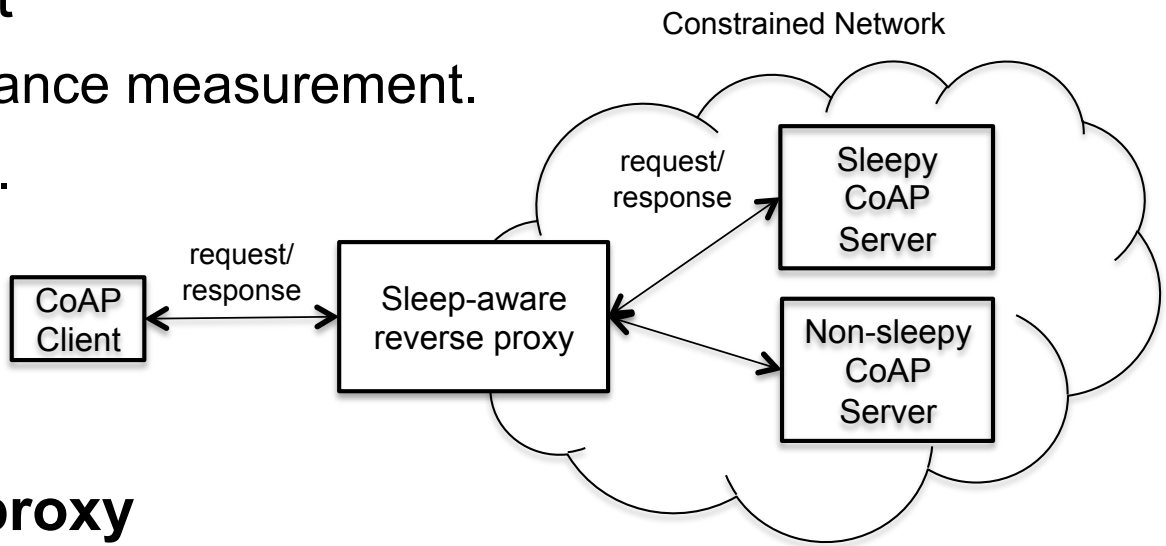
    get -> post ?

      start from single-subnet configuration, and then complex case.

  Security is out of scope so far.

# core WG meeting, cont.

- Sleepy node support
  - Sleepy node performance measurement.
  - Discussion continues.




## Sleep-aware reverse proxy

✓CoRE Sleep-aware Resource Directory

Support storing published sleep parameters (state or duration) from CoAP servers

✓Sleep-aware CoAP 5.03 Response Capability

If CoAP request to a sleeping server is received, proxy returns a '5.03 Retry-After' response to client.

5.03 contains a timestamp maxAge indicating when the sever will wake back up.

✓Sleep-aware CoAP Store-and-Forward Capability

If CoAP request to a sleeping server is received, proxy stores request until server wakes up and then forwards it.

✓Caching capability

Cache GET responses from server if maxAge option is present (this is not a sleep aware feature)

# core WG meeting, cont.

- HTTP-CoAP reverse proxy and URI mapping
  - for implementers to make it interoperable.
  - draft-castellani-core-http-mapping-07
- Alternative transport
  - CoAP over TCP, DTN, ...
  - CoAP over SMS, USSD
  - OMA Lightweight M2M
- Others
  - Cross reverse convention mapping
  - JSON for linkformat
  - IPsec for CoAP

**SMS**: Short Messaging Service
**USSD**: unstructured supplementary service data, SMS for GSM
**GSM**: Global Service for Mobile
**OMA**: Open Mobile Alliance

# What is roll WG?

- Routing Over Low power and Lossy networks

  Co-chairs:
  JP Vasseur (Cisco)
  Michael Richardson (Consultant)

- Mission

  LLNとSmart Objects向けの経路制御に関する課題の解決

  "Low power and Lossy networks (LLNs) are typically composed of many embedded devices with limited power, memory, and processing resources interconnected by a variety of links, such as IEEE 802.15.4, Low Power WiFi."

- RFCs and Significant Documents

  RFC 5548, 5673, 5826, 5867: Requirement for Urban, IA, HA, BA

  RFC 6206: Trickle Algorithm

  RFC 6550: RPL Core Spec

  RFC 6551: Routing Metrics

  RFC 6552: Objective Function Zero

  RFC 6553: IPv6 Hop-by-Hop Option for RPL

  RFC 6554: IPv6 Routing Header Option for RPL

  P2P-RPL in IESG queue

  RPL Multicast

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# roll WG: Document Status

- Reactive Discovery of Point-to-Point Routes in LLN
  - IESG evaluation was done.
    - PIO was removed, too confusing.
    - the option to send data (an ipv6 upper layer protocol) was removed; use case was unclear.
  - approved by IESG as Experimental RFC. (30-Mar-2013)
- p2p-measurements
  - approved by IESG as Experimental RFC. (04-Apr-2013)
  - now in Editor queue.
- Trickel Multicast
  - IPR claim filed, Nokia Corporation
  - WG Last Call ended. (30-Mar-2013)
- Terminology
  - AD evaluation was done, revised id needed.
  - IETF Last Call ended. (30-Mar-2013)
- Security Threat Analysis
  - IETF Last Call ended (21-Jan-2013)
  - draft-ietf-roll-security-threats-01 was published. (25-Feb-2013)

# roll WG: Applicability Documents

- Industrial, home and building app. are WG adopted.
- Metering applicbility statement has gone AWOL ?

  needs resurrection by end of april.

- Home and building

  roll-rpl-applicability-home-building

  → roll-p2p-rpl-applicability-home building

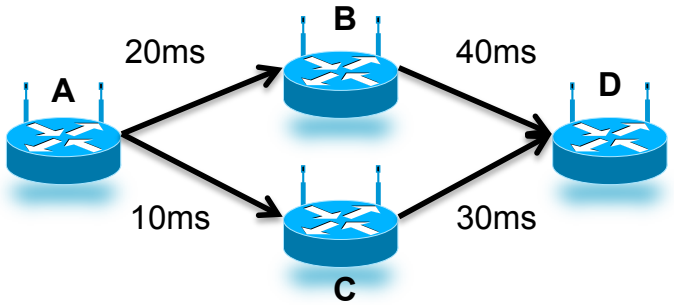
  p2p, home, building とは何か？ついて紛糾。

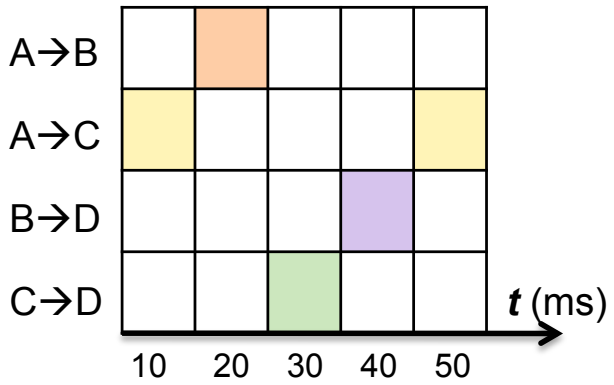
  e.g. managed or unmanaged

# 6tsch

**TSCH: Time Synchronization and Channel Hopping defined by IEEE1888.15.4e**

- IPv6 access and routing over deterministic (TSCH) MAC
- Required by the industrial networks.
  - originally from RPL applicability
  - Liaizon with ISA100.20
  - dependency: IEEE 802.1TSN, ISA100.20, IoT6
- Motivation from
  - Industrial Deterministic Routing Extension for LLN
  - TDMA(L2)の待ち時間をメトリックに扱う提案。



# 6tsch: Players

- PCE

  for centralized scheduling.

  has full knowledge of topology and traffic requirements to computes schedule.

  communicates with nodes to configure their schedule.

  PCE-node protocol **TBD**

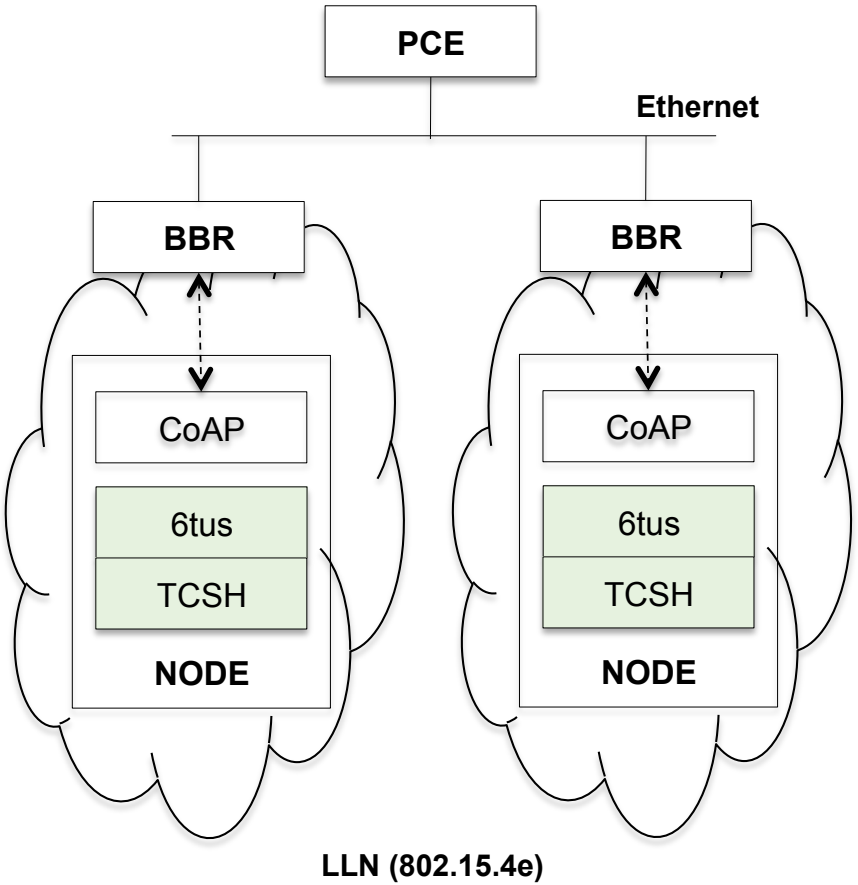
  e.g. CoAP in COMAN

  PCE typically schedules hard links.

- 6tus

  for distributed scheduling.

  management and track reservation.



# Conclusion

## roll WG

- ✓P2P-RPL, Measurement
  - become RFCs soon.
- ✓Others in progress
  - terminology.
  - trickle multicast.
  - security analysis.
- ✓Applicability
  - Industry, Home and Building.
  - Metering.
- ✓6tsch

## core WG

- ✓Core: IETF LC finished.
- ✓Observe: AD review soon.
- ✓Block: AD review soon.
- ✓additional protocols
  - resource directory.
  - sleepy suppor.
  - http-coap mapping.
  - etc....

*Lake Formosa*