Building Power-Efficient CoAP Devices for Cellular Networks

draft-arkko-lwig-cellular-00

J. Arkko, A. Eriksson, A. Keränen

IETF 86, Orlando, Florida

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Ari Keränen

ari.keranen@ericsson.com

Background

- Used to be draft-arkko-core-cellular
- How to minimize power consumption in cellular(-like) networks

Scope

- Cellular networks
  - Large-scale, public, point-to-point, radio networks
- When power saving is important
  - Battery operation
  - Energy harvesting
  - …
- Optimize the system, not just the radio layer

Power Usage Strategies

- Always-on – self-explanatory
- Always-off – wake-up infrequently, perform full attachment, communicate, detach, sleep
- Low-power – all other attempts to minimize power consumption while keeping some state and attachment status across periods of sleep

Types of Devices and Power Strategies

```
               SENSOR COMMUNICATION INTERVAL
           +---------------+---------------+---------------+
POWER SOURCE |    Seconds    |    Minutes    | Hours or Days |
+-----------+---------------+---------------+---------------+
|           |               |               |               |
| Battery   |   Low-power   | Low-power or  |  Always-off   |
|           |               |  Always-off   |               |
+-----------+---------------+---------------+---------------+
|           |               |               |               |
| Harvesting|   Low-power   | Low-power or  |  Always-off   |
|           |               |  Always-off   |               |
+-----------+---------------+---------------+---------------+
|           |               |               |               |
|   Mains   |   Always-on   |   Always-on   |   Always-on   |
|           |               |               |               |
+-----------+---------------+---------------+---------------+
```

Some Possible Recommendations

- Protocol: CoAP – less round trips; small packet size
- Data formats: JSON/SENML – smaller than XML; easier than binary
- Communications frequency – per application needs; possibly bundle
- Discovery – registration to be discovered; how to discover registration server?
- Communications model – client (MP) works better than server for sleepy nodes

Way Forward

- What kind of document we want at the WG?
  - Problem statement?
  - Proposing solutions?