

Problem statement and Use cases of Sleepy node in Constrained node networks

draft-hong-lwig-sleepynode-problem-statement-00

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Goals of this draft

- Goal of Iwigo WG
 - Build minimal yet interoperable IP-capable devices for the most constrained environments
- Make **interoperable** sleepy node
 - Sleepy nodes in network layer
 - Power saving has become issues in network layer
- Develop sleepy node
 - To do this, it is required to identify the target use cases and related problems

Related works

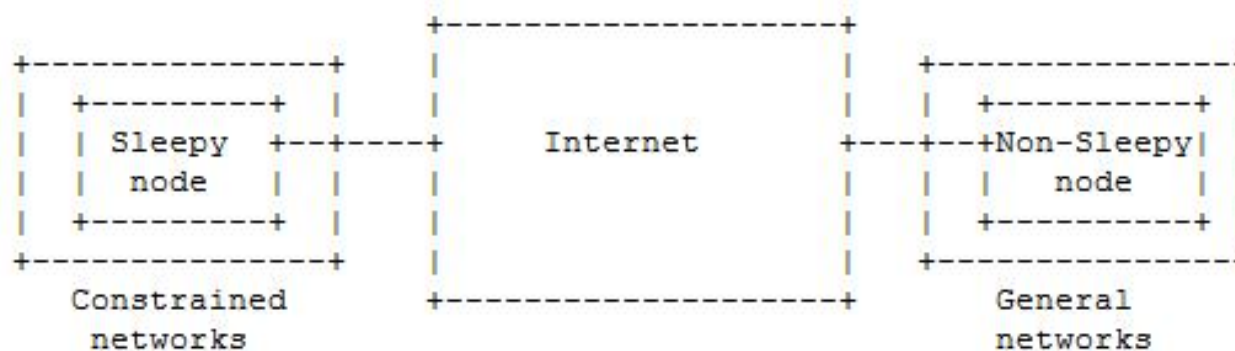
- Power saving in PHY/MAC layer
 - Power Save Mode (PSM) in IEEE 802.11 WLAN
 - Synchronous sleep scheduling policy
 - Alternate between an active mode and a sleep mode
- 6lowpan-nd
 - Has limited the usage of multicast signaling
- CoAP
 - Functions such as proxy and cache

Use cases of Sleepy node [1]

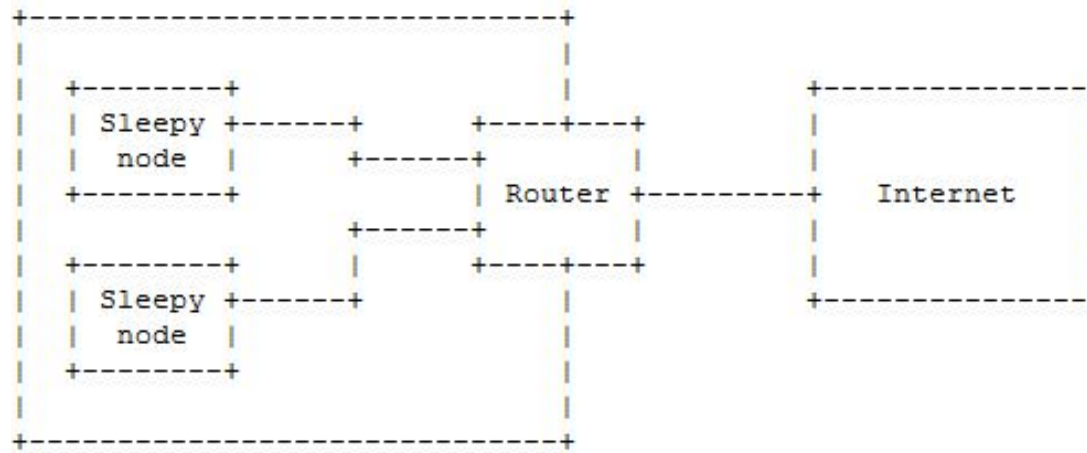
- By end-to-end communication nodes
 - Communication between a sleepy node and a non-sleepy node
 - Communication between sleepy nodes
- By network topology
 - Communication across routers
 - Communication within a router
 - Communication in ad-hoc network

Use cases of Sleepy node [2]

- Communication between a sleepy node and a non-sleepy node

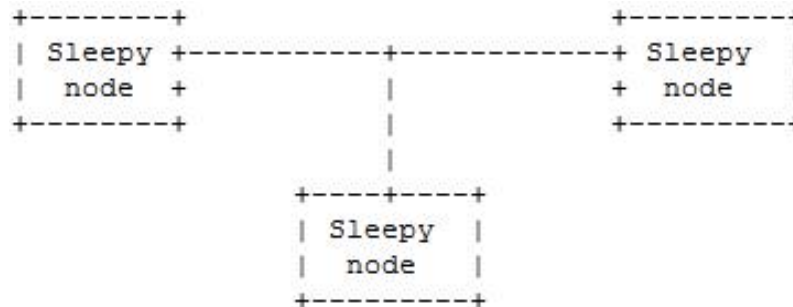


- Communication between sleepy nodes



Use cases of Sleepy node [3]

- Communication across routers
 - Similar to Communication between a sleepy node and a non-sleepy node
- Communication within a router
 - Similar to Communication between sleepy nodes
- Communication in ad-hoc network



Problem Statement [1]

- Problems of a sleepy node in Network layer
 - Problems related to ND
 - Limited usage of multicast signaling due to power consumption
 - Problems related to time
 - Find the proper reasonable timeout value
 - Choosing the proper a sleep time appropriate for its energy characteristics

Problem Statement [2]

- Problems of a sleepy node in Transport layer
 - Basically, UDP/TCP does not have any functionality to support a sleepy node
 - Thus, source node does not know that data may or may not be successful to the destination node going into sleep mode
 - In particular, TCP mistakes data loss generated by sleepy node as data loss over end-to-end transmission
 - Thus. TCP can perform unnecessary retransmission
 - This situation can occur in most constrained environments

Problem Statement [3]

- Problems of a sleepy node in Application layer
 - CoAP may solve relevant issues !

Next Step?

- A sleepy node is a typical case of constrained node
- To design and implement a sleepy node
 - We need target use cases
 - It is required to identify problems
- Is there interest in WG?