

# Network Proxy Protocol

<draft-jeong-eman-network-proxy-protocol-01>

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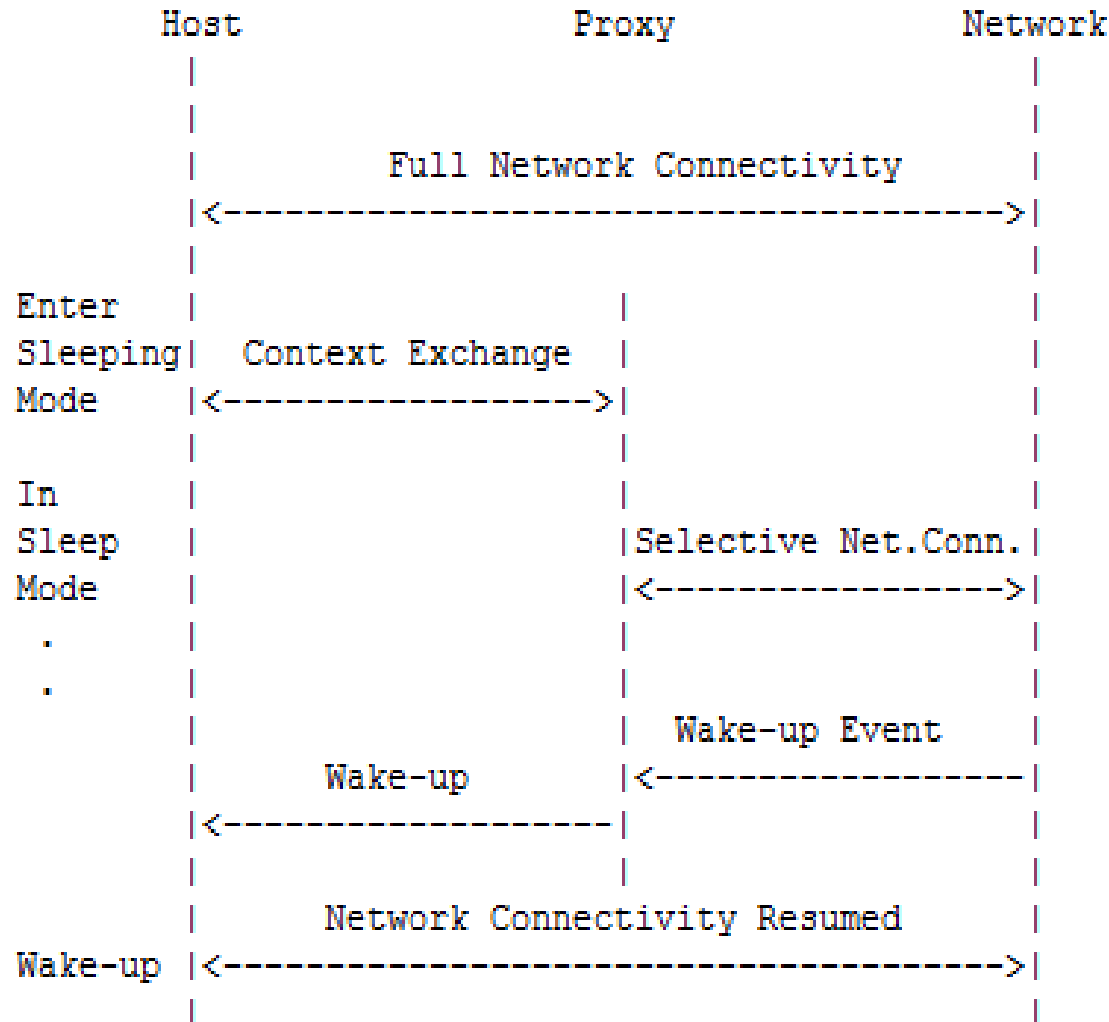
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# Problem statement

- When not in use, network nodes can go into sleeping mode in order to save energy
- However, many Internet protocols may break if sleeping modes would be introduced
  - They operate based on the assumption that the participating nodes are always-on
- Though a node is idle with no running applications, background traffic is received that needs to be processed which prevents the node from sleeping
  - Network proxy maintains network connectivity for other network devices so that these can go into low power sleeping mode
  - Framework and network proxy behavior has been standardized by ECMA-393
- It is needed to define the protocols and procedures for network proxy operation such as discovery, selection, delegation and wake-up
  - Describes a protocol that is need for communication between external proxies and network hosts

# Operational scenario of network proxy



# Scope

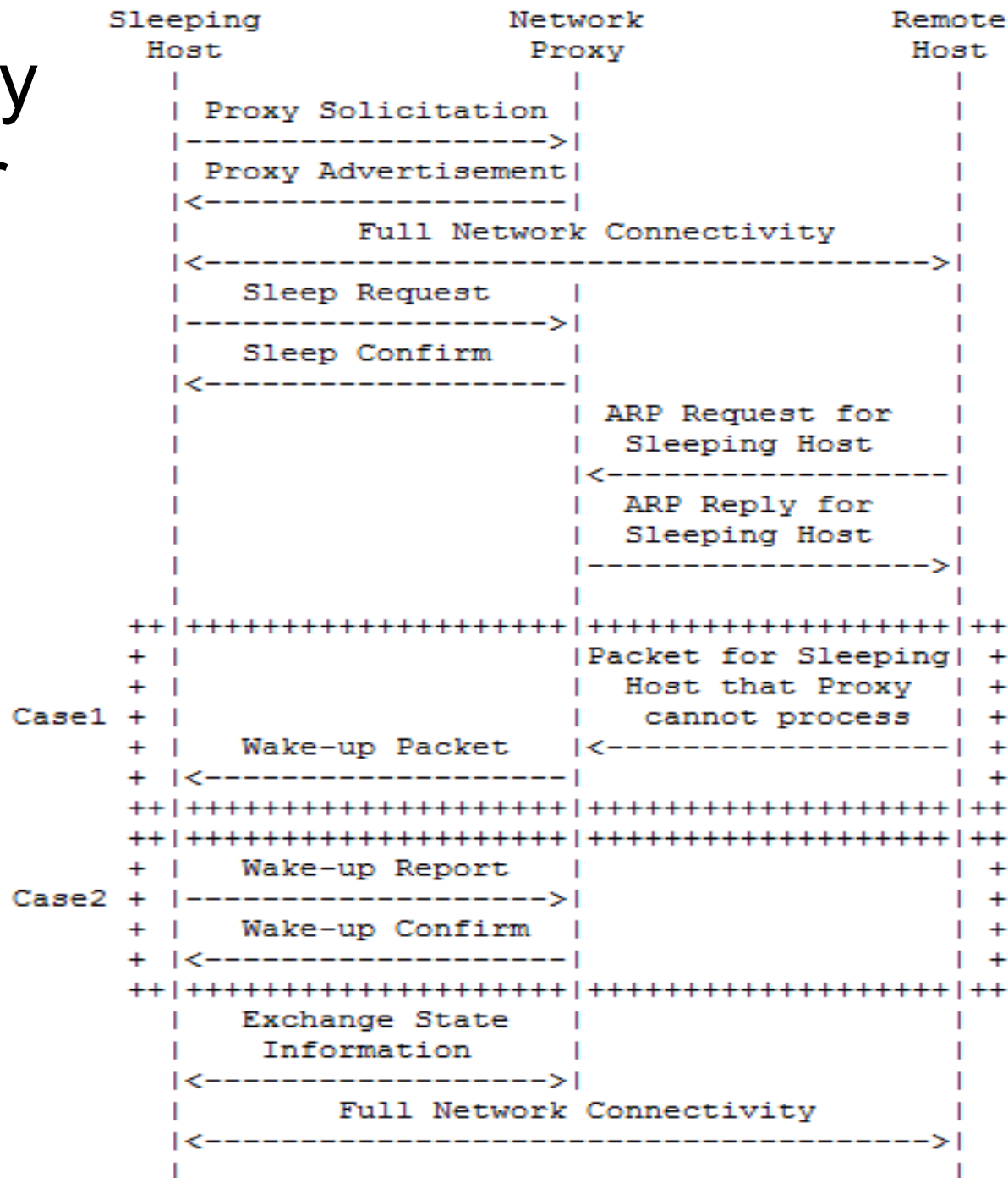
- Required media/protocols for network proxy

<b>Media/Protocol</b>	<b>Required/Option</b>
IEEE 802.3 Media	Mandatory
IEEE 802.11 Media	Mandatory
IPv4 ARP	Mandatory
IPv6 Neighbor Discovery	Mandatory
DNS	Option
DHCP	Option
IGMP	Option
MLD	Option
Remote Access using SIP & IPv4	Option
Remote Access using Teredo for IPv6	Option
SNMP	Option
Service Discovery using mDNS	Option
Name Resolution with LLMNR	Option
Wake Packet	Mandatory

# Design of network proxy protocol

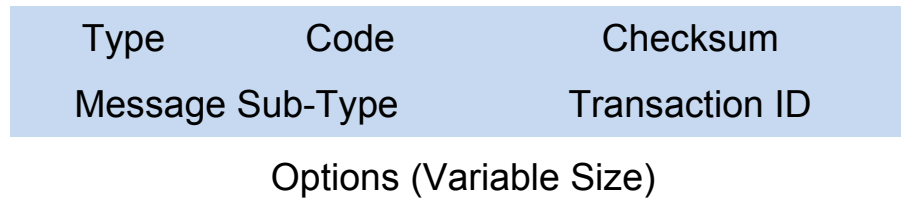
- Exchange control information between (sleeping) host and network proxy server for maintaining network presence
  - Discovery, selection, delegation and wake-up
- Extend ICMP messages to support following detailed functions
  - Proxy Solicitation/Advertisement
  - Sleeping Request/Confirm
  - Wake-up Report/Confirm

# Network proxy operation for IPv4 ARP



# Message formats for network proxy protocol

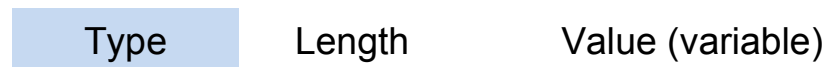
- Define two new ICMP messages (Proxy Request/Reply)



- Message Sub-Types

- 1 Proxy Solicitation Message
- 2 Proxy Advertisement Message
- 3 Sleep Request Message
- 4 Sleep Confirm Message
- 5 Wake-up Report Message
- 6 Wake-up Confirm Message

- Option (TLV format):



- 0: Padding, 255: End of option
- 1 Proxy Solicitation Option, 2 Proxy Advertisement Option
- 3 Sleep Request Option, 4 Sleep Confirm Option
- 5 Wake-up Report Option, 6 Wake-up Confirm Option

# Wake-up method

- Magic Packet defined by Wake-on-LAN standard
- Implementation of Magic Packet
  - MAC frame
  - TCP segment
  - UDP datagram
- Magic Packet over UDP
  - dest. IP: 255.255.255.255
  - UDP data: FF FF FF FF FF FF [Target MAC \* 16 duplications]

```
0000 FF FF FF FF FF FF 00 19 DB 00 DB 68 yyyyyyy..Û.Ûh
000C 08 00 45 00 00 82 21 AE 00 00 80 11 ..E..!@..
0018 55 B1 C0 A8 02 64 FF FF FF FF 07 8D U±À".dyyyy.
0024 9C 40 00 6E 4B 48 FF FF FF FF FF FF  @.nKHyyyyyy
0030 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
003C 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
0048 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
0054 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
0060 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
006C 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
0078 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
0084 04 4B 80 80 80 03 04 4B 80 80 80 03 .K...K...
```



# Next steps

- Status: initial draft covers IPv4 ARP related operation
  - Revise to support other mandatory protocols
  - Solicit comments
- Developing network protocol for energy management of nodes is within the scope of WG
  - A starting point for discussion