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Information technology — Telecommunications and information exchange between systems — proxZzzy for sleeping hosts

Technologies de l'information — Téléinformatique — proxZzzy pour hôtes dormants

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 16317 was prepared by Ecma International (as ECMA-393) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

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Introduction

Large amounts of electricity are used by electronic devices that are on solely for the purpose of maintaining network connectivity while they might otherwise be asleep. The computation required to stay connected is small, but these devices have large power differences between their on and sleep modes; thus, most of this energy use is wasted. Billions of dollars per year of electricity (and consequent carbon emissions) could be saved by widespread use of a “network proxy” for devices like PCs, printers, game consoles and set-top boxes. A low-power proxy handles key network tasks for a high-power device, thus allowing the high-power device to sleep when not in active use.

In 2008, the Energy Star program identified preying in its Computer Specification, version 5.0, as a technology with substantial energy saving potential. The standard designates that a “platform-independent industry standard” will specify the behaviour of a qualifying proxy. It is expected that ISO/IEC 16317 will be that standard.

This International Standard provides an overall architecture for a proxy and key requirements for preying select protocols. Handling of incoming traffic can require generating a reply packet, causing a system wakeup, or ignoring it. Proxies also do some routine packet generation on their own, and data are exchanged between a host and a proxy when the host goes to sleep and when it wakes up.

Existing technologies require other entities on the network to know that the host is asleep and alter their behaviour appropriately. A key goal of a proxy is to save energy, while simultaneously keeping the device accessible to the rest of the network. The operations of the proxy are best-effort, both in attempting to extend sleep time, as well as maintaining network access.

There are many possible ways to implement proxy functionality, and this International Standard seeks to avoid unduly restricting choices in those designs. In particular, it does not specify the location of the proxy, within the host itself or in attached network devices.

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Information technology — Telecommunications and information exchange between systems — proxZzzy for sleeping hosts

1 Scope

This International Standard specifies maintenance of network connectivity and presence by proxies to extend the sleep duration of hosts.

This International Standard specifies:

- capabilities that a proxy may expose to a host;
- information that must be exchanged between a host and a proxy;
- proxy behaviour for 802.3 (Ethernet) and 802.11 (WiFi);
- required and optional behaviour of a proxy while it is operating, including responding to packets, generating packets, ignoring packets, and waking the host.

This International Standard does not:

- specify communication mechanisms between hosts and proxies;
- extend or modify the referenced specifications (and for any discrepancies those specifications are authoritative);
- support security and communication protocols such as IPsec, MACSec, SSL, TLS, Mobile IP, etc.

2 Conformance

An “M”, “S” or “O” in the “M/S/O” column in the tables in Clause 6, 7 and 8 qualify the requirements as “M” for Mandatory, “S” for Should and “O” for Option respectively.

Conformant proxies implement at least the mandatory requirements in the “Basic Framework Protocol” in Clause 6 and zero or more Options in Clause 8. Proxies adhere to configuration and management behaviours as specified in Clause 7.

The table below summarises the Requirements and status.

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Requirements Implemented	Required/Option
Media (802.3, 802.11)	Requires implementation of 6.1 or 6.2 or both
IPv4 ARP	Mandatory
IPv6 Neighbor Discovery	Mandatory
DNS	Option
DHCP	Option
IGMP	Option
MLD	Option
Remote Access using SIP and IPv4	Option
Remote Access using Teredo for IPv6	Option
SNMP	Option
Service Discovery using mDNS	Option
Name Resolution with LLMNR	Option
Wake Packets	Mandatory

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8802-3:2000, *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications*

ISO/IEC 8802-11:2005, *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications*

ISO/IEC TR 11802-2:2005, *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Technical reports and guidelines — Part 2: Standard Group MAC Addresses*

RFC 826, *An Ethernet Address Resolution Protocol;* David C. Plummer (MIT); November 1982; http://tools.ietf.org/html/rfc826

RFC 1122, *Requirements for Internet Hosts — Communication Layers;* R. Braden; October 1989; http://tools.ietf.org/html/rfc1122

RFC 3261, *SIP: Session Initiation Protocol;* Many Authors; June 2002; http://tools.ietf.org/html/rfc3261

RFC 4380, *Teredo: Tunneling IPv6 over UDP through Network Address Translations (NATs);* http://tools.ietf.org/html/rfc4380

RFC 4443, *Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification,* http://tools.ietf.org/html/rfc4443

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RFC 2460, *Internet Protocol, Version 6 (IPv6) Specification;* http://tools.ietf.org/html/rfc2460

RFC 4861, *Neighbor Discovery for IP Version 6 (IPv6);* http://tools.ietf.org/html/rfc4861

IEEE Std 802.11r-2008, *IEEE Standard for information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Amendment 2: Fast Basic Service Set (BSS) Transition"*

http://tools.ietf.org/html/draft-cheshire-dnsext-multicastdns-08 (Multicast DNS)

http://tools.ietf.org/html/draft-cheshire-dnsext-dns-sd-05 (DNS-Based Service Discovery)

[MS-LLMNRP] "Link Local Multicast Name Resolution (LLMNR) Profile", Microsoft Developer Network Open Specifications Developer Center Library, http://msdn.microsoft.com/en-us/library/dd240328%28PROT.10%29.aspx

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