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Hardware and Network Address Options for TFTP
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Status of this Memo

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Abstract

The Hardware Address and Network Address options carry the hardware address and network address respectively of a client device that performs a Trivial File Transfer Protocol (TFTP) request.

1. Introduction

The Trivial File Transfer Protocol [2] (TFTP) is a simple protocol that allows a client to read a file from, or write a file to, a remote server.

In some networks, a proxy relays requests and responses between a TFTP client and a TFTP server. A router may also be present between the client and the server. In these cases, addressing information that identifies the client and that may be required by the server for authentication, file-generation or other purposes may not be readily available to the server. The options defined in this document allow the client or the proxy to provide the needed address(es) to the server.

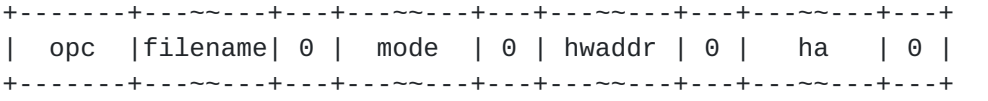
The general mechanism used for adding options to TFTP messages is described in [4].

2. Terminology

The key words MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL in this document are to be interpreted as described in [3].

3. Format of the Hardware Address option

The TFTP Read Request or Write Request packet is modified to include the hwaddr option. All named fields except "opc" are followed by a single-octet field containing the value zero.



opc	The opcode field contains either a 1, for Read Requests, or 2, for Write Requests, as defined in [2].
filename	The name of the file to be read or written, as defined in [2].
mode	The mode of the file transfer: "netascii", "octet", or "mail", as defined in [2].
hwaddr	The Hardware Address option, containing the case-insensitive string "hwaddr" in ASCII.

ha	A hardware address. The format of hardware addresses is defined in Section 4.

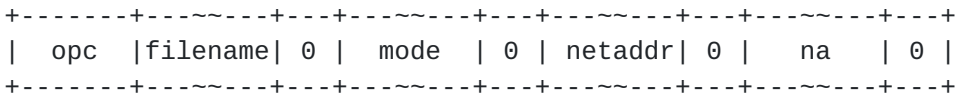
4. Format of the Hardware Address

A hardware address comprises two comma-separated ASCII fields: hardware type and the address value.

hardware type	A number representing the type of the hardware address. This document defines a single value, "1", representing an Ethernet address.
address value	A representation of the hardware address. This document defines a single format, to be used in the case that the hardware type has the value "1". In this case, that address MUST be an Ethernet MAC address in the case-insensitive form "xx:xx:xx:xx:xx:xx".

5. Format of the Network Address option

The TFTP Read Request or Write Request packet is modified to include the netaddr option. All named fields except "opc" are followed by a single-octet field containing the value zero.



opc	The opcode field contains either a 1, for Read Requests, or 2, for Write Requests, as defined in [2].
filename	The name of the file to be read or written, as defined in [2].
mode	The mode of the file transfer: "netascii", "octet", or "mail", as defined in [2].
netaddr	The Network Address option, containing the case-insensitive string "netaddr" in ASCII.
na	A network address. The format of network addresses is defined in Section 6.

6. Format of the Network Address

A network address comprises two comma-separated ASCII fields: network type and the address value.

network type	A number representing the type of the network address. This document defines two values: "1" represents an IPv4 address; "2" represents an IPv6 address.
address value	A representation of the network address. This document defines two formats. If the network type has the value "1", the network address MUST be a dotted decimal IPv4 address as defined in [1] . If the network type has the value "2", the network address MUST be a case-insensitive IPv6 address in one of the formats specified by section 2.2 of [5].

7. Option Acknowledgement

[4] allows for the possibility that TFTP options will be acknowledged explicitly with an OACK packet. A TFTP server SHOULD NOT respond to the presence of a valid Hardware Address option or Network Address option by sending an OACK as defined in [4].

8. Errors

[4] allows for the possibility that TFTP options will contain errors. For the options defined in this document, the server SHOULD return a TFTP ERROR message with ErrorCode value 8 if any of the following occurs:

1. An error when parsing an option;
2. An unknown hardware or network type;
3. An incorrectly formatted hardware or network address.

9. Security Considerations

TFTP provides no security safeguards; it relies on other layers to provide appropriate security where necessary. This document does not introduce any additional safeguards into TFTP. In the absence of other security measures, several possibilities exist for inappropriate behaviour:

- A client could populate the options defined in this document with incorrect but legal values, which could cause the TFTP server to behave in an undesirable manner (for example, it might report an incorrect hardware address to a backoffice system).

- An attacker could replace correct option values with incorrect ones.
- An attacker could insert incorrect option values into a request that originally did not use the options defined in this document.
- An attacker could return an ERROR message to the client even though there was no ERROR in the request.
- An attacker could insert an option into a reply that did not originally contain that option.

10. IANA Considerations

This document has no actions for IANA.

11. Normative References

[1] Kirkpatrick, S., Stahl, M., and M. Recker, "Internet numbers", RFC 1166, July 1990.

[2] Sollins, K., "The TFTP Protocol (Revision 2)", STD 33, RFC 1350, July 1992.

[3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[4] Malkin, G. and A. Harkin, "TFTP Option Extension", RFC 2347, May 1998.

[5] Hinden, R. and S. Deering, "Internet Protocol Version 6 (IPv6) Addressing Architecture", RFC 3513, April 2003.

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