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**DHCPv6 Support for Remote Boot**  
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Abstract

This document provides new DHCPv6 (Dynamic Host Configuration protocol version 6) options for clients, to obtain information about TFTP [2] servers and bootfiles needed for booting.

## **1. Introduction**

Network booting is widely used mechanism for booting up of the clients. The clients contact the TFTP [2] server to download the bootfiles for bootup. The advantages of using network booting are; softwares will be in central server and requires maintenance at only one location rather than maintaining individual systems separately. Also, switching between different operating systems becomes easy when network booting is being used. In some cases, the nodes may need multiple bootfiles also. The additional boot files may be used as

supporting software for the boot image. Different Operating System vendors use different way of handling this. Single TFTP server for

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huge number of diskless clients is prone to single point of failure. So, Multiple TFTP servers are needed for high availability.

DHCPv6 (Dynamic Host Configuration Protocol Version 6) provides a framework for passing configuration information for hosts on an IPv6 network. However, DHCPv6 does not provide a way to send information about TFTP server address and bootfile names. This document defines two options, Remote boot option and Remote Boot parameter option to provide information about TFTP servers and bootfile names to the clients. These options are required for the clients, which are booting over a network.

## 2. Requirements

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in [RFC 2119](#) [3]

## 3. Terminology

This document uses terminology specific to IPv6 and DHCPv6 as defined in "Terminology" section of the DHCPv6 specification [1].

## 4. Remote Boot Option

The Remote Boot Option is used to carry the parameters needed for remote boot of the DHCPv6 clients. Using the information provided by this option, the DHCPv6 clients will bootp up. This will be mainly used by the clients, which are booting using remote boot server.

The format of the Remote Boot Option is as shown below:

```

      0               1               2               3
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           OPTION_REMOTE_BOOT           |           option-len       |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                           |                         |
|           Remote-Boot-options           |                         |
|                                           |                         |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

option-code: OPTION\_REMOTE\_BOOT (tbd)

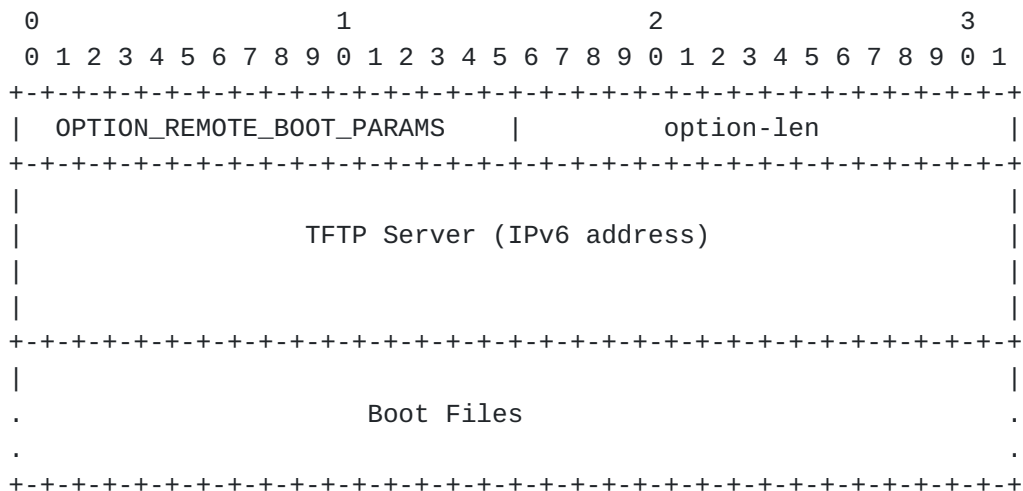
option-len: Length of the 'Remote-Boot-options' fields in octets;

Remote\_Boot-options: Options associated with the Remote Boot Option.

The Remote Boot option encapsulates those options that are specific to remote boot. This document defines one such option called Remote Boot Parameters Option. Multiple Remote Boot Parameters Options can appear in this option. This option is defined in the [Section 5](#).

## 5. Remote Boot Parameters Option

The Remote Boot Parameters Option is used by the server to convey the client about the TFTP [2] Server IPv6 address and list of boot files needed for booting of the clients. The clients are supposed to contact the TFTP Server, obtain the boot files one by one and boot up using these files.



option-code: OPTION\_REMOTE\_BOOT\_PARAMS (tbd)

option-len: Length of the 'TFTP Server' (16 bytes) + 'Boot Files' in Octets;

Boot Files: One or more Boot File names in the NVT-ASCII string format. Each file name should be NULL terminated. They should be represented as fully qualified directory-path name.

If multiple boot files are provided by the server, then, they should appear in the order of their execution in the client. The first appearing boot file name should be downloaded and executed first for boot up, then the next and so on.

This option can only appear in the OPTION\_REMOTE\_BOOT. If multiple Remote Boot Parameters Options are present in OPTION\_REMOTE\_BOOT, then they should be listed in the increasing order of preferences.

## 6. Appearance of these options

The Remote Boot Option MUST NOT appear in other than the following messages: Solicit, Advertise, Request, Renew, Rebind, Information-Request and Reply.

The option number of Remote Boot option MAY appear in the Option Request Option [1] in the following messages: Solicit, Request,

Renew, Rebind, Information-Request and Reconfigure.

The Remote Boot Parameters Option MUST appear only in the Remote Boot Option.

## 7. Security Considerations

The Remote Boot Option may be used by an intruder DHCPv6 server to provide to cause DHCPv6 clients to contact rogue TFTP server (or) to send invalid file names. This will make booting up of DHCPv6 clients to fail.

To avoid attacks through this option, the DHCP client SHOULD use authenticated DHCP (see section "Authentication of DHCP messages" in the DHCPv6 specification [1]).

## 8. IANA Considerations

IANA is requested to assign an option code to the following options from the option-code space defined in "DHCPv6 Options" section of the DHCPv6 specification [1].

Option Name	Value	Described in
OPTION_REMOTE_BOOT	tbd	<a href="#">Section 4</a>
OPTION_REMOTE_BOOT_PARAMS	tbd	<a href="#">Section 5</a>

## 9. Normative References

- [1] Bound, J., Carney, M., Perkins, C., Lemon, T., Volz, B. and R. Droms (ed.), "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", [RFC 3315](#), July 2003.

## 10. Informative References

- [2] K. Sollins, The TFTP Protocol (Revision 2), [RFC 1350](#), July 1992.
- [3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

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