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Jerome Privat  
BT  
Michael Borella  
3Com Corp

DHCP Next Server Option  
<[draft-ietf-dhc-nextserver-02.txt](#)>

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## Abstract

This proposal allows host configuration to be split between two different address servers, potentially under different administration.

This ability may be useful to satisfy specific regulatory, operational or business model requirements, as well as to provide support for secondary address servers. This draft proposes two new DHCP options called the DHCP Next Server DNS name option and the DHCP Next Server IP address option. A DHCP server can use these options to redirect clients to a secondary server.

## **1. Introduction**

The Dynamic Host Configuration Protocol (DHCP) [[RFC2131](#)] provides a mechanism for the assignment of addressing and other parameters from a server to a client. In order to extend DHCP's abilities, a process for defining new DHCP options has been established [[RFC2489](#)].

This document defines two new DHCP options for redirecting requests to a secondary address server. This secondary server may or may not be a DHCP server. In particular, we consider DHCP redirect to an RSIP [[RSIP-FRAME](#)] server.

## 2. Terminology

### - DHCP client

A DHCP client is an Internet host using DHCP to obtain configuration parameters such as a network address.

### - DHCP server

A DHCP server is an Internet host that returns configuration parameters to DHCP clients.

### - Realm Specific IP (RSIP)

A method through which a client from one addressing realm can assume and utilize addressing and configuration parameters from a second addressing realm [[RSIP-FRAME](#)].

### - RSIP Server

A router situated on the boundary between a private realm and a public realm and owns one or more public IP addresses. An RSIP server is responsible for public parameter management and assignment to RSIP clients.

### - RSIP Client

A host within the private realm that assumes publicly unique parameter sets from an RSIP server through the use of RSIP.

## 3. Specification of Requirements

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this documents are to be interpreted as described in [[RFC2119](#)].

## 4. Architecture

Our proposed architecture is as follows. Client host configuration information is split between two different address servers, potentially under different administrative control. The primary (most local) address server is always a DHCP server. The secondary address server may or may not be DHCP.

The primary server manages IP addresses. More precisely, it allocates an IP address, a network mask and a default router to clients. It MAY also manage other parts of the configuration. The secondary server manages the rest of the configuration.

Partition of the configuration information (other than IP address, network mask and default router) between the two servers is a matter of policy and agreement between administrators of the two servers. It is out of the scope of this document.

## **5. Redirect to Secondary Server**

We define two new DHCP options called the DHCP Next Server DNS name option and the DHCP Next Server IP address option. These options are used by a DHCP server to indicate to a DHCP client respectively, the DNS name and the IP address of a secondary server from where it can retrieve other parts of its configuration.

The utility of these options is that they allow a client to discover a secondary configuration server even if that server is not on the same logical subnet as the client. For example, a client might use a UDP broadcast on a particular port number to discover a configuration server. However, these broadcasts, with the exception of DHCP/BOOTP traffic, will be dropped by first-hop routers. By allowing DHCP servers to provide a secondary server's address or DNS name to a client, the client is able to contact that server directly, using whatever protocol is necessary.

## **6. Next Server Options**

These options are DHCP options [RFC2131, [RFC2489](#)]. Next Server Options are returned in DHCP OFFER and DHCP ACK by a DHCP server.

### **6.1. Next Server IP address option**

The Next Server IP address Option specifies a list of IP addresses for secondary servers (Multiple addresses of secondary servers MAY be provided for robustness). Secondary servers MUST be listed in order of preference, if there is an order of preference.

The code for this option is TBD, and its length is N. The Length value must include one for the 'Proto' byte and include four for each Secondary Server address which follows; it has a minimum value of 5. The Length minus one of the option MUST always be divisible by 4.

The address of the Secondary Server is given in network byte order.

The "Proto field" p indicates the protocol to use to contact the secondary server.

More than one Next Server IP address Option MAY be provided to a client. However each of these options MUST contain different protocol fields.

Code	Len	Proto	Address						
-----+-----+-----+-----+-----+-----+-----+-----+-----+									
TBD	N	p	a1	a2	a3	a4	...		
-----+-----+-----+-----+-----+-----+-----+-----+-----+									

## 6.2. Next Server DNS name option

This option specifies the DNS [[RFC1035](#)] name for the secondary server.

The code for this option is TBD, and its length is N. The Length value is equal to one plus the length of the DNS name string. Thus the maximum length of the DNS name string is 254 octets.

Code	Len	Proto	DNS name of secondary server						
-----+-----+-----+-----+-----+-----+-----+-----+-----+									
TBD	N	p	s1	s2	s3	s4	s5	...	
-----+-----+-----+-----+-----+-----+-----+-----+-----+									

The "Proto field" p indicates the protocol to use to contact the secondary server.

More than one Next Server DNS name Option MAY be provided to a client. However each of these options MUST contain different protocol fields.

The reason for defining this option in addition to the Next Server IP address option is that it allows implementation of load-balancing by using an SRV [[RFC2052](#)] query.

### c. Protocol field

Initial values for p, the protocol to use to contact the secondary server, are defined below:

- [0](#) Reserved
- [1](#) DHCP
- [2](#) RSIP

New values for p MAY be registered with IANA.

Note on the scope of these options:

These options are meant to redirect the client in situations where further configuration transactions may be necessary but not to replace other options in general. Thus new values of p should only be attributed for protocols used by clients to retrieve part of their configuration.

If a client receives a Next Server Option with a protocol that it does not support, the client MUST silently ignore the fact that it has been referred to a secondary server.

## **7. DHCP Server as Secondary Server**

In this section we use the term Next Server Option to mean either Next Server IP address option or Next Server DNS name option.

If a DHCP server is indicated by the protocol field of the Next Server Option, a DHCP client SHOULD send a DHCPINFORM to the server identified in the Next Server Option field to retrieve the rest of its configuration via DHCP. A typical double-phase DHCP configuration using the DHCP next server option is:

- A DHCP client broadcasts a DHCPDISCOVER. It receives a DHCPOFFER from the primary DHCP server containing (at least) a proposed IP address, a network mask and a default router.
- Based on its local policy, the primary DHCP server returns a Next Server Option or not. This decision, as well as the address or DNS name returned in the Next Server Option, MAY be based on some of the options in the client request such as the 'client identifier' option or the 'user class' option [[DHC-UC](#)].
- The DHCP client and the primary DHCP server finish their DHCP exchange in the standard way.
- If a Next Server Option was present and it indicates that the secondary server is a DHCP server, then the DHCP client SHOULD send a DHCPINFORM to the server indicated in the option.

Note that the two phases are independent of each other. In this way, a failure of the second phase does not affect the first one.

The 'siaddr' field is used by a DHCP server to tell a DHCP client the IP address of the server to use in the next step of the client bootstrap process [[RFC2131](#)]. The proposed option differs from the 'siaddr' field in that the Next Server Option is used by the DHCP client not to retrieve

a boot file, but other parts of its configuration.

## **8. RSIP Server as Secondary Server**

In this section we use the term Next Server Option to mean either Next Server IP address option or Next Server DNS name option.

If an RSIP server is indicated in the Next Server Option, the client SHOULD contact the RSIP server using the RSIP protocol [[RSIP-PROTO](#)].

The typical double phase redirect configuration with RSIP is:

- A DHCP client broadcasts a DHCPDISCOVER. It receives a DHCP OFFER from the primary DHCP server containing (at least) a proposed IP address, a network mask and a default router.
- Based on its local policy, the primary DHCP server returns a Next Server Option or not. This decision, as well as the address or domain name returned in the Next Server Option, MAY be based on some of the options in the client request such as the 'client identifier' option or the 'user class' option [[DHC-UC](#)].
- The client and the primary DHCP server finish their DHCP exchange in the standard way.
- If the Next Server Option was present and it indicates that the secondary server is an RSIP server, then the client SHOULD send an RSIP REGISTER\_REQUEST message to the server indicated in the option.
- The RSIP protocol continues as defined in [[RSIP-PROTO](#)].

Note that the two phases are independent of each other. In this way, a failure of the second phase does not affect the first one.

## **9. Security Considerations**

The IP address of the secondary server may depend on some options sent by the client such as the 'client identifier' option or the 'user class' option [[DHC-UC](#)]. A client giving false information in one of these options could have access to some configuration information to which it is not entitled. Authentication [[DHC-AUTH](#)] and policy at the DHCP server SHOULD be used to prevent that happening.

## **10. Acknowledgements**

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The introduction of the DHCP Next Server DNS name option was suggested by the use of a similar option defined in the DHCP option for SIP server draft by G. Nair and H. Schulzrinne.

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## **12. Authors' Addresses**

Jerome Privat  
BT Advanced Communications Technology Centre  
Adastral Park, Martlesham Heath, IP5 3RE  
UK  
+44 1473 606304

jerome.privat@bt.com

Michael Borella  
3Com Corp.  
[1800 W. Central Rd.](#)  
Mount Prospect IL 60056  
USA  
(847) 342-6093  
mike\_borella@3com.com

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