

Network Working Group
Internet-Draft
Intended status: Standards Track
Expires: August 2, 2013

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January 29, 2013

DNS Service Discovery options in DHCP
draft-orr-dhcp-dns-sd-options-00

Abstract

This document specifies DHCPv4 and DHCPv6 options to deliver Service Discovery Domains required for DNS based service registration and discovery.

Requirements Language

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 [RFC 2119](#) [[RFC2119](#)].

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[1.](#) Introduction

Domain Name System (DNS) allows for dynamic registration and discovery of service through the use of Resource Records (RR) to allow hosts to connect to network resources without knowing apriori what services currently reside in the network. DNS based service discovery is defined in [[I-D.cheshire-dnsext-dns-sd](#)] and dynamic DNS updates for service registration is described in [[RFC2136](#)] and [[RFC3007](#)].

For a host to dynamically register and browse services it has to know the domain in which it is allowed to register/browse these services. If the server for such a service domain cannot be dynamically looked up in the DNS search domain then the server's address has to be learnt by the host where it can register and browse services. This document specifies options for DHCPv4 and DHCPv6 to inform the host or a network device service discovery domain it can use and advertise.

[2.](#) Motivation

Service registration and browsing is a critical part of client operations. Without service registration and browsing, a user must know in advance the IP address or hostname where the specific service they require is located. By using dynamic service registration and browsing, clients can search their domain for services of interest (printers, video devices, storage etc) or these services can advertise themselves on the network. Practical applications range from homenets to enterprise and service provide architectures. Typical DNS deployment models using DHCP option allow hosts to receive their DNS Domain as well as their primary/secondary DNS servers. These DNS servers typically are used for Fully Qualified Domain Name to IP address translation where the service is included as part of the name such as `www.xyz123.com` or `ftp.xyz123.com` to designate the Web and FTP Services for the `xyz123.com` domain. This

document introduces DHCP options to provide multiple domains in addition to the FQDN to register and browse for services. Direct application for this can be seen in home/residential networking where the FQDN and DNS servers delivered to the host does not permit them to register or browse for services on their local home network where it would be more applicable to provide a "home" domain for these users in addition to Service Provider assigned domain.

In enterprise networks when heirarchical sub-domains have to be carved out network device that is at the root of such sub-domains can learn and provide these options to clients that are part of such sub-domains.

[3.](#) Terminology

All the DHCP related terms used in this document are to be interpreted as defined in the Dynamic Host Configuration Protocol v4 (DHCPv4) [[RFC2131](#)] and Dynamic Host Configuration Protocol v6 (DHCPv6) [[RFC3315](#)] specifications. DHCP refers to both DHCPv4 and DHCPv6 messages and entities throughout this document.

All the DNS related terms used in this document are to be interpreted as defined in the DNS [[RFC1035](#)] and [[RFC2136](#)].

[4.](#) DNS Service Discovery Domain Name Option

DNS Service Discovery Domain Name option carries service discovery domain information where services can be registered and discovered.

The format of the DNS SD Domain Name option is shown below.

DHCPv4 Option

Code	Len	DNS-SD-domain-name	Value
+-----+-----+-----+-----+-----+--			--+-----+
TBD1	len	DNS-SD-domain-name	...
+-----+-----+-----+-----+-----+--			--+-----+

TBD1: 8-bit code carrying TBD1

len: 8 bit indicating total length of the included
DNS-SD-domain-name value.

DNS-SD-domain-name: Contains the domain name encoded according to
[Section 3.1](#) of[RFC 1035]

This option contains a single domain name and,
as such,MUST contain precisely one root label.

DHCPv6 Option

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-code (TBD2)		option-length

```

+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
.                               DNS-SD-domain-name                               .
.                               ...                                              .
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

option-code: 16-bit code TBD2

option-length: 16-bit unsigned integer indicating length
in octets of this option

DNS-SD-domain-name: Contains the domain name encoded according to
[Section 3.1](#) of[RFC 1035]
This option contains a single domain name and,
as such,MUST contain precisely one root label.

5. Client Behavior

All hosts or clients MAY request for Service Domain Name option in all the upstream DHCP messages. A DHCPv4 client MAY request a service domain name option in a Parameter Request List option, as described in [[RFC2131](#)]. A DHCPv6 client MAY request an service domain name option in an Options Request Option (ORO), as described in [[RFC3315](#)].

6. Relay Agent Behavior

<TBD> Directly connected relay agent MAY provide a hint about the connected service domain to influence the service domain provided to the client as per [[RFC6422](#)] by including this option in the Relay-Supplied Options option towards the server.

7. Server Behavior

If a DHCP Server is configured with these options and receives a client request for these options, it MUST return these options and associated data in a downstream DHCP message. Additionally, if a DHCP server is configured with these options, it SHOULD deliver them to the client whether or not it is explicitly requested.

8. IANA Considerations

This document defines DHCPv4 Service Domain Name option which requires assignment of DHCPv4 option code TBD1 assigned from "Bootp and DHCP options" registry (<http://www.iana.org/assignments/bootp-dhcp-parameters/bootp-dhcp-parameters.xml>), as specified in [RFC2939].

IANA is requested to assign option code TBD2 for DHCPv6 option from the "DHCPv6 and DHCPv6 options" registry (<http://www.iana.org/assignments/dhcpv6-parameters/dhcpv6-parameters.xml>).

IANA is requested to add TBD2 to "Options Permitted in the Relay-Supplied Options Option".

9. Security Considerations

The options defined in this document may be used by an intruder DHCP server to assign invalid parameters, resulting in clients unable to register and discover services.

To minimize these attacks, this option SHOULD be included by DHCP entities only when it is configured. Where critical decisions might be based on the value of this option, DHCP authentication as defined in "Authentication for DHCP Messages" [RFC3118] and "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)" [RFC3315] SHOULD be used to protect the integrity of the DHCP options. Link-layer confidentiality and integrity protection may also be employed to reduce the risk of disclosure and tampering.

10. Acknowledgements

11. Change log

12. Normative References

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