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Multicast DNS Configuration Option

1. Copyright Notice

2. Abstract

This document defines a new DHCP option which is passed from the DHCP Server to the DHCP Client to specify the multicast DNS configuration.

3. Introduction

Multicast DNS was first defined in [5], and behavior was further specified in [3]. The Dynamic Host Configuration Protocol (DHCP)[1] provides a framework for passing configuration information to hosts on a TCP/IP network. RFC 2132 [2] allows DHCP servers to specify configuration information for various kinds of name servers to be passed to DHCP clients. However, no information is provided as to the configuration desired for multicast DNS. The purpose of this document is to allow DHCP servers to specify the multicast DNS configuration to be used by DHCP clients.

3.1. Requirements 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 RFC 2119 [4].

3.2. DHCP terminology

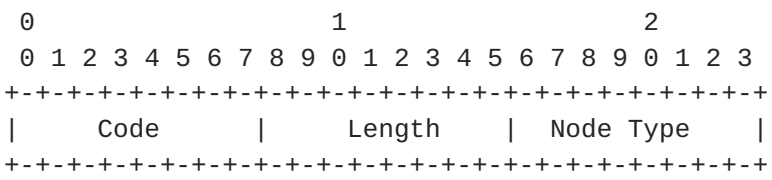
This document uses the following terms:

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

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

4. Format of the multicast DNS configuration option

The following diagram defines the format of the multicast DNS configuration option:



Code

TBD

Length

1

Node type

The node type field, which is one octet, describes how the host behaves as multicast DNS querier and listener. Values are defined as follows:

Value	Node Type
0x1	B-node
0x2	P-node
0x3	Reserved
0x4	M-node
0x5 - 0x7	Reserved
0x8	H-node
0x9 - 0xFF	Reserved

4.1. B-node

B-nodes MUST act as multicast DNS queriers and listeners, but MUST NOT send unicast DNS queries. As a result, they are unable to resolve names outside the scope of the multicast DNS, as defined in [3].

Hosts configured as B-nodes MUST listen for mDNS queries on both the linklocal and local scope addresses, and MUST respond to mDNS queries as described in [3].

4.2. P-node

P-nodes MUST only send unicast DNS queries, and MUST NOT listen for multicast DNS queries or respond to them in any way. Hosts configured as P-nodes MUST NOT send multicast DNS queries for any purpose, including DNS server location. By default, both IPv4 and IPv6 hosts that are configured via DHCP but do not receive a multicast DNS configuration option behave as P-nodes. If no DNS server option is provided, a P-node host will be unable to resolve names.

4.3. M-node

M-nodes MUST use multicast DNS queries for resolving names prior to querying the DNS server using unicast. M-nodes configured without a DNS server will send only multicast DNS queries, and will be unable to resolve names outside the scope of the multicast DNS, as defined in [3].

Hosts configured as M-nodes MUST listen for mDNS queries on both the linklocal and local scope addresses, and MUST respond to mDNS queries as described in [3].

4.4. H-nodes

H-nodes MUST send multicast DNS queries only if they have not been able to resolve the name via a query to a DNS server using unicast. H-nodes lacking a DNS server will send only multicast DNS queries, and will be unable to resolve names outside the scope of the multicast DNS as defined in [3].

Hosts configured as H-nodes MUST listen for mDNS queries on both the linklocal and local scope addresses, and MUST respond to mDNS queries as described in [3]. H-nodes MUST NOT send mDNS queries without first querying the unicast DNS server if one is available.

5. Scalability considerations

Since B and M-nodes function as multicast DNS listeners as well as multicast DNS queriers of first resort, the presence of these nodes can result in considerable multicast traffic propagating within the local administrative scope zone. This could represent a scalability problem in large enterprise networks, and so in this scenario, configuration of hosts as B and M-nodes is discouraged. Instead, it is recommended that enterprise networks deploy dynamic DNS utilizing hosts configured as P-nodes, which is the default behavior where no mDNS configuration option is provided.

6. References

[1] Droms, R., "Dynamic Host Configuration Protocol", RFC 2131, March 1997.

[2] Alexander, S., Droms, R., "DHCP Options and BOOTP Vendor Extensions", RFC 2132, March 1997.

[3] Esibov, L., Aboba, B., Thaler, D. "Multicast DNS", Internet draft (work in progress), draft-aboba-dnsext-mdns-00.txt, March 2000.

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

[5] Braden, R., "Requirements for Internet Hosts -- Application and Support", RFC 1123, October 1989.

7. Security Considerations

The option described in this draft may be used in situations where DHCP is authenticated or unauthenticated. In situations where authenticated DHCP is not used, it is possible for a rogue DHCP server to respond to the DHCP client with an inappropriate mDNS configuration option. For

example, the rogue DHCP server could specify an mDNS configuration option of 0x1. This would cause the host to become both an mDNS querier and listener (B-node). Were hosts to be widely configured this way, this could result in propagation of mDNS queries throughout the enterprise.

8. IANA Considerations

This draft does not create any new number or name spaces for IANA administration.

9. Acknowledgements

This draft has been enriched by comments from Erik Guttman of Sun Microsystems.

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This memo is filed as <draft-aboba-dhc-mdns-conf-01.txt>, and expires October 1, 2000.