

Network Working Group
Request for Comments: 3256
Category: Standards Track

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April 2002

The DOCSIS (Data-Over-Cable Service Interface Specifications) Device
Class DHCP (Dynamic Host Configuration Protocol) Relay Agent
Information Sub-option

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Abstract

This document proposes a new sub-option to the DHCP (Dynamic Host Configuration Protocol) Relay Agent Information Option. This new sub-option is for use with DOCSIS (Data-Over-Cable Service Interface Specifications) cable modems and describes a "device class" to which the cable modem belongs. The cable modem signals its device class information to the Relay Agent using DOCSIS signaling, and the Relay Agent forwards the device class information to the DHCP Server which can then make a policy decision based on it.

1. Introduction

The "Relay Agent Information" Option is described in [1] and includes several Relay Agent Information sub-options. This RFC proposes an additional sub-option for use with DOCSIS cable modems. This sub-option is added by DHCP relay agents which terminate cable modems. The sub-option encodes an identifier of the device class to which the cable modem belongs. It is intended for use by DHCP servers to make policy decisions based on the device class of the host.

The motivation for using a Relay Agent Information sub-option, rather than a new or existing DHCP option, is the introduction of CPE Controlled Cable Modems (CCCMs) [2]. In an implementation of a CCCM, the modem firmware controls DOCSIS signaling, but the attached computer (CPE) manages other protocol activities -- particularly DHCP client message handling. The assumption of this document is that it

is better to trust the operation of the CCCM firmware, than to trust the operation of CCCM software running on the attached computer (e.g., a standard PC).

The key words "MUST", "MUST NOT", "SHOULD", "SHOULD NOT", and "MAY" in this document are to be interpreted as described in RFC 2119 [4].

2. DOCSIS Device Class Sub-option

The DOCSIS RFI specification [3] specifies the Device Class encoding within the payload of the Device Class Identification Request (DCI-REQ) message. The relay agent MUST pass the Device Class value unchanged to the DHCP server. Possible uses of this field include:

- o host endpoint information
- o host hardware capabilities
- o host software capabilities
- o host options information

DOCSIS defines the Device Class to be a 32-bit field where individual bits represent individual attributes of the CM. Bit #0 is the least significant bit of the field. Bits are set to 1 to select the attributes defined below.

bit #0 - CPE Controlled Cable Modem (CCCM)

bits #1-31 - Reserved and set to zero

The DOCSIS Device Class sub-option is coded as follows:

SubOpt	Len	Device Class			
4	4	d1	d2	d3	d4

The DHCP server needs to understand the meaning of this sub-option in order to offer different policy options in its reply to the host. DHCP servers MAY use the device class for IP and other parameter assignment policies for cable modems.

3. Security Considerations

Operation of the DHCP Relay Agent Information Option relies on an implied trusted relationship between the DHCP relay agent and the DHCP server. The discussion of security considerations for the DHCP relay agent information option [1] apply to this sub-option as well.

Operation of the DOCSIS Device Class sub-option relies on an implied trusted relationship between the DHCP client (i.e., the cable modem) and the DHCP relay agent, through DOCSIS signaling. According to DOCSIS specifications [2], the cable modem firmware always controls DOCSIS signaling, but cannot control DHCP client message handling (e.g., CCCMs). This document assumes that the cable modem firmware is trustworthy for DOCSIS signaling information.

This document introduces a new identifier, the DOCSIS Device Class sub-option, that is provided by the relay agent device and is assumed to be trusted. Cryptographic or other techniques to authenticate the device class are beyond the scope of this document.

4. IANA Considerations

IANA has assigned a value of 4 from the DHCP Relay Agent Sub-options space [RFC 3046] for the DOCSIS Device Class sub-option defined in section 2.

5. References

- [1] Patrick, M., "DHCP Relay Agent Information Option", RFC 3046, January 2001.
- [2] "Data-Over-Cable Service Interface Specifications: Cable Modem to Customer Premise Equipment Interface Specification SP-CMCI-I07-020301", DOCSIS, March 2002, <http://www.cablemodem.com>.
- [3] "Data-Over-Cable Service Interface Specifications: Cable Modem Radio Frequency Interface Specification SP-RFIV1.1-I08-020301", DOCSIS, March 2002, <http://www.cablemodem.com>.
- [4] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.