       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