Network Working Group
Request for Comments: 5417
Category: Standards Track

P. Calhoun
Cisco Systems, Inc.

March 2009

Control And Provisioning of Wireless Access Points (CAPWAP) Access Controller DHCP Option

Status of This Memo

Copyright Notice

Abstract

The Control And Provisioning of Wireless Access Points Protocol allows a Wireless Termination Point to use DHCP to discover the Access Controllers to which it is to connect. This document describes the DHCP options to be used by the CAPWAP Protocol.

Table of Contents

1. Introduction

The Control And Provisioning of Wireless Access Points Protocol (CAPWAP) [RFC5415] allows a Wireless Termination Point (WTP) to use DHCP to discover the Access Controllers (AC) to which it is to connect.

Prior to the CAPWAP Discovery process, the WTP may use one of many methods to identify the proper AC with which to establish a CAPWAP connection. One of these methods is through the DHCP protocol. This is done through the CAPWAP AC DHCPv4 or CAPWAP AC DHCPv6 Option.

1.1. Conventions Used in This Document

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].

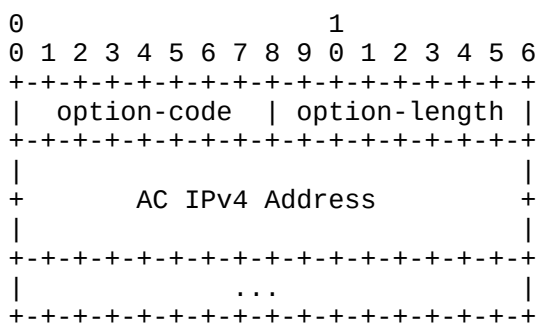
1.2. Terminology

This document uses terminology defined in [RFC3753], [RFC2131], [RFC3315], and [RFC5415].

2. CAPWAP AC DHCPv4 Option

This section defines a DHCPv4 option that carries a list of 32-bit (binary) IPv4 addresses indicating one or more CAPWAP ACs available to the WTP.

The DHCPv4 option for CAPWAP has the format shown in the following figure:



option-code: OPTION_CAPWAP_AC_V4 (138)

option-length: Length of the 'options' field in octets; MUST be a multiple of four (4).

AC IPv4 Address: IPv4 address of a CAPWAP AC that the WTP may use. The ACs are listed in the order of preference for use by the WTP.

A DHCPv4 client, acting on behalf of a CAPWAP WTP, MUST request the CAPWAP AC DHCPv4 Option in a Parameter Request List Option, as described in [RFC2131] and [RFC2132].

A DHCPv4 server returns the CAPWAP AC Option to the client if the server policy is configured appropriately and the server is configured with a list of CAPWAP AC addresses.

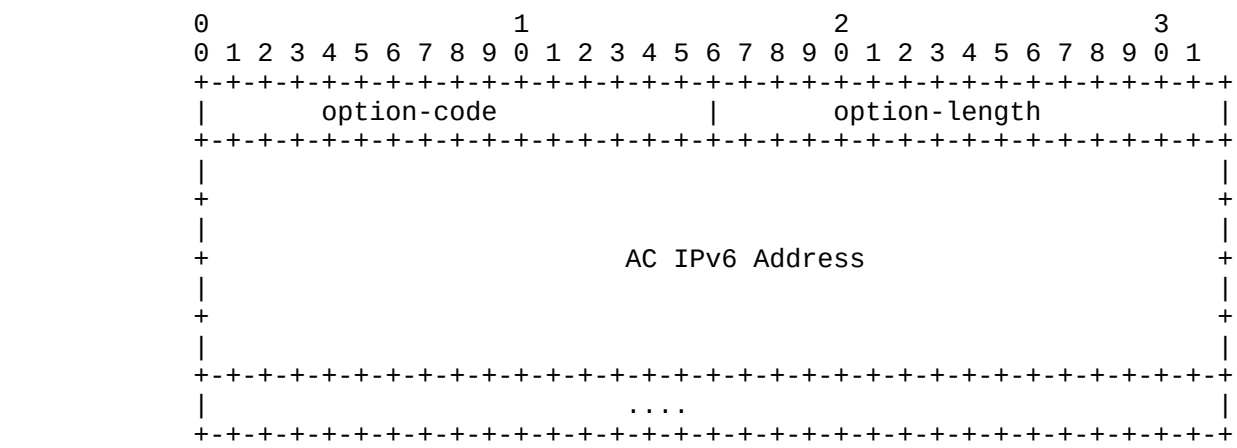
A CAPWAP WTP, acting as a DHCPv4 client, receiving the CAPWAP AC DHCPv4 Option MAY use the (list of) IP address(es) to locate an AC. The CAPWAP Protocol [RFC5415] provides guidance on the WTP's discovery process.

The WTP, acting as a DHCPv4 client, SHOULD try the records in the order listed in the CAPWAP AC DHCPv4 Option received from the DHCPv4 server.

3. CAPWAP AC DHCPv6 Option

This section defines a DHCPv6 option that carries a list of 128-bit (binary) IPv6 addresses indicating one or more CAPWAP ACs available to the WTP.

The DHCPv6 option for CAPWAP has the format shown in the following figure:



option-code: OPTION_CAPWAP_AC_V6 (52)

option-length: Length of the 'options' field in octets; MUST be a multiple of sixteen (16).

AC IPv6 Address: IPv6 address of a CAPWAP AC that the WTP may use. The ACs are listed in the order of preference for use by the WTP.

A DHCPv6 client, acting on behalf of a CAPWAP WTP, MUST request the CAPWAP AC DHCPv6 Option in a Parameter Request List Option, as described in [RFC3315].

A DHCPv6 server returns the CAPWAP AC Option to the client if the server policy is configured appropriately and the server is configured with a list of CAPWAP AC addresses.

A CAPWAP WTP, acting as a DHCPv6 client, receiving the CAPWAP AC DHCPv6 Option MAY use the (list of) IP address(es) to locate an AC. The CAPWAP Protocol [RFC5415] provides guidance on the WTP's discovery process.

The WTP, acting as a DHCPv6 client, SHOULD try the records in the order listed in the CAPWAP AC DHCPv6 Option received from the DHCPv6 server.

4. IANA Considerations

The following DHCPv4 option code for CAPWAP AC Options has been assigned by IANA:

Option Name	Value	Described in
OPTION_CAPWAP_AC_V4	138	Section 2

The following DHCPv6 option code for CAPWAP AC Options has been assigned by IANA:

Option Name	Value	Described in
OPTION_CAPWAP_AC_V6	52	Section 3

5. Security Considerations

The security considerations in [RFC2131], [RFC2132], and [RFC3315] apply. If an adversary manages to modify the response from a DHCP server or insert its own response, a WTP could be led to contact a rogue CAPWAP AC, possibly one that then intercepts call requests or denies service. CAPWAP's use of Datagram Transport Layer Security (DTLS) MUST be used to authenticate the CAPWAP peers in the establishment of the session.

In most of the networks, the DHCP exchange that delivers the options prior to network access authentication is neither integrity protected nor origin authenticated. Therefore, in security sensitive environments, the options defined in this document SHOULD NOT be the only methods used to determine to which AC a WTP should connect. The CAPWAP protocol [RFC5415] defines other AC discovery procedures a WTP MAY utilize.

6. Acknowledgments

The following individuals are acknowledged for their contributions to this protocol specification: Ralph Droms, Margaret Wasserman.

7. References

7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2131] Droms, R., "Dynamic Host Configuration Protocol", RFC 2131, March 1997.

[RFC2132] Alexander, S. and R. Droms, "DHCP Options and BOOTP Vendor Extensions", RFC 2132, March 1997.

[RFC3315] Droms, R., Bound, J., Volz, B., Lemon, T., Perkins, C., and M. Carney, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", RFC 3315, July 2003.

[RFC5415] Montemurro, M., Stanley, D., and P. Calhoun, "CAPWAP Protocol Specification", RFC 5415, March 2009.

7.2. Informative References

[RFC3753] Manner, J. and M. Kojo, "Mobility Related Terminology", RFC 3753, June 2004.

Author's Address

Pat R. Calhoun
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134

Phone: +1 408-902-3240
EMail: pcalhoun@cisco.com