A method for configuration of IPsec clients using DHCP
draft-richardson-ipsec-dhcp-over-ike-00.txt

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Abstract

IPsec technology is frequently used for remote access scenarios. A tunnel is established from a mobile node (such as a laptop) and an IPsec gateway located at the Enterprise. The mobile node’s tunnel outer address is potentially any IP address on the Internet. The mobile node’s tunnel inner address should be an address from within the enterprise. The assignment of this address should ideally be done dynamically.

This document specifies a configuration mode called "DHCP over IKE". The document specifies that the payload of a DHCP exchange should be carried over an IKE phase 1 exchange.
1. Introduction

Intro about problem space for configuring clients with addresses. We use [1] to with [2].
2. Time sequence diagram

The setup consists of:

\[\begin{array}{ccc}
+--------+ & +---------+ & +--------+
| client | =============== | Security | --------- | DHCP     |
+--------+ & +---------+ & +--------+
|         | gateway     |         | server   |
\end{array}\]

HDR, SAi1, KEi, Ni ->
<= HDR, SAr1, KEr, Nr, [CERTREQ]

HDR, SK {IDi, [CERT,] [CERTREQ,] [IDr,]}
AUTH, DHCP(disc)) -->

---DHCP Discovery-->
<=DHCP Offer-------

<= HDR, SK {IDr, [CERT,] AUTH, DHCP(offer))}

HDR, SK {SAi2, TSi, TSr, DHCP(request)}-->

---DHCP request-->
<=DHCP ACK-------

<= HDR, SK {SAr2, TSi, TSr, DHCP(ack)}

later, upon rekey, one does:

HDR, SK {SAi2, TSi, TSr, DHCP(request)}-->

---DHCP request-->
<=DHCP ACK-------

<= HDR, SK {SAr2, TSi, TSr, DHCP(ack)}
3. Comparisons with mode-cfg

From the point of view of the IKE implementor, this proposal is very similar to mode configuration. There are two major differences: inclusion of a DHCP client state machine into the client IKE, and the IKEv2 gateway must encapsulate the DHCP payloads into a UDP packet and relay them to a DHCP server. The gateway SHOULD also append DHCP relay options to the end to signal to the DHCP server that it came via IKEv2.

The major advantage of DHCP-over-IKE vs mode-cfg is that it leverages all of the DHCP protocol infrastructure for configuration of the end host. Further, it naturally interacts with the DHCP infrastructure at the enterprise end.
4. Comparisons with DHCP-over-IPsec

The DHCP-over-IKE situation appears more complicated due to the inclusion of the DHCP state machines into IKEv2. The major complexity appears to be on the client. Note that this is an illusion - in the DHCP-over-IPsec, the IKE on the client needs to know what state the DHCP client it is so that it may act accordingly. As such, the states are simply represented twice. Unless the implementor is able to take advantage of an existing DHCP client present on the OS, there is little savings in actual code.

DHCP-over-IPsec requires that a very strange IPsec SA be configured for: 0.0.0.0/0:udp/67 <->0.0.0.0/0:udp/68. Note that extreme care must be taken to make sure that this does not also catch packets destined to the DHCP server on the physical wire. This SA MUST be torn down before any traffic is mis-directed on it. Further, it is very difficult to configure a mobile system that must maintain tunnels to two enterprises.
References


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