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IKEv2 based flow control extension of PMIPv6 draft-liu-netext-flow-pmip-03

Abstract

PMIPv6 is designed to provide network based mobility, it requries no changes to the UE. There are proposals to extend PMIPv6 to support flow mobility. Flow mobility requries the UE and the network having communication protocol to carry the flow control messages. This document proposes to use the extended IKEv2 protocol to carry the flow control messages between the UE and network.

Status of this Memo

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1. Introduction

There are proposals to extend PMIPv6 to support flow mobility. But there is currently no protocol is specified between the UE and network which is used to carry the flow control policies. Since PMIPv6 is aimed to provide network based mobility solution and no UE changes is prefered, it is not feasible to define new protocol between the UE and network which is used to carry the flow control information. This document proposes to use extended IKE protocol to carry the flow control information.

2. 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 [RFC2119].

3. Overview of using IKEv2 to carry flow control information

IKEv2 is used for security parameter negotiation. It is usally used combine with IPSec. There are configuration payload options in IKEv2 which could be used for IP address allocation and other configuration purposes. This document proposes to extend the configuration payloads to carry the flow control information.

IKEv2/IPSec is also used for protecting mobility signalling in 3GPP. In 3GPP architecture, s2b interface is based on PMIP and used for un-trusted non-3GPP access. There is an IPSec tunnel between the UE and the un-trusted non- 3GPP access gateway(ePDG). This IPSec tunnel's security association and other security parameters are set up using IKEv2. Except for the security function, the IKEv2 protocol between the UE and no-3GPP access gateway(ePDG) is also used for IP address configuration. The IP address is carried by configuration payload in IKEv2.

From the above analysis, we can see that there is a mandatory IKEv2 protocol running between the UE and the network in 3GPP s2b interface. It is natural to consider extending this protocol to carry the flow mobility control information.

4. IKEv2 configuration payload extension

IKEv2's configuration payload is defined to carry configuration information, for example: IP address allocation etc. The format of the configration payload is as follows:

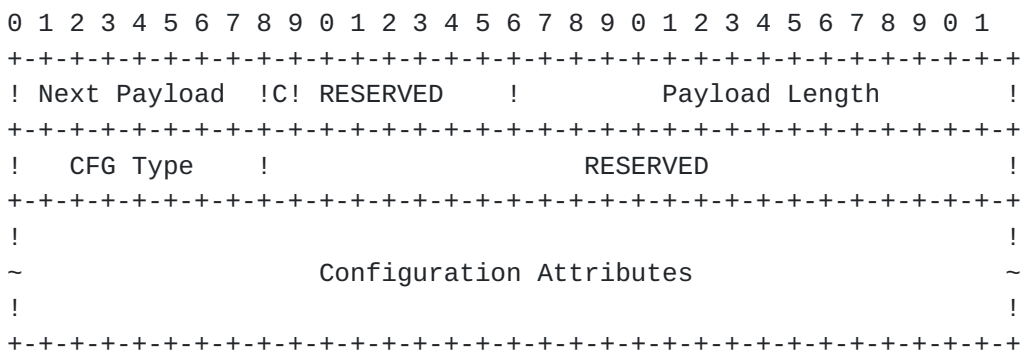

Figure 1: Format of Configuration Payload of IKEv2

As Figure 1 depicted, IKEv2 configuration payload has CFG Type and configuration attributes options. CFG Type includes CFG_REQUEST, CFG_REPLY, CFG_SET, CFG_ACK. "CFG_SET/CFG_ACK" allows an IKE endpoint to push configuration data to its peer. "CFG_REQUEST/ CFG_REPLY" allows an IKE endpoint to request information from its peer.

Configuration attributes has the following format:

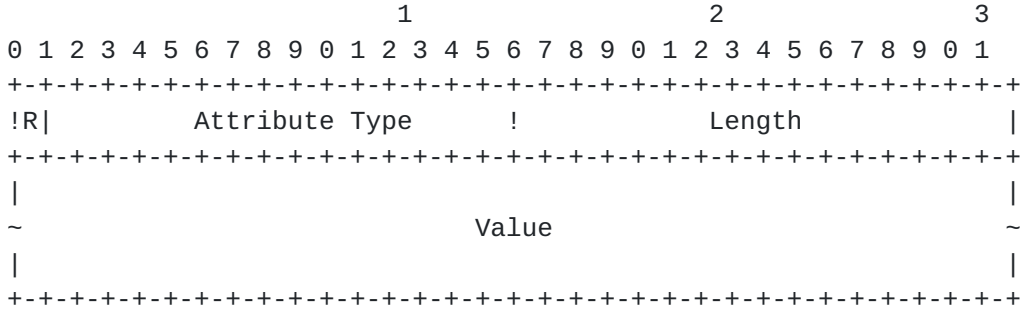

Figure 2: Format of Configuration attributes

Current specified attribute type include:

Attribute Type	Value	Multi-Valued	Length
RESERVED	0		
INTERNAL_IP4_ADDRESS	1	YES*	0 or 4 octets
INTERNAL_IP4_NETMASK	2	NO	0 or 4 octets
INTERNAL_IP4_DNS	3	YES	0 or 4 octets
INTERNAL_IP4_NBNS	4	YES	0 or 4 octets
INTERNAL_ADDRESS_EXPIRY	5	NO	0 or 4 octets
INTERNAL_IP4_DHCP	6	YES	0 or 4 octets
APPLICATION_VERSION	7	NO	0 or more
INTERNAL_IP6_ADDRESS	8	YES*	0 or 17 octets
RESERVED	9		
INTERNAL_IP6_DNS	10	YES	0 or 16 octets
INTERNAL_IP6_NBNS	11	YES	0 or 16 octets
INTERNAL_IP6_DHCP	12	YES	0 or 16 octets
INTERNAL_IP4_SUBNET	13	YES	0 or 8 octets
SUPPORTED_ATTRIBUTES	14	NO	Multiple of 2
INTERNAL_IP6_SUBNET	15	YES	17 octets

Figure 3: Attribute type

This document proposes to extend the attribute type of the Configuration attributes , adding two new types: IPv4_FLOW_CONTROL/ IPv6_FLOW_CONTROL, the definition of this proposal is as follows:

Attribute Type	Value	Multi-Valued	Length
IPv4_FLOW_CONTROL	20	YES*	0 or x octets
IPv6_FLOW_CONTROL	21	YES*	0 or x octets

Figure 4: Attribute type extension

The corresponding value of this proposed FLOW_CONTROL attribute is as follows:

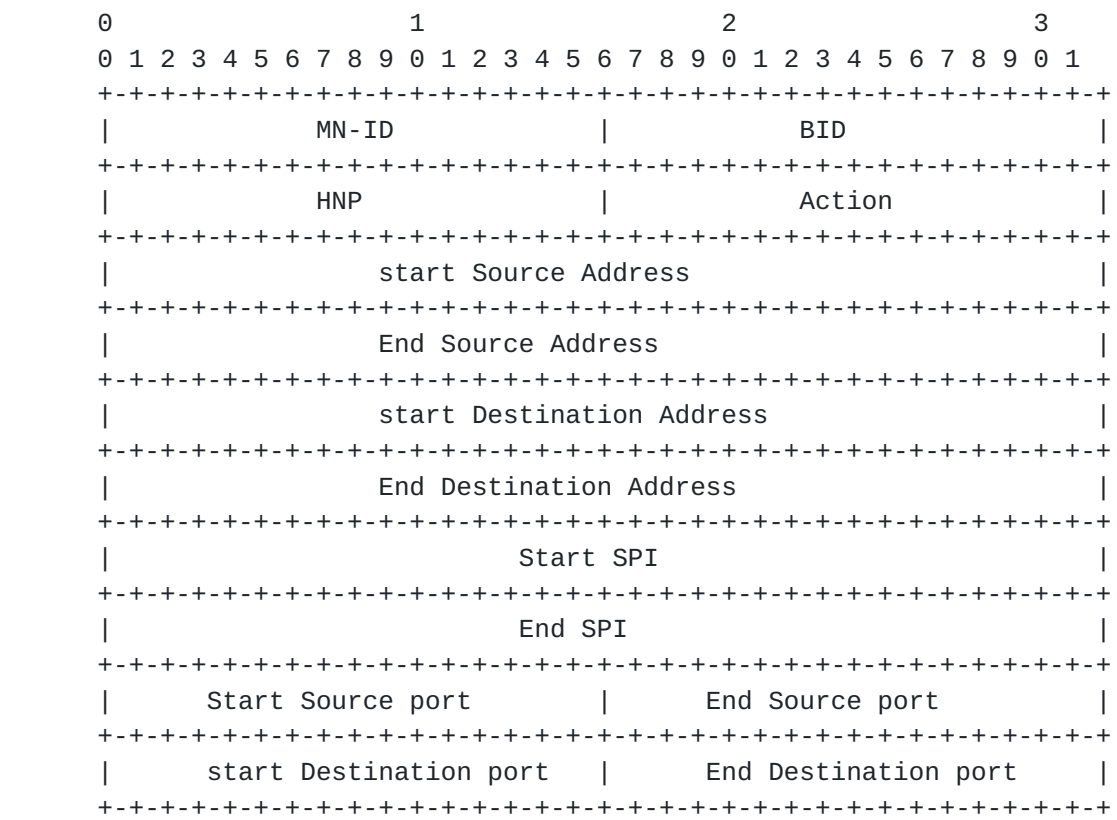

Figure 5: FLOW_CONTROL Attribute value definition

- MN-ID: MN idendification of the mobile node.
- BID: Binding idendification associated with this flow and HNP.
- HNP: Home network prefix associated with this flow.
- Action: The action that the sender request the receiver to perform. Actions may include:Foward(1): request the receiver to foward the flow based on the HNP and BID.other values of action need further specified.
- Start Source Address: Start of source address of this flow. this address could be IPv4 or IPv6 address, depending on the FLOW_CONTROL type is IPv4 or IPv6.
- End Source Address: end of source address of this flow. this address could be IPv4 or IPv6 address, depending on the FLOW_CONTROL type is IPv4 or IPv6.
- Start Destination Address:start of destination address of this flow. this address could be IPv4 or IPv6 address, depending on the FLOW_CONTROL type is IPv4 or IPv6.
- End Destination Address:end of destination address of this flow. this address could be IPv4 or IPv6 address, depending on the FLOW_CONTROL type is IPv4 or IPv6.

- Start SPI: Start SPI of this flow.
- End SPI: End SPI of this flow.
- Start Source port: Start soure port of this flow.
- End Source port: End of source port of this flow.
- Start Destination port: Start of destination port of this flow.
- End Destination port: End of destination port of this flow.

5. MN operation

for flow mobility, MN decides when to initiate flow handover. MN uses the above extended IKEv2 configureation payload extension to send the flow control message. Flow mobility polilcy control function need to communicate with the IKE module in the MN to carry the flow mobility control information.

6. MAG operation

MAG needs to get the flow mobility control information from the IKE configration payload extension. MAG then send PBU message with the flow mobility extension.

7. LMA operation

LMA get flow control information from the PBU which carries the flow mobility extension. Then it control the flow mobility action accordingly.

8. Security Considerations

TBD

9. IANA Considerations

None

10. References

10.1. Normative References

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