Security in the last mile

----DHCP is going to help

Extended DHCPv6 for Piggybacking Security Association Configuration

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Background

- The importance of DHCP
  - DHCP is typically the first protocol executed by a mobile host when it enters a new network.
  - *DHCP service is typically provided by a centralized service composed of fewer managed components, so DHCP server misconfiguration is less likely than delivery of misconfigured Route Advertisements.(*As in draft-droms-dhc-dhcpv6-default-router-00 by Ralph Droms*)*
  - The other IP address associated configuration could be accomplished via DHCP as well.

Background

- IPSec is pervasive in many scenarios to build the channel of security mechanism to protect the communication between the host and the local servers.
  - DNS recursive name server
  - SIP server
- Security Association (SA) Configuration is indispensible for IPSec.
  - Manually
  - IKE

Motivation

- DHCP is widely used in wireless access network
  - If DHCP is indispensable, why bother to employ another interaction to configure SA to invite delay in operation
- IPSec is IP address-oriented
  - IPSec connection cannot survive renumbering
  - SA configuration might go with IP address assignment as well

Intended Scenarios

- Public Wireless Access Network
- Access Network where IP addresses are assigned dynamically

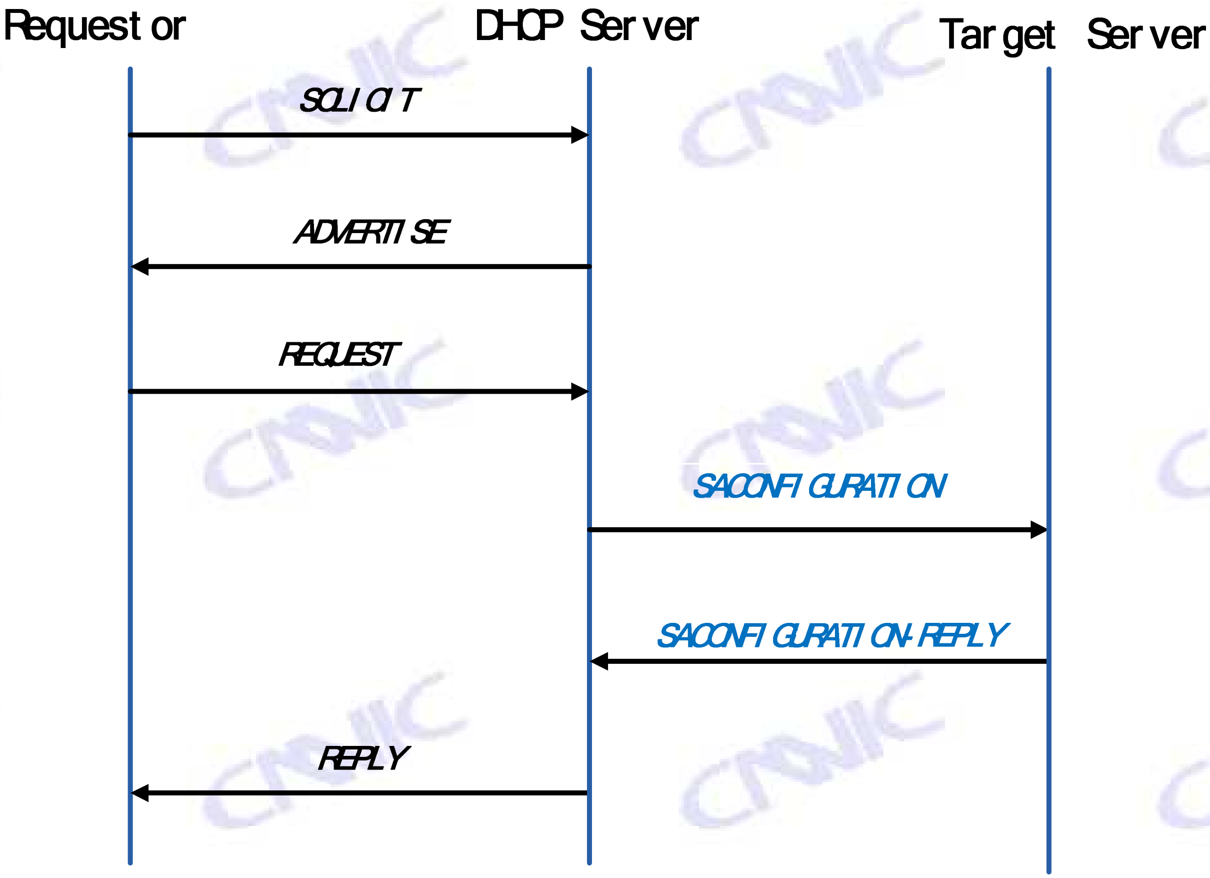
Is DHCP ready for that?

- The desired preparation
  - Pre-shared secret configured on DHCP server and the other local server respectively
  - It is especially appropriate for those local servers that already interpret DHCPv6 messages.

New DHCPv6 Roles

- target server
  - A local server of the access network, who is to be configured with SA by DHCP. The target server works as a DHCP client listening for DHCP messages on UDP port 546
- requestor
  - A host that wants to establish SA with a target server . The requestor works as a DHCP client requesting configuration parameters for SA.

Extended DHCP Operation



Message Exchange

- New defined DHCPv6 messages
  - SACONFIGURATION and SACONFIGURATION-REPLY
- Confidentiality of key
  - DHCP server uses requestor’s public key to encrypt the symmetric key of SA
  - DHCP server uses pre-shred key to encrypt the symmetric key of SA

New DHCPv6 Options

- Client Public Key Option
  - To specify the requestor’s public key
- Requestor's Parameters Option
  - To specify security parameters provided by the requestor
- SA Request Option
  - To encapsulate SA Requestor's Parameters Option(s) for different target server
- SA Option
  - To specify SA parameters shared between a requestor and a specific target server
- SA List Option
  - To contain one or more SA Options in response to the SA request

Other Considerations

- SA configuration after DHCP phase
  - DHCPv6 Information-Request message
- Rogue DHCP server
  - DHCP Authentication
  - In public wireless access network, secured link layer is going to help.

Thanks!

You will find more details in this document

http://tools.ietf.org/id/draft-madi-dhc-dhcpv6-psac-00.txt

Q&A