DHCPv4 Option for Port-Set Assignment
draft-sun-dhc-port-set-option-00

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Use Case

- Provide IPv4 address in IPv6 access network
- IPv4 address sharing among end users
- IPv4 resources allocation over IPv6 network

IPv4 User

IPv4-in-IPv6 tunnel

DHCPv4-over-IPv6

IPv6 Network

IPv4 Remote end

IPv4 Internet

IPv4 Internet

IPv6 Network

46 addr binding for ENCAP

v4 addr
port set
v6 addr

IPv4 Internet

IPv6 Network

46 binding sync

Native IPv4
Requirements

• Public IPv4 address
  – DHCPv4-over-IPv6 for IPv4 assignment in IPv6 net
    • draft-ietf-dhc-dhcpv4-over-ipv6-05
• IPv4 SIP server, IPv4 NTP server, ...
  – Leverage existing DHCPv4 options over IPv6
• Port-set assignment in DHCPv4
  – To be defined
DHCPv4 Port Set Option

- Assign a contiguous port set
- Port set determined by 16-bit mask and index
- Format

Example:
- Port Set Index: 0001 0100 0000 0000 (5120)
- Port Set Mask: 1111 1100 0000 0000 (64512)
- One contiguous port set: 5120 - 6143
Preventing incorrect address sharing

- DHCPv4 server prevents configuring a shared addr to a client over IPv4
  - With relay agent in the middle
    - TRA validates the source IPv6 address of DHCP message from client (Done in DHCPv4-over-IPv6 draft)
    - DHCPv4 server validates the RA’s address (Current practice)
  - TSV (DHCPv4 over IPv6 Server)
    - TSV validates the source IPv6 address of DHCP message from client (Done in DHCPv4-over-IPv6 draft)
Preventing incorrect address sharing

• DHCPv4 server prevents configuring a port set to a port-set incapable client
  – A port-set incapable client MUST NOT request a port set in PRL
  – DHCPv4 server MUST NOT return port set option if client doesn’t request it
Changes since Vancouver IETF

• Merged two drafts
  – draft-bajko-pripaddrassign-04
  – draft-wu-dhc-port-set-option-00
• Four options/sub-options -> ONE option
  – Port mask for allocating ONE contiguous port set to each user
• Major Points
  – Port mask is easy for implementation
  – Non-Contiguous port set doesn’t increase security compared to contiguous port set
  – Port Randomization: A contiguous port set + port randomization on client side (RFC6269)
Implementation Efforts

• Tsinghua, Huawei, China Telecom and GreenNet
• DHCPv4-over-IPv6 with port-set option
• Implementations of DHCP server, relay and client
• Easy to implement:
  – It takes two weeks for GreenNet to realize relay and client
• Interop test in Tsinghua
  – 2 DHCPv4 servers, 1 TSV, 3 DHCP relays, 3 DHCP clients
  – About 20 combinations and over 1400 test cases
  – Testing result shows the mechanism works well
Summary

• Consensus among authors of two drafts
  – draft-bajko-pripaddrassign-04
  – draft-wu-dhc-port-set-option-00

• Simple and clean

• Use DHCPv4 for allocating IPv4 related resources
  – Leverage existing DHCPv4 options for v4 clients
  – Phase out IPv4 and DHCPv4 after transition
  – No side effect for DHCPv6 server/client after IPv4/IPv6 transition is completed

• Implementations from multiple vendors
  – Inter operation goes well
Next Step

• Adopt it as a WG item?