A Study of LISP
on Large-scale Data Center

Sangwook Bae, Byungyun Kong, and Seo-Young Noh

Abstract—In recent year, the large-scale data center requires thousands of Internet Protocol addresses. But the available Internet Protocol version 4 addresses were exhaustion already. Therefore, the large-scale data center adopting Internet Protocol version 6 addresses today. However, there is the large-scale data center that has not yet been switched to IPv6, and the connection with existing IPv4 must be guaranteed. Thus, although many IPv4/IPv6 translation technologies are applied, overhead due to protocol translation may occur, and additional cost problems may arise for translation. To solve this issue, our paper proposes a method to apply locator identifier separation protocol on large-scale data center, and proposes a method to apply it, and also explore the advantages of LISP on large-scale data center

Research Keywords— LISP, IPv6, Large-Scale Data Center.

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1 INTRODUCTION

Nowadays, as the demand for data grows, many large-scale data centers need to apply the latest technology to accommodate it.

Specially, the large-scale data center adopting Internet Protocol version 6 (IPv6)[1]. Because it helps resolve almost all IPv4 defects like limited address space, larger size of routing tables, poor support for QoS, no auto configuration and no inherent security.

But many large-scale data centers cannot be built because the IPv6 network cannot support the existing IPv4 network. Therefore, there are many IPv4/IPv6 transition mechanisms like tunneling, dual stack and translation. However, these transition mechanisms are applied, overhead due to protocol translation may occur, and additional cost problems may arise in translation. But, applying LISP(Locator/ID Separation Protocol) on large-scale data centers not only solves the above problems but also has various advantages.

The rest of our paper is organized as follows: section 2 explores LISP issues on large-scale data center; Section 3 concludes the paper and future works.

2 A STUDY OF LISP ON LARGE-SCALE DATA CENTER

In this section, we will introduce LISP issues on on large-scale data center. First of all, we are explain how to works LISP on large-scale data center. Secondly, we discuss the advantage and disadvantage of LISP on large-scle data center.

2.1 Apply LISP on large-scale data center

LISP is a simple and incremental network-based protocol designed to implement Internet addresses separated. Specifically, it decouples host identity from its location. It creates two different namespces like endpoint identifiers (EIDs) and routing locators (RLOCs). Fig.1. shows that operation scenario of LISP on large-scale data center.

(1) The EIDS obtains the EID corresponding to the URL of the EIDD through DNS lookup. And it sends to RLOC_1.
(2) RLOC_1 requests to LISP mapping system for EID of RLOC_2.

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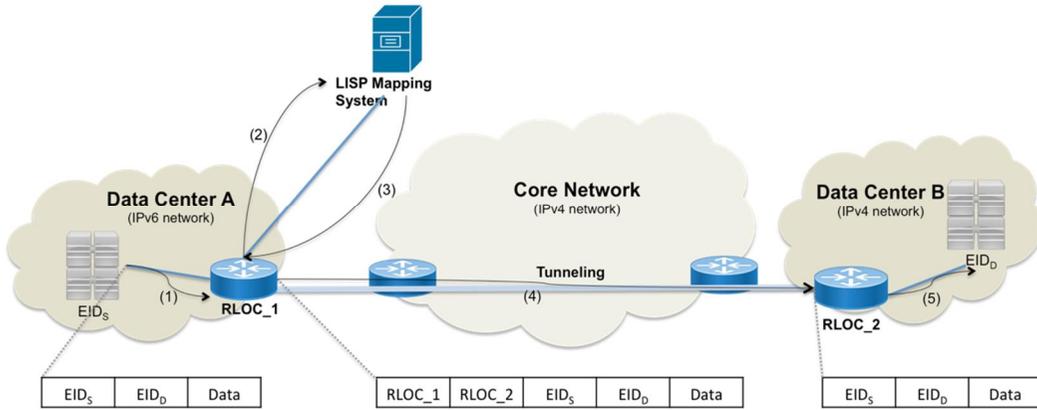
Fig. 1 Operation scenario of LISP on large-scale data center

(3) LISP Mappint system sends EID of RLOC_2 to RLOC_1.
(4) RLOC_1 sends data using tunnel to RLOC_2.
(5) RLOC_2 sends data to EIDD.

2.2 Review of LISP on large-scale data center

To indtroduce latest technology such as IPv6, SDN, Multicast the entire backbone network must be changed at the same time. But, in order to introduce LISP, only the mapping system for controlling the LISP network and the edge router of the access network for introducing LISP need to be changed. The following introduction effect can be expected. First, Hardware such as switches and routers that support LISP is managed by the mapping system, which is the control plane of LISP, and programmability is supported through the mapping system. Therefore, it has the possibility to use LISP as an SDN / NFV solution. Second, LISP enables load balancing of traffic in the best effort network. That is, the Ingress Router can divide the traffic delivered through the backbone network at an arbitrary rate designated by the administrator. Third, Because of the use of LISP, various EID address blocks are not introduced into the core router. And only the RLOC address space is used by the core. Thus, the use of various IP address blocks can solve the problem of non-integrated addresses occupying the RIB and reduce routing table entry growth through topology-based integration.

3 CONCLUSION AND FUTURE WORKS

Currently, the large-scale data centers actively adopt IPv6. There are many reasons why IPv6 have deployed in this filed: larger address space, SLAAC, Quality of Service (QoS), improved security and etc.

But there is the large-scale data center that has not yet been switched to IPv6, and the connection with existing IPv4 must be guaranteed. Thus, the aim of this study was to examine LISP issues in large-scale data center. First, we showed about Operation scenario of LISP on large-scale data center. Second, we discussed about disadvantage and disadvange of LISP on large-scale data center. Using LISP on large-scale data center, there are many benefits like followings: scalability, network programmabilit, realizing traffic engineering, decreases RIB size of core router and etc. In the future plan, we plan to develop and test a system for LISP on large-scale data center systems.

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