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X.Wei
Huawei Technologies
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Interaction between SFC network and 3GPP network
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Abstract

This document provides a discussion of how SFC (Service Function Chain) domain could interact with carrier network to provide network service for traffic. Here LTE (Long Term Evolution) network is used as an example of carrier network for discussion.

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June 30, 2014

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1 Introduction

Different kinds of network Service Function (SF) have been deployed in current network to provide network service for traffic. But current SF deployments are tightly coupled to network topology and physical resources, and this limits the ability of an operator to introduce new services and/or service functions. To overcome the disadvantages of current SF deployments, flexible SFC (Service Function Chain) is under discussion in IETF [SFC PS].

Though SFC domain is typically deployed by the owner of carrier network, here we treat SFC domain and carrier network as two separate network domain. A typical relationship between carrier network and SFC domain is shown in Figure 1. When network traffic goes through SFC domain, the SFC domain needs to know how to steer the traffic, i.e. which service chain the traffic should pass. The carrier network and SFC domain should interact properly in order to provide network service to traffic.

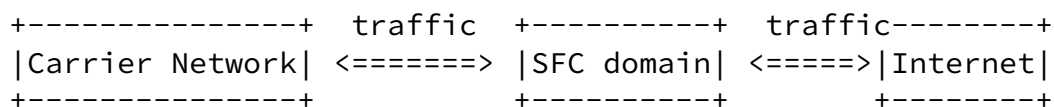


Figure 1 Relationship between carrier network and SFC domain

LTE (Long Term Evolution) network [TS23.401] is standardized by 3rd Generation Partnership Project (3GPP), the basic architecture of LTE network is shown in Figure 2, three network entities including eNodeB, SGW and PDN-GW form the data path for user's traffic from UE to IP service network, and MME (Mobility Management Entity) acts as a central control point of the network.

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+-----+
|      IP      |
+-----+

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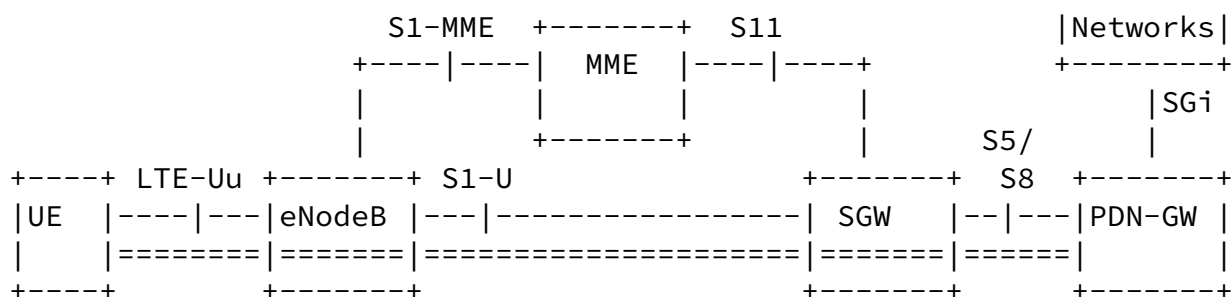


Figure 2 Basic LTE network architecture
 LTE network connects to IP service network through SGi interface

[TS29.061].

Gi-LAN service area is presently used by mobile network operator to differentiate their services to their subscribers; mobile network operator could deploy any kinds of SFs, e.g. Firewall, video optimizer, NAT (Network Address Translator), to provide network service for user's traffic.

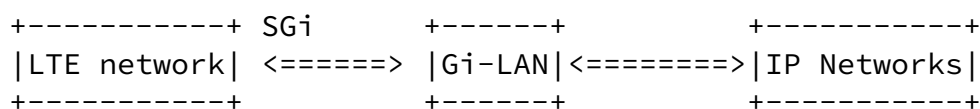


Figure 3 Gi-LAN for LTE network

This document use LTE network as an example to illustrate how carrier network and SFC domain could cooperate to provide network service to traffic.

1.1 Terminology

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 [RFC 2119](#) [RFC2119].

SFC domain: or SFC network, a network that implements SFC.

2. Interaction between LTE network and SFC domain

In this section, we will discuss how SFC domain could provide network

service for traffic in LTE network.

2.1 Interaction model

Before the discussion of interaction between LTE network and SFC domain, we first introduce the concept of Logical Service Function Chain (LSFC) and Physical Service Function Chain (PSFC). LSFC is a service function chain which is consisted of a list of SF type, and no specific SF instance is included in LSFC.

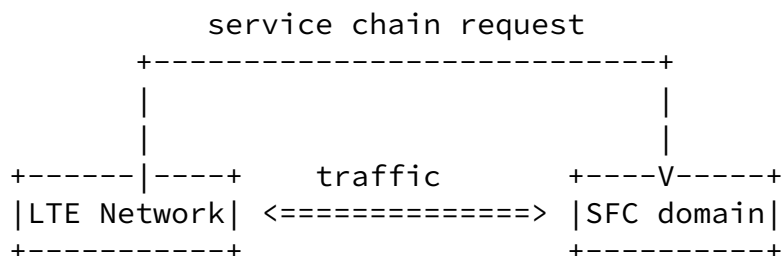
PSFC is a service function chain which is consisted of a list of SF instance, so PSFC could be viewed as an instance of LSFC. Considering of the requirements of load balance, there could be more than one instance for one type of SF, so a LSFC could be mapped into one or more PSFC.

LSFC stands for a requirement of service function chain for certain traffic, and PSFC is a physical implementation that satisfies the requirement.

When we take LTE network and SFC domain as two separate domains, LTE network plays the role of producing network service requirements and SFC domain plays the role of providing network service for LTE network's traffic.

An overview of interaction between LTE network and SFC domain is depicted in Figure 4. LTE network creates LSFC for traffic and sends the LSFC to SFC domain, and then SFC domain is in charge of translating LSFC to PSFC.

Besides LSFC, additional information such as subscriber ID, that might be used but could not be accessed directly by SFC domain, will also be conveyed in service chain request procedure.



[3](#) IANA Considerations

This document requires no requirement for IANA.

[4](#) Security Considerations

Security related issues is not involved.

[5](#) Acknowledgments

Many thanks to John Kaippallimalil and Chunshan Xiong (Sam) for their valuable comments.

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Authors' Addresses

Xinpeng Wei
EMail: weixinpeng@huawei.com