NSF–triggered Traffic Steering in I2NSF Framework
(draft-hyun-i2nsf-nsf-triggered-steering-01)

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• This document describes an architecture of the I2NSF framework to enable traffic steering between NSFs.

• Such traffic steering enables composite inspection of network traffic through various types of NSFs.

• It can also provide load balancing over NSF instances combined with dynamic NSF instantiation with NFV.

• Our traffic steering is based on NSF Capability Information Model.
Motivation

We focused on **HOW TO REALIZE??**

We need to **STEER** the packet/flow to the subsequent module(function)

Security Function Forwarder (NSFF) to **STEER** the packet/flow

Reference: draft-xibassnez-i2nsf-capability-00
Motivation

- **Existing Service Function Chain (SFC) Architecture**
  - In [draft-hyun-i2nsf-sfc-enabled-i2nsf-01], we integrated SFC arch into I2NSF framework.

  ① Pre-defined SFC config & management (sync)
  ② Initial Classification
     - Determines Service Function Path (SFP)
  ③ Traffic Steering (through SFP)
  ④ Traffic Steering (along with SFP)
Motivation

- In I2NSF framework: Information model for NSFs capabilities

**“dynamic decision”**

⇒ no pre-defined NSF path in I2NSF
Motivation

Can skip this part!!

1. Pre-defined SFC config
   (synchronization needs to be provided)

2. Initial Classification
   - Determines Service Function Path (SFP)

3. Traffic Steering
   (along with SFP)

4. Traffic Steering
   (along with SFP)

Traffic

SFF

NSF₁

NSF₂
NSFF

- Forwards packets from one NSF instance to another.
- Consults with NSF Operation Manager about the next NSF instance to forward a packet.
Architecture & Components

NSF Operation Manager

- Maintaining the information of NSF instances.
  - NSF Profile
  - Forwarding information (i.e., IP, VxLAN etc.)
  - Capacity & load status

- Provides the forwarding information of the select NSF instance to NSFF.

- Requesting Developer's Management System for the dynamic instantiation or elimination.

Network Operator Mgmt Security Controller

NSF Operation Manager

Registration Interface

NSF Facing Interface

Consumer Facing Interface

I2NSF User

NSFF\(_1\)
NSFF\(_2\)
NSF\(_1\)
NSF\(_2\)
NSF\(_3\)
Summary & Next Step

- Discussion on the existing SFC approach vs. Ours

<table>
<thead>
<tr>
<th>SFC Architecture-Friendly Approach</th>
<th>I2NSF Framework-Friendly New Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Existing standard</td>
<td>✓ No pre-defined NSF path configuration &amp; management</td>
</tr>
<tr>
<td>✓ Good for enforcing a static service function path</td>
<td>✓ No classifier and initial classification required</td>
</tr>
<tr>
<td></td>
<td>✓ No re-classification required</td>
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</tbody>
</table>

- We proved the feasibility of our NSF-triggered traffic steering in IETF-97 I2NSF Hackathon Project.

- We will design more details of information that should be exchanged
  ✓ between NSFF and NSF Operation Manager and
  ✓ between NSFF and NSF.
Appendix
Architecture & Components

Developer’s Management System

This component might exist in a third party domain (e.g., NSF vendors’ clouds).

- Creates additional NSF instances when the existing NSF instances are congested
- Eliminates some of the NSF instances which are unused

NSF Operation Manager will request NSF instantiation or elimination based on NSF instances’ current status.
Use Case of VoIP/VoLTE (1/4)

Ingress Packet

Ingress Packet is forwarded to Firewall via NSFF1.

Unusual call pattern (VoIP)

I2NSF User

Consumer Facing Interface

Security Controller

NSF Operation Manager

Developer's Mgmt System

Registration Interface

Instance Layer Interface

NSF Facing Interface

NSF Forwarder1

NSF Forwarder2

Firewall

DPI (e.g., VoIP)

Use Case of VoIP/VoLTE (1/4)

Ingress Packet is forwarded to Firewall via NSFF1.
Use Case of VoIP/VoLTE (2/4)

I2NSF User

Consumer Facing Interface

Security Controller

NSF Operation Manager

Registration Interface

Developer's Mgmt System

Instance Layer Interface

NSF Facing Interface

NSF Forwarder1

Firewall

Mirror the traffic packets to SF Forwarder2 through Mirroring

Forward the traffic packets toward the Intranet

NSF Forwarder2

DPI (e.g., VoIP)
Use Case of VoIP/VoLTE (3/4)

1. **I2NSF User**
   - Consumer Facing Interface
   - NSF Facing Interface

2. **Security Controller**
   - NSF Operation Manager

3. **Developer’s Mgmt System**
   - Registration Interface
   - Instance Layer Interface

4. **NSF Forwarder1**
   - NSF Facing Interface

5. **NSF Forwarder2**
   - NSF Facing Interface

6. **Firewall**
   - Drop the malicious traffic

7. **DPI (e.g., VoIP)**
Use Case of VoIP/VoLTE (4/4)