NMRG Meeting

IETF Hackathon:
I2NSF Framework Project

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Online

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I2NSF Framework: Architecture

Security Client

I2NSF User
(e.g., Video conference controller, Service orchestrator, Administrator)

Security Management System

Consumer-Facing Interface

Security Controller

Registration Interface

Developer's Management System

Security Network

NSF-Facing Interface

NSF₁ - NSF₂ - ... - NSFᵢ - NSFₙ

NSF: Network Security Function
(e.g., Firewall, Web Filter, Deep Packet Inspection, and Antivirus)

Video Client

https://www.rfc-editor.org/rfc/rfc8329.html

IETF-108 I2NSF Hackathon Project
I2NSF Framework: Interfaces

• Registration Interface
  - Used for Developer’s Management System to register an NSF into Security Controller with the NSF’s capability.

• Consumer-Facing Interface
  - Used for I2NSF User to deliver a high-level security policy to Security Controller.

• NSF-Facing Interface
  - Used for Security Controller to deliver a low-level security policy to an NSF.
  - Note: Security Controller translates the received high-level security policy into the corresponding low-level security policy.
Hackathon Plan

- The Reflection of the Revision of the following drafts in the OpenStack-based I2NSF System:
  - draft-ietf-i2nsf-capability-data-model-06
  - draft-ietf-i2nsf-consumer-facing-interface-dm-09
  - draft-ietf-i2nsf-nsf-facing-interface-dm-09
  - draft-ietf-i2nsf-registration-interface-dm-08
  - draft-yang-i2nsf-security-policy-translation-06
I2NSF Framework for IBN-Based Security Services

Reference:
I2NSF in NFV Environment

I2NSF Framework

- **I2NSF User (OSS/BSS)**
- **Vendor’s Management Systems (EM)**
- **Security Controller (EM)**
- **NFV Orchestrator (NFVO)**
- **VNF Manager(s) (VNFMs)**
- **Virtualized Infrastructure Manager(s) (VIMs)**

**NFVI**

- **Compute Virtualization**
- **Storage Virtualization**
- **Network Virtualization**

**Virtualization Layer**

- **Compute**
- **Storage**
- **Network**

**Infrastructure**

- **NSF (VNF)**
- **Vendor’s Management Systems (EM)**
- **Consumer-Facing Interface**
- **Registration Interface**

1. Consumer-Facing Interface
2. Registration Interface
3. NSF-Facing Interface
4. **❼**
5. **❹ ❽**
6. **❼**
7. **❼**
8. **❼**
9. **❼**
Security Policy Translation in I2NSF

1. Consumer-Facing Interface
2. Security Policy Translator
3. Data Extractor
4. Data Converter
5. Policy Generator
6. Database
7. NSF-Facing Interface

- Extracted Meaningful Data
  - Source: Employee
  - Destination: SNS
  - Action: Drop

- Converted Low-Level Data
  - Source: 10.0.0.2 - 10.0.0.10
  - Destination: facebook, instagram
  - Action: Drop

- Custom Data
  - Employee: 10.0.0.2 - 10.0.0.10
  - SNS: facebook, instagram

- Security Capability Data
  - NSF 1: IPv4, Pass, Drop, Log
  - NSF 2: IPv6, Pass, Drop, Log
  - NSF 3: URL, Pass, Drop, Log

Target NSF 1: NSF 1: IPv4, Pass, Drop, Log
Target NSF 3: NSF 3: URL, Pass, Drop, Log
Network Topology for Hackathon Project

**Open Source:**
- **OS:** Ubuntu 16.04 LTS
- **ConfD:** 6.6 Version
- **MySQL:** 14.14 Version
- **OpenStack:** Queens
- **Suricata:** 3.2.1 RELEASE
- **RestConf:** JETCONF Server

**Minimum Specification for OpenStack:**
- **RAM:** 4 ~ 8 GB
- **Storage:** 10 GB
- **CPU:** 2 ~ 4 cores @ 2.4 GHz
What got done

- Restoration of I2NSF Framework on top of OpenStack
  - Web-based I2NSF User
  - Console-based Security Controller and DMS
  - Security Policy Translator in Security Controller

- Reflection of the Latest Revision of YANG Data Models
  - Consumer-Facing Interface over RESTCONF/YANG
  - NSF-Facing Interface over NETCONF/YANG (Partially)
What we learned

- We recognized the necessity of a security policy translator to support the following for IBN-based security services:
  - Automatic mapping between High-level YANG attributes and Low-level YANG attributes
  - Installation of Low-level YANG production rules for the generation of the Low-level security policy

- Next Steps
  - Reflection of the Latest Registration Interface YANG Data Model
  - Implementation of the I2NSF Monitoring YANG Data Model
  - Enhancement of Security Policy Translator for Automatic Setup
## Wrap Up

### Hackathon Team:
- **Champion:** Jaehoon Paul Jeong (SKKU)
- **Members:**
  - Patrick Lingga (SKKU)
  - Chaehong Chung (SKKU)
  - Yoseop Ahn (SKKU)
- **Participants:**
  - Younghan Kim (SSU)
  - Hyunsik Yang (SSU)
  - Kyungsik Kim (KNU)
  - Benson Muite (Kichakkato Kizito)

### Open Source Project:

### Demo Video Clip:
[youtu.be/dAA1WTGhIXE](https://youtu.be/dAA1WTGhIXE)