I2NSF Framework Project @ IETF-105 Hackathon

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Introduction (1/2)

Goals of IETF-105 I2NSF Hackathon

1. Implementation of the I2NSF Framework for NSF in OpenStack Environment with
   - ✓Registration Interface via NETCONF/YANG
   - ✓Consumer-Facing Interface via RESTCONF/YANG
   - ✓NSF-Facing Interface via NETCONF/YANG
   - ✓Security Policy Translator in Security Controller

2. Integration of I2NSF Security Controller with ETRI's Public Cloud Control Platform (SoA: Security-on-Air) based on SoA Controller for WYSWYG Network Configuration

3. Application of Commercial Firewall (from Wins) and Open-Source Web Filter (from Suricata)

Introduction (2/2)

Build Environment

1. **OS**
   - Ubuntu 18.04 LTS
2. **ConfD**
   - 6.6 Version
3. **MySQL**
   - 14.14 Version
4. **Apache2**
   - 2.4.7 Version
5. **Django**
   - 1.11.14 Version
6. **OpenStack**
   - Mitaka
7. **Suricata**
   - 3.2.1 RELEASE
8. **Jetconf**
   - Python Open API for RESTCONF

I2NSF Internet Drafts for Hackathon

- NSF Capability Data Model
  - ✓ **draft-ietf-i2nsf-capability-data-model-04**
- Consumer-Facing Interface Data Model
  - ✓ **draft-ietf-i2nsf-consumer-facing-interface-dm-05**
- NSF-Facing Interface Data Model
  - ✓ **draft-ietf-i2nsf-nsf-facing-interface-dm-06**
- Registration Interface Data Model
  - ✓ **draft-ietf-i2nsf-registration-interface-dm-04**
- Security Policy Translation
  - ✓ **draft-yang-i2nsf-security-policy-translation-03**

I2NSF Hackathon Project Poster

I2NSF (Interface to Network Security Functions) Framework Project

Champions: Jaehoon Paul Jeong (SKKU) and Jong-Hyun Kim (ETRI)

IETF-105 Hackathon

I2NSF Framework Project

Professor

- Jaehoon Paul Jeong (SKKU)

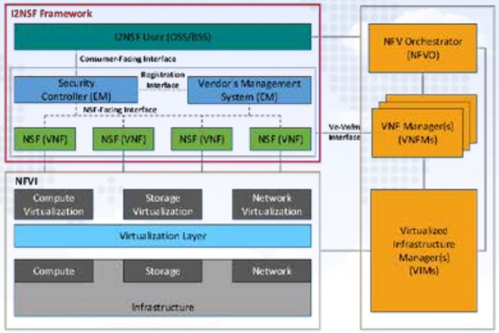
Collaborators

- Jong-Hyun Kim (ETRI)
- Young-Soo Kim (ETRI)
- Jong-Geun Park (ETRI)
- Jung-Tae Kim (ETRI)
- Gu-Min Nam (Wins)

Students

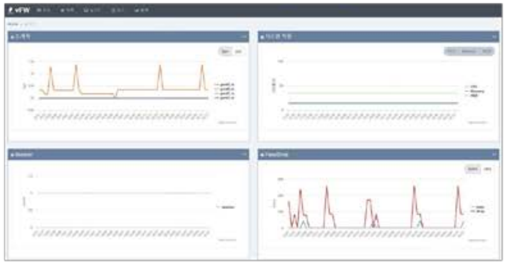
- Jinyong Tim Kim (SKKU)
- Jinhyuk Yang (SKKU)
- Chaehong Chung (SKKU)

I2NSF Architecture in NFV Reference



ETRI Security on Air Dashboard

Wins Firewall (COTS)



Where to get code

- Github – Source Code
  - ✓ https://github.com/ kimjinyong/i2nsf-framework

What to pull down to set up an environment

- OS: Ubuntu 18.04 LTS
- ConfD for NETCONF: 6.6 Version
- JetConf for RESTCONF
- Apache2: 2.4.7 Version
- MySQL: 14.14 Version
- Django: 1.11.14 Version
- OpenStack: Mitaka

Manual for Operation Process

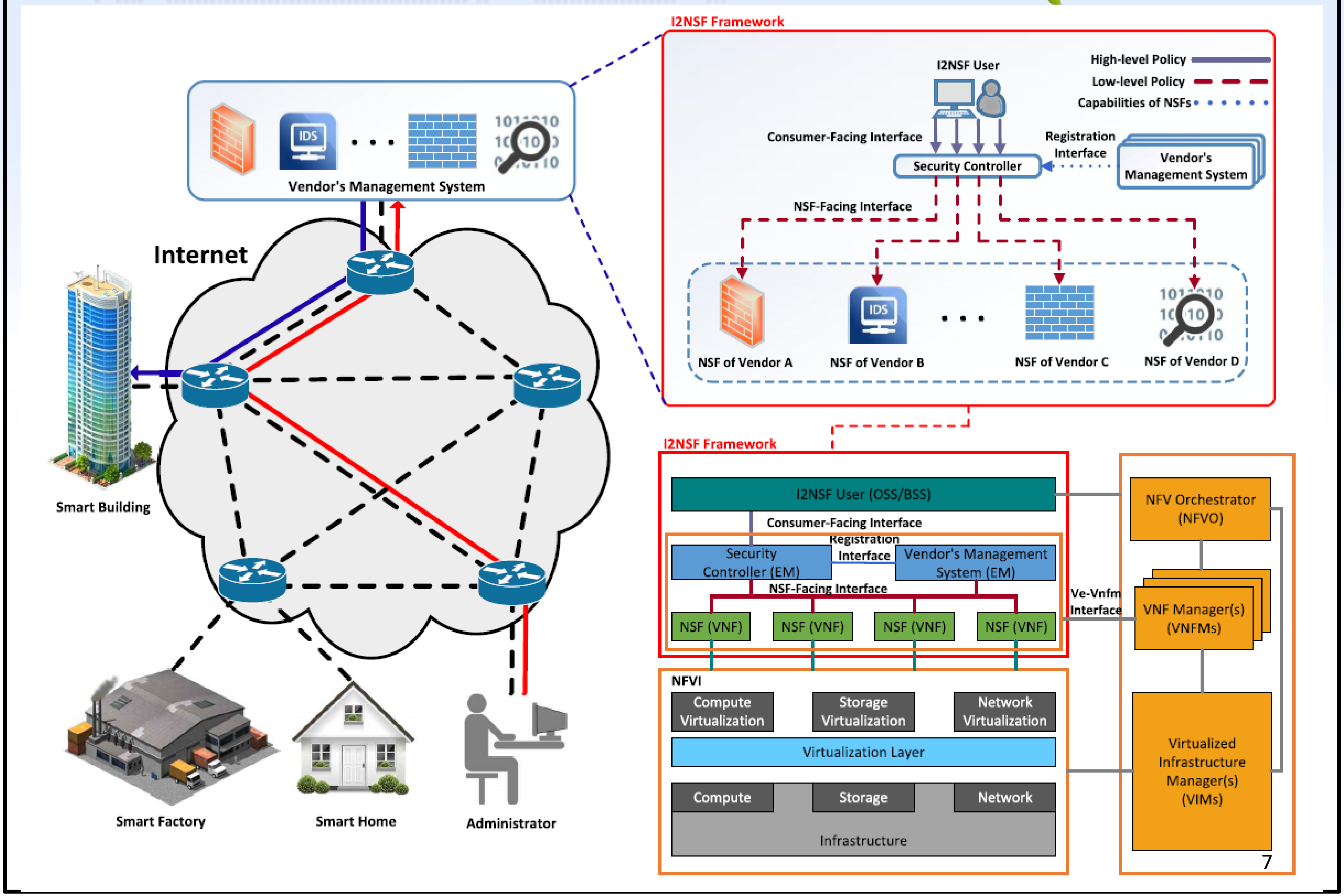
- Detailed description about operation process in Manual.txt (It can be found in Open Source Project folder.)

Contents of Implementation

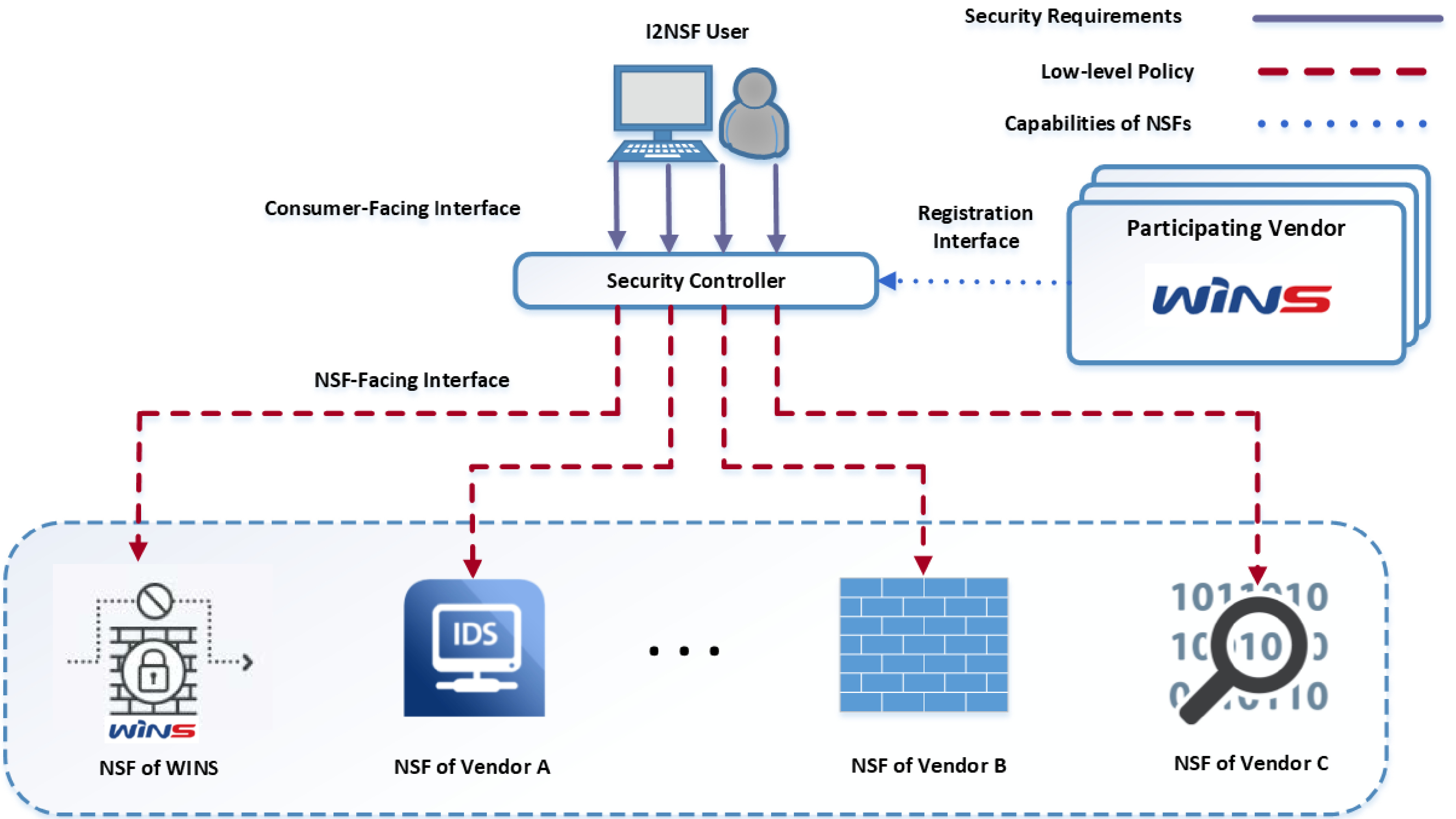
- I2NSF Framework for Network Security Functions (NSFs)
  - ✓ Registration Interface via NETCONF/YANG
  - ✓ NSF-Facing Interface via NETCONF/YANG
  - ✓ I2NSF Framework in OpenStack NFV Environment
  - ✓ NSF Database Management via Consumer-Facing Interface
  - ✓ Interface Data Model Auto-Adoption
- Network Security Functions
  - ✓ Commercial Firewall(Wins) and Web-filter(Suricata)
- Advanced Functions
  - ✓ Security Policy Translation
  - ✓ Application of Wins commercial Firewall for Network Security Function (New Feature)
  - ✓ Integration of Security on Air(SoA) and I2NSF Services (New Feature)

I2NSF Hackathon Project Team

I2NSF System using NSF Framework

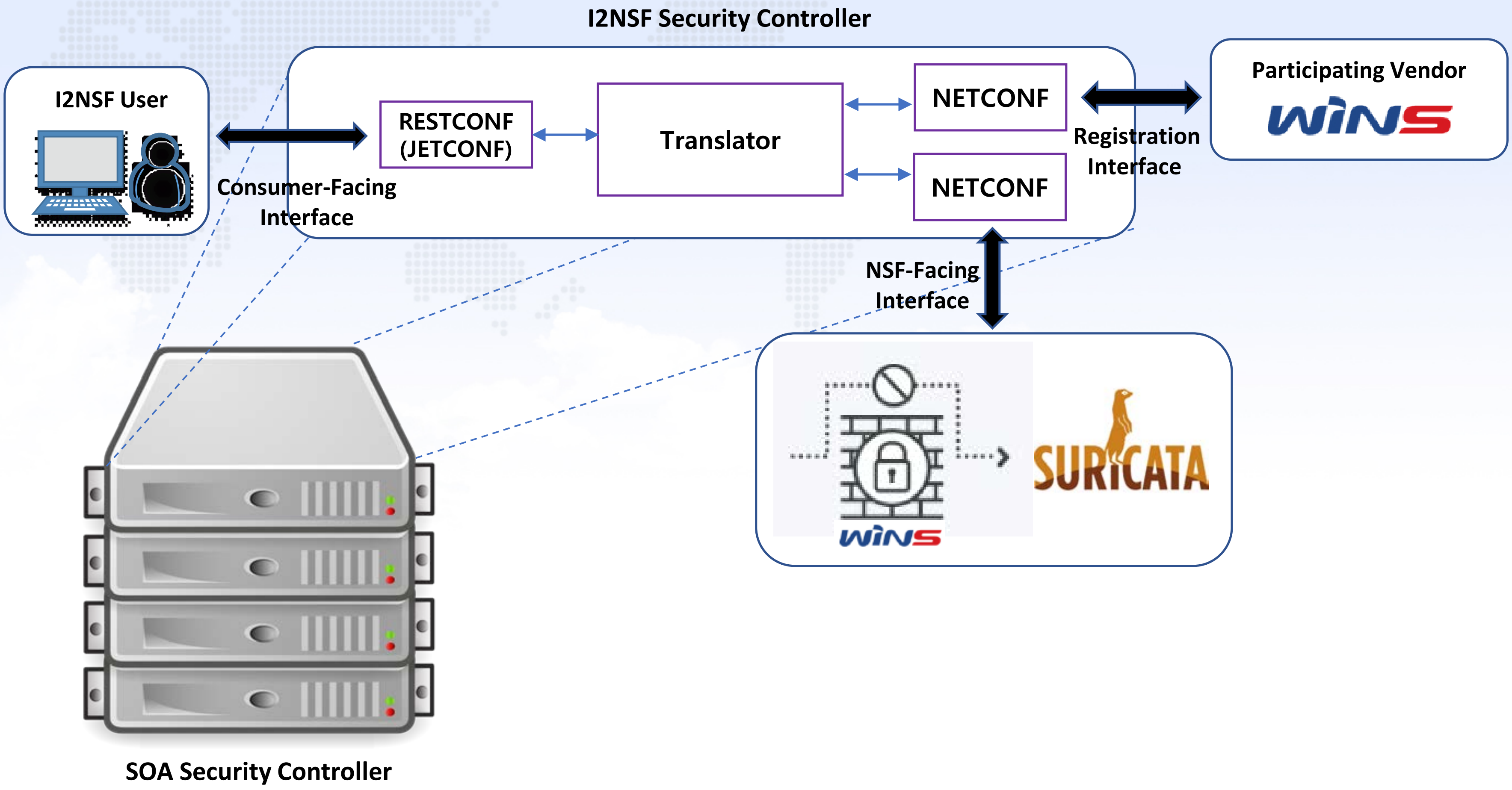


Implementation of I2NSF Hackathon Project (1/2)



1. Application of **Commercial Firewall (from Wins)** as an NSF

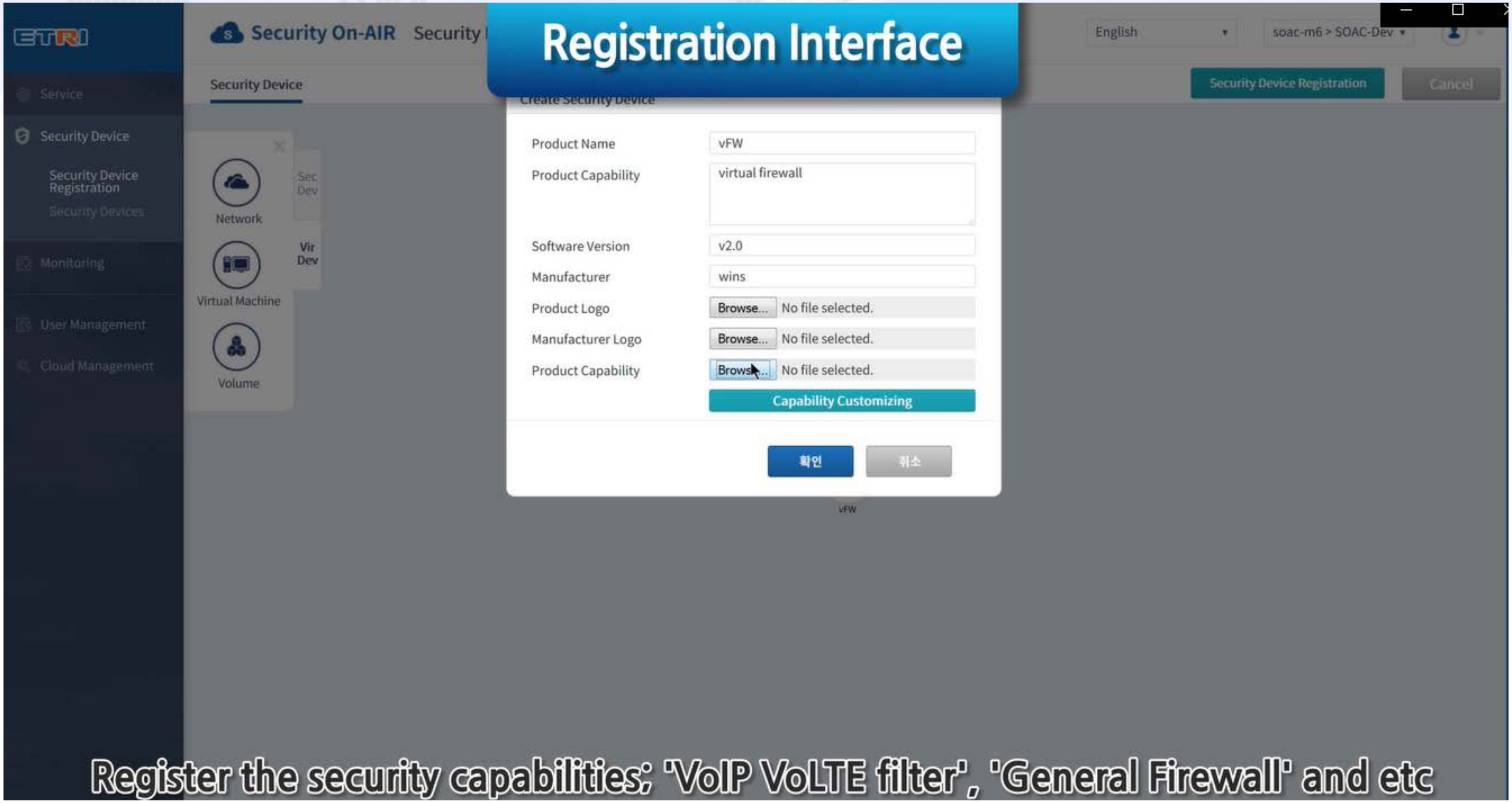
Implementation of I2NSF Hackathon Project (2/2)



2. Integration of I2NSF Security Controller with ETRI's Public Cloud Control Platform (SoA: Security-on-Air)

Hackathon Demonstration (1/5)

- Registration Interface via NETCONF/YANG



Create Security Device

Product Name: vFW

Product Capability: virtual firewall

Software Version: v2.0

Manufacturer: wins

Product Logo: Browse... No file selected.

Manufacturer Logo: Browse... No file selected.

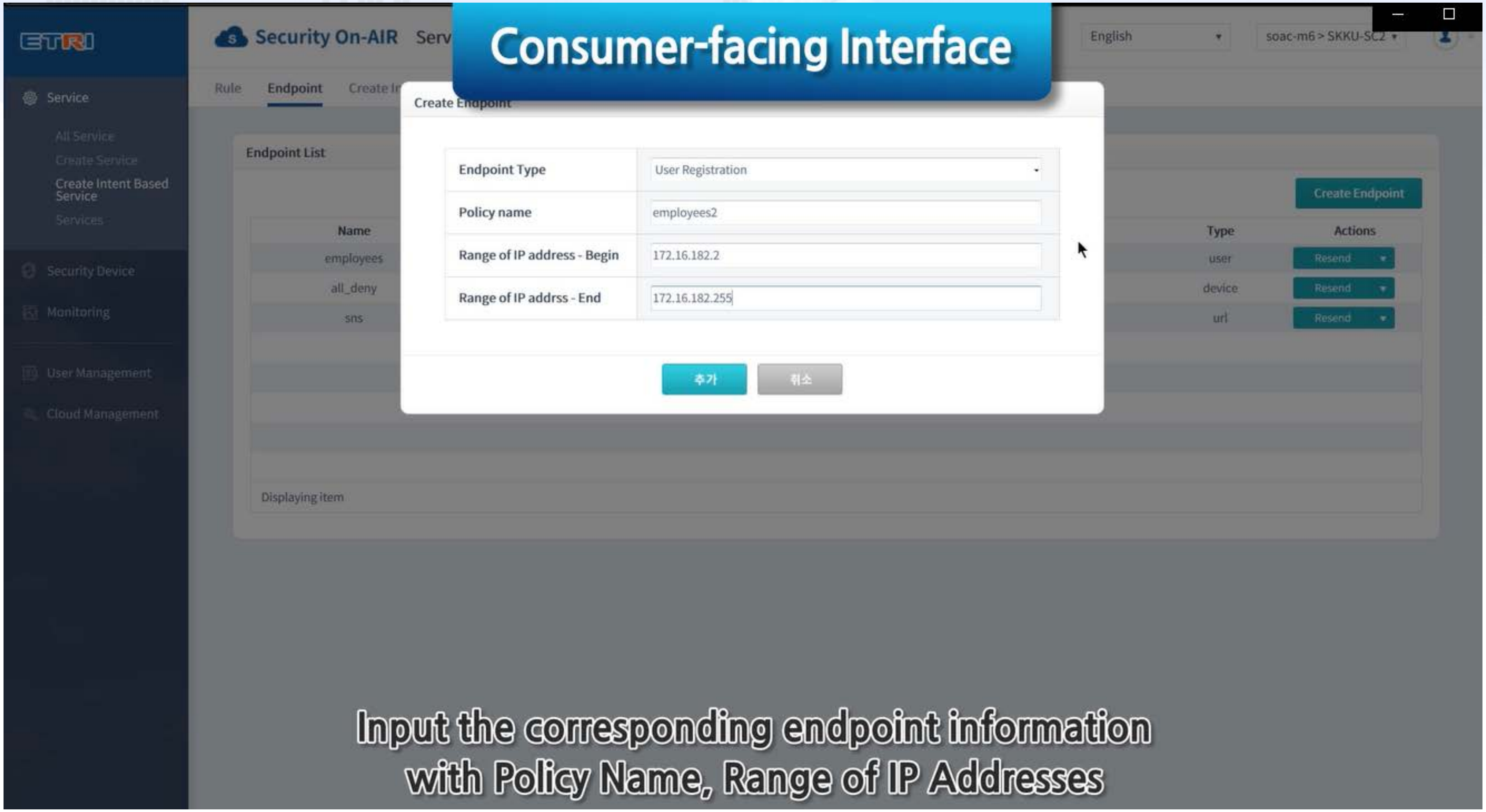
Product Capability: Browse... No file selected.

Capability Customizing

Register the security capabilities; 'VoIP VoLTE filter', 'General Firewall' and etc

Hackathon Demonstration (2/5)

- Consumer-Facing Interface via RESTCONF/YANG



Consumer-facing Interface

Create Endpoint

Endpoint Type	User Registration
Policy name	employees2
Range of IP address - Begin	172.16.182.2
Range of IP addrss - End	172.16.182.255

Endpoint List

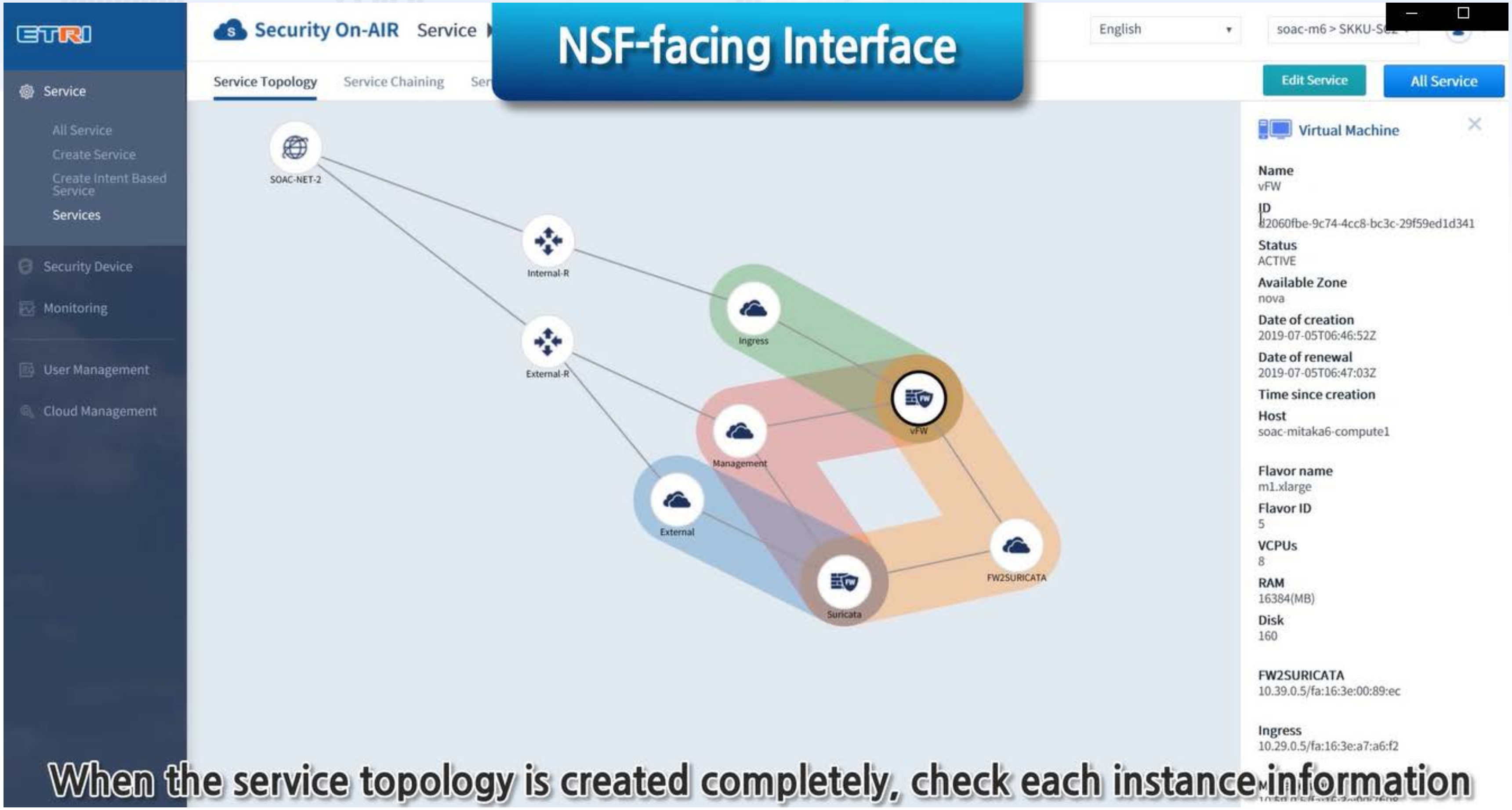
Name	Type	Actions
employees	user	Resend
all_deny	device	Resend
sns	url	Resend

Displaying item

Input the corresponding endpoint information with Policy Name, Range of IP Addresses

Hackathon Demonstration (3/5)

- NSF-Facing Interface via NETCONF/YANG



NSF-facing Interface

Virtual Machine

Name
vFW

ID
d2060fbe-9c74-4cc8-bc3c-29f59ed1d341

Status
ACTIVE

Available Zone
nova

Date of creation
2019-07-05T06:46:52Z

Date of renewal
2019-07-05T06:47:03Z

Time since creation

Host
soac-mitaka6-compute1

Flavor name
m1.xlarge

Flavor ID
5

VCPUs
8

RAM
16384(MB)

Disk
160

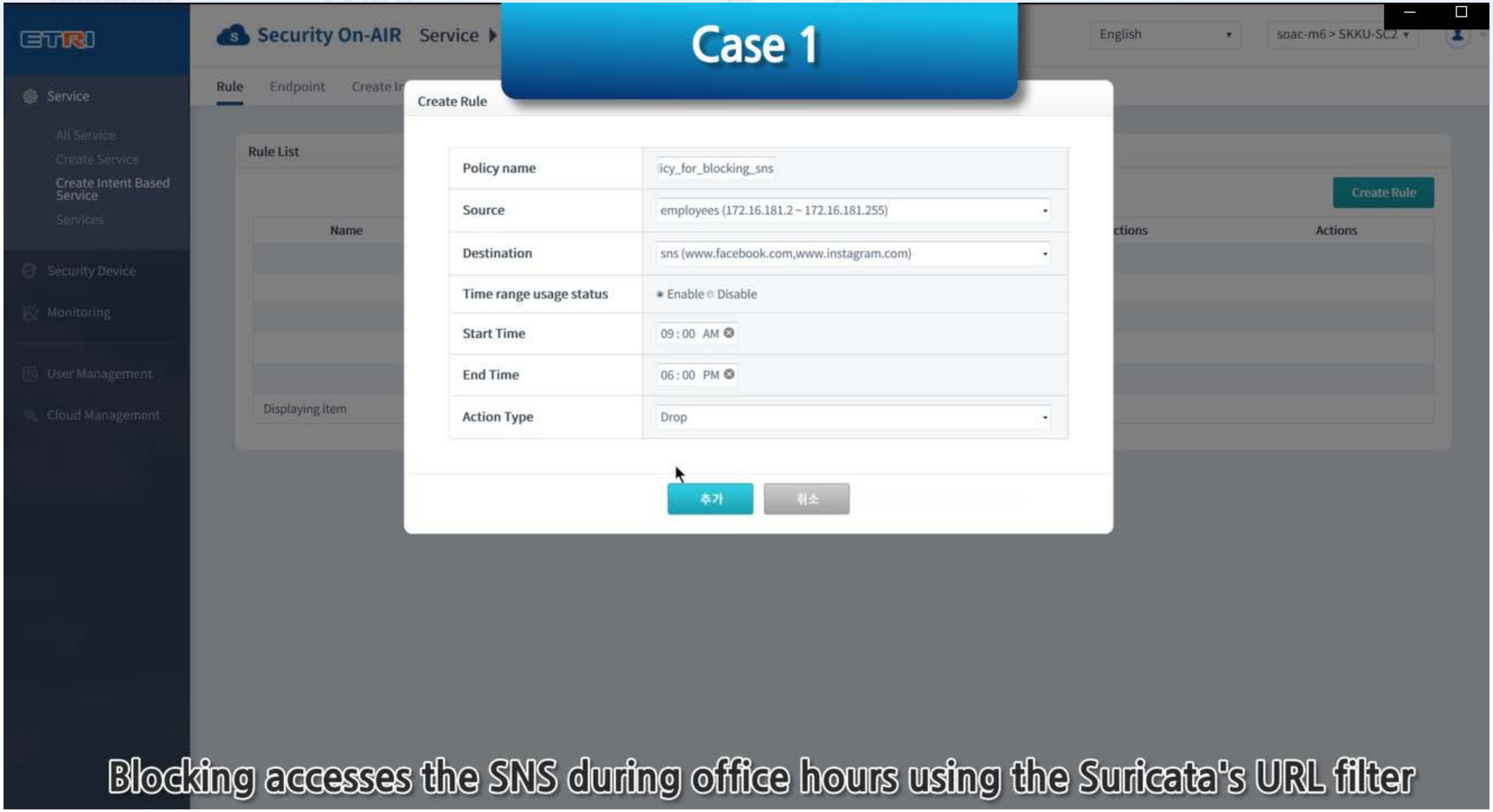
FW2SURICATA
10.39.0.5/fa:16:3e:00:89:ec

Ingress
10.29.0.5/fa:16:3e:a7:a6:f2

When the service topology is created completely, check each instance information

Hackathon Demonstration (4/5)

- **Scenario Case 1:** Block the access to SNS during office hours



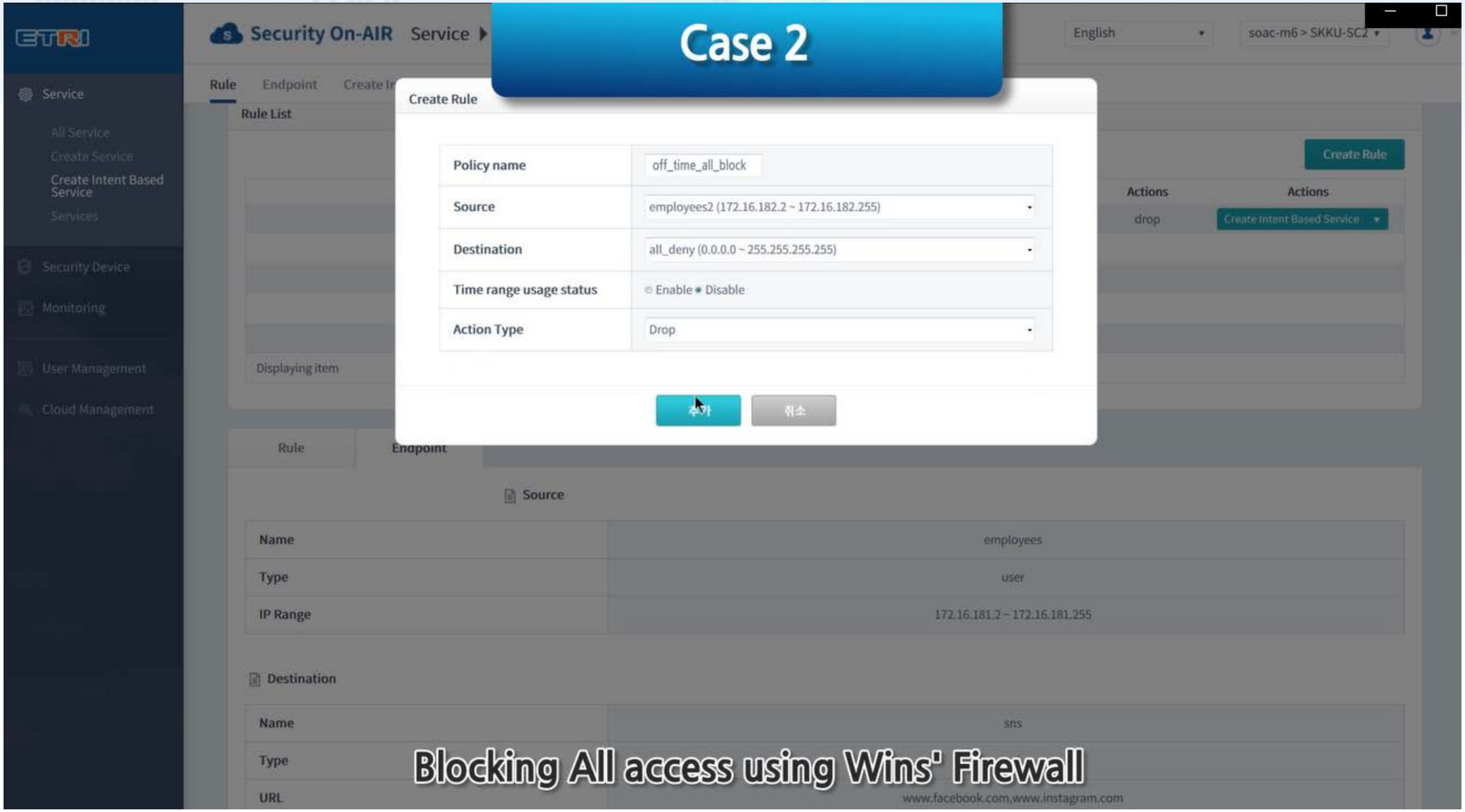
Create Rule

Policy name	icy_for_blocking_sns
Source	employees (172.16.181.2 ~ 172.16.181.255)
Destination	sns (www.facebook.com,www.instagram.com)
Time range usage status	● Enable ○ Disable
Start Time	09 : 00 AM
End Time	06 : 00 PM
Action Type	Drop

Blocking accesses the SNS during office hours using the Suricata's URL filter

Hackathon Demonstration (5/5)

- **Scenario Case 2**: Block the access to all the websites



Create Rule

Policy name	off_time_all_block
Source	employees2 (172.16.182.2 ~ 172.16.182.255)
Destination	all_deny (0.0.0.0 ~ 255.255.255.255)
Time range usage status	○ Enable ● Disable
Action Type	Drop

추가 취소

Rule | Endpoint

Source

Name	employees
Type	user
IP Range	172.16.181.2 ~ 172.16.181.255

Destination

Name	sns
Type	
URL	www.facebook.com,www.instagram.com

Blocking All access using Wins' Firewall

Lessons from IETF-105 Hackathon

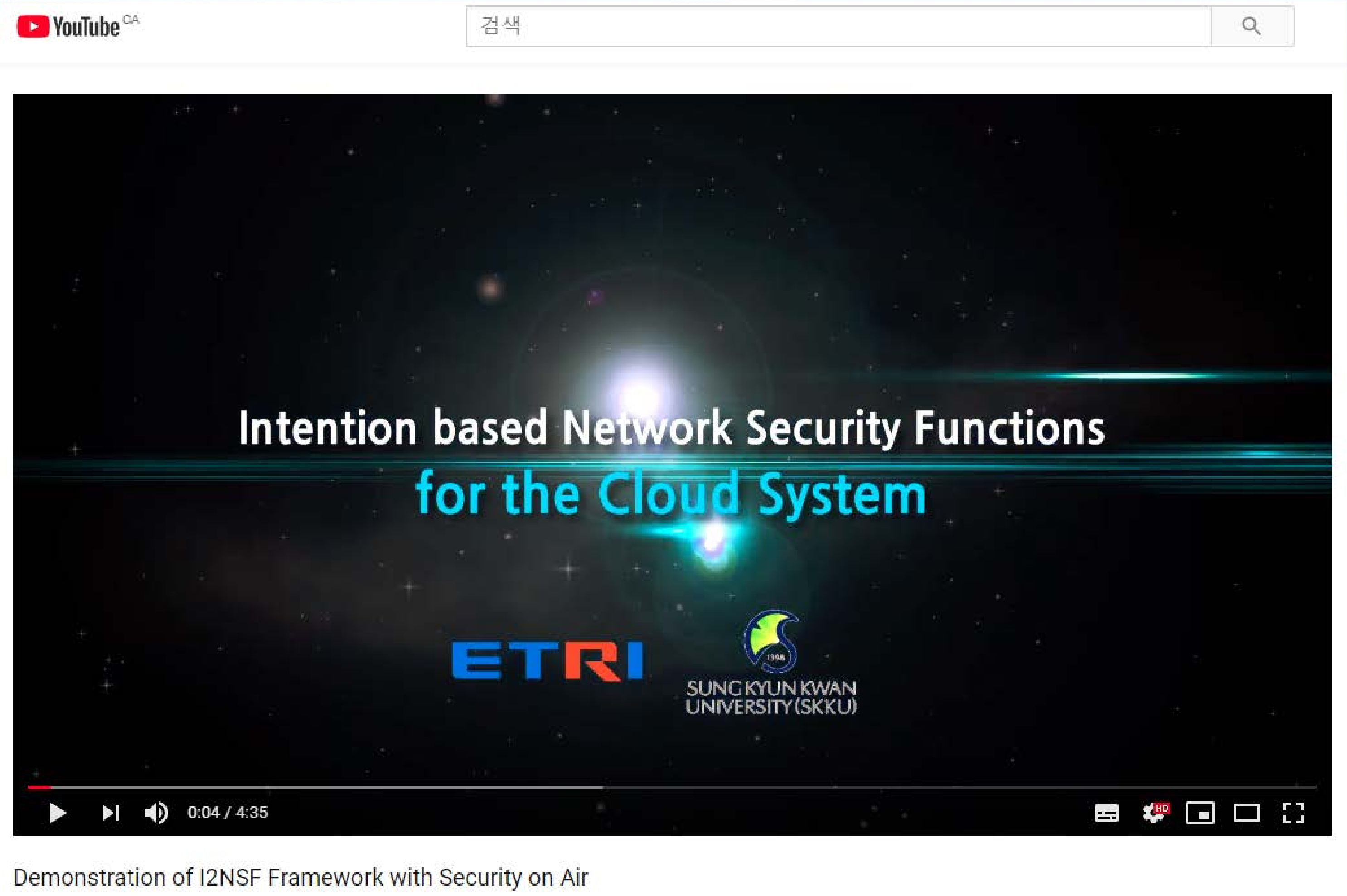
- **Proof of Concept (POC) of I2NSF Framework**
  - **I2NSF Framework on NFV Framework**
  - **I2NSF Interfaces (Consumer-Facing, NSF-Facing, and Registration Interfaces)**
  - **I2NSF Security Policy Translator**

- **Integration of I2NSF to Commercial Platform**
  - **Application of a Commercial Vendor's NSF (e.g., Wins Firewall)**
  - **Integration of I2NSF Security Controller into a Commercial Security Cloud Platform (called SOA)**

Information of I2NSF Hackathon Project (1/2)

YouTube for Video Demonstration

- https://www.youtube.com/watch?v=jD4ndqzN0is



Intention based Network Security Functions for the Cloud System

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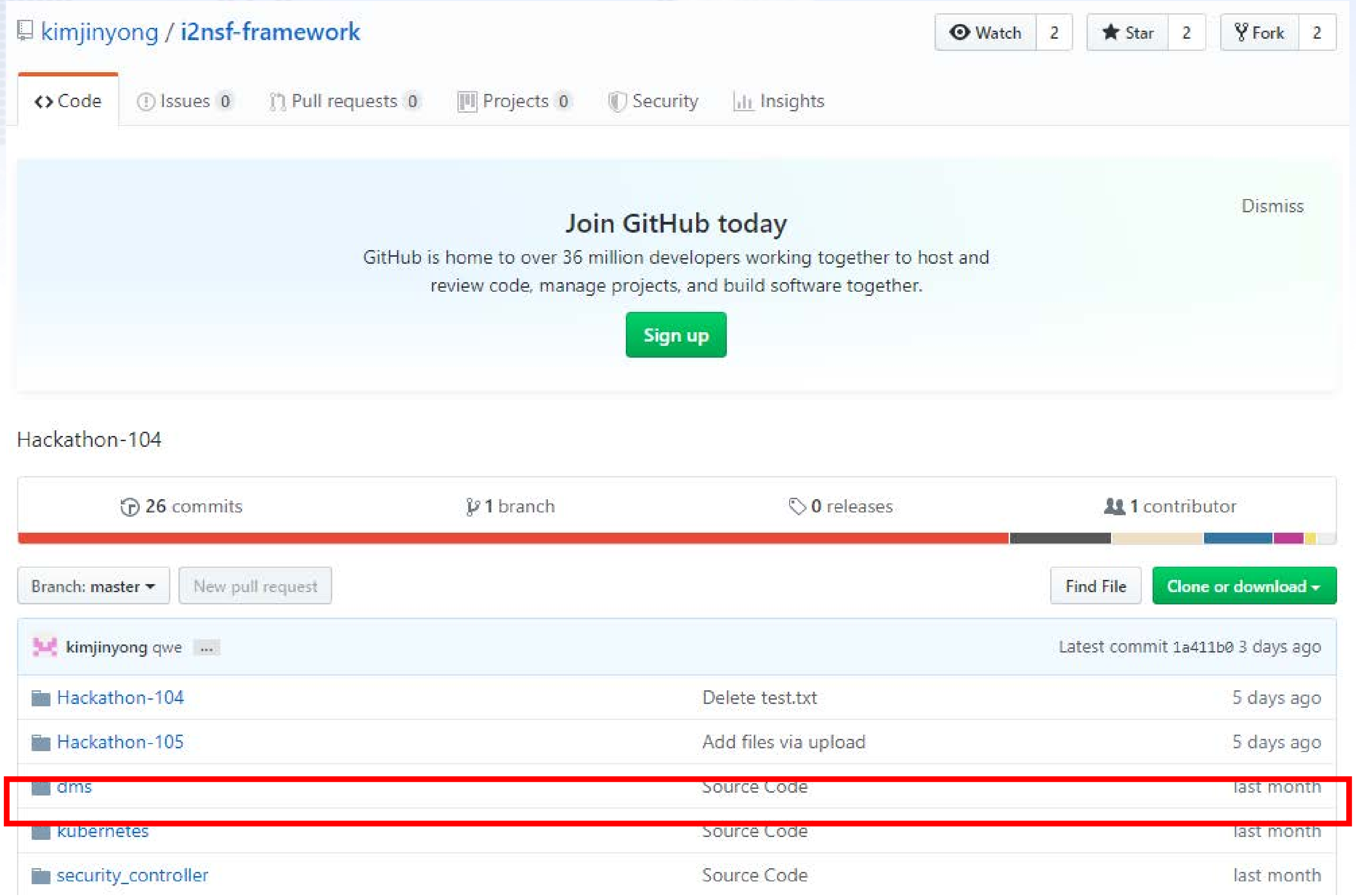
Demonstration of I2NSF Framework with Security on Air

Information of I2NSF Hackathon Project (2/2)

GitHub for I2NSF Hackathon Source Code

- https://github.com/kimjinyong/i2nsf-framework



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Hackathon-104

26 commits | 1 branch | 0 releases | 1 contributor

Branch: master ▾ | New pull request | Find File | Clone or download ▾

kimjinyong qwe ... Latest commit 1a411b0 3 days ago

Hackathon-104	Delete test.txt	5 days ago
Hackathon-105	Add files via upload	5 days ago
dms	Source Code	last month
kubernetes	Source Code	last month
security_controller	Source Code	last month