# IETF-109 Hackathon

# I2NSF Framework Project

**November 9-13, 2020**
**Online**

**Champion:** Jaehoon Paul Jeong (SKKU)
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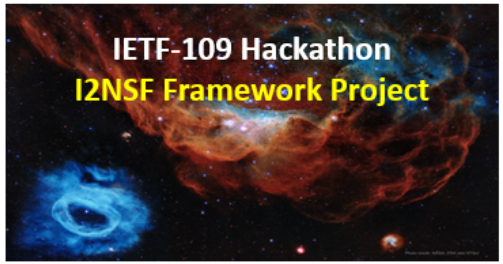
# I2NSF (Interface to Network Security Functions) Framework Project

## Champion: Jaehoon (Paul) Jeong (SKKU)




### Professors:

- Jaehoon (Paul) Jeong (SKKU)
- Younghan Kim (SSU)

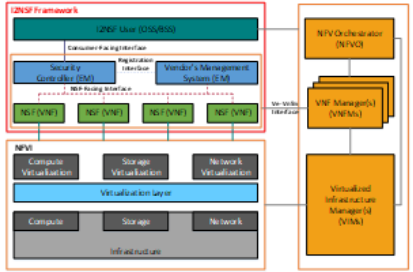
### Researchers:

- Jung-Soo Park (ETRI)
- Yunchul Choi (ETRI)

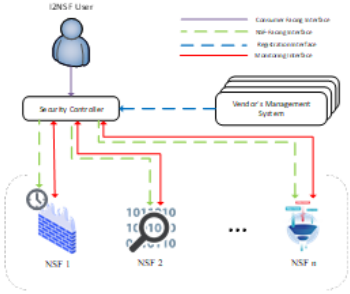
### Students:

- Patrick Lingga (SKKU)
- Yoseop Ahn (SKKU)
- Mose Gu (LU)
- Hyunsik Yang (SSU)
- Kyungsik Kim (KNU)

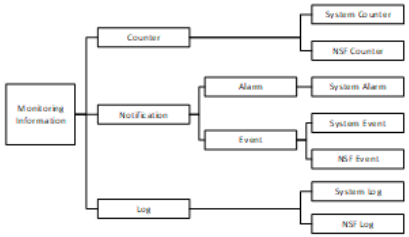
### I2NSF Architecture in NFV Reference




### I2NSF Framework




### Monitoring Data Model Information




### Where to get Code and Demo Video Clip

- Github – Source Code
  - ✓ https://github.com/jaehoonpaul/i2nsf-framework
- Youtube – Demo Video Clip
  - ✓ https://youtu.be/dAA1WTGhlXE

### What to pull down to set up an environment

- OS: Ubuntu 16.04 LTS
- ConfD for NETCONF: 6.6 Version
- Jetconf for RESTCONF
- OpenStack: Queens version
- NSF: Suricata

### Manual for Operation Process

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

### Contents of Implementation

- Cloud-based Security Service System using I2NSF Framework
  - ✓ Web-based I2NSF User
  - ✓ Console-based Security Controller
  - ✓ Console-based Developer's Management System
  - ✓ I2NSF Framework in OpenStack NFV Environment
  - ✓ I2NSF Capability YANG Data Model
  - ✓ Registration Interface via NETCONF/YANG
  - ✓ Consumer-Facing Interface via RESTCONF/YANG
  - ✓ NSF-Facing Interface via NETCONF/YANG
  - ✓ Monitoring Interface via NETCONF/YANG
- Network Security Functions
  - ✓ Firewall and Web-filter using Suricata
- Advanced Function
  - ✓ Security Policy Translation
  - ✓ Security Policy Provisioning

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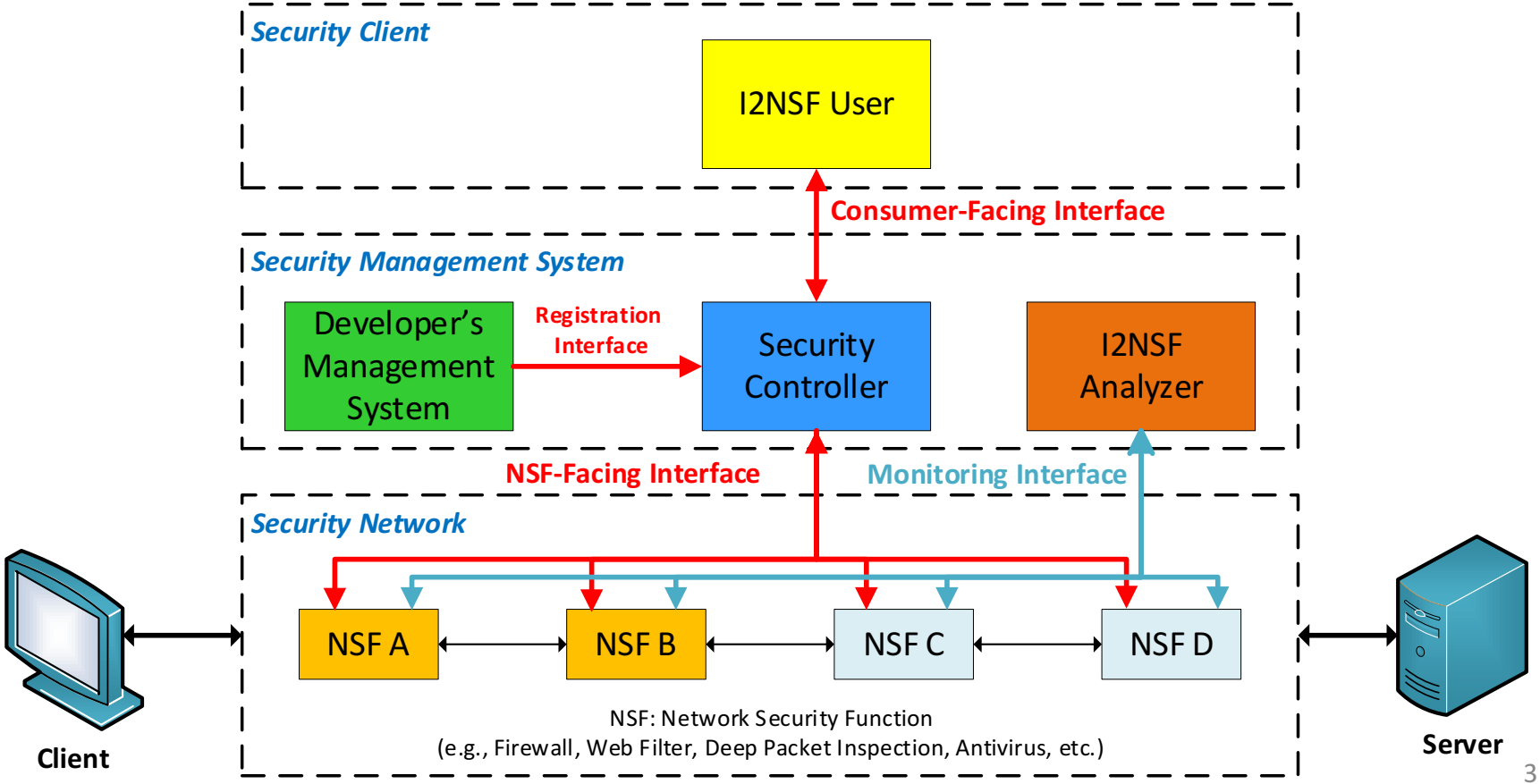
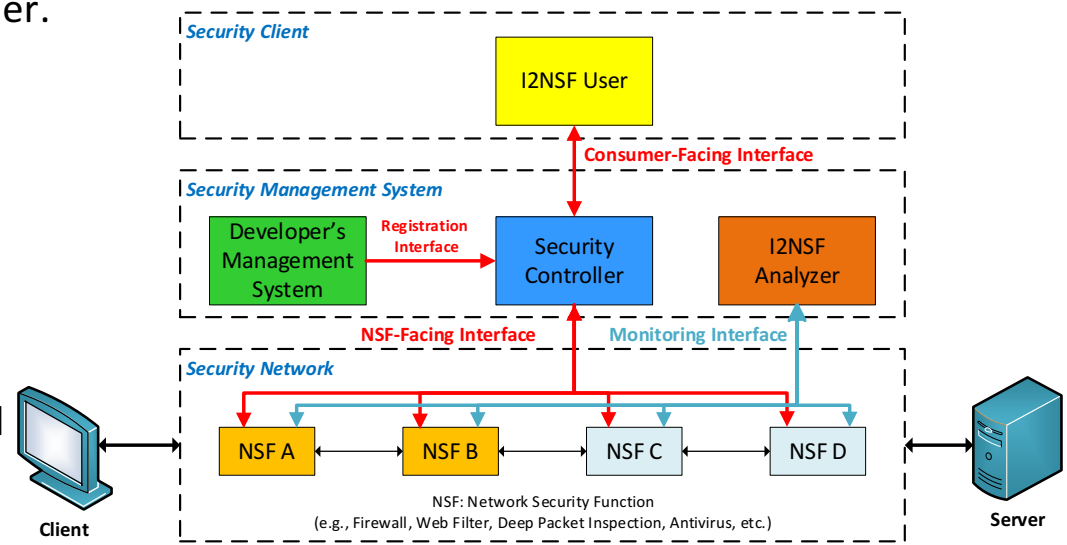
openstack. SURICATA

# I2NSF for Security Management Automation



# I2NSF Framework: Interfaces

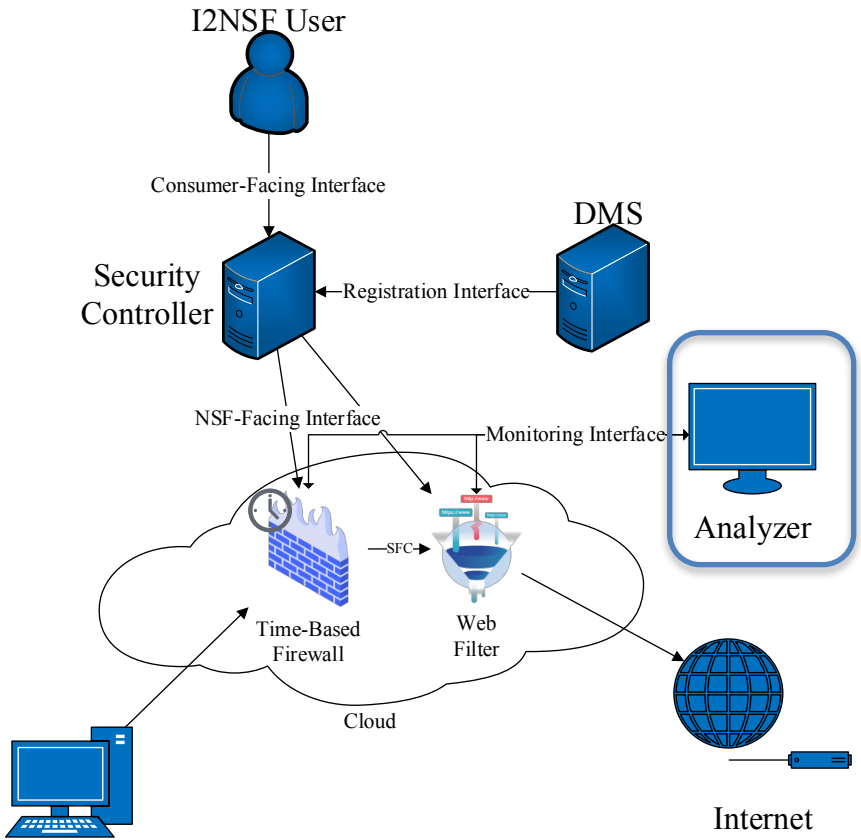
- Registration Interface
  - Developer's Management System (DMS) registers an NSF with Security Controller.
- Consumer-Facing Interface
  - I2NSF User delivers a high-level security policy to Security Controller.
- NSF-Facing Interface
  - Security Controller delivers a low-level security polity to an NSF.
- Monitoring Interface
  - An NSF delivers its monitoring data to I2NSF Analyzer.



# Hackathon Plan

- The Implementation of the Internet Drafts for the I2NSF System for Cloud-based Security Services:
  - draft-ietf-i2nsf-capability-data-model-13
  - draft-ietf-i2nsf-consumer-facing-interface-dm-12
  - draft-ietf-i2nsf-nsf-facing-interface-dm-10
  - draft-ietf-i2nsf-registration-interface-dm-09
  - draft-ietf-i2nsf-nsf-monitoring-data-model-04
  - draft-yang-i2nsf-security-policy-translation-06
  - draft-jeong-i2nsf-security-management-automation-00

# Network Topology for Hackathon Project

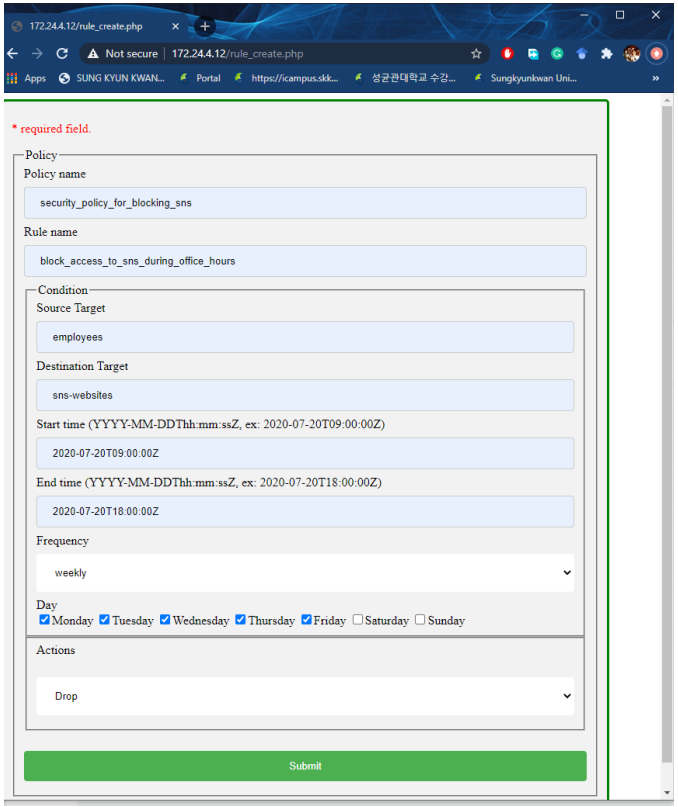



- **Open Source:**
  - ✓ **OS:** Ubuntu 16.04 LTS
  - ✓ **ConfD:** 6.6 Version
  - ✓ **MySQL:** 14.14 Version
  - ✓ **OpenStack:** Queens
  - ✓ **Suricata:** 3.2.1 RELEASE
  - ✓ **RestConf:** JETCONF Server
- **Minimum Specification for OpenStack:**
  - ✓ **RAM**: 4 ~ 8 GB
  - ✓ **Storage**: 10 GB
  - ✓ **CPU**: 2 ~ 4 cores @ 2.4 GHz

# What got done (1/3)

- I2NSF Framework on top of OpenStack.
  - Web-based I2NSF User.
  - Console-based Security Controller and DMS.
  - Security Policy Translator in Security Controller.
  - Security Policy Provisioning
- NSFs Monitoring using I2NSF Monitoring Interface.
  - Pulling of NSF's Resources Data (CPU, Memory, Disk, Interface)

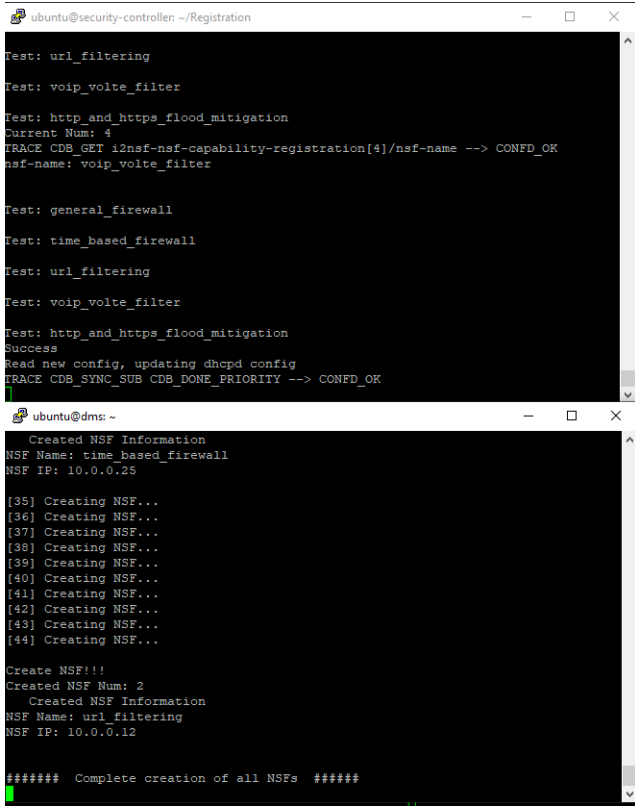
# What got done (2/3)




Web-based I2NSF User

Security Controller

Developer's Management System (DMS)




Console-based Security Controller and DMS

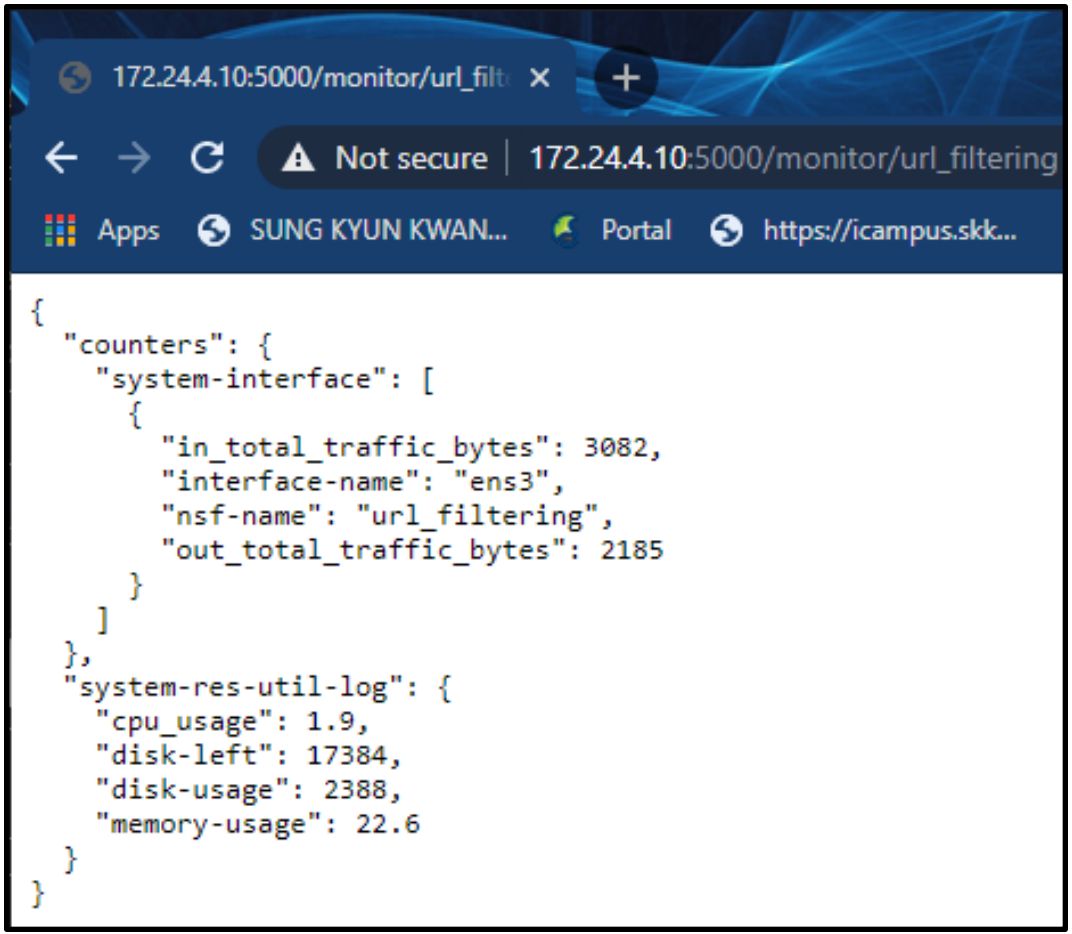
# What got done (3/3)

**Monitoring of NSFs**

NSF (Web Filter)

**Monitoring Interface (JSON/RESTCONF)**

I2NSF Analyzer



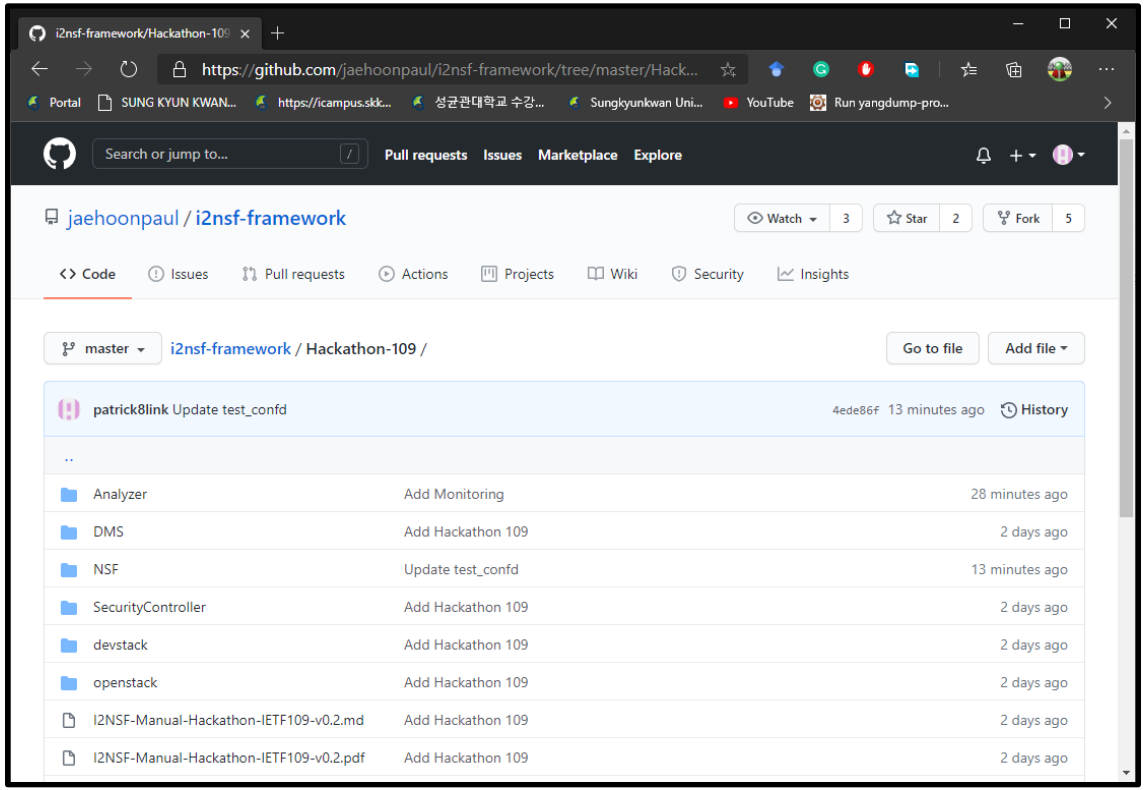
# What we learned

- We realized the feasibility of NSF monitoring via RESTCONF or NETCONF for Security Management.

- Next Steps:
  - Support of NETCONF for NSF Monitoring Interface.
  - Enhancement of Security Policy Translator for Automatic Setup.
  - Implementation of Application Interface for Security Management Automation.

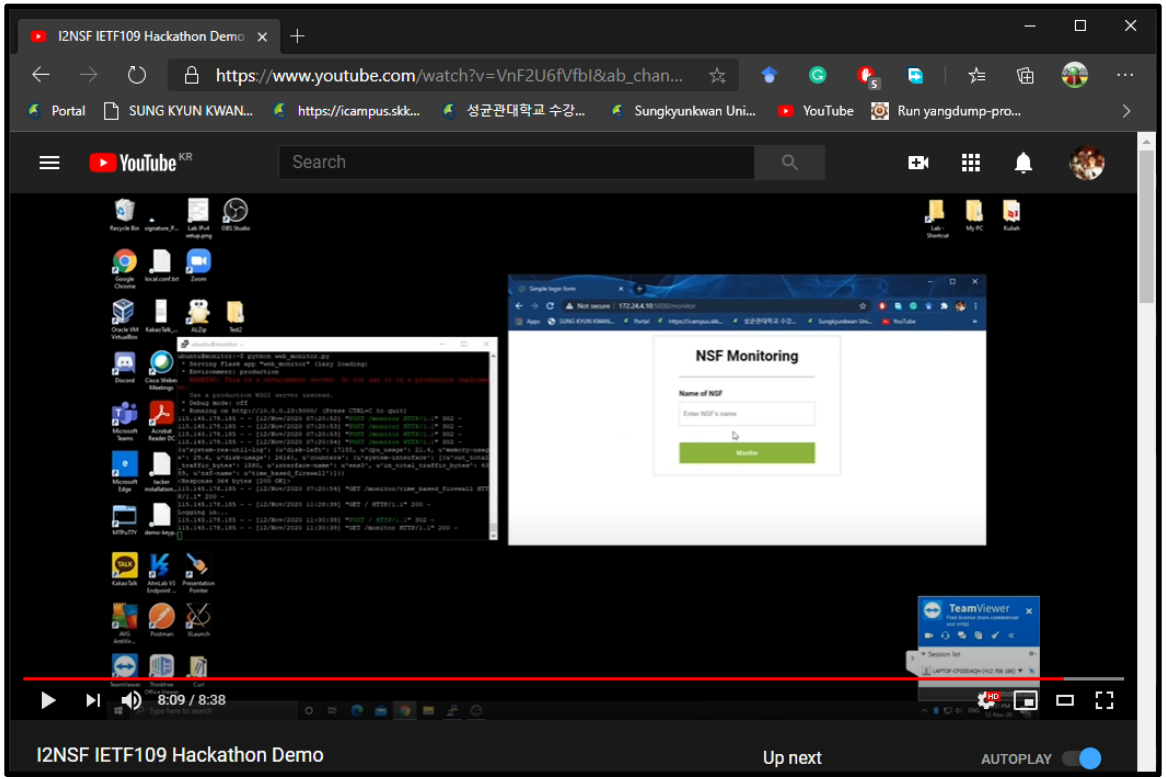
# Open Source Project at Github

- URL: https://github.com/jaehoonpaul/i2nsf-framework/tree/master/Hackathon-109



# Demo Video Clip at YouTube

- URL: https://youtu.be/VnF2U6fVfbI



# Wrap Up

**Hackathon Team**

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I2NSF hackathon team worked in collaboration with IPWAVE and BMWG teams.