IETF-110 Hackathon

I2NSF Framework Project

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Online
(Busan, Korea)

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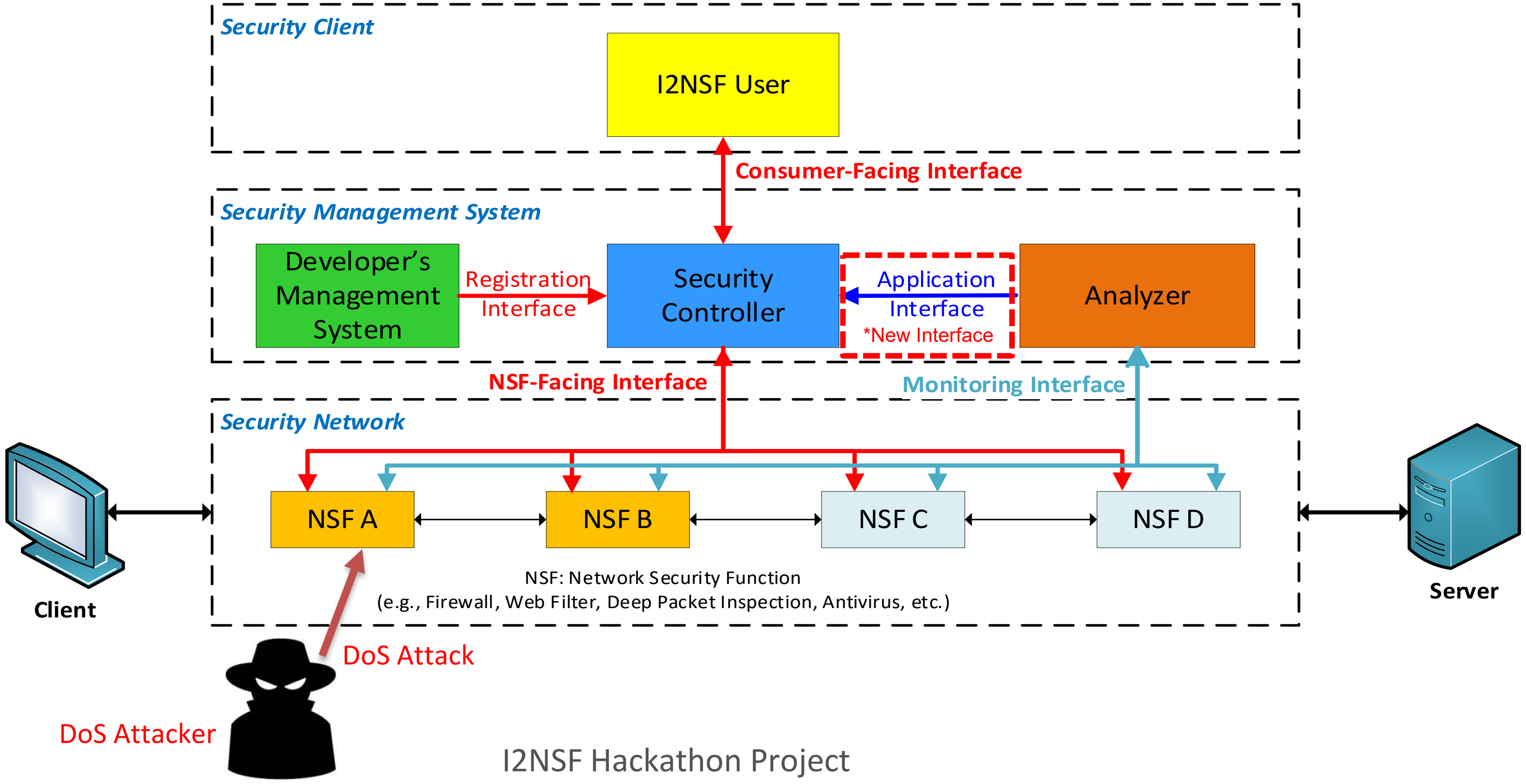
Hackathon Plan (1/2)

❖ The Implementation of the Internet Drafts for the I2NSF System for Cloud-based Security Services:

- draft-ietf-i2nsf-capability-data-model-15
- draft-ietf-i2nsf-consumer-facing-interface-dm-12
- draft-ietf-i2nsf-nsf-facing-interface-dm-11
- draft-ietf-i2nsf-registration-interface-dm-10
- draft-ietf-i2nsf-nsf-monitoring-data-model-06
- draft-yang-i2nsf-security-policy-translation-08
- draft-jeong-i2nsf-security-management-automation-01

❖ Implementing Application Interface for delivering Feedback from I2NSF Analyzer to Security Controller.

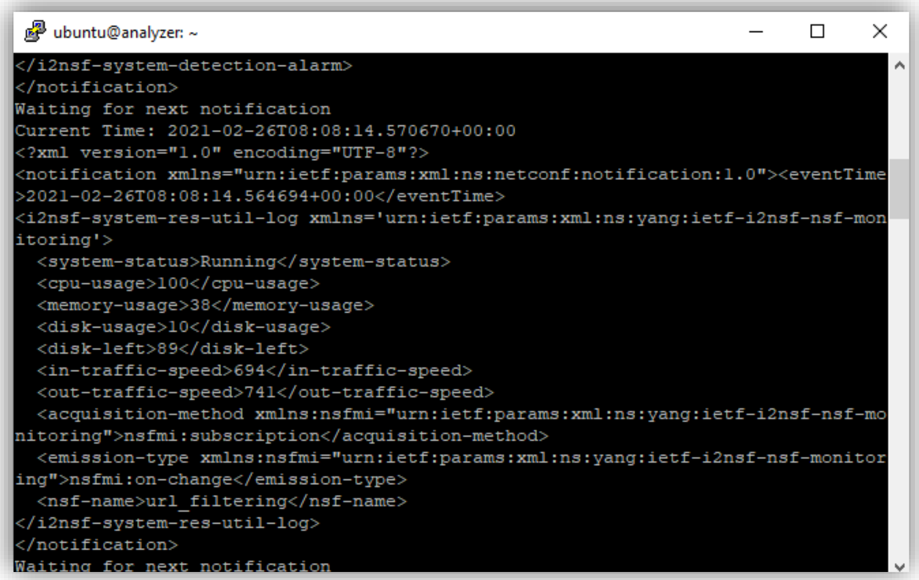
Hackathon Plan (2/2)



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

What got done (1/3)

- NSF Monitoring using I2NSF Monitoring Interface via NETCONF.
  - Subscription-based NSF Monitoring.



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</i2nsf-system-detection-alarm>
</notification>
Waiting for next notification
Current Time: 2021-02-26T08:08:14.570670+00:00
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<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0"><eventTime
>2021-02-26T08:08:14.564694+00:00</eventTime>
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itoring'>
  <system-status>Running</system-status>
  <cpu-usage>100</cpu-usage>
  <memory-usage>38</memory-usage>
  <disk-usage>10</disk-usage>
  <disk-left>89</disk-left>
  <in-traffic-speed>694</in-traffic-speed>
  <out-traffic-speed>741</out-traffic-speed>
  <acquisition-method xmlns:nsfmi="urn:ietf:params:xml:ns:yang:ietf-i2nsf-nsf-mo
nitoring">nsfmi:subscription</acquisition-method>
  <emission-type xmlns:nsfmi="urn:ietf:params:xml:ns:yang:ietf-i2nsf-nsf-monitor
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  <nsf-name>url_filtering</nsf-name>
</i2nsf-system-res-util-log>
</notification>
Waiting for next notification
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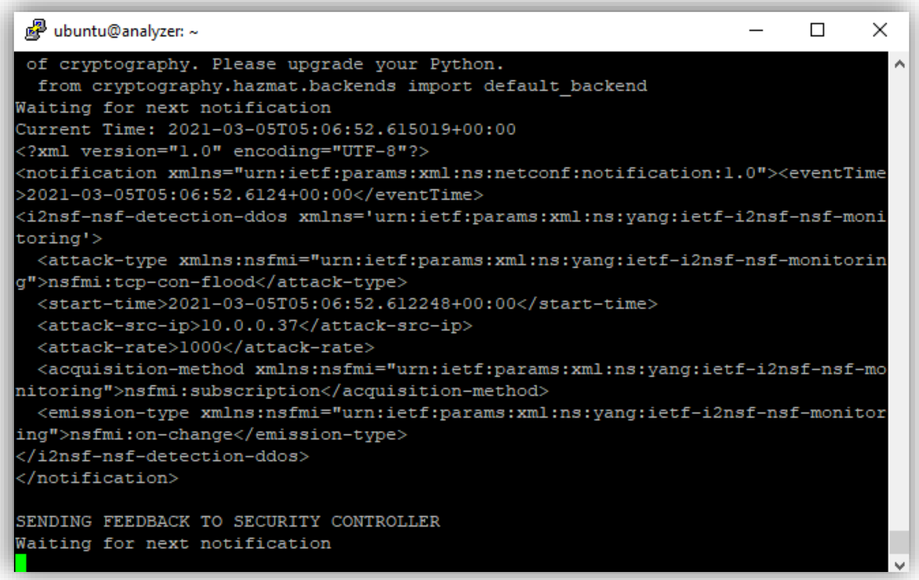
Monitoring NSF's Resources



```
 of cryptography. Please upgrade your Python.
  from cryptography.hazmat.backends import default_backend
Waiting for next notification
Current Time: 2021-03-05T05:06:52.615019+00:00
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toring'>
  <attack-type xmlns:nsfmi="urn:ietf:params:xml:ns:yang:ietf-i2nsf-nsf-monitorin
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  <start-time>2021-03-05T05:06:52.612248+00:00</start-time>
  <attack-src-ip>10.0.0.37</attack-src-ip>
  <attack-rate>1000</attack-rate>
  <acquisition-method xmlns:nsfmi="urn:ietf:params:xml:ns:yang:ietf-i2nsf-nsf-mo
nitoring">nsfmi:subscription</acquisition-method>
  <emission-type xmlns:nsfmi="urn:ietf:params:xml:ns:yang:ietf-i2nsf-nsf-monitor
ing">nsfmi:on-change</emission-type>
</i2nsf-nsf-detection-ddos>
</notification>

SENDING FEEDBACK TO SECURITY CONTROLLER
Waiting for next notification
```
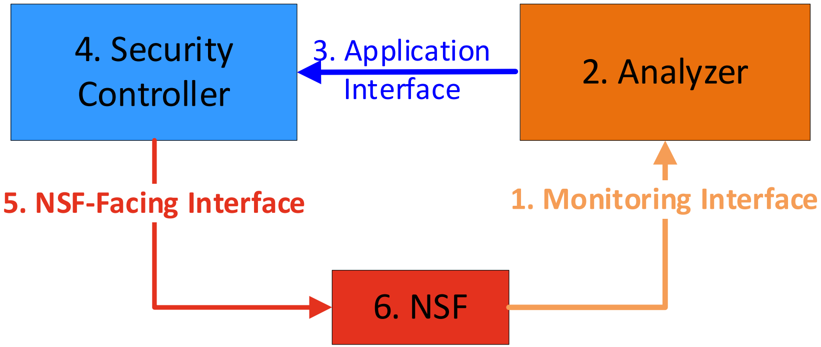

Monitoring DDoS Detection

What got done (2/3)

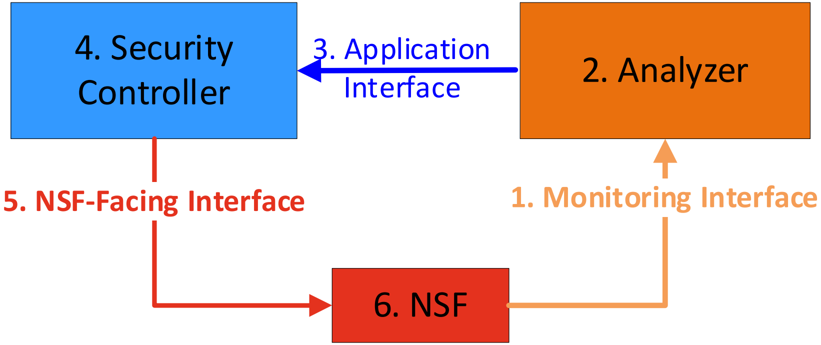
- Implementation of Application Interface for Feedback delivery to create a closed-loop system of I2NSF Framework.



1. **NSF sends monitoring data to Analyzer via Monitoring Interface, such as DoS Detection Report.**
2. **Analyzer creates a new policy based on the received data through machine learning.**
3. **Analyzer sends the new policy to Security Controller via Application Interface.**

What got done (3/3)

- Implementation of Application Interface for Feedback delivery to create a closed-loop system of I2NSF Framework.



4. **Security Controller translates a high-level security policy of Application Interface to a low-level security policy of NSF-Facing Interface.**

5. **Security Controller sends the new low-level security policy to NSF via NSF-Facing Interface.**

6. **NSF enforces the requested security policy.**

What we learned

- The draft-ietf-i2nsf-nsf-monitoring-data-model-06 may be extended for monitoring packet flows in NSFs to detect DoS/DDoS attacks.
  - The monitored packet flow data can be useful to protect the I2NSF Framework.

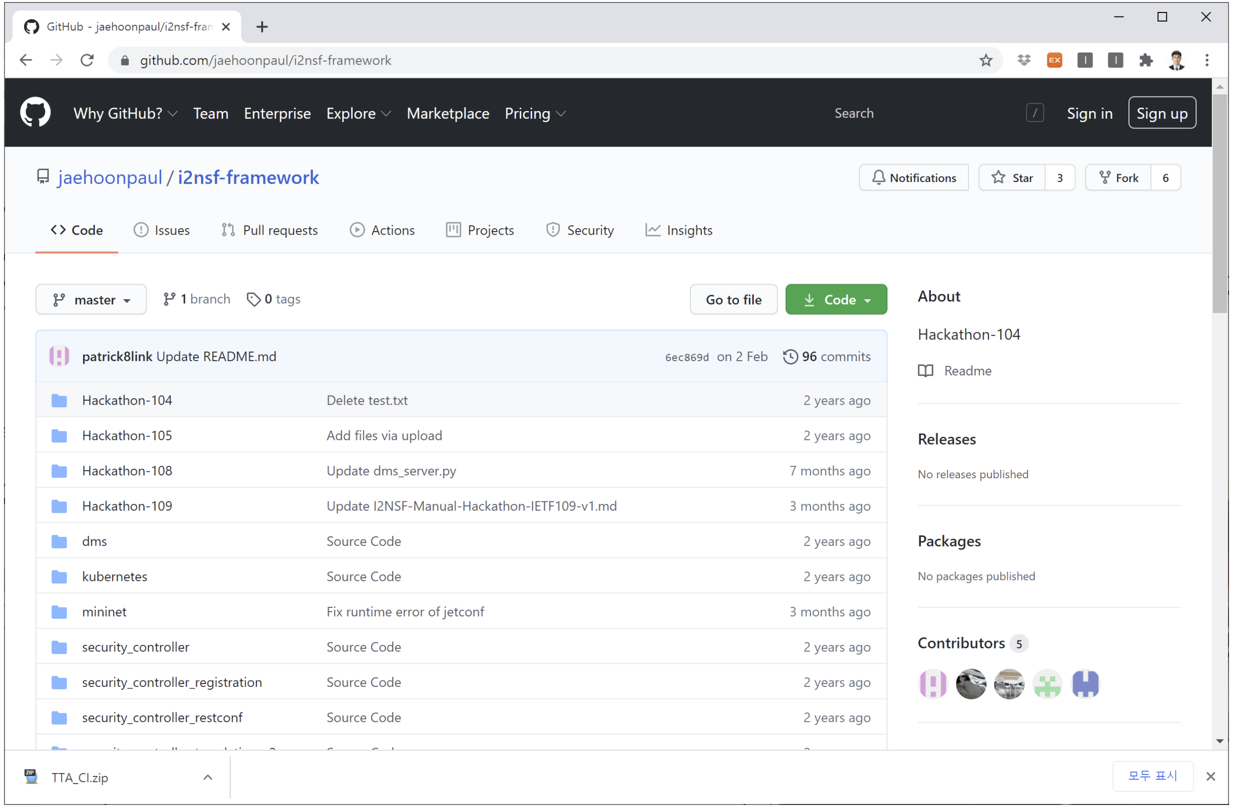
- The Feasibility of Application Interface in I2NSF Framework is demonstrated for Security Management Automation.

Next Step

- Extension of the monitoring YANG data model to monitor packet flows.
- Usage of sFlow for network traffic monitoring the NSFs.
- Improvement of I2NSF Analyzer with Machine Learning to update/create a security policy.
- Automatic Update of the SFC Path of NSFs for a new security policy
- Enhancement of Security Policy Translator for security management automation.

I2NSF Open-Source Project at Github

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



jaehoonpaul / i2nsf-framework

1 branch 0 tags

patrick8link Update README.md 6ec869d on 2 Feb 96 commits

Hackathon-104	Delete test.txt	2 years ago
Hackathon-105	Add files via upload	2 years ago
Hackathon-108	Update dms_server.py	7 months ago
Hackathon-109	Update I2NSF-Manual-Hackathon-IETF109-v1.md	3 months ago
dms	Source Code	2 years ago
kubernetes	Source Code	2 years ago
mininet	Fix runtime error of jetconf	3 months ago
security_controller	Source Code	2 years ago
security_controller_registration	Source Code	2 years ago
security_controller_restconf	Source Code	2 years ago

About

Hackathon-104

Readme

Releases

No releases published

Packages

No packages published

Contributors 5

Wrap Up

I2NSF Hackathon Team

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Professor:

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- Yoseop Ahn (SKKU)
- Mose Gu (Liberty University)
- Kyungsik Kim (KNU)

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

Sponsors

NRF National Research Foundation of Korea

IITP Institute of Information & Communications Technology Planning & Evaluation

TTA 한국정보통신기술협회 Telecommunications Technology Association

SUNGKYUNKWAN UNIVERSITY 1398 성균관대학교

숭실대학교 Soongsil University

ETRI 한국전자통신연구원 Electronics and Telecommunications Research Institute

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