An Information Model for the Monitoring of Network Security Functions (NSF)

draft-zhang-i2nsf-info-model-monitoring-00

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April 2016 Buenos Ayres

Monitoring Part of I2NSF Architecture

Service Layer

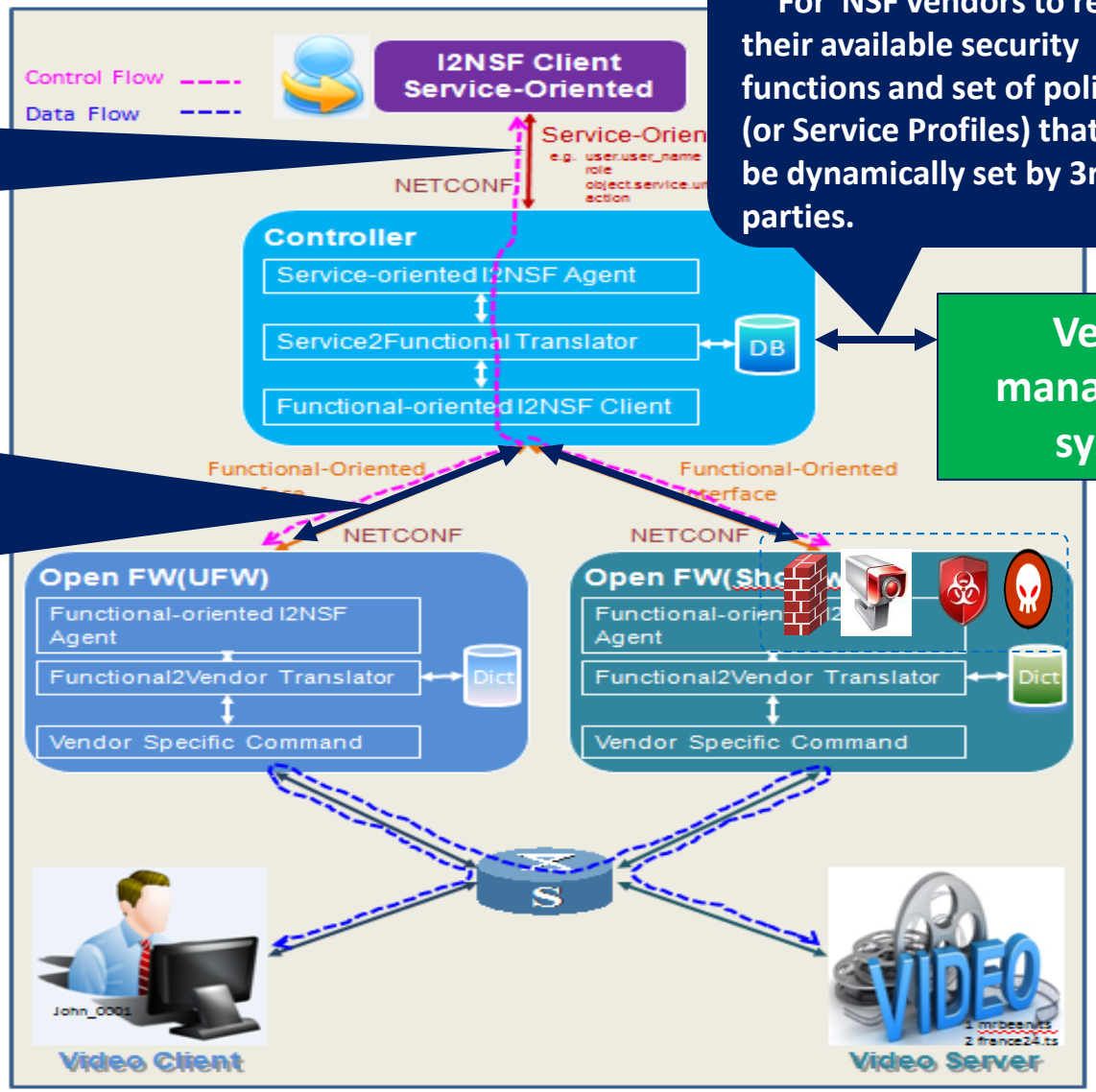
For clients or App Gateway to express and monitor security policies for their specific flows

NSF Registration

For NSF vendors to register their available security functions and set of policies (or Service Profiles) that can be dynamically set by 3rd parties.

Capability Layer

For controller to define explicit rules for individual NSFs to treat packets, as well as methods to monitor the execution status of those functions



Vendor management system

Objectives

- Specify the information model for the monitoring part of capability interface:
  - ✓ Which information should be provided: security related status and event from NSFs, others (traffic statistics, policy execution, operation related, etc);
  - ✓ The standard information model for the monitoring information: alarms vs reports, real time vs periodically, NSF status vs security events, etc.

Information Model Design

- Monitoring message types:
  - Alarm: the message triggered by certain abnormal conditions occurred in a NSF (referred to as a System Alarm) or a detected network abnormal conditions (referred to as a Security Event Alarm)
  - Report: the message triggered by a timer or a request from the NE which monitors the NSFs. A report contains more statistical information comparing to alarm.

Common Information

- The common information that should be included in all the alarm or report messages:
  - Time Stamp
  - NSF name
  - Vendor name
  - Type of NSF: firewall, WAF, IPS
  - NSF model
  - Interface Version
  - NSF Version
  - Type of report: Alarm, report, etc

Alarm Specification

- System Alarm
  - Memory Alarm
  - CPU Alarm
  - DISK Alarm
  - Session Table Alarm
  - Interface Alarm
- Security Event Alarm
  - DDoS Alarm
  - Virus Alarm
  - Intrusion Alarm
  - Botnet Alarm
  - Web Attack Alarm

- event _Name: 'SESSION_USAGE_HIGH'
- current: the number of concurrent sessions
- max: the maximum number of sessions that the session table can support
- threshold: the threshold triggering the event
- message: 'The number of session table exceeded the threshold'

- event_Name: 'SEC_EVENT_DDoS'
- sub_attack_type: any one of Syn flood, ACK flood, SYN-ACK flood, FIN/RST flood, TCP Connection flood, UDP flood, icmp flood, HTTPS flood, HTTP flood, DNS query flood, DNS reply flood, SIP flood, and etc.
- dst_ip: the IP address of a victim under attack
- dst_port: the port numbers that the attack traffic aims at.
- start_time: the time stamp indicating when the attack started
- end_time: the time stamp indicating when the attack ended. If the attack is still undergoing when sending out the alarm, this field can be empty.
- attack_rate: the PPS of attack traffic
- attack_speed: the bps of attack traffic

Report Specification

- Attack Report
  - DDoS Report
  - Virus Report
  - Intrusion Report
  - Botnet Report
  - Web Attack Report
- Service Report
  - Traffic Report
  - Policy Hit Report
  - DPI Report
- System Report
- Operation Report
- Running Report

Besides the fields in an DDoS Alarm, the following information should be included in a DDoS Report:

- **attack_type: DDoS**
- **attack_ave_rate: The average pps of the attack traffic within the recorded time**
- **attack_ave_speed: The average bps of the attack traffic within the recorded time**
- **attack_pkt_ num: The number attack packets within the recorded time**
- **rule_id: The ID of the rule being triggered**
- **rule_name: The name of the rule being triggered**
- **attack_ src_ip: The source IP addresses of attack traffics. If there are a large amount of IP addresses, then pick a certain number of resources according to different rules.**

Next Step

- Solicit comments

- Keep on improvement, including:
  - incorporate contents from draft-zhou-i2nsf-capability-interface-monitoring-00
  - supplement missing contents

Thanks!

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