YANG Data Model of Interface to Network Security Functions Capability Interface

(draft-jeong-i2nsf-capability-interface-yang-02)

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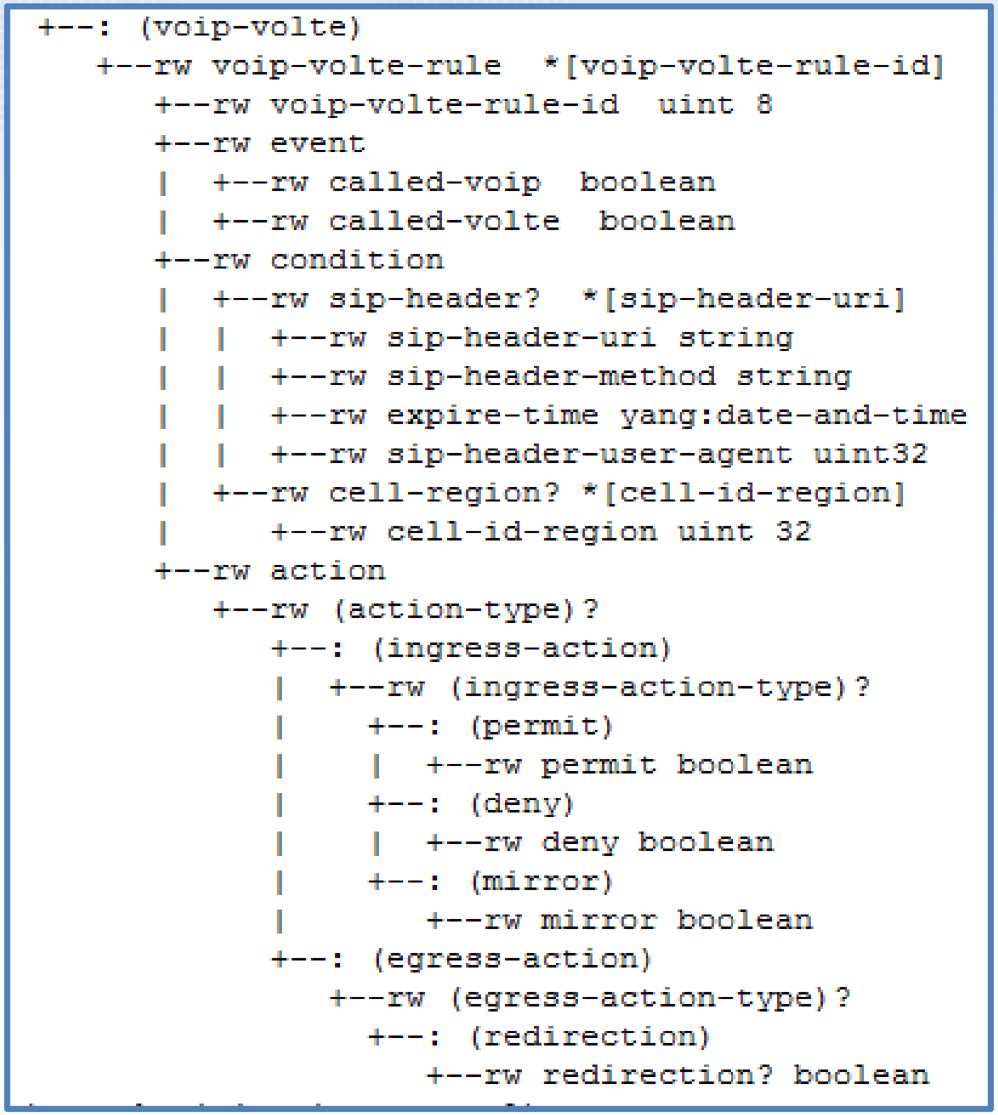
Introduction

- This document defines a YANF data model corresponding to the information model for I2NSF capability interface (i.e., NSF facing interface).

- It describes a data model for three security capabilities (i.e., network security functions).
  - Network security control
  - Content security control
  - Attack mitigation control

- It covers three use cases:
  - **Firewall** for Network security control
  - **VoIP/VoLTE** for Content security control
  - **DDoS attack** for Attack mitigation control

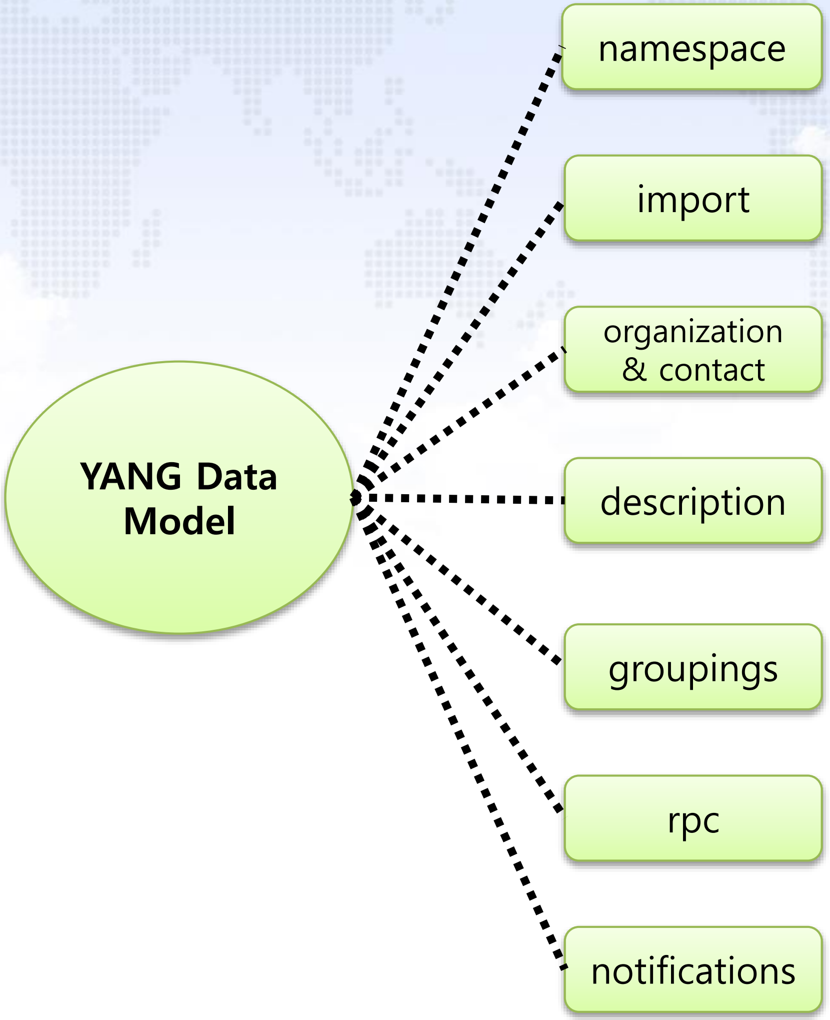
Generic Data Model of VoIP/VoLTE



```
+--:  (voip-volte)
   +--rw voip-volte-rule  *[voip-volte-rule-id]
      +--rw voip-volte-rule-id  uint 8
      +--rw event
      |  +--rw called-voip  boolean
      |  +--rw called-volte  boolean
      +--rw condition
      |  +--rw sip-header?  *[sip-header-uri]
      |  |  +--rw sip-header-uri string
      |  |  +--rw sip-header-method string
      |  |  +--rw expire-time yang:date-and-time
      |  |  +--rw sip-header-user-agent uint32
      |  +--rw cell-region? *[cell-id-region]
      |     +--rw cell-id-region uint 32
      +--rw action
         +--rw (action-type)?
            +--:  (ingress-action)
            |  +--rw (ingress-action-type)?
            |    +--:  (permit)
            |    |  +--rw permit boolean
            |    +--:  (deny)
            |    |  +--rw deny boolean
            |    +--:  (mirror)
            |       +--rw mirror boolean
            +--:  (egress-action)
               +--rw (egress-action-type)?
                 +--:  (redirection)
                    +--rw redirection? boolean
```

<Figure 1. Generic Model of VoIP/VoLTE>

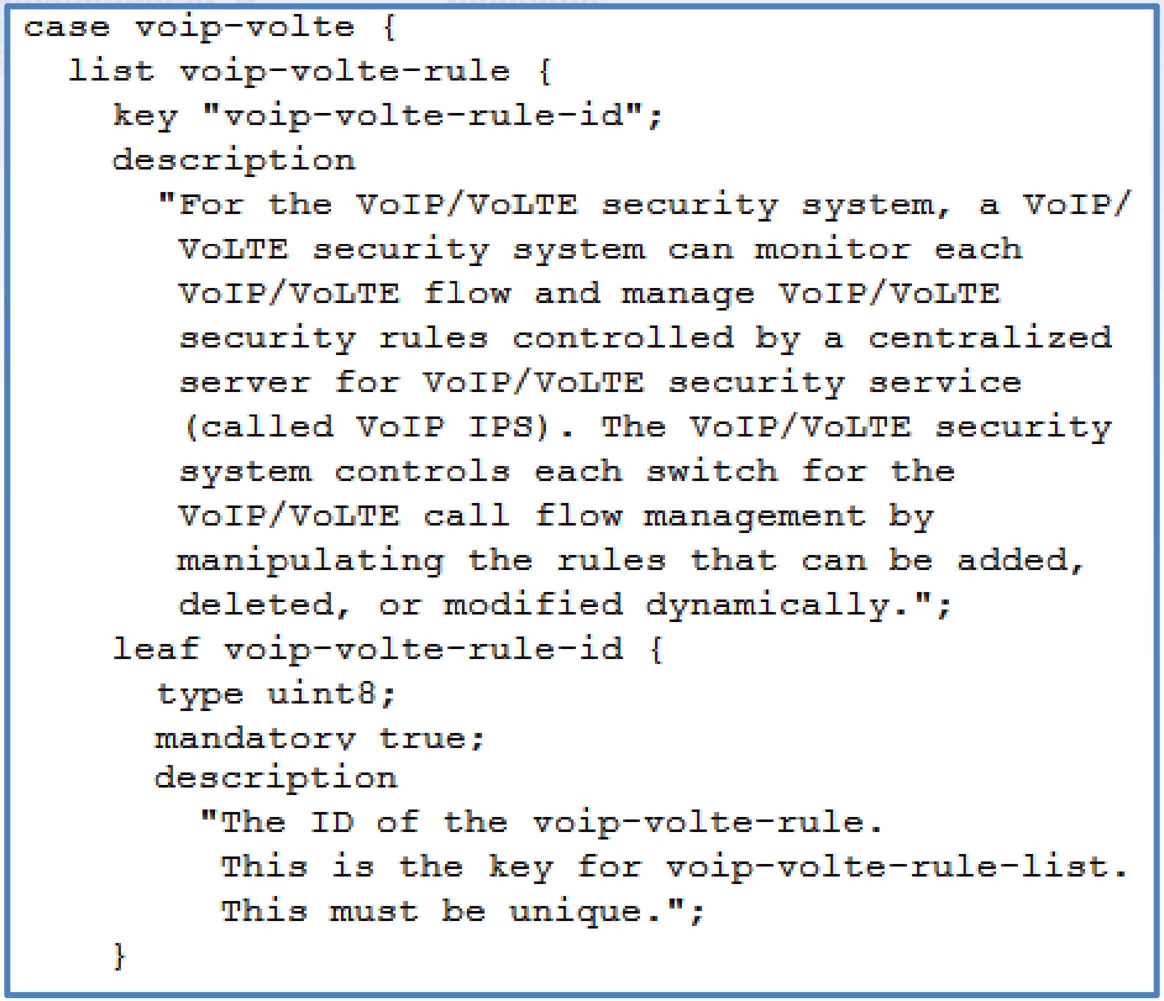
YANG Data Model



<Figure 2. YANG Data Model of NSF Facing Interface>

- Module : ietf-i2nsf-capability-interface.
- We refer to the RFC 6020 for YANG.
- The YANG data model is based on the information model of network security functions, as defined in the [draft-xia-i2nsf-capability-interface-im-05].
- The YANG data model is made of the information model, as shown in Figure 1.

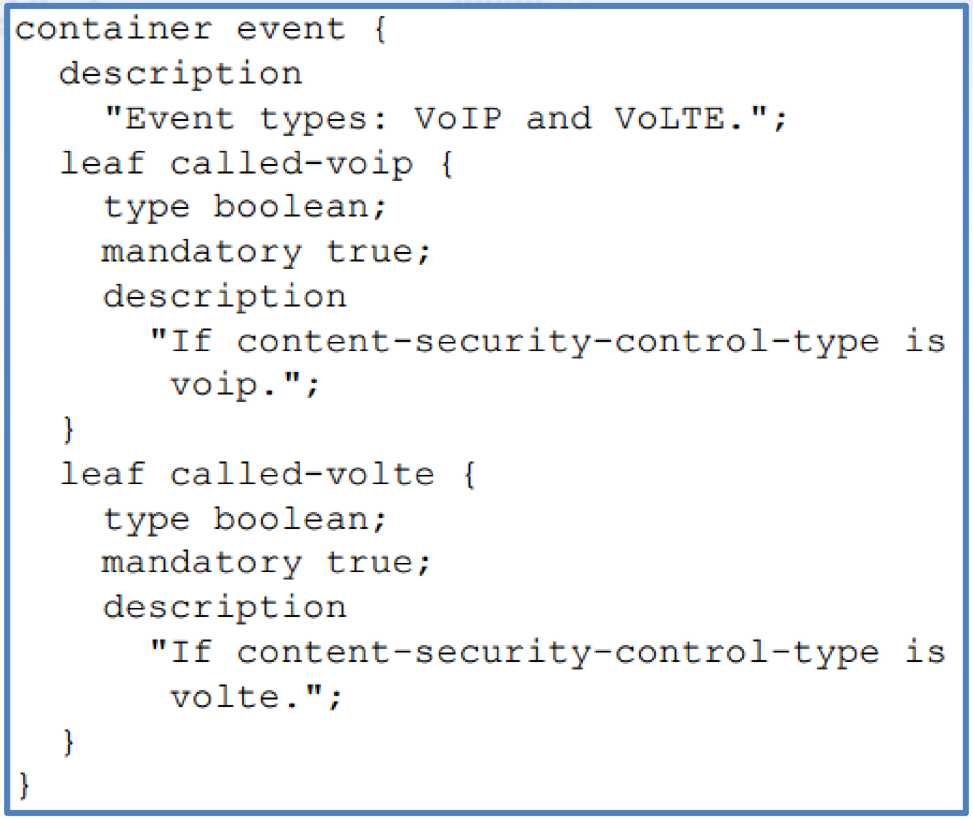
Data Model of VoIP/VoLTE (1/4)



```
case voip-volte {
  list voip-volte-rule {
    key "voip-volte-rule-id";
    description
      "For the VoIP/VoLTE security system, a VoIP/
       VoLTE security system can monitor each
       VoIP/VoLTE flow and manage VoIP/VoLTE
       security rules controlled by a centralized
       server for VoIP/VoLTE security service
       (called VoIP IPS). The VoIP/VoLTE security
       system controls each switch for the
       VoIP/VoLTE call flow management by
       manipulating the rules that can be added,
       deleted, or modified dynamically.";
    leaf voip-volte-rule-id {
      type uint8;
      mandatory true;
      description
        "The ID of the voip-volte-rule.
         This is the key for voip-volte-rule-list.
         This must be unique.";
    }
```

<Figure 3. YANG Data Model of NSF Facing Interface for VoIP/VoLTE>

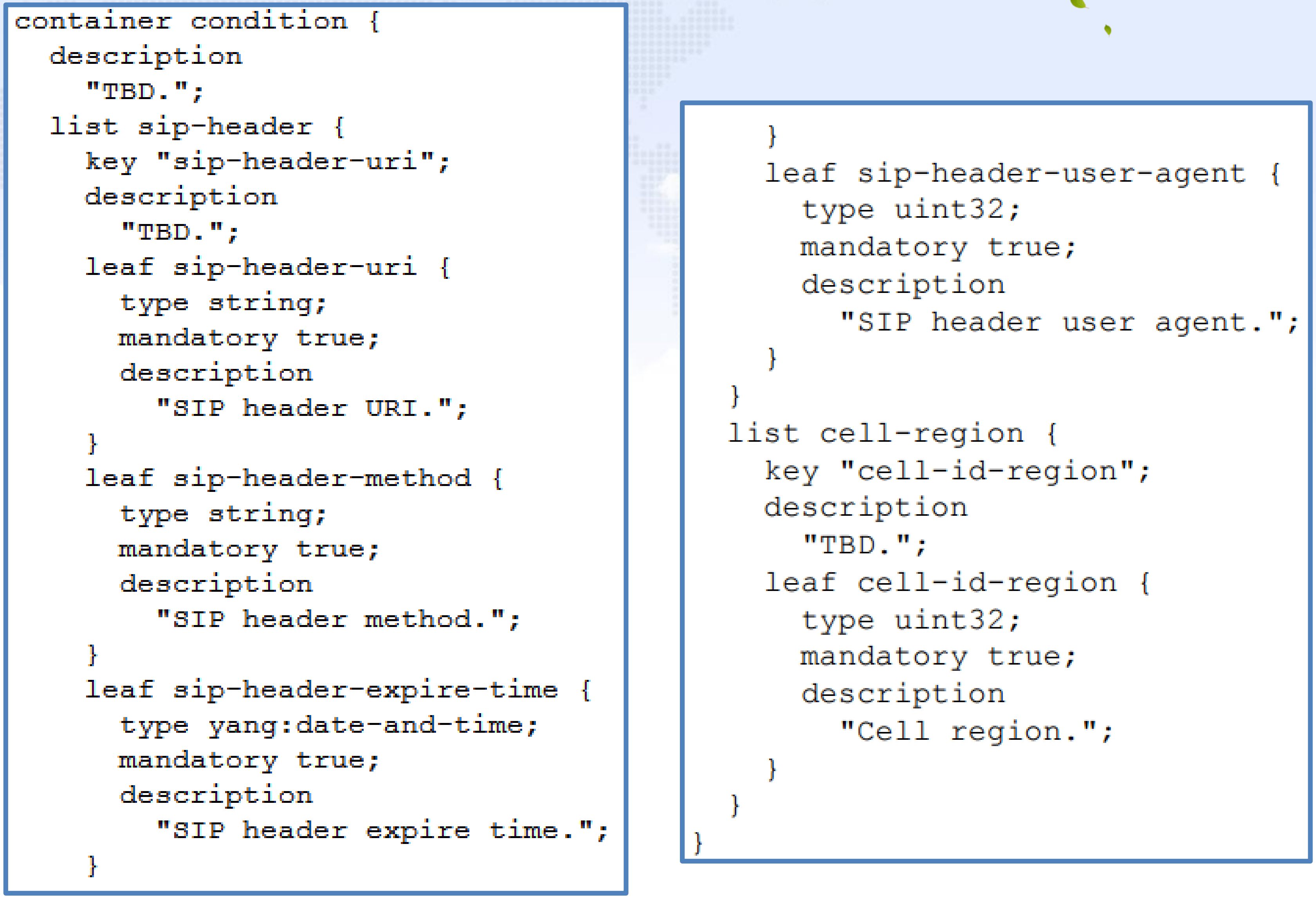
Data Model of VoIP/VoLTE (2/4)



```
container event {
  description
    "Event types: VoIP and VoLTE.";
  leaf called-voip {
    type boolean;
    mandatory true;
    description
      "If content-security-control-type is
       voip.";
  }
  leaf called-volte {
    type boolean;
    mandatory true;
    description
      "If content-security-control-type is
       volte.";
  }
}
```

<Figure 4. YANG Data Model of NSF Facing Interface for VoIP/VoLTE>

Data Model of VoIP/VoLTE (3/4)

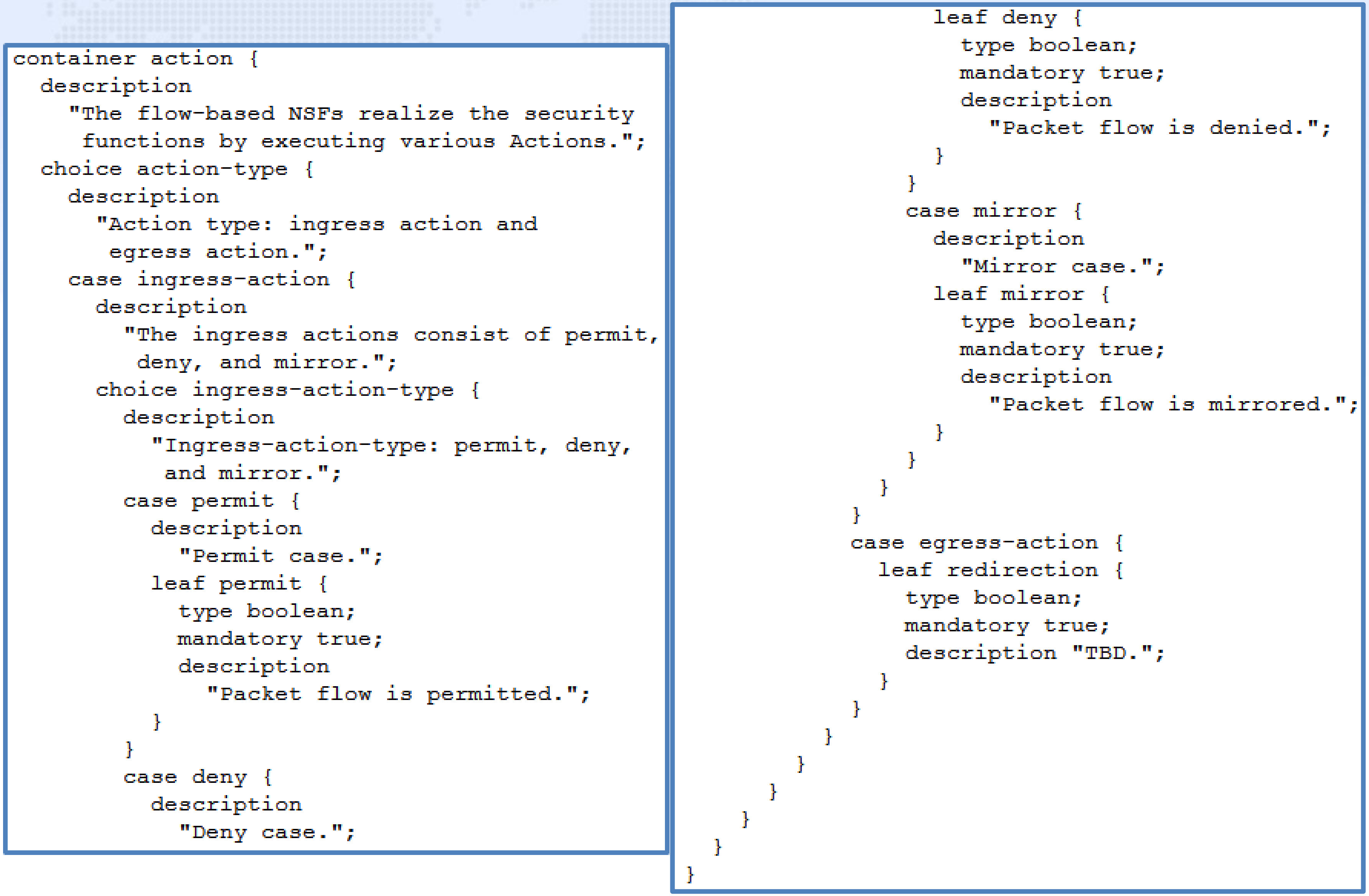


```
container condition {
  description
    "TBD.";
  list sip-header {
    key "sip-header-uri";
    description
      "TBD.";
    leaf sip-header-uri {
      type string;
      mandatory true;
      description
        "SIP header URI.";
    }
    leaf sip-header-method {
      type string;
      mandatory true;
      description
        "SIP header method.";
    }
    leaf sip-header-expire-time {
      type yang:date-and-time;
      mandatory true;
      description
        "SIP header expire time.";
    }
```

```
    }
    leaf sip-header-user-agent {
      type uint32;
      mandatory true;
      description
        "SIP header user agent.";
    }
  }
  list cell-region {
    key "cell-id-region";
    description
      "TBD.";
    leaf cell-id-region {
      type uint32;
      mandatory true;
      description
        "Cell region.";
    }
  }
}
```

<Figure 5. YANG Data Model of NSF Facing Interface for VoIP/VoLTE>

Data Model of VoIP/VoLTE (4/4)



```
container action {
  description
    "The flow-based NSFs realize the security
     functions by executing various Actions.";
  choice action-type {
    description
      "Action type: ingress action and
       egress action.";
    case ingress-action {
      description
        "The ingress actions consist of permit,
         deny, and mirror.";
      choice ingress-action-type {
        description
          "Ingress-action-type: permit, deny,
           and mirror.";
        case permit {
          description
            "Permit case.";
          leaf permit {
            type boolean;
            mandatory true;
            description
              "Packet flow is permitted.";
          }
        }
        case deny {
          description
            "Deny case.";
                  leaf deny {
                    type boolean;
                    mandatory true;
                    description
                      "Packet flow is denied.";
                  }
                }
                case mirror {
                  description
                    "Mirror case.";
                  leaf mirror {
                    type boolean;
                    mandatory true;
                    description
                      "Packet flow is mirrored.";
                  }
                }
              }
            }
            case egress-action {
              leaf redirection {
                type boolean;
                mandatory true;
                description "TBD.";
              }
            }
          }
        }
      }
    }
  }
}
```

<Figure 6. YANG Data Model of NSF Facing Interface for VoIP/VoLTE>

Next Steps

- Susan’s Draft and Jeong’s Draft will be merged for the YANG data model for the updated information model for NSF facing interface:
  - ➢ draft-xia-i2nsf-capability-interface-im-06
- Implementation
  - ➢ We will develop NSF facing interface using the merged YANG data model.
  - ➢ We will prepare for I2NSF Hackathon using the YANG data model in IETF96 Seoul Meeting in November, 2016.