IETF®

Network Security Functions Facing Interface YANG Data Model

(draft-ietf-i2nsf-nsf-facing-interface-dm-00)

IETF 101, London

March 21, 2018

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Updates from the Previous Version

- The Previous Draft:
  - draft-kim-i2nsf-nsf-facing-interface-data-model-04
- Now adopted as a new WG document:
  - draft-ietf-i2nsf-nsf-facing-interface-dm-00
- This document defines a YANG Data Model (DM) corresponding to the Information Model (IM) for NSF-Facing Interface:
  - draft-ietf-i2nsf-capability-00.
- This YANG data module was verified through a prototype implemented at IETF-101 Hackathon.

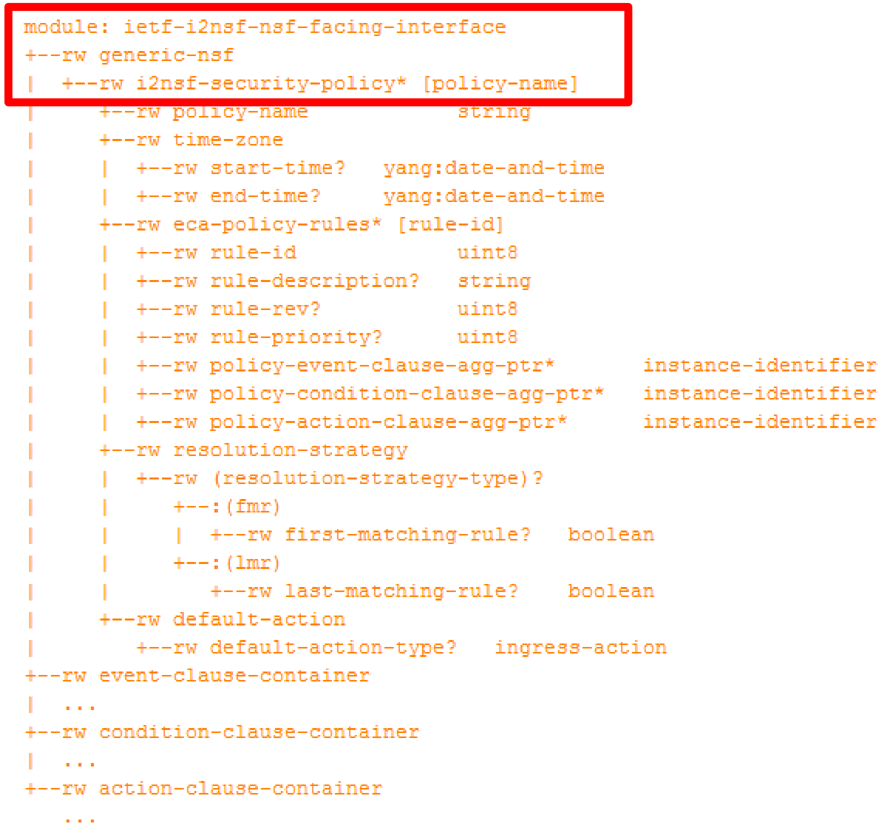
List of Updates

- Modification of YANG Module Name
  - John’s Comments (Resolved)
- Modification of Time Zone
  - Dongyue’s Comments (Resolved)
- Addition of Port Number to Condition Clause
  - Dongyue’s Comments (Resolved)
- Modification of Choice-Case Structure into Container Structure
  - Dongyue’s Comments (Resolved)
- Consistency between Capability Information Model (IM) and NSF-Facing Interface YANG Data Model (DM)
  - John’s Comments (Ongoing)
- Object-Oriented Features
  - John’s Comments (Ongoing)

Modification of YANG Module Name

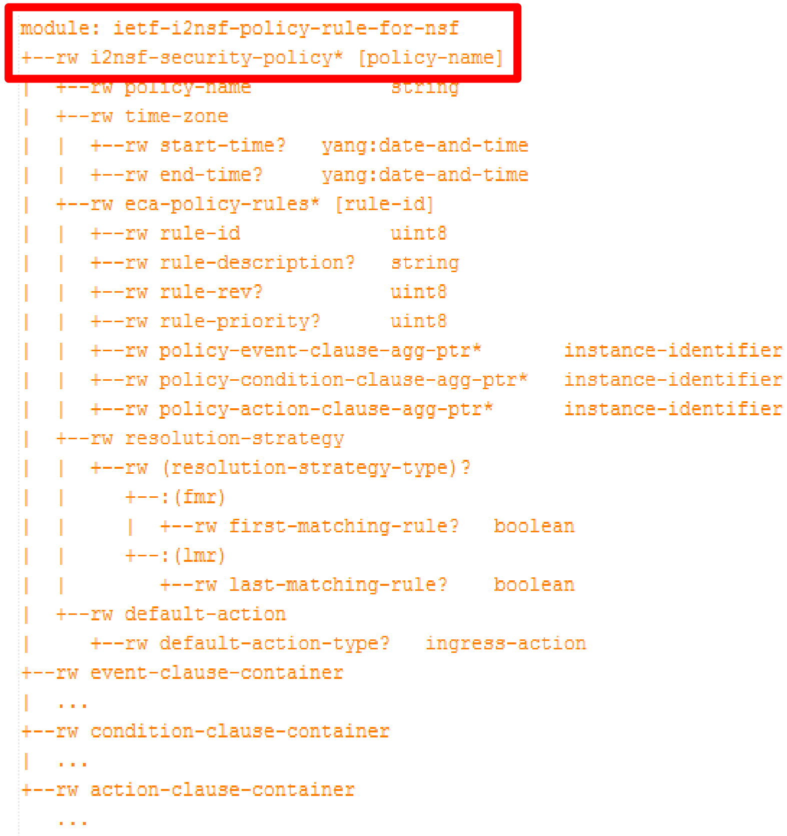
- The YANG module name becomes ietf-i2nsf-policy-rule-for-nsf.

OLD:



```
module: ietf-i2nsf-nsf-facing-interface
+--rw generic-nsf
|  +--rw i2nsf-security-policy* [policy-name]
|     +--rw policy-name                string
|     +--rw time-zone
|     |  +--rw start-time?   yang:date-and-time
|     |  +--rw end-time?     yang:date-and-time
|     +--rw eca-policy-rules* [rule-id]
|     |  +--rw rule-id                 uint8
|     |  +--rw rule-description?   string
|     |  +--rw rule-rev?           uint8
|     |  +--rw rule-priority?      uint8
|     |  +--rw policy-event-clause-agg-ptr*       instance-identifier
|     |  +--rw policy-condition-clause-agg-ptr*   instance-identifier
|     |  +--rw policy-action-clause-agg-ptr*      instance-identifier
|     +--rw resolution-strategy
|     |  +--rw (resolution-strategy-type)?
|     |     +--:(fmr)
|     |     |  +--rw first-matching-rule?   boolean
|     |     +--:(lmr)
|     |        +--rw last-matching-rule?    boolean
|     +--rw default-action
|        +--rw default-action-type?   ingress-action
+--rw event-clause-container
|  ...
+--rw condition-clause-container
|  ...
+--rw action-clause-container
   ...
```

NEW:

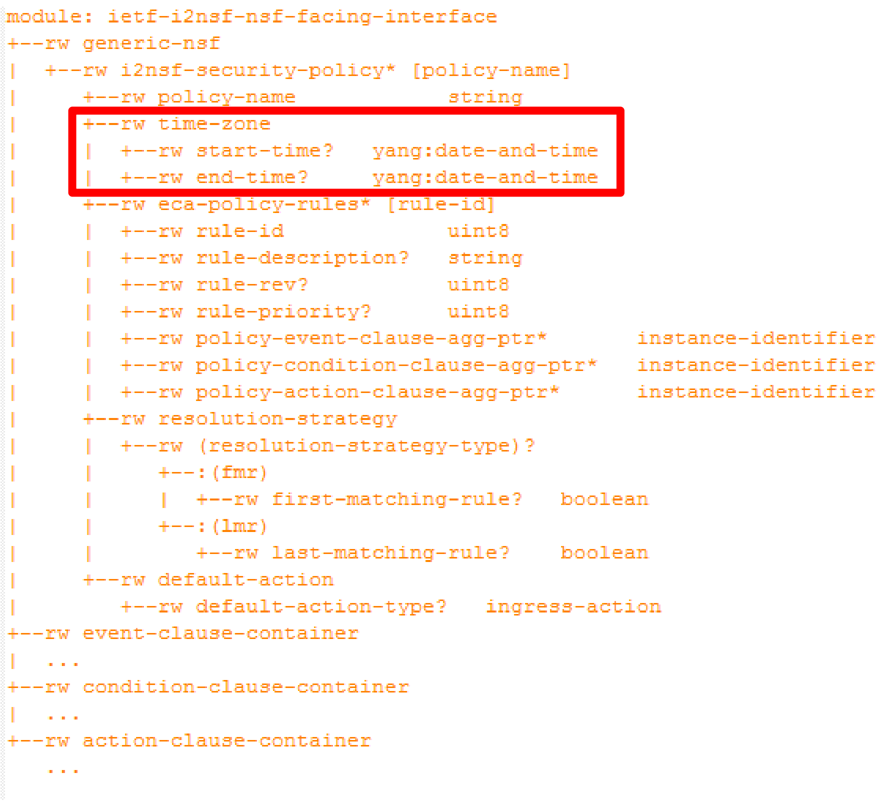


```
module: ietf-i2nsf-policy-rule-for-nsf
+--rw i2nsf-security-policy* [policy-name]
|  +--rw policy-name                string
|  +--rw time-zone
|  |  +--rw start-time?   yang:date-and-time
|  |  +--rw end-time?     yang:date-and-time
|  +--rw eca-policy-rules* [rule-id]
|  |  +--rw rule-id                 uint8
|  |  +--rw rule-description?   string
|  |  +--rw rule-rev?           uint8
|  |  +--rw rule-priority?      uint8
|  |  +--rw policy-event-clause-agg-ptr*       instance-identifier
|  |  +--rw policy-condition-clause-agg-ptr*   instance-identifier
|  |  +--rw policy-action-clause-agg-ptr*      instance-identifier
|  +--rw resolution-strategy
|  |  +--rw (resolution-strategy-type)?
|  |     +--:(fmr)
|  |     |  +--rw first-matching-rule?   boolean
|  |     +--:(lmr)
|  |        +--rw last-matching-rule?    boolean
|  +--rw default-action
|     +--rw default-action-type?   ingress-action
+--rw event-clause-container
|  ...
+--rw condition-clause-container
|  ...
+--rw action-clause-container
   ...
```

Modification of Time Zone

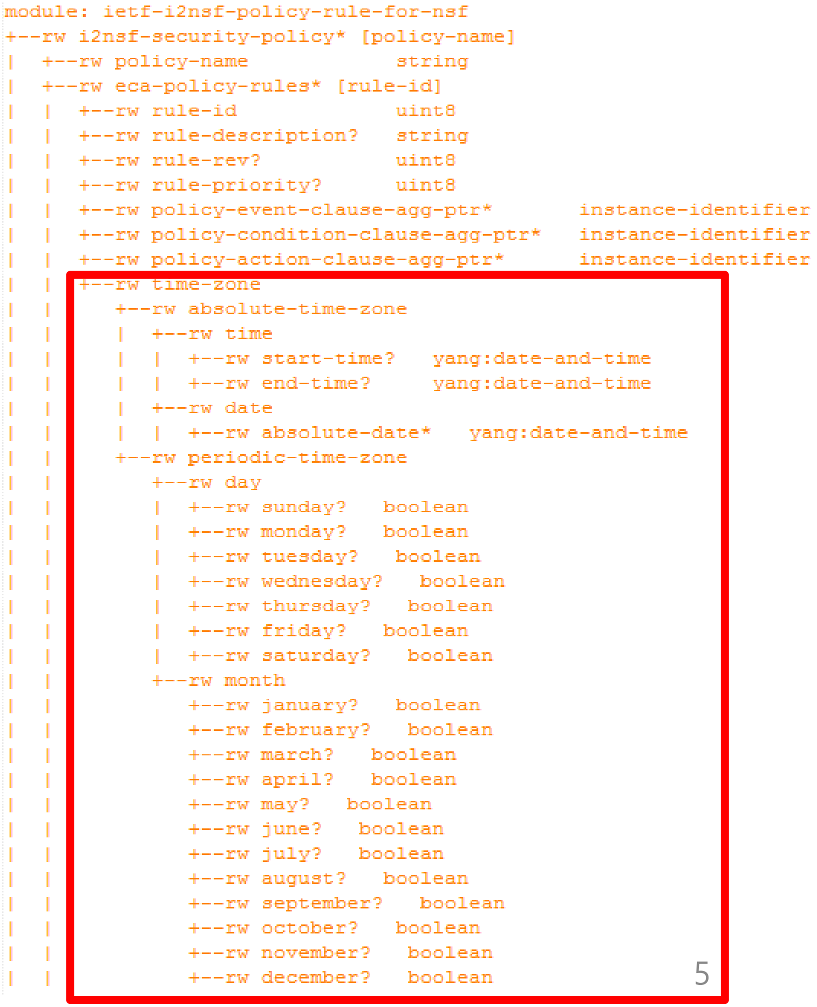
- We added not only an absolute time zone but also a periodic time zone to eca-policy-rules.

OLD:



```
module: ietf-i2nsf-nsf-facing-interface
+--rw generic-nsf
|  +--rw i2nsf-security-policy* [policy-name]
|     +--rw policy-name                 string
|     +--rw time-zone
|     |  +--rw start-time?   yang:date-and-time
|     |  +--rw end-time?     yang:date-and-time
|     +--rw eca-policy-rules* [rule-id]
|     |  +--rw rule-id                 uint8
|     |  +--rw rule-description?   string
|     |  +--rw rule-rev?               uint8
|     |  +--rw rule-priority?       uint8
|     |  +--rw policy-event-clause-agg-ptr*       instance-identifier
|     |  +--rw policy-condition-clause-agg-ptr*   instance-identifier
|     |  +--rw policy-action-clause-agg-ptr*      instance-identifier
|     +--rw resolution-strategy
|     |  +--rw (resolution-strategy-type)?
|     |     +--:(fmr)
|     |     |  +--rw first-matching-rule?   boolean
|     |     +--:(lmr)
|     |        +--rw last-matching-rule?    boolean
|     +--rw default-action
|        +--rw default-action-type?   ingress-action
+--rw event-clause-container
|  ...
+--rw condition-clause-container
|  ...
+--rw action-clause-container
   ...
```

NEW:



```
module: ietf-i2nsf-policy-rule-for-nsf
+--rw i2nsf-security-policy* [policy-name]
|  +--rw policy-name                string
|  +--rw eca-policy-rules* [rule-id]
|  |  +--rw rule-id                 uint8
|  |  +--rw rule-description?   string
|  |  +--rw rule-rev?               uint8
|  |  +--rw rule-priority?       uint8
|  |  +--rw policy-event-clause-agg-ptr*       instance-identifier
|  |  +--rw policy-condition-clause-agg-ptr*   instance-identifier
|  |  +--rw policy-action-clause-agg-ptr*      instance-identifier
|  |  +--rw time-zone
|  |     +--rw absolute-time-zone
|  |     |  +--rw time
|  |     |  |  +--rw start-time?   yang:date-and-time
|  |     |  |  +--rw end-time?     yang:date-and-time
|  |     |  +--rw date
|  |     |  |  +--rw absolute-date*   yang:date-and-time
|  |     +--rw periodic-time-zone
|  |        +--rw day
|  |        |  +--rw sunday?   boolean
|  |        |  +--rw monday?   boolean
|  |        |  +--rw tuesday?   boolean
|  |        |  +--rw wednesday?   boolean
|  |        |  +--rw thursday?   boolean
|  |        |  +--rw friday?   boolean
|  |        |  +--rw saturday?   boolean
|  |        +--rw month
|  |           +--rw january?   boolean
|  |           +--rw february?   boolean
|  |           +--rw march?   boolean
|  |           +--rw april?   boolean
|  |           +--rw may?   boolean
|  |           +--rw june?   boolean
|  |           +--rw july?   boolean
|  |           +--rw august?   boolean
|  |           +--rw september?   boolean
|  |           +--rw october?   boolean
|  |           +--rw november?   boolean
|  |           +--rw december?   boolean
```

Addition of Port Number to Condition Clause

- We added a port number to a condition clause.

OLD:

```
|  +--rw packet-security-tcp-condition
|  |  +--rw pkt-sec-cond-tcp-seq-num*       uint32
|  |  +--rw pkt-sec-cond-tcp-ack-num*       uint32
|  |  +--rw pkt-sec-cond-tcp-window-size*   uint16
|  |  +--rw pkt-sec-cond-tcp-flags*         uint8
|  +--rw packet-security-udp-condition
|  |  +--rw pkt-sec-cond-udp-length*   string
|  +--rw packet-security-icmp-condition
|     +--rw pkt-sec-cond-icmp-type*      uint8
|     +--rw pkt-sec-cond-icmp-code*      uint8
|     +--rw pkt-sec-cond-icmp-seg-num*   uint32
```

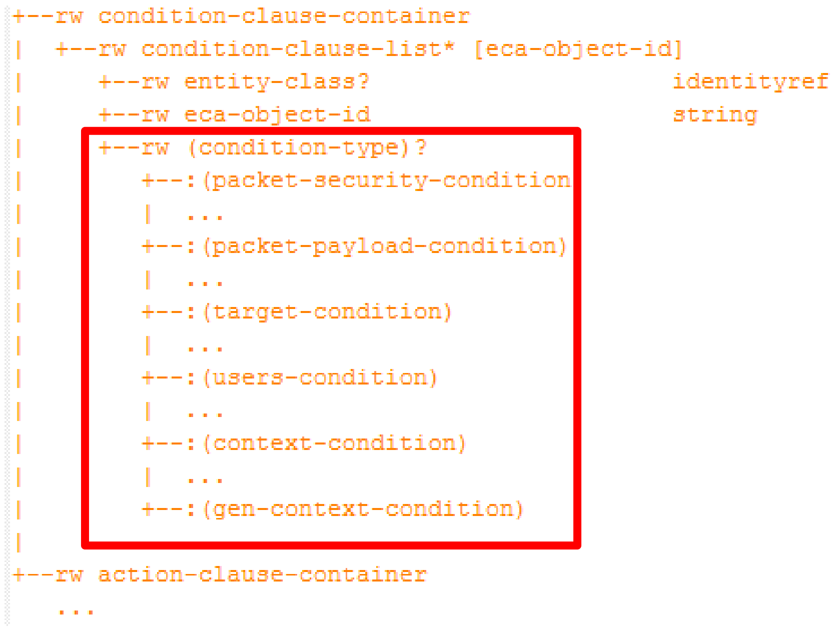
NEW:

```
|  +--rw packet-security-tcp-condition
|  |  +--rw pkt-sec-cond-tcp-src-port*         inet:port-number
|  |  +--rw pkt-sec-cond-tcp-dest-port*         inet:port-number
|  |  +--rw pkt-sec-cond-tcp-seq-num*       uint32
|  |  +--rw pkt-sec-cond-tcp-ack-num*       uint32
|  |  +--rw pkt-sec-cond-tcp-window-size*   uint16
|  |  +--rw pkt-sec-cond-tcp-flags*         uint8
|  +--rw packet-security-udp-condition
|  |  +--rw pkt-sec-cond-udp-src-port*         inet:port-number
|  |  +--rw pkt-sec-cond-udp-dest-port*         inet:port-number
|  |  +--rw pkt-sec-cond-udp-length*   string
|  +--rw packet-security-icmp-condition
|     +--rw pkt-sec-cond-icmp-type*      uint8
|     +--rw pkt-sec-cond-icmp-code*      uint8
|     +--rw pkt-sec-cond-icmp-seg-num*   uint32
```

Modification of Choice-Case Structure into Container Structure (1/2)

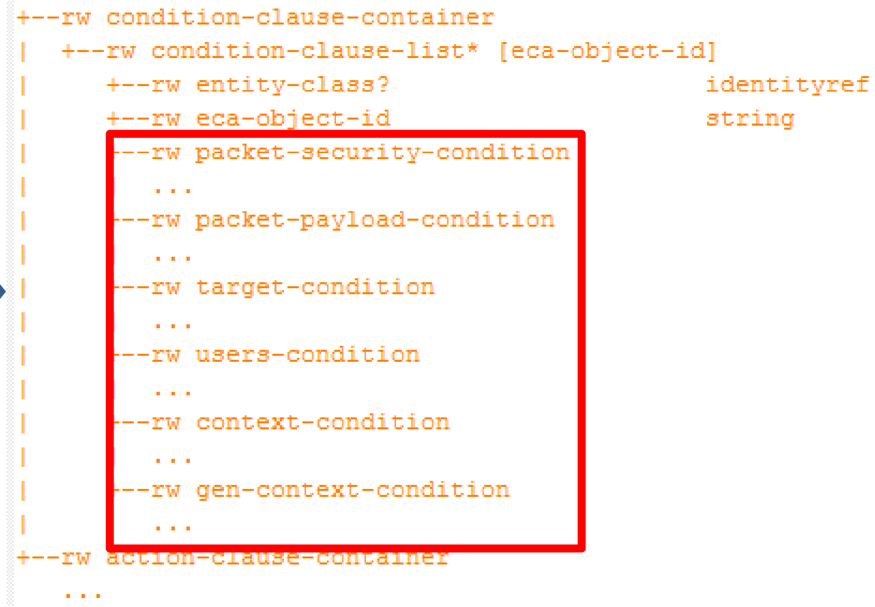
- We changed a choice-case structure into a container structure about a condition clause for a multiple configuration.

OLD:



```
+--rw condition-clause-container
|  +--rw condition-clause-list* [eca-object-id]
|     +--rw entity-class?                          identityref
|     +--rw eca-object-id                          string
|     +--rw (condition-type)?
|        +--:(packet-security-condition
|        |  ...
|        +--:(packet-payload-condition)
|        |  ...
|        +--:(target-condition)
|        |  ...
|        +--:(users-condition)
|        |  ...
|        +--:(context-condition)
|        |  ...
|        +--:(gen-context-condition)
|
+--rw action-clause-container
   ...
```

NEW:

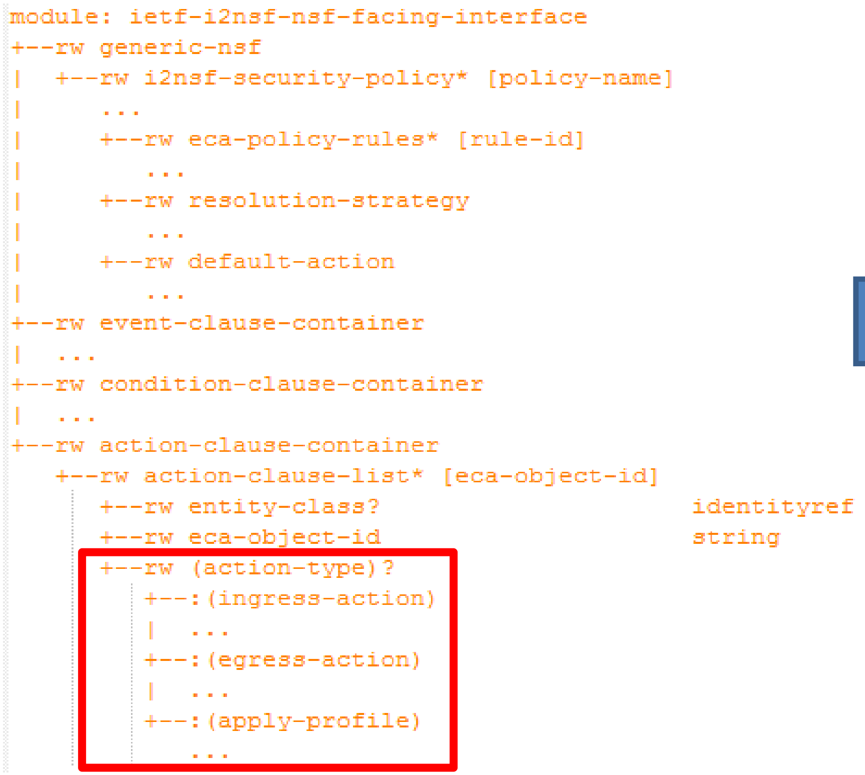


```
+--rw condition-clause-container
|  +--rw condition-clause-list* [eca-object-id]
|     +--rw entity-class?                          identityref
|     +--rw eca-object-id                          string
|     --rw packet-security-condition
|         ...
|     --rw packet-payload-condition
|         ...
|     --rw target-condition
|         ...
|     --rw users-condition
|         ...
|     --rw context-condition
|         ...
|     --rw gen-context-condition
|         ...
+--rw action-clause-container
   ...
```

Modification of Choice-Case Structure into Container Structure (2/2)

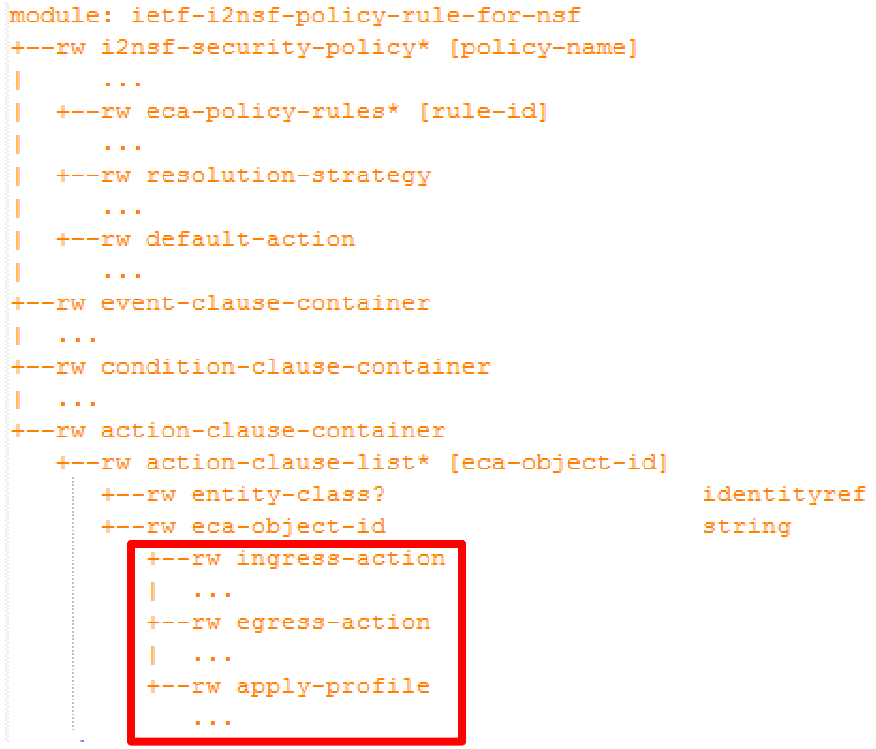
- We changed a choice-case structure into a container structure about an action clause for a multiple configuration.

OLD:



```
module: ietf-i2nsf-nsf-facing-interface
+--rw generic-nsf
|  +--rw i2nsf-security-policy* [policy-name]
|     ...
|     +--rw eca-policy-rules* [rule-id]
|        ...
|     +--rw resolution-strategy
|        ...
|     +--rw default-action
|        ...
+--rw event-clause-container
|  ...
+--rw condition-clause-container
|  ...
+--rw action-clause-container
   +--rw action-clause-list* [eca-object-id]
      +--rw entity-class?                        identityref
      +--rw eca-object-id                        string
      +--rw (action-type)?
         +--:(ingress-action)
         |  ...
         +--:(egress-action)
         |  ...
         +--:(apply-profile)
            ...
```

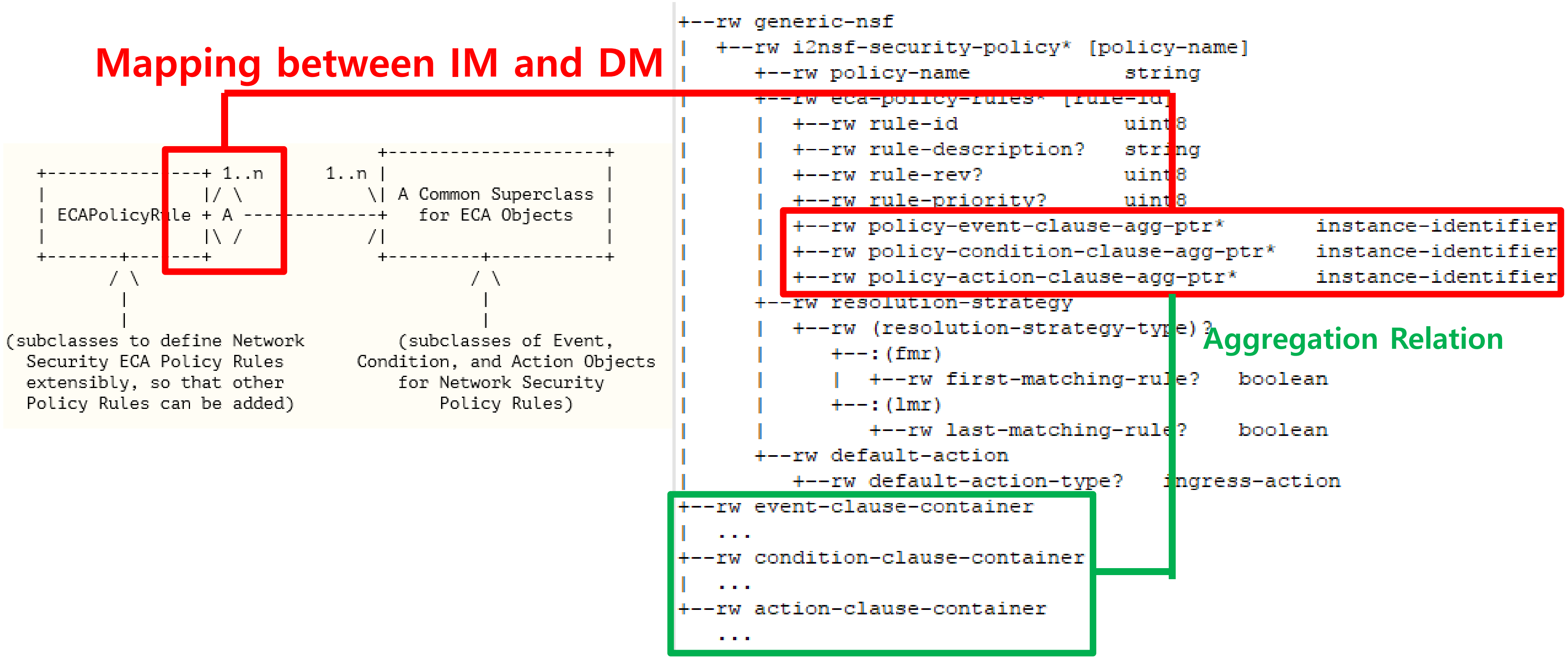
NEW:



```
module: ietf-i2nsf-policy-rule-for-nsf
+--rw i2nsf-security-policy* [policy-name]
|     ...
|  +--rw eca-policy-rules* [rule-id]
|     ...
|  +--rw resolution-strategy
|     ...
|  +--rw default-action
|     ...
+--rw event-clause-container
|  ...
+--rw condition-clause-container
|  ...
+--rw action-clause-container
   +--rw action-clause-list* [eca-object-id]
      +--rw entity-class?                        identityref
      +--rw eca-object-id                        string
         +--rw ingress-action
         |  ...
         +--rw egress-action
         |  ...
         +--rw apply-profile
            ...
```

Consistency between Capability IM and NSF-Facing Interface DM (Ongoing)

- We have modified event, condition, and action clauses to be aggregated into a policy.



```
                                    +---------------------+
 +---------------+ 1..n    1..n |                     |
 |               |/ \           \| A Common Superclass |
 | ECAPolicyRule + A ------------+   for ECA Objects   |
 |               |\ /           /|                     |
 +-------+-------+                +----------+----------+
        / \                                / \
         |                                  |
         |                                  |
(subclasses to define Network      (subclasses of Event,
  Security ECA Policy Rules      Condition, and Action Objects
  extensibly, so that other        for Network Security
  Policy Rules can be added)            Policy Rules)
```

```
+--rw generic-nsf
|  +--rw i2nsf-security-policy* [policy-name]
|     +--rw policy-name               string
|     +--rw eca-policy-rules* [rule-id]
|     |  +--rw rule-id                uint8
|     |  +--rw rule-description?      string
|     |  +--rw rule-rev?              uint8
|     |  +--rw rule-priority?         uint8
|     |  +--rw policy-event-clause-agg-ptr*       instance-identifier
|     |  +--rw policy-condition-clause-agg-ptr*   instance-identifier
|     |  +--rw policy-action-clause-agg-ptr*      instance-identifier
|     +--rw resolution-strategy
|     |  +--rw (resolution-strategy-type)?
|     |     +--:(fmr)
|     |     |  +--rw first-matching-rule?    boolean
|     |     +--:(lmr)
|     |        +--rw last-matching-rule?     boolean
|     +--rw default-action
|        +--rw default-action-type?    ingress-action
+--rw event-clause-container
|  ...
+--rw condition-clause-container
|  ...
+--rw action-clause-container
   ...
```

Next Steps

- We will change the current YANG data model to the YANG data model of Object-Oriented (OO) Style.

- We will verify the OO YANG data model by implementing a prototype in the next Hackathon.