YANG Data Model for Internet Protocol Security (IPSec)

draft-tran-ipecme-yang-ipsec-00

K. Tran, Ericsson

Goals

- YANG data model for configuring and monitoring IPSec
  - IPSec
  - IKE
  - IKEv2

Relationship with Other Modules

- An independent tree

Architecture

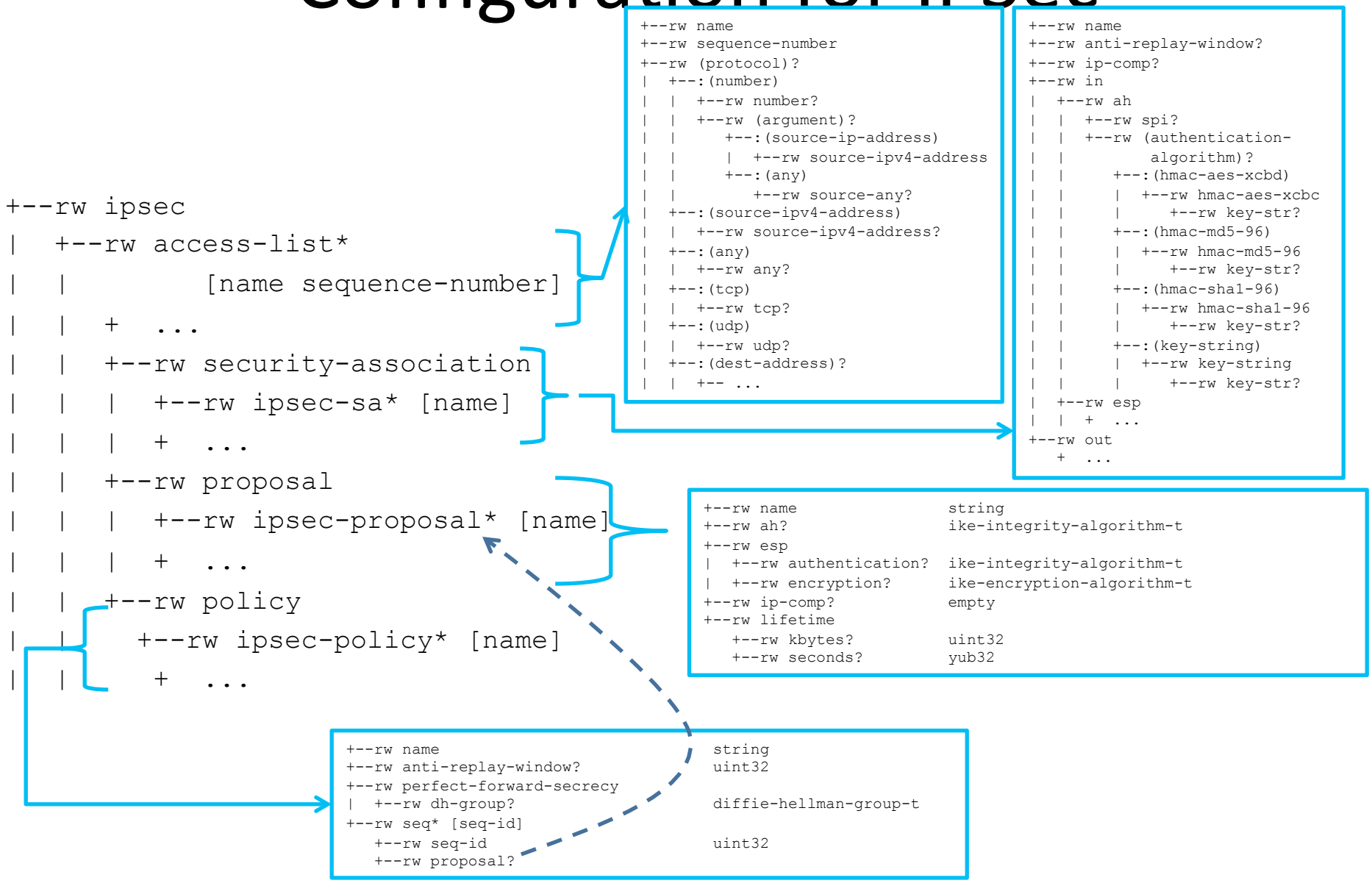
Configuration and State Data

```
+--rw ipsec
|  +--rw access-list*
|           [name sequence-number]
|     +  ...
|     +--rw security-association
|     |  +--rw ipsec-sa* [name]
|     |  +  ...
|     +--rw proposal
|     |  +--rw ipsec-proposal* [name]
|     |  +  ...
|     +--rw policy
|        +--rw ipsec-policy* [name]
|        +  ...
+--rw ike
|  +--rw proposal* [name]
|  |  +  ...
|  +--rw policy* [name]
|     +  ...
+--rw ikev2
|  +--rw proposal* [name]
|  |  +  ...
|  +--rw policy* [name]
|     +  ...
+--ro ipsec-state
|  +--ro …
+--ro ike-state
|  +--ro …
+--ro ikev2-state
   +--ro …
```

RPC

```
rpcs:
   +---x clear-ipsec-group
   |  +--ro input
   |     +--ro alarm-hold-down?
   |                          uint8
   |     +--ro ipsec-policy-name?
   |                          leafref
   +---x clear-ike-group
   |  +--ro input
   |     +--ro proposal?      leafref
   +---x clear-ikev2-group
      +--ro input
         +--ro proposal?      leafref
```

Configuration for IPSec



Configuration for IKE

```
+--rw ipsec
|  ...
+--rw ike
|  +--rw proposal* [name]
|  |  ...
|  +--rw keepalive? empty
|  +--rw policy* [name]
|  |  ...
```

```
+--rw name                string
+--rw dh-group            diffie-hellman-group-t
+--rw encryption
|  +--rw algorithm?       ike-encryption-algorithm-t
+--rw lifetime            uint32
+--rw authentication
|  +--rw algorithm?       ike-integrity-algorithm-t
|  +--rw prehared-key?    empty
|  +--rw rsa-signature?   empty
```

```
+--rw name                                  string
+--rw mode
|  +--rw aggressive?                        empty
|  +--rw main?                              empty
+--rw connection-type                       connection-type-t
+--rw pre-shared-key?                       union
+--rw validate-certificate-identity?        empty
+--rw seq* [seq-id]
|  +--rw seq-id                             uint32
|  +--rw proposal?
+--rw identity
   +--rw local
   |  +--rw (identity)?
   |     +--rw:(ipv4-address)
   |     |  +--rw ipv4-address?             inet:ipv4-address
   |     +--rw:(ipv6-address)
   |     |  +--rw ipv6-address?             inet:ipv6-address
   |     +--rw:(fqdn-string)
   |     |  +--rw fqdn-string?              string
   |     +--rw:(rfc822-address-string)
   |     |  +--rw rfc822-address-string?    string
   |     +--rw:(dnX509)
   |        +--rw dnX509?
   +--rw remote
   |  ...
```

Configuration for IKEv2

Operational States for IPSec

```
+--rw
|  …
+--ro ipsec-state
   +--ro policy*
   |  +--ro name?                       string
   |  +--ro anti-replay-window?         uint32
   |  +--ro perfect-forward-secrecy?    diffie-hellman-group-t
   |  +--ro seq*
   |     +--ro seq-id?          uint32
   |     +--ro proposal-name?   string
   +--ro proposal*
   |  +--ro name?       string
   |  +--ro ah?         ike-integrity-algorithm-t
   |  +--ro esp
   |  |  +--ro authentication?   ike-integrity-algorithm-t
   |  |  +--ro encryption?       ike-encryption-algorithm-t
   |  +--ro ip-comp?    empty
   |  +--ro lifetime
   |     +--ro kbytes?    uint32
   |     +--ro seconds?   uint32
   +--ro hold-down?   uint32
   +--ro sa*
      +--ro name?                        string
      +--ro anti-replay-window?          uint16
      +--ro ip-comp?                     empty
      +--ro spi?                         uint32
      +--ro description?                 string
      +--ro authentication-algorithm?    ike-integrity-algorithm-t
      +--ro encryption-algorithm?        ike-encryption-algorithm-t
```

Operational States for IKE

```
+--rw
|  ...
+--ro ipsec-state
|  ...
+--ro ike-state
   |  +--ro proposal*
   |  |  +--ro name?              string
   |  |  +--ro lifetime?          uint32
   |  |  +--ro encryption?        ike-encryption-algorithm-t
   |  |  +--ro dh-group?          diffie-hellman-group-t
   |  |  +--ro authentication?    ike-integrity-algorithm-t
   |  +--ro policy*
   |     +--ro name?               string
   |     +--ro description?        string
   |     +--ro mode?               enumeration
   |     +--ro connection-type?    connection-type-t
   |     +--ro local-identity?     inet:ipv4-address-no-zone
   |     +--ro remote-identity?    inet:ipv4-address-no-zone
   |     +--ro pre-shared-key?     string
   |     +--ro seq?                uint32
   |     +--ro proposal?           string
```

Operational States for IKEv2

```
+--rw
|  ...
+--ro ipsec-state
|  ...
+--ro ike-state
|  ...
+--ro ikev2-state
   |  +--ro proposal*
   |  |  +--ro name?                      string
   |  |  +--ro pseudo-random-function?   pseudo-random-function-t
   |  |  +--ro authentication?           ike-integrity-algorithm-t
   |  |  +--ro encryption?               ike-encryption-algorithm-t
   |  |  +--ro dh-group                  diffie-hellman-group-t
   |  +--ro policy*
   |     +--ro name?              string
   |     +--ro description?       string
   |     +--ro mode?              enumeration
   |     +--ro connection-type?   connection-type-t
   |     +--ro local-identity?    inet:ipv4-address-no-zone
   |     +--ro remote-identity?   inet:ipv4-address-no-zone
   |     +--ro pre-shared-key?    string
   |     +--ro seq?               uint32
   |     +--ro proposal?          string
```

RPC Operations

```
rpcs:
   +---x clear-ipsec-group
   |  +--ro input
   |     +--ro alarm-hold-down?     uint8
   |     +--ro ipsec-policy-name?   leafref
   +---x clear-ike-group
   |  +--ro input
   |     +--ro proposal?            leafref
   +---x clear-ikev2-group
      +--ro input
         +--ro proposal?            leafref
```

Comparison

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```
+--rw ipsec
|  +--rw access-list* [name sequence-number]
|  |  +--rw name                          string
|  |  +--rw description?                  String
|  |  +--rw sequence-number               uint32
|  |  +--rw (protocol)?
|  |     ...
|  +--rw alarms
|  |  +--rw hold-down?   uint8
|  +--rw qos
|  |  +--rw policy* [name]
|  |     ...
|  +--rw redundancy
|  |     ...
|  +--rw security-association
|  |  +--rw ipsec-sa* [name]
|  |     ...
|  +--rw proposal
|  |  +--rw ipsec-proposal* [name]
|  |     ...
|  +--rw policy
|     +--rw ipsec-policy* [name]
|  |     ...
+--rw ike
|  +--rw proposal* [name]
|  |     ...
|  +--rw keepalive?   empty
|  +--rw policy* [name]
|  |     ...
+--rw ikev2
|  +--rw proposal* [name]
|  |     ...
|  +--rw policy* [name]
|  |     ...
```

```
+--ro ipsec-state
|  +--ro proposal*
|  |  ...
|  +--ro policy*
|  |  ...
|  +--ro sa*
+--ro ike-state
|  +--ro proposal*
|  |  ...
|  +--ro policy*
|  |  ...
+--ro ikev2-state
   +--ro proposal*
   |  ...
   +--ro policy*
      +  ...
```

draft-wang-ipsecme-ike-yang

```
+--rw ike-global-configuration
|  ...
+--rw ipsec-proposal
|  ...
+--rw ike-proposal
|  ...
+--rw ike-peer
|  ...
+--rw ipsec-policy
|  +--rw policy-entries*
|  |              [policy-name sequence-number]
|  |  ...
|  +--rw policy-template-entries*
|                 [policy-name sequence-number]
|     ...
+--rw ipsec-interface-map
|  ...
+--ro ike-sa
|  ...
+--ro ipsec-sa
|  ...
```

Next Steps

- Solicit comments
- Plan to coordinate
  - draft-tran-ipecme-yang-ipsec
  - draft-wang-ipsec-ipsec-yang
  - draft-wang-ipsec-ike-yang
- Tangential topics
  - draft-chen-rtgwg-key-table-yang
  - draft-acee-rtg-key-chain-yang