

YANG Data Model for OSPF Protocol

draft-ietf-ospf-yang-07
draft-ietf-ospf-sr-yang-00
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Changes in draft-ietf-ospf-yang-07

- Primarily involve aligning with other models
 - Models that OSPF imports and depends on
 - ietf-routing-types.yang
 - ietf-key-chain.yang
 - ISIS YANG model

Align with Routing Types and Key Chain Models

- Use of ietf-routing-types.yang
 - From ietf-yang-types.yang dotted-quad to ietf-routing-types.yang router-id
- Align with updated ietf-key-chain.yang
 - See next slide

Key-Chain Model Alignment

augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol:

```

+--rw instance* [af]
  +--rw areas
    | +--rw area* [area-id]
    |   +--rw interfaces
    |     +--rw interface* [name]
    |       +--rw name if:interface-ref
    |       .
    |       .
    |     +--rw authentication
    |       | +--rw (auth-type-selection)?
    |       | +--:(auth-ipsec)
    |       | | {ospfv3-authentication-ipsec}?
    |       | | +--rw sa? string
    |       | +--:(auth-trailer-key-chain)
    |       | | +--rw key-chain?
    |       | | key-chain:key-chain-ref
    |       | +--:(auth-trailer-key)
    |       | +--rw key? string
    |       | +--rw crypto-algorithm
    |       | +--rw (algorithm)?
    |       | +--:(hmac-sha-1-12) {crypto-hmac-sha-1-12}?
    |       | | +--rw hmac-sha1-12? empty
    |       | +--:(md5)
    |       | | +--rw md5? empty
    |       | +--:(sha-1)
    |       | | +--rw sha-1? empty
    |       | +--:(hmac-sha-1)
    |       | | +--rw hmac-sha-1? empty
    |       | +--:(hmac-sha-256)
    |       | | +--rw hmac-sha-256? empty
    |       | .
    |       | .
    |       | /* more algorithms */
  
```

```

+--rw key? string
+--rw crypto-algorithm
+--rw (algorithm)?
+--:(hmac-sha-1-12) {crypto-hmac-sha-1-12}?
| +--rw hmac-sha1-12? empty
+--:(md5)
| +--rw md5? empty
+--:(sha-1)
| +--rw sha-1? empty
+--:(hmac-sha-1)
| +--rw hmac-sha-1? empty
+--:(hmac-sha-256)
| +--rw hmac-sha-256? empty
.
.
/* more algorithms */
  
```

augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol:

```

+--rw instance* [af]
  +--rw areas
    | +--rw area* [area-id]
    |   +--rw interfaces
    |     +--rw interface* [name]
    |       +--rw name if:interface-ref
    |       .
    |       .
    |     +--rw authentication
    |       | +--rw (auth-type-selection)?
    |       | +--:(auth-ipsec)
    |       | | {ospfv3-authentication-ipsec}?
    |       | | +--rw sa? string
    |       | +--:(auth-trailer-key-chain)
    |       | | +--rw key-chain?
    |       | | key-chain:key-chain-ref
    |       | +--:(auth-trailer-key)
    |       | +--rw key? string
    |       | +--rw crypto-algorithm? identityref
  
```

```

+--rw key? string
+--rw crypto-algorithm? identityref
  
```

From ietf-key-chain.yang:

```

identity crypto-algorithm {
  description
    "Base identity of cryptographic algorithm options.";
}
identity hmac-sha-1-12 {
  base crypto-algorithm;
  if-feature "crypto-hmac-sha-1-12";
}
identity aes-cmac-prf-128 {
  base crypto-algorithm;
  if-feature "aes-cmac-prf-128";
}
/* more algorithms defined as identities */
  
```

new version

Align with ISIS

- Removed less common functionality
 - Removed optional feature LDP-IGP autoconfig
 - Removed the ability to implicitly configure a TE Router-ID by referencing an interface
- Added newer features
 - Added optional feature ietf-spf-delay (to support draft-ietf-rtgwg-backoff-algo)
 - Added optional feature node-tag and encoding in LSA
- Added several RPCs
 - clear-neighbor
 - clear-database
- Moved BFD configuration back into the model as an optional feature
 - Only enable/disable BFD
- Renamed several identifiers such that OSPF and ISIS models match
 - network-type -> interface-type
 - admin-distance -> preference

Previous version

```
augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol:  
  +--rw ospf  
  .  
  .  
  +--rw instance* [af]  
    +--rw af          identityref  
    .  
    .  
  +--rw spf-control  
    | +--rw paths?    uint16 {max-ecmp}?
```

New version

```
augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol:  
  +--rw ospf  
  .  
  .  
  +--rw instance* [af]  
    +--rw af          identityref  
    .  
    .  
  +--rw spf-control  
    | +--rw paths?    uint16 {max-ecmp}?  
    | +--rw ietf-spf-delay {ietf-spf-delay}?  
    |   +--rw initial-delay?  uint16  
    |   +--rw short-delay?    uint16  
    |   +--rw long-delay?     uint16  
    |   +--rw hold-down?      uint16  
    |   +--rw time-to-learn?  uint16
```

Modeled after
draft-ietf-rtgwg-backoff-algo

ISIS Model Alignment: New node-tag and LSA encoding additions

augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol:

```
  +--rw ospf
    .
    .
    +--rw instance* [af]
      +--rw af          identityref
```

```
  .
  .
  +--rw node-tags {node-tag}
    | +--rw node-tag* [tag]
    |   +--rw tag          uint32
```

LSA encoding

```
  .
  .
  +--ro header
    | +--ro option      bits
    | +--ro lsa-id     inet:ip-address
    | .
    | .
```

```
  +--ro body
    +--ro opaque
      +--ro node-tag-tlvs*
        | +--ro node-tag*
        |   +--ro tag?    uint32
```

rpcs:

- +---x clear-neighbor

 - | +---w input

 - | +---w routing-protocol-name -> /rt:routing/control-plane-protocols/control-plane-protocol/name

 - | +---w interface? if:interface-ref

- +---x clear-database

 - +---w input

 - +---w routing-protocol-name -> /rt:routing/control-plane-protocols/control-plane-protocol/name

ISIS Model Alignment: Moved BFD enable/disable to ietf-ospf.yang

```
augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol:  
+--rw instance* [af]  
  +--rw areas  
    | +--rw area* [area-id]  
    |   +--rw interfaces  
    |     +--rw interface* [name]  
    |       +--rw name    if:interface-ref  
    |       + .  
    |       + .  
    |       +--rw bfd     {bfd}  
    |         | +--rw enable?    boolean  
    |         + .  
    |         + .
```

Current Status: draft-ietf-ospf-yang-07

- Edits pending
 - Virtual link constraint error
 - Static neighbor identification
 - OSPF and ISIS final alignment on LSDB/SPF logging
- At least one implementation in progress
- Functionality mostly complete for both config and operational states
 - Details in next slide

Dependencies

- All YANG module dependencies are in RFC or Last Call stage with two exceptions
 - ietf-routing-types.yang is an exception
 - Routing YANG Design Team will prioritize to expedite standardization
 - Route policy for redistribution is another exception
 - draft-ietf-rtgwg-policy-model expired in April 2016
- Datastore
 - Still no decision on combined config-state tree vs. separate

Next Steps: draft-ietf-ospf-yang

- Make pending edits
- YANG doctor review
- Last call for publication
 - Wait for some or all dependencies?

Changes in draft-ietf-ospf-sr-yang-01

- Align with segment routing specification
 - Added the P-bit persistent flag to Adjacency SID Sub-TLV
- Xpath corrections

Next Steps: draft-ietf-ospf-sr-yang

- Pending changes
 - Prefix SID Sub-TLV flags currently defined to begin at position 1
 - Binding TLV consists of one or more ERO Sub-TLVs
- Decide where to place OSPFv3 SR extensions for IPv6 data plane
 - Within OSPF-SR draft or in a separate draft specific to IPv6 data plane
- YANG doctor review