

IETF 93 Prague Yang Data Model for OSPF Protocol draft-ietf-ospf-yang-01

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Agenda

- Changes from -00 for ietf-ospf module
- New ietf-ospf-sr module in -01
- Next steps

Protocol-centric vs VRF-centric

- Decide to support VRF-centric config only in last IETF 92.
- Remove protocol-centric support.

+-rw ospf

+-rw instance* [routing-instance af]

+-rw ospf

+-rw instance* [af]

Structural Changes

- Enclose list in container, except for instance.

```
+--rw area* [area-id]
```

```
| +--rw virtual-link* [router-id]
```

```
| +--rw sham-link* [local-id remote-id]
```

```
| +--rw interface* [interface]
```

```
+--rw areas
```

```
| +--rw area* [area-id]
```

```
|   +--rw virtual-links
```

```
|     | +--rw virtual-link* [router-id]
```

```
|     +--rw sham-links
```

```
|       | +--rw sham-link* [local-id remote-id]
```

```
|       +--rw interfaces
```

```
|         +--rw interface* [interface]
```

- pyang failure when adding instances container.

Change due to ietf-routing

- Use relative path for reference to rib.

```
leaf name {  
  type rt:rib-ref;  
  description "RIB";  
}
```

```
leaf name {  
  type leafref {  
    path "../../../../../rt:ribs/rt:rib/rt:name";  
  }  
  description "RIB";  
}
```

Change due to ietf-routing (Cont.)

- Add ability to set single admin distance.

```
+-rw admin-distance
| +--rw (granularity)?
| | +--:(detail)
| | | +--rw intra-area?  uint8
| | | +--rw inter-area?  uint8
| | +--:(coarse)
| |   +--rw internal?    uint8
| +--rw external?       uint8
```

```
+--rw admin-distance
| +--rw (scope)?
|   +--:(single-value)
|   | +--rw all?        uint8
|   +--:(multi-values)
|     +--rw (granularity)?
|     | +--:(detail)
|     | | +--rw intra-area?  uint8
|     | | +--rw inter-area?  uint8
|     | +--:(coarse)
|     |   +--rw internal?    uint8
|     +--rw external?       uint8
```

New additions

- Add F and T bit to OSPFv3 external LSA.
- Add virtual-link/sham-link to operation state.
- Add IPFRR per-interface config.
- Add node-flag.
- Add stub router support.
- Add statistics to operation data.
- Add local rib.

New bits and Virtual/Sham link

- Add F and T bit to OSPFv3 external LSA.
- Add virtual-link/sham-link to operation state.

```
+--ro ospf
  +--ro instance* [af]
    +--ro areas
      | +--ro area* [area-id]
      |   +--ro virtual-links
      |     | +--ro virtual-link*
      |     +--ro sham-links
      |       | +--ro sham-link*
```


IPFRR

```
+--rw instance* [af]
  +--rw fast-reroute {fast-reroute}?
    | +--rw lfa {lfa}?
  +--rw areas
    | +--rw area* [area-id]
    |   +--rw interfaces
    |     +--rw interface* [interface]
    |       +--rw interface          if:interface-ref
    |       +--rw fast-reroute {fast-reroute}?
    |         | +--rw lfa {lfa}?
    |         |   +--rw candidate-disabled? boolean
    |         |   +--rw enabled?          boolean
    |         |   +--rw remote-lfa {remote-lfa}?
    |         |   +--rw enabled? boolean
```

Node-flag

- draft-ietf-ospf-prefix-link-attr-06.txt

```
+--rw instance* [af]
  +--rw areas
    | +--rw area* [area-id]
    |   +--rw interfaces
    |     +--rw interface* [interface]
    |       +--rw interface      if:interface-ref
    |       +--rw node-flag?     boolean {node-
flag}?
```

Stub router support

- rfc6987

```
+--ro ospf
  +--ro instance* [af]
    +--rw stub-router {stub-router}?
      | +--rw (trigger)?
      |   +--:(always)
      |     +--rw always!
```

Statistics

- Per-Instance.

```
+--ro ospf
  +--ro instance* [af]
    +--ro af      identityref
    +--ro statistics
      | +--ro originate-new-lsa-count? yang:counter32
      | +--ro rx-new-lsas-count?      yang:counter32
      | +--ro as-scope-lsa-count?    yang:gauge32
      | +--ro as-scope-lsa-cksum-sum? uint32
      | +--ro database
      |   +--ro as-scope-lsa-type*
      |     +--ro lsa-type?      uint16
      |     +--ro lsa-count?    yang:gauge32
      |     +--ro lsa-cksum-sum? Int32
```

Statistics (Cont.)

- Per area & per interface.

+++ro areas

```
| +++ro area* [area-id]
|   +++ro area-id      area-id-type
|   +++ro statistics
|   | +++ro spf-runs-count?      yang:counter32
|   | +++ro abr-count?          yang:gauge32
|   | +++ro asbr-count?         yang:gauge32
|   | +++ro ar-nssa-translator-event-count? yang:counter32
|   | +++ro area-scope-lsa-count? yang:gauge32
|   | +++ro area-scope-lsa-cksum-sum?   int32
|   | +++ro database
|   |   +++ro area-scope-lsa-type*
|   |     +++ro lsa-type?    uint16
|   |     +++ro lsa-count?   yang:gauge32
|   |     +++ro lsa-cksum-sum? Int32
```

| +++ro interfaces

```
| | +++ro interface* [interface]
| |   +++ro statistics
| |   | +++ro if-event-count?      yang:counter32
| |   | +++ro link-scope-lsa-count? yang:gauge32
| |   | +++ro link-scope-lsa-cksum-sum? uint32
| |   | +++ro database
| |   |   +++ro link-scope-lsa-type*
| |   |     +++ro lsa-type?    uint16
| |   |     +++ro lsa-count?   yang:gauge32
| |   |     +++ro lsa-cksum-sum? int32
```

Local RIB

```
+--ro ospf
  +--ro instance* [af]
    +--ro local-rib
      | +--ro route* [prefix]
      |   +--ro prefix      inet:ip-prefix
      |   +--ro next-hops
      |     | +--ro next-hop* [next-hop]
      |     |   +--ro outgoing-interface? if:interface-ref
      |     |   +--ro next-hop          inet:ip-address
      |     +--ro metric?      uint32
      |     +--ro route-type?  route-type
      |     +--ro route-tag?   uint32
```

Reorganization & Cleanup

- Replace protocol-shutdown with admin-control.
- Reorganize max-path etc node.
- Remove key statement inside LSA body.
- Use dotted-quad for all router-id fields.
- Update grouping notification-instance-hdr.
- Rework condition for opaque type and id in OSPFv2 LSA.

Replace protocol-shutdown with admin-control

```
+-rw instance* [routing-instance af]
  +-rw protocol-shutdown {protocol-shutdown}?
  | +-rw shutdown? boolean

  | +-rw interface* [interface]
  |   +-rw protocol-shutdown {protocol-if-
shutdown}?
  |   | +-rw shutdown? boolean
```

```
+-rw instance* [af]
  +-rw enable?          boolean {admin-control}?

  | +-ro interfaces
  | | +-ro interface* [interface]
  | |   +-ro enable?          boolean {admin-
control}?
```


Reorganize max-path etc node

+-rw instance* [routing-instance af]

+-rw maximum

| +-rw paths? uint16 {max-ecmp}?

| +-rw max-lsa? uint32 {max-lsa}?

+-rw instance* [af]

+-rw spf-control

| +-rw paths? uint16 {max-ecmp}?

+-rw database-control

| +-rw max-lsa? uint32 {max-lsa}?

Remove key statement inside LSA body

		+-ro ospfv2			+-ro ospfv2
		+-ro header			+-ro header
		+-ro body			+-ro body
		+-ro router			+-ro router
		+-ro link* [link-id link-data]			+-ro links
		+-ro link-id union			+-ro link*
		+-ro link-data union			+-ro link-id? union
					+-ro link-data? union

Use dotted-quad for all router-id fields

```
| | +--ro neighbor* [neighbor-id]
```

```
| | | +--ro neighbor-id inet:ipv4-address
```

```
| | +--ro neighbors
```

```
| | | +--ro neighbor* [neighbor-router-id]
```

```
| | | +--ro neighbor-router-id yang:dotted-quad
```

Update grouping notification- instance-hdr

+--ro routing-instance? rt:routing-instance-ref	+--ro routing-instance? rt:routing-instance-ref
+--ro routing-protocol-name? string	+--ro routing-protocol-type? leafref
+--ro instance-af	+--ro routing-protocol-name? leafref
+--ro af? identityref	+--ro af? leafref

- Path check to ensure correctness.

```
leaf routing-protocol-type {
  type leafref {
    path "/rt:routing/rt:routing-instance"
      + "[rt:name=current()/../routing-instance]/"
      + "rt:routing-protocols/rt:routing-protocol/"
      + "rt:type";
  }
  must ". = 'ospf:ospfv2' or . = 'ospf:ospfv3'" {
    description "Only interested in OSPF routing protocol";
  }
  description
    "Describes the type of the OSPF routing protocol.";
}
```

- Config
 - VRF red ospf 1
 - VRF blue ospf 2
- VRF red ospf 2 is invalid

Rework condition for opaque type and id in OSPFv2 LSA

- Allow DSDL validation

```
leaf opaque-type {  
  when "../header/type = 9 or "  
    + "../header/type = 10 or "  
    + "../header/type = 11" {  
    description  
      "Only apply to opaque LSA.";  
  }  
  type uint8;  
  mandatory true;  
  description "Opaque type."  
}
```

```
container header {  
  must "(type = 9 or type = 10 or type = 11) and "  
    + "opaque-id and opaque-type "  
    + "or (type != 9 and type != 10 and type != 11) "  
    + "and not(opaque-id) and "  
    + "not(opaque-type)" {  
    description "Opaque type and id only apply to  
opaque LSA."  
  }  
  leaf opaque-type {  
    type uint8;  
    description "Opaque type."  
  }  
  leaf opaque-id {  
    type uint24;  
    description "Opaque id."  
  }  
}
```

Bugfixes

- Allow multiple link TLVs in one LSA.
- Make unreserved bandwidth into list.
- Rename local-remote-ipv4-addr with remote-if-ipv4-addr.
- Remove OSPFv3 restriction in link-scope-lsas.
- Fix usage of af-area-config.
- Use uint16 for LSA type.
- Support more than one multi-area per interface.

Opaque LSA

- Allow multiple link TLVs in one LSA.
- Make unreserved bandwidth into list.
- Rename local-remote-ipv4-addr with remote-if-ipv4-addr.

```
||| | +--ro opaque
||| |   +--ro link-tlv
||| |     +--ro local-remote-ipv4-addr* inet:ipv4-
address
||| |     +--ro unreserved-bandwidth? decimal64
```

```
||| | +--ro opaque
||| |   +--ro link-tlvs
||| |     | +--ro link-tlv
||| |     |   +--ro remote-if-ipv4-addr
||| |     |   | +--ro remote-if-ipv4-addr* inet:ipv4-
address
||| |     |   +--ro unreserved-bandwidths
||| |     |   | +--ro unreserved-bandwidth*
||| |     |   |   +--ro priority?          Uint8
||| |     |   |   +--ro unreserved-bandwidth? decimal64
```

Remove OSPFv3 restriction in link-scope-lsas.

```
list link-scope-lsas {  
  when ".././.././../rt:type = 'ospfv3'" {  
    description  
      "Link scope LSA only exists in OSPFv3."  
  }  
}
```

```
container link-scope-lsas {  
  description  
    "All link scope LSAs of this LSA type."  
  list link-scope-lsa {  
  }  
}
```


Fix usage of af-area-config

```
grouping area-config {
  uses af-area-config {
    when "../operation-mode = 'ospf:ships-in-the-night'" {
      description
        "Ships in the night configuration.";
    }
  }
}
```

```
list area {
  uses area-config;
```

```
container areas {
  uses area-config;
  uses af-area-config {
    when "../operation-mode = "
      + "'ospf:ships-in-the-night'" {
      description
        "Ships in the night configuration.";
    }
  }
}
```

Use uint16 for LSA type

| +--ro area-scope-lsas* [lsa-type]

| +--ro lsa-type uint8

| +--ro area-scope-lsa* [lsa-id adv-router]

| +--ro database

| +--ro area-scope-lsa-type* [lsa-type]

| +--ro lsa-type uint16

| +--ro area-scope-lsas

| +--ro area-scope-lsa* [lsa-id adv-router]

Support more than one multi-area per interface

```
| +--rw interface* [interface]
```

```
|   +--rw interface      if:interface-ref
```

```
|   +--rw multi-area {multi-area-adj}?
```

```
|     | +--rw multi-area-id? area-id-type
```

```
|     | +--rw cost?      uint16
```

```
|   +--rw interfaces
```

```
|     +--rw interface* [interface]
```

```
|     +--rw multi-areas
```

```
|         | +--rw multi-area* [multi-area-id] {multi-area-adj}?
```

```
|         |   +--rw multi-area-id area-id-type
```

```
|         |   +--rw cost?      uint16
```

OSPF SR

- New ietf-ospf-sr module
- Same document.
- Augment config and operation state in ietf-ospf using grouping defined in **draft-litkowski-spring-sr-yang-01**.
- Augment LSA groupings in ietf-ospf based on draft-ietf-ospf-prefix-link-attr-06.txt and draft-ietf-ospf-segment-routing-extensions-04.

Next Steps

- Implementation efforts
- Model
 - More config/operation state?
 - Inheritance
 - Operation state placement
- More feedback