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YANG Data Model for OSPF Application-Specific Link Attributes and  
Flexible Algorithm  
draft-ietf-lsr-ospf-flex-algo-yang-00

## Abstract

This document defines a YANG data model to support OSPF Application-Specific Link Attributes and Flexible Algorithm. It also specifies the initial version of IANA-maintained YANG modules for IGP Algorithm Types and IGP Metric-Type.

## Status of This Memo

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## 1. Overview

This document defines YANG [RFC7950] data modules augmenting the IETF OSPF YANG model [RFC9129], which itself augments [RFC8349], to provide support for both OSPF Flexible Algorithm as defined in [RFC9350] and OSPF Application-Specific Link Attributes as defined in [RFC9492].

Four YANG modules defined in this document. The first is the initial version of the IANA-maintained YANG module for IGP Algorithm Types. The second module is the initial version of the IANA-maintained YANG module for IGP Metric-Type. The third module augments the IETF OSPF YANG data model to support OSPF Flexible Algorithm, and the fourth module is to support OSPF Application-Specific Link Attributes.

## 1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

## 2. IANA IGP Algorithm Types Module

IANA has created a registry titled "IGP Algorithm Types" under the "Interior Gateway Protocol (IGP) Parameters" registry group to identify Algorithm Types. Module iana-igp-algo-types is an IANA-maintained module, which defines the identities for the Algorithm Types as in the IANA "IGP Algorithm Types" registry.

This module is maintained by IANA and will be updated if and when there is any change to the registry.

This document defines the initial version of the IANA-maintained YANG module for Algorithm Types that mirrors the IANA "IGP Algorithm Types" registry [IANA-IGP-ALGO-Types].

```
<CODE BEGINS> file "iana-igp-algo-types@2025-06-13.yang"
module iana-igp-algo-types {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:iana-igp-algo-types";
  prefix iana-algo-types;

  organization
    "Internet Assigned Numbers Authority (IANA)";

  contact
    "Internet Assigned Numbers Authority

    ICANN
    12025 Waterfront Drive, Suite 300
    Los Angeles, CA 90094-2536
    United States of America

    Tel:      +1 310 301 5800
    <mailto:iana@iana.org>";

  description
    "The YANG module defines the identities for Interior Gateway
    Protocol (IGP) Algorithm Types.

    This YANG module is maintained by IANA and reflects the 'IGP
    Algorithm Types' registry.

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    This initial version of this YANG module is part of RFC XXXX
    (https://www.rfc-editor.org/info/rfcXXXX); see the RFC itself
    for full legal notices.

    //RFC Ed.: replace XXXX with actual RFC number and remove
    this note
```

//RFC Ed.: replace IANA\_FOO\_URL and remove this note.

The latest version of this YANG module is available at  
<mailto:iana@iana.org>;

```
revision 2025-06-13 {
  description
    "Initial Version";
  reference
    "RFC XXXX: YANG Data Model for OSPF Flexible Algorithm";
}

identity algo-type {
  description
    "Base identity for IGP Algorithm Type. The algorithm types
    are defined in IANA IGP Algorithm Types registry.";
}

identity algo-spf {
  base algo-type;
  description
    "Shortest Path First (SPF) algorithm based on link metric.";
  reference
    "RFC 8665: OSPF Extensions for Segment Routing";
}

identity algo-strict-spf {
  base algo-type;
  description
    "Strict Shortest Path First (SPF) algorithm based on link
    metric.";
  reference
    "RFC 8665: OSPF Extensions for Segment Routing";
}
}
<CODE ENDS>
```

### 3. IANA IGP Metric Types Module

IANA has created a registry titled "IGP Metric-Type" under the "Interior Gateway Protocol (IGP) Parameters" registry group to identify Metric Types. Module iana-igp-metric-types is an IANA-maintained module, which defines the identities for the Metric Types as in the IANA "IGP Metric-Type" registry.

This module is maintained by IANA and will be updated if and when there is any change to the registry.

This document defines the initial version of the IANA-maintained YANG module for Algorithm Types that mirrors the IANA "IGP Metric-Type" registry [IANA-IGP-Metric-Types].

```
<CODE BEGINS> file "iana-igp-metric-types@2025-06-13.yang"
module iana-igp-metric-types {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:iana-igp-metric-types";
  prefix iana-metric-types;
```

```
organization
```

```
"Internet Assigned Numbers Authority (IANA)";
```

```
contact
```

```
"Internet Assigned Numbers Authority
```

```
ICANN
```

```
12025 Waterfront Drive, Suite 300
```

```
Los Angeles, CA 90094-2536
```

```
United States of America
```

```
Tel:      +1 310 301 5800
```

```
<mailto:iana@iana.org>;
```

```
description
```

```
"The YANG module defines the identities for Interior Gateway
Protocol (IGP) Metric-Types.
```

```
This YANG module is maintained by IANA and reflects the 'IGP
Metric-Type' registry.
```

```
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```

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```

```
This initial version of this YANG module is part of RFC XXXX
(https://www.rfc-editor.org/info/rfcXXXX); see the RFC itself
for full legal notices.
```

```
//RFC Ed.: replace XXXX with actual RFC number and remove
this note
```

//RFC Ed.: replace IANA\_FOO\_URL and remove this note.

The latest version of this YANG module is available at  
<IANA\_FOO\_URL>.";

```
revision 2025-06-13 {
  description
    "Initial Version";
  reference
    "RFC XXXX: YANG Data Model for OSPF Flexible Algorithm";
}

identity metric-type {
  description
    "Base identity for IGP Metric-Type. The metric types
    are defined in IANA IGP Metric-Type registry.";
}

identity igp-metric {
  base metric-type;
  description
    "IGP Metric.";
}

identity min-unidirectional-link-delay {
  base metric-type;
  description
    "Min Unidirectional Link Delay as defined in RFC8570 Section 4.2
    and RFC7471 Section 4.2.";
}

identity te-default-metric {
  base metric-type;
  description
    "STraffic Engineering Default Metric as defined in RFC5305
    Section 3.7 and Traffic Engineering Metric as defined in
    RFC3630, Section 2.5.5.";
}

identity bandwidth-metric {
  base metric-type;
  description
    "Bandwidth metric.";
}
}
<CODE ENDS>
```

#### 4. YANG Module for OSPF Application-Specific Link Attributes

This document defined a YANG module for OSPF Application-Specific Link Attributes as defined in [RFC9492].

```

module: ietf-ospf-link-attr
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf:
      +--rw ospf-link-attr
        +--rw (link-attr-op-mode)
          +--:(legacy)
            | +--rw legacy?          empty
          +--:(transition)
            | +--rw transition?      empty
          +--:(app-specific)
            +--rw app-specific?      empty
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
    /ospf:database/ospf:area-scope-lsa-type
    /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
    /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
    /ospf:extended-link-opaque/ospf:extended-link-tlv:
      +--ro app-specific-link-attr-sub-tlvs
        +--ro asla-sub-tlvs* []
          +--ro sabm-length?          uint8
          +--ro udabm-length?         uint8
          +--ro sabm
            | +--ro sabm-bits*        identityref
          +--ro udabm
          +--ro link-attributes-sub-sub-tlvs
            +--ro unknown-tlvs
              +--ro unknown-tlv* []
                +--ro type?          uint16
                +--ro length?        uint16
                +--ro value?         yang:hex-string
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
    /ospf:database/ospf:area-scope-lsa-type
    /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
    /ospf:ospfv3/ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-router
    /ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv:
      +--ro app-specific-link-attr-sub-tlvs
        +--ro asla-sub-tlvs* []
          +--ro sabm-length?          uint8
          +--ro udabm-length?         uint8
          +--ro sabm
            | +--ro sabm-bits*        identityref
          +--ro udabm

```

```

    +--ro link-attributes-sub-sub-tlvs
      +--ro unknown-tlvs
        +--ro unknown-tlv* []
          +--ro type?      uint16
          +--ro length?    uint16
          +--ro value?     yang:hex-string

<CODE BEGINS> file "ietf-ospf-link-attr@2025-07-05.yang"
module ietf-ospf-link-attr {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-ospf-link-attr";

  prefix ospf-link-attr;

  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing
      Management (NMDA Version)";
  }

  import ietf-ospf {
    prefix ospf;
    reference
      "RFC 9129: YANG Data Model for the OSPF Protocol";
  }

  import ietf-ospfv3-extended-lsa {
    prefix ospfv3-e-lsa;
    reference
      "RFC 9587: YANG Data Model for OSPFv3 Extended Link
      State Advertisements (LSAs)";
  }

  organization
    "IETF LSR - Link State Routing Working Group";

  contact
    "WG Web:  <https://datatracker.ietf.org/wg/lsr/>
    WG List:  <mailto:lsr@ietf.org>

    Author:   Yingzhen Qu
              <mailto:yingzhen.ietf@gmail.com>
    Author:   Acee Lindem
              <mailto:acee.ietf@gmail.com>
    Author:   Stephane Litkowski
              <mailto:slitkows.ietf@gmail.com>";
```



`description`

"This YANG module defines the configuration and operational state for OSPF application specific link attributes feature as defined in RFC 9492.

This YANG model conforms to the Network Management Datastore Architecture (NMDA) as described in RFC 8342.

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`reference "RFC XXXX";`

`revision 2025-07-05 {`

`description`

`"Initial version";`

`reference`

`"RFC XXXX: OSPF YANG Model Augmentations for Additional  
 Features - Version 1.";`

`}`

`identity sabm-bit {`

`description`

`"Base identity for SABM bits.";`

`}`

`identity rsvp-te-bit {`

`base sabm-bit;`

`description`

`"R bit, RSVP-TE.";`

`}`

```
identity sr-policy-bit {
  base sabm-bit;
  description
    "S bit, Segment Routing Policy.";
}

identity lfa-bit {
  base sabm-bit;
  description
    "F bit, Loop Free Alternate (LFA). Includes all LFA types.";
}

identity flex-algo-bit {
  base sabm-bit;
  description
    "X bit, flexible algorithm.";
  reference
    "RFC 9350: IGP Flexible Algorithm, Section 12.";
}

grouping app-specific-link-attr-sub-tlvs {
  description
    "OSPF Application-Specific Link Attributes (ASLA) sub-TLV.
    The ASLA sub-TLV is a sub-TLV of the OSPFv2 Extended Link
    TLV (RFC7684) and OSPFv3 Router-Link TLV (RFC8362).";

  container app-specific-link-attr-sub-tlvs {
    description "Application-Specific Link Attributes sub-TLV.";
    list asla-sub-tlvs {
      leaf sabm-length {
        type uint8;
        description
          "Standard Application Identifier Bit Mask Length in
          octets.";
      }
      leaf udabm-length {
        type uint8;
        description
          "User Defined Application Identifier Bit Mask Length
          in octets.";
      }
      container sabm {
        leaf-list sabm-bits {
          type identityref {
            base sabm-bit;
          }
          description
            "SABM bits list. This list will contain
```

```
        identities for the bits which are set in the
        SABA bits.";
    }
    description
        "Standard Application Identifier Bit Mask.";
}
container udabm {
    description
        "User Defined Application Identifier Bit Mask.
        This container is to be augmented by user defined
        applications.";
}
container link-attributes-sub-sub-tlvs {
    uses ospf:unknown-tlvs;
    description
        "Link Attributes sub-sub-TLVs.";
}
description
    "List of application-Specific Link Attributes sub-TLVs.";
}
}
}

/* Configuration */
augment "/rt:routing/rt:control-plane-protocols"
    + "/rt:control-plane-protocol/ospf:ospf" {
    when "../rt:type = 'ospf:ospfv2' or "
        + "../rt:type = 'ospf:ospfv3'" {
        description
            "This augments the OSPF routing protocol when used.";
    }
    description
        "This augments OSPF protocol configuration
        with application-specific link attributes.";

    container ospf-link-attr {
        choice link-attr-op-mode {
            mandatory "true";
            leaf legacy {
                type empty;
                description
                    "Only send legacy advertisements.";
            }
            leaf transition {
                type empty;
                description
                    "Send both application-specific and legacy
                    advertisements.";
            }
        }
    }
}
```

```

    }
    leaf app-specific{
        type empty;
        description
            "Only send application-specific advertisements.";
    }
    description
        "Link attributes mode";
}
description
    "Link attributes operation mode.";
}
}

/* Database */
augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:areas/"
+ "ospf:area/ospf:database/"
+ "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
+ "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
+ "ospf:ospfv2/ospf:body/ospf:opaque/"
+ "ospf:extended-link-opaque/ospf:extended-link-tlv" {
when "derived-from(/rt:routing/rt:control-plane-protocols/"
+ "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
    description
        "This augmentation is only valid for OSPFv2.";
}
description
    "OSPF Application-Specific Link Attributes (ASLA) sub-TLV is
    a sub-TLV of OSPFv2 Extended Link TLV (RFC7684).";

    uses app-specific-link-attr-sub-tlvs;
}

augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
+ "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
+ "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
+ "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-router/"
+ "ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv" {
when "derived-from(/rt:routing/rt:control-plane-protocols/"
+ "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
    description
        "This augmentation is only valid for OSPFv3
        E-Router LSAs";
}
}

```

```

    description
      "Augment OSPFv3 Area scope router-link TLV.";

    uses app-specific-link-attr-sub-tlvs;
  }
}
<CODE ENDS>

```

## 5. YANG Module for OSPF Flexible Algorithm

This document defines a YANG module for OSPF Flexible Algorithm as defined in [RFC9350]. It is an augmentation of the OSPF base model.

```
module: ietf-ospf-flex-algo
```

```

augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf:
  +--rw ospf-flex-algo
    +--rw flex-algo* [algo-number]
      +--rw algo-number          uint8
      +--rw advertise-definition? boolean
      +--rw admin-groups
        | {te-types:extended-admin-groups,
        |   te-types:named-extended-admin-groups}?
        +--rw exclude-admin-groups*   leafref
        +--rw include-any-admin-groups* leafref
        +--rw include-all-admin-groups* leafref
      +--rw exclude-srlgs*
        | -> /te:te/globals/named-srlgs/named-srlg/name
        | {te-types:named-srlg-groups}?
      +--rw calc-type?              identityref
      +--rw metric-type?            identityref
      +--rw prefix-metric!
      +--rw priority?               uint8
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
    /ospf:interfaces/ospf:interface/ospf:database
    /ospf:link-scope-lsa-type/ospf:link-scope-lsas
    /ospf:link-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
    /ospf:body/ospf:opaque/ospf:ri-opaque:
  +--ro fad-tlvs
    +--ro fad-tlv* []
      +--ro flex-algo?              uint8
      +--ro metric-type?            identityref
      +--ro calc-type?              identityref
      +--ro priority?               uint8
      +--ro fa-ex-ag-sub-tlv
        | +--ro extended-admin-groups* uint64

```

```

    +--ro fa-in-any-ag-sub-tlv
    |   +--ro extended-admin-groups*   uint64
    +--ro fa-in-all-ag-sub-tlv
    |   +--ro extended-admin-groups*   uint64
    +--ro fad-flags-sub-tlv
    |   +--ro fad-flags*   identityref
    +--ro fa-ex-srlg-sub-tlv
    |   +--ro srlgs*   uint32
    +--ro unknown-tlvs
        +--ro unknown-tlv* []
            +--ro type?   uint16
            +--ro length?   uint16
            +--ro value?   yang:hex-string
augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
    /ospf:database/ospf:area-scope-lsa-type
    /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
    /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
    /ospf:ri-opaque:
    +--ro fad-tlvs
        +--ro fad-tlv* []
            +--ro flex-algo?   uint8
            +--ro metric-type?   identityref
            +--ro calc-type?   identityref
            +--ro priority?   uint8
            +--ro fa-ex-ag-sub-tlv
            |   +--ro extended-admin-groups*   uint64
            +--ro fa-in-any-ag-sub-tlv
            |   +--ro extended-admin-groups*   uint64
            +--ro fa-in-all-ag-sub-tlv
            |   +--ro extended-admin-groups*   uint64
            +--ro fad-flags-sub-tlv
            |   +--ro fad-flags*   identityref
            +--ro fa-ex-srlg-sub-tlv
            |   +--ro srlgs*   uint32
            +--ro unknown-tlvs
                +--ro unknown-tlv* []
                    +--ro type?   uint16
                    +--ro length?   uint16
                    +--ro value?   yang:hex-string
augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:database
    /ospf:as-scope-lsa-type/ospf:as-scope-lsas
    /ospf:as-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
    /ospf:body/ospf:opaque/ospf:ri-opaque:
    +--ro fad-tlvs
        +--ro fad-tlv* []
            +--ro flex-algo?   uint8

```

```

    +--ro metric-type?          identityref
    +--ro calc-type?            identityref
    +--ro priority?              uint8
    +--ro fa-ex-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fa-in-any-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fa-in-all-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fad-flags-sub-tlv
    | +--ro fad-flags*      identityref
    +--ro fa-ex-srlg-sub-tlv
    | +--ro srlgs*          uint32
    +--ro unknown-tlvs
    | +--ro unknown-tlv* []
    | | +--ro type?      uint16
    | | +--ro length?    uint16
    | | +--ro value?     yang:hex-string
augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
    /ospf:interfaces/ospf:interface/ospf:database
    /ospf:link-scope-lsa-type/ospf:link-scope-lsas
    /ospf:link-scope-lsa/ospf:version/ospf:ospfv3/ospf:ospfv3
    /ospf:body/ospf:router-information:
+--ro fad-tlvs
| +--ro fad-tlv* []
| | +--ro flex-algo?          uint8
| | +--ro metric-type?        identityref
| | +--ro calc-type?          identityref
| | +--ro priority?           uint8
| | +--ro fa-ex-ag-sub-tlv
| | | +--ro extended-admin-groups*  uint64
| | +--ro fa-in-any-ag-sub-tlv
| | | +--ro extended-admin-groups*  uint64
| | +--ro fa-in-all-ag-sub-tlv
| | | +--ro extended-admin-groups*  uint64
| | +--ro fad-flags-sub-tlv
| | | +--ro fad-flags*      identityref
| | +--ro fa-ex-srlg-sub-tlv
| | | +--ro srlgs*          uint32
| | +--ro unknown-tlvs
| | | +--ro unknown-tlv* []
| | | | +--ro type?      uint16
| | | | +--ro length?    uint16
| | | | +--ro value?     yang:hex-string
augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
    /ospf:database/ospf:area-scope-lsa-type

```

```

    /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
    /ospf:ospfv3/ospf:ospfv3/ospf:body
    /ospf:router-information:
+--ro fad-tlvs
  +--ro fad-tlv* []
    +--ro flex-algo?          uint8
    +--ro metric-type?        identityref
    +--ro calc-type?          identityref
    +--ro priority?           uint8
    +--ro fa-ex-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fa-in-any-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fa-in-all-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fad-flags-sub-tlv
    | +--ro fad-flags*  identityref
    +--ro fa-ex-srlg-sub-tlv
    | +--ro srlgs*  uint32
    +--ro unknown-tlvs
      +--ro unknown-tlv* []
        +--ro type?  uint16
        +--ro length?  uint16
        +--ro value?  yang:hex-string
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:database
  /ospf:as-scope-lsa-type/ospf:as-scope-lsas
  /ospf:as-scope-lsa/ospf:version/ospf:ospfv3/ospf:ospfv3
  /ospf:body/ospf:router-information:
+--ro fad-tlvs
  +--ro fad-tlv* []
    +--ro flex-algo?          uint8
    +--ro metric-type?        identityref
    +--ro calc-type?          identityref
    +--ro priority?           uint8
    +--ro fa-ex-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fa-in-any-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fa-in-all-ag-sub-tlv
    | +--ro extended-admin-groups*  uint64
    +--ro fad-flags-sub-tlv
    | +--ro fad-flags*  identityref
    +--ro fa-ex-srlg-sub-tlv
    | +--ro srlgs*  uint32
    +--ro unknown-tlvs
      +--ro unknown-tlv* []
        +--ro type?  uint16

```



```

        +--ro length?    uint16
        +--ro value?     yang:hex-string
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
  /ospf:interfaces/ospf:interface/ospf:database
  /ospf:link-scope-lsa-type/ospf:link-scope-lsas
  /ospf:link-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
  /ospf:body/ospf:opaque/ospf:extended-prefix-opaque
  /ospf:extended-prefix-tlv:
+--ro fapm-sub-tlvs
  +--ro fapm-sub-tlv* []
    +--ro flex-algo?    uint8
    +--ro fapm-flags*   identityref
    +--ro metric?       uint32
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
  /ospf:database/ospf:area-scope-lsa-type
  /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
  /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
  /ospf:extended-prefix-opaque/ospf:extended-prefix-tlv:
+--ro fapm-sub-tlvs
  +--ro fapm-sub-tlv* []
    +--ro flex-algo?    uint8
    +--ro fapm-flags*   identityref
    +--ro metric?       uint32
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:database
  /ospf:as-scope-lsa-type/ospf:as-scope-lsas
  /ospf:as-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
  /ospf:body/ospf:opaque/ospf:extended-prefix-opaque
  /ospf:extended-prefix-tlv:
+--ro fapm-sub-tlvs
  +--ro fapm-sub-tlv* []
    +--ro flex-algo?    uint8
    +--ro fapm-flags*   identityref
    +--ro metric?       uint32
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
  /ospf:database/ospf:area-scope-lsa-type
  /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
  /ospf:ospfv3/ospf:ospfv3/ospf:body
  /ospfv3-e-lsa:e-inter-area-prefix
  /ospfv3-e-lsa:e-inter-prefix-tlvs
  /ospfv3-e-lsa:inter-prefix-tlv:
+--ro fapm-sub-tlvs
  +--ro fapm-sub-tlv* []
    +--ro flex-algo?    uint8
    +--ro fapm-flags*   identityref

```

```

    +--ro metric?          uint32
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:database
  /ospf:as-scope-lsa-type/ospf:as-scope-lsas
  /ospf:as-scope-lsa/ospf:version/ospf:ospfv3/ospf:ospfv3
  /ospf:body/ospfv3-e-lsa:e-as-external
  /ospfv3-e-lsa:e-external-tlvs
  /ospfv3-e-lsa:external-prefix-tlv:
+--ro fapm-sub-tlvs
  +--ro fapm-sub-tlv* []
    +--ro flex-algo?      uint8
    +--ro fapm-flags*     identityref
    +--ro metric?         uint32
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
  /ospf:database/ospf:area-scope-lsa-type
  /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
  /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque:
+--ro eia-asbr-opaque
  +--ro eia-asbr-tlv
    +--ro asbr-rtr-id?    rt-types:router-id
    +--ro faam-sub-tlvs
      +--ro faam-sub-tlv* []
        +--ro flex-algo?  uint8
        +--ro metric?     uint32
    +--ro unknown-tlvs
      +--ro unknown-tlv* []
        +--ro type?       uint16
        +--ro length?     uint16
        +--ro value?      yang:hex-string
  +--ro unknown-tlvs
    +--ro unknown-tlv* []
      +--ro type?         uint16
      +--ro length?       uint16
      +--ro value?        yang:hex-string
augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
  /ospf:database/ospf:area-scope-lsa-type
  /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
  /ospf:ospfv3/ospf:ospfv3/ospf:body
  /ospfv3-e-lsa:e-inter-area-router
  /ospfv3-e-lsa:e-inter-router-tlvs
  /ospfv3-e-lsa:inter-router-tlv:
+--ro faam-sub-tlvs
  +--ro faam-sub-tlv* []
    +--ro flex-algo?      uint8
    +--ro metric?         uint32

```

```
<CODE BEGINS> file "ietf-ospf-flex-algo@2025-07-05.yang"
module ietf-ospf-flex-algo {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-ospf-flex-algo";
  prefix ospf-flex-algo;

  import ietf-routing {
    prefix rt;
    reference "RFC 8349: A YANG Data Model for Routing
              Management (NMDA Version)";
  }

  import ietf-routing-types {
    prefix "rt-types";
    reference "RFC 8294: Common YANG Data Types for the
              Routing Area";
  }

  import ietf-te-types {
    prefix te-types;
    reference
      "RFC8776: Common YANG Data Types for Traffic Engineering.";
  }

  import ietf-ospf {
    prefix "ospf";
    reference "RFC 9129: YANG Data Model for the OSPF
              Protocol";
  }

  import ietf-ospfv3-extended-lsa {
    prefix "ospfv3-e-lsa";
    reference "RFC 9587: YANG Data Model for OSPFv3 Extended Link
              State Advertisements (LSAs)";
  }

  import ietf-te {
    prefix te;
  }

  import iana-igp-algo-types {
    prefix iana-algo-types;
  }

  import iana-igp-metric-types {
    prefix iana-metric-type;
  }
}
```

## organization

"IETF LSR - Link State Routing Working Group";

## contact

"WG Web: <<https://datatracker.ietf.org/wg/lsr/>>

WG List: <<mailto:lsr@ietf.org>>

Author: Yingzhen Qu

<<mailto:yingzhen.ietf@gmail.com>>

Author: Acee Lindem

<<mailto:acee.ietf@gmail.com>>

Author: Stephane Litkowski

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";

## description

"The YANG module defines the configuration and operational state for OSPF Flexible Algorithm as defined in RFC 9350.

This YANG model conforms to the Network Management Datastore Architecture (NMDA) as described in RFC 8342.

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This version of this YANG module is part of RFC XXXX; see the RFC itself for full legal notices.

The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL', 'SHALL NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED', 'NOT RECOMMENDED', 'MAY', and 'OPTIONAL' in this document are to be interpreted as described in BCP 14 (RFC 2119) (RFC 8174) when, and only when, they appear in all capitals, as shown here.";

reference "RFC XXXX: YANG Data Model for OSPF Flexible Algorithm.";

revision 2025-07-05 {

description

"Initial Version";

reference

```
    "RFC XXXX: OSPF YANG Model Augmentations for Additional
      Features - Version 1.";
}

/* Identities */

identity fad-flags {
  description
    "Base identity for OSPF FAD flags.";
}

identity m-bit {
  base fad-flags;
  description
    "M bit, when set, the flex-algo specific prefix and ASBR
    metric MUST be used for inter-area and external prefix
    calculation.";
}

identity fapm-flags {
  description
    "Base identity for OSPF flex-algo prefix metric flags.";
}

identity e-bit {
  base fapm-flags;
  description
    "External metric, if set, the metric specified is a
    type 2 external metric.";
}

/* Groupings */
grouping fa-ex-ag-sub-tlv {
  container fa-ex-ag-sub-tlv {
    leaf-list extended-admin-groups {
      type uint64;
      description
        "Extended administrative group as defined in RFC 7308.";
    }
    description
      "The flex-algo exclude admin group sub-tlv.";
  }
  description
    "The flex-algo exclude admin group sub-tlv.";
}

grouping fa-in-any-ag-sub-tlv {
  container fa-in-any-ag-sub-tlv {
```

```
    leaf-list extended-admin-groups {
      type uint64;
      description
        "Extended administrative group as defined in RFC 7308.";
    }
    description
      "The flex-algo include-any admin group sub-tlv.";
  }
  description
    "The flex-algo include-any admin group sub-tlv.";
}

grouping fa-in-all-ag-sub-tlv {
  container fa-in-all-ag-sub-tlv {
    leaf-list extended-admin-groups {
      type uint64;
      description
        "Extended administrative group as defined in RFC 7308.";
    }
    description
      "The flex-algo include-all admin group sub-tlv.";
  }
  description
    "The flex-algo include-all admin group sub-tlv.";
}

grouping fad-flags-sub-tlv {
  container fad-flags-sub-tlv {
    leaf-list fad-flags {
      type identityref {
        base fad-flags;
      }
      description
        "Flex-algo definition flags list.";
    }
    description
      "OSPF flex-algo definition flags.";
  }
  description
    "The flex-algo definition flags sub-tlv.";
}

grouping fa-ex-srlg-sub-tlv {
  container fa-ex-srlg-sub-tlv {
    leaf-list srlgs {
      type uint32;
      description
        "SRLG value as defined in RFC 4203.";
    }
  }
}
```

```
    }
    description
      "The flex-algo exclude SRLG sub-tlv.";
  }
  description
    "The flex-algo exclude SRLG sub-tlv.";
}

grouping fad-tlvs {
  container fad-tlvs {
    list fad-tlv {
      leaf flex-algo {
        type uint8;
        description
          "Flex-algo number, value between 128 and 255 inclusive.";
      }
      leaf metric-type {
        type identityref {
          base iana-metric-type:metric-type;
        }
        description
          "Type of metric to be used during the calculation.";
      }
      leaf calc-type {
        type identityref {
          base iana-algo-types:algo-type;
        }
        description
          "IGP algorithm types, value from 0 to 127 as
          defined under 'Interior Gateway Protocol (IGP)
          Parameter' by IANA.";
      }
      leaf priority {
        type uint8;
        description
          "Priority of the advertisement.";
      }
    }

    uses fa-ex-ag-sub-tlv;
    uses fa-in-any-ag-sub-tlv;
    uses fa-in-all-ag-sub-tlv;
    uses fad-flags-sub-tlv;
    uses fa-ex-srlg-sub-tlv;
    uses ospf:unknown-tlvs;

    description
      "List of flex-algo definition TLVs.";
  }
}
```

```
        description
            "OSPF Flexible Algorithm Definition TLV.";
    }
    description
        "OSPF Flexible Algorithm Definition (FAD) TLV.";
}

grouping fapm-sub-tlvs {
    container fapm-sub-tlvs {
        list fapm-sub-tlv {
            leaf flex-algo {
                type uint8;
                description
                    "Flex-algo number, value between 128 and 255
                    inclusive.";
            }
            leaf-list fapm-flags {
                type identityref {
                    base fapm-flags;
                }
                description
                    "Flex-algo prefix metric flags list.";
            }
            leaf metric {
                type uint32;
                description
                    "Prefix metric.";
            }
        }
        description
            "List of flex-algo prefix sub-tlvs.";
    }
    description
        "Flex-algo prefix metric sub-tlvs.";
}
description
    "Flexible Algorithm Prefix Metric (FAPM) sub-TLVs.";
}

grouping faam-sub-tlvs {
    container faam-sub-tlvs {
        list faam-sub-tlv {
            leaf flex-algo {
                type uint8;
                description
                    "Flex-algo number, value between 128 and 255
                    inclusive.";
            }
        }
        leaf metric {
```



```
        type uint32;
        description
            "Prefix metric.";
    }
    description
        "List of faam sub-tlvs.";
    }
    description
        "Flexible Algorithm ASBR Metric (FAAM) Sub-TLVs.";
    }
    description
        "Flexible Algorithm ASBR Metric (FAAM) Sub-TLVs.";
    }
}

/* Configurations */

augment "/rt:routing/rt:control-plane-protocols"
+ "/rt:control-plane-protocol/ospf:ospf" {
    when "../rt:type = 'ospf:ospfv2' or "
    + "../rt:type = 'ospf:ospfv3'" {
        description
            "This augments the OSPF routing protocol when used.";
    }
    description
        "This augments OSPF protocol with Flexible
        Algorithm.";
}

container ospf-flex-algo {
    list flex-algo {
        key "algo-number";

        leaf algo-number {
            type uint8 {
                range "128..255";
            }
            description
                "An identifier in the range 128-255 that's associated
                with the Flexible Algorithm Definition.";
        }

        leaf advertise-definition {
            type boolean;
            default true;
            description
                "Enable to advertise the flex-algo definition.";
        }
    }
}
```

```
container admin-groups {
  if-feature "te-types:extended-admin-groups";
  if-feature "te-types:named-extended-admin-groups";
  leaf-list exclude-admin-groups {
    type leafref {
      path "/te:te/te:globals/te:named-admin-groups/"
        + "te:named-admin-group/te:name";
    }
    description
      "Exclude rule used during the flex-algo
      path computation.";
  }
  leaf-list include-any-admin-groups {
    type leafref {
      path "/te:te/te:globals/te:named-admin-groups/"
        + "te:named-admin-group/te:name";
    }
    description
      "Include-any rule used during the flex-algo
      path computation.";
  }
  leaf-list include-all-admin-groups {
    type leafref {
      path "/te:te/te:globals/te:named-admin-groups/"
        + "te:named-admin-group/te:name";
    }
    description
      "Include-all rule used during the flex-algo
      path computation.";
  }
  description
    "Specify links for the flex-algo path computation.";
}

leaf-list exclude-srlgs {
  if-feature "te-types:named-srlg-groups";
  type leafref {
    path "/te:te/te:globals/te:named-srlgs/te:named-srlg/"
      + "te:name";
  }
  description
    "Shared Risk Link Groups (SRLGs) to be excluded during
    the flex-algo path computation.";
}

leaf calc-type {
  type identityref {
    base iana-algo-types:algo-type;
```

```

    }
    default iana-algo-types:algo-spf;
    description
        "Calculation-type. Value from 0-127 inclusive from the IANA
        'IGP Algorithm Types' registry defined under the 'Interior
        Gateway Protocol (IGP) Parameters' registry.";
    }

    leaf metric-type {
        type identityref {
            base iana-metric-type:metric-type;
        }
        description
            "Type of metric to be used during the calculation.";
    }

    container prefix-metric {
        presence
            "Use flex-algo specific prefix metric.";
        description
            "Use flex-algo prefix metric.";
    }

    leaf priority {
        type uint8;
        description
            "Priority of the advertisement.";
    }

    description
        "List of flex-algo configurations.";
    }
    description
        "Flexible Algorithm configuration.";
    }
}

/* Database */

augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:areas/ospf:area/"
+ "ospf:interfaces/ospf:interface/ospf:database/"
+ "ospf:link-scope-lsa-type/ospf:link-scope-lsas/"
+ "ospf:link-scope-lsa/ospf:version/ospf:ospfv2/"
+ "ospf:ospfv2/ospf:body/ospf:opaque/ospf:ri-opaque" {
when "../../../../../../../../../../../../../../../"
+ "rt:type = 'ospf:ospfv2'" {

```

```
    description
      "This augmentation is only valid for OSPFv2.";
  }

  description
    "Flex-algo definition TLVs for OSPFv2 type 9 opaque RI LSA.";

  uses fad-tlvs;
}

augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:areas/"
+ "ospf:area/ospf:database/"
+ "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
+ "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
+ "ospf:ospfv2/ospf:body/ospf:opaque/ospf:ri-opaque" {
when "../.../.../.../.../.../.../.../.../..."
+ "rt:type = 'ospf:ospfv2'" {
  description
    "This augmentation is only valid for OSPFv2.";
}

description
  "Flex-algo definition TLVs for OSPFv2 type 10 opaque RI LSA.";

  uses fad-tlvs;
}

augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:database/"
+ "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
+ "ospf:as-scope-lsa/ospf:version/ospf:ospfv2/"
+ "ospf:ospfv2/ospf:body/ospf:opaque/ospf:ri-opaque" {
when "../.../.../.../.../.../.../.../..."
+ "rt:type = 'ospf:ospfv2'" {
  description
    "This augmentation is only valid for OSPFv2.";
}
description
  "Flex-algo definition TLVs for OSPFv2 type 11 opaque RI LSA.";

  uses fad-tlvs;
}

augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
```

```

    + "ospf:ospf/ospf:areas/ospf:area/"
    + "ospf:interfaces/ospf:interface/ospf:database/"
    + "ospf:link-scope-lsa-type/ospf:link-scope-lsas/"
    + "ospf:link-scope-lsa/ospf:version/ospf:ospfv3/"
    + "ospf:ospfv3/ospf:body/ospf:router-information" {
when "../.../.../.../.../.../.../.../.../.../..."
    + "rt:type = 'ospf:ospfv3'" {
    description
        "This augmentation is only valid for OSPFv3.";
    }

description
    "Flex-algo definition TLVs for OSPFv3 Router
    Information (RI) LSA.";

    uses fad-tlvs;
}

augment "/rt:routing/"
    + "rt:control-plane-protocols/rt:control-plane-protocol/"
    + "ospf:ospf/ospf:areas/"
    + "ospf:area/ospf:database/"
    + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
    + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
    + "ospf:ospfv3/ospf:body/ospf:router-information" {
when "../.../.../.../.../.../.../.../.../.../..."
    + "rt:type = 'ospf:ospfv3'" {
    description
        "This augmentation is only valid for OSPFv3.";
    }

description
    "Flex-algo definition TLVs for OSPFv3 Router
    Information (RI) LSA.";

    uses fad-tlvs;
}

augment "/rt:routing/"
    + "rt:control-plane-protocols/rt:control-plane-protocol/"
    + "ospf:ospf/ospf:database/"
    + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
    + "ospf:as-scope-lsa/ospf:version/ospf:ospfv3/"
    + "ospf:ospfv3/ospf:body/ospf:router-information" {
when "../.../.../.../.../.../.../.../.../.../..."
    + "rt:type = 'ospf:ospfv3'" {
    description
        "This augmentation is only valid for OSPFv3.";

```

```

    }
    description
      "Flex-algo definition TLVs for OSPFv3 Router Information LSA.";

    uses fad-tlvs;
  }

augment "/rt:routing/"
  + "rt:control-plane-protocols/rt:control-plane-protocol/"
  + "ospf:ospf/ospf:areas/ospf:area/"
  + "ospf:interfaces/ospf:interface/ospf:database/"
  + "ospf:link-scope-lsa-type/ospf:link-scope-lsas/"
  + "ospf:link-scope-lsa/ospf:version/ospf:ospfv2/"
  + "ospf:ospfv2/ospf:body/ospf:opaque/"
  + "ospf:extended-prefix-opaque/ospf:extended-prefix-tlv" {
when "../.../.../.../.../.../.../.../.../.../.../.../..."
  + "rt:type = 'ospf:ospfv2'" {
  description
    "This augmentation is only valid for OSPFv2.";
  }
  description
    "Flex-algo prefix metric sub-TLVs for OSPFv2 extended
      prefix TLV in type 9 opaque LSA.";
  uses fapm-sub-tlvs;
}

augment "/rt:routing/"
  + "rt:control-plane-protocols/rt:control-plane-protocol/"
  + "ospf:ospf/ospf:areas/"
  + "ospf:area/ospf:database/"
  + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
  + "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
  + "ospf:ospfv2/ospf:body/ospf:opaque/"
  + "ospf:extended-prefix-opaque/ospf:extended-prefix-tlv" {
when "../.../.../.../.../.../.../.../.../.../.../..."
  + "rt:type = 'ospf:ospfv2'" {
  description
    "This augmentation is only valid for OSPFv2.";
  }
  description
    "Flex-algo prefix metric sub-TLVs for OSPFv2 extended
      prefix TLV in type 10 opaque LSA.";
  uses fapm-sub-tlvs;
}

augment "/rt:routing/"
  + "rt:control-plane-protocols/rt:control-plane-protocol/"
  + "ospf:ospf/ospf:database/"

```

```

    + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
    + "ospf:as-scope-lsa/ospf:version/ospf:ospfv2/"
    + "ospf:ospfv2/ospf:body/ospf:opaque/"
    + "ospf:extended-prefix-opaque/"
    + "ospf:extended-prefix-tlv" {
when "../.../.../.../.../.../.../.../.../..."
    + "rt:type = 'ospf:ospfv2'" {
    description
        "This augmentation is only valid for OSPFv2.";
    }
description
    "Flex-algo prefix metric sub-TLVs for OSPFv2 extended
    prefix TLV in type 11 opaque LSA.";
uses fapm-sub-tlvs;
}

/* Flex-algo prefix metric Sub-TLV in OSPFv3 Inter-Area
   Prefix TLV */
augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
+ "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
+ "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
+ "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-inter-area-prefix/"
+ "ospfv3-e-lsa:e-inter-prefix-tlvs/"
+ "ospfv3-e-lsa:inter-prefix-tlv" {
when "../.../.../.../.../.../.../.../.../..."
    + "rt:type = 'ospf:ospfv3'" {
    description
        "This augmentation is only valid for OSPFv3
        E-Router LSAs";
    }
uses fapm-sub-tlvs;
description
    "OSPFv3 Area-Scoped Inter-Area Prefix TLV.";
}

/* Flex-algo prefix metric Sub-TLV in OSPFv3 External Prefix TLV */
augment "/rt:routing/"
+ "rt:control-plane-protocols/rt:control-plane-protocol/"
+ "ospf:ospf/ospf:database/"
+ "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
+ "ospf:as-scope-lsa/ospf:version/ospf:ospfv3/"
+ "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-as-external/"
+ "ospfv3-e-lsa:e-external-tlvs/"
+ "ospfv3-e-lsa:external-prefix-tlv" {
when "'ospf:.../.../.../.../.../.../.../.../..."
    + "rt:type' = 'ospf:ospfv3'" {

```

```

        description
            "This augmentation is only valid for OSPFv3.";
    }
    uses fapm-sub-tlvs;
    description
        "OSPFv3 AS-Scoped External Prefix TLV.";
}

/* OSPFv2 Extended Inter-Area ASBR LSA */
augment "/rt:routing/"
    + "rt:control-plane-protocols/rt:control-plane-protocol/"
    + "ospf:ospf/ospf:areas/"
    + "ospf:area/ospf:database/"
    + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
    + "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
    + "ospf:ospfv2/ospf:body/ospf:opaque" {
    when "../.../.../.../.../.../.../.../.../..."
        + "rt:type = 'ospf:ospfv2'" {
        description
            "This augmentation is only valid for OSPFv2.";
    }
    description
        "OSPFv2 Extended Inter-Area ASBR LSA in type 10
        opaque LSA.";

    container eia-asbr-opaque {
        container eia-asbr-tlv {
            leaf asbr-rtr-id {
                type rt-types:router-id;
                description
                    "The OSPF Router ID of the ASBR.";
            }
            uses faam-sub-tlvs;
            uses ospf:unknown-tlvs;
            description
                "EIA-ASBR TLV, used to advertise additional attributes
                associated with the reachability of an ASBR.";
        }
        uses ospf:unknown-tlvs;

        description
            "OSPFv2 Extended Inter-Area (EIA-ASBR) opaque LSA.";
    }
}

/* FAAM Sub-TLV in OSPFv3 Inter-Area-Router TLV */
augment "/rt:routing/"
    + "rt:control-plane-protocols/rt:control-plane-protocol/"

```



```

+ "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
+ "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
+ "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
+ "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-inter-area-router/"
+ "ospfv3-e-lsa:e-inter-router-tlvs/"
+ "ospfv3-e-lsa:inter-router-tlv" {
when "../../../../../../../../../../../../../../../"
+ "rt:type = 'ospf:ospfv3'" {
description
  "This augmentation is only valid for OSPFv3
  Inter-Area-Router TLV.";
}
uses faam-sub-tlvs;
description
  "OSPFv3 Area-Scoped Inter-Area-Router TLV.";
}
}
<CODE ENDS>

```

## 6. Security Considerations

The YANG modules specified in this document define a schema for data that is designed to be accessed via network management protocols such as NETCONF [RFC6241] or RESTCONF [RFC8040]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [RFC6242]. The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [RFC5246].

The NETCONF access control model [RFC6536] provides the means to restrict access for particular NETCONF or RESTCONF users to a pre-configured subset of all available NETCONF or RESTCONF protocol operations and content.

There are a number of data nodes defined in the modules that are writable/creatable/deletable (i.e., config true, which is the default). These data nodes may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations.

Some of the readable data nodes in the modules may be considered sensitive or vulnerable in some network environments. It is thus important to control read access (e.g., via get, get-config, or notification) to these data nodes. The exposure of the Link State Database (LSDB) will expose the detailed topology of the network. This may be undesirable since both due to the fact that exposure may facilitate other attacks. Additionally, network operators may consider their topologies to be sensitive confidential data.

## 7. IANA Considerations

### 7.1. Registering YANG Modules

This document registers URIs in the IETF XML registry [RFC3688]. Following the format in [RFC3688], the following registrations are requested to be made:

URI: urn:ietf:params:xml:ns:yang:iana-igp-algo-types

Registrant Contact: The IESG.

XML: N/A, the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang:iana-igp-metric-types

Registrant Contact: The IESG.

XML: N/A, the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang:ietf-ospf-link-attr

Registrant Contact: The IESG.

XML: N/A, the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang:ietf-ospf-flex-algo

Registrant Contact: The IESG.

XML: N/A, the requested URI is an XML namespace.

This document registers the YANG modules in the YANG Module Names registry [RFC6020].

name: iana-igp-algo-types

Maintained by IANA? Y

namespace: urn:ietf:params:xml:ns:yang:iana-igp-algo-types

prefix: iana-algo-types

reference: RFC XXXX

name: iana-igp-metric-types

Maintained by IANA? Y

namespace: urn:ietf:params:xml:ns:yang:iana-igp-metric-types

prefix: iana-metric-types

reference: RFC XXXX

```
name: ietf-ospf-link-attr
Maintained by IANA? N
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-link-attr
prefix: ospf-link-attr
reference: RFC XXXX

name: ietf-ospf-flex-algo
Maintained by IANA? N
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-flex-algo
prefix: ospf-flex-algo
reference: RFC XXXX
```

## 7.2. IANA IGP Algorithm Types Module

This document defines the initial version of the IANA-maintained "iana-algo-types" YANG module (Section 2). The latest version of the YANG module is available from the "YANG Parameters" registry [IANA-YANG-Parameters].

IANA needs to add this note to the "YANG Module Names" registry:

```
| New values must not be directly added to the "iana-algo-types"
| YANG modules. They must instead be added to the "IGP Algorithm
| Types" registry in the "Interior Gateway Protocol (IGP)
| Parameters" registry group.
```

The name of the "identity" is "algo-" plus the lowercase of the abbreviation of the "Description". The "identity" statement should have the following substatements defined:

```
"base": contains the value of "algo-type".
"description": contains the first sentence in the "Description".
"reference": the corresponding RFC information.
```

When the iana-algo-types YANG module is updated, a new "revision" statement must be added in from of the existing revision statements.

## 7.3. IANA IGP Metric-Type Module

This document defines the initial version of the IANA-maintained "iana-metric-types" YANG module (Section 3). The latest version of the YANG module is available from the "YANG Parameters" registry [IANA-YANG-Parameters].

IANA needs to add this note to the "YANG Module Names" registry:

New values must not be directly added to the "iana-metric-types" YANG modules. They must instead be added to the "IGP Metric-Type" registry in the "Interior Gateway Protocol (IGP) Parameters" registry group.

The name of the "identity" is the metric name in the "Description" separated by "-". The "identity" statement should have the following substatements defined:

"base": contains the value of "metric-type".  
"description": copy from the "Description".  
"reference": the corresponding RFC information.

When the iana-metric-types YANG module is updated, a new "revision" statement must be added in from of the existing revision statements.

## 8. Acknowledgements

This document was produced using Marshall Rose's xml2rfc tool.

The YANG model was developed using the suite of YANG tools written and maintained by numerous authors.

## 9. Normative References

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