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July 7, 2019

OSPF YANG Model Augmentations for Additional Features - Version 1  
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## Abstract

This document defines YANG data modules augmenting the IETF OSPF YANG model to provide support for OSPF Two-Part Metric as defined in [RFC 8042](#), OSPF Graceful Link Shutdown as defined in [RFC 8379](#) and OSPF Link-Local Signaling (LLS) Extensions for Local Interface ID Advertisement as defined in [RFC 8510](#).

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## [1.](#) Overview

YANG [[RFC6020](#)] [[RFC7950](#)] is a data definition language used to define the contents of a conceptual data store that allows networked devices to be managed using NETCONF [[RFC6241](#)]. YANG is proving relevant beyond its initial confines, as bindings to other interfaces (e.g., ReST) and encodings other than XML (e.g., JSON) are being defined. Furthermore, YANG data models can be used as the basis for implementation of other interfaces, such as CLI and programmatic APIs.

This document defines YANG data modules augmenting the IETF OSPF YANG model [[I-D.ietf-ospf-yang](#)], which itself augments [[RFC8349](#)], to provide support for configuration and operational state for the following OSPF features:

[RFC8042](#): OSPF Two-Part Metric [[RFC8042](#)].

[RFC8379](#): OSPF Graceful Link Shutdown [[RFC8379](#)].

[RFC8510](#): OSPF Link-Local Signaling (LLS) Extensions for Local Interface ID Advertisement [[RFC8510](#)].

The augmentations defined in this document requires support for the

OSPF base model[I-D.ietf-ospf-yang] which defines basic OSPF configuration and state. The OSPF YANG model augments the ietf-routing YANG model defined in [\[RFC8022\]](#).

### [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.](#) YANG Module for OSPF Two-Part Metric

This document defines a YANG module for OSPF Two-Part Metric feature as defined in [\[RFC8042\]](#). It is an augmentation of the OSPF base model.

```
module: ietf-ospf-two-part-metric
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas
      /ospf:area/ospf:interfaces/ospf:interface:
        +--rw two-part-metric
          +--rw enable?          boolean
          +--rw int-input-cost?  uint16
  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-tlvs/ospf:extended-link-tlv:
        +--ro network-to-router-metric-sub-tlvs
          +--ro net-to-rtr-sub-tlv*
            +--ro mt-id?          uint8
            +--ro mt-metric?     uint16
```

```
<CODE BEGINS> file "ietf-ospf-two-part-metric@2019-07-05.yang"
module ietf-ospf-two-part-metric {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-ospf-two-part-metric";
```

```
prefix ospf-two-metric;

import ietf-routing {
  prefix "rt";
}

import ietf-ospf {
  prefix "ospf";
}

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

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```
contact
  "WG Web:  <http://tools.ietf.org/wg/lsr>
  WG List:  <mailto:lsr@ietf.org>

  Author:   Yingzhen Qu
            <mailto:yqu@futurewei.com>
  Author:   Acee Lindem
            <mailto:acee@cisco.com>;
```

#### description

"This YANG module defines the configuration and operational state for OSPF Two-Part Metric feature as defined in [RFC 8042](#).

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

```
reference "RFC XXXX";
```

```
revision 2019-07-05 {
```

```

description
  "Initial version";
reference
  "RFC XXXX: A YANG Data Model for OSPF.";
}

/* RFC 8042 */
augment "/rt:routing/rt:control-plane-protocols/"
  + "rt:control-plane-protocol/ospf:ospf/"
  + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface" {
when "../..../rt:type = 'ospf:ospfv2' or "
  + "../..../rt:type = 'ospf:ospfv3'" {
  description
    "This augments the OSPF interface configuration
    when used.";
}
description
  "This augments the OSPF protocol interface
  configuration with two-part metric.";

```

```

container two-part-metric {
  when "enum-value(..ospf:interface-type) = 2" {
    description
      "Two-part metric when link type is multi-access.";
  }
  leaf enable {
    type boolean;
    default false;
    description
      "Enable two-part metric.";
  }
  leaf int-input-cost {
    type uint16;
    description
      "Link state metric from the two-part-metric network
      to this router.";
  }
  description
    "Interface two part metric configuration.";
}
}

```

```

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-tlvs/ospf:extended-link-tlv" {
when "../../../../../../../../../../../../../../../"
+ "rt:type = 'ospf:ospfv2'" {
description
  "This augmentation is only valid for OSPFv2.";
}
description
  "Network-to-Router metric sub tlv for OSPFv2 extended link TLV
  in type 10 opaque LSA.";

  container network-to-router-metric-sub-tlvs {
    description "Network-to-Router metric sub TLV.";
    list net-to-rtr-sub-tlv {
      leaf mt-id {
        type uint8;
        description "Multi-Topology Identifier (MT-ID).";
      }
      leaf mt-metric {
        type uint16;

```

```

      description "Network-to-router metric.";
    }
    description
      "Network-to-Router metric sub-TLV.";
  }
}
}
}
<CODE ENDS>

```

### [3.](#) YANG Module for OSPF Graceful Link Shutdown

This document defines a YANG module for OSPF Graceful Link Shutdown feature as defined in [\[RFC8379\]](#). It is an augmentation of the OSPF base model.

```
module: ietf-ospf-graceful-link-shutdown
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf/ospf:areas
    /ospf:area/ospf:interfaces/ospf:interface:
      +--rw graceful-link-shutdown
        +--rw enable?    boolean
  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-tlvs/ospf:extended-link-tlv:
+---ro grace-link-shut-sub-tlv!
+---ro remote-address-sub-tlv
|   +---ro remote-address?   inet:ipv4-address
+---ro local-remote-int-id-sub-tlv
    +---ro local-int-id?     uint32
    +---ro remote-int-id?    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-router
        /ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv:
+---ro grace-link-shut-sub-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-router
        /ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv:
+---ro grace-link-shut-sub-tlv!

```

```

<CODE BEGINS> file "ietf-ospf-graceful-link-shutdown@2019-07-05.yang"
module ietf-ospf-graceful-link-shutdown {
  yang-version 1.1;
  namespace
    "urn:ietf:params:xml:ns:yang:ietf-ospf-graceful-link-shutdown";

  prefix ospf-grace-linkdown;

  import ietf-inet-types {
    prefix "inet";
  }

  import ietf-routing {
    prefix "rt";
  }

```

```

}

```



```

import ietf-ospf {
    prefix "ospf";
}

import ietf-ospfv3-extended-lsa {
    prefix "ospfv3-e-lsa";
}

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

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

    Author:     Yingzhen Qu
                <mailto:yqu@futurewei.com>
    Author:     Acee Lindem
                <mailto:acee@cisco.com>";

description
    "This YANG module defines the configuration and operational
    state for OSPF Graceful Link Shutdown feature as defined
    in RFC 8379."

```

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

```

reference "RFC XXXX";

revision 2019-07-05 {
    description
        "Initial version";
    reference
        "RFC XXXX: A YANG Data Model for OSPF.";
}

```

```
}

/* RFC 8379 */
augment "/rt:routing/rt:control-plane-protocols/"
  + "rt:control-plane-protocol/ospf:ospf/"
  + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface" {
  when "../..../rt:type = 'ospf:ospfv2' or "
    + "../..../rt:type = 'ospf:ospfv3'" {
    description
      "This augments the OSPF interface configuration
      when used.";
  }
  description
    "This augments the OSPF protocol interface
    configuration with segment routing.";

  container graceful-link-shutdown {
    leaf enable {
      type boolean;
      default false;
      description
        "Enable OSPF graceful link shutdown.";
    }
    description
      "OSPF Graceful Link Shutdown.";
  }
}

/* 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-tlvs/ospf:extended-link-tlv" {
  when "../..../rt:type = 'ospf:ospfv2'" {
    description
      "This augmentation is only valid for OSPFv2.";
  }
  description
    "OSPF graceful link shutdown for OSPFv2 extended link TLV"
```

in type 10 opaque LSA.";

```
    container graceful-link-shutdown-sub-tlv {
      presence "Enable graceful link shutdown";
      description
        "Graceful-Link-Shutdown sub-TLV identifies the link as being
         gracefully shutdown.";
    }

    container remote-address-sub-tlv {
      leaf remote-address {
        type inet:ipv4-address;
        description
          "Remote IPv4 address used to identify a particular link
           on the remote side.";
      }
      description
        "This sub-TLV specifies the IPv4 address of the remote
         endpoint on the link.";
    }

    container local-remote-int-id-sub-tlv {
      leaf local-int-id {
        type uint32;
        description "Local interface ID.";
      }
      leaf remote-int-id {
        type uint32;
        description "Remote interface ID.";
      }
      description
        "This sub-TLV specifies Local and Remote Interface IDs.";
    }
  }

  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 "'ospf:../../../../../../../../../../'"
+ "rt:type" = 'ospf:ospfv3' {
description
    "This augmentation is only valid for OSPFv3
    E-Router LSAs";
}
container graceful-link-shutdown-sub-tlv {
presence "Enable graceful link shutdown";

```

```

description
    "Graceful-Link-Shutdown sub-TLV identifies the link as being
    gracefully shutdown.";
}
description
    "Augemnt OSPFv3 Area scope router-link 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-router"
+ "/ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv" {
when "'ospf:../../../../../../../../../../'"
+ "rt:type" = 'ospf:ospfv3' {
description
    "This augmentation is only valid for OSPFv3
    E-Router LSAs";
}
container graceful-link-shutdown-sub-tlv {
presence "Enable graceful link shutdown";
description
    "Graceful-Link-Shutdown sub-TLV identifies the link as being
    gracefully shutdown.";
}
description
    "Augemnt OSPFv3 AS scope router-link TLV.";
}
}
<CODE ENDS>

```

#### 4. YANG Module for OSPF LLS Extension for Local Interface ID Advertisement

This document defines a YANG module for OSPF Link-Local Signaling (LLS) Extensions for Local Interface ID Advertisement feature as defined in [RFC8510]. It is an augmentation of the OSPF base model.

```
module: ietf-ospf-lls-local-id
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/ospf:ospf:
      +--rw lls-int-id
        +--rw enable?    boolean
```

<CODE BEGINS> file "ietf-ospf-lls-local-id@2019-07-05.yang"

```
module ietf-ospf-lls-local-id {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-ospf-lls-local-id";

  prefix ospf-lls-localid;

  import ietf-routing {
    prefix "rt";
  }

  import ietf-ospf {
    prefix "ospf";
  }

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

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

    Author:   Yingzhen Qu
              <mailto:yqu@futurewei.com>
    Author:   Acee Lindem
              <mailto:acee@cisco.com>;
```

description

"This YANG module defines the configuration and operational state for OSPF Link-Local Signaling (LLS) Extensions for Local Interface ID Advertisement feature as defined in [RFC 8510](#).

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

reference "RFC XXXX";

revision 2019-07-05 {  
description

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```
    "Initial version";  
reference  
    "RFC XXXX: A YANG Data Model for OSPF.";  
}  
  
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 the OSPF protocol configuration  
    to support LLS extensions for interface ID as  
    defined in RFC 8510.";  
container lls-int-id {  
    leaf enable {
```

```

        type boolean;
        default false;
        description
            "Enable LLS to advertise local interface ID.";
    }
    description
        "OSPF LLS Extensions for interface ID.";
    }
}
}
<CODE ENDS>

```

## 5. 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.

## [6.](#) IANA Considerations

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

URI: urn:ietf:params:xml:ns:yang:ietf-ospf-two-metric  
Registrant Contact: The IESG.  
XML: N/A, the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang:ietf-ospf-grace-linkdown  
Registrant Contact: The IESG.  
XML: N/A, the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang:ietf-ospf-lls-localid  
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: ietf-ospf-two-metric  
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-two-metric  
prefix: ospf-two-metric  
reference: RFC XXXX

name: ietf-ospf-grace-linkdown  
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-grace-linkdown  
prefix: ospf-grace-linkdown  
reference: RFC XXXX

name: ietf-ospf-lls-localid  
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-lls-localid  
prefix: ospf-lls-localid  
reference: RFC XXXX

## [7.](#) 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.

## 8. References

### 8.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC3688] Mealling, M., "The IETF XML Registry", [BCP 81](#), [RFC 3688](#), DOI 10.17487/RFC3688, January 2004, <<https://www.rfc-editor.org/info/rfc3688>>.
- [RFC5246] Dierks, T. and E. Rescorla, "The Transport Layer Security (TLS) Protocol Version 1.2", [RFC 5246](#), DOI 10.17487/RFC5246, August 2008, <<https://www.rfc-editor.org/info/rfc5246>>.
- [RFC6020] Bjorklund, M., Ed., "YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)", [RFC 6020](#), DOI 10.17487/RFC6020, October 2010, <<https://www.rfc-editor.org/info/rfc6020>>.
- [RFC6241] Enns, R., Ed., Bjorklund, M., Ed., Schoenwaelder, J., Ed., and A. Bierman, Ed., "Network Configuration Protocol (NETCONF)", [RFC 6241](#), DOI 10.17487/RFC6241, June 2011, <<https://www.rfc-editor.org/info/rfc6241>>.
- [RFC6242] Wasserman, M., "Using the NETCONF Protocol over Secure Shell (SSH)", [RFC 6242](#), DOI 10.17487/RFC6242, June 2011, <<https://www.rfc-editor.org/info/rfc6242>>.
- [RFC6536] Bierman, A. and M. Bjorklund, "Network Configuration Protocol (NETCONF) Access Control Model", [RFC 6536](#), DOI 10.17487/RFC6536, March 2012, <<https://www.rfc-editor.org/info/rfc6536>>.
- [RFC7950] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", [RFC 7950](#), DOI 10.17487/RFC7950, August 2016, <<https://www.rfc-editor.org/info/rfc7950>>.

- [RFC8022] Lhotka, L. and A. Lindem, "A YANG Data Model for Routing Management", [RFC 8022](#), DOI 10.17487/RFC8022, November 2016, <<https://www.rfc-editor.org/info/rfc8022>>.
- [RFC8040] Bierman, A., Bjorklund, M., and K. Watsen, "RESTCONF Protocol", [RFC 8040](#), DOI 10.17487/RFC8040, January 2017, <<https://www.rfc-editor.org/info/rfc8040>>.
- [RFC8042] Zhang, Z., Wang, L., and A. Lindem, "OSPF Two-Part Metric", [RFC 8042](#), DOI 10.17487/RFC8042, December 2016, <<https://www.rfc-editor.org/info/rfc8042>>.
- [RFC8349] Lhotka, L., Lindem, A., and Y. Qu, "A YANG Data Model for Routing Management (NMDA Version)", [RFC 8349](#), DOI 10.17487/RFC8349, March 2018, <<https://www.rfc-editor.org/info/rfc8349>>.
- [RFC8379] Hegde, S., Sarkar, P., Gredler, H., Nanduri, M., and L. Jalil, "OSPF Graceful Link Shutdown", [RFC 8379](#), DOI 10.17487/RFC8379, May 2018, <<https://www.rfc-editor.org/info/rfc8379>>.
- [RFC8510] Psenak, P., Ed., Talaulikar, K., Henderickx, W., and P. Pillay-Esnault, "OSPF Link-Local Signaling (LLS) Extensions for Local Interface ID Advertisement", [RFC 8510](#), DOI 10.17487/RFC8510, January 2019, <<https://www.rfc-editor.org/info/rfc8510>>.

## 8.2. Informative References

- [I-D.ietf-ospf-yang]  
Yeung, D., Qu, Y., Zhang, Z., Chen, I., and A. Lindem, "YANG Data Model for OSPF Protocol", [draft-ietf-ospf-yang-23](#) (work in progress), July 2019.

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