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July 12, 2020

IS-IS YANG Model Augmentations for Additional Features - Version 1  
draft-acee-lsr-isis-yang-augmentation-v1-02

## Abstract

This document defines YANG data modules augmenting the IETF IS-IS YANG model to provide support for IS-IS Minimum Remaining Lifetime as defined in [RFC 7987](#).

## Status of This Memo

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## Table of Contents

<a href="#">1.</a>	Overview . . . . .	<a href="#">2</a>
<a href="#">1.1.</a>	Requirements Language . . . . .	<a href="#">2</a>
<a href="#">2.</a>	YANG Module for IS-IS Minimum Remaining Lifetime . . . . .	<a href="#">2</a>
<a href="#">3.</a>	YANG Module for IS-IS Application-Specific Link Attributes . . . . .	4
<a href="#">4.</a>	Security Considerations . . . . .	<a href="#">13</a>
<a href="#">5.</a>	IANA Considerations . . . . .	<a href="#">14</a>
<a href="#">6.</a>	Acknowledgements . . . . .	<a href="#">14</a>
<a href="#">7.</a>	References . . . . .	<a href="#">14</a>
<a href="#">7.1.</a>	Normative References . . . . .	<a href="#">14</a>
<a href="#">7.2.</a>	Informative References . . . . .	<a href="#">16</a>
	Authors' Addresses . . . . .	<a href="#">16</a>

[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 IS-IS YANG model [[I-D.ietf-isis-yang-isis-cfg](#)], which itself augments [[RFC8349](#)], to provide support for configuration and operational state for the following IS-IS features:

[RFC7987](#): IS-IS Minimum Remaining Lifetime[RFC7987].

The augmentations defined in this document requires support for the IS-IS base model[I-D.ietf-isis-yang-isis-cfg] which defines basic IS-IS configuration and state. The IS-IS 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 IS-IS Minimum Remaining Lifetime

This document defines a YANG module for IS-IS Minimum Remaining Lifetime as defined in [RFC7987]. It is an augmentation of the IS-IS base model.

Lindem, et al.

Expires January 13, 2021

[Page 2]

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Internet-Draft

ISIS YANG Augments V1

July 2020

```
module: ietf-isis-remaining-lifetime
```

```
  notifications:
```

```
    +---n corrupt-remaining-lifetime
```

```
      +--ro routing-protocol-name?  -> /rt:routing
                                      /control-plane-protocols
                                      /control-plane-protocol/name
```

```
      +--ro isis-level?              level
```

```
      +--ro lsp-id?                  isis:lsp-id
```

```
<CODE BEGINS> file "ietf-isis-remaining-lifetime@2020-05-06.yang"
```

```
module ietf-isis-remaining-lifetime {
```

```
  yang-version 1.1;
```

```
  namespace "urn:ietf:params:xml:ns:yang:ietf-isis-remaining-lifetime";
```

```
  prefix isis-remaining-lifetime;
```

```
  import ietf-isis {
```

```
    prefix "isis";
```

```
  }
```

```
  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:yingzhen.qu@futurewei.com>
```

```
    Author:   Acee Lindem
```

```
              <mailto:acee@cisco.com>
```

```
    Author:   Stephane Litkowski
```

```
              <mailto:slitkows.ietf@gmail.com>;
```

description

"This YANG module defines the configuration and operational state for IS-IS Minimum Remaining Lifetime feature as defined in [RFC 7987](#)."

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Lindem, et al.

Expires January 13, 2021

[Page 3]

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Internet-Draft

ISIS YANG Augments V1

July 2020

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(<http://trustee.ietf.org/license-info>).

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

reference "RFC XXXX";

revision 2020-05-06 {

description

"Initial version";

reference

"RFC XXXX: A YANG Data Model for IS-IS.";

}

notification corrupt-remaining-lifetime {

uses isis:notification-instance-hdr;

leaf lsp-id {

type isis:lsp-id;

description "LSP ID";

}

description

"This notification is sent when the system detects corrected lifetime of an LSP.";

}

}

<CODE ENDS>

### [3.](#) YANG Module for IS-IS Application-Specific Link Attributes

This document defines a YANG module for IS-IS Application-Specific Link Attributes [[I-D.ietf-isis-te-app](#)]. It is an augmentation of the IS-IS base model.

```
module: ietf-isis-link-attr
  augment /rt:routing/rt:control-plane-protocols
    /rt:control-plane-protocol/isis:isis/isis:interfaces
    /isis:interface:
  +--rw isis-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/isis:isis/isis:database
```

```
    /isis:levels/isis:lsp/isis:extended-is-neighbor
    /isis:neighbor/isis:instances/isis:instance:
  +--ro application-specific-link-attributes-sub-tlvs
    +--ro asla-sub-tlvs* []
      +--ro l-flag?          boolean
      +--ro sabm-length?     uint8
      +--ro r-flag?          boolean
      +--ro udabm-length?    uint8
      +--ro sabm
        | +--ro sabm-bits*    identityref
      +--ro udabm
      +--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/isis:isis/isis:database
    /isis:levels/isis:lsp/isis:mt-is-neighbor/isis:neighbor
    /isis:instances/isis:instance:
  +--ro application-specific-link-attributes-sub-tlvs
    +--ro asla-sub-tlvs* []
```

```

    +---ro l-flag?          boolean
    +---ro sabm-length?     uint8
    +---ro r-flag?         boolean
    +---ro udabm-length?    uint8
    +---ro sabm
    |   +---ro sabm-bits*    identityref
    +---ro udabm
    +---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/isis:isis/isis:database
        /isis:levels/isis:lsp:
+---ro application-specific-srlg-tlv
    +---ro as-srlg-tlvs* []
        +---ro neighbor-system-id?    isis:system-id
        +---ro pseudo-node-id?        uint8
        +---ro l-flag?                boolean
        +---ro sabm-length?            uint8
        +---ro r-flag?                boolean
        +---ro udabm-length?           uint8
        +---ro sabm
        |   +---ro sabm-bits*    identityref
        +---ro udabm

```

```

    +---ro length-of-sub-tlvs?    uint8
    +---ro link-id-sub-tlvs
    |   +---ro link-local-remote-ids
    |   |   +---ro link-local-id?    union
    |   |   +---ro link-remote-id?    union
    |   +---ro ipv4-interface-addr
    |   |   +---ro ipv4-int-addr?     inet:ipv4-address
    |   +---ro ipv4-neighbor-addr
    |   |   +---ro ipv4-neighbor-addr? inet:ipv4-address
    |   +---ro ipv6-interface-addr
    |   |   +---ro ipv6-int-addr?     inet:ipv6-address
    |   +---ro ipv6-neighbor-addr
    |       +---ro ipv6-neighbor-addr? inet:ipv6-address
    +---ro srlgs
        +---ro srlg*    uint32

```

```

<CODE BEGINS> file "ietf-isis-link-attr@2020-07-12.yang"
module ietf-isis-link-attr {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-isis-link-attr";

  prefix isis-link-attr;

  import ietf-inet-types {
    prefix inet;
    reference "RFC 6991 - Common YANG Data Types";
  }

  import ietf-routing {
    prefix "rt";
  }

  import ietf-isis {
    prefix "isis";
  }

  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>
    Author:     Stephane Litkowski

```

<mailto:slitkows.ietf@gmail.com>;

#### description

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

This YANG model conforms to the Network Management

Datastore Architecture (NMDA) as described in [RFC 8242](#).

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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";

```
revision 2020-07-12 {
  description
    "Initial version";
  reference
    "RFC XXXX: A YANG Data Model for IS-IS.";
}
```

```
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.";
}

grouping application-identifier-bit-mask {
    description
        "Identification of the set of applications associated with link
        attribute advertisements";

    leaf l-flag {
        type boolean;
        description
            "Legacy Flag. When set, all of the applications
            specified in the bit mask MUST use the legacy
            advertisements.";
    }
    leaf sabm-length {
        type uint8;
        description
            "Standard Application Identifier Bit Mask Length in
            octets.";
    }
    leaf r-flag {
        type boolean;
        default false;
        description
            "Reserved.";
    }
    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.";
}
}

grouping application-specific-link-attributes-sub-tlv {
    description
        "Grouping for specification of the applications and
        application-specific attribute values.";

    container application-specific-link-attributes-sub-tlvs {
        list asla-sub-tlvs {
            uses application-identifier-bit-mask;
            uses isis:unknown-tlvs;

        }
    }
}

grouping application-specific-srlg-tlv {
    description
        "Grouping of a TLV to advertise application-specific
        SRLGs for a given link.";
    container application-specific-srlg-tlv {
        list as-srlg-tlvs {
            leaf neighbor-system-id {
                type isis:system-id;
                description
                    "Neighbor System-ID.";
            }
            leaf pseudo-node-id {
                type uint8;
                description
                    "Pseudo-node ID.";
            }
        }
        uses application-identifier-bit-mask;
    }
}
```

```
leaf length-of-sub-tlvs {  
    type uint8;  
}
```

```
    description  
        "Length of sub-tlvs.";  
}  
  
container link-id-sub-tlvs {  
    description  
        "Link Identifier sub-TLVs.";  
    container link-local-remote-ids {  
        description  
            "Link local/remote identifier sub-tlv.";  
        leaf link-local-id {  
            type union {  
                type inet:ipv4-address;  
                type uint32;  
            }  
            description  
                "Local identifier of the link.  
                It could be an IPv4 address or a local identifier.";  
        }  
        leaf link-remote-id {  
            type union {  
                type inet:ipv4-address;  
                type uint32;  
            }  
            description  
                "Remote identifier of the link.  
                It could be an IPv4 address or a remotely learned  
                identifier.";  
        }  
    }  
}  
  
container ipv4-interface-addr {  
    leaf ipv4-int-addr {  
        type inet:ipv4-address;  
        description  
            "IPv4 address for the interface.";  
    }  
    description  
        "IPv4 interface address sub-tlv.";  
}
```

```

    container ipv4-neighbor-addr {
      leaf ipv4-neighbor-addr {
        type inet:ipv4-address;
        description
          "IPv4 address for a neighboring router
           on this link.";
      }
      description
        "IPv4 neighbor address sub-tlv.";
    }

```

```

    }
    container ipv6-interface-addr {
      leaf ipv6-int-addr {
        type inet:ipv6-address;
        description
          "IPv6 address for the interface.";
      }
      description
        "IPv6 interface address sub-tlv.";
    }
    container ipv6-neighbor-addr {
      leaf ipv6-neighbor-addr {
        type inet:ipv6-address;
        description
          "IPv6 address for a neighboring router
           on this link.";
      }
      description
        "IPv6 neighbor address sub-tlv.";
    }
  }
}

container srlgs {
  description "List of SRLGs.";
  leaf-list srlg {
    type uint32;
    description
      "SRLG value of the link.";
  }
}
}
}
}

```

```

}

augment "/rt:routing/" +
    "rt:control-plane-protocols/rt:control-plane-protocol"+
    "/isis:isis/isis:interfaces/isis:interface" {
    when "/rt:routing/rt:control-plane-protocols/"+
        "rt:control-plane-protocol/rt:type = 'isis:isis'" {
        description
            "This augment ISIS routing protocol when used.";
    }
    description
        "This augments ISIS protocol configuration
        with TE attributes per application.";

    container isis-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.";
}
}

/* TLV 22 */

```

```

augment "/rt:routing/" +
    "rt:control-plane-protocols/rt:control-plane-protocol"+
    "/isis:isis/isis:database/isis:levels/isis:lsp"+
    "/isis:extended-is-neighbor/isis:neighbor"+
    "/isis:instances/isis:instance" {
when "/rt:routing/rt:control-plane-protocols/"+
    "rt:control-plane-protocol/rt:type = 'isis:isis'" {
    description
        "This augment ISIS routing protocol when used";
}
description
    "This augments ISIS protocol LSDB TLV22.";

    uses application-specific-link-attributes-sub-tlv;
}

/* TLV 223 */
augment "/rt:routing/" +
    "rt:control-plane-protocols/rt:control-plane-protocol"+
    "/isis:isis/isis:database/isis:levels/isis:lsp"+
    "/isis:mt-is-neighbor/isis:neighbor"+
    "/isis:instances/isis:instance" {
when "/rt:routing/rt:control-plane-protocols/"+

```

```

    "rt:control-plane-protocol/rt:type = 'isis:isis'" {
description
    "This augment ISIS routing protocol when used";
}
description
    "This augments ISIS protocol LSDB TLV22.";

    uses application-specific-link-attributes-sub-tlv;
}

/* application-specific SRLG TLV 238 */
augment "/rt:routing/" +
    "rt:control-plane-protocols/rt:control-plane-protocol"+
    "/isis:isis/isis:database/isis:levels/isis:lsp" {
when "/rt:routing/rt:control-plane-protocols/"+
    "rt:control-plane-protocol/rt:type = 'isis:isis'" {
description
    "This augment ISIS routing protocol when used";
}
}

```

```

    }
    description
      "This augments ISIS protocol LSDB router capability.";

    uses application-specific-srlg-tlv;
  }
}
<CODE ENDS>

```

#### 4. 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.

## [5.](#) 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-isis-remaining-lifetime  
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-isis-remaining-lifetime  
namespace: urn:ietf:params:xml:ns:yang:ietf-isis-remaining-lifetime  
prefix: isis-remaining-lifetime  
reference: RFC XXXX

## [6.](#) 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.

## [7.](#) References

### [7.1.](#) 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>>.
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