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YANG Data Model for IS-IS Segment Routing MPLS PICS
draft-ietf-lsr-isis-pics-srmppls-yang-02

Abstract

The YANG model in this document is to query an IS-IS Protocol Implementation Conformance Statement (PICS) of Segment Routing on MPLS data plane.

Status of This Memo

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1. Overview

YANG [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.

[I-D.ietf-lsr-isis-pics-yang] defines the framework to query IS-IS Protocol Implementation Conformance Statement (PICS). The module defined in this document is used to query an IS-IS PICS of Segment Routing on MPLS data plane [RFC8667].

The YANG modules in this document conform to the Network Management Datastore Architecture (NMDA) [RFC8342].

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] [RFC8174].

2. Design of the Model

The YANG module is used to query an IS-IS implementation of Segment Routing on MPLS data plane [RFC8667] for the conformance of the protocol implementation.

Container "isis-pics-sr-mpls" only exists when "isis-pics-sr-mpls" is included in the list of "supported-isis-pics" in ietf-isis-pics module.

The existence of a TLV support container means the support of a TLV. The details of the flags and features are included in the container.

3. IS-IS PICS for SR MPLS Tree

This document uses the graphical representation of data models defined in [RFC8340].

```

module: ietf-isis-pics-sr-mpls
  +--ro isis-pics-sr-mpls
    +--ro sr-capability-sub-tlv-support!
      | +--ro i-bit-support?  isis-pics:support
      | +--ro v-bit-support?  isis-pics:support
    +--ro prefix-sid-sub-tlv-support!
      | +--ro tlv-135?  isis-pics:support
      | +--ro tlv-235?  isis-pics:support
      | +--ro tlv-236?  isis-pics:support
      | +--ro tlv-237?  isis-pics:support
    +--ro adj-sid-sub-tlv-support!
      | +--ro tlv-22?  isis-pics:support
      | +--ro tlv-222?  isis-pics:support
      | +--ro tlv-23?  isis-pics:support
      | +--ro tlv-223?  isis-pics:support
      | +--ro tlv-141?  isis-pics:support
    +--ro lan-adj-sid-sub-tlv-support!
      | +--ro tlv-22?  isis-pics:support
      | +--ro tlv-222?  isis-pics:support
      | +--ro tlv-23?  isis-pics:support
      | +--ro tlv-223?  isis-pics:support
    +--ro sid-label-tlv-support?  isis-pics:support
    +--ro sid-label-binding-tlv-support!
      | +--ro srms
      | | +--ro sending?  isis-pics:support
      | | +--ro receiving?  isis-pics:support
      | +--ro mirror-sid?  isis-pics:support
    +--ro mt-sid-label-binding-tlv-support!
      | +--ro srms
      | | +--ro sending?  isis-pics:support
      | | +--ro receiving?  isis-pics:support
      | +--ro mirror-sid?  isis-pics:support
    +--ro sr-algorithm-tlv-support!
      | +--ro algo-support*  uint8
    +--ro sr-lb-tlv-support?  isis-pics:support
    +--ro srms-preference-tlv-support?  isis-pics:support

augment /isis-pics:isis-pics/isis-pics:isis-pics-mptlv:
  +--ro sid-label-binding-support?  isis-pics:support
  +--ro mt-sid-label-binding-support?  isis-pics:support

```

4. IS-IS PICS SR-MPLS YANG Modules

```
<CODE BEGINS> file "ietf-isis-pics-sr-mpls@2025-05-05.yang"
module ietf-isis-pics-sr-mpls {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-isis-pics-sr-mpls";
  prefix isis-pics-sr-mpls;

  import iana-isis-pics {
    prefix "iana-isis-pics";
  }

  import ietf-isis-pics {
    prefix "isis-pics";
  }

  organization
    "IETF LSR - Link State Routing Working Group";
  contact
    "WG Web:    <http://datatracker.ietf.org/wg/lsr>
    WG List:    <mailto:lsr@ietf.org>

    Author:     Yingzhen Qu
                 <mailto:yingzhen.ietf@gmail.com>
    Author:     Les Ginsberg
                 <mailto:ginsberg@cisco.com>
    Author:     Tony Przygienda
                 <mailto:prz@juniper.net>
    Author:     Bruno Decraene
                 <mailto:bruno.decraene@orange.com>
    Author:     Yongqing Zhu
                 <mailto:zhuyq8@chinatelecom.cn>";

  description
    "The YANG module is used to query an IS-IS Protocol
    Implementation Conformance Statement (PICS) of Segment
    Routing for MPLS data plane (RFC8667).

    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
(<https://www.rfc-editor.org/info/rfcXXXX>); see the RFC itself
for full legal notices.";

reference

"RFC XXXX: YANG Data Model for IS-IS Segment Routing MPLS PICS";

revision 2025-05-05 {

description

"Initial Version";

reference

"RFC XXXX: YANG Data Model for IS-IS Segment Routing MPLS PICS.";

}

container isis-pics-sr-mpls {

when "/isis-pics:isis-pics/isis-pics:supported-isis-pics "

+ "= 'iana-isis-pics:isis-pics-sr-mpls'" {

description

"This container only exists when isis-pics-sr-mpls is present
in the ietf-isis-pics module.";

}

config false;

description

"IS-IS Protocol Implementation Conformance Statement (PICS) of
Segment Routing on MPLS data plane.";

reference

"RFC 8667: IS-IS Extensions for Segment Routing";

container sr-capability-sub-tlv-support {

presence "Support of sr-capability sub-tlv.";

description

"Support of sr-capability sub-tlv (Type 2).";

leaf i-bit-support {

type isis-pics:support;

description

"support mpls-ipv4 capability.";

}

leaf v-bit-support {

type isis-pics:support;

description

"support mpls-ipv6 capability.";

}

}

container prefix-sid-sub-tlv-support {

presence "Support of prefix-sid sub-tlv.";

```
description
  "Support of prefix-sid sub-tlv (Type 3).";

leaf tlv-135 {
  type isis-pics:support;
  description
    "May present in TLV-135, extended IPv4 reachability.";
}
leaf tlv-235 {
  type isis-pics:support;
  description
    "May present in TLV-235, multi-topology IPv4 reachability.";
}
leaf tlv-236 {
  type isis-pics:support;
  description
    "May present in TLV-236, IPv6 IP reachability.";
}
leaf tlv-237 {
  type isis-pics:support;
  description
    "May present in TLV-237, multi-topology IPv6 IP
    reachability.";
}
}

container adj-sid-sub-tlv-support {
  presence "Support of adj-sid sub-tlv.";
  description
    "Support of adjacency segment identifier sub-tlv (Type 31).";

  leaf tlv-22 {
    type isis-pics:support;
    description
      "May present in TLV-22, extended IS reachability.";
  }
  leaf tlv-222 {
    type isis-pics:support;
    description
      "May present in TLV-222, MT-ISN.";
  }
  leaf tlv-23 {
    type isis-pics:support;
    description
      "May present in TLV-23, IS neighbor attribute.";
  }
  leaf tlv-223 {
    type isis-pics:support;
```

```
        description
            "May present in TLV-223, MT IS neighbor attribute.";
    }
    leaf tlv-141 {
        type isis-pics:support;
        description
            "May present in TLV-141, inter-AS reachability information.";
    }
}

container lan-adj-sid-sub-tlv-support {
    presence "Support of lan-adj-sid sub-tlv.";
    description
        "Support of LAN adj-sid sub-tlv (Type 32).";

    leaf tlv-22 {
        type isis-pics:support;
        description
            "May present in TLV-22, extended IS reachability.";
    }
    leaf tlv-222 {
        type isis-pics:support;
        description
            "May present in TLV-222, MT-ISN.";
    }
    leaf tlv-23 {
        type isis-pics:support;
        description
            "May present in TLV-23, IS neighbor attribute.";
    }
    leaf tlv-223 {
        type isis-pics:support;
        description
            "May present in TLV-223, MT IS neighbor attribute.";
    }
}

leaf sid-label-tlv-support {
    type isis-pics:support;
    description
        "Support of sid/label sub-tlv (Type 1).";
}

container sid-label-binding-tlv-support {
    presence "Support of sid-label-binding sub-tlv.";
    description
        "Support of sid/label binding tlv (Type 149).";
}
```



```
container srms {
  description
    "Support to advertise or receive prefix to sid/label
    mapping.";

  leaf sending {
    type isis-pics:support;
    description
      "Support to advertise SR mappings.";
  }
  leaf receiving {
    type isis-pics:support;
    description
      "Support to receive and use the MS mapping advertisement.";
  }
}

leaf mirror-sid {
  type isis-pics:support;
  description
    "Support to advertise a mirror sid indicating the ability
    of a node to process traffic originally destined to
    another IGP node.";
}

container mt-sid-label-binding-tlv-support {
  presence "Support of multi-topology sid-label-binding sub-tlv.";
  description
    "Support of multi-topology sid/label binding tlv (Type 150).";

  container srms {
    description
      "Support to advertise or receive prefix to sid/label
      mapping.";

    leaf sending {
      type isis-pics:support;
      description
        "Support to advertise SR mappings.";
    }
    leaf receiving {
      type isis-pics:support;
      description
        "Support to receive and use the MS mapping advertisement.";
    }
  }
}
```

```
    leaf mirror-sid {
      type isis-pics:support;
      description
        "Support to advertise a mirror sid indicating the ability
        of a node to process traffic originally destined to
        another IGP node.";
    }
  }

  container sr-algorithm-tlv-support {
    presence "Support of SR-Algorithm sub-tlv.";
    description
      "Support of SR-Algorithm sub-tlv (Type 19).";

    leaf-list algo-support {
      type uint8;
      description
        "Supported algorithms.";
    }
  }

  leaf sr-lb-tlv-support {
    type isis-pics:support;
    description
      "Support of the SR Local Block sub-tlv (Type 22).";
  }

  leaf srms-preference-tlv-support {
    type isis-pics:support;
    description
      "Support of the SRMS Preference sub-tlv (Type 24).";
  }
}

augment "/isis-pics:isis-pics/isis-pics:isis-pics-mptlv"
{
  description
    "Augment isis-pics-mptlv container with the tlvs defined
    in RFC 8667.";

  leaf sid-label-binding-support {
    type isis-pics:support;
    description
      "MP-TLV support of sid/label binding tlv (Type 149).";
  }

  leaf mt-sid-label-binding-support {
    type isis-pics:support;
  }
}
```

```
        description
          "MP-TLV support of multi-topology sid/label
           binding tlv (Type 150).";
      }
    }
  }
<CODE ENDS>
```

5. Security Considerations

The YANG modules defined in this document are designed to be accessed via YANG-based management protocols, such as NETCONF [RFC6241] and RESTCONF [RFC8040]. These protocols have to use a secure transport layer (e.g., SSH [RFC4252], TLS [RFC8446], and QUIC [RFC9000]) and have to use mutual authentication.

The Network Configuration Access Control Model (NACM) [RFC8341] provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

Some of the readable data nodes in the `ietf-isis-pics-sr-mpls.yang` module 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.

6. IANA Considerations

The document requests IANA to create a entry, called `isis-pics-sr-mpls` in the "IS-IS PICS" registry [I-D.ietf-lsr-isis-pics-yang].

This document requests IANA to add a new "identity" to the `iana-isis-pics` YANG module. The following statement is suggested:

```
identity isis-pics-sr-mpls {
  base "isis-pics";
  description
    "The identity for IS-IS PICS support of SR MPLS.";
  reference
    "RFC 8667: IS-IS Extensions for Segment Routing.";
}
```

This document registers a URI in the IETF XML registry [RFC3688]. Following the format in [RFC3688], the following registration is requested to be made:

URI: urn:ietf:params:xml:ns:yang:ietf-isis-pics-sr-mpls
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.

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

name: ietf-isis-pics-sr-mpls
namespace: urn:ietf:params:xml:ns:yang:ietf-isis-pics-sr-mpls
prefix: isis-pics-sr-mpls
reference: RFC XXXX

7. Acknowledgements

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

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