

A YANG Data Model for Intermediate System to intermediate System (IS-IS) Topology

[draft-ogondio-opsawg-isis-topology-00](#)

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Rationale of this work

- Network operators perform the **capacity planning** for their networks and run regular **what-if scenarios** analysis based on **representations of the real network**.
- What-if analysis and capacity planning processes require, among other information, a **topological view** (domains, nodes, links, network interconnection) of the deployed network.
- **Goal of the work:** How to use IETF topology model to represent a real carrier network based on IS-IS domains for planning/simulation purposes
- The IETF topology drafts present an example of how could an IGP network be represented.
- The draft documents the use cases.
- This draft proposes a set of augments over the standard IETF network topology model to cover the gaps found to represent IS-IS topologies

Use Cases

- **Network design:** verifying that the actual deployed IS-IS network conforms to the planned design
- **Failure analysis:** Systematic and massive test of the network under multiple simulated failure situations, evaluating the network fault tolerance properties, and using mathematical models to derive statistical network availability metrics.
- **What-if analysis:** Estimation of the network KPIs in modified network situations. For instance, failure situations, traffic anomaly situations, addition or deletion of new adjacencies, IGP weight reconfigurations.
- **Capacity planning:** Dimensioning or redesign of the IP infrastructure to satisfy target KPI metrics under existing or forecasted traffic demands.

Relation with existing works

Device IS-IS Yang Model

- RFC 9130 covers the IS-IS YANG data model for the device.
- That model can be used to configure and retrieve operational state from the Router
- The proposed draft complements by offering a network-wide model (more abstracted) to cope with the previous use cases.

Digital Map

- Draft-havel-ospsawg-digital-map provides a core multi-layer topology model and data for a digital twin.
- The propose draft covers an specific layer of the digital map.

Definition of the model for IS-IS network

- One instance of ietf-network represents the nodes and links participating in one IGP process
- There will be as many ietf-Networks as IS-IS processes (domains)

First draft version (to be enhanced)

```
module: ietf-l3-isis-topology
  augment /nw:networks/nw:network/nw:network-types:
    +--rw isis-topology!
  augment /nw:networks/nw:network/nw:node/l3t:l3-node-attributes:
    +--rw isis-timer-attributes
      | +--rw lsp-lifetime?      string
      | +--rw lsp-refresh-interval? string
    +--rw isis-status
      +--rw level?      ietf-isis:level
      +--rw area-address* ietf-isis:area-address
      +--ro neighbours* inet:ip-address
  augment .../nt:termination-point/l3t:l3-termination-point-attributes:
    +--rw isis-termination-point-attributes
      +--rw interface-type? identityref
      +--rw level?      ietf-isis:level
      +--rw metric?    uint64
      +--rw is-passive? boolean
```

Type to indicate it is
an IS-IS IGP view

Node-level
information

Termination-point
information

Implementation Status

- Telefonica:
 - Proposed model used in one of the Telefonica operations to export the **Multi-vendor IP/MPLS topology** based on **multiple IS-IS domains** to Operation Support System tools for visualization, capacity planning and simulation.
- Huawei
 - A Digital Map PoC with a real lab has been built, based on multi-vendor devices, with RFC8345 as the base YANG module for the topology building blocks and modelling IS-IS routing.
- E-lighthouse:
 - Tool for simulate the network behavior under different changes, covering the what-if, failure analysis, dimensioning consumes the IS-IS network topology information from a commercial controller, using the Yang model proposed in this draft.

Next Steps and questions

- Improve the Yang model and the document and alignment with device model.
- Request WG participants to read and review the document
- Is OPSAWG Working Group interested in this work?
- Request Feedback from routing area WG.
- Questions & Suggestions are welcome