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A Yang Data Model for WSON Optical Networks

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Abstract

This document provides a YANG data model for the routing and wavelength assignment (RWA) TE topology in wavelength switched optical networks (WSONs).

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[1. Introduction](#)

This document provides a YANG data model for the routing and wavelength assignment (RWA) Traffic Engineering (TE) topology in wavelength switched optical networks (WSONs). The YANG model described in this document is a WSON technology-specific Yang model based on the information model developed in [[RFC7446](#)] and the two encoding documents [[RFC7581](#)] and [[RFC7579](#)] that developed protocol independent encodings based on [[RFC7446](#)]. This document augments the generic TE topology draft [[TE-TOP0](#)].

What is not in scope of this document is both impairment-aware WSON and flex-grid.

2. YANG Model (Tree Structure)

```
module: ietf-wson-topology
augment /nd:networks/nd:network/nd:network-types/tet:te-topology:
  +--rw wson-topology!
augment /nd:networks/nd:network/nd:node/tet:te/tet:config/tet:te-node-attributes/tet:connectivity-matrix:
  +--rw wson-matrix
    +--rw device-type?          devicetype
    +--rw dir?                  directionality
    +--rw matrix-interface* [in-port-id]
      +--rw in-port-id          wson-interface-ref
      +--rw out-port-id?       wson-interface-ref
augment /nd:networks/nd:network/lnk:link/tet:te/tet:config:
  +--rw wavelength-available-bitmap* boolean
augment /nd:networks/nd:network/nd:node/tet:te/tet:config:
  +--rw resource-pool* [resource-pool-id]
    +--rw resource-pool-id      uint32
    +--rw pool-state?          boolean
    +--rw matrix-interface* [in-port-id]
      +--rw in-port-id          wson-interface-ref
      +--rw out-port-id?       wson-interface-ref
```

3. WSON-RWA YANG Model

```
<CODE BEGINS> file "ietf-wson-topology@2016-07-09.yang"

module ietf-wson-topology {
  namespace "urn:ietf:params:xml:ns:yang:ietf-wson-topology";

  prefix wson;

  import ietf-network {
    prefix "nd";
  }

  import ietf-network-topology {
    prefix "lnk";
  }

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

  import ietf-te-topology {
    prefix "tet";
  }

  organization
    "IETF CCAMP Working Group";

  contact
    "Editor: Young Lee <leeyoung@huawei.com>";
```

`description`

"This module contains a collection of YANG definitions for RWA WSON.

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`revision 2016-07-09 {``description`

"Version 3";

`reference`

"RFC XXX: A Yang Data Model for WSON Optical Networks ";

`}``typedef wson-topology-id {``type inet:uri;``description`

"The WSON Topology ID";

`}``typedef wson-node-id {``type inet:ip-address;``description`

"The WSON Node ID";

`}``typedef devicetype {``type enumeration {``enum adm {``value 1;``description`

"Device is ADM";

```
    }

    enum roadm {
        value 2;
        description
            "Device is ROAMD/OXC";
    }
}
description
    "device type: fixed (ADM) or switched (ROADM/OXC)";
}

typedef directionality {
    type enumeration {
        enum bidir {
            value 0;
            description
                "bi-directional";
        }
        enum input {
            value 1;
            description
                "input direction";
        }
        enum output {
            value 2;
            description
                "output direction";
        }
    }
}
description
    "The directionality of link set";
}
```

```
typedef wson-interface-ref {
    type leafref {
        path "/nd:networks/nd:network/lnk:link/lnk:link-id";
    }
    description
```

```
        "This type is used by data models that need to
        reference WSON interface.";
    }

    grouping wson-topology-type {
        description
            "Identifies the wson topology type.";
        container wson-topology {
            presence "Indicates WSON topology.";
            description
                "Its presence identifies the WSON topology type.";
        }
    } // wson-topology-type

    augment "/nd:networks/nd:network/nd:network-types"
        + "/tet:te-topology" {

        description "Augment network-types to include WSON topology";
        uses wson-topology-type {
            description
                "An empty WSON container to identify
                the topology type.";
        }
    }

    augment "/nd:networks/nd:network/nd:node/tet:te/tet:config"
        + "/tet:te-node-attributes"
        + "/tet:connectivity-matrix" {
        when "nd:network-types/tet:te-topology/wson-topology" {
            description
                "This augment is only valid for WSON.";
        }
        description "WSON Connectivity Matrix augmentation.";
        container wson-matrix{
            description "WSON specific Matrix.";
            leaf device-type {
                type devicetype;
                description
                    "device type: fixed (ADM) or switched
                    (ROADM/OXC)";
            }
        }
    }
```

```
    leaf dir {
      type directionality;
      description
        "bi-directionality or input or output
        of link set";
    }
    list matrix-interface {
      key "in-port-id";

      description
        "matrix-interface describes input-ports
        and out-ports around a connectivity
        matrix";

      leaf in-port-id {
        type wson-interface-ref;
        description
          "The reference to in-port";
      }

      leaf out-port-id {
        type wson-interface-ref;
        description
          "The reference to out-port";
      }
    }
  }
}

augment "/nd:networks/nd:network/lnk:link/tet:te/tet:config" {

  when "nd:network-types/tet:te-topology/wson-topology" {

    description
      "This augment is only valid for WSON.";
  }
  description "WSON Link augmentation.";

  leaf-list wavelength-available-bitmap {
    type boolean;
    description
```

```
        "array of bits (i.e., bitmap) that indicates
        if a wavelength is available or not on each
        channel.";
    }
}
augment "/nd:networks/nd:network/nd:node/tet:te/tet:config" {
  when "nd:network-types/tet:te-topology/wson-topology" {
    description
      "This augment is only valid for WSON.";
  }
  description "WSON Node augmentation.";

  list resource-pool {
    key "resource-pool-id";
    description
      "The resource pool list";

    leaf resource-pool-id {
      type uint32;
      description
        "The resource pool ID";
    }

    leaf pool-state {
      type boolean;
      description
        "TRUE is state UP; FALSE is state down";
    }
  }

  list matrix-interface {
    key "in-port-id";

    description
      "pool is described as matrix-interface
      with input-ports and output-ports
      around the pool";

    leaf in-port-id {
      type wson-interface-ref;
      description
        "The reference to in-interface";
    }
  }
}
```

```
    }  
    leaf out-port-id {  
      type wson-interface-ref;  
      description  
        "The reference to out-interface";  
    }  
  }  
}  
}  
}  
}  
<CODE ENDS>
```

4. Security Considerations

TDB

5. IANA Considerations

TDB

6. Acknowledgments

This document was prepared using 2-Word-v2.0.template.dot.

7. References

7.1. Normative References

[TE-TOP0] X. Liu, et al., "YANG Data Model for TE Topologies", work in progress: [draft-ietf-teas-yang-te-topo](#).

7.2. Informative References

[RFC7446] Y. Lee, G. Bernstein, D. Li, W. Imajuku, "Routing and Wavelength Assignment Information Model for Wavelength Switched Optical Networks", [RFC 7446](#), February 2015.

[RFC7579] G. Bernstein, Y. Lee, D. Li, W. Imajuku, "General Network Element Constraint Encoding for GMPLS Controlled Networks", [RFC 7579](#), June 2015.

[RFC7581] G. Bernstein, Y. Lee, D. Li, W. Imajuku, "Routing and Wavelength Assignment Information Encoding for Wavelength Switched Optical Networks", [RFC 7581](#), June 2015.

8. Contributors

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