

CCAMP Working Group

Internet Draft

Intended status: Standard Track

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Expires: January 8, 2017

July 8, 2016

A Yang Data Model for WSON Optical Networks

[draft-ietf-ccamp-wson-yang-02.txt](#)

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@2016-07-08.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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    authors of the code. All rights reserved."
```

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```
revision 2015-10-14 {  
  description  
    "version 2.";
```

```
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

- [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.
- [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

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