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A YANG Data Model for network energy efficiency
draft-li-green-network-energy-efficiency-yang-00

Abstract

This document defines the YANG data model for network energy efficiency management, used to maintain network energy efficiency attributes, including device-level, board-level, and port-level.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

This document defines the YANG data model for network energy efficiency management, used to maintain network energy efficiency attributes, including device-level, board-level, and port-level.

The network model augments the "ietf-network" module [RFC8345].

This document defines energy efficiency based on energy consumption per unit of traffic, rather than simply advertising the power consumed by each unit.

2. Terminology and Notations

2.1. Requirements Language

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 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2.2. Terminology

The following terms are defined in [RFC7950] and are not redefined here:

* server

* augment

* data model

* data node

The following terms are defined in [RFC6241] and are not redefined here:

* configuration data

* state data

The following terms are defined in [RFC8342] and are not redefined here:

* applied configuration

Also, the document makes use of the following terms:

Device:

Card:

port:

2.3. Tree Diagrams

The meanings of the symbols in the YANG tree diagrams are defined in [RFC8340].

2.4. YANG Prefixes

Prefix	YANG Module	Reference
ianahw	iana-hardware	[IANA_YANG]
ni	ietf-network-inventory	[ietf-ivy-network-inventory-yang]

Table 1: Prefixes and corresponding YANG modules

3. Network Energy Efficiency Tree Diagram

The structure of the Network Energy Efficiency Model is depicted in Figure 1.

```
   module: ietf-network (RFC 8345)
     +--rw networks
       +--rw network* [network-id]
         +--rw network-id            network-id
         +--rw network-types
         +--rw supporting-network* [network-ref]
         |  +--rw network-ref    -> /networks/network/network-id
         |  +--rw node* [node-id]
         |
         |
   module: ietf-network-energy-efficiency (This Document)
     augment /nw:networks/nw:network/nw:node:
         +--ro component* [name]
           +--ro name              string
           +--ro class             identityref
           +-- green-energy-efficiency*
             +-- ro type?          green-type(avg/max/real-time)
             +-- ro value?         decimal64
             +-- ro timestamp?     yang:date-and-time
             +-- ro update-period? uint32
```

Figure 2: Network Energy Efficiency tree diagram

4. YANG Data Model for Network Energy Efficiency

<CODE BEGINS> file "ietf-network-energy-efficiency@2025-10-20.yang"

```
module ietf-network-energy-efficiency {

  yang-version 1.1;

  namespace "urn:ietf:params:xml:ns:yang:ietf-network-energy-
efficiency";

  prefix ntw-eff;



  import ietf-network {

    prefix nw;

    reference

      "RFC 8345: A YANG Data Model for Network Topologies";

  }

  import ietf-yang-types {
```

```
       prefix yang;

       reference

         "RFC 6991: Common YANG Types";

     }

     import iana-hardware {

       prefix ianahw;

       reference

         "https://www.iana.org/assignments/iana-hardware/iana-
   hardware.xhtml";

     }


     organization "IETF NETMOD Working Group";

     contact

       "WG Web:   <https://datatracker.ietf.org/wg/netmod/>

        WG List:  <mailto:netmod@ietf.org>";


     description

       "This module augments the ietf-network model to add power

        consumption monitoring capabilities for hardware components.

        Copyright (c) 2025 IETF Trust and the persons identified as

        authors of the code. All rights reserved.";


     revision 2025-10-20 {

       description

         "Initial revision.";

       reference
```

```
        "RFC XXXX: Power Consumption Extension for Hardware
   Management";
    }

    feature energy-efficiency {
      description
        "Indicates support for energy efficiency monitoring features";
    }

    // ========== Type Definitions ==========
    identity green-type {
      description "Base identity for energy-efficiency types";
    }

    identity average {
      base green-type;
      description "Average energy-efficiency over time";
    }

    identity maximum {
      base green-type;
      description "Maximum energy-efficiency observed";
    }

    identity real-time {
      base green-type;
```

```
      description "Real-time energy-efficiency reading";
    }

    grouping green-energy-efficiency {
      description "Energy Efficiency attributes";

      leaf value {
        type decimal64 {
          fraction-digits 4;
        }
        units "watts/GB";
        mandatory true;
        description "Energy Efficiency value";
      }

      leaf timestamp {
        type yang:date-and-time;
        description "Time when measurement was taken";
      }

      leaf update-period {
        type uint32;
        units "seconds";
        description
          "For maximum and real-time values, it indicates the minimum
   refresh time when there is a change; if the value remains unchanged,
```

```
   no refresh occurs. For the average, it represents the sampling
   window.";

       }

     } // End of green-energy-efficiency grouping


     // ========== Main Augmentation ==========

     augment "/nw:networks/nw:network/nw:node" {

       if-feature energy-efficiency;

       description

         "Add green consumption to network components";


       list component {

         key name;

         config false;

         description

           "List of components.";


         leaf name {

           type string;

           description

             "The name assigned to this component.

              This name is not required to be the same as

              entPhysicalName.";

         }


         leaf class {
```

```
          type identityref {
            base ianahw:hardware-class;
          }
          mandatory true;
          description
            "An indication of the general hardware type of the
             component.";
          reference
            "RFC 6933: Entity MIB (Version 4) - entPhysicalClass";
        }

        uses green-energy-efficiency;
      } // End of component list
    } // End of augment
  } // End of module
  <CODE ENDS>
```

Figure 3: Network Energy Efficiency YANG module

5. IANA Considerations

TBD.

6. References

6.1. Normative References

[RFC8348] A. Bierman, YumaWorks, M. Bjorklund, Tail-f Systems, J. Dong, Huawei Technologies, D. Romascanu, "A YANG Data Model for Hardware Management", RFC 8348, DOI 10.17487/RFC8348, March 2018, <https://www.rfc-editor.org/info/rfc8348>.

6.2. Informative References

TBD.

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