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Definition of Managed Objects for the DYMO Manet Routing Protocol
draft-ietf-manet-dymo-mib-04

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes objects for configuring aspects of the DYMO routing process. The DYMO-MIB also reports state information, performance information, and notifications. In addition to configuration, this additional state, performance and notification information is useful to management operators troubleshooting DYMO routing problems.

Status of This Memo

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1. **Introduction**

This memo defines a portion of the Management Information Base (MIB)
for use with network management protocols in the Internet community. In
particular, it describes objects for configuring aspects of a Dynamic
MANET On-demand (DYMO) routing [I-D.ietf-manet-dymo] (Chakeres, I. and
C. Perkins, "Dynamic MANET On-demand (DYMO) Routing," July 2010.)

process. The DYMO-MIB also reports state information, performance metrics, and notifications. In addition to configuration, this additional state, performance and notification information is useful to management stations troubleshooting routing problems.

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2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410] (Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework," December 2002.).
Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578] (McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIv2)," April 1999.), STD 58, RFC 2579 [RFC2579] (McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2," April 1999.) and STD 58, RFC 2580 [RFC2580] (McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2," April 1999.).

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3. Conventions

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 RFC 2119 [RFC2119] (Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," March 1997.).

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4. Overview

The Dynamic MANET On-demand (DYMO) routing protocol [I-D.ietf-manet-dymo] (Chakeres, I. and C. Perkins, "Dynamic MANET On-demand (DYMO) Routing," July 2010.) is intended for use by mobile nodes in wireless, multihop networks. DYMO determines unicast routes among

DYMO routers within the network in an on-demand fashion, offering
improved convergence in dynamic topologies.
A DYMO router's MIB contains DYMO process configuration parameters
(e.g. interfaces), state information (e.g. sequence number),
performance counters (e.g. number of control messages), and
notifications.

4.1. DYMO Management Model

This section describes the management model for the DYMO routing
protocol.
The MIB is comprised of four groups, i.e., Notifications,
Configuration, State and Performance. The configuration of the managed
devices is controlled by the objects in the Configuration Group. These
are divided into Nodal and Interface objects. The bulk of the DYMO
configuration is in the Nodal objects which control protocol behavior.
The Interface objects merely identify/configure interfaces to enable
DYMO routing over their interface. The Nodal objects are further
divided into routing (or protocol) objects and Gateway objects. Gateway
objects define other routing prefixes for which the node acts as a
routing proxy on behalf of these non-local prefixes.
The Configuration Objects drive the behavior of the managed DYMO device
and hence determines the information in the remaining groups, i.e.,
State, Performance and Notifications. The State objects primarily
present the resulting forwarding table objects. The Performance group
primarily is comprised of counters for monitoring the number of DYMO
routing messages received locally, per node and per interface. The
Notifications group contains objects which monitor changes to the
interface configuration and the gateway prefixes configuration.
See the below diagram outlining the DYMO-MIB device management model.

```
+------------------------------------------+
|   CONFIGURATION GROUP                    |
|                                          |
|   Nodal                      Interface   |
|                                          |
|   +-------+  +-------+       +-------+  |
|   |Gateway|  |Routing|       |Routing|  |
|   +-------+  +-------+       +-------+  |
|                                          |
+------------------------------------------+
    ||           ||              ||
    ||           ||              ||
    ||           ||              ||
   \  /         \  /            \  /
    \/           \/              \/
 +-------+  +-------------+  +---------------+
 | STATE |  | PERFORMANCE |  | NOTIFICATIONS |
 | GROUP |  | GROUP       |  | GROUP         |
 +-------+  +-------------+  +---------------+
```
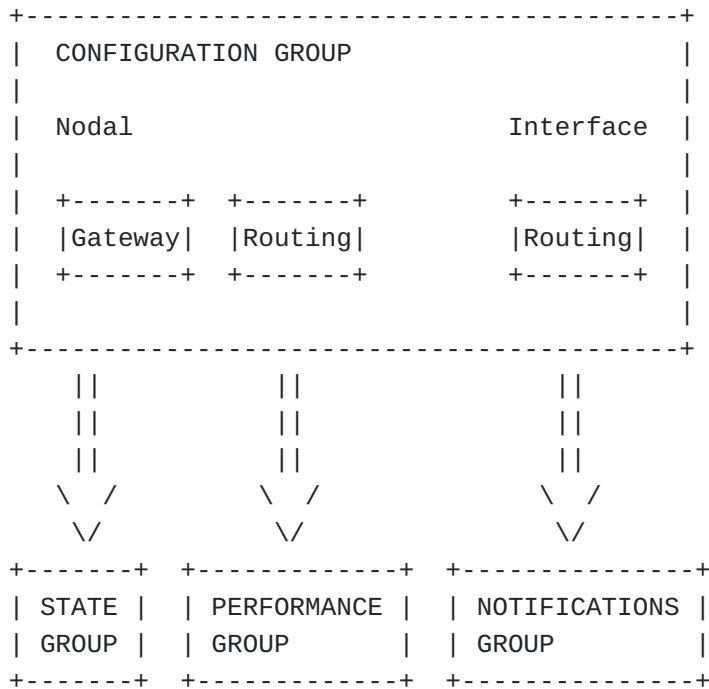
4.2. Terms

The following definitions apply throughout this document:

   *Configuration Objects - switches, tables, objects which are
    initialized to default settings or set through the management
    interface defined by this MIB.

   *Tunable Configuration Objects - objects whose values affect
    timing or attempt bounds on the DYMO protocol.

   *State Objects - automatically generated values which define the
    current operating state of the DYMO protocol process in the
    router.

   *Performance Objects - automatically generated values which help
    an operator or automated tool to assess the performance of the
    DYMO protocol process on the router and the overall routing
    performance within the DYMO routing domain.

```

## 5.  Structure of the MIB Module

This section presents the structure of the DYMO MIB module. The objects are arranged into the following groups:

*dymoMIBNotifications - defines the notifications associated with the DYMO-MIB. These are currently limited to notifications of interface state changes and gateway prefix changes.

*dymoMIBObjects - defines the objects forming the basis for the DYMO-MIB. These objects are divided up by function into the following groups:

*   -Configuration Group - This group contains the DYMO objects that configure specific options that determine the overall performance and operation of the routing protocol for the router device and its interfaces.

-State Group - Contains information describing the current state of the DYMO process such as the DYMO routing table.

-Performance Group - Contains objects which help to characterize the performance of the DYMO process, typically statistics counters. There are two types of DYMO statistics: global counters and per interface counters.

*dymoMIBConformance - defines minimal and full conformance of implementations to this DYMO-MIB.

---

### 5.1.  Textual Conventions

The textual conventions used in the DYMO-MIB are as follows. The RowStatus and TruthValue textual conventions are imported from RFC 2579 [RFC2579] (McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2," April 1999.). The DymoInterfaceOperStatus is defined within the DYMO-MIB. This contains the current operational status of the DYMO interface.

---

### 5.2.  The Configuration Group

The DYMO device is configured with a set of controls. The list of configuration controls for the DYMO device follow.
Protocol Configuration Parameters:

*DID

        *MSG_HOPLIMIT

        *ROUTE_TIMEOUT

        *ROUTE_AGE_MIN_TIMEOUT

        *ROUTE_SEQNUM_AGE_MAX_TIMEOUT

        *ROUTE_USED_TIMEOUT

        *ROUTE_DELETE_TIMEOUT

        *ROUTE_RREQ_WAIT_TIME

        *UNICAST_MESSAGE_SENT_TIMEOUT

        *MSG_HOPLIMIT

        *DISCOVERY_ATTEMPTS_MAX

Protocol Configuration Tables:

        *Responsible Hosts - If RESPONSIBLE_ADDRESSES is set to other than
         self address, then the DYMO router must be configured with the
         set of host addresses for which it is to generate RREP messages.

        *Interfaces - If DYMO_INTERFACES is set to other than all, then
         the DYMO router must be told which interfaces to run the DYMO
         protocol over. This is a table containing the interfaces and
         associated information.

---

### 5.3.  The State Group

The State Subtree reports current state information. State information
from the DYMO-MIB is primarily contained in the 'Routing' Table.

---

### 5.3.1.  Routing Table

The DYMO routing table contains information related to IP forwarding
entries found by the node's DYMO processes.

## 5.4.  The Performance Group

The Performance subtree reports primarily counters that relate to DYMO protocol activity. The DYMO performance objects consists of per node and per interface objects:

*OwnSequenceNumber

*RREQ initiated

*RREQ sent

*RREQ received

*RREP initiated

*RREP sent

*RREP received

*RRER initiated

*RRER sent

*RRER received

*Per interface statistics table with the following entries:

*  -RREQ initiated

   -RREQ sent

   -RREQ received

   -RREP initiated

   -RREP sent

   -RREP received

   -RRER initiated

   -RRER sent

   -RRER received

## 5.5.  The Notifications Group

The Notifications Subtree contains the list of notifications supported
within the DYMO-MIB and their intended purpose or utility. This group
is currently contains two notification objects, one related to status
changes in DYMO interfaces and one related to changes in the gateway
prefixes table.

---

## 6.  Relationship to Other MIB Modules

The text of this section specifies the relationship of the MIB modules
contained in this document to other standards, particularly to
standards containing other MIB modules. Definitions imported from other
MIB modules and other MIB modules that SHOULD be implemented in
conjunction with the MIB module contained within this document are
identified in this section.

---

## 6.1.  Relationship to the SNMPv2-MIB

The 'system' group in the SNMPv2-MIB [RFC3418] (Presuhn, R.,
"Management Information Base (MIB) for the Simple Network Management
Protocol (SNMP)," December 2002.) is defined as being mandatory for all
systems, and the objects apply to the entity as a whole. The 'system'
group provides identification of the management entity and certain
other system-wide data. The DYMO-MIB does not duplicate those objects.

---

## 6.2.  MIB modules required for IMPORTS

The DYMO-MIB module IMPORTS objects from SNMPv2-SMI [RFC2578]
(McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed.,
"Structure of Management Information Version 2 (SMIv2)," April 1999.),
SNMPv2-TC [RFC2579] (McCloghrie, K., Ed., Perkins, D., Ed., and J.
Schoenwaelder, Ed., "Textual Conventions for SMIv2," April 1999.),
SNMPv2-CONF [RFC2580] (McCloghrie, K., Perkins, D., and J.
Schoenwaelder, "Conformance Statements for SMIv2," April 1999.), INET-
ADDRESS-MIB [RFC4001] (Daniele, M., Haberman, B., Routhier, S., and J.
Schoenwaelder, "Textual Conventions for Internet Network Addresses,"
February 2005.) and IF-MIB [RFC2863] (McCloghrie, K. and F. Kastenholz,
"The Interfaces Group MIB," June 2000.).

---

7.  **Definitions**

```
MANET-DYMO-MIB DEFINITIONS ::= BEGIN

IMPORTS

    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
    Counter32, Integer32, Unsigned32, mib-2
        FROM SNMPv2-SMI   -- [RFC2578]

    TEXTUAL-CONVENTION, RowStatus, TruthValue
        FROM SNMPv2-TC   -- [RFC2579]

    MODULE-COMPLIANCE, OBJECT-GROUP,
    NOTIFICATION-GROUP
        FROM SNMPv2-CONF   -- [RFC2580]

    InetAddress, InetAddressType,
    InetAddressPrefixLength
        FROM INET-ADDRESS-MIB   -- [RFC4001]

    InterfaceIndexOrZero
        FROM IF-MIB   -- [RFC2863]
    ;

manetDymoMIB MODULE-IDENTITY
    LAST-UPDATED "201101191200Z" -- January 19, 2011
    ORGANIZATION "IETF MANET Working Group"
    CONTACT-INFO
        "WG E-Mail: manet@ietf.org

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```

```
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```

```
DESCRIPTION
   "This MIB module contains managed object definitions for
    the Dynamic MANET On-demand (DYMO) routing protocol as
    defined in: Chakeres,I., and C. Perkins, Dynamic MANET
    On-demand (DYMO) Routing, draft-ietf-manet-dymo-21,
    July 26, 2010.

    Copyright (C) The IETF Trust (2008). This version
    of this MIB module is part of RFC xxxx; see the RFC
    itself for full legal notices."

-- Revision History
REVISION    "201101191200Z"   -- January 19, 2011
DESCRIPTION
   "Fifth draft of this MIB module published as
    draft-ietf-manet-dymo-mib-04.txt.
    Changes include:
    - Incorporated the DYMO ID by adding Instance
      Table.
    - Added dymoSetNotification for improved control
      of DYMO Notifications.
    - Updated various object names to be consistent
      with current draft-ietf-manet-dymo-21.
    "
REVISION    "200910251200Z"   -- October 25, 2009
DESCRIPTION
   "Fourth draft of this MIB module published as
    draft-ietf-manet-dymo-mib-03.txt.
    - Minor changes to textual material, including
      additions to the IMPORTS text.
    - Added DEFVAL clauses to all read-write
      configuration objects with defaults identified
      in the DYMO draft."
REVISION    "200902241200Z"   -- February 24, 2009
DESCRIPTION
   "Third draft of this MIB module published as
    draft-ietf-manet-dymo-mib-02.txt.
    - Minor changes to dymoInterfacesTable and
      dymoResponsibleAddrTable.
    - Added global dymoAdminStatus and interface
      specific dymoIfAdminStatus.
    - Imported InterfaceIndexOrZero type from
```

```
          IF-MIB."
    REVISION     "200811031200Z"    -- November 03, 2008
    DESCRIPTION
       "Second draft of this MIB module published as
        draft-ietf-manet-dymo-mib-01.txt. Minor changes to
        dymoInterfacesTable and dymoResponsibleAddrTable."
    REVISION     "200805141200Z"    -- May 14, 2008
    DESCRIPTION
       "Initial draft of this MIB module published as
        draft-ietf-manet-dymo-mib-00.txt."
    -- RFC-Editor assigns XXXX
    ::= { mib-2 999 }   -- to be assigned by IANA


--
-- TEXTUAL CONVENTIONs
--


Status ::= TEXTUAL-CONVENTION
     STATUS       current
     DESCRIPTION
        "An indication of the operability of a DYMO
         function or feature.  For example, the status
         of an interface: 'enabled' indicates that
         it is willing to communicate with other DYMO routers,
         and 'disabled' indicates that it is not."
     SYNTAX  INTEGER { enabled (1), disabled (2) }



--
-- Top-Level Object Identifier Assignments
--

dymoMIBNotifications OBJECT IDENTIFIER ::= { manetDymoMIB 0 }
dymoMIBObjects       OBJECT IDENTIFIER ::= { manetDymoMIB 1 }
dymoMIBConformance   OBJECT IDENTIFIER ::= { manetDymoMIB 2 }


--
-- dymoConfigurationGroup
--
--    This group contains the DYMO objects that configure specific
--    options that determine the overall performance and operation
--    of the routing protocol for the router device and its
--    interfaces.
--

dymoConfigurationGroup  OBJECT IDENTIFIER ::= { dymoMIBObjects 1 }


--
-- DYMO Global Router Configuration Group
--
```

```
dymoRouterConfigGroup OBJECT IDENTIFIER ::= {dymoConfigurationGroup 1}

 dymoInstanceTable  OBJECT-TYPE
    SYNTAX      SEQUENCE OF DymoInstanceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The DYMO Instance Table describes the DYMO
        ...."
    REFERENCE
       "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
        I., and C. Perkins, July 2010. The DID."
 ::= { dymoRouterConfigGroup 1 }

 dymoInstanceEntry OBJECT-TYPE
    SYNTAX      DymoInstanceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The DYMO instance entry describes one DYMO
        process as indexed by its DID."
    INDEX { dymoInstanceIndex }
 ::= { dymoInstanceTable 1 }

 DymoInstanceEntry ::=
    SEQUENCE {
       dymoInstanceIndex
          Integer32,
       dymoInstanceDid
          Integer32,
       dymoInstanceAdminStatus
          Status,
       dymoInstanceRowStatus
          RowStatus
       }

 dymoInstanceIndex  OBJECT-TYPE
    SYNTAX      Integer32 (0..255)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The instance index for this DYMO process."
    ::= { dymoInstanceEntry 1 }

 dymoInstanceDid OBJECT-TYPE
     SYNTAX      Integer32 (0..255)
     MAX-ACCESS  read-write
     STATUS      current
```

```
        DESCRIPTION
            "The DYMO ID of this instance of the
             DYMO process.
            "
    ::= { dymoInstanceEntry 2 }

    dymoInstanceAdminStatus OBJECT-TYPE
        SYNTAX       Status
        MAX-ACCESS   read-write
        STATUS       current
        DESCRIPTION
            "The administrative status of this DYMO
            process in the router.  Multiple processes are
            allowed.  The value 'enabled' denotes that the
            DYMO Process is active on at least one interface;
            'disabled' disables it on all interfaces.

            This object is persistent and when written
            the entity SHOULD save the change to non-volatile storage."
    ::= { dymoInstanceEntry 3 }

    dymoInstanceRowStatus  OBJECT-TYPE
        SYNTAX       RowStatus
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object permits management of the table
             by facilitating actions such as row creation,
             construction, and destruction. The value of
             this object has no effect on whether other
             objects in this conceptual row can be
             modified."
    ::= { dymoInstanceEntry 4 }

    dymoMaxHopLimit  OBJECT-TYPE
        SYNTAX       Unsigned32 (0..255)
        UNITS        "hops"
        MAX-ACCESS   read-write
        STATUS       current
        DESCRIPTION
            "The maximum number of hops. The suggested value
             default is 10 hops. This is the DYMO MSG_HOPLIMIT
             parameter value."
        REFERENCE
            "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
             I., and C. Perkins, July 2010. Table 2 Suggested
             Parameter Values."
        DEFVAL { 10 }
    ::= { dymoRouterConfigGroup 2 }
```

```
dymoRouteTimeout  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   UNITS       "milliseconds"
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
      "The route timeout value. The suggested default
       value is 5000 milliseconds. This is the
       DYMO ROUTE_TIMEOUT parameter value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 5000 }
::= { dymoRouterConfigGroup 3 }

dymoRouteAgeMinTimeout  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   UNITS       "milliseconds"
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
      "The minimum route age timeout value. The
       suggested default value is 1000 milliseconds.
       This is the DYMO ROUTE_AGE_MIN_TIMEOUT parameter
       value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 1000 }
::= { dymoRouterConfigGroup 4 }

dymoRouteSeqnumAgeMaxTimeout  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   UNITS       "milliseconds"
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
      "The maximum route age timeout value. The
       suggested default value is 60,000 milliseconds.
       This is the DYMO ROUTE_SEQNUM_AGE_MAX_TIMEOUT
       parameter value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 60000 }
```

```
    ::= { dymoRouterConfigGroup 5 }

dymoRouteUsedTimeout  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   UNITS       "milliseconds"
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
      "The route used timeout value. The
       suggested default value is to set this
       to the dymoRouteTimeout object value
       (whose default is 5000 milliseconds). This
       is the DYMO ROUTE_USED_TIMEOUT parameter
       value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 5000 }
::= { dymoRouterConfigGroup 6 }

dymoRouteDeleteTimeout  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   UNITS       "milliseconds"
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
      "The route delete timeout value. The
       suggested default value is 2 * dymoRouteTimeout
       value (which is equal to 10000 milliseconds
       if using the default value for the
       dymoRouteTimeout value). This is the
       DYMO ROUTE_DELETE_TIMEOUT parameter value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 10000 }
::= { dymoRouterConfigGroup 7 }

dymoRouteRreqWaitTime  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   UNITS       "milliseconds"
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
      "The Route Request wait time. The suggested default
       value is 2000 milliseconds. This is the DYMO
       ROUTE_RREQ_WAIT_TIME parameter value."
```

```
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 2000 }
::= { dymoRouterConfigGroup 8 }

dymoDiscoveryAttemptsMax  OBJECT-TYPE
   SYNTAX       Unsigned32 (1..16)
   UNITS        "attempts"
   MAX-ACCESS   read-write
   STATUS       current
   DESCRIPTION
      "The number of Route Request retry attempts. The
       suggested default value is 3. This is the
       DYMO DISCOVERY_ATTEMPTS_MAX parameter value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 3 }
::= { dymoRouterConfigGroup 9 }

dymoUnicastMsgSentTimeout  OBJECT-TYPE
   SYNTAX       Unsigned32 (1..65535)
   UNITS        "milliseconds"
   MAX-ACCESS   read-write
   STATUS       current
   DESCRIPTION
      "The message sent timeout value for unicast packets.
       The suggested default value is 1000 milliseconds.
       This is the DYMO UNICAST_MESSAGE_SENT_TIMEOUT
       parameter value."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
   DEFVAL { 1000 }
::= { dymoRouterConfigGroup 10 }



--
-- DYMO Interfaces Configuration Table
--

dymoInterfaceTable  OBJECT-TYPE
   SYNTAX       SEQUENCE OF DymoInterfaceEntry
   MAX-ACCESS   not-accessible
```

```
            STATUS       current
            DESCRIPTION
               "The DYMO Interface Table describes the DYMO
                interfaces that are participating in the
                DYMO routing protocol. The ifIndex is from
                the interfaces group defined in the Interfaces
                Group MIB."
            REFERENCE
               "RFC 2863 - The Interfaces Group MIB, McCloghrie,
                K., and F. Kastenholtz, June 2000."
        ::= { dymoConfigurationGroup 2 }

        dymoInterfaceEntry OBJECT-TYPE
            SYNTAX       DymoInterfaceEntry
            MAX-ACCESS   not-accessible
            STATUS       current
            DESCRIPTION
               "The DYMO interface entry describes one DYMO
                interface as indexed by its ifIndex."
            INDEX { dymoIfIndex }
        ::= { dymoInterfaceTable 1 }

        DymoInterfaceEntry ::=
            SEQUENCE {
               dymoIfIndex
                   InterfaceIndexOrZero,
               dymoIfAdminStatus
                   Status,
               dymoIfRowStatus
                   RowStatus
               }

        dymoIfIndex  OBJECT-TYPE
            SYNTAX       InterfaceIndexOrZero
            MAX-ACCESS   not-accessible
            STATUS       current
            DESCRIPTION
               "The ifIndex for this DYMO interface."
            ::= { dymoInterfaceEntry 1 }

        dymoIfAdminStatus OBJECT-TYPE
            SYNTAX       Status
            MAX-ACCESS   read-create
            STATUS       current
            DESCRIPTION
               "The DYMO interface's administrative status.
                The value 'enabled' denotes that the interface
                is running the DYMO routing protocol.
                The value 'disabled' denotes that the interface is
```

```
         external to DYMO."
   ::= { dymoInterfaceEntry 2 }


dymoIfRowStatus  OBJECT-TYPE
   SYNTAX      RowStatus
   MAX-ACCESS  read-create
   STATUS      current
   DESCRIPTION
      "This object permits management of the table
       by facilitating actions such as row creation,
       construction, and destruction. The value of
       this object has no effect on whether other
       objects in this conceptual row can be
       modified."
::= { dymoInterfaceEntry 3 }



--
-- DYMO Responsible Address Table
--

dymoResponsibleAddrTable OBJECT-TYPE
   SYNTAX      SEQUENCE OF DymoResponsibleAddrEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
      "The DYMO Responsible Address Table is a
       list of IP address prefixes, and their
       associated prefix length for which the
       DYMO router is responsible."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 3 Important
       Settings."
::= { dymoConfigurationGroup 3 }

dymoResponsibleAddrEntry  OBJECT-TYPE
   SYNTAX      DymoResponsibleAddrEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
      "A single host address range. Information
       in this table is persistent and when this object
       is written, the entity SHOULD save the change to
       non-volatile storage."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 3 Important
       Settings."
```

```
            INDEX { dymoResponsibleAddrIndex }
      ::= { dymoResponsibleAddrTable 1 }

      DymoResponsibleAddrEntry ::=
         SEQUENCE {
            dymoResponsibleAddrIndex
               Unsigned32,
            dymoResponsibleAddrType
               InetAddressType,
            dymoResponsibleAddr
               InetAddress,
            dymoResponsibleAddrPrefixLen
               InetAddressPrefixLength,
            dymoResponsibleAddrRowStatus
               RowStatus
            }

      dymoResponsibleAddrIndex  OBJECT-TYPE
         SYNTAX      Unsigned32
         MAX-ACCESS  not-accessible
         STATUS      current
         DESCRIPTION
            "This object is the index into this table."
      ::= { dymoResponsibleAddrEntry 1 }

      dymoResponsibleAddrType  OBJECT-TYPE
         SYNTAX      InetAddressType
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
            "The type of the dymoResponsibleAddr, as defined
             in the InetAddress MIB [RFC 4001]."
         REFERENCE
            "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
             I., and C. Perkins, July 2010. Table 3 Important
             Settings."
      ::= { dymoResponsibleAddrEntry 2 }

      dymoResponsibleAddr  OBJECT-TYPE
         SYNTAX      InetAddress
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
            "The destination IP address of this route. The type
             of this address is determined by the value of the
             dymoResponsibleAddrType object."
         REFERENCE
            "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
             I., and C. Perkins, July 2010. Table 3 Important
```

```
         Settings."
::= { dymoResponsibleAddrEntry 3 }

dymoResponsibleAddrPrefixLen  OBJECT-TYPE
   SYNTAX      InetAddressPrefixLength
   MAX-ACCESS  read-create
   STATUS      current
   DESCRIPTION
      "Indicates the number of leading one bits that form the
       mask to be logical-AND'd with the destination address
       before being compared to the value in the dymoResonsibleAddr
       field."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 3 Important
       Settings."
::= { dymoResponsibleAddrEntry 4 }

dymoResponsibleAddrRowStatus  OBJECT-TYPE
   SYNTAX      RowStatus
   MAX-ACCESS  read-create
   STATUS      current
   DESCRIPTION
      "This object permits management of the table
       by facilitating actions such as row creation,
       construction, and destruction. The value of
       this object has no effect on whether other
       objects in this conceptual row can be
       modified."
::= { dymoResponsibleAddrEntry 5 }


--
-- dymoStateGroup
--
--    Contains information describing the current state of the DYMO
--    process such as the DYMO routing table.
--

dymoStateGroup  OBJECT IDENTIFIER ::= { dymoMIBObjects 2 }

dymoCurrentSeqNum  OBJECT-TYPE
   SYNTAX      Unsigned32 (1..65535)
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
      "The current DYMO sequence number. The DYMO sequence
       numbers allow nodes to judge the freshness of routing
       information and ensures loop freedom. If the sequence
```

```
      number has been assigned to be the largest possible
      number representable as a 16-bit unsigned integer
      (i.e., 65,535), then the sequence number is set to
      256 when incremented.  Setting the sequence number
      to 256 allows other nodes to detect that the number
      has rolled over and the node has not lost its sequence
      number (e.g., via reboot)."
::= { dymoStateGroup 1 }


--
-- DYMO Routing Table
--

dymoRoutingTable  OBJECT-TYPE
   SYNTAX       SEQUENCE OF DymoRoutingEntry
   MAX-ACCESS   not-accessible
   STATUS       current
   DESCRIPTION
      "The DYMO Routing Table describes the
       current routing information learned
       via DYMO control messages."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
       I., and C. Perkins, July 2010. Table 2 Suggested
       Parameter Values."
::= { dymoStateGroup 2 }

dymoRoutingEntry  OBJECT-TYPE
   SYNTAX       DymoRoutingEntry
   MAX-ACCESS   not-accessible
   STATUS       current
   DESCRIPTION
      "The DYMO routing entry contains a
       piece of routing information for a
       particular set of addresses."
   INDEX { dymoRoutingIpAddrType,
           dymoRoutingIpAddr,
           dymoRoutingPrefixLen }
::= { dymoRoutingTable 1 }

DymoRoutingEntry ::=
   SEQUENCE {
      dymoRoutingIpAddrType
         InetAddressType,
      dymoRoutingIpAddr
         InetAddress,
      dymoRoutingPrefixLen
         InetAddressPrefixLength,
      dymoRoutingSeqNum
```

```
            Unsigned32,
        dymoRoutingNextHopIpAddrType
            InetAddressType,
        dymoRoutingNextHopIpAddress
            InetAddress,
        dymoRoutingNextHopInterface
            InterfaceIndexOrZero,
        dymoRoutingForwardingFlag
            TruthValue,
        dymoRoutingBrokenFlag
            TruthValue,
        dymoRoutingDist
            Unsigned32
        }

dymoRoutingIpAddrType  OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The routing table address IP address type."
    REFERENCE
       "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
        I., and C. Perkins, July 2010. Table 3 Important
        Settings."
::= { dymoRoutingEntry 1 }

dymoRoutingIpAddr  OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The routing table Inet IPv4 or IPv6 address."
    REFERENCE
       "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
        I., and C. Perkins, July 2010. Table 3 Important
        Settings."
::= { dymoRoutingEntry 2 }

dymoRoutingPrefixLen  OBJECT-TYPE
    SYNTAX      InetAddressPrefixLength
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "The prefix length. This is a decimal value that
        indicates the number of contiguous, higher-order
        bits of the address that make up the network
        portion of the address."
    REFERENCE
```

```
           "Dynamic MANET On-demand (DYMO) Routing, Chakeres,
            I., and C. Perkins, July 2010. Table 3 Important
            Settings."
   ::= { dymoRoutingEntry 3 }

   dymoRoutingSeqNum  OBJECT-TYPE
      SYNTAX       Unsigned32 (1..65535)
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "The interface sequence number. This
          is the DYMO SeqNum associated with this
          routing information."
   ::= { dymoRoutingEntry 4 }

   dymoRoutingNextHopIpAddrType OBJECT-TYPE
      SYNTAX       InetAddressType
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "The IP address type of the next hop."
      ::= { dymoRoutingEntry 5 }

   dymoRoutingNextHopIpAddress OBJECT-TYPE
      SYNTAX       InetAddress
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "The IP address of the next hop."
      ::= { dymoRoutingEntry 6 }

   dymoRoutingNextHopInterface OBJECT-TYPE
      SYNTAX       InterfaceIndexOrZero
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "The interface ifIndex for sending
          packets toward the destination route
          address."
      ::= { dymoRoutingEntry 7 }

   dymoRoutingForwardingFlag OBJECT-TYPE
      SYNTAX       TruthValue
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "The Forwarding Flag indicates whether
          this route can be used for forwarding
          data packets. A value 'true(1)'
```

```
         indicates that this route is being used
         for forwarding of data packets, while
         a value 'false(2)' indicates that it is
         not being used for forwarding."
   ::= { dymoRoutingEntry 8 }

dymoRoutingBrokenFlag OBJECT-TYPE
   SYNTAX       TruthValue
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
      "The Broken Flag indicates whether
       this Route is broken.  This flag is set
       if the next-hop becomes unreachable or
       in response to processing a RERR. A value
       'true(1)' indicates that this route is
       broken, while a value 'false(2)'
       indicates that it is not broken."
   ::= { dymoRoutingEntry 9 }

dymoRoutingDist OBJECT-TYPE
   SYNTAX       Unsigned32 (0..65535)
   UNITS        "hops"
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
      "The distance to the destination address's
       DYMO router. This is a metric of the
       distance a message or piece of information
       has traversed. The minimum value of distance
       is the number of IP hops traversed. The
       maximum value is 65,535.

       This parameter is an optional field in the
       DYMO routing table.  If the DYMO Route.Dist
       is not supported by this device, then this
       object should be set to '0'."
   REFERENCE
      "Dynamic MANET On-demand (DYMO) Routing,
       Chakeres, I., and C. Perkins, April
       2008. Section 3 Terminology."
   ::= { dymoRoutingEntry 10 }




--
-- DYMO Performance Group (Performance Management)
--
```

```
--     Contains objects which help to characterize the
--     performance of the DYMO process, typically statistics
--     counters. There are two types of DYMO statistics:
--     global counters and per interface counters.
--

dymoPerformanceGroup  OBJECT IDENTIFIER ::= { dymoMIBObjects 3 }

dymoGlobalPerfGroup  OBJECT IDENTIFIER ::= { dymoPerformanceGroup 1 }

dymoRreqOriginated  OBJECT-TYPE
   SYNTAX      Counter32
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
      "A counter of the number of
       RREQ messages that this DYMO
       device has initiated."
::= { dymoGlobalPerfGroup 1 }

dymoRreqForwarded  OBJECT-TYPE
   SYNTAX      Counter32
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
      "A counter of the number of
       RREQ messages that this DYMO
       device has forwarded, i.e., this
       device neither originated or
       terminated the RREQ message."
::= { dymoGlobalPerfGroup 2 }

dymoRreqReceived  OBJECT-TYPE
   SYNTAX      Counter32
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
      "A counter of the number of
       RREQ messages that this DYMO
       device has received as the
       target of the message."
::= { dymoGlobalPerfGroup 3 }

dymoRrepOriginated  OBJECT-TYPE
   SYNTAX       Counter32
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
      "A counter of the number of
```

```
                RREP messages that this DYMO
                device has initiated."
    ::= { dymoGlobalPerfGroup 4 }


    dymoRrepForwarded  OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "A counter of the number of
             RREP messages that this DYMO
             device has forwarded, i.e, this
             device neither originated or
             terminated the RREP message."
    ::= { dymoGlobalPerfGroup 5 }


    dymoRrepReceived   OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "A counter of the number of
             RREP messages that this DYMO
             device has received as the
             target of the message."
    ::= { dymoGlobalPerfGroup 6 }


    dymoRrerOriginated  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "A counter of the number of
             RRER messages that this DYMO
             device has initiated."
    ::= { dymoGlobalPerfGroup 7 }


    dymoRrerForwarded  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "A counter of the number of
             RRER messages that this DYMO
             device has forwarded, i.e., this
             device neither originated or
             terminated the RRER message."
    ::= { dymoGlobalPerfGroup 8 }
```

```
dymoRrerReceived  OBJECT-TYPE
   SYNTAX      Counter32
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
      "A counter of the number of
       RRER messages that this DYMO
       device has received as the
       target of the message."
::= { dymoGlobalPerfGroup 9 }


--
-- Per DYMO Interface Performance Table
--

dymoInterfacePerfGroup OBJECT IDENTIFIER ::= {dymoPerformanceGroup 2}

dymoInterfacePerfTable OBJECT-TYPE
   SYNTAX      SEQUENCE OF DymoInterfacePerfEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
      "The DYMO Interface Performance Table
       describes the DYMO statistics per
       interface."
::= { dymoInterfacePerfGroup 1 }

dymoInterfacePerfEntry OBJECT-TYPE
   SYNTAX      DymoInterfacePerfEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
      "The DYMO Interface Performance entry
       describes the statistics for a particular
       DYMO interface."
   INDEX { dymoIfPerfIfIndex }
::= { dymoInterfacePerfTable 1 }

DymoInterfacePerfEntry ::=
   SEQUENCE {
      dymoIfPerfIfIndex
         InterfaceIndexOrZero,
      dymoIfRreqOriginated
         Counter32,
      dymoIfRreqForwarded
         Counter32,
      dymoIfRreqReceived
         Counter32,
      dymoIfRrepOriginated
```

```
                        Counter32,
                dymoIfRrepForwarded
                    Counter32,
                dymoIfRrepReceived
                    Counter32,
                dymoIfRrerOriginated
                    Counter32,
                dymoIfRrerForwarded
                    Counter32,
                dymoIfRrerReceived
                    Counter32
                    }

        dymoIfPerfIfIndex  OBJECT-TYPE
            SYNTAX      InterfaceIndexOrZero
            MAX-ACCESS  not-accessible
            STATUS      current
            DESCRIPTION
               "The ifIndex for this DYMO interface
                that is collecting this set of
                performance management statistics."
        ::= { dymoInterfacePerfEntry 1 }

        dymoIfRreqOriginated  OBJECT-TYPE
            SYNTAX      Counter32
            MAX-ACCESS  read-only
            STATUS      current
            DESCRIPTION
               "A counter of the number of
                RREQ messages that this DYMO
                interface has initiated."
        ::= { dymoInterfacePerfEntry 2 }

        dymoIfRreqForwarded  OBJECT-TYPE
            SYNTAX      Counter32
            MAX-ACCESS  read-only
            STATUS      current
            DESCRIPTION
               "A counter of the number of
                RREQ messages that this DYMO
                interface has forwarded, i.e., this
                interface neither originated nor
                terminated the RREQ message."
        ::= { dymoInterfacePerfEntry 3 }

        dymoIfRreqReceived  OBJECT-TYPE
            SYNTAX      Counter32
            MAX-ACCESS  read-only
            STATUS      current
```

```
         DESCRIPTION
            "A counter of the number of
             RREQ messages that this DYMO
             interface has received as the
             target of the message."
      ::= { dymoInterfacePerfEntry 4 }

      dymoIfRrepOriginated  OBJECT-TYPE
         SYNTAX        Counter32
         MAX-ACCESS    read-only
         STATUS        current
         DESCRIPTION
            "A counter of the number of
             RREP messages that this DYMO
             interface has initiated."
      ::= { dymoInterfacePerfEntry 5 }

      dymoIfRrepForwarded  OBJECT-TYPE
         SYNTAX        Counter32
         MAX-ACCESS  read-only
         STATUS        current
         DESCRIPTION
            "A counter of the number of
             RREP messages that this DYMO
             interface has forwarded, i.e., this
             interface neither originated nor
             terminated the RREP message."
      ::= { dymoInterfacePerfEntry 6 }

      dymoIfRrepReceived   OBJECT-TYPE
         SYNTAX        Counter32
         MAX-ACCESS    read-only
         STATUS        current
         DESCRIPTION
            "A counter of the number of
             RREP messages that this DYMO
             interface has received as the
             target of the message."
      ::= { dymoInterfacePerfEntry 7 }

      dymoIfRrerOriginated  OBJECT-TYPE
         SYNTAX        Counter32
         MAX-ACCESS    read-only
         STATUS        current
         DESCRIPTION
            "A counter of the number of
             RRER messages that this DYMO
             interface has initiated."
      ::= { dymoInterfacePerfEntry 8 }
```

```
dymoIfRrerForwarded  OBJECT-TYPE
   SYNTAX       Counter32
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
      "A counter of the number of
       RRER messages that this DYMO
       interface has forwarded, i.e., this
       interface neither originated nor
       terminated the RRER message."
::= { dymoInterfacePerfEntry 9 }

dymoIfRrerReceived  OBJECT-TYPE
   SYNTAX       Counter32
   MAX-ACCESS  read-only
   STATUS       current
   DESCRIPTION
      "A counter of the number of
       RRER messages that this DYMO
       interface has received as the
       target of the message."
::= { dymoInterfacePerfEntry 10 }




--
-- Notifications
--

dymoMIBNotifControl OBJECT IDENTIFIER ::= { dymoMIBNotifications 1 }
dymoMIBNotifObjects OBJECT IDENTIFIER ::= { dymoMIBNotifications 2 }

-- dymoMIBNotifControl

dymoSetNotification OBJECT-TYPE
      SYNTAX       OCTET STRING (SIZE(4))
      MAX-ACCESS  read-write
      STATUS       current
      DESCRIPTION
         "A 4-octet string serving as a bit map for
          the notification events defined by the DYMO
          notifications. This object is used to enable
          and disable specific DYMO notifications where
          a 1 in the bit field represents enabled. The
          right-most bit (least significant) represents
          notification 0.

          This object is persistent and when written
```

```
              the entity SHOULD save the change to
              non-volatile storage.
              "
          ::= { dymoMIBNotifControl 1 }


-- dymoMIBNotifObjects

dymoInstanceAdminStatusChange  NOTIFICATION-TYPE
   OBJECTS     { dymoInstanceAdminStatus,
                  dymoInstanceDid
               }
   STATUS      current
   DESCRIPTION
      "This notification is generated when the
       administrative status of a DYMO process changes."
::= { dymoMIBNotifObjects 1 }

dymoInterfaceAdminStatusChange  NOTIFICATION-TYPE
   OBJECTS     { dymoIfAdminStatus }
   STATUS      current
   DESCRIPTION
      "This notification is generated when the
       administrative status of a DYMO interface changes."
::= { dymoMIBNotifObjects 2 }

dymoResponsibleAddrEntryChange  NOTIFICATION-TYPE
   OBJECTS     { dymoResponsibleAddrRowStatus }
   STATUS      current
   DESCRIPTION
      "This notification is generated when the status
       of an entry in the DYMO Responsible Address
       Table changes. This includes the creation or
       deletion of a row."
::= { dymoMIBNotifObjects 3 }

--
-- Compliance Statements
--

dymoCompliances  OBJECT IDENTIFIER ::= { dymoMIBConformance 1 }
dymoMIBGroups    OBJECT IDENTIFIER ::= { dymoMIBConformance 2 }

dymoBasicCompliance  MODULE-COMPLIANCE
   STATUS current
   DESCRIPTION "The basic implementation requirements for
                managed network entities that implement
                the DYMO routing protocol."
   MODULE  -- this module
   MANDATORY-GROUPS { dymoConfigObjectsGroup }
```

```
            ::= { dymoCompliances 1 }

dymoFullCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION "The full implementation requirements for managed
                 network entities that implement the DYMO routing
                 protocol."
    MODULE  -- this module
    MANDATORY-GROUPS { dymoConfigObjectsGroup,
                       dymoStateObjectsGroup,
                       dymoPerfObjectsGroup,
                       dymoNotifObjectsGroup,
                       dymoNotificationGroup }
    ::= { dymoCompliances 2 }

--
-- Units of Conformance
--

dymoConfigObjectsGroup OBJECT-GROUP
    OBJECTS {
            dymoInstanceAdminStatus,
            dymoInstanceDid,
            dymoInstanceRowStatus,
            dymoMaxHopLimit,
            dymoRouteTimeout,
            dymoRouteAgeMinTimeout,
            dymoRouteSeqnumAgeMaxTimeout,
            dymoRouteUsedTimeout,
            dymoRouteDeleteTimeout,
            dymoRouteRreqWaitTime,
            dymoDiscoveryAttemptsMax,
            dymoUnicastMsgSentTimeout,
            dymoIfAdminStatus,
            dymoIfRowStatus,
            dymoResponsibleAddrType,
            dymoResponsibleAddr,
            dymoResponsibleAddrPrefixLen,
            dymoResponsibleAddrRowStatus
    }
    STATUS  current
    DESCRIPTION
       "Set of DYMO configuration objects implemented
        in this module."
    ::= { dymoMIBGroups 1 }

dymoStateObjectsGroup  OBJECT-GROUP
    OBJECTS {
            dymoCurrentSeqNum,
```

```
                    dymoRoutingSeqNum,
                    dymoRoutingNextHopIpAddrType,
                    dymoRoutingNextHopIpAddress,
                    dymoRoutingNextHopInterface,
                    dymoRoutingForwardingFlag,
                    dymoRoutingBrokenFlag,
                    dymoRoutingDist
            }
        STATUS  current
        DESCRIPTION
            "Set of DYMO state objects implemented
             in this module."
     ::= { dymoMIBGroups 2 }

    dymoPerfObjectsGroup  OBJECT-GROUP
        OBJECTS {
                    dymoRreqOriginated,
                    dymoRreqForwarded,
                    dymoRreqReceived,
                    dymoRrepOriginated,
                    dymoRrepForwarded,
                    dymoRrepReceived,
                    dymoRrerOriginated,
                    dymoRrerForwarded,
                    dymoRrerReceived,
                    dymoIfRreqOriginated,
                    dymoIfRreqForwarded,
                    dymoIfRreqReceived,
                    dymoIfRrepOriginated,
                    dymoIfRrepForwarded,
                    dymoIfRrepReceived,
                    dymoIfRrerOriginated,
                    dymoIfRrerForwarded,
                    dymoIfRrerReceived
            }
        STATUS  current
        DESCRIPTION
            "Set of DYMO statistic objects implemented
             in this module for performance management."
     ::= { dymoMIBGroups 3 }

    dymoNotifObjectsGroup OBJECT-GROUP
        OBJECTS {
            dymoSetNotification
        }
        STATUS  current
        DESCRIPTION
            "Set of DYMO notifications objects implemented
             in this module."
```

```
      ::= { dymoMIBGroups 4 }

   dymoNotificationGroup NOTIFICATION-GROUP
      NOTIFICATIONS {
         dymoInstanceAdminStatusChange,
         dymoInterfaceAdminStatusChange,
         dymoResponsibleAddrEntryChange
      }
      STATUS  current
      DESCRIPTION
         "Set of DYMO notifications implemented in this
          module."
   ::= { dymoMIBGroups 5 }

   END
```

---

8. Security Considerations

[TODO] Each specification that defines one or more MIB modules MUST
contain a section that discusses security considerations relevant to
those modules. This section MUST be patterned after the latest approved
template (available at http://www.ops.ietf.org/mib-security.html).
Remember that the objective is not to blindly copy text from the
template, but rather to think and evaluate the risks/vulnerabilities
and then state/document the result of this evaluation.
[TODO] if you have any read-write and/or read-create objects, please
include the following boilerplate paragraph.
There are a number of management objects defined in this MIB module
with a MAX-ACCESS clause of read-write and/or read-create. Such objects
may be considered sensitive or vulnerable in some network environments.
The support for SET operations in a non-secure environment without
proper protection can have a negative effect on network operations.
These are the tables and objects and their sensitivity/vulnerability:

   *[TODO] writable MIB objects that could be especially disruptive
    if abused MUST be explicitly listed by name and the associated
    security risks MUST be spelled out; RFC 2669 has a very good
    example.

   *[TODO] list the writable tables and objects and state why they
    are sensitive.

[TODO] else if there are no read-write objects in your MIB module, use
the following boilerplate paragraph.
There are no management objects defined in this MIB module that have a
MAX-ACCESS clause of read-write and/or read-create. So, if this MIB

module is implemented correctly, then there is no risk that an intruder can alter or create any management objects of this MIB module via direct SNMP SET operations.

[TODO] if you have any sensitive readable objects, please include the following boilerplate paragraph.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

* [TODO] you must explicitly list by name any readable objects that are sensitive or vulnerable and the associated security risks MUST be spelled out (for instance, if they might reveal customer information or violate personal privacy laws such as those of the European Union if exposed to unauthorized parties)

* [TODO] list the tables and objects and state why they are sensitive.

[TODO] discuss what security the protocol used to carry the information should have. The following three boilerplate paragraphs should not be changed without very good reason. Changes will almost certainly require justification during IESG review.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410] (Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework," December 2002.), section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

9. IANA Considerations

[TODO] In order to comply with IESG policy as set forth in http://
www.ietf.org/ID-Checklist.html, every Internet-Draft that is submitted
to the IESG for publication MUST contain an IANA Considerations
section. The requirements for this section vary depending what actions
are required of the IANA. see RFC4181 section 3.5 for more information
on writing an IANA clause for a MIB module document.
[TODO] select an option and provide the necessary details.
Option #1:

        The MIB module in this document uses the following IANA-assigned
        OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

        Descriptor   OBJECT IDENTIFIER value
        ----------   -----------------------

        sampleMIB { mib-2 XXX }

Option #2:
Editor's Note (to be removed prior to publication): the IANA is
requested to assign a value for "XXX" under the 'mib-2' subtree and to
record the assignment in the SMI Numbers registry. When the assignment
has been made, the RFC Editor is asked to replace "XXX" (here and in
the MIB module) with the assigned value and to remove this note.
Note well: prior to official assignment by the IANA, a draft document
MUST use place-holders (such as "XXX" above) rather than actual
numbers. See RFC4181 Section 4.5 for an example of how this is done in
a draft MIB module.
Option #3:
This memo includes no request to IANA.

---

10. Contributors   [TOC]

This MIB document uses the template authored by D. Harrington which is
based on contributions from the MIB Doctors, especially Juergen
Schoenwaelder, Dave Perkins, C.M.Heard and Randy Presuhn.

---

11. Acknowledgements   [TOC]

[TOC]

12. References

12.1. Normative References

[RFC2863]	McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB," RFC 2863, June 2000 (TXT).
[RFC3418]	Presuhn, R., "Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)," STD 62, RFC 3418, December 2002 (TXT).
[RFC4001]	Daniele, M., Haberman, B., Routhier, S., and J. Schoenwaelder, "Textual Conventions for Internet Network Addresses," RFC 4001, February 2005 (TXT).
[RFC2119]	Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," BCP 14, RFC 2119, March 1997 (TXT, HTML, XML).
[RFC2578]	McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIv2)," STD 58, RFC 2578, April 1999 (TXT).
[RFC2579]	McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2," STD 58, RFC 2579, April 1999 (TXT).
[RFC2580]	McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2," STD 58, RFC 2580, April 1999 (TXT).
[I-D.ietf-manet-dymo]	Chakeres, I. and C. Perkins, "Dynamic MANET On-demand (DYMO) Routing," draft-ietf-manet-dymo-21 (work in progress), July 2010 (TXT).

12.2. Informative References

[RFC3410]	Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework," RFC 3410, December 2002 (TXT).

Appendix A. Change Log

This section identifies the changes that have been made from draft-ietf-manet-dymo-mib-00 .

These changes were made from draft-ietf-manet-dymo-mib-00 to draft-ietf-manet-dymo-mib-01.

1. Only minor changes of a typographic nature, e.g., read-only to read-write on MAX_ACCESS clauses of a few configuration objects.

These changes were made from draft-ietf-manet-dymo-mib-01 to draft-ietf-manet-dymo-mib-02.

1. Added the ForwardingFlag and BrokenFlag objects to the DYMO Routing Table.

2. Added the TruthValue Textual Convention to handle the new Routing Table objects.

3. Added the DYMO device management model to the introductory sections of this draft.

4. General clean up of the introductory sections of this draft.

These changes were made from draft-ietf-manet-dymo-mib-02 to draft-ietf-manet-dymo-mib-03.

1. Minor changes to the textual material and added to the IMPORTS text in the introductory material.

2. Added DEFVAL clauses to all read-write configuration objects having default values identified in the DYMO specification.

These changes were made from draft-ietf-manet-dymo-mib-03 to draft-ietf-manet-dymo-mib-04.

1. Incorporated the DID into the Configuration Group by changing the dymoAdminStatus object to an Instance Table. This allows for the presence of multiple DYMO processes concurrent on the same router.

2. Added the dymoNotifObjectsGroup and its dymoSetNotifications object to allow for individual control of the DYMO Notifications. Updated the Conformance sections accordingly.

3. Renamed several of the Configuration Objects to be consistent with the naming within the current draft-ietf-manet-dymo-21.

Appendix B. Open Issues

This section contains the set of open issues related to the development and design of the DYMO-MIB. This section will not be present in the final version of the MIB and will be removed once all the open issues have been resolved.

1. Work on the Security Section. This MIB does have settable objects, but not sensitive objects (true?).

2. Work on the relationship to other MIBs, IF-MIB, NHDP-MIB.

3. Cleanup all the [TODOs] from the MIB template.

Appendix C.

```
****************************************************************
* Note to the RFC Editor (to be removed prior to publication) *
*                                                              *
* 1) The reference to RFCXXXX within the DESCRIPTION clauses   *
* of the MIB module point to this draft and are to be         *
* assigned by the RFC Editor.                                 *
*                                                              *
* 2) The reference to RFCXXX2 throughout this document point  *
* to the current draft-ietf-manet-dymo-xx.txt.  This          *
* need to be replaced with the XXX RFC number.                *
*                                                              *
****************************************************************
```

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